

3.0 Affected Environment

This chapter describes the existing conditions of the affected physical, natural, and human environments in the OTR Project Area. All maps referenced in this chapter are provided in Volume 4 of the FEIS.

In accordance with NEPA regulations, this chapter provides a baseline from which to understand the potential effects of the Proposed Action and alternatives analyzed in Chapter 4.0.

Each section of this chapter includes a description of the existing conditions and trends of the resource and relevant management considerations. In preparing the sections, resource specialists collected data from existing reports, consulted with various agencies and individuals, and conducted field investigations, as appropriate.

The term “Project Area” generally refers to the area encompassing the 42-mile stretch of the Arkansas River Canyon between Cañon City and Salida. This includes all jurisdictions along the river and adjacent US 50 and UPRR rail corridor that provide access to the river.

In many cases, individual resource “Analysis Areas” have been defined to better describe resource characteristics and areas of potential effect relevant to the proposed project. This term will be used to describe resource-specific study areas and will be determined on an individual resource basis. Some resources must consider areas outside the Project Area (such as air quality, transportation, and socioeconomics) when analyzing impacts. Some resources may vary in use of this term if a resource has a differing industry standard (e.g., Area of Potential Effect [APE] for cultural resources).

The analyzed resources are grouped and ordered as follows:

Biological Resources

- 3.1 Terrestrial Wildlife and Habitat
- 3.2 Avian Wildlife and Habitat
- 3.3 Aquatic Wildlife and Habitat
- 3.4 Wetlands, Floodplains, and Riparian Habitat
- 3.5 Vegetation and Plant Communities
- 3.6 Noxious Weeds and Invasive Species
- 3.7 Range Resources
- 3.8 Threatened, Endangered, and Sensitive Species

Physical Resources

- 3.9 Atmosphere, Air Resources, and Air Quality
- 3.10 Water Resources
- 3.11 Soil Resources
- 3.12 Geologic Substrate and Terrain

Other Resources

- 3.13 Environmental Justice/Protection of Children
- 3.14 Socioeconomics, Social Impacts
- 3.15 Public Health and Safety
- 3.16 Transportation and Traffic
- 3.17 Hazardous Materials

- 3.18 Waste (Nonhazardous)
- 3.19 Realty Authorizations and Land Use
- 3.20 Recreation Resources
- 3.21 Visual/Aesthetic Resources
- 3.22 Wild and Scenic Rivers
- 3.23 Wilderness and Special Management Areas
- 3.24 Sound Resources and Noise
- 3.25 Historic Properties and Native American Religious Concerns
- 3.26 Paleontological Resources

BIOLOGICAL RESOURCES

3.1 TERRESTRIAL WILDLIFE AND HABITAT

Terrestrial wildlife special status species, including Federally listed, BLM Sensitive, and Colorado State listed species, with potential to occur in the Project Area are addressed in detail in Section 3.1. Information on hunting and wildlife viewing activities is presented in Section 3.20, Recreation Resources.

Wildlife viewing is one of the fastest growing outdoor recreational activities in the U.S., and is an important activity for tourists and local residents along the Arkansas River between Cañon City and Salida. Hunting of game species is also an attraction to the area. Both of these activities have become economic staples for local communities.

The Project Area contains a diversity of terrestrial wildlife species. Each of these species has a relationship with the Arkansas River Canyon, which depends on a complex web of habitat functions to live, eat, mate, and raise young. Terrestrial species with potential to occur in the Project Area include, but are not limited to, large mammals such as bighorn sheep, mountain lions, black bears, mule deer, and elk; small mammals such as mice, voles, coyotes, gray fox, red fox, bobcats, beaver, weasels, cottontail rabbits, ground squirrels, and various bat species; and reptile and amphibian such as western rattlesnake, coachwhip, bull snake, prairie lizard, six-lined racerunner, great-plains skink, tiger salamander, northern leopard frog, Woodhouse's toad, and western chorus frog. Some of these species, such as black bears or coyotes, habituate to human activities and human food sources, while other species, such as bighorn sheep, are sensitive to or deterred by human activity. Habituation of wildlife species, such as black bears and coyotes, to humans is often negative, and may lead to increased human-wildlife conflicts.

Overall, the canyon is dominated by piñon-juniper woodland with a patchwork of mixed shrubland and grasslands on the varied terrain. The understory of the piñon-juniper woodland consists of Gambel oak (*Quercus gambelii*) and mountain mahogany (*Cercocarpus montanus*) on the dry shallow soils of hill slopes, with frankenia (*Frankenia jamesii*) and Bigelow sage brush (*Artemisia bigelovii*) on the Niobrara shale hogbacks (Neid 2007). The valley bottoms and other areas with deeper soils are comprised of grasslands. In addition to the upland plant communities, there is a narrow band of riparian and wetland vegetation that borders both sides of the Arkansas River. Section 3.5, Vegetation and Plant Communities, provides a complete description of vegetation cover types in the Project Area.

For the purpose of the terrestrial wildlife section, the Analysis Area is the US 50 corridor from Mile Marker (MM) 225 to 266, with a 2-mile buffer on either side.

3.1.1 Current Conditions and Trends

3.1.1.1 Large Mammals

Large mammal species occurring within the Analysis Area include bighorn sheep (*Ovis canadensis canadensis*), mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), mountain lion (*Felis concolor*), and black bear (*Ursus americanus*). Major large mammal migration corridors avoid this steep-walled canyon, but resident large mammals frequently traverse the Analysis Area to access resources within their ranges.

Wildlife crossings of US 50 to access the river or other resources present hazards for both wildlife and drivers. Animal Vehicle Collisions (AVCs) often go unreported, but available records in the Analysis Area include 51 incidents between 2000 and 2004; most of these are assumed to be mule deer. This data is likely a low estimate of the actual number of AVCs, but is indicative of where and when AVCs are likely to occur in the canyon. Of the 51 incidents, 34 occurred at night, 4 occurred during dawn hours, 9 occurred during the day, and 4 occurrence times are unlisted. Speeds ranged from 35 to 63 mph, with the majority (37) between 45 and 55mph. Of the 16 segments addressed in the 2008 CDOT report, 3 segments had AVCs as the largest cause of accidents, and 8 segments had AVCs as the second highest cause of accidents (Wilkinson 2008). A few specific areas were described by the National Diversity Information Source (NDIS 2006) as being particularly problematic, including a mule deer crossing area on the curve between MM 233.5 and 235.5 and a straight section between MM 241 and 242. There are also three recorded locations where bighorn sheep have been hit. There was a collision at MM 251.5 with a yearling ram, a mature ewe was hit at MM 245, and a pregnant ewe was hit at MM 245. This list is not inclusive of all bighorn sheep-motor vehicle accidents.

a. Bighorn Sheep

Known locally as “Bighorn Sheep Canyon,” the open, rocky landscape carved by the Arkansas River between Salida and Cañon City is prime habitat for bighorn sheep. The bighorn sheep is the Colorado state mammal, an economically important game species, and an important attraction for wildlife viewers visiting the area. A statewide decline in bighorn populations ended around 1970, at which time there were approximately 2,200 individuals. Since then, bighorn sheep in Colorado have rebounded to just below historic population estimates, for a total of approximately 7,000 individuals statewide (George et al. 2009). The trends in the Analysis Area reflect these statewide trends. All but extirpated from this part of Colorado, transplanted and supplemented herds in the Analysis Area have reached a stable population over the past 5 to 10 years (George et al. 2009). CDOW estimates there are 410 bighorn sheep in the Analysis Area at the present time (Aragon 2010). Bighorn sheep seasonal migrations tend to be short (Fitzgerald et al. 1994).

The open grasslands and steep topography, typical of the Analysis Area, is preferred habitat for the bighorn sheep. Grasses and sedges as well as shrubs constitute most of the bighorn sheep’s diet. Areas where piñon-juniper and scrub oak begin to dominate the vegetation have reduced habitat quality for bighorn sheep, both because the forage is less suitable and the closed canopy increases the chances of predation (Reed et al. 1994 as cited in J.F. Sato 2007).

Bighorn sheep generally rut in November through December, and lambing occurs in May through late June (Fitzgerald et al. 1994). Bighorn sheep are highly dependent on reliable water and typically stay within 2 miles of a water source; ewes with lambs tend to stay much closer to dependable water sources. (Geist 1971, Van Dyke et al. 1983 as cited in BLM 2001b; Leslie and Douglas 1980, McCarthy and Bailey

1994 as cited in BLM 2001b). The Analysis Area, especially the Three Rocks area near MM 259, the Cotopaxi area between MM 247 and 249, and the County Line area near MM 227, are considered optimal lambing range for the north herds (Boyd et al. 1986, Baker et al. 1999 as cited in J.F. Sato 2007). During the lambing season (May–June), watering areas are critical for lactating ewes and new lambs (Reed et al. 1994 as cited in J.F. Sato 2007).

Bighorn sheep in the Project Area are divided into four herds (George et al. 2009) (Map 3-1). Maps 3-2 through 3-13 show sheep count data at each panel site. These herds include the Grape Creek herd (S-49) southeast, Cotopaxi herd (S-68) southwest, Arkansas River herd (S-7) northeast, and Brown's Canyon herd (S-47) northwest. The Grape Creek herd (S-49) is a transplanted herd that has increased from 100 sheep in the mid-1980s to approximately 225 sheep presently. The Cotopaxi herd (S-68) is a transplanted herd started with 25 sheep in 1997, and has stabilized at approximately 60 sheep over the past 10 years. The Arkansas River herd (S-7) is a supplemented herd that had approximately 120 individuals in the mid-1980s, decreased in the early 1990s, rebounded in the late 1990s, and has now stabilized at approximately 85 animals. The Brown's Canyon herd (S-47) is a transplanted herd that has remained somewhat stable since the mid-1980s, ranging between 125 and 150 individuals (George et al. 2009, note: populations estimates are based on observations and harvest statistics).

GIS data of bighorn sheep observations have been collected by multiple sources and maintained by the BLM for the period 1998-2009 (BLM 2009g). These data show 640 of 720 mapped observation locations occurring between Parkdale (MM 266) and Five Points (MM 257). Although this may be partially due to bias in the observation patterns (observers not always driving the entire road up to the Fremont-Chaffee county line), this 9 miles of canyon appears to contain the highest concentration of bighorn in the Project Area. In an attempt to estimate the number of bighorn sheep in the Project Area, BLM observation data from Texas Creek to Parkdale was used. Data in other locations are incomplete and inappropriate for analysis. The data were queried by panel location and then analyzed for the high one-day counts within 1 mile of each panel location to estimate the upper limit of the number of sheep that may be potentially impacted at that location (Arapaho and Roosevelt National Forest 1997). Inherent bias in this analysis includes sheep moving from one location to another during the course of the year and may lead to an overestimation of the total number of animals involved. Also, data were collected by a variety of individuals and may have inherent observer bias of either over or underestimation. The high count results are as follows:

- 35 sheep at Three Rocks panels
- 15 at Maytag panels
- 27 at eastern Spikebuck panels
- 59 at western Spikebuck panels
- 36 at Texas Creek panels
- 49 at the Parkdale panels

Since these numbers most likely include counts of the same individuals at different locations at different times, it is not appropriate to add the counts and assume that the sum is the number of animals that would be affected at all panel sites. It can be said, however, that the Parkdale and western Spikebuck panels appear to have the greatest potential for negatively influencing bighorn sheep; while the Maytag panels appear to have the least potential.

The bighorn sheep on the south side of the Arkansas River (Grape Creek and Cotopaxi herds) have multiple alternative sources for water as well as other habitat features, such as open grassy areas further south, which give them alternative habitat away from US 50 and the Arkansas River. However, winter concentration areas and severe winter areas occur within the US 50 corridor from Parkdale to Texas Creek for the Grape Creek herd (NDIS 2009). Bighorn also utilize other various locations where they come to the river to drink. Some have been hit by vehicles on US 50 at or near these areas. Sightings of sheep are not uncommon at MM 254.3, where the Texas Creek panels are proposed (Woodruff 2009). This area is also near a frequently used informal recreational camping area. Between MM 264 and MM 264.5, sheep are seen during summer months using the area to the south of the highway. The Baker Gulch (MM 264), Spikebuck (MM 262), Sheep Basin (MM 260), and the areas around MM 243 and MM 246-248 have also had sightings recorded on the south side of the highway. There are a number of reported AVCs involving bighorn sheep on US 50 at MM 252.5, where a ewe with 2 lambs was hit June 6, 2008; at MM 254.5 on November 9, 2007; and MM 262 where a yearling ram was hit on April 16, 2005 (CDOW/BLM statewide vegetation cover GIS data). Presumably, these sightings and accidents are associated with sheep from the southern herds attempting to climb down to the Arkansas River.

The bighorn sheep on the north side of the Arkansas River are divided into a number of sub-herds. These include the Brown's Canyon herd, the County Line herd, the Badger Creek herd, and the Coaldale/County Line herd. These herds are transplanted herds. They have been brought in and occupy historical bighorn range within the canyon from which the sheep were previously extirpated. Historically, there has been some interchange among these herds, but this has not occurred in recent years. These herds are dependent on the water and habitat along the river within the Project Area. The north side of the Arkansas River in the Analysis Area lacks natural springs and perennial side creeks. The north herds use the Arkansas River as their primary water source, often in mid-morning to mid-afternoon (BLM 2000a). Alternative watering areas for the Arkansas River herd, such as springs, are present in East Cedar Gulch (MM 264.2), in the drainage above Sharks Tooth Rapids (MM 263.3), and near Big Hole (above MM 261-262). Unassociated with the Arkansas River, these areas are ephemeral, dependent on summer precipitation, and have high exposure to predation by mountain lions. Two apparent mountain lion kills were found in the spring of 1999, and reports of lions stalking sheep have been made near this area (Baker et al. 1999, Reed et al. 1994 as cited in J.F. Sato 2007).

The bighorn sheep within the Analysis Area on the north side are of paramount management concern for the BLM and CDOW. The population on the north side of the Analysis Area remains in or near the canyon on a year-round basis (Woodruff 2009). The current Brown's Canyon herd population (S-47) is a result of six transplants made between 1980 and 1990. This area was historically sheep habitat, but no sheep were known to occur in the area at the time of the transplants (CDOW 2008a). Within the Brown's Canyon herd (S-47) there are four sub-herds. Of these four, two sub-herds fall within the Project Area: County Line and Coaldale/Cotopaxi. The Brown's Canyon sub-herd northwest of Salida is not known to come into the Analysis Area. Interchange between the sub-herds has not been documented, except for one known transplanted animal that moved from the County Line sub-herd to the Badger Creek sub-herd. Reproduction is estimated to be low in the Badger Creek sub-herd and lab tests have shown the Badger Creek animals have had issues with disease (CDOW 2008a). The results of multiple bighorn sheep studies in Bighorn Sheep Canyon concur that the bighorn sheep population north of the Arkansas River in Bighorn Sheep Canyon is closely tied to the river corridor throughout the year, using the river banks daily to drink (Reed et al. 1994, Backstrand 1991, Baker et al. 1999).

The Arkansas River herd occurs most frequently between Texas Creek and the railroad siding at Parkdale (CDOW/BLM GIS data, Baker et al. 1999). Most sheep from this herd have been sighted in areas adjacent to suitable escape terrain (slopes steeper than 30° to 45°). Nearly 200 of the 500 observations that provided habitat descriptions recorded sheep on or near cliffs or steep terrain (CDOW/BLM GIS data, Baker et al. 1999 as cited in J.F. Sato 2007). The Arkansas River herd concentrates in the spring along the river's edge and the railroad tracks where there is high quality green forage (Carochi n.d.). Little-leaf mockorange and mountain mahogany also constitute a large part of the herd's diet in the Arkansas River Canyon (Reed et al. 1994 as cited in J.F. Sato 2007). Sheep winter concentration and severe winter areas occur from Parkdale to Texas Creek for both the Arkansas River herd and the County Line sub-herd of the Brown's Canyon herd (NDIS 2009).

Research is conclusive that stress, such as human contact, vehicles, dust, noise, and harassment on bighorn is a factor in their susceptibility to disease (Spraker et al. 1984). Stress has been measured in the canyon using heart rate monitors. In one instance in January 1999, a bighorn was observed at the river with a resting heart rate of 75 beats per minute (bpm). As humans on the opposite bank began to yell, wave arms, and whistle, the ewe stared back without a flight response, but her heart rate jumped to 85 bpm. With continued harassment (5 minutes) the ewe did not flee, but eventually had a heart rate raised to 120 bpm, showing that behavioral response is not necessarily an adequate measure of stress in bighorn (Baker et al. 1999). The added stress of increased human presence can cause an increase of steroid secretion from the adrenal cortex. High levels of steroids inhibit the inflammatory process, in turn resulting in susceptibility to bacterial pathogens. This, in concert with added dust in the air, can collectively contribute to upper and lower respiratory infections producing pneumonia (Spraker et al. 1984). Bighorn sheep are also susceptible to lungworm infestation, transmitted via larvae in feces. Lungworm infestation can add additional stress to the heart muscle and degrade the sheep's general viability.

Other disturbance effects include collisions with vehicles and trains (see previous AVC discussion). Three bighorn were reported to have been killed by trains in the early 1990s when the trains still operated in the canyon (Reed et al. 1994). The results of multiple studies concur that the bighorn sheep population north of the Arkansas River in Bighorn Sheep Canyon is closely tied to the river corridor throughout the year, without much room for dispersal from stressors (Reed et al. 1994, Backstrand 1991, Baker et al. 1999). In general, animals adapt to consistent predictable disturbance, and it is not known how well these sheep will habituate to stimuli that are infrequent and unpredictable (Baker et al. 1999 as cited in J.F. Sato 2007). A noise survey was conducted near Brown's Landing (near Parkdale) on June 24, 2006. In that survey researchers documented three kinds of background noise levels: (1) near the river with calm flow, (2) near the river with rapids, and (3) near US 50. Noise levels were lowest near the river with calm flows (55 decibels adjusted [dBA]), followed by near the highway (67.5 dBA), and the highest background levels were near the river with rapids (70 dBA). Noise levels increased to 64 dBA with calm flow or rapids, and to 80 dBA near the highway with vehicles driving past on US 50 (Hankard Environmental 2006 as cited in J.F. Sato 2007).

While, in general, bighorn sheep are notorious for being negatively affected by humans and by anthropogenic disturbances of any sort, the populations in the Analysis Area have been living and persisting in a very noisy and heavily human used environment for years. To some extent they appear to have habituated to the presence of noise produced by cars, motorcycles, trucks, rafts and rafters, fishermen, and other humans on foot. In summary, the bighorn sheep in the Analysis Area on the north side of the river are a primary concern for CDOW and BLM with or without additional stressors. It is

known that these herds are fairly isolated from augmentation from adjacent herds and isolated from water sources other than the Arkansas River.

b. Mule Deer

Mule deer are common in Colorado and occur statewide in a wide variety of habitats. Mule deer are nocturnal or crepuscular in warmer months, but are known to be more active during the day in winter. They are a migratory species ranging from a few kilometers (km) to over 80 km seasonally. In general they prefer meadows and forest edges in the warm seasons, and lower elevations and south-facing slopes in the winter. Mortality of deer is variable depending on age class. Fawn mortality is primarily due to starvation and predation, while older animal mortalities are split between winter starvation, annual harvest, and predation (Fitzgerald et al. 1994).

CDOW habitat maps for mule deer indicate there are winter concentration areas between Texas Creek and Coaldale on both sides of the river, near Parkdale south of the river, at West Creek (MM 235) on both sides of the river, at Wellsville on the north side of the river, and near County Line south of the river (Map 3-14). Severe winter range for mule deer also covers the majority of the north side of the river throughout the Analysis Area. Some patches also occur west of Texas Creek on the south side of the river (NDIS 2006). The entire Analysis Area is considered summer range and regular winter range for mule deer.

Mule deer utilize most of the habitats found in the Analysis Area, including the riparian zone, grassy meadows, upland shrub areas, and piñon-juniper habitats. Although mule deer can traverse steep rocky terrain, it is a less important habitat characteristic for deer than it is for the bighorn sheep. Two areas where deer frequently cross US 50 include Howard (from MM 233.5 to 235.5), and Coaldale (from MM 241 to 242.2) (NDIS 2006). Deer cross the highway in many other places as well, as indicated above in the AVC discussion.

Mule deer have patterns that change with the season and other factors, such as predator and human avoidance. Mule deer feed in the shrub or riparian areas during crepuscular hours in the early to late evening and in the early morning hours. During other times of day and night, mule deer are likely to spend time away from the river corridor in the piñon-juniper uplands.

c. Elk

Common to the western two-thirds of Colorado as well as pockets of eastern Colorado, elk are a large species of deer native to Colorado. In general, elk are nocturnal or crepuscular, but are known to be more active during the day in areas without disturbance. They favor steep slopes of 15% to 30%. Mortality of elk in Colorado is split relatively evenly between calve starvation, annual harvest, and predation (Fitzgerald et al. 1994). Elk are uncommon along the riparian corridor in the canyon. Elk occur in the forested and open grassy habitats at the higher elevations of the Analysis Area to the south, west, and north of the Project Area. The overall NDIS elk habitat map shows Bighorn Sheep Canyon as an extension of nonhabitat for elk branching up from the eastern plains. However, the canyon is surrounded on three sides by fairly important elk production areas, winter concentration, and severe winter areas in close proximity, but slightly higher elevations above the river (Map 3-15). Elk habitat occurs fairly close to US 50 on the south side of the Project Area and 1 to 2 miles from the Project Area on the north side. There are no identified areas of elk crossings on US 50 within the Analysis Area. Outside of the Analysis Area, an elk migration corridor is located approximately 6 miles to the south (NDIS 2006).

d. Mountain Lion

Mountain lion are common throughout the Project Area (Map 3-16). The habitat in the Analysis Area, specifically, consists primarily of canyon country associated with piñon-juniper woodlands. This is considered to be preferred habitat for mountain lion in Colorado (Fitzgerald et al. 1994). Mountain lion mainly prey on mule deer but also take bighorn sheep, elk, and other small mammals that are available (Fitzgerald et al. 1994, NDIS 2006). Mountain lion are primarily nocturnal mammals and likely use the river corridor for hunting, denning, and access to water. Two bighorn sheep were killed by lions in the spring of 1999 (Baker et al. 1999). There have been additional documented occurrences of sheep kills since that time (Backstrand 2010).

With a growing human presence in the foothills environment in Colorado, conflicts with lions are increasing. There are mountain lion conflict areas in Cañon City and in an area 4 to 6 miles south of Texas Creek (NDIS 2006). Human exploitation via legal and illegal harvest, as well as accidental death is the largest cause of mountain lion mortality (Fitzgerald et al. 1994).

e. Black Bear

Black bear are a common species in the Analysis Area (Map 3-16). Black bear are adaptable to almost any environment as long as food and cover are available (Fitzgerald et al. 1994). Denning in Colorado begins between October and December, and bears generally use rock cavities or dens dug under shrubs. Breeding occurs in June through August. Black bear summer concentration areas occur throughout the Analysis Area; the area west of Texas Creek and south of US 50 is considered a black bear fall concentration area (this fall concentration area is located outside of the Project Area). There are several documented bear/human conflict areas in the Analysis Area, but only one conflict area close to the Project Area (NDIS 2009). This conflict area is less than 0.5 mile from the proposed County Line panel installation at Bear Creek. Black bear are adaptable to living in proximity to humans and can become dependent on food sources associated with people, such as around campgrounds, garbage dumps, or garbage cans. In a more natural setting, bears are elusive and forage on what is seasonally available, such as grasses, forbs, berries, fruits, acorns, insects, small mammals, amphibians, young ungulates, and carrion. Two bears were killed crossing US 50, at MM 226.5 and MM 234.2 (J.F. Sato 2007), and additional collisions are known to have occurred between Salida and Cañon City.

3.1.1.2 Small and Medium-Size Mammals

Within both the Project and Analysis Areas, there are a number of small mammal species. These mammal species utilize a variety of habitats, including riparian areas, floodplains, and uplands for food, water, and shelter. Most species use all three zones to some extent. Many of these species are active nocturnally or during crepuscular hours. Many small to medium-size mammals inhabit, or potentially inhabit, the Project Area including, but not limited to, mice (*Peromyscus* spp., *Reithrodontomys* spp.), voles (*Microtus* spp.), Mexican woodrat (*Neotoma mexicana*), raccoon (*Procyon lotor*), ringtail (*Bassariscus astutus*), striped skunk (*Mephitis mephitis*), western spotted skunk (*Spilogale gracilis*), long-tailed weasel (*Mustela frenata*), mink (*Mustela vison*), beaver (*Castor canadensis*), bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), and coyote (*Canis latrans*) (EDAW field observations; Fitzgerald et al. 1994). During 2009 field surveys, potential river otter (*Lontra canadensis*) sign was observed. During surveys in the late 1990s, species documented at the rock quarry near Brown's Landing included northern pocket gopher (*Thomomys talpoides*), rock squirrel (*Spermophilus variegatus*), least chipmunk (*Neotamias minimus*), bushy tailed woodrat (*Neotoma cinerea*), and Nuttall's (or mountain) cottontail (*Sylvilagus nuttallii*) (EMS 1997 as cited in J.F. Sato 2007).

Bat species in the Analysis Area utilize the natural caves and mine shafts for colonial roosting and trees, and rock crevices for individual roosts. Bats also require flat water areas for drinking almost immediately after emergence from the roost and for feeding on insect hatches. Both drinking and feeding likely draws bats into the Project Area along the river. There are two known maternity roost sites for the Townsend's big-eared bat (*Plecotus townsendii*), a State Species of Concern and BLM sensitive species, in proximity to the County Line and Parkdale panel areas (Wertsbaugh 2009); see also Section 3.8, Threatened, Endangered, and Sensitive Species for more information. Other bat species that potentially occur in the canyon include, but are not necessarily limited to, western small-footed myotis (*Myotis ciliolabrum*), little brown myotis (*M. lucifugus*), fringed myotis (*M. thysanodes*), long-legged myotis (*M. volans*), long-eared myotis (*M. evotis*), hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*), and big brown bat (*Eptesicus fuscus*) (Fitzgerald et al. 1994).

Since its discovery in Albany, New York in 2006, white nose syndrome (WNS) has killed over one million bats and spread to 11 states (USFWS 2010). WNS is a genus of common kinds of soil fungus, *Geomyces*, and named after the white fungus that is evident on the bat's muzzle and wings. WNS is transmitted from bat to bat and inadvertently by humans. WNS has not yet reached Colorado, but signs have been reported as far west as Woodward County, Oklahoma (USFWS 2010). Little brown myotis is sustaining the largest numbers of deaths, but WNS is not limited to a single genus of bats (USFWS 2010).

Potential habitat for the Botta's pocket gopher (*Thomomys bottae*), a BLM sensitive species, may occur at Vallie Bridge, although the closest known population is lower in elevation near the town of Florence.

3.1.1.3 Reptiles and Amphibians

Several species of reptiles and amphibians are likely to inhabit the Analysis Area. Many of the reptile species primarily use upland habitats. However, in some areas there is a sharp transition from riparian to upland vegetation within a meter or less, creating opportunities to potentially find many of these snakes and lizards close to the river within the Project Area. Upland reptile species include, but are not necessarily limited to, eastern collared lizard (*Crotaphytus collaris*), short-horned lizard (*Phrynosoma hernandesi*), triploid Colorado checkered whiptail (*Cnemidophorus neotesselatus*), six-lined race runner (*Cnemidophorus sexlineatus*), smooth green snake (*Liochlorophis vernalis*), coachwhip (*Masticophis flagellum*), bull snake (*Pituophis melanoleucus*), plains garter snake (*Thamnophis radix*), western terrestrial garter snake (*Thamnophis elegans*), prairie rattlesnake (*Crotalus viridis*), and Corn snake (*Elaphe guttata*) (Hammerson 1999).

Amphibian species utilize a different set of resources than reptiles. The wetlands in the Analysis Area along the Arkansas River are limited by the steep terrain and ephemeral side drainages in the canyon. There are some locations, such as the perennial and seasonal ponds on the north side of the railroad, in the Analysis Area along the Arkansas River that flatten out enough to provide habitat for frogs, toads, and salamanders and to sustain breeding populations. Potential amphibians in the Analysis Area include, but are not limited to, northern leopard frog (*Rana pipiens*), Woodhouse's toad (*Bufo woodhouseii*), western chorus frog (*Pseudacris triseriata*), bullfrog (*Rana catesbeiana*), and tiger salamander (*Ambystoma tigrinum*) (Hammerson 1999). Within the Project Area, wetlands are even more limited by the fact that the project has purposefully selected areas with steep-sided banks to provide elevation for the cables over the water. Panel locations may support amphibian dispersal habitat but is not likely to support breeding sites. During surveys in July 2009, a dead bull snake was observed at MM 259. Other observed reptiles include a coachwhip on the north side of US 50.

3.1.2 Current Management Considerations

A summary of wildlife management plans and activities by species is provided in Table 3-1.

Table 3-1. Plans and Activities on Groups of Species

Species	Summary	Implications
Game Species	Data analysis unit (DAU) plans address each game species. Population size objectives and harvest limits. Annual regulations brochure has specific season details.	DAU plans addressing past and current wildlife population status as well as future projections can be used as a baseline for estimates to the potential disruption and the cumulative impacts to the game species that are managed in the canyon. See below for specific CDOW plan goals and objectives where available.
Action Decision Source Status Species Summary Implications		
Big Free-Tailed Bat	BLM sensitive. No known management or active projects.	Species listed as sensitive by the BLM are being assessed or tracked due to downward trends, small populations, or other ecological sensitivities. These species should be prioritized for minimizing and/or mitigating impacts during project construction and estimating/monitoring cumulative impacts in the future.
Bighorn Sheep	CDOW harvest regulations and ongoing research projects including radio-telemetry and a bait and treat program in Badger Creek (Aragon 2009).	It is unclear when these studies will take place during the proposed project timeline. Coordination with CDOW should be prioritized to limit conflict between the project and annual CDOW operations.
Black Bear	CDOW harvest regulations and ongoing research projects.	It is unclear when these studies will take place during the proposed project timeline. Coordination with CDOW should be prioritized to limit conflict between the project and annual CDOW operations.
Brown Trout	CDOW harvest regulations and ongoing research projects.	It is unclear when these studies will take place during the proposed project timeline. Coordination with CDOW should be prioritized to limit conflict between the project and annual CDOW operations. Thought should be given to the implications of fabric and/or other machinery or materials falling into or polluting the river ecosystem and/or disrupting CDOW operations.
Elk	CDOW harvest regulations, DAU report, and ongoing research projects.	It is unclear when these studies will take place during the proposed project timeline. Coordination with CDOW should be prioritized to limit conflict between the project and annual CDOW operations. "The Division of Wildlife adopted a population objective of 1,400 elk in 1987 for DAU E-27 (south of the Arkansas River). At that time the estimated post-season population was nearly 2,100 elk. Antlerless harvest has increased in recent years in an effort to reduce the population. The 2004 post-hunt population estimate is approximately 1,825 animals." This area has a mixed opinion on ideal herd size, with hunter's preferring to have the herd size managed for a 25% increase while ranchers would prefer a decrease in the herd to reduce competition with livestock on private lands (Allen Vitt 2005).
Fringed Myotis	BLM sensitive. No known management or active projects.	Species listed as sensitive by the BLM are being assessed or tracked due to downward trends, small populations, or other ecological sensitivities. These species should be prioritized for minimizing and/or mitigating impacts during the project construction and estimating/monitoring cumulative impacts in the future.

Species	Summary	Implications
Species Summary Implications		
Lynx	Federal Recovery Outline, ongoing research program (USFWS 2005; State Endangered)	Lynx studies take place primarily at higher elevations. Coordination with CDOW should be made if Lynx are tracked into the project vicinity to limit conflict between the project and CDOW operations.
Mountain Lion	CDOW harvest regulations, DAU report, and ongoing research projects.	Mountain lion are common in the canyon and coordination with CDOW should be made if lions are reported in the project vicinity to limit conflict between the project personnel/visitors and CDOW operations. The goal of the lion DAU plan for L-16 (3600 square mile area south of the Arkansas River) is "to maintain a rich, vegetative and wildlife community that is in balance with the available habitat, which will minimize game damage complaints and support a self sustaining mountain lion population. This DAU is being managed for a stable population." This area is estimated to have 225-302 mountain lions (Vitt 2004).
Mule Deer	CDOW harvest regulations, DAU report, and ongoing research projects, including a radio-telemetry survival study (Aragon 2009).	It is unclear when these studies will take place during the proposed project timeline. Coordination with CDOW should be prioritized to limit conflict between the project and annual CDOW operations. DAU D-16's "recommended alternatives are to manage for a post-season population objective of 16,000 to 20,000 deer with an observed post-season composition of 30 to 35 bucks/100 does. Public input supports these objectives and adequate habitat exists to support a population of this size." (Vayhinger 2007).
Northern Leopard Frog	Ongoing inventory in the Project Area (Aragon 2009).	It is unclear when these studies will take place during the proposed project timeline. Coordination with CDOW should be prioritized to limit conflict between the project and annual CDOW operations.
Species Summary Implications		
River Otter	State Recovery Plan (CDOW 2003a).	No applicable recommendations related to this project. If sightings in the Project Area are reported, steps to avoid impacts to the otter should be researched and coordinated with CDOW.
Southern Redbelly Dace	State endangered. This species occurs downstream from the Project Area near Pueblo and Chico Creek.	Applicable recommendations related to this project include maintaining downstream water quality and quantity. Thought should be given to the implications of fabric and/or other machinery or materials falling into or polluting the river ecosystem and/or disrupting downstream fish populations.
Texas Horned Lizard	BLM sensitive. No known management or active projects.	Species listed as sensitive by the BLM are being assessed or tracked due to downward trends, small populations, or other ecological sensitivities. These species should be prioritized for minimizing and/or mitigating impacts during the project construction and estimating/monitoring cumulative impacts in the future.
Townsend's Big Eared Bat	BLM sensitive, State Species of Concern. There are two known maternity roosts for this species in the project vicinity. Bats/Inactive Mines Program (BIMP) and CDOW conduct surveys and monitoring for Townsend's big-eared bats in this area.	Species listed as sensitive by the BLM are being assessed or tracked due to downward trends, small populations, or other ecological sensitivities. These species should be prioritized for minimizing and/or mitigating impacts during the project construction and estimating/monitoring cumulative impacts in the future.
Yuma Myotis	BLM sensitive. No known management or active projects.	Species listed as sensitive by the BLM are being assessed or tracked due to downward trends, small populations, or other ecological sensitivities. These species should be prioritized for minimizing and/or mitigating impacts during the project construction and estimating/monitoring cumulative impacts in the future.

3.1.2.1 Bureau of Land Management

BLM’s management objectives for terrestrial and avian wildlife and habitat include (Proposed RMP/Final EIS [BLM 1995]):

- Maintain and enhance wildlife habitat values.
- Conflicts between wildlife habitat and other uses, e.g. livestock grazing, mineral development, etc., will be resolved in favor of achieving vegetation management goals.

The associated management actions are presented in Table 3-2.

Table 3-2. Relevant Management Actions for Terrestrial and Avian Wildlife and Habitat

Management Action	Decision Source
All nongame wildlife is managed to be consistent with <i>Wildlife 2000</i> .	Proposed RMP/Final EIS (1995)– Planning Area Wide
In all vegetation manipulation areas, a Desired Plant Community (DPC) is determined.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Conflicts between wildlife habitat and other uses, e.g., livestock grazing, mineral development, etc., will be resolved in favor of achieving vegetation management goals.	1996 RMP ROD– Eco-Subregion 1 (Arkansas River), #1-16
Big game birthing habitat is limited in the following ways: closed to mineral entry, closed to mineral material disposal, OHV use is limited to designated trails and roads.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-17
Big-game birthing and critical winter habitat is avoided by major Rights-of-Way.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-18
Big game critical winter habitat with identified conflicts is addressed through cooperative efforts with Federal and state agencies and private groups, i.e., Colorado Habitat Partnership Program.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-19
Seasonal stipulations for the following habitats: Big game critical winter habitat (12/1 – 4/30) Big game birthing habitat (Varies by species) Elk calving and deer fawning habitat (4/16 – 6/30) Pronghorn antelope fawning (5/1 – 7/15) Bighorn sheep lambing (5/1 – 7/15) Wild turkey winter habitat (12/1 – 4/1)	Proposed RMP/Final EIS (1995), 1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-21 and #1-22
Maintain productive plant and animal communities of native and other desirable species at viable population levels.	Statewide Standards and Guides Amendment 1996

3.1.2.2 Colorado Division of Wildlife

CDOW manages wildlife throughout the State of Colorado. The mission of CDOW is to “protect, preserve, enhance, and manage the wildlife of Colorado for the use, benefit, and enjoyment of the people of Colorado and its visitors.” CDOW operates under the authority of the Colorado Wildlife Commission to enforce the state statutes and regulations concerning the harvest and management of wildlife, including waterfowl, big game, small game, and nongame species.

a. Habitat (Land) Based Plans and Activities

Two habitat partnership programs apply to the area affected by the proposal: (1) North of Arkansas River—Arkansas River Committee, and (2) South of Arkansas River—Sangre de Cristo Committee. Both plans aim to lessen conflict between big game and forage for livestock (Aragon 2009). These two partnership programs detail the current range management scenario in the canyon. There are no CDOW fee title properties falling within the Project Area, but CDOW has a seasonal lease for public fishing access on a SLB parcel just upstream of Parkdale. CDOW also has a perpetual fishing lease on a mixed private and BLM parcel between Vallie Bridge and Howard (Aragon 2009).

3.2 AVIAN WILDLIFE AND HABITAT

Avian wildlife species are abundant along the Arkansas River in both the Analysis Area and the Project Area. Since bats are not avian wildlife species, they are covered in Section 3.1, Terrestrial Wildlife and Habitat under the mammals discussion. The Project Area contains a wide variety of song birds, raptors, and waterfowl, some of which habituate to human activities while others are very sensitive to or deterred by human activity. Table 3-3 is a list of species known or expected to occur in the area. Map 3-17 shows recent avian observations in the Analysis Area; however, this map is not intended to be a comprehensive record of all avian species likely to occur in the Analysis Area.

For the purpose of the Avian Wildlife and Habitat section, the Analysis Area is the section of US 50 from MM 225 to 266 with a 2-mile buffer on either side. While some species, such as riparian nesters, may spend the majority of their time in the Project Area, the volant nature of bird species would suggest that a majority (if not all) species in the Analysis Areas will enter the Project Area at some point to feed, drink, or pass through. These species can be grouped into three major categories: raptors, passerines, and waterfowl/shorebird/wading bird/gull/pelicaniform. Raptors in the Analysis Area include golden eagle, peregrine falcon, prairie falcon, bald eagle, red-tailed hawk, and kestrel. Passerines found in the area include a wide variety of small and medium-size birds. Waterfowl and wading birds include ducks, geese, and sandpipers.

Table 3-3. Bird Observations in the Over the River Analysis Area

Common Name	Scientific Name	J.F. Sato Survey	Knorr Survey	EDAW Survey	BBA 2007*
Diurnal Raptors					
American kestrel	<i>Falco sparverius</i>	x			C(Ark)
American peregrine falcon	<i>Falco peregrinus anatum</i>			x	
golden eagle	<i>Aquila chrysaetos</i>	x			PR(PJ)
red-tailed hawk	<i>Buteo jamaicensis</i>	x		x x**	
sharp-shinned hawk	<i>Accipiter striatus</i>	x			PO(Kerr)
turkey vulture	<i>Cathartes aura</i>	x		x	PO(PJ)
osprey	<i>Pandion haliaetus</i>	x			
Passerines					
American dipper	<i>Cinclus mexicanus</i>	x			C(Ark)
American goldfinch	<i>Carduelis tristis</i>				PO(Ark)
American robin	<i>Turdus migratorius</i>				C(Ark)
bald eagle	<i>Haliaeetus leucocephalus</i>			x**	
barn swallow	<i>Hirundo rustica</i>	x	x	x	PO(Ark)
bell's vireo	<i>Vireo bellii</i>	x			
belted kingfisher	<i>Ceryle alcyon</i>	x		x	C(Ark)
Bewick's wren	<i>Thryomanes bewickii</i>		x		
black phoebe	<i>Sayornis nigricans</i>	x		x	PO(Ark)
black-billed magpie	<i>Pica hudsonia</i>	x		x	C(Ark)
black-capped chickadee	<i>Poecile atricapilla</i>	x		x	PR(Ham)
blue grosbeak	<i>Guiraca caerulea</i>	x			C(Ark)
blue-gray gnatcatcher	<i>Poliopitila caerulea</i>	x		x	C(PJ)
Brewer's blackbird	<i>Euphagus cyanocephalus</i>			x	C(Ark)
broad-tailed hummingbird	<i>Selasphorus platycercus</i>	x		x	C(Ark)
brown-headed cowbird	<i>Molothrus ater</i>			x	C(Ark)
Bullock's oriole	<i>Icterus bullockii</i>		x	x	C(Ark)
canyon wren	<i>Catherpes mexicanus</i>	x		x	PO(Ark)
cedar waxwing	<i>Bombycilla cedrorum</i>			x	
chipping sparrow	<i>Spizella passerina</i>	x	x	x	C(Ham)
Clark's nutcracker	<i>Nucifraga columbiana</i>	x	x		
cliff swallow	<i>Petrochelidon pyrrhonota</i>	x		x	C(Ark)
common grackle	<i>Quiscalus quiscula</i>				C(Ark)
common nighthawk	<i>Chordeiles minor</i>	x			C(PJ)
common raven	<i>Corvus corax</i>	x	x		PO(Ark)
Eurasian collared-dove	<i>Streptopelia decaocto</i>				PR(Ark)
European starling	<i>Sturnus vulgaris</i>				C(Ark)
gray flycatcher	<i>Empidonax wrightii</i>	x			C(PJ)
gray vireo	<i>Vireo vicinior</i>	x			
indigo bunting	<i>Passerina cyanea</i>				PR(Ark)
lark sparrow	<i>Chondestes grammacus</i>				C(Ark)
Lazuli bunting	<i>Passerina amoena</i>				PR(Ark)
lesser goldfinch	<i>Carduelis psaltria</i>	x	x	x	C(PJ)
Lewis' woodpecker	<i>Melanerpes lewis</i>	x			C(Ark)
mountain bluebird	<i>Siala currucoides</i>	x			C(PJ)
mourning dove	<i>Zenaida macroura</i>	x	x	x	C(PJ)
northern flicker	<i>Colaptes auratus</i>	x			PR(Ark)
orange-crowned warbler	<i>Vermivora celata</i>			x	

Common Name	Scientific Name	J.F. Sato Survey	Knorr Survey	EDAW Survey	BBA 2007*
palm warbler	<i>Dendroica palmarum</i>	x			
piñon jay	<i>Gymnorhinus cyanocephalus</i>	x			PO(PJ)
red-naped sapsucker	<i>Sphyrapicus nuchalis</i>			x	
rock dove	<i>Columbia livia</i>	x			PO(Ark)
rock wren	<i>Salpinctes obsoletus</i>	x	x	x	
rufous hummingbird	<i>Selasphorus rufus</i>	x			
rusty blackbird	<i>Euphagus carolinus</i>	x			
red-winged blackbird	<i>Agelaius phoeniceus</i>			x	C(Ark)
say's phoebe	<i>Sayornis saya</i>	x			C(Ham)
song sparrow	<i>Melospiza melodia</i>				PO(Ark)
spotted towhee	<i>Pipilo maculatus</i>	x		x	C(PJ)
Steller's jay	<i>Cyanocitta stelleri</i>			x	PO(Ham)
summer tanager	<i>Piranga rubra</i>	x			
Townsend's warbler	<i>Dendroica townsendi</i>		x		
vesper sparrow	<i>Pooecetes gramineus</i>	x			
violet-green swallow	<i>Tachycineta thalassina</i>	x		x	C(PJ)
western kingbird	<i>Tyrannus verticalis</i>	x			C(Kerr)
western meadowlark	<i>Sturnella neglecta</i>				C(Ark)
western scrub jay	<i>Aphelocoma californica</i>	x			C(PJ)
western tanager	<i>Piranga ludoviciana</i>	x	x	x	C(Ark)
western wood-peewee	<i>Contopus sordidulus</i>			x	C(Ham)
white-throated swift	<i>Aeronautes saxatalis</i>			x	
Williamson's sapsucker	<i>Sphyrapicus thyroideus</i>				PO(Ark)
yellow warbler	<i>Dendroica petechia</i>	x		x	C(Ark)
yellow-breasted chat	<i>Icteria virens</i>				PR(Ark)
yellow-rumped warbler	<i>Dendroica coronata</i>			x	PO(PJ)
Waterfowl/Shorebirds/Wading Birds/Gulls/Pelicaniformes					
common merganser	<i>Mergus merganser</i>			x**	C(Ark)
double-crested cormorant	<i>Phalacrocorax auritus</i>	x			
great blue heron	<i>Ardea herodias</i>		x	x**	
herring gull	<i>Larus argentatus</i>	x		x	
killdeer	<i>Charadrius vociferus</i>	x			PO(Ark)
sandpiper spp.	<i>Calidris spp.</i>	x		x	PR(Ark)
Canada goose	<i>Branta canadensis</i>	x		x	C(Ark)
mallard duck	<i>Anas platyrhynchos</i>	x	x		PR(Ark)
gadwall***	<i>Anas strepera</i>				
goldeneye***	<i>Bucephala spp.</i>				
teal***	<i>Anas crecca</i>				
Galliformes					
wild turkey***	<i>Meleagris gallopavo</i>				
Total # of Species = 78					

*The Colorado Breeding Bird Atlas classifies breeding in three ways; C = confirmed; PR = probable; PO = possible. See <http://bird.atlasing.org/Atlas/CO/> for detail descriptions of classifications. Ark = the Arkansas River 1 mile below and 2 miles above Vallie Bridge. Kerr (Kerr Gulch), Ham (Hamilton Creek), and PJ (piñon/juniper habitat) = a zone within 10 miles of Coaldale in these areas (Note: Not all Kerr, Ham, and PJ species are listed, only those found along the Arkansas River during one of the four surveys.)

**Winter Survey

***Source: Personal Communication, Gilbert 2011.

3.2.1 Current Conditions and Trends

3.2.1.1 Raptors

Raptor species that have been recorded nesting within the Analysis Area, either along the corridor or in the vicinity of the river, include the golden eagle, prairie falcon, American kestrel, and red-tailed hawk. Raptor species generally nest between March and July.

There are four golden eagle nests occurring within the vicinity of the Analysis Area. Of these four, only one golden eagle nest is located within the Analysis Area and within 60 meters of the Project Area at Vallie Bridge (J.F. Sato 2007). The Vallie Bridge golden eagle nest occurs on the cliffs just south of the highway and was active during the summer of 2009 (Moss 2009b). Three other golden eagle nests also occur: south of the highway approximately 2.25 miles southeast of the Parkdale panel area, 1.25 miles southwest of the Texas Creek panel area, and north of the river approximately 0.7 miles northeast of the Three Rocks panel area. The nest near Texas Creek was active in 2006 (Brekke 2006). More recent activity is unknown at these three nest locations. A nest from an unknown raptor species occurs 2 miles west of Texas Creek, as well.

Falcon nest sites near the Analysis Area include prairie falcon nests located approximately 2.25 miles northeast of the Tunnel panel area and 6 miles north of the Three Rocks panel area. A peregrine falcon nest site was recorded 3 miles north of the Three Rocks panel area, a location that is outside the Analysis Area (J.F. Sato 2007). A peregrine falcon was observed sitting on the cliffs a few hundred yards from the Project Area at MM 264.5 and soaring over the river at MM 261 on July 9, 2009. Other peregrine falcon nests in the region occur between Cañon City and Parkdale and near the Royal Gorge, 4.7 miles from the Parkdale panel area and 1.8 miles away from the Project Area.

Bald eagles and ospreys have been observed perching and feeding in the Analysis and Project Areas during winter, and during migrations in the spring and fall. Confirmed bald eagle roost trees occur 0.2, 1, and 1.1 miles upstream of the Tunnel panel area. Five confirmed bald eagle roost trees occur in proximity to the Vallie Bridge panel areas; of these, three occur within 0.3 to 0.5 miles downstream of the proposed panel location, one occurs 2 miles downstream of the proposed panel location, and one occurs 1.3 miles upstream of this panel location. There are 12 confirmed bald eagle roost trees 0.4 to 0.6 miles upstream of the Texas Creek Project Area (J.F. Sato 2007). Bald eagles are common winter residents on the river, often perching in large dead ponderosa pines within the Analysis and Project Areas. During 2010 AECOM winter surveys, 1 juvenile and 4 adult bald eagles were seen using the river. Bald eagle use of the corridor was documented by E. Brekke and B. Bibles during the winter of 2005–2006 (Brekke 2005, Brekke 2006 as cited in J.F. Sato 2007). Much of the bald eagle use in the river corridor occurs along private lands in the Howard, Coaldale, and Swissvale areas, where there are many large trees along the river (see map in Appendix D1, J.F. Sato 2007). High use areas were mapped and suitable perching trees were identified as confirmed or potential by BLM and CDOW (Map 3-18). Maps 3-19 through 3-28 show bald eagle habitat, use areas, and observations at each of the panel locations. In 2009, AECOM biologists conducted surveys to update existing BLM and CDOW suitable bald eagle perch data. A total of 39 confirmed perches and another 106 suitable perch trees were identified.

The bald eagle diet consists of approximately 56% fish, 28% injured waterfowl, and 14% small to medium-size mammals (Ark Ecological Services 2007). Bald eagles use and transit the area from Texas Creek to Parkdale. However, bald eagle use, as documented by field observations, is not as frequent between Texas Creek and Parkdale as it is between Coaldale and Howard. Bald eagle use along the Texas Creek to Parkdale highway corridor may be limited by the presence of fewer large trees. Bald eagle use

was documented within 0.4 mile of the Texas Creek Panels, and a flyover was documented directly above the Parkdale Panels during the 2010 AECOM winter surveys.

Bald eagles do not use the area from Texas Creek to Parkdale as much because the highway is so close to the river, there are few large trees for perching, and the river also runs quite fast in this reach. Bald eagles are usually in the river corridor from early December to the end of March. In a typical year, no more than 4 or 5 eagles winter along the river. The estimate of 4 or 5 eagles using the area was confirmed during the 2010 winter surveys. A bald eagle nest occurs approximately 8 miles northeast of the Analysis Area on Four-mile Creek (J.F. Sato 2007).

Other raptor species observed within the Arkansas River corridor of the Project Area include American kestrel, red-tailed hawk, sharp-shinned hawk, and turkey vulture (Table 3-3). The great-horned owl, western screech owl, northern saw-whet, and flammulated owl are likely to occur in the Project Area (Kingery 1998). Mexican spotted owl breeding occurs 7 to 10 miles to the northeast and southeast of the Project Area and is discussed in Section 3.8, Threatened, Endangered, and Sensitive Species (NDIS 2006). The 2007 Breeding Bird Survey confirmed breeding of the American kestrel along the Arkansas River near Vallie Bridge within the Analysis Area; confirmed breeding of Cooper's hawk up Hamilton Creek; and found possible breeding of sharp-shinned hawk up Kerr Gulch, great horned owl up Hamilton Creek, and turkey vulture and northern pygmy-owl in the piñon/juniper within 10 miles of Coaldale (Mitchell 2007). During surveys in July 2009, a red-tailed hawk was observed foraging 0.5 mile north of the river near MM 259, and whitewash from an unknown species was observed on a cliff near MM 230.3, north side of and 100 feet from the river.

3.2.1.2 Passerines

Many small and medium-size passerine bird species use both the Analysis and Project Areas. Riparian corridors are used by neotropical migrants, spring and summer breeders, and year-round residents. Some of these species, such as warblers, wrens, sparrows, and tanagers, nest in thick vegetation and will often move nest locations from year to year. Other species, such as dippers, swallows, and phoebes, also nest in the riparian corridor but have higher nest site fidelity. American dippers occupy at least four nest sites along the Arkansas River in the Analysis Area: one less than a mile upstream of the Texas Creek panel area, a second less than a mile downstream of the Vallie Bridge panel area, a third approximately 2 miles upstream of the Vallie Bridge panel area, and a fourth in a rock outcrop in the County Line section of the Project Area (J.F. Sato 2007). Colorado Bird Breeding Atlas behavior for dippers, including feeding young, was documented by Viera in June 2008 and again in June 2009 (Vieira 2009). The American dipper is a species that spends its entire life on fast-moving rivers and streams. Dippers are year-round residents that begin nest building as early as February, and nests can be occupied through August when chicks are fledged (Kingery 1998). Nests are built on cliffs, rocks, stream banks, or bridges. Dippers are aquatic invertebrate specialists (occasionally taking small fish) and spend much of their time standing on rocks in midstream and diving for prey (Kingery 1998). According to the Birds of North America, American dippers have high nest fidelity and will flee humans at distances of 15 to 50 meters.

Other bird species, such as the belted kingfisher, use the riverside vegetation and banks as feeding perches to hunt for small fish and use tree cavities for nest sites (Kingery 1998). Black phoebe is a species likely to nest along the river edge in the Project Area. This species has high nest fidelity, and human disturbance is noted as a significant cause of egg loss (Wolf 1997 as cited in Moss 2009a). Black phoebe nesting has been documented at Wellsville during the last three years and a potential nesting pair at Texas Creek (Moss 2009a). A juvenile black phoebe was observed during summer 2009 field

surveys and is evidence of possible nesting near MM 238.7. White-throated swift is a species that nests in rock cliffs and is noted for high-speed swooping dives while hunting (Kingery 1998).

White-throated swifts have been documented nesting near the Project Area (Moss 2009a). On a May 2009 visit, biologists observed a pair of swifts in their high speed diving and hunting maneuvers over the Arkansas River near MM 230 within the Tunnel panel area. It is probable that this pair was nesting on the south side of US 50 at this location.

Five species of swallows are documented in the Analysis Area: tree, violet-green, cliff, northern rough-winged, and barn swallows (Moss 2009a). These species nest in cliffs, bridges, and trees along the river; feed over the river; and drink on the wing by swooping over the surface (Kingery 1998). Swallow nests have been documented in the Project Area at MM 238.1 and MM 262.6. During the 2007 Breeding Bird Atlas surveys, Mitchell and Lundberg (2007) counted approximately 425 active cliff swallow nests on Vallie Bridge alone.

Other active passerine nests of note located during 2009 EDAW surveys include a cedar waxwing nest at MM 225.65, blue-grey gnatcatcher nest (raided by brown headed cowbird chick) at MM 230.3, and a Bullock's oriole nest at MM 254.6. Breeding confirmation was also documented for Canada goose, broad-tailed humming bird, belted kingfisher, black-billed magpie, northern rough-winged swallow, yellow warbler, western tanager, lark sparrow, blue grosbeak, red-winged blackbird, western meadowlark, brewer's blackbird, common grackle, brown-headed cowbird, and Bullock's oriole (Mitchell and Lundberg 2007). One invasive bird species, the European starling, is also a confirmed breeder near Vallie Bridge (Mitchell and Lundberg 2007). Much of the passerine activity in the Analysis Area is driven by habitat type. The four basic habitats include: riparian, grassland, shrubland, and piñon-juniper. The Arkansas Valley Audubon Society lists the following passerine birds as likely to occur in the Analysis Area:

- **Riparian habitat:** yellow warbler, yellow-rumped warbler, Bullock's warbler, blue grosbeak, warbling vireo, western wood-peewee, American robin, belted kingfisher, song sparrows, Lazuli bunting, yellow-breasted chat, house wren, cordilleran flycatcher, and black-billed magpie.
- **Grassland habitat:** mountain bluebird, western meadowlark.
- **Shrubland habitat:** Virginia's warbler, spotted towhee, and broad-tailed hummingbird.
- **Piñon-juniper habitat:** chipping sparrow, vesper sparrow, lark sparrow, black-headed grosbeak, lesser goldfinch, black-throated grey warbler, hepatic tanager, western tanager, canyon towhee, mountain chickadee, juniper titmouse, bushtit, white-breasted nuthatch, rock wren, canyon wren, blue-grey gnatcatcher, grey flycatcher, ash-throated flycatcher, Plumbeous vireo, western scrub-jay, piñon jay, Clark's nutcracker, American crow, and common raven. (Moss 2009).

3.2.1.3 Waterfowl/Shorebirds/Wading Birds/Gulls/Pelicaniformes

Waterfowl that occur in the Analysis Area include, but are not necessarily limited to, great blue heron, double-crested cormorant, mallard, common merganser, Canada goose, spotted sand piper, killdeer, and herring gulls. A common merganser with 14 young in tow was recorded along the shore of the river near Vallie Bridge (Mitchell and Lundberg 2007). These birds tend to spend most if not all of their time on the water edge, often preferring shallow margins and slow or ponded water. During a 2009 field visit, a flock of Canada geese were seen using the river corridor to fly upstream in the early morning. They flew at about 10 feet over the water surface following the river. Wading birds in the Project Area hunt along the shallow margins of water for small fish, invertebrates, and amphibians.

A previously undocumented great-blue heron rookery east of the Parkdale Quarry was recently reported by Setta Moss of the Arkansas Valley Audubon Society (AVAS). This heronry was first observed by the AVAS several years ago and has been reported as active over the past three years. The BLM has no data regarding its existence or historical activity, as it is not located on BLM property. The heronry is comprised of eight separate nests and is located in a small cottonwood grove on the north side of the railroad line adjacent to the Arkansas River, and is 0.71 miles to the east of the Parkdale panel area (Pers. Comm. Moss 2011).

3.2.2 Current Management Considerations

Management of avian species in the Project Area is primarily coordinated by CDOW, BLM, and U.S. Fish and Wildlife Service (USFWS). Relevant management guidelines and activities for groups of avian species are presented in Table 3-4.

Table 3-4. Plans and Activities on Groups of Species

Species	Summary	Implications
American Peregrine Falcon	State Guidelines and Federal Recovery Plan (CDOW Raptor Guidelines [CDOW 2008b] and USWFS 1983; State Species of Concern, Federally Delisted).	No surface occupancy (beyond that which historically occurred in the area) within 0.5-mile radius of active nests. Seasonal restriction to human encroachment within 0.5 mile of the nest cliff(s) from March 15 to July 31. Due to propensity to relocate nest sites, sometimes up to 0.5 mile along cliff faces, it is more appropriate to designate 'Nesting Areas' that encompass the cliff system and a 0.5-mile buffer around the cliff complex. (CDOW 2008b)
Bald Eagle	State Guidelines and Federal Recovery Plan (CDOW Raptor Guidelines 2008 and USWFS 1983; State Threatened, Federally Delisted but see Eagle Protection Act)	<p>The Bald Eagle Protection Act of 1940 provides for the protection of the bald eagle and golden eagle by prohibiting the taking of these species under penalty of federal law.</p> <p>Nest Site: No surface occupancy (beyond that which historically occurred in the area) within 0.25-mile radius of active nests. Seasonal restriction to human encroachment within 0.5-mile radius of active nests from October 15 through July 31. This closure is more extensive than the National Bald Eagle Management Guidelines (USFWS 2007) due to the generally open habitat used by Colorado's nesting bald eagles.</p> <p>Winter Night Roost: No human encroachment from November 15 through March 15 within 0.25-mile radius of an active winter night roost if there is no direct line of sight between the roost and the encroachment activities. No human encroachment from November 15 through March 15 within 0.5-mile radius of an active winter night roost if there is a direct line of sight between the roost and the encroachment activities. If periodic visits (such as oil well maintenance work) are required within the buffer zone after development, activity should be restricted to the period between 1000 and 1400 hours from November 15 to March 15.</p> <p>Hunting Perch: Diurnal hunting perches associated with important foraging areas should also be protected from human encroachment. Preferred perches may be at varying distances from human encroachment and buffer areas will vary. Consult CDOW for recommendations for specific hunting perches. (CDOW 2008b)</p>

Species	Summary	Implications
Golden Eagle	State Guidelines and Federal Recovery Plan (CDOW Raptor Guidelines 2008 and USWFS 1983; State Threatened, Federally Delisted but see Eagle Protection Act)	The Bald Eagle Protection Act of 1940 provides for the protection of the bald eagle and golden eagle by prohibiting the taking of these species under penalty of federal law. Nest Site: No surface occupancy (beyond that which historically occurred in the area) within 0.25-mile radius of active nests. Seasonal restriction to human encroachment within 0.5-mile radius of active nests from December 15 through July 15. (CDOW 2008b)
Lewis' Woodpecker	USFS Sensitive. Nest identified in Project Area. No known management or active projects.	Species listed as sensitive by the USFS are being assessed or tracked due to downward trends, small populations, or other ecological sensitivities. These species should be prioritized for minimizing and/or mitigating impacts during project construction and estimating/monitoring cumulative impacts in the future.
Osprey	State Guidelines (CDOW Raptor Guidelines 2008).	Nest Site: No surface occupancy (beyond that which historically occurred in the area) within 0.25-mile radius of active nests. Seasonal restriction to human encroachment within 0.25-mile radius of active nests from April 1 through August 31. Some osprey populations have habituated and are tolerant to human activity in the immediate vicinity of their nests. (CDOW 2008b)
Prairie Falcon	State Guidelines (CDOW Raptor Guidelines 2008).	Nest Site: No surface occupancy (beyond that which historically occurred in the area) within 0.5-mile radius of active nests. Seasonal restriction to human encroachment within 0.5-mile radius of active nests from March 15 through July 15. (CDOW 2008b)
Red-Tailed Hawk	State Guidelines (CDOW Raptor Guidelines 2008).	Nest Site: No surface occupancy (beyond that which historically occurred in the area) within 1/3 mile radius of active nests. Seasonal restriction to human encroachment within 1/3 mile radius of active nests from February 15 through July 15. Some members of this species have adapted to urbanization and may tolerate human habitation to within 200 yards of their nest. Development that encroaches on rural sites is likely to cause abandonment. (CDOW 2008b)

3.2.2.1 Bureau of Land Management

BLM’s management objectives for terrestrial and avian wildlife and habitat are included in the proposed RMP/Final EIS (BLM 1995); these objectives are shown in Table 3-5.

Table 3-5. Relevant Management Actions for Terrestrial and Avian Wildlife and Habitat

Management Action	Decision Source
All nongame wildlife is managed to be consistent with <i>Wildlife 2000</i> .	Proposed RMP/Final EIS (1995)– Planning Area Wide
In all vegetation manipulation areas, a Desired Plant Community (DPC) is determined.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Conflicts between wildlife habitat and other uses, e.g., livestock grazing, mineral development, etc., will be resolved in favor of achieving vegetation management goals.	1996 RMP ROD– Eco-Subregion 1 (Arkansas River), #1-16
No surface occupancy stipulation for raptor nest/fledgling habitat. Raptor nesting and fledgling habitat (3/1 – 7/31)	1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-20
Maintain productive plant and animal communities of native and other desirable species at viable population levels.	Statewide Standards and Guides Amendment 1996

3.2.2.2 Colorado Division of Wildlife

CDOW manages wildlife throughout the State of Colorado. The mission of CDOW is to “protect, preserve, enhance, and manage the wildlife of Colorado for the use, benefit, and enjoyment of the people of Colorado and its visitors.” CDOW operates under the authority of the Colorado Wildlife Commission to enforce state statutes and regulations concerning the harvest and management of wildlife, including waterfowl, big game, small game, and nongame species. As a part of CDOW’s management, the Colorado Wildlife Action Plan’s purpose is to “convey the state’s wildlife conservation needs in order to foster greater consistency in conservation efforts among all members of Colorado’s wildlife conservation community and others with a stake in Colorado wildlife conservation.” This plan details many of Colorado’s species and habitats and directs broad management guidelines and objectives (CDOW 2006).

Additionally, CDOW has established recommendations on buffer zones for raptor species that include seasonal restrictions for human activity (CDOW 2008b). The size of the buffer areas and the restriction periods vary with the species’ sensitivity to human intrusion and length of time for nesting and fledging. Those that apply to species in the Project Area are as follows:

- Bald eagle winter roost restriction is a 0.25-mile radius between November 15 and March 15. A larger buffer of 0.5-mile radius is recommended if there is a direct line of sight from the roost to the activities. Approximately 40 roost trees have been identified that are regularly used by bald eagles in the winter. These trees are located between Texas Creek and Wellsville, but are largely concentrated between Texas Creek and Cotopaxi.
- Golden eagle nest site restrictions are recommended within a 0.5-mile radius of a nest site from December 15 to July 15. Such restrictions would apply to work in the Vallie Bridge area, and possibly in the Texas Creek Staging Area and the Three Rocks area. More precise nest site locations are necessary to determine if the staging area and Three Rocks area are within the buffer area.

- Peregrine falcon buffer area restrictions are similar to the golden eagle at a 0.5-mile radius, but the seasonal restrictions are March 15 to July 31. No known nest sites are close enough to any project areas where buffers for this species would be required.
- Red-tailed hawk nest site restrictions apply within a 1/3-mile radius, but the seasonal restrictions are February 15 through July 15.

3.2.2.3 Migratory Bird Treaty Act

Passerine birds as well as raptors and all other migratory birds native to the United States and territories are managed under the MBTA of 1918. The MBTA protects nest sites for native migratory birds and further establishes a federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird." The USFWS has the authority to enforce the unlawful taking of migratory birds. CDOW wildlife officers also have the authority to enforce provisions of the MBTA under a formal Memorandum of Agreement (MOA) with the USFWS, Office of Law Enforcement (Pers. Comm. Gordon 2010).

3.3 AQUATIC WILDLIFE AND HABITAT

Aquatic biology resources include fish, invertebrates, plants, amphibians, and aquatic reptiles (turtles) and their habitat in the Arkansas River. The resource-specific study area for aquatic biology resources includes the 42-mile section of the Arkansas River between Salida and Cañon City. This portion of the Arkansas River supports a high quality trout fishery, which is an important component of the local economy and recreational resources. Aquatic communities are also important components of the ecological processes of the river (i.e., photosynthesis, decomposition, and food web dynamics). Some aquatic communities, such as macroinvertebrates and attached algae, are used as indicators of water quality conditions (Barbour et al. 1997).

3.3.1 Current Conditions and Trends

The following information describes the current conditions and trends for aquatic communities (fish, macroinvertebrates, and attached algae) and their habitat.

3.3.1.1 Habitat

The Arkansas River between Cañon City and Salida is a coldwater mountain stream. The BLM and CDOW characterized aquatic habitat in this section of the Arkansas River as part of the *Arkansas River Water Needs Assessment* (Bridges et al. 2000). Four habitat types were described between Salida and Cañon City, as described below. Overall, habitat type 3 (described in bullet 3) covered the largest linear distance within this portion of the Arkansas River.

- Deep pools, moderate gradient, narrow widths, and large boulder substrate, with the Browns Canyon segment being typical of this habitat type;

- Low gradient, wide, moderate depth riffles, cobble substrate and islands, with the segment between Coaldale and Howard being typical of this habitat type;
- Moderate gradient, medium boulder and cobble substrate, moderate widths, and pocket water, with the Texas Creek to Coaldale and Howard to Salida segments and a small section at Parkdale being typical of this habitat type; and
- Stair-stepped, fast water flowing into deep runs, substrate small to medium boulders and moderate widths, which is typical for the Parkdale to Texas Creek segment.

Specific habitat information for the proposed panel locations was obtained during a field survey conducted by AECOM on May 6 and 7, 2009. In total, 17 habitat reaches were selected to characterize the panel locations (Table 3-6). One to three reaches were selected per area, with each reach being approximately 300 feet in length. The estimated stream width ranged from approximately 50 to 130 feet, with an average width of 80 feet. In general, habitat in most of the reaches was dominated by riffles and runs. However, pool habitat was the most abundant type in several of the panel locations, such as Spikebuck and Tunnel. The type of fish cover in the reaches mostly consisted of scattered boulders, larger submerged substrates, and depth. Turbulence cover was present in reaches containing an abundance of riffles, especially in the Three Rocks, Maytag, Texas Creek, and County Line areas. In general, overhanging cover in the form of trees and shrubs was absent at the survey flows (approximately 663 to 726 cubic feet per second [cfs] at the Parkdale U.S. Geological Survey [USGS] gage). Several reaches within Parkdale, Three Rocks, and County Line contained limited overhanging cover along at least one side of the river.

Table 3-6. Aquatic Habitat in the OTR Art Sections in the Arkansas River¹

Habitat Reaches	Approximate Habitat Area Percentage			Type of Fish Cover
	Run	Riffle	Pool	
Parkdale				
P1	100	0	0	Scattered boulders, larger submerged substrates, depth, and limited overhanging vegetation at this flow.
P2	71	29	0	
P3	75	24	1	
Spikebuck				
SB1	62	0	38	Scattered boulders, larger submerged substrates, depth, and no overhanging vegetation at this flow.
SB2	80	18	2	
SB3	32	23	45	
Three Rocks				
TR1	21	64	15	Scattered boulders, larger submerged substrates, depth, and turbulence. Overhanging vegetation along the south bank at TR1.
TR2	21	61	18	
Maytag				
MT1	100	0	0	Scattered boulders, larger submerged substrates, depth, and no overhanging vegetation at this flow.
MT2	30	58	12	
Texas Creek				
TF1	0	95	5	Scattered boulders, larger submerged substrates, depth, turbulence, and no overhanging vegetation at this flow.
TF2	36	55	9	
Vallie Bridge				
VB1	0	95	5	Scattered boulders, larger submerged substrates, depth, turbulence, and no overhanging vegetation at this flow.

Habitat Reaches	Approximate Habitat Area Percentage			Type of Fish Cover
	Run	Riffle	Pool	
Tunnel				
T1	17	31	52	Scattered boulders, larger submerged substrates, depth, and no overhanging vegetation at this flow. Deep pool with depth at T1.
T2	74	20	6	
County Line				
CL1	24	72	4	Scattered boulders, larger submerged substrates, and depth. Overhanging vegetation at CL2.
CL2	0	94	6	

¹Habitat characterizations were conducted by AECOM on May 6 and 7, 2009, when flows ranged from approximately 663 to 726 cfs at the Parkdale USGS gage.

Although aquatic habitat has been characterized in the Arkansas River, sufficient information is not available to identify trends in habitat conditions. Critical components of aquatic habitat are water depth and flow levels. Based on the Arkansas River Water Needs Assessment (Bridges et al. 2000), flow ranges were identified as guidance to maintain optimum habitat for brown trout life stages. In general, flows have exceeded optimum flow levels during most of the past 10 years. Current conditions and trends in water quality are discussed in Water Resources, Section 3.10.

3.3.1.2 Fisheries

The fish community in the section of the Arkansas River between Cañon City and Salida is considered a coldwater fishery that includes trout, sucker, and minnow species. This section supports a high quality trout fishery composed of brown and rainbow trout. Recent electrofishing surveys, conducted by CDOW in the Coaldale and Wellsville areas, indicated that brown trout was the most abundant species, where it comprised approximately 82% to 96% of the total catch per sampling date (Table 3-7). Rainbow trout, the other game fish species in this section of the river, comprised approximately 2% to 11% of the catch in these surveys. Other nongame fish species collected in these surveys included longnose sucker, white sucker, and longnose dace (Table 3-7) (CDOW 2009a). Fathead minnow has also been reported in previous sampling efforts (Bridges et al. 2000).

Table 3-7. Fish Composition Expressed as Percent of Total Catch Per Survey Effort in the Arkansas River

Common Name	Scientific Name	Wellsville Area				Coaldale Area	
		9/23/2003	10/6/2004	10/30/2006	10/21/2008	10/13/2004	10/24/2008
Trout	Salmonidae						
Brown trout	<i>Salmo trutta</i>	95.2	96.0	88.9	82.6	88.5	81.7
Rainbow trout	<i>Oncorhynchus mykiss</i>	2.1	2.7	8.6	14.3	4.6	11.0
Suckers	Catostomidae						
Longnose sucker	<i>Catostomus catostomus</i>	2.1	1.2	1.1	0.8	5.7	5.4
White sucker	<i>Catostomus commersoni</i>	0.6	0.1	1.3	2.3	1.2	1.9
Minnows	Cyprinidae						
Longnose dace	<i>Rhinichthys cataractae</i>	0	0	0.1	0	0	0
	Total Percent	100.0	100.0	100.0	100.0	100.0	100.0

Source: CDOW 2009a

Based on surveys conducted in the Arkansas River by CDOW, trends in trout densities and fish condition were reviewed. Surveys conducted during the past 10 years at Coaldale and Wellsville reported densities ranging from 4,435 to 7,183 brown trout per mile and 83 to 467 rainbow trout per mile (CDOW 2009a). To evaluate trends in trout densities, the Wellsville site is considered to be representative of the Cañon City to Salida section (Policky 2007). Trout densities (expressed as number of fish per acre) are available at this site from 1985 through 2008. Brown trout was the most abundant species, with densities ranging from approximately 135 to 450 fish per acre (Policky 2008) (Figure 3-1). The trend in brown trout densities is shown in Figure 3-1. Overall, the brown trout population is considered healthy and robust, based on densities, biomass, and body conditions. Optimum conditions for brown trout were created in 2002 when early season temperatures were warm and summer flows were below 400 cfs. Rainbow trout densities are relatively low, with densities ranging from approximately 1 to 45 fish per acre (Policky 2008) (see Figure 3-1). Rainbow trout percent composition within the trout community has improved in 2008 and 2009. Since rainbow trout is a species stocked by CDOW, trends are mainly the result of stocking effort and subsequent survival.

The type of habitat used by trout species varies depending upon life stages. Optimal habitat for adult brown and rainbow trout consists of clear, cool to coldwater temperatures, with relatively silt-free rocky substrates in riffle-run areas along with deep pool areas (Raleigh et al 1984, Raleigh et al. 1986). Cover requirements include instream substrates, streambank vegetation, undercut banks, woody debris, pool depth, and surface disturbance. These types of cover are present in the Arkansas River between Cañon City and Salida, except for streambank vegetation and undercut banks, which are generally limited at low to moderate flows. In general, juvenile brown and rainbow trout occur at shallower depths and lower velocities compared to adults.

The brown trout population in the Arkansas River is maintained by natural reproduction. Brown trout spawning occurs in mid-October to mid-November in the main stem section of the river, as well as tributary streams such as Cottonwood, Chalk, Badger, and Texas creeks (Bridges et al. 2000). Spawning is most abundant behind boulders or woody debris in the tail of pools. Habitat conditions at spawning sites typically consist of stream velocities exceeding 0.5 feet/second, depths from 12 to 36 inches, and gravel substrates (0.4-2.8-inch diameter) (Bridges et al. 2000, Raleigh et al. 1986).

Currently, the rainbow trout population in the Arkansas River is maintained by stocking. Lack of successful spawning in previous rainbow trout populations (Colorado River variety) was due to their susceptibility to whirling disease. However, CDOW introduced a rainbow trout variety in 2009 (Hofer x Tasmanian strain) in an attempt to establish a naturally reproducing population. This strain is resistant to whirling disease. If fish successfully reach the adult stage, spawning for this rainbow trout variety would occur in March through early April. There will be three-year-old fish in the population in 2011, so the initial spawning for rainbow trout is expected to occur in the spring of 2011. Typically, rainbow trout select gravel substrates at the head of a riffle or the downstream edge of a pool near the edge of the river (Orcutt et al. 1968 as cited in Bridges et al. 2000).

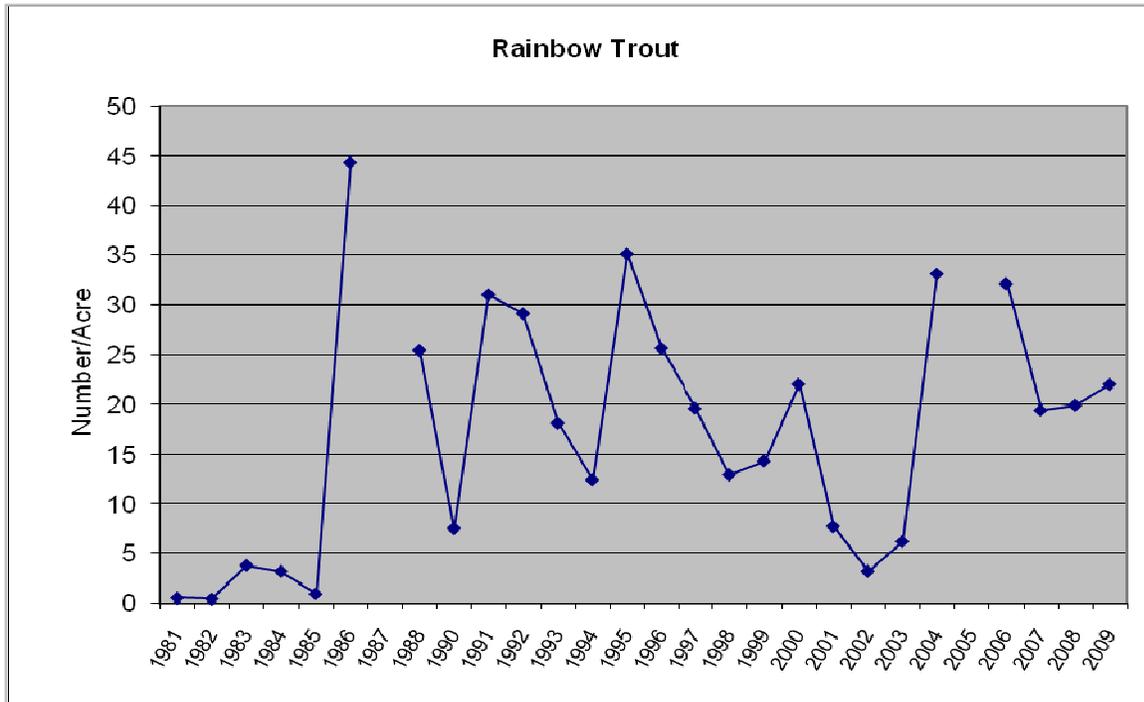
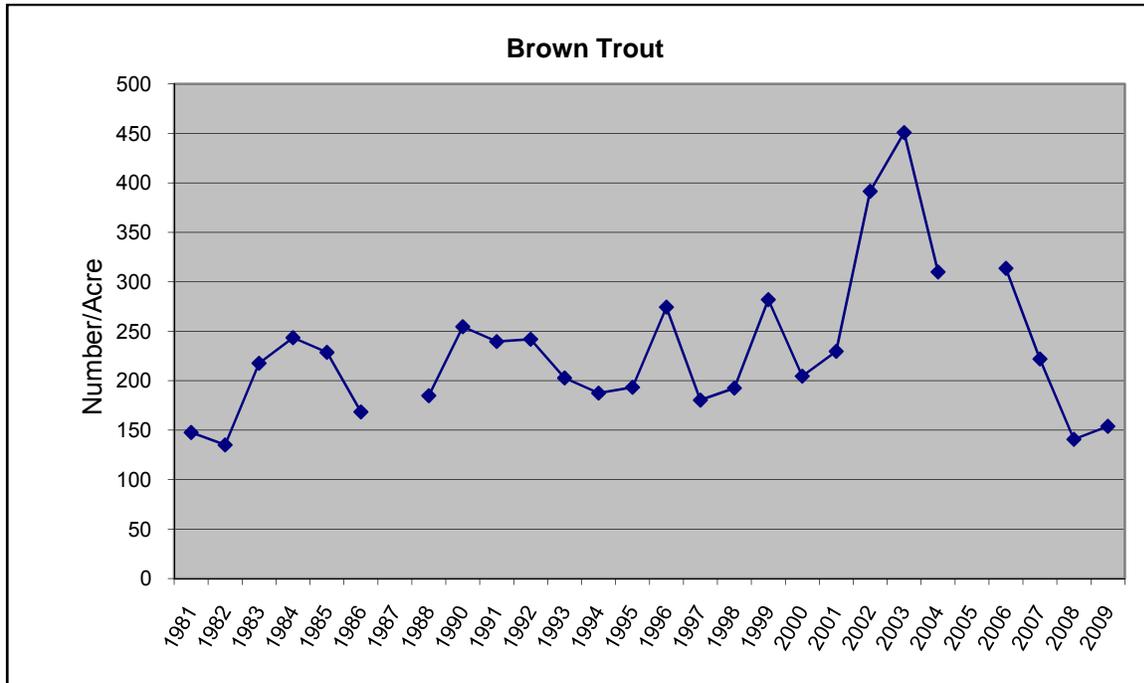


Figure 3-1. Trout Population Estimates for the Arkansas River Near Wellsville, Colorado

3.3.1.3 Macroinvertebrates

Macroinvertebrate communities in the Arkansas River between Cañon City and Salida are considered to be a diverse and productive component of the aquatic environment. Based on a one-time sampling event in April 2000, the Colorado Department of Public Health and Environment (CDPHE 2009a) identified 27 taxa in the Arkansas River near Salida. Five taxa individually comprised at least 5% of the total macroinvertebrate densities: mayflies (*Ephemerella*, *Baetis tricaudatus*, and *Rithrogena*) and blackflies (*Simulium*). Based on invertebrate sampling in 1982 and 1983 near Cotopaxi, the most abundant groups were true flies (*Diptera*), mayflies (*Ephemeroptera*), and caddisflies (*Trichoptera*) (Winters 1988). Biomass was dominated by dipterans, mayflies, and stoneflies (*Plecoptera*). Other groups that comprised at least 5% of the total densities or biomass per sample date included beetles (*Coleoptera*) and oligochaete worms. Macroinvertebrate studies by Ruse and Herrmann (2000) and Ruse et al. (2000) indicated a diverse occurrence of chironomid midge larvae, stoneflies, and caddisflies in the Arkansas River between Leadville and Pueblo, Colorado. Based on limited macroinvertebrate surveys in this section of the Arkansas River, information on trends in macroinvertebrate abundance or composition is not available.

3.3.1.4 Attached Algae

Limited information is available regarding algal communities in the Arkansas River. Based on studies in the Oklahoma portion of the Arkansas River, benthic diatoms were abundant and represented by *Navicula*, *Surirella*, *Nitzschia*, *Synedra*, *Coconeis*, *Amphiprora*, and *Gomphonema* (Matthews et al. 2005). Filamentous algae also typically develop as part of the algal community. Based on the lack of surveys in this section of the Arkansas River, information on trends in periphyton abundance or composition is not available.

3.3.1.5 Amphibians and Aquatic Reptiles

Amphibians (toads, salamanders, and frogs) and aquatic reptiles (turtles) use the Arkansas River for at least a portion of their development. Most of the toad and salamander species occur in terrestrial habitats throughout the year, but move to aquatic habitats for breeding in the spring or early summer. Most of the frogs and turtle species are associated with wet areas throughout the year, with young developing after breeding in the spring and summer. Although preferred habitat consists of ponds, wetlands, or streams, it is possible that larger river systems, such as the Arkansas River, are used to a lesser extent.

3.3.1.6 Aquatic Nuisance Organisms

The only known aquatic nuisance organism to inhabit the Arkansas River from Cañon City and Salida is whirling disease (Policky 2009). This disease causes skeletal deformation and neurological damage in trout and salmon species. The disease is a myxosporean parasite that needs to infect a tubificid oligochaete worm to complete its life cycle. Signs are posted at recreation areas along this portion of the river to educate anglers about the introduction of other nuisance organisms, such as New Zealand snail.

3.3.2 Current Management Considerations

Management of aquatic resources in the Arkansas River is a cooperative effort by the BLM and CDOW. Fish resources are managed by CDOW, while habitat is managed by the BLM. Based on direction provided in the BLM's proposed RMP (BLM 1995), BLM land adjacent to the Arkansas River has the following management objectives:

- Stream fisheries on BLM surface lands are maintained;
- Improvements in condition and stability are accomplished through riparian, wildlife, forestry, grazing, and recreation programs where the potential exists;
- Fishery habitat in the Arkansas River is managed to maintain and enhance habitat values; and
- Conflicts with other uses (e.g., livestock grazing, mineral development, etc.) will be resolved in favor of fisheries.

Additional habitat characteristics involving riparian vegetation and water quality are managed by the BLM, as described in the current RMP. These management directions are discussed in Section 3.4, Wetlands, Floodplains, and Riparian Habitat, and Section 3.10, Water Resources.

Other management direction for aquatic resources is provided in the following plans:

- Arkansas River Management Plan – Goal to provide for continued protection of fisheries and aquatic habitat, improvement projects to reduce impacts from recreation use, and strive for compatibility of sports fishermen with other recreation users.
- Voluntary Flow Management Plan – Water users voluntarily agree to keep minimum flows in the river to maintain fisheries habitat and ensure a quality recreational experience. The target flows were determined as part of the Arkansas River Water Needs Assessment (Bridges et al. 2000).

3.4 WETLANDS, FLOODPLAINS, AND RIPARIAN HABITAT

3.4.1 Current Conditions and Trends

Wetlands, floodplains, and riparian habitat all provide valuable functions for riverine systems, including flood control, bank stabilization, sediment control, maintaining biochemical processes, regulating nitrogen, sulfur, methane and carbon cycles, enhancing water quality, and providing wildlife habitat. In addition, floodplains provide added capacity when excessive volumes of water exceed normal flows, and provide a mechanism to slowly release water back into the river's main system. Floodplains generally support riparian habitat, which helps slow velocities and allows sediment to settle out of the flood waters. Historic railroad and highway construction includes the placement of fill and ballast within the floodplain. This has reduced the flood capacity of the river and has changed channel dynamics from their natural state.

Numerous efforts have been made to map wetlands and riparian habitat along this stretch of river, including in the 1970s and 1980s by the USFWS and National Wetlands Inventory (NWI). In addition, there was a cooperative interagency effort by CDOW, BLM, and U.S. Forest Service (USFS) (BLM 2001a) to map riparian and wetland communities along the Arkansas River between Leadville Junction and Pueblo Reservoir. The project falls within Segment 9 (Salida Stockyards to Swissvale), Segment 10

(Swissvale to Coaldale), and Segment 11 (Coaldale to Parkdale) of the interagency effort, which was divided into uniform stretches based on geology (J.F. Sato 2007).

Prior studies conducted for the OTR project documented wetlands and riparian vegetation in the Project Area using a combination of existing maps and file data, as well as data collected during fieldwork conducted in 2000, 2005, and 2006 (J.F. Sato 2007). The fieldwork consisted of characterizing the plant communities and verifying the wetland and riparian units on aerial photography at each of the panel locations. Wetland characterization included using soil conditions (moisture regime and saturation depth, and general soil texture) as well as classifying the wetlands according to Cowardin et al. (1979). BLM (2001a) describes the dominant communities of Segment 9 as equal amounts of a narrowleaf cottonwood/coyote willow community that occurs in isolated pockets throughout the segment, as well as continuous bands of a coyote willow/mesic graminoid community. Small patches of less dominant communities include narrowleaf cottonwood/Rocky Mountain juniper, river birch/mesic forb, water sedge, and mesic graminoid. Segment 10 is also dominated by coyote willow, including coyote willow/mesic graminoid and narrowleaf cottonwood/coyote willow communities, mostly in continuous bands and in moderate densities. Other, less prominent communities of this segment include a Rocky Mountain juniper alliance, coyote willow/bare ground, river birch/mesic forbs, water sedge, mesic graminoid, and several narrowleaf cottonwood and plains cottonwood communities (BLM 2001a). Wetlands, floodplains, and riparian habitats in the Analysis Area are shown on Maps 3-29 through 3-39.

Segment 11, which extends to Parkdale, is dominated almost entirely by a coyote willow/mesic graminoid (mostly water sedge) community. Secondary communities include water sedge, river birch/mesic forb, and river birch/mesic graminoid (BLM 2001a). Table 3-8 lists the wetland types (Cowardin et al. 1979) and plant communities (BLM 2001a and J.F. Sato 2007) that dominate each of the panel areas. Table 3-9 lists the species riparian and wetland species observed (J.F. Sato 2007).

Table 3-8. Wetland Types and Plant Communities by Panel Area, West to East

Project Area	Wetland Type*	Dominant Communities
County Line	PFO/SS	Narrowleaf cottonwood/coyote willow
	PSS/EM PEM	Coyote willow/reed canarygrass–redtop–arctic rush: alder/arctic rush Reed canarygrass
Tunnel	PSS/EM PEM	Coyote willow/reed canarygrass–spikerush–scouring rush Reed canarygrass–spikerush
Vallie Bridge (Red Rocks)	PFO/EM	Narrowleaf cottonwood/sedge-grass
	PSS/EM	Coyote willow/reed canarygrass–spikerush
	PEM	Reed canarygrass–spikerush
Texas Creek	PSS/EM	Coyote willow/reed canarygrass – spikerush – saltgrass
	PSS/EM	River birch-coyote willow/reed canarygrass – hardstem bulrush
	PEM	Reed canarygrass – hard-stem bulrush-spikerush
Maytag	PSS/EM	Coyote willow/reed canarygrass – sedge – spikerush
	PSS/EM	River birch/reed canarygrass
Three Rocks	PFO/ SS/EM	Narrowleaf cottonwood/coyote willow/reed canarygrass – sedges
	PSS/EM	River birch - coyote willow/reed canarygrass – sedges: coyote willow/sedges
Spikebuck	PSS/EM	Coyote willow/reed canarygrass – sedges
	PEM	Reed canarygrass – sedges

Project Area	Wetland Type*	Dominant Communities
Parkdale	PFO/EM	Narrowleaf cottonwood/reed canarygrass – spikerush
	PSS/EM	Coyote willow/reed canarygrass – spikerush – arctic rush
	PSS/EM	River birch – coyote willow/reed canarygrass – sedges
	PEM PEM PEM	Reed canarygrass – bulrush – sedges Cattail – bulrush

*P = Palustrine: all nontidal wetlands dominated by trees, shrubs, persistent emergents, as well as small ponds. FO = forested; SS = scrub-shrub; EM = emergent: of erect, rooted, herbaceous hydrophytes.

(J.F. Sato 2007)

Table 3-9. Characteristic Wetland and Riparian Plant Species along the Arkansas River in OTR Panel Areas; Wetland/Riparian Plant Species Area/Mile Markers

Scientific Name	Common Name	Wetland Indicator Status1	County		Vallie Bridge	Texas Creek	Maytag	Three Rocks	Spike-buck	Parkdale
			Line 225.3-225.9	Tunnel 230.0-230.9						
<i>Alnus incana</i> spp. <i>tenuifolia</i>	Alder	NO	X	X						X
<i>Acer negundo</i>	Box-elder	FAC	X			X				
<i>Agrostis stolonifera</i>	Redtop	FAC+	X		X					
<i>Aristida purpurea</i>	Three-awn			X						
<i>Betula occidentalis</i>	River birch	FACW				X	X	X		X
<i>Calamagrostis canadensis</i>	Canada reedgrass	OBL								
<i>Carex</i> spp.	Sedge					X	X	X		X
<i>Dactylis glomerata</i>	Orchardgrass	FACU	X	X		X				
<i>Distichlis spicata</i>	Saltgrass	FACW				X				
<i>Eleocharis</i> spp.	Spikerush			X	X	X	X	X		X
<i>Elymus canadensis</i>	Canada wild rye									
<i>Elymus elymoides</i>	Squirreltail	FACU								X
<i>Elymus</i> spp.	Wild rye								X	
<i>Elytrigia repens</i>	Quackgrass	FAC		X						
<i>Equisetum</i> spp.	Scouring-rush	FACW	X	X				X		
<i>Festuca idahoensis</i>	Idaho fescue			X						
<i>Gaura coccinea</i>	Scarlet gaura					X				
<i>Hesperostipa comata</i>	Needle-andthread								X	
<i>Juncus</i> spp.	Arctic rush	NO	X							
<i>Juniperus scopulorum</i>	Rocky Mountain juniper									

Scientific Name	Common Name	Wetland Indicator Status ¹	County		Vallie	Texas	Three	Spike-	Parkdale	
			Line 225.3-225.9	Tunnel 230.0-230.9	Bridge 237.6-237.9	Creek 253.6-254.3	Maytag 254.9-255.5	Rocks 258.7-259.3	buck 260.8-262.4	263.0-266.0
<i>Melilotus albus</i>	White sweetclover	FACU				X				
<i>Phalaris arundinacea</i>	Reed canarygrass	FACW+	X	X	X	X	X	X	X	X
<i>Pinus ponderosa</i>	Ponderosa pine	FACU-	X							
<i>Populus angustifolia</i>	Narrowleaf cottonwood	FACW	X		X			X		X
<i>Populus deltoides</i> ssp. <i>monilifera</i>	Plains Cottonwood	FAC							X	
<i>Portulaca oleracea</i>	Common purslane	FAC						X		
<i>Prunus virginiana</i>	Chokecherry	FACU	X							
<i>Ptelea trifoliata</i>	Hoptree	UPL								X
<i>Ranunculus cymbalaria</i>	Shore buttercup	OBL								
<i>Salix exigua</i>	Coyote willow	OBL	X	X	X	X	X	X	X	X
<i>Salix</i> spp.	Willows									X
<i>Schoenoplectus acutus</i>	Hardstem bulrush	OBL				X				X
<i>Solidago</i> spp.	Goldenrod			X						
<i>Sporobolus airoides</i>	alkali sacaton	FAC								
<i>Thinopyrum ponticum</i>	Tall wheatgrass					X				
<i>Typha latifolia</i>	Broad-leafed Cattail	OBL								X
<i>Verbascum thapsus</i>	Mullein					X				
<i>Vitis riparia</i>	Grape	FAC								

Region 5, 1996 National List of Vascular Plant Species that Occur in Wetlands from <http://www.usace.army.mil/CECW/Documents/cecwo/reg/plants/list96.pdf>

(J.F. Sato 2007)

Key:

- NO No occurrence
- FAC Facultative
- FACW Facultative wetland
- OBL Obligate wetland
- FACU Facultative upland
- Obligate upland
- +/- Wetter/drier end of the designation's spectrum

J.F. Sato (2007) described the wetlands and riparian areas that fall within the panel areas as follows:

County Line Area

Wetlands in the County Line panel area are dominated by coyote willow (Table 3-8) with a thin understory of reed canarygrass, redtop, and arctic rush. This wetland type often occurs on a rocky substrate, which appreciably reduces the herbaceous cover. Areas where deposition instead of scouring has occurred are characterized by more soil development and a higher cover of herbaceous species under the willow overstory. This shrub wetland type occurs in a variety of hydrologic conditions: from up to 1 foot of surface water in late summer flows to approximately 1 foot above the active flow channel. In the latter case, the community contains a better-developed soil and graminoid understory. In these areas, the willow type is generally bordered by a narrow emergent wetland of reed canarygrass with lesser amounts of arctic rush, and a forested narrowleaf cottonwood community occurs in a few sites behind the willows in a relatively stable part of the floodplain (J.F. Sato 2007).

The narrowleaf cottonwood wetland type is prominent at a number of sites in this area, with a large stand at MM 225.32 on both sides of the river. Smaller stands occur at approximately MMs 225.36, 225.44, 225.50, and 225.81. Several smaller stands of alder occur in a similar position of the floodplain as narrowleaf cottonwood behind coyote willow stands, which are able to withstand higher flows (J.F. Sato 2007).

Tunnel Area

The wetlands of the Tunnel panel area are dominated by an emergent type of reed canarygrass that occurs in long, narrow (2-3 feet wide) strands along the active flow channel. Although reed canarygrass dominates these areas, spikerush is often associated with it, mostly adjacent to the channel. Soils are of sand and silt, and saturated at 6 inches below the surface (late summer conditions). Coyote willow-dominated wetlands also occur here but are scattered, with the largest stand on the north side of the river at approximately MM 230.5. Other characteristic species of this wetland type include reed canarygrass, spikerush, and scouring rush (J.F. Sato 2007).

Vallie Bridge Area

The wetlands of the Vallie Bridge panel area are scattered because much of the area along the channel is quite rocky. However, coyote willow stands occur prominently on the south side of the river from approximately MM 237.67 to 237.80, and also from MM 237.89 to 237.91 (J.F. Sato 2007).

Although coyote willow characterizes the wetlands (Table 3-8), reed canarygrass and spikerush are also prominent in this wetland type if soil has developed. Conversely, areas of rock support nearly monotypic stands of willow, and these areas are often within the active part of the channel, which is heavily inundated during spring flows (J.F. Sato 2007).

Texas Creek Area

The wetlands in the Texas Creek panel area are composed of nearly equal parts of shrub-scrub (coyote willow) and emergent (reed canarygrass) types (Table 3-8). In most areas, these two types occur separately, with reed canarygrass occupying relatively wide, lower terraces of the

river. This wetland type is also characterized by hard-stem bulrush and spikerush (Table 3-8). Exceptions do occur, however, where coyote willow occurs on a second terrace behind the emergent wetlands. In these situations, the emergent type forms a narrow band along the active channel and is heavily dominated by reed canarygrass (for example, MM 253.70) (J.F. Sato 2007).

A second shrub community occurs in this area as a river birch–coyote willow association (for example, MM 254.10). River birch generally occurs on a second terrace of the floodplain on soils that contain moisture at depths of 1 foot or more. Soils here are unconsolidated sand and silt (J.F. Sato 2007).

Maytag Area

Wetlands of the Maytag panel area are dominated by dense stands of coyote willow that occur between rock outcrops. This community is especially prominent at the beginning (MM 254.92) and end (MM 255.05) of the first section of this area, where it occurs on stable sand bars. Because of this stability and soil deposition, a well-developed herbaceous stratum of reed canarygrass, sedges, and spikerush also characterizes this wetland type (J.F. Sato 2007).

Another wetland scrub type of river birch and reed canarygrass is present, but is much more restricted, occurring in several sites near the end of the area (MM 255.37) (J.F. Sato 2007).

Three Rocks Area

Wetlands of the Three Rocks panel area are similar to those described for the Maytag area, although more disjointed because of the amount of rock, including riprap that occurs along the channel. Thus, coyote willow-dominated wetlands are present as long narrow stands on both sides of the river (for example, MM 259.08 to 259.10). River birch forms small areas of wetlands in several sites near MM 259.01 on the south side of the river, and again near MM 259.26 on the north side of the river where it occurs near a large stand of narrowleaf cottonwood. This latter species forms a forested wetland type on a wide terrace that also includes coyote willow, and sedges nearer the channel. The soils of this wetland were relatively well-drained during late summer and of unconsolidated sand and silt, although the area of coyote willow occurs in conjunction with a higher water table (J.F. Sato 2007).

Spikebuck Area

Wetlands of the Spikebuck panel area are relatively simple, with only shrub-scrub of coyote willow and one small emergent wetland (MM 262.85) of reed canarygrass represented (Table 3-8). This area is rocky, which minimizes wetland development to a few locations (for example, MMs 261.0, 262.20, 262.31, and 262.39) (J.F. Sato 2007).

Parkdale Area

The Parkdale panel area is the longest of the proposed panel locations and contains a variety of wetland types ranging from forested to emergent (Table 3-8). Narrowleaf cottonwood forms a forested wetland at approximately MM 263.58 on the north side of the river. Other emergent wetlands are formed by sedges and reed canarygrass, especially adjacent to the channel. This latter species occurs in narrow bands at the outer edge of the low terrace, but where soil is present (J.F. Sato 2007).

Shrub-scrub of coyote willow, with reed canarygrass, spikerush, and arctic rush, is by far the most prominent wetland type throughout this area. Several small shrub-scrub wetlands of river birch also occur here. As observed in other panel locations, wetlands are often limited by rock, although coyote willow occurs on this substrate in some areas (for example, MMs 264.55 to 264.78). The more robust willow stands, however, are associated with areas of sand deposition and some soil development (J.F. Sato 2007).

Riparian Zones

Fitzgerald et al. (1994) has documented that riparian habitats have the highest wildlife species diversity of all habitats encountered in Colorado. The abundant resources found in riparian habitat that contribute to high wildlife species diversity include: cover, food, movement corridors, and water. The Colorado Natural Heritage Program (CNHP) considers these habitats to be “rare and imperiled communities” due to their limited distribution. J.F. Sato (2007) identified riparian communities using the BLM (2001a) descriptions, and this information was supplemented with data obtained during field investigations and aerial photography interpretation. The communities described in Table 3-9 also form riparian communities along the OTR areas (J.F. Sato 2007). Unlike wetlands, riparian vegetation is not protected by regulation and permits are not required for impact.

The riparian habitats within the Arkansas River Valley are valuable for wildlife. Riparian vegetation has evolved to either tolerate mild flooding or recover from the more infrequent destructive flooding and scouring that occurs. Healthy riparian habitats are resilient to natural disturbances caused by the normal dynamics of a river system. However, some anthropogenic disturbances, such as fill, flow diversion, changes in flood patterns or groundwater hydrology, and introduction of exotic species may be more difficult to recover from.

Mature riparian systems provide structural diversity, including grass or herbaceous understory, lower shrub canopies, and tall shrub and/or tree canopies. The health and diversity of the riparian habitat in the Project Area is dependent upon maintaining the natural processes that help establish them at those locations in the first place, including sediment deposition and erosional scouring. Riparian vegetation has developed along the inside of river meanders where the first and second terraces are best defined (J.F. Sato 2007).

J.F. Sato (2007) also found that herbaceous cover of reed canarygrass occurs on the lower, first terrace where inundation from the river is more frequent. However, the herbaceous cover also occurs in conjunction with the shrub component and floodplain areas, such as sloughs and ponds where run-in is supplied by secondary channels. Other herbaceous species associated with backwater channels include Canada reedgrass (*Calamagrostis canadensis*) and shore buttercup (*Ranunculus cymbalaria*).

Coyote willow is the most prominent vegetation type along the secondary river terraces with a variety of herbaceous understory, including reed canarygrass, broadleaved cattail, sedges, rushes (*Juncus spp.*), spikerush (*Eleocharis spp.*), hard-stemmed bulrush (*Scirpus spp.*), and scouring-rush (J.F. Sato 2007). The soils on the secondary terrace may be more stable and have slightly better drainage than on lower, primary terraces, favoring conditions for coyote willow to flourish. However, coyote willow also occurs adjacent to the channel and in rocky areas that may have been scoured out by flooding (J.F. Sato 2007).

Trees in the riparian zone only occur sporadically along the river where flows are more stable or in areas protected from flooding. Riparian tree species include narrowleaf cottonwood, ponderosa pine, plains cottonwood, Rocky Mountain juniper (*Juniperus scopulorum*), box-elder, river birch, and hoptree (*Ptelea trifoliata*) (J.F. Sato 2007 and BLM 2006). Narrowleaf cottonwood stands are common between 5,000 and 8,000 feet above mean sea level (AMSL) (BLM 2001a) in areas where wider and more stable parts of the floodplain can provide the required soils and hydrology. The lack of a wide stable floodplain through the panel areas likely limits the number of narrowleaf cottonwoods. The largest narrowleaf cottonwood stand near the proposed Project Area occurs in the Three Rocks area at approximately MM 259.26 on the north side of the river (J.F. Sato 2007). Herbaceous species associated with the narrowleaf cottonwood include Canada wild rye (*Elymus canadensis*), coyote willow, and alkali sacaton (*Sporobolus airoides*). Grape (*Vitis riparia*) also is common within the riparian forests (J.F. Sato 2007).

3.4.2 Current Management Considerations

The Clean Water Act (CWA) (33 U.S.C. §1251 et seq. 1972) governs discharge of pollutants into waters of the U.S. and regulates water quality standards for surface waters. Section 404 of the CWA regulates the discharge of fill material into waters of the U.S., including jurisdictional wetlands. National Pollutant Discharge Elimination System (NPDES) permits are required for point source pollution discharge into waters of the U.S. Waters of the U.S. include a number of categories, but the most common are traditional navigable waters, including wetlands adjacent to those waters. The Arkansas River is considered a water of the U.S., as defined by the CWA, due to navigability as well as the support of interstate and foreign commerce, such as recreation and fishing. In addition, the CWA defines wetland areas that meet all three wetland criteria, including: hydric plants, hydric soils, and hydrology. The U.S. Army Corps of Engineers (USACE) administers Section 404 and NPDES permits that are required in order to discharge fill material or pollutants into waters of the U.S.

The floodplains identified by the Federal Emergency Management Agency (FEMA) are generally regulated by the local municipality or county and may require permits. Maps 3-29 through 3-39 depict the Flood Insurance Rate Maps (FIRMs) and 100-year floodplains in the Project Area as delineated by FEMA (see Section 3.10, Water Resources, for more information). Fremont County defines the floodplain as:

The relatively level land area on either side of the banks of a stream is regularly subject to flooding. That part of the floodplain, subject to a 1% chance of flooding (100-year flood) in any given year, is designated as an "area of special flood hazard" by FEMA (Fremont County 2002).

In addition, several executive orders address the protection of wetlands and pollution control standards as describe below.

Executive Orders

- Executive Order 11990 (Protection of wetlands) to avoid to the extent possible the long and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. Executive Order No. 11990, May 24, 1977, 42 F.R. 26961.

- Executive Order 12088 (Federal compliance with pollution control standards) to ensure federal compliance with applicable pollution control standards. Executive Order 12088 of Oct. 13, 1978, appears at 43 FR 47707, 3 CFR, 1978 Comp., p. 243.
- BLM Instruction Memoranda and Information Bulletins.
- IM 78-410 (Protection of wetlands and riparian areas).
- IM 78-523 (Compliance with BLM Interim Floodplain Management Procedures).
- IM 87-261 (Implementation of the Riparian Area Management Policy).

Bureau of Land Management Manuals

- BLM-M-6740 (Establishes policy and procedures for the identification, protection, maintenance, and management of fresh, brackish, and saline waters and wetland areas).
- Maintain or achieve a properly functioning condition with full range of uses on most areas.
- Manage vegetation to accomplish BLM initiatives included in Range of Our Vision, Riparian-Wetland Initiatives for the 90s, Forests Our Growing Legacy, and Fish and Wildlife 2000.

The associated management actions for the protection of wetlands, riparian habitat, and floodplains are shown in Table 3-10 below.

Table 3-10. Management Action for the Protection of Wetlands, Riparian Habitat and Floodplains

Management Action	Decision Source
Riparian areas are inventoried on a priority basis.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Bureau guidance to maintain and/or improve current conditions in riparian zones is implemented. Prior to implementation, all actions within riparian areas are assessed for the effects on the resource.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Grazing is eliminated on riparian habitat in poor condition. These areas are scattered throughout the planning area in numerous places and have not been identified because the inventory is incomplete. The amount of acreage is estimated at 50% of existing riparian in poor condition. These areas, because of topography and other factors, can be improved only through exclusion of livestock grazing.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Seventy-five percent of all riparian areas will be at proper functioning condition by 1997 (Bureau policy).	1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-9
Perennial riparian areas are closed to locatable mineral entry except for recreational placering, closed to mineral materials disposal, will have all withdrawals for waterpower/reservoir sites recommended for revocation, and all OHV use limited to designated roads and trails.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-10
Riparian area inventories will be completed and mapped as soon as possible so limitations can be implemented and enforced.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-11
Interdisciplinary support for riparian restoration is emphasized.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-12

Management Action	Decision Source
Preserve and protect riparian and wetland areas maintaining Proper Functioning Condition (PFC) and improve degraded vegetation for long-term health.	Statewide Standards and Guides Amendment 1996
Range improvement projects are designed consistent with overall ecological functions and processes, with minimum adverse impacts to other resources or uses of riparian/wetland and upland sites.	Statewide Standards and Guides Amendment 1996

3.5 VEGETATION AND PLANT COMMUNITIES

3.5.1 Current Conditions and Trends

Vegetation special status species, including Federally listed, BLM Sensitive, and Colorado State listed species, with potential to occur in the Project Area are addressed in detail in Section 3.8.

The vegetation within the Project Area consists primarily of piñon-juniper woodland (*Pinus edulis*, *Juniperus monosperma*, *Juniperus scopulorum*) with scattered ponderosa pines. The vegetation is relatively patchy with areas of bare ground and exposed rock. The Arkansas River has cut a steep sided gorge through the canyon leaving exposed rock, with soil only developing in small pockets or along more gradual terrain. The canyon’s diverse terrain consists of steep rocky gorges, gradual hill slopes, open valleys, high walled benches, and barren hogbacks intersected by steep narrow gulches. The overall canyon is dominated by piñon-juniper woodland with a patchwork of mixed shrubland and grasslands on the varied terrain. The understory of the piñon-juniper woodland consists of Gambel oak (*Quercus gambelii*) and mountain mahogany (*Cercocarpus montanus*) on the dry shallow soils of hill slopes, with frankenia (*Frankenia jamesii*) and Bidelow’s sage (*Artemisia bigelovii*) on the Niobrara shale hogbacks (Neid 2007). The valley bottoms and other areas with deeper soils are comprised of grasslands. In addition to the upland plant communities, there is a narrow band of riparian and wetland vegetation that borders both sides of the Arkansas River. The geology and diverse terrain in the area create conditions making the species of plants that evolved at this location relatively unique. The Nature Conservancy has identified the barren hogbacks as one of the sixteen highest priority areas for immediate conservation because of the wealth of biodiversity resources in a region experiencing high development pressure (Kelso et al. 2003, The Nature Conservancy 2001).

Two scales of mapping have been prepared for the area, including a regionwide interagency vegetation mapping effort led by CDOW in spring and fall of 1993 through 1997, mapped at 81-foot pixel resolution using the Landsat Thematic Mapper for a multispectral analysis (CDOW 2003b); and more detailed mapping of each of the panel locations in 2006 by J.F. Sato at 0.5-foot pixel resolution (J.F. Sato 2007).

The coarse vegetation mapping completed by CDOW shows the canyon is dominated by piñon-juniper and piñon-juniper-oak mix with patches of grass/forb mix; irrigated, sparse piñon-juniper/shrubs/rock mix; and shrub/grass/forb mix scattered throughout the canyon. Ponderosa pine forest can be found at higher elevations above the canyon. Vegetation communities in the Project Area are shown on Map 3-40.

Piñon-juniper grows in rocky soils on ridges, in deep soils in valleys, and on benches ranging from 5,000 to 10,000 feet. In the canyon it grows relatively sparse, with junipers becoming the dominant species at the lower elevations. This plant community’s high diversity makes it difficult to describe by using only a

few dominant species. Neid (2007) describes some of the species occurring in the sparse piñon-juniper (*Pinus edulis-Juniperus monosperma*) woodland. Common shrubs include mountain mahogany (*Cercocarpus montanus*), Bigelow sage (*Artemisia bigelovii*), frankenia (*Frankenia jamesii*), mock orange (*Philadelphus microphyllus*), wax currant (*Ribes cereum*), rabbitbrush (*Chrysothamnus nauseosus*), cholla (*Cylindropuntia imbricata*), snakeweed (*Gutierrezia sarothrae*), sage species (*Artemisia ludoviciana*, *Artemisia frigida*), and skunkbush (*Rhus trilobata*). Low-growing herbaceous species include ricegrass (*Oryzopsis hymenoides*), New Mexico feathergrass (*Hesperostipa neomexicana*), spearleaf buckwheat (*Erigonum fendleriana*), three awn (*Aristida purpurea*), James' prairie clover (*Dalea jamesii*), stemless daisy (*Hymenoxys acaulis*), blue grama (*Bouteloua gracilis*), and hairy woolygrass (*Erioneuron pilosum*). Other less dominant shrubs include California brickellbush (*Brickellia californica*) and hoptree (*Ptelea trifoliata*), with diverse graminoids like little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), hairy grama (*Bouteloua hirsuta*), bush muhly (*Muhlenbergia porteri*), California oatgrass (*Danthonia californicus*), common wolfstail (*Lycurus phleoides*), poverty threeawn (*Aristida divaricata*), Scribner's needlegrass (*Stipa scribneri*), three-awn (*Aristida purpurea*), and sand dropseed (*Sporobolus cryptandrus*), plus large hedgehog cactus (*Echinocereus triglochidiatus*), dwarf Indian mallow (*Abutilon parvulum*), chickenthiel (*Mentzelia oligosperma*), and narrowleaf four o'clock (*Oxybaphus linearis*).

The ips beetle (*Ips confusus*) is an endemic insect to Colorado; however, between 2002 and 2005 Colorado experienced a large ips beetle outbreak in the piñon pine (Reed 2010). The 2002 drought seems to be one of the main stressors on the forest that lead to the outbreak. A number of small stands of piñon were infested around Cañon City in 2004, but the wet 2005 seemed to help facilitate the forest's recovery and resilience to the expansion of the ips beetle. The ips beetle population in the Cañon City vicinity returned to pre-outbreak numbers. Piñon mortality throughout the southwest during the three-year outbreak is estimated to be 25% (Reed 2010).

Stressed trees (i.e., drought, defoliation, pruning, or other damage) become highly susceptible to beetle infestations, especially during spring and early summer. Although thinning piñon-juniper woodland can improve woodland vigor, thinning activities can attract beetles by releasing terpenes. The ips beetle flight is tied to temperature and occurs multiple times a year – during spring and summer months (April to September) and can overlap.

The RGFO forester has been closely monitoring the ips beetle activity since 2004, and Parkdale is one of the last known active regions within the RGFO where mortality associated with the beetle is continuing.

J.F. Sato mapped the vegetation at each of the fabric panel locations in great detail (including the surrounding anchor locations). J.F. Sato (2007) and Neid (2007) describe the vegetation specific to each of the panel areas below.

County Line Area

J.F. Sato (2007) describes the vegetation at County Line as primarily consisting of open piñon-juniper woodland, especially on the north bank of the river, which is also characterized by large stands of scrub oak, prickly pear, yucca, and scattered ponderosa pine. Thinleaf alder occurs at several locations on the lower slopes near the floodplain. The vegetation of the open piñon-juniper woodland consists of a mixed herbaceous ground cover of common sagewort, snakeweed, and various grass species. Vegetation on the south side of the river is characterized by a large, nearly contiguous stand of rubber rabbitbrush that generally borders the upper banks

along the highway, as well as more open areas of mixed herbaceous and weedy vegetation. Other prominent species include scattered ponderosa pine, box-elder, skunkbrush, scrub oak, yucca, and piñon-juniper. As with most of the river corridor, grass/forb or mixed herbaceous vegetation occurs in open areas not dominated by trees or shrubs, and includes a number of grass species (blue grama, needle-and-thread, Indian ricegrass, smooth brome), common sagewort, and fringed sage. J.F. Sato mapped approximately 14.5 acres surrounding the County Line panel area, which is dominated by mixed herbaceous (4 acres), coyote willow (1 acre), piñon-juniper (0.9 acre), sparsely vegetated (0.9 acre), rock (0.8 acre), and sparsely vegetated rock (0.7 acre). A total of 24 other vegetation types comprise the remaining 6.2 acres at the County Line panel area.

Neid (2007) describes the County Line area as being bisected by the old Denver and Rio Grande Railroad (D&RG) that parallels the Arkansas River. It is on the north side of the river at the toeslope of rugged hillslopes that rise steeply out of the river valley. The hills are vegetated with rocky piñon-juniper woodland among myriad rock outcrops and ledges of gneiss bedrock. The dominant plant community in the uplands is piñon pine-juniper/blue grama (*Pinus edulis-Juniperus spp./Bouteloua gracilis*) woodland. Additional associated plant species include skunkbush (*Rhus trilobata*), currant (*Ribes leptanthum, Ribes cereum*), fringed sage (*Artemisia frigida*), Scribner's needlegrass (*Stipa scribneri*), needle-and-thread (*Hesperostipa comata*), western wheatgrass (*Pascopyrum smithii*), ricegrass (*Oryzopsis micrantha*), cactus species (*Echinocereus triglochidiatus, Opuntia polyacantha*), and bluntleaf spikemoss (*Selaginella mutica*), which are all common in this habitat.

Three ponderosa pines were mapped within the County Line panel area (BLM 2006).

Tunnel Area

Vegetation on the north side of the river is mapped by J.F. Sato (2007) as open piñon-juniper woodland with a sparsely vegetated and rocky ground cover. Ponderosa pine is scattered among the more prominent woodland, often farther down the banks toward the river. Other prominent species include scrub oak, big sagebrush, ground-cherry, and snakeweed. This area also contains several prominent areas of barren rock outcrops (J.F. Sato 2007).

J.F. Sato (2007) describes the vegetation on the south side of the river as characterized by relatively large areas of piñon-juniper woodland and an understory of mixed herbaceous and grass species. Rubber rabbitbrush occurs as a nearly continuous stand adjacent to the highway. Other common species include scrub oak and mountain mahogany. J.F. Sato mapped approximately 20 acres of vegetation at the Tunnel panel area, which is dominated by sparsely vegetated/rock (7.8 acres), open piñon-juniper (3.5 acres), rock (2.5 acres), and sparsely vegetated (1.4 acre). A total of 21 other vegetation types comprise the remaining 4.2 acres mapped at the Tunnel panel area.

Neid (2007) describes the Tunnel Potential Conservation Areas (PCA) containing dry, open cliffs and rock outcrops above the north side of the Arkansas River, where it winds around steep, rugged hillslopes before its confluence with Badger Creek. The steep hillsides above the river are sparsely vegetated with rocky piñon-juniper woodland (*Pinus edulis-Juniperus spp./Cercocarpus montanus woodland*). There is a railroad corridor on this side of the river with a tunnel through

the hillside. The river winds around a point of land where State Parks has established a campground.

BLM mapped one ponderosa pine within the Tunnel panel area (BLM 2006).

Vallie Bridge Area

J.F. Sato (2007) describes the Vallie Bridge area as containing relatively large stands of piñon-juniper woodland on the north side of the river, where there is a large, gentle slope between the railroad and the steeper slope to the river. Where the woodland is more disjunctive or open, the vegetation is composed of sparsely vegetated herbaceous and weedy cover (for example, snakeweed) or of rubber rabbitbrush, and scattered patches of poison ivy. The south side of the river contains many rocky, barren areas that alternate with expanses of rubber rabbitbrush that occur near the highway. This area also contains a few scattered junipers and thickets of clematis.

Neid (2007) describes the site as a swath of rugged foothills on the north-facing toeslope of the Sangre de Cristo Range. The Arkansas River has a broader floodplain in this vicinity, with small towns and irrigated hay meadows in the valley. The surrounding hills are comprised of piñon-juniper (*Pinus edulis*, *Juniperus monosperma*) woodland with some shrub cover from mountain mahogany (*Cercocarpus montanus*), Gambel oak (*Quercus gambelii*), skunkbush (*Rhus trilobata*), and rabbitbrush (*Chrysothamnus nauseosus*). Herbaceous species include many forbs, including Arkansas Canyon stickleaf (*Nuttallia densa*).

Texas Creek Area

J.F. Sato (2007) describes the Texas Creek area as containing a large amount of rock, especially between the railroad and the river on the north side, which includes areas of ballast. Vegetation here consists of scattered piñon, skunkbrush, rubber rabbitbrush, yucca, common sagewort, clematis, and mixed herbaceous grasses and weedy species. Vegetation on the south side of the river is more continuous, although rocky areas are also prominent. Rubber rabbitbrush dominates much of this area, but the vegetation is also characterized by scrub oak, piñon-juniper, skunkbrush, cholla, mountain mahogany, and open areas of mixed herbaceous species (snakeweed, blue grama, Indian ricegrass). A disturbed area pullout and parking area occurs in a relatively wide area between the highway and river at MM 254.22 to the end of the section in this area.

Neid (2007) describes the area between Texas Creek and Parkdale (including Maytag, Three Rocks, and Spikebuck) as a portion of the Arkansas River Canyon formed by dry, open, steep, granitic slopes covered with piñon-juniper woodland. The slopes have several steep, ephemeral drainages and are dissected by several broad sand/gravel wash drainages or gulches. The river is confined by transportation corridors on both sides in the canyon; it is paralleled by US 50 on the south bank and the old D&RG on the north side. There is a mix of natural habitat, such as gravel washes and steep, granitic slopes, and unnatural habitat including railroad and highway rights-of-way (ROWs). The unnatural habitat consists of riprap slopes of various size boulders (highway side) and sharp cobble (railroad side) that climb steeply away from the riverbanks. On the south side of the river there are frequent pullouts, as well as AHRA river access and infrastructure in the narrow area between the river and the highway. On the other sides of the highway and railroad from the river are steep hills and canyonsides, some of which are now road/railroad cuts, although the majority of the habitat is natural above the transportation infrastructure. The

sparse piñon-juniper woodland occurs in coarse sand and gravel soils and has a canopy of piñon pine (*Pinus edulis*), one-seeded juniper (*Juniperus monosperma*), and Rocky Mountain juniper (*Juniperus scopulorum*). Common shrubs include mock orange (*Philadelphus microphyllus*), wax currant (*Ribes cereum*), rabbitbrush (*Chrysothamnus nauseosus*), cholla (*Cylindropuntia imbricata*), snakeweed (*Gutierrezia sarothrae*), and sage species (*Artemisia ludoviciana*, *Artemisia frigida*). Herbs are largely dominated by graminoids like ricegrass (*Oryzopsis hymenoides*), Scribner's needlegrass (*Stipa scribneri*), three-awn (*Aristida purpurea*), and sand dropseed (*Sporobolus cryptandrus*).

Maytag Area

The Maytag area is described by J.F. Sato (2007) as being similar to the Texas Creek area in that rock and ballast dominate the north side of the river. The area between the railroad and river is narrow and the vegetation is sparse, consisting only of sparse clusters of rubber rabbitbrush and a few scattered junipers. The south side of the river contains better developed vegetation, although rock outcrops are also prominent. Dominant species include mixed mountain shrub of rubber rabbitbrush, scrub oak, skunkbrush, and an area of grass/forb mix (blue grama, Indian ricegrass, sand dropseed) with cholla and yucca. Junipers are scattered throughout this area (J.F. Sato 2007).

Three Rocks Area

The vegetation of the Three Rocks area is characterized by J.F. Sato (2007) as consisting of a mosaic of vegetation as well as sparsely vegetated or nearly barren areas of rock. Rock and ballast dominate the narrow area between the river and the railroad on the north side, but stands of rubber rabbitbrush and sparse herbaceous vegetation occur in several areas. A large stand of ponderosa pine, narrowleaf cottonwood, and river birch characterizes the vegetation at MM 259.20 on a bench where the railroad diverges away from the river. Although also rocky, the south side of the river here is characterized by long, continuous stands of rubber rabbitbrush, especially near the highway, with occasional ponderosa pine and river birch that occur on the lower slopes nearer the river.

Spikebuck Area

J.F. Sato (2007) describes the Spikebuck area as being similar to the Three Rocks area in that the north side between the river and the railroad is narrow and rocky, consisting mostly of fill material and ballast and containing mostly a few scattered stands of rubber rabbitbrush. Where the intervening area is wider, the vegetation consists of mixed grass/forb vegetation as well as some areas of grape, and mixed mountain shrub of rubber rabbitbrush, scrub oak, mountain mahogany, and widely scattered junipers. The south side of the river is again more diverse, with large stands of rubber rabbitbrush and scrub oak. Ponderosa pine is also prominent from approximately MM 262.55 to the eastern end of this section. Other vegetation is comprised of mixed herbaceous ground cover that consists of grass species (Indian ricegrass, blue grama), along with sagewort and cholla. This vegetation interfaces with mountain mahogany scrub.

Parkdale Area

J.F. Sato (2007) documented the greatest species diversity at the Parkdale panel area. The vegetation, however, is similar to that described for the Spikebuck and Three Rocks areas. Where the intervening area between the railroad and the river is narrow, barren or sparsely vegetated rock is common. Where this area widens, the vegetation consists of piñon-juniper woodland, scattered ponderosa pine, and mixed mountain shrub of rubber rabbitbrush and cholla. Occasionally, thickets of poison ivy occur in the shade of taller vegetation (J.F. Sato 2007).

The south side of the river is characterized by nearly continuous, narrow stands of rubber rabbitbrush, especially along the highway. However, ponderosa pine is prominent in some areas (for example, MMs 265.35, 265.56). Other common species include piñon-juniper-mountain shrub mix of juniper, scrub oak, mountain mahogany, and cholla, and also areas of mixed grass/forb vegetation that intermingle with the shrubs, including cholla (J.F. Sato 2007).

In March of 2006, the BLM inventoried trees large enough for bald eagle perching and roosting along the length of the river between Parkdale to just west of Cotopaxi where the canyon opens up near Howard. From that point on, only trees with known eagle uses were recorded on privately owned property. Some trees were mapped up to 200 feet from the river center line. The inventory recorded 93 ponderosa pine, 49 cottonwood, 2 juniper, and 1 miscellaneous deciduous tree (BLM 2006).

3.5.1.1 Burnable Vegetation/Wildland Fire

The Project Area is located entirely within the Middle Arkansas Fire Management Unit (FMU). Much of the Middle Arkansas FMU is characterized by steep, canyon terrain with narrow gulches and broken rock outcroppings, primarily on the north and south sides of the Arkansas River corridor (BLM 2004). Terrain severity decreases with distance from the river corridor (BLM 2004).

Most of the BLM-administered land within the Middle Arkansas FMU falls within the Low Montane ESR containing arid piñon pine and juniper (piñon-juniper woodland), with transition to ponderosa pine and mixed spruce/fir at higher elevations (BLM 2004). Closed canopy piñon-juniper woodlands have little or no herbaceous understory. Open stand piñon-juniper woodlands on the steeper slopes of canyon walls contain a mixture of short grass and mountain shrub species with scattered breaks in fuel continuity. There are limited stands of Aspen in select areas, with some containing an exclusive, mature and dominant overstory.

In the Middle Arkansas FMU, lightning-caused fires account for 84% of the fire occurrences, with the remaining human-caused occurrences involving railroad and abandoned campfires (BLM 2004). The majority of suppression fires occur between the months of May and August, but this FMU has experienced fires in every month of the year. Maximum annual temperatures rarely exceed 100° F during the primary fire season. Frequent summer season lightning storms are often accompanied by wetting rains.

Fires in Size Class A and B (0 to 0.25 acre and 0.26 to 9 acres, respectively) account for over 95% of historical fire occurrence from 1980 through 2003. Incidents in Fire Size Class C (10-99 acres) are infrequent, with only 4 being recorded since 1980. Incidents in Fire Size Class D, E, and F (greater than 100 acres) are rare, with only one occurrence recorded in each size class. Over 92% of all fires have occurred at Fire Intensity Level (FIL) 1-3. FIL is based on a burning index scale of 1-6 (with 1 being the

low end and 6 being the high end). The burning index is an estimate of the potential difficulty of fire containment as it relates to the flame-length at the head of a fire.

Wildland fire in the piñon-juniper cover type is typically slow moving and has low rates of spread and intensity (BLM 2004). The piñon-juniper fuel type requires higher sustained wind speed to drive the fire into the canopy, resulting in higher rates of spread and larger perimeter growth. A typical piñon-juniper lightning ignition, when associated with brief afternoon thunderstorm winds, will occasionally push the fire beyond Fire Size Class B; but as winds subside, these fires are usually contained within the initial burn period (BLM 2004). Stand replacing events are rare, but considerable potential exists in areas with adequate fuel continuity (BLM 2004).

Fire return interval (FRI) estimates for piñon-juniper communities vary widely from <30 years to over 300 years (Anderson 2002 and Scher 2002). The variation in fire intervals is largely the result of differences in fuel loading and species composition; where vegetation is sparse and unable to carry fire; fire-free intervals are much longer than in areas with a well-developed understory or greater tree density. In the Analysis Area, piñon-juniper communities are generally associated with mountain mahogany-Gambel oak-scrub communities with a FRI of <35 to <100 years. Additionally, the crown cover for the piñon-juniper along the river is generally less than 15% and there is very minimal ground cover, so fire spread rates and intensity levels are expected to be low to moderate (J.F. Sato 2007, 2009 field surveys).

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). The majority of the immediate Project Area is classified as Fire Regime III, which indicates that the fire return interval is approximately 35 to 100+ years and fires are likely to exhibit mixed severity (less than 75% of the dominant overstory vegetation replaced in a fire event).

Fire Regime Condition Class (FRCC) categorizes the landscape's departure from the natural fire regime into three Condition Classes. Condition Classes represent a spectrum of conditions from within the natural (historical) range (Condition Class 1) to substantially altered from the natural (historical) range (Condition Class 3). Although areas of Condition Class 1 and 3 exist within the overall Project Area, the lands immediately adjacent to project activity areas and the river corridor are generally classified as Condition Class 2. The National Wildfire Coordinating Group (NWCG) defines Condition Class 2 as:

Fire regimes have been moderately altered from their natural (historical) range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from natural frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation and fuel attributes have been moderately altered from their natural (historical) range. Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, in order to be restored to the natural fire regime.

3.5.2 Current Management Considerations

Current management consideration for vegetation is to protect cover and species diversity to the extent possible. There are no regulatory requirements or executive orders that are specific to overall

vegetation. BLM’s management objectives for vegetation and plant communities include (Proposed RMP/Final EIS [1995]):

- Attain a stable watershed and soil condition based on site potential.
- Overall trend, condition, and forage production are expected to improve.
- Manage vegetation to accomplish BLM initiatives included in Range of Our Vision, Riparian-Wetland Initiatives for the 90s, Forests Our Growing Legacy, and Fish and Wildlife 2000.

In addition, Standards for Public Land Health (healthy plant and animal communities) provide for maintaining residual vegetation to prevent erosion.

The management actions associated with these objectives are presented in Table 3-11.

Table 3-11. Relevant Management Actions for Vegetation and Plant Communities

Current Management Decision	Decision Source
An ecological site inventory is conducted by priority on most lands in the resource area.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Ecological site descriptions are developed on a priority basis for riparian areas, critical watersheds, and critical wildlife habitat.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Site-specific resource objectives, including specific Desired Plant Community (DPC), are identified in integrated activity plans and individual activity plans, and in most cases is a diverse community of grasses, shrubs, and trees that could be reasonably achieved.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Overall trend, condition, and forage production is monitored.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Maintenance, improvement, and/or manipulation of the existing vegetation will continue to be a priority concern for all actions.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Vegetation is disturbed annually by harvest, thinning, or other silvicultural treatment, resulting in a change in plant succession.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Vegetation on existing developed recreation sites as well as future developed recreation sites is disturbed annually by harvest, thinning, or other silvicultural treatment, resulting in a change in plant succession.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Vegetation is managed to accomplish other BLM initiatives, i.e., riparian, wildlife, etc.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-1
Improved vegetation management resulting in new forage is distributed on a case-by-case basis to either livestock or big game through cooperative efforts with federal and state agencies and private groups (i.e., the Colorado Habitat Partnership Program).	1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-1
Management of forest lands is for enhancement of other resource values.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-1
Preserve and protect riparian and wetland areas maintaining PFC and improve degraded vegetation for long-term health.	Statewide Standards and Guides Amendment 1996
Maintain productive plant and animal communities of native and other desirable species at viable population levels.	Statewide Standards and Guides Amendment 1996

3.5.2.1 Wildland Fire Management

The BLM RGFO developed a revised Fire Management Plan (FMP) in 2004, consistent with overarching federal wildland fire management policies. The 2004 FMP revision provides a foundation for integrating fire management with all other resource management programs administered by the RGFO (BLM 2004). It guides the ongoing decision-making process of evaluating and responding to fires on BLM lands in the RGFO planning area, and assists in achieving resource management objectives as defined in the RGFO RMP.

The purpose of the FMP is to identify and integrate all wildland fire management guidance, direction, and activities required to implement national fire policy and fire management direction from the Royal Gorge RMP.

The full range of wildland fire and fuels management practices can be implemented within this FMU, depending on current conditions, location, and values to be protected. Relevant fire management practices include suppression and wildland fire use (WFU).

Suppression Priorities

- In all cases, full suppression is the management response if wildland fire poses a threat to life or property.
- Suppress all wildland fire within 0.5 mile of adjoining land jurisdictions and wildland-urban interface (WUI) areas under an Appropriate Management Response strategy.
- Suppress all wildland fire at FIL 4 and above.
- Protect adjoining private land from unwanted wildland fire spread to the greatest extent possible.
- All human-caused ignitions will be aggressively suppressed.

Wildland Fire Use Priorities

- All natural ignitions will be evaluated and considered for WFU opportunities. However, WFU would only be applied when fires occur within well-contained, contiguous BLM lands, and when natural ignition occurs more than 0.5 mile away from adjacent land jurisdictions and WUI areas.
- The Healthy Forests Initiative (HFI) was launched in August 2002 with the goal of reducing wildfire risk to people, communities, and the environment. The HFI accomplishes these goals through administrative reforms and legislative action, including the 2003 Healthy Forests Restoration Act (HFRA). HFRA provides authority for expedited vegetation treatment on certain USFS and BLM lands, encourages fuels management and biomass removal, and provides assistance to watershed projects and silvicultural research.

3.6 NOXIOUS WEEDS AND INVASIVE SPECIES

3.6.1 Current Conditions and Trends

Noxious and invasive weeds are a threat to the biological diversity, integrity of native ecosystems, and individual populations of endemic species. Noxious and invasive weeds cause the loss of productive rangeland, loss of wildlife habitat, increased soil erosion, decreased biological diversity, risk to rare or sensitive species, and increased risk of fire. Interagency cooperative efforts have been made through the Upper Arkansas Regional Weed Management Cooperative to map and manage weeds, a partnership involving BLM, CDOT, NRCS, and State Parks.

Executive Order 13112, signed by President Clinton in 1999, sets up a mechanism to prevent the introduction of invasive species, provide for their control, and minimizes the economic, ecological, and human health impacts that invasive species cause. These weeds are primarily spread along roads, waterways, and trails through animals, vehicles, hikers, and soil disturbing activities.

Weeds are difficult to control unless there is regional land management cooperation between federal, state, county, and private groups. The Carlson-Foley Act (Public Law [P.L.]90-583), as well as state and county laws, holds the federal government responsible to control designated noxious and invasive weeds on federal land and provides direction on their control. Other state and federal acts facilitate the management of invasive and noxious weeds, such as the Federal Noxious Weed Act of 1974, Colorado Noxious Weed Act of 2003, and Colorado Executive Order D 006 99.

Table 3-12 is the list of invasive and noxious weeds for RGFO, Fremont County. Other weeds have been identified for Fremont County as potential weed invaders or have been posted for high alerts. Invasive and noxious weeds are highly aggressive competitors for native species and outcompete native species for resources, such as space, water, and nutrients, especially on disturbed sites. Some weeds have special adaptations for competing, such as increasing soil salinity and allelopathic chemicals.

Table 3-12. Noxious Weeds of Primary Concern in Project Area

Species	Common Name	BLM National List	State of Colorado	Fremont County	Observed Within Project Area
<i>Acroptilon repens</i>	Russian knapweed	X	List B	X	
<i>Cardaria draba</i>	Hoary cress	X	List B	X	
<i>Carduus nutans</i>	Musk thistle	X	List B	X	
<i>Centaurea diffusa</i>	Diffuse knapweed	X	List B	X	X
<i>Centaurea maculosa</i>	Spotted knapweed	X	List B	X	
<i>Cirsium nutans</i>	Canada thistle	X	List B	X	X
<i>Cirsium vulgare</i>	Bull thistle	X	List B	X	
<i>Cynoglossum officinale</i>	Houndstongue	X	List B	X	
<i>Euphorbia esula</i>	Leafy spurge	X	List B	X	
<i>Linaria genistifolia</i>	Yellow toadflax	X	List B	X	
<i>Linaria genistifolia</i>	Dalmatian toadflax	X	List B	X	
<i>Tamarix ramosissima</i>	Tamarisk	X	List B	X	X
<i>Bromus tectorum</i>	Cheatgrass	X	List C		X
<i>Verbascum thapsus</i>	Common mullien		List C		X
<i>Ulmus pumila</i>	Chinese elm	X	Not listed		X
<i>Brassica elongata</i>	Elongated Mustard	Not listed	Not listed	X	

List B weed species are species for which the Commissioner, in consultation with the state noxious weed advisory committee, local governments, and other interested parties, develops and implements state noxious weed management plans designed to stop the continued spread of these species:

List C weed species are species for which the Commissioner, in consultation with the state noxious weed advisory committee, local governments, and other interested parties, will develop and implement state noxious weed management plans designed to support the efforts of local governing bodies to facilitate more effective integrated weed management on private and public lands. The goal of such plans will not be to stop the continued spread of these species but to provide additional education, research, and biological control resources to jurisdictions that choose to require management of List C species.

In addition to the high priority listed weeds above, Table 3-13 lists the nonnative weed species documented in the J.F. Sato (2007) and Neid (2007) reports. EDAW updated the weed maps provided by BLM with field verification of the weed data in August 2009. All new occurrences were added to the GIS data. Observed weed species are shown on Maps 3-41 through 3-51. Many of the previously mapped weed infestations are no longer present and prior weed treatment efforts appear to have been successful, including tamarisk, Russian knapweed, and diffuse knapweed. Other invasive weed species that were ubiquitous throughout the Project Area included kochia, cheatgrass, and common mullien. Table 3-13 is a list of exotic species observed within the vicinity of the panel areas.

Table 3-13. Exotic Species Observed within the Vicinity of the Panel Areas

Species	Common Name
<i>Acroptilon repens</i>	Russian knapweed
<i>Agrostis stolonifera</i>	Redtop
<i>Bromus inermis</i>	Smooth brome
<i>Bromus tectorum</i>	Cheatgrass
<i>Centaurea diffusa</i>	Diffuse knapweed
<i>Cirsium canadensis</i>	Canada thistle
<i>Cirsium nutans</i>	Canada thistle
<i>Kochia scoparia</i>	Kochia
<i>Lactuca serriola</i>	Prickly lettuce
<i>Melilotus alba</i>	White sweetclover
<i>Salsola australis</i>	Russian thistle
<i>Sisymbrium altissimum</i>	Jim Hill mustard
<i>Tamarix parviflora</i>	Tamarisk
<i>Tamarix ramosissimum</i>	Tamarisk
<i>Tribulus terrestris</i>	Puncture vine
<i>Ulmus pumila</i>	Chinese elm
<i>Verbascum thapsus</i>	Common mullien

3.6.2 Current Management Considerations

The following state and federal acts and executive orders provide guidance for the treatment and management of noxious weeds.

- Carlson-Foley Act of 1968 (P.L. 90-583) directs federal agencies to enter upon lands under their jurisdiction having noxious plants (weeds), and destroy noxious plants growing on such land.
- Executive Order on Invasive Species 1999 coordinates federal strategy to address the growing environmental and economic threat of invasive species, plants, and animals that are not native to ecosystems of the U.S.

- Federal Noxious Weed Act of 1974 (P.L. 93-629) (7 U.S.C. 2801 et seq.), as amended by the Food, Agriculture, Conservation and Trade Act of 1990, Section 1453 (Section 15 - “Management of Undesirable Plants on Federal Lands”), directs federal agencies to have an office or person trained to coordinate an undesirable plant management program, adequately fund the program, implement cooperative agreements, and conduct Integrated Pest Management Techniques.
- Colorado Noxious Weed Act of 2003 empowers local governments to manage weeds on public or private land.
- Executive Order D 006 99 from the Governor of Colorado on Noxious Weeds on State Grounds mandates state agencies to develop and implement weeds management plans.

BLM’s management objective for noxious weeds and invasive species is to manage noxious weeds in accordance with the principles of integrated pest management, the Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States, Programmatic Environmental Impact Statement (June 2007) and the *Colorado Undesirable Plant Act* (Proposed RMP/Final EIS [1995]). The associated management actions are presented in Table 3-14.

Table 3-14. Relevant Management Actions for Noxious Weeds and Invasive Species

Current Management Decision	Decision Source
Cooperative efforts with county weed boards to control infestations are developed.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Methods used will include chemical, cultural, mechanical, and biological control.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Environmental assessments are tied to the Vegetation Treatment on BLM Lands Final EIS (1991).	Proposed RMP/Final EIS (1995)– Planning Area Wide

3.7 RANGE RESOURCES

3.7.1 Current Conditions and Trends

Cattle grazing is the only type of authorized grazing allowed on the 62 allotments in the Arkansas River sub-ecosystem of the Royal Gorge Planning area. Grazing occurs throughout all seasons, but the season of use varies by allotment. The allotments are managed to provide a rest period so that forage species can recover from the prior grazing period before the allotment is regrazed. This management practice allows forage to regrow, regain vigor, produce seeds and seedlings, and accumulate plant litter. Plant litter accumulation protects the soil surface from erosion and returns nutrients back to the soil.

There are 16 grazing allotments bordering the Project Area, from Salida east to Parkdale and totaling 162,182 acres (Map 3-52). Table 3-15 lists the grazing allotments in the Project Area, season of use, and management. BLM manages the rangeland based on the five health standards and eight grazing guidelines described in the BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (LHS & Gs) (BLM 1997). The standards and guidelines in the LHS & Gs are summarized below.

Land Health Standards

- Upland Soils
- Riparian

- Healthy Plant and Animal Communities
- Special Status, T & E Species
- Water Quality

Grazing Management Guidelines

- Promote Plant Health
- Address Season Duration, Distribution, Frequency, and Intensity; Kind, Number, and Class of Livestock
- Maintain Residual Vegetation to Prevent Erosion

- Emphasize Native Plants
- Design Improvement Projects Consistent with Ecological Function and Processes, and Minimize Adverse Effects on Other Resources
- Minimize Establishment and Spread of Noxious Weeds
- Manage for Sustainability and Adapt to Natural Events and Management Prescriptions that Promote Biodiversity
- Implement Colorado BMPs

The allotments are relatively large and range from 2,885 to 36,852 acres, with the exception of the McCoy Gulch allotment, which is only 195 acres. The grazing duration and season of use for the other allotments vary throughout the year, from spring grazing to winter grazing and totaling 6,807 Animal Unit Months (AUMs). Ten of the allotments are categorized as “Improve” and 5 are categorized as “Maintain.” Most livestock operations are cow-calf or cow-calf-yearling and calving and occur predominately in the spring.

Grazing is excluded on developed recreational sites and where conflict with recreation occurs. Livestock drift onto uncontrolled private land is managed through BLM fencing, cooperative projects, or grazing elimination. All allotments bordering the Project Area have been assessed and meet the Standards for Public Land Health. In addition, grazing use on these allotments complies with the Guidelines for Livestock Grazing Management in Colorado.

Table 3-15. Royal Gorge Resource Area Grazing Allotments, Between Salida to Parkdale, MMs 223–266

Allotment Name	Allotment No.	Location Mile		Season of Use Grazing Dates*	Animal Unit Months	Management Category/ Priority No. (1)	Land Treatment (2)
		Marker North/South of the River	Acres				
Wellsville	5005	223-227 North	4,471	04/10–05/31	182	M 68	None
Maverick Gulch	5091	227-230 North	3,910	12/01- 1/31	147 I	37	None
Badger Creek	5109	230-245 North	36,852	04/16–10/15*	1,203	I 1	Thin 4,054 ac
Table Mountain	15001	245-250 North	15,248	9/1–4/30	901	I 6	Thin 1,020 ac
Big Hole	15002	250-259 North	18,890	10/1–3/31	1,068	I 5	Burn 400 ac
Little Hole	15003	259-262 North	6,612	8/15 – 10/31	256	I 18	None
Parkdale	00004	262-266 North	1384	6/15–7/15* 7/16–8/31*	128	I 58	None
South Side Arkansas River South							
Bear Creek	15004	223-227	2,885	11/20–3/31	120	M 85	None
West Box Canyon	5179	227-232 South	5,395	05/15–10/15*	217	I 66	Thin 160 ac
Howard Creek	15008	232-237 South	880	03/01–05/31	69	M 34	None
Kerr Gulch Common	5006	237-242 South	5,754	05/01–09/30*	190	I 7	Thin 1,500 ac
Lower Granite	5027	242-245 South	3,454	12/01–04/30	182	M 80	Burn 400 ac
Sand Gulch Common	15007	245-248.5 South	3,741	03/01–05/31 12/01–02/28 03/01–05/31	696	I 56	Burn 1,000 ac
McCoy Gulch	15049	248.5-253 South	195	03/01–04/30	89	M 17	None
Texas Creek Common	15043	253-261 South	20,932	06/16–10/15*	1,263	I 4	None
Copper Gulch Common	15036	261-266 South	30,080	07/03–10/15*	1,026	I 2	Thin 1,600 ac

Source: Royal Gorge Resource Area Proposed Resource Management Plan and Final Environmental Impact Statement (BLM 1995).

Royal Gorge Resource Area, Cañon City District, Colorado (BLM 1995).

*Dates overlap the proposed viewing period of OTR

(1) Priority Number: Ranking of the “improve (I) and maintain (M)” category allotments for investment of public funds for range improvements. Range improvements include fences, spring development, water catchments, reservoirs, water pipelines, water troughs, cattleguards, wells, and water tanks. The specific type of studies will be determined by the integrated activity plan (IAP) objectives.

(2) Land Treatment: Proposed vegetation treatment to improve forage production, which include prescribed burning and selective thinning.

The major allotments on the north side of the river that are grazed during the winter season are Table Mountain and Big Hole. These allotments rely heavily on the river for water, especially during the winter months when alternative sources are frozen. Typical December, January, and February average low temperature is 25°F (Weatherunderground 2010). During other times of the year, the cattle may use alternate water sources. In addition to the Arkansas River, there are 10 known water access points for cattle on these allotments. Known water sources are provided in Table 3-16. Other watering areas may exist south of the Arkansas River; however, their locations are not documented.

The allotments located south of the river terminate at US 50. Since no ground disturbing or other project activities are proposed for areas located south of the highway, these allotments are not discussed in further detail.

A number of these grazing allotments include public access roads with cattle guards and some fencing, restricting cattle movement. The railroad crosses through all of the allotments on the north side of the river.

Table 3-16. List of Alternate Water Sources in the Project Area

Water Sources	Allotments
Longfellow Gulch	Wellsville
Fern Creek	Table Mountain
Badger Creek	Badger Creek
Maverick Gulch	Maverick
Reese Gulch	Big Hole
Texas Creek Gulch	Big Hole
Hindman Gulch	Big Hole
Echo Canyon	Big Hole
Spikebuck Gulch	Little Hole and McCoy
McCoy Gulch	Little Hole and McCoy

3.7.2 Current Management Considerations

The Royal Gorge RMP EIS (BLM 1995) provides the current management guidelines for grazing in the Project Area. The RMP defines three objectives for range management and how grazing is managed:

- Maintain current resource condition
- Manage to improve resource conditions
- Manage to prevent resource deterioration

Additionally, associated management actions for range resources are presented in Table 3-17.

Table 3-17. Relevant Management Actions for Range Resources

Current Management Decision	Decision Source
Livestock grazing management is based on the 1981 Royal Gorge Area Grazing EIS in all eco-subregions. A number of management decisions were carried forward from that EIS.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Allotment Management Plans will continue to be used to prescribe management objectives and achieve the grazing management programs on an interim basis until replaced with integrated activity plans (IAPs).	Proposed RMP/Final EIS (1995)– Planning Area Wide
Grazing allotments in the planning area have been assigned to one of three management categories. The Maintain category allotments generally are managed to maintain current satisfactory resource conditions; Improve category allotments generally are managed to improve resource conditions; and Custodial category allotments will receive custodial management to prevent resource deterioration. Allotments are categorized as follows: Improve allotments (25); Maintain allotments (3); Custodial allotments (32); Unallotted allotments (2)	Proposed RMP/Final EIS (1995)– Planning Area Wide; 1996 RMP ROD – Eco-Subregion 1 (Arkansas River) #1-8
Based on monitoring studies, corrective action is taken if IAP objectives are not being met. Livestock use adjustments will most often be made by changing one or more of the following: class of livestock, season of use, stocking rate, or the grazing management system. Although most livestock use adjustments will occur in the Improve category allotments, use adjustments could occur in the Maintain and Custodial category allotments. Changes are made through an EA or RMP revision.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Current poor condition allotments with ecological site inventory (ESI) data are reevaluated and appropriateness of management levels of use to meet current objectives is determined. ESI is conducted on allotments with conflicts, and stocking rates and season of use is adjusted accordingly.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Livestock grazing is excluded in historical sites (potential NRHP sites), if a threat of damage exists, and in developed recreation sites.	Proposed RMP/Final EIS (1995)– Planning Area Wide; 1996 RMP ROD – Eco-Subregion 1 (Arkansas River) #1-6
Assessments of impacts to vegetation are based on expectations of normal precipitation during the life of the plan.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Cattleguards are required for public roads on lands allocated for grazing.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Livestock grazing season of use and stocking rates based on 1981 grazing EIS and existing monitoring data will continue. Livestock grazing is prioritized based on IAPs resolution of conflicts with riparian areas, critical wildlife habitat, and ACECs.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River) #1-2 and #1-3
Grazing is authorized on 42 allotments.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River) #1-4
Grazing is restricted on the High Mesa Grasslands portion (1,454 acres) of the Arkansas Canyonlands ACEC.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River) #1-5
Livestock “drift” onto uncontrolled private land is eliminated through a combination of BLM fencing, cooperative projects, or by eliminating grazing.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River) #1-7

Current Management Decision	Decision Source
Native plant species and natural revegetation are emphasized in the support of sustaining ecological functions and site integrity. Where reseeding is required on land treatment efforts, emphasis is placed on using native plant species. Seeding of nonnative plant species is considered based on local goals, native seed availability and cost, persistence of nonnative plants, annuals, and noxious weeds on the site, and composition of nonnatives in the seed mix.	Statewide Standards and Guides Amendment 1996
Range improvement projects are designed consistent with overall ecological functions and processes, with minimum adverse impacts to other resources or uses of riparian/wetland and upland sites.	Statewide Standards and Guides Amendment 1996
Natural occurrences of fire, drought, and flooding and prescribed land treatments should be combined with livestock management practices to move the sustainability of biological diversity across the landscape. This would include the maintenance, restoration, or enhancement of habitat to promote and assist the recovery and conservation of threatened, endangered, or other special status species by helping to provide natural vegetation patterns, a mosaic of successional stages, and vegetation corridors, which would minimize habitat fragmentation.	Statewide Standards and Guides Amendment 1996
Colorado Best Management Practices (BMP) and other scientifically developed practices that enhance land and water quality should be used in the development of activity plans prepared for land use.	Statewide Standards and Guides Amendment 1996
Little Hole allotment's grazing permit was renewed for 10 years under the condition that a grazing use analysis be conducted as scheduled under the trial period.	Allotment Modification & Permit Renewal EA for Little Hole Allotment # CO-200-2007-0034 EA
Maintain existing roads on allotment for administration purposes.	Allotment Modification & Permit Renewal EA for Little Hole; Allotment # CO-200-2007-0034 EA
Create four pastures on the Parkdale Allotment and analyze both winter and summer grazing use with restrictions and renew the grazing permit for ten years.	Allotment Modification & Permit Renewal EA for Parkdale Allotment # CO-200-2007-0054 EA
Improvement of the existing trail from Parkdale to Somerville Table, and construction of new fences.	Allotment Modification & Permit Renewal EA for Parkdale Allotment # CO-200-2007-0054 EA
Acquire an administrative easement connecting the Fremont County Road to the existing Parkdale Trail on BLM administered land.	Allotment Modification & Permit Renewal EA for Parkdale Allotment # CO-200-2007-0054 EA
Grazing permits were renewed for the Park Ditch, Hecla Junction East, Hecla Junction West, and Wellsville Allotments for 10 years.	Grazing Permit Renewal DNA #CO-200-08-0042 and CO-200-08-0044
A grazing permit for the West Box Canyon Allotment was renewed for 10 years with changes in the terms and conditions.	Grazing Permit Renewal EA CO-200-2009-0033
A grazing permit for the Badger Creek Allotment was renewed for 10 years with allotment management changes.	Badger Creek Allotment EA # CO-057-99-120 EA
Grazing permits were renewed for 10 years for each allotment with minor changes/additions to the terms and conditions of the existing permits. Ten allotments were renewed within the Royal Gorge Creek Fifth Level Watershed. In addition, changes in the AUMs on the Big Hole Allotment and the transfer of permits for Big Hole and Race Path Allotments were made.	Grazing Permit Renewal EA # CO-200-2006-0017 EA

Relevant regulatory management requirements through Acts and Technical Notes are provided below.

- BLM-M-4180 (Rangeland health standards) developed a handbook that set a standard.
- Colorado Public Land Health Standards and Guidelines for Livestock Grazing Management (BLM 1997).
- Public Rangelands Improvement Act of 1978 (43 U.S.C. 1901) reaffirms the federal government's commitment to the free range of horses, burros, and livestock on public land and manage and improve range production.
- Technical Notes 365: Hydrology and USLE: application to rangelands.
- Technical Notes 369: Considerations in rangeland watershed monitoring.
- The rangeland programmatic memorandum of agreement among BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers.

3.8 THREATENED, ENDANGERED, AND SENSITIVE SPECIES

This section addresses all wildlife and plant species protected by the Endangered Species Act (ESA) as Federally threatened or endangered, BLM Sensitive, and Colorado State threatened or endangered. Federally threatened and endangered species are referred to as "T&E" or "T&E Species;" T&E Species, BLM Sensitive species, and State listed species are referred to collectively as "special status species."

3.8.1 Current Conditions and Trends

Species listed under the ESA of 1973 as threatened, endangered, or candidate species are protected under the U.S. Code of Law and managed by USFWS. ESA protects all species listed as T&E, and USFWS has the authority to enforce the unlawful taking ("to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct") of T&E wildlife.

Candidate species under ESA are species the USFWS has enough information to warrant proposing, but is precluded from listing because of higher priorities. USFWS works with states, tribes, private landowners, private partners, and other federal agencies to prevent further decline and possibly eliminate the need for listing these candidate species. USFWS also protects all native bird species under the MBTA; these species are addressed in Avian Wildlife and Habitat (Section 3.2).

The BLM sensitive species list includes those species that are sensitive to the potential of becoming endangered or extinct in Colorado. The ESA requires federal agencies to ensure that all actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any T&E species, or result in the destruction or adverse modification of their critical habitat. In addition, BLM policy requires that BLM sensitive species are given the same consideration and protection as listed species. The BLM sensitive species designation is intended to focus species management efforts towards maintaining habitats under a multiple use mandate, consider species when making land management decisions, prevent species from listing under ESA, and prioritize conservation work (BLM on-line 1 and 2).

Species listed as threatened, endangered, or species of special concern by the State of Colorado are managed by CDOW. State T&E species have no federal legal protection, though they are protected under the Chapter 10 regulations set by CDOW for game and nongame species discussed in Terrestrial

Wildlife and Habitat (Section 3.1). State T&E species are only afforded additional funding as stated in Title 33 Article 2-102 of the Colorado State Statues:

The general assembly finds and declares that it is the policy of this state to manage all nongame wildlife, recognizing the private property rights of individual property owners, for human enjoyment and welfare, for scientific purposes, and to insure their perpetuation as members of ecosystems; that species or subspecies of wildlife indigenous to this state which may be found to be endangered or threatened within the state should be accorded protection in order to maintain and enhance their numbers to the extent possible; that this state should assist in the protection of species or subspecies of wildlife which are deemed to be endangered or threatened elsewhere; and that adequate funding be made available to the division annually by appropriations from the general fund, (CDOW 2006).

Tables 3-18 and 3-19 provide a list of special status wildlife and plant species reviewed for inclusion in the OTR special status species analysis. This list is based on recent USFWS, CDOW, and BLM lists for Chaffee and Fremont counties (USFWS Letter of February 3, 2006; USFWS 2009). This list has also been evaluated using data from 2009 field observations and desktop research (Kingery 1998, Hammerson 1999, Fitzgerald et al. 1994, NDIS 2006, NatureServe 2006 and 2009, BLM online 1). Maps 3-53 and 3-54 show areas of suitable habitat and overall range for T&E wildlife and plants, respectively.

Table 3-18. Special Status Wildlife Species Reviewed for Further Analysis

Common Name	Scientific Name	Status	Habitat Notes	Retained for Further Analysis?
Mammals				
Big free-tailed bat	<i>Nyctinomops macrotis</i>	BLM		Yes
Black-footed ferret	<i>Mustela nigripes</i>	FE, SE	Open prairie grasslands habitat or prairie dog towns	No – No suitable habitat
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>	SC	Prairie and grassland species	No – No suitable habitat
Botta's Pocket Gopher (rubidus ssp)	<i>Thomomy bottae rubidus</i>	SC	Closest known occurrence is located near Florence, and suitable habitat occurs at Vallie Bridge (Ark Ecological Services 2007).	Yes
Canada lynx	<i>Lynx canadensis</i>	FT, SE	Suitable habitat of sub-alpine forest or sub-alpine willow riparian.	No – No suitable habitat
Fringed myotis	<i>Myotis thysanodes</i>	BLM		Yes
Gunnison's prairie dog	<i>Cynomys gunnisoni</i>	FC	Sagebrush, <10,000 ft, <30 degree slope	Yes
Northern river otter	<i>Lutra canadensis</i>	ST	Unconfirmed sightings of river otter scat during 2009 survey	Yes
Preble's Meadow Jumping Mouse	<i>Zapus hudsonius preblei</i>	FT, ST		No – No suitable habitat; out of species' range
Swift fox	<i>Vulpes vulpes</i>	SC	No shortgrass prairie habitat in Project Area and not recorded in Fremont County (Fitzgerald et al. 1994).	No – No suitable habitat
Townsend's big-eared bat*	<i>Corynorhinus townsendii</i> spp. <i>Pallescens</i>	BLM, SC	Two known maternity roosts in Analysis Area	Yes
Yuma myotis	<i>Myotis yumanensis</i>	BLM		Yes

Common Name	Scientific Name	Status	Habitat Notes	Retained for Further Analysis?
Birds				
Bald eagle*	<i>Haliaeetus leucocephalus</i>	SC	Bald eagles are common winter residents in the Project Area.	Yes
Barrow's goldeneye	<i>Bucephala islandica</i>	BLM	Local winter resident at Sands Lake and river corridor near Salida 1 mile from Analysis Area (Ark Ecological Services 2007).	Yes
Black tern	<i>Chlidonias niger</i>	BLM	No suitable freshwater marsh habitat. Closest known breeding locations in the San Luis Valley 60 miles south of the Analysis Area (Kingery 1998).	No – No suitable habitat; out of species' range
Ferruginous hawk	<i>Buteo regalis</i>	BLM, SC	No suitable prairie grassland habitat (Kingery 1998). May occur as a migrant.	No – No suitable habitat
Gunnison sage grouse	<i>Centrocercus minimus</i>	SC	No suitable expansive sagebrush habitat (CDOW web). Closest known population occurs about 5 miles from the Analysis Area on Poncha Pass.	No – No suitable habitat; out of species' range
Lewis' woodpecker*	<i>Melanerpes lewis</i>	BLM	There is one known nesting location for Lewis' woodpecker within the Analysis Area (BLM data).	Yes
Long-billed curlew	<i>Numenius americanus</i>	SC	No suitable prairie grassland habitat. Closest known breeders are 60 miles east of the Project Area (Kingery 1998).	No – No suitable habitat; out of species' range
Mexican spotted owl	<i>Strix occidentalis</i>	FT, ST	Breeding is known from 7-10 miles northeast and southeast of the Project Area (Kingery 1998).	Yes
Mountain plover	<i>Charadrius montanus</i>	BLM, SC	No suitable prairie grassland habitat. Closest breeding occurrence is 15 miles north of the Analysis Area in South Park (Kingery 1998).	No – No suitable habitat; out of species' range
Northern goshawk	<i>Accipiter gentiles</i>	BLM	Commonly nests in ponderosa and aspen forest up to 10,000ft. Analysis Area may not have large enough forest blocks to support goshawk. Nearest nesting location about 4.5 miles south of the Project Area (BLM GIS data).	Yes
Peregrine falcon*	<i>Falco peregrinus anatum</i>	SC	Suitable habitat and a nesting territory within 1 mile of Analysis Area. A peregrine was spotted sitting on a cliff a few hundred meters from the Project Area during 2009 summer surveys.	Yes
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>	BLM, SC	No suitable playa or evaporated shoreline habitat. Closest known breeding locations in the San Luis Valley 60 miles south of the Analysis Area (Kingery 1998).	No – No suitable habitat; out of species' range
White pelican	<i>Pelecanus erythrorhynchos</i>	BLM, SC	No suitable large water body with island habitat. Nearest breeding record is from Antero Reservoir 30 miles north of the Project Area in South Park (Kingery 1998).	No – No suitable habitat

Common Name	Scientific Name	Status	Habitat Notes	Retained for Further Analysis?
White-faced ibis	<i>Plegadis chihi</i>	BLM	No suitable reservoir/pond, marsh, wet hay meadow habitat. Closest known breeders are in the San Luis Valley 60 miles south of the Analysis Area (Kingery 1998).	No – No suitable habitat; out of species' range
Fish				
Arkansas darter	<i>Etheostoma cragini</i>	FC, SE	The range for this fish is from Arkansas and Missouri up the Arkansas River to El Paso and Pueblo counties in Colorado (NatureServe 2006).	No – No suitable habitat; out of species' range
Flathead chub	<i>Hybopsis gracilis</i>	BLM, SC	Suitable fast moving turbid main stem river habitat, historical occurrence in the upper Arkansas to Salida, but recent collections suggest the upstream limit is a large diversion structure near Florence (NDIS 2006).	Yes
Greenback cutthroat trout	<i>Oncorhynchus clarki stomias</i>	FT, BLM, ST	A critical greenback population has been identified in the Hayden Creek drainage, adjacent to the Project Area (CDOW pers. comm. 2010).	Yes
Iowa darter	<i>E. exile</i>	BLM, SC	No records in the Arkansas River drainage, closest known occurrence in northeast Colorado in the Platte River drainage (NatureServe 2009).	No – No suitable habitat; out of species' range
Orangethroat darter	<i>E. spectabile</i>	BLM, SC	The fish is present in the lower Arkansas River basin in Kansas, Oklahoma, and Arkansas, but only the Republican drainage in CO (NatureServe 2009).	No – No suitable habitat; out of species' range
Plains topminnow	<i>Fundulus sciadicus</i>	BLM	Found in small tributaries and main stem of the South Platte (NDIS 2009)	No – No suitable habitat; out of species' range
Southern redbelly dace	<i>Phoxinus erythrogaster</i>	SE	No suitable slow flowing habitat, however collections from the Arkansas River at Cañon City in 1965 found single individuals and the one Colorado occurrence is known from a tributary of the Arkansas River near Pueblo downstream of the Project Area (NDIS 2006).	Yes
Stonecat	<i>Noturus flavus</i>	BLM, SC	This species only occurs in Colorado in the South Platte R. basin (NatureServe 2006).	No – No suitable habitat; out of species' range
Amphibians				
Boreal toad	<i>Bufo boreas boreas</i> pop 1 (Southern Rocky Mt. population)	SE	No suitable high elevation (between 8,500 and 12,000 feet in this area of Colorado) habitat, out of range (personal observation).	No – No suitable habitat; out of species' range
Northern cricket frog	<i>Acris crepitans</i>	BLM, SC	Presumed extirpated from the historic occurrences in the lower South Platte and Republican River in Colorado (Hammerson 1999). It occurs in Nebraska and Kansas and the lower Arkansas River basin downstream of Colorado (NatureServe 2006).	No – No suitable habitat; out of species' range

Common Name	Scientific Name	Status	Habitat Notes	Retained for Further Analysis?
Northern leopard frog	<i>Rana pipiens</i>	BLM, SC	No known records from the Project Area but known breeding occurs within 2 miles of the Analysis Area in Salida (personal observation).	Yes
Plains leopard frog	<i>R. blairi</i>	SC	Although hybridization of the plains and northern leopard frog occurs where the two species ranges overlap in eastern Fremont and western Pueblo counties on the Arkansas River (personal observation), generally the western half of Fremont County is considered out of the plains leopard frog range (Hammerson 1999).	No – Out of species' range
Reptiles				
Common kingsnake	<i>Lampropeltis getula</i>	BLM, SC	There are only records from Bent, Otero, Las Animas, and Montezuma counties in Colorado (Hammerson 1999).	No – Out of species' range
Massasauga	<i>Sistrurus catenatus</i>	BLM, SC	This species occurs on the shortgrass prairie with the closest known occurrences 60 miles east of the Project Area in eastern Pueblo and El Paso Counties (Hammerson 1999, NDIS 2006).	No – No suitable habitat; out of species' range
Texas horned lizard	<i>Phrynosoma cornatum</i>	BLM, SC	This species occurs on the shortgrass prairie with the closest known occurrences 60 miles east of the Project Area in eastern Pueblo County (Hammerson 1999, NDIS 2006).	No – No suitable habitat; out of species' range
Colorado Checkered Whiptail*	<i>Aspidoscelis neotesselata</i>	SC.	Closest known occurrence is near the confluence of Tallahassee Draw and the Arkansas River, and suitable sparsely vegetated canyon habitat occurs within the Project Area (Hammerson 1999, Ark Ecological Services 2007).	Yes
Utah milksnake	<i>L. triangulum taylori</i>	BLM	The subspecies taylori occurs in west-central Colorado with some intergradation between subspecies (Hammerson 1999). Hammerson (1999) suggests taxonomic intergradations in this species are arbitrary.	No - Out of species' range
Invertebrates				
Pawnee Montane Skipper	<i>Hesperia leonardus montana</i>	FT	No suitable tall grass foothills grassland habitat. Critical habitat occurs 50 miles north of the Project Area in Douglas and Jefferson Counties (USFWS 200X).	No – No suitable habitat; out of species' range
Uncompahgre fritillary butterfly	<i>Boloria acrocneuma</i>	FE	No suitable alpine habitat (NatureServe 2006).	No – No suitable habitat; out of species' range

Key: FE = Federally endangered, FT = Federally threatened, FC = Federal Candidate Species, SE = State endangered, ST = State threatened, SC = State species of special concern, BLM = Bureau of Land Management sensitive species, * indicates known occurrence within the Analysis Area.

Table 3-19. Special Status Plant Species Reviewed for Further Analysis

Common Name	Species Name	Status	Habitat Notes	Retained for Further Analysis?
Rock-loving aletes	<i>Neoparrya lithophila</i>	BLM SR	Potential habitat could occur within the Project Area.	Yes
Golden columbine	<i>Aquilegia chrysantha</i> <i>var. rydbergii</i>	SR	Plants known only from 3 to 5 locations in Colorado (depending on definitions) and about 1,500 individuals (NatureServe 2006). Prefers riparian habitats and rocky ravines in mountainous regions of Fremont and El Paso counties (CNHP 1999). Plants are fairly abundant in a 60-sq.-mi. area between Colorado Springs and Cañon City. USFWS listed the species in Notice of Review for Listing as Endangered or Threatened in 1985 (NatureServe 2006). It is not expected in the river corridor.	No – Out of species' range
Dwarf milkweed	<i>Asclepias uncialis</i>	BLM, SR	TNC ranks this species critically imperiled because of rarity. Preferred habitat is shortgrass prairie on mesa tops and on the plains (Weber 1999, CNHP 1998). Is most commonly found on sandstone-derived soils or on gravelly/rocky slopes between 4,000 and 6,500 feet. The species occurs in eastern Fremont County, but habitat is not present in the Arkansas R. corridor and the species is not expected to occur in the Project Area.	No – No suitable habitat
Low northern sedge	<i>Carex concinna</i>	BLM, SR	Occurs in cool moist forest with mosses on rich peaty soils at elevations between 8,800-10,500ft (Spackman et al. 1997).	No – No suitable habitat
Livid sedge	<i>Carex livida</i>	SR	Species ranges from Canada south to Colorado where it is critically imperiled and very rare (NatureServe 2006). The preferred habitat is bogs and it is known only from Jackson, Larimer, and Park counties in the Platte R. drainage (NatureServe 2006). It is not expected in the Arkansas R. corridor.	No – No suitable habitat
Grassy slope sedge	<i>Carex oreocharis</i>	BLM	Species occurs on well developed grassland on older alluvium or more substantial bedrock types (Neid 2009). Not likely to occur due to limited grassland within the constricted canyon.	No – No suitable habitat
Little green sedge	<i>Carex viridula</i>	BLM, SR	Species ranges from Canada to NM and is critically imperiled in Colorado. It occurs in Gunnison, Jackson, LaPlata, Park, and San Juan counties and in the drainages of the Platte and Colorado Rivers (NatureServe 2006). It is not expected in the Arkansas R. corridor.	No – Out of species' range
Brandegeee wild buckwheat	<i>Eriogonum brandegeei</i>	BLM, SR	Potential habitat could occur within the Project Area.	Yes
Slender cottongrass	<i>Eriophorum gracile</i>	SR	Species ranges from Alaska to California and Colorado, where it is imperiled. It is known from Grand, Gunnison, Jackson and Park counties, and in the Platte and Colorado River headwaters (NatureServe 2006). It is not expected in the Arkansas R. corridor.	No – No suitable habitat

Common Name	Species Name	Status	Habitat Notes	Retained for Further Analysis?
Showy prairie gentian	<i>Eustoma exaltatum ssp. russellianum</i>	BLM, SR	Species ranges from Colorado and Nebraska to Mexico. It occurs in 10 counties in CO, including Fremont (USDA 2006). The plant is native to prairies and fields and is not expected in the Arkansas R. corridor.	No – No suitable habitat
Penland's alpine fen mustard	<i>Eutrema penlandii</i>	FT, BLM, SR	Species is endemic to a 24-mile length of the Continental Divide near the border of Park and Summit counties. This taxon is the only Eutrema in the US (NatureServe 2006). It is known from Mosquito Pass west of the river corridor but fens are not present in the Arkansas R. corridor.	No – No suitable habitat
Northern twayblade	<i>Listera borealis</i>	BLM, SR	Occurs in moist, spruce forests at elevations 8,700 - 10,800 feet (CNHP 1997). Site conditions are not appropriate and outside of elevation range.	No – No suitable habitat; out of elevational range
Golden blazing star	<i>Mentzelia chrysantha</i>	BLM, SR	Species is categorized by TNC as critically imperiled and is vulnerable to extirpation from the state. Plant is endemic to the Arkansas R. Valley between Pueblo and Cañon City. Preferred habitat is on barren slopes of limestone, shale, or clay at elevations from 5,120 to 5,700 feet (CNHP 1998). Because this habitat is not present and elevations are too high, this species is not expected to occur in the Arkansas R. corridor.	No – No suitable habitat; out of elevational range
Arkansas Canyon stickleaf	<i>Mentzelia densa</i>	* SR	Potential habitat could occur within the Project Area.	Yes
Few flowered ragwort	<i>Packera pauciflora</i>	SR, BLM	This member of the Aster family is critically imperiled in Colorado, which is the southern extent of its range. It is known only from Park County in the S. Platte River drainage (NatureServe 2006). It is not expected in the Arkansas River corridor.	No – No suitable habitat
Arkansas River feverfew	<i>Parthenium tetraeuris</i>	SR	Although usually associated with piñon-juniper woodlands at elevations of 5400 to 5750 ft, this species is associated with barren, light colored shale and limestone benches and knolls, derived from the Smoky Hill shale and the Fort Hays limestone members of the Niobrara Formation and the Greenhorn limestone formation (gypseous shale) (NatureServe 2009). The closest habitat with Niobrara shale barrens is in Cañon City	No – No suitable habitat
Degener beardtongue	<i>Penstemon degeneri</i>	BLM, SR	Potential habitat could occur within the Project Area.	Yes
Greenland primrose	<i>Primula egaliksensis</i>	BLM, SR	This primrose family member only occurs in Wyoming and Colorado in the US where it is critically imperiled and imperiled, respectively. In Colorado, it occurs only in Park County in the S. Platte River drainage (USDA 2006). It is not expected in the Arkansas River corridor.	No – Out of species' range

Common Name	Species Name	Status	Habitat Notes	Retained for Further Analysis?
Porter's featherglass or false needlegrass	<i>Ptilagrostis porteri</i>	SR	This grass is endemic to Colorado in Park, Summit and El Paso counties. It is in the Fountain Cr. Drainage but not known in the Arkansas main stem (USDA 2006). Habitat is subalpine meadow, willow bogs, and boggy wetlands elevated above the water table (NatureServe 2006). Habitat is not present in the Arkansas R. corridor and the plant is not expected.	No – No suitable habitat
Silver willow or sageleaf willow	<i>Salix candida</i>	SR	This shrub willow ranges from Canada to Colorado. It is known from four counties in Colorado but not Chaffee or Fremont. Is known to be in the upper S. Platte R. drainage and upper tributaries to the Colorado R. (NatureServe 2006). It is not expected in the Arkansas R. corridor.	No – No suitable habitat
Low blueberry willow	<i>Salix myrtifolia</i>	SR	This shrub is not expected to occur within the project area since it occurs in calcareous fens and likely only occurs at higher elevations within the Arkansas River Headwaters.	No – No suitable habitat
Autumn willow	<i>Salix serissima</i>	SR	This shrub occurs only at higher elevations (7,800 to 9,300 feet) in Chaffee County and is not expected to occur with the Project Area.	No – No suitable habitat; out of elevational range

BLM=BLM sensitive; FC=Federal candidate species; FE=Federal endangered; FT=Federal threatened; SR=State rare; *indicates known from the Analysis Area.

Source: J.F. Sato 2007 amended to reflect additional information

3.8.1.1 Animal Species

Special status wildlife species carried forward for analysis are shown in Table 3-20.

Table 3-20. Wildlife Species Retained for Further Analysis

Common Name	Scientific Name	Status
Federally Listed or Candidate Species		
Gunnison's prairie dog	<i>Cynomys gunnisoni</i>	FC
Canada Lynx	<i>Lynx canadensis</i>	FT, SE
Mexican spotted owl	<i>Strix occidentalis lucida</i>	FT, ST
Greenback cutthroat trout	<i>Oncorhynchus clarki stomias</i>	FT, ST, BLM
State Listed		
Botta's pocket gopher (rubidus ssp)	<i>Thomomys bottae rubidus</i>	SC
Peregrine falcon*	<i>Falco peregrinus anatum</i>	SC
Colorado checkered whiptail*	<i>Aspidoscelis neotesselata</i>	SC
Townsend's big-eared bat*	<i>Corynorhinus townsendii spp. Pallescens</i>	SC, BLM
Flathead chub	<i>Hybopsis gracilis</i>	SC, BLM
Northern leopard frog	<i>Rana pipiens</i>	SC, BLM
Southern redbelly dace	<i>Phoxinus erythrogaster</i>	SE
Northern river otter	<i>Lutra canadensis</i>	ST
Bald eagle*	<i>Haliaeetus leucocephalus</i>	ST
BLM Sensitive		
Big free-tailed bat	<i>Nyctinomops macrotis</i>	BLM
Fringed myotis	<i>Myotis thysanodes</i>	BLM

Common Name	Scientific Name	Status
Yuma myotis	<i>Myotis yumanensis</i>	BLM
Barrow's goldeneye	<i>Bucephala islandica</i>	BLM
Lewis' woodpecker*	<i>Melanerpes lewis</i>	BLM
Northern goshawk	<i>Accipiter gentilis</i>	BLM

Key: FE = federally endangered, FT = federally threatened, FC = Federal Candidate Species, SE = state endangered, ST = state threatened, SC = state species of special concern, BLM = Bureau of Land Management sensitive species, *indicates known from the Analysis Area.

The federally listed or candidate species shown in Table 3-20 have only marginal habitat within the Project Area; however, they are being carried forward for analysis because of the potential for indirect effects to suitable habitat. Designated Critical Habitat for the Mexican spotted owl occurs within 8 miles of the Project Area.

a. Mammals

Big free-tailed bat (*Nyctinomops macrotis*). The big free-tailed bat occurs mainly in southern California, Arizona, New Mexico, Texas, and Mexico. Only a few have been documented in Colorado, on both sides of the Continental Divide and as high as Gunnison (at 7,700 feet) (CDOW 2010). This is the largest bat found in Colorado, but little is known of their occurrence or natural history. Generally they are moth feeders that roost in cliff crevices and buildings. There are no breeding records from Colorado and just a scant five records statewide of occurrence, indicating that Colorado might be out of breeding range and only hosts occasional wandering bats (Fitzgerald 1994). Potential habitat with rough cliff country occurs in the Analysis Area, but the big free-tailed bat would be expected only as a rare migrant. There are no documented occurrences of this species in the Project Area.

Botta's pocket gopher (*Thomomys bottae*). This species prefers sandy soils in valley bottoms and riparian areas. They can be found in agricultural areas, grasslands, roadsides, piñon-juniper woodland, open montane forest, montane shrubland, and semidesert shrubland. Botta's pocket gopher feeds primarily on seeds, tubers, roots, and green vegetation. Insects make up less than 20% of their diet. Breeding in Colorado occurs March through July, with a 19-day gestation period and a single litter each year; young disperse in late summer and early fall. They dig complex burrow systems of both shallow and deep tunnels; nests are found about 38 cm below ground. This species is active year-round and densities range from 10 to 150 per hectare. Fitzgerald et al. 1994 illustrates the species distribution of Botta's pocket gopher to cover most of Fremont County and a small portion of southeastern Chaffee County, and further cites two populations of the Coloradan species of *Thomomys* within 0.5 mile of each other, approximately 6 miles north of Cotopaxi (Vaughan and Hansen 1964, as cited in Fitzgerald et al. 1994). There is suitable habitat for the Botta's pocket gopher within about several hundred feet of the Vallie Bridge panel area (Ark Ecological Services 2007, personal observation); however, there are no documented occurrences of this species in the Project Area.

Fringed myotis (*Myotis thysanodes*). The fringed myotis is uncommon in Colorado and is found in ponderosa woodlands, greasewood, oakbrush, and saltbush. Caves, mines, and buildings are used as maternity colonies, solitary day and night roosts, and hibernacula. They feed on a broad variety of insects near the plant canopy, picking prey off the vegetation in slow controlled flight (Fitzgerald et al. 1994). There is potential habitat for this bat in the Analysis Area.

Gunnison's prairie dog (*Cynomys gunnisoni*). The Gunnison's prairie dog is a yellowish buff color mixed with black above; slightly paler below with a short, white-tipped tail. It is the smallest of the three prairie dog species found in Colorado: approximately 12 to 14 inches in length, between 12 to 15 inches tall, weighing about 23 to 42 ounces. Gunnison's prairie dogs inhabit grasslands and semidesert and montane shrublands (Fitzgerald et al. 1994), and are a keystone species of the sagebrush ecosystem (USFWS). Their diet consists mostly of grasses and sedges, and they do not require open water sources. Gunnison's prairie dogs hibernate from October through mid-April. The species' distribution in Colorado is limited mostly to the southwestern portion of the state, and includes both Chaffee and Fremont County. The USFWS has determined that populations of the Gunnison's prairie dog located in central and south-central Colorado and north-central New Mexico are warranted for protection under the ESA. However, listing these populations at this time is precluded by pending actions for other species with higher listing priorities (USFWS). There is potential for this species to occur in the Project Area; however, there are no documented occurrences of this species in the Project Area.

Northern river otter (*Lutra canadensis*). Northern river otters are believed to have occurred in most major waterways of Colorado at the turn of the twentieth century. Settlement activities, such as trapping, pollution, and water level flux during the early 1900s caused the otter to disappear from Colorado. In the 1970s, CDOW started a reintroduction program in the otter's historical range. Otters were introduced to the South Platte, Dolores, and upper Colorado rivers (CDOW 2009b). Current surveys and sightings suggest that the species is surviving, and CDOW has downgraded the listing status from endangered to threatened. River otters inhabit riparian areas ranging from semidesert shrubland to montane, and subalpine forest covering a variety of ecosystems. Suitable otter habitat is composed of a perennial water source of high quality, access to shores, ice-free reaches in winter, and an abundant fish population. Historical habitat in Colorado mostly consisted of relatively large rivers at moderate or low elevations (Fitzgerald et al. 1994). River otters are not known to be present within the Arkansas River drainage, and the closest records are in the South Platte drainage over 30 miles from the Analysis Area in Park County (NDIS 2009).

Townsend's big-eared bat (*Corynorhinus townsendii*). Bat species in the Analysis Area utilize the natural caves and mine shafts for colonial roosting and trees and rock crevices for individual roosts. Bats also require flat water areas for drinking and insect hatches for feeding. Both drinking and feeding likely draws bats into the Project Area along the river. The Townsend's big-eared bat is on the BLM and USFS sensitive list, is a state species of concern, and the BLM considers it imperiled in the state because of its rarity. This bat species inhabits semidesert shrublands, piñon-juniper woodlands, and open montane forests. These bats predominantly use caves, abandoned mines for day roosts and hibernacula, but also use rocky crevices and buildings as refugia. Townsend's are late flyers, emerging after dark to feed on caddisflies, moths, and flies. Much of the foraging occurs over water and along the vegetation margin, gleaning insects from leaves. They are easily disturbed and will leave caves or mines where human harassment occurs (Fitzgerald et al. 1994). Winter retreats to hibernacula in early fall are followed by breeding in the hibernacula in late fall and winter. Young are born in May or June, and females assemble into maternity colonies forming dense clusters for shared heat. Females leave young to feed. During surveys in 1993, Townsend's big-eared bat was documented within the Royal Gorge region of the Arkansas River (Navo 1999 as cited in J.F. Sato 2007). Four roost sites have since been documented within the Analysis Area: a fall/winter hibernaculum in the vicinity of Tallahassee Creek north of the river, a roost site just west of Wellsville, a fall/winter roost just east of Cleora (in close proximity to the maternity roost), and a maternity roost east of Salida near Longfellow Gulch. There is also a summer roost in the Royal Gorge area (Navo 1999 as cited in J.F. Sato 2007). The winter hibernacula could be within a 0.5 mile of the Parkdale Project Area; the maternity roost could be within 0.5 mile of the County

Line Project Area. Of the 15 known maternity roosts in the state, one is located just west of Wellsville (within the Project Area) and one is located in proximity to Cleora (CDOW pers. com. 2010).

Yuma myotis (*Myotis yumaensis*). Similar in size to the common little brown bat (*Myotis lucifugus*), the Yuma myotis is a small bat but paler than the more common myotis. This bat is associated with riparian areas in semi-arid canyonlands in Colorado. An early forager, these bats feed low over water (within a few centimeters of the surface) on aquatic insects, moths, flies, beetles, and grasshoppers. Breeding is documented in Colorado (Fitzgerald et al. 1994). There is potential habitat for this bat in the Analysis Area.

b. Birds

Bald eagle (*Haliaeetus leucocephalus*). In Colorado, bald eagles are often found near reservoirs and rivers with abundant prey, such as fish. In 2001, there were about 51 nesting pairs of bald eagles in the state (CDOW on-line species profile). NDIS (2008) identifies 106 active nest locations. In Colorado, bald eagles use large trees often located along rivers and reservoirs for their nest sites (Kingery 1998). Colorado is also host to a large number of wintering bald eagles. There are 136 areas identified as winter concentrations covering close to 5,000 square kilometers (NDIS 2008). NDIS (2008) also identifies three winter concentrations and three roost sites in the Analysis Area, one roost site in the Vallie Bridge Project Area, and the whole river corridor within the Analysis Area is an eagle forage area. Finer-scale BLM data shows confirmed bald eagle roost trees 0.2, 1, and 1.1 miles upstream of the Tunnel project area, three confirmed bald eagle roost trees 0.3 to 0.5 and one 2.1 miles downstream, and two others at 1.3 and 1.4 miles upstream of the Vallie Bridge project area. There are 12 confirmed bald eagle roost trees 0.4 to 0.6 miles upstream of the Texas Creek project area (J.F. Sato 2007). In a typical year, no more than 4 to 5 bald eagles winter along the river from Parkdale to Salida between late November and March (Brekke 2006 as cited in J.F. Sato 2007). The majority of bald eagle use in the Analysis Area occurs along private lands in the Howard, Coaldale, and Swissvale areas where there are large perch trees along the river; and the area from Parkdale to Texas Creek has less use (Brekke 2006 as cited in J.F. Sato 2007). A bald eagle nest occurs approximately 8 miles northeast of the Analysis Area on Four-mile Creek (J.F. Sato 2007).

Barrow's goldeneye (*Bucephala islandica*). The Barrow's goldeneye is a cavity nester. Early collectors found this species common in the central and southern mountains of Colorado in the 1870s; it was nearly a century before they were recorded again in the Flat Tops in 1982 (Preston n.d. as cited in Kingery 1998). In Colorado, they are primarily found nesting at shallow, high elevation lakes in the Flat Tops Wilderness in the north-central part of the state (Kingery 1998). Numbers of Barrow's goldeneye are estimated to be around 150,000 on the west coast from California to Alaska. Colorado is on the edge of their primary range and only supports about 100 breeding pairs (Kingery 1998). The Project Area does not support suitable breeding habitat for this species. However, it is possible that they would migrate through the Project Area. Observations of Barrow's goldeneye in Chaffee County have been reported by Rocky Mountain Bird Observatory (RMBO) during the annual Barrow's goldeneye counts each November.

Lewis' woodpecker (*Melanerpes lewis*). Lewis' woodpecker is a USFS/BLM sensitive species and is on the Colorado Partners in Flight Watchlist. They nest primarily along riparian corridors in old decadent cottonwood trees within sight of piñon-juniper or ponderosa pine. Lewis' woodpecker is a specialist, feeding almost exclusively on emergent insects during breeding season (Kingery 1998). There is a nesting location for Lewis' woodpecker within 1 mile downstream of the Vallie Bridge project area (J.F. Sato 2007).

Mexican spotted owl (*Strix occidentalis lucida*). The Mexican spotted owl occurs in Colorado along the Rocky Mountain Front Range between SH 69 near Walsenburg to as far north as the Rampart Range southwest of Littleton (NDIS 2009). The Mexican spotted owl also occurs in far southwestern Colorado near Mesa Verde National Park. Breeding activity occurs in rocky canyons or forested mountains below 9,500 feet, preferring old-growth conifer habitat (Kingery 1998). They can also inhabit sparsely forested canyons (Willey n.d. as cited in Kingery 1998). It is thought that they prefer these habitats for the shaded cool microclimates, forage, and nesting (Ganey et al. 1993 as cited in Kingery 1998). This species was listed in 1993 due to forest management practices (e.g., even-age silviculture) and risk of catastrophic fire (USFWS 1995). High counts from Colorado tallied 20 owls with 7 breeding pairs in 1993 (Kingery 1998). The Mexican spotted owl occurs on the periphery of the Project Area, 7 to 10 miles to the northeast and southeast, respectively, of the proposed panel locations.

Northern Goshawk (*Accipiter gentilis*). Habitat for the goshawk varies by region, but in southern Colorado they tend to choose ponderosa pine forests. They also tend to nest in forest stands with large, older trees and relatively open canopies (Kingery 1998). This species requires large patches of mature matrix forest, preferring open understory for hunting. Goshawks typically use the same territory year to year and often will have a few alternate nest locations (Kingery 1998). The northern goshawk breeds in the Project Area.

Peregrine falcon (*Falco peregrinus anatum*). The peregrine falcon has rebounded from a population of 4 nesting pairs in Colorado in 1977 to 68 pairs nesting in 1985 (Kingery 1998). They have been removed from the federal endangered species list and currently are monitored as a species of special concern by CDOW. Peregrine falcons prefer to nest on ledges of high cliffs and mate for life (CDOW on-line species profile). Nests located in more assessable sites, such as dikes, have not withstood increasing human disturbance. Preferred habitats for the falcon include piñon-juniper or ponderosa pine forests, and are near water and plentiful prey. An ideal eyrie also is in an area with little disturbance (Kingery 1998). Three nests have been located near the Analysis Area. The nest locations are shown in Map 3-53, beginning just east of the Analysis Area. A peregrine was spotted sitting on the cliffs a few hundred meters from the Project Area at MM 264.5, and soaring over the river at MM 261 on July 9, 2009. One peregrine falcon nest is located approximately 4.7 miles from the Parkdale panel area at the Royal Gorge (Brekke 2010). This pair of falcons nesting in the Royal Gorge has successfully fledged up to four offspring in a given year and has successfully fledged young most years, probably due to the high quality of the surrounding habitat for peregrines (Bibles 2006 as cited in J.F. Sato 2007). The Project Area is within suitable habitat and hunting range of the peregrine nest sites, and the Spikebuck and Parkdale panel areas occur within the 10-mile foraging range of their nest site (Craig 1999 as cited in J.F. Sato 2007). Peregrine falcons prey on small mammals and medium to small-size birds.

c. Fish

Flathead chub (*Hybopsis gracilis*). The flathead chub is a large minnow that can reach a length of 9 inches. Habitat for the flathead chub includes main stem rivers and streams with sand or gravel substrates, and turbid waters (NDIS 2009). Reports of the flathead chub in the Arkansas River main stem up to Salida, where the river is a coldwater trout fishery, were common in the early twentieth century (Ellis 1914 as cited in NDIS 2009). A large diversion structure west of Florence is thought to have restricted the species' upstream mobility on the Arkansas River (NDIS 2009).

Greenback cutthroat trout (*Oncorhynchus clarki stomias*). The state fish of Colorado, the greenback, is native to the headwaters of the Arkansas and South Platte River drainages. The greenback cutthroat

trout is a federally and state threatened species as well as being on the BLM and USFW sensitive lists (CDOW online species profile). The numbers of greenback took a precipitous decline due to overstocking nonnative trout, overfishing, and pollution to the point of near extinction around 1900. In 1973, two small populations were discovered and reintroduction efforts since have returned the species to about 5% of its native range (Greenback Recovery Plan, CDOW online species profile). Currently, the species primarily occupies ponds and upper tributaries of the South Platte and Arkansas River drainages. The closest known occurrences are approximately 5 miles south of Coaldale within the Analysis Area (Aragon 2010). This trout is adapted to cold, clear, well-oxygenated mountain ponds and streams with moderate gradients, rocky to gravelly substrates, and abundant riparian vegetation. Historically the greenback occurred at lower elevations than it does today, but the exact river and stream distribution is unclear (Greenback Recovery Plan); therefore, it is unclear if the Analysis Area on the main stem is within the historic range. Any occurrences of the greenback cutthroat trout in the main stem of the Arkansas River would be considered rare.

Southern redbelly dace (*Phoxinus erythrogaster*). The redbelly dace is a small fish currently known in only one small, slow flowing, clear spring-fed creek near Pueblo approximately 20 miles downstream of the Project Area (Miller 1982 as cited in NDIS 2006). The stream has abundant algal growths, substrate of deep silt deposits, abundant riparian vegetation that provides shade, and the water can get very warm with low dissolved oxygen (NDIS 2006). Additionally, single individuals of the southern redbelly dace were collected in 1965 in the Arkansas River in Pueblo and Cañon City (Seilheimer n.d. as cited in NDIS 2006), and by Miller (1982 as cited in NDIS 2006) in Turkey Creek in Pueblo County. The preferred southern redbelly dace habitat of cool springs or seeps with undercut banks, heavy cover, and clear water do not occur within the Project Area. However, the southern redbelly dace is retained for further analysis because the project is within the species historic range. Although flooding and periods of high water are the prime dispersal agents, carrying fish, especially young fish, to downstream areas (Bertrand and Gido 2004), adult fish in streams probably move upstream (Stasiak 2007). Because this species is an r-selected species, one capable of rapid recolonization when conditions are suitable (Stasiak 2007), it is difficult to rule out. Historic populations within the Arkansas River have been documented at Cañon City and Pueblo. Any occurrences of the southern redbelly dace in the main stem of the Arkansas River would be considered rare, especially as high up as the Analysis Area.

d. Amphibians

Northern leopard frog (*Rana pipiens*). This frog species occurs throughout much of Colorado, except for the southeastern portions of the state where the plains leopard frog (*Rana blairi*) range begins (Hammerson 1999). The dividing line occurs in eastern Fremont County approximately 20 miles downstream of the Analysis Area; however, there tends to be hybridization between the plains and northern leopard frog in southeast Colorado (personal observation). Population declines in Colorado are primarily due to habitat loss and degradation, and especially due to competition with bull frogs (NatureServe 2002, CDOW 2006). Typical habitat for the northern leopard frog includes wet meadows and shallows and banks of marshes, ponds, lakes, reservoirs, streams, and irrigation ditches. Leopard frogs are most often found at the water's margin but will also disperse from this habitat, especially during wet weather or just after metamorphosis (personal observation, Hammerson 1999). Although observations of northern leopard frogs have not been documented within the Analysis Area, suitable habitat exists within the Project Area and known breeding occurs within 2 miles of the Analysis Area in Salida (personal observation).

e. Reptiles

Colorado checkered whiptail (*Aspidoscelis neotesselata*). This all female species occurs in southeast Colorado, with the Analysis Area falling in the northwestern edge of the known range. This lizard is tolerant of some disturbance and is known to occur in rural landfill sites. It prefers grassland or grassland-juniper hillsides, canyons, and dry washes within the Arkansas River Valley (Hammerson 1999). Suitable habitat exists within the Analysis Area, and there is a documented occurrence near the confluence of Tallahassee Draw (Hammerson 1999).

3.8.1.2 Plant Species

Special status plant species carried forward for analysis are shown in Table 3-21.

Table 3-21. Plant Species Retained for Further Analysis

Common Name	Species Name	Status	Retained for Further Analysis?
Rock-loving aletes	<i>Neoparrya lithophila</i>	BLM	Yes
Brandegee wild buckwheat	<i>Eriogonum brandegeei</i>	BLM, SR	Yes
Arkansas Canyon stickleaf	<i>Mentzelia densa</i>	*SR	Yes
Fendler's false cloak fern	<i>Argyrochosma fendleri</i>	SR	Yes
Degener beardtongue	<i>Penstemon degeneri</i>	SRBLM	Yes

Key: FC = Federal Candidate Species, SR = State Rare, BLM = Bureau of Land Management sensitive species, *indicates known from the Analysis Area.

Rock-loving aletes (*Neoparrya lithophila*). This member of the parsley family is formerly a federal candidate, BLM sensitive, and State rare. The rock-loving aletes is a narrow endemic, largely known in the San Luis Valley, that inhabits igneous rock outcrops or sedimentary rock derived from tertiary volcanic rocks with little soil development, such as shelves, crevices, and loose gravel on steep inaccessible cliffs (Anderson 2004). It is found at elevations between 7,000 and 10,000 feet and tends to prefer north-facing cliffs and ledges within piñon-juniper woodlands (O’Kane 1988; Peterson et al. 1981a). The rock-loving aletes flowers in May to early July and fruits in late June-September.

Brandegee wild buckwheat (*Eriogonum brandegeei*). The Brandegee wild buckwheat is a mat forming perennial with deep woody taproots. It inhabits steep, unstable slopes and pedestals, with much of its woody roots exposed. The Brandegee wild buckwheat has erect, densely hairy leaves that give it a blue-green look, and it flowers and fruits during July/August. It grows in open piñon/juniper and sagebrush in white to grayish soil derived from limestone or sandstone in the Morrison Formation and Dry Union Formation between elevations 5,775-8,400 feet. (O’Kane 1988). No suitable geology or populations of Brandegee wild buckwheat were found in the panel areas. The Brandegee wild buckwheat in the Castle Gardens PCA is the largest known population (Anderson 2006a). It grows in the greatest densities on fine-textured soils on steep, eroding slopes where there is virtually no other vegetation (Neid 2007). Focused surveys for this species were conducted by CNHP and results are discussed below.

Arkansas Canyon stickleaf (*Mentzelia densa*). The Arkansas Canyon stickleaf is a shrubby plant in the shape of a tumbleweed. It has lemon yellow flowers that open after 6 p.m. and close around 9 p.m. (Spackman Panjabi 2004). The Arkansas Canyon stickleaf is endemic to the Arkansas River Canyon between Salida and Cañon City, especially between Texas Creek and Parkdale. It grows in granite bedrock and dark shale in sparsely vegetated, gravelly substrates like rocky cliffs and outcrops, as well as

sand and gravel washes (O’Kane 1988). This member of the blazing star family is a stress-tolerant, annual or short-lived perennial species that tends to prefer ruderal or disturbed environments (Darlington 1934). The Arkansas Canyon stickleaf produces numerous flowers and dies shortly after setting seed. It is inherently mobile and is likely dispersed by gravity, especially along roads and railroads. Focused surveys for this species were conducted by CNHP and results are discussed below.

Fendler’s false cloak fern (*Argyroschisma fendleri*). This xeric fern grows in crevices of granitic or volcanic cliffs and rock outcrops in the southern Rocky Mountains in Colorado (Flora of North America Editorial Committee 1993). Its range includes southeastern Wyoming to New Mexico and to the Sonoran region of Mexico. The Fendler’s false cloak fern is diminutive in size, occurs in small sporadic populations, and is difficult to detect. Little is known about this species’ habitat restrictions and unoccupied habitat is prevalent surrounding known populations. Focused surveys for this species were conducted by CNHP and results are discussed below.

Degener beardtongue (*Penstemon degeneri*). This member of the figwort family is a low-growing perennial herb on loose, poorly developed granitic soils in open piñon-juniper woodland or open ponderosa pine (Neid 2007). Reproductive timing of this species fluctuates from year to year and may not reflect abundance of different species of pollinators (Nielson 1998, Tepedino et al. 1999). Leaves are lanceolate, entire and up to 6 cm long, and the cauline leaves are more pubescent. When flowering, the plant lacks a basal rosette. The corolla of the flower is dark blue to violet and inflated. The corollas are slightly ridged on the floor and have straight, reddish guides and sparse yellow hairs on the throat. Focused surveys for this species were conducted by CNHP and results are discussed below.

3.8.1.3 Focused Surveys

CNHP performed rare plant surveys for those species where suitable conditions occurred at the eight OTR panel areas and surrounding parcels (Neid 2007). The species surveyed by CNHP are listed in Table 3-22 below.

Table 3-22. List of Species Found by Neid

Scientific Name	Common Name	Global Rank	State Rank	Flowering Period ¹	Life Cycle
<i>Argyroschisma fendleri</i>	Fendler's false cloak fern	G3	S3	n/a	Perennial
<i>Eriogonum brandegeei</i>	Brandegee wild buckwheat	G1G2	S1S2	July-August	Perennial
<i>Lesquerella calcicola</i>	Rocky Mountain bladderpod	G2	S2	late May-early June ²	Perennial
<i>Mentzelia densa</i>	Arkansas Canyon stickleaf	G2	S2	July-early August	Annual
<i>Mentzelia speciosa</i>	Jeweled blazingstar	G3?	S3?	July-September ²	Perennial
<i>Neoparrya lithophila</i>	Rock-loving aletes	G3	S3	May-early July	Perennial
<i>Pellaea wrightiana</i>	Wright's cliffbrake	G5	S2	n/a	Perennial
<i>Penstemon degeneri</i>	Degener beardtongue	G2	S2	mid June-mid July	Perennial
<i>Townsendia fendleri</i>	Fendler's Townsend daisy	G2	S1	July-Sept ²	Perennial

¹ From Spackman et al. (1997) and Weber and Whittman (2001)

² CU Museum (2006)

Species listed in BOLD are regional endemics.

Source: Neid 2007

Ranking Defined:

The conservation status of a species or ecosystem is designated by a number from 1 to 5, preceded by a letter reflecting the appropriate geographic scale of the assessment (G = Global), N = National, and S = Subnational). The numbers have the following meaning:

1 = critically imperiled

2 = imperiled

3 = vulnerable

4 = apparently secure

5 = secure.

For example, G1 would indicate that a species is critically imperiled across its entire range (i.e., globally). In this sense, the species as a whole is regarded as being at very high risk of extinction. A rank of S3 would indicate the species is vulnerable and at moderate risk within a particular state or province, even though it may be more secure elsewhere.

(NatureServe 2009)

CNHP developed PCAs to identify areas that would need to be conserved to protect these rare or special status species. Table 3-23 lists the PCAs as they relate to each of the panel areas. Table 3-24 lists the elements found at each of the PCAs and which BLM parcel they fall within. PCAs depict planning areas for occurrences of vulnerable species and plant communities. PCAs approximately capture the ecological processes that are necessary to support the continued existence of one or more elements of natural heritage significance (CCLT 2009). The proposed boundary does not preclude activities within the PCA, but instead designates ecologically significant areas in which land managers may wish to consider how specific activities or land use changes affect natural heritage resources and sensitive species on which the PCA is based (Neid 2007).

CNHP found Arkansas stickleaf and Fendler's false cloak fern within the panel areas (Neid 2007).

Table 3-23 shows the species that were found at each panel section and a summary of individual Arkansas stickleaf found within each of the panel areas.

Other rare species were found, including brandegeee wild buckwheat at the Castle Garden PCA; Rocky Mountain bladderpod and Wright's cliff brake at the Grape Creek Water Gap PCA; Fendler's townsend daisy and *Aletes lithophilus* at King Gulch PCA; and degener beardtongue, Fendler's cloakfern, and jeweled blazingstar at the McIntyre Hills PCA. Map 3-54 shows all PCAs in relation to the panel sections.

Table 3-23. Number of Arkansas Stickleaf Found at Each of the Panel Areas

Panel Section	PCA Name	Biological Diversity Rank	Element Present	Number of Arkansas Canyon Stickleaf Individuals within OTR Panel Sections		
				North Side of River	South Side of River	South Side of US 50
County Line Section	County Line	B2	<i>Mentzelia densa</i> , <i>Argyrochosma fendleri</i>	383	0	0
Tunnel Section	Badger Creek Tunnel	B2	<i>Mentzelia densa</i>	151	0	0
Vallie Bridge Section	Vallie	B3	<i>Mentzelia densa</i>	0	12	46
Texas Creek Section	McIntyre Hills	B2	<i>Mentzelia densa</i>	1577	1	0
Maytag Section	McIntyre Hills	B2	<i>Mentzelia densa</i>	169	9	0
Three Rocks Section	McIntyre Hills	B2	<i>Mentzelia densa</i>	183	15	0
Spikebuck Section	McIntyre Hills	B2	<i>Mentzelia densa</i>	706	194	307
Parkdale Section	McIntyre Hills	B2	<i>Mentzelia densa</i>	1041	69	87

B2 -Very High Significance:

B- or C-ranked occurrence of a G1 element

or B-ranked occurrence of a G2 element

One of the most outstanding (for example, among the five best) occurrences rangewide (at least A- or B-ranked) of a G3 element.

Concentration of A- or B-ranked G3 elements (four or more)

Concentration of C-ranked G2 elements (four or more)

B3 - High Significance:

C-ranked occurrence of a G2 element

or B-ranked occurrence of a G3 element

D-ranked occurrence of a G1 element (if best available occurrence)

Up to five of the best occurrences of a G4 or G5 community (at least A- or B-ranked) in an ecoregion (requires consultation with other experts)

Source: Neid 2007

Table 3-24. Natural Heritage Features at BLM Parcels

Parcel Name	PCA Name	Elements Present*
Big Hole	McIntyre Hills	<i>Argyrochosma fendleri</i> , <i>Mentzelia densa</i>
Castle Garden	Castle Gardens	<i>Eriogonum brandegeei</i>
Five Points	McIntyre Hills	<i>Mentzelia densa</i> , <i>Penstemon degeneri</i>
Grape Creek	Grape Creek Water Gap	<i>Lesquerella calcicola</i> , <i>Pellaea wrightiana</i>
Kings Gulch	Kings Gulch	<i>Neoparrya lithophila</i> , <i>Townsendia fendleri</i> *
Tenderfoot Hill Area	Tenderfoot Hill	<i>Neoparrya lithophila</i> , <i>Mentzelia densa</i>
Salida East AHRA	none	none; potential, but unverifiable, occurrence of <i>Mentzelia speciosa</i>
Texas Creek Area	McIntyre Hills	<i>Argyrochosma fendleri</i> , <i>Mentzelia densa</i> , <i>Mentzelia speciosa</i>

Source: Neid 2007

The results of the Neid (2007) survey are described below for each of the panel areas.

County Line Area

CNHP ranks the County Line PCA as Very High Biodiversity Significance. Populations of both the Arkansas Canyon stickleaf and Fendler's cloak-fern were observed within the County Line panel area. A total of 383 Arkansas Canyon stickleaf individuals were found. No T&E species were identified. The County Line PCA is ranked as B2-Very High Biodiversity Significance.

Tunnel Area

A total of 151 Arkansas River stickleaf were found on the north side of the river. No other rare or threatened or endangered plants were found during the Neid surveys. The Badger Creek/Tunnel PCA is ranked as B2-Very High Biodiversity Significance.

Vallie Area

Several populations of the Arkansas River stickleaf were identified, totaling 12 between the river and US 50 (south of the river) and 46 south of US 50 (Neid 2007). No other rare or sensitive species were found in the vicinity of the Vallie panel area. The Vallie PCA is rated as B3-High Biodiversity Significance.

Texas Creek, Maytag, Three Rock, Spikebuck, and Parkdale Areas

The McIntyre Hills PCA includes the Texas Creek, Maytag, Three Rocks, Spikebuck, and Parkdale panel areas. The McIntyre Hills PCA represents the largest known population of Arkansas River stickleaf in the world (Neid 2007). The Texas Creek panel area contains 1,577 individuals north of the river and one individual south of the river (Neid 2007). The McIntyre Hills PCA is rated as B2-Very High Biodiversity Significance.

3.8.2 Current Management Considerations

3.8.2.1 Wildlife Species

a. Endangered Species

ESA protects federally listed threatened and endangered species. USFWS has the authority to enforce the unlawful taking of wildlife listed as threatened or endangered. The closest known listed species are the Mexican spotted owl, Canada lynx, and greenback cutthroat trout. Designated critical habitat for the Mexican spotted owl occurs within 8 miles of the project footprint; however, there is no suitable habitat for this species in the Project Area and it is unlikely for them to be hunting along the river. The Canada lynx has been reintroduced in Colorado, but no suitable habitat for this species exists within the Project Area. The greenback cutthroat trout has important habitat in the headwaters of the Arkansas River drainage and a known population within the Analysis Area approximately 5 miles south of the Coaldale area (Aragon 2010). In addition, potential habitat for the federal candidate species, Gunnison's prairie dog, exists within the Project Area, although no known records for this species exist in the Arkansas River corridor.

b. Migratory Bird Treaty Act

MBTA decreed that all migratory birds (native to the U.S. or its territories) and their parts (including eggs, nests, and feathers) were fully protected. Language from the treaties (with multiple nations) is adopted

in Title 16 Chapter 7 of the U.S. Code. The USFWS has the authority to enforce the unlawful taking of migratory birds. The Secretary of the Interior is “authorized and directed to determine when, to what extent, if at all, and by what means, it is compatible with the terms of the conventions to allow hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any such bird, or any part, nest, or egg thereof, and to adopt suitable regulations permitting and governing the same, in accordance with such determinations, which regulations shall become effective when approved by the President... any person, association, partnership, or corporation who shall violate any provisions of said conventions or of this subchapter, or who shall violate or fail to comply with any regulation made pursuant to the MBTA shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined not more than \$15,000 or be imprisoned not more than six months, or both.”

The Over the River *Design and Planning Report* (Appendix E2, Migratory Bird Species List [J.F. Sato 2007]) provides a list of species found in the Project Area. The MBTA applies to all of the raptor species listed below, as well as species such as black phoebe, American dipper, American kestrel, sharp-shinned hawk, Bullock’s oriole, and great blue heron and their active nests. Coordination with USFWS should be made to avoid a “take” under the MBTA.

c. Applicable Federal Agency Wildlife Plans and Policies

The associated management actions are presented in Table 3-25 and Table 3-26.

Table 3-25. Relevant Management Actions for Special Status Plant/Community Species

Current Management Decision	Decision Source
Threatened and endangered and sensitive species and plant communities are inventoried and monitored as necessary to provide information for proper management.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Management of uses in areas with special status species are in compliance with ESA.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Any reintroduction of federal or state listed endangered, threatened, candidate, and sensitive species are achieved following environmental analysis and consultation with the USFWS, Colorado Natural Areas Program (CNAP), CDOW, and other affected parties.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Desired Plant Community is determined in vegetation manipulation areas to enhance habitat for species.	Proposed RMP/Final EIS (1995)– Planning Area Wide
In all cases, full compliance with Sec. 7 of ESA is completed before invoking specific actions resulting from RMP decisions.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Clearances for special status species are completed for all proposed management actions.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Intensive recreation development is limited to protect existing and potential special status species habitat.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Special status plants and plant communities habitat will be protected through elimination of conflicting uses.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-27
Enhance habitat for special status, threatened and endangered, or other officially designated plant and animal species.	Statewide Standards and Guides Amendment 1996

Table 3-26. Relevant Management Actions for Special Status Animal Species

Current Management Decision	Decision Source
Threatened and endangered and sensitive species are inventoried and monitored as necessary to provide information for proper management.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Any reintroduction of federal or state listed endangered, threatened, candidate, and sensitive species are achieved following environmental analysis and consultation with the USFWS, CDOW, and other affected parties.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Management of uses in areas with special status species are in compliance with the ESA.	Proposed RMP/Final EIS (1995)– Planning Area Wide
In all cases, full compliance with Sec. 7 of the ESA is completed before invoking specific actions resulting from RMP decisions.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Clearances for special status species are completed for all proposed management actions.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Intensive recreation development is limited to protect existing and potential special status species habitat.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Special status animal species will be protected through elimination of conflicting uses.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-30
Seasonal stipulations apply for the following habitats: Ferruginous hawk nesting and fledgling habitat (2/1 – 8/15) Bald eagle winter roosting habitat (11/16 – 4/15) Mexican spotted owl habitat (2/1 – 7/31) Peregrine falcon habitat (3/16 – 7/31)	Proposed RMP/Final EIS (1995), 1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-31 and #1-33
Enhance habitat for special status, threatened and endangered, or other officially designated plant and animal species.	Statewide Standards and Guides Amendment 1996

d. CDOW – Habitat (Land) Based Plans and Activities

Two habitat partnership programs apply to the area affected by the proposal: (1) North of Arkansas River—Arkansas River Committee, and (2) South of Arkansas River—Sangre de Cristo Committee. Both plans aim to lessen conflict between big game and forage for livestock (Aragon 2009). These two agreements detail the current range management scenario in the canyon. These agreements can be used as a baseline for judging the sensitive relationship between wildlife management and active land use by residents in the canyon.

There are no CDOW fee title properties falling within the proposed project footprint. The CDOW/SLB lease on the SLB parcel is seasonal and recreational, and communications will go through the SLB. The perpetual fishing lease on a mixed private and BLM parcel between Vallie Bridge and Howard is not fee title, and communications should go through BLM (Aragon 2009).

A summary of plans and activities by species is provided in Table 3-27.

Table 3-27. Plans and Activities on Groups of Species

Species	Summary	Implications
American Peregrine Falcon	State Guidelines and Federal Recovery Plan (CDOW Raptor Guidelines 2008 and USWFS 1983; State Species of Concern, Federally Delisted).	"No surface occupancy (beyond that which historically occurred in the area) within 0.5-mile radius of active nests. Seasonal restriction to human encroachment within 0.5 mile of the nest cliff(s) from March 15 to July 31. Due to propensity to relocate nest sites, sometimes up to 0.5 mile along cliff faces, it is more appropriate to designate 'Nesting Areas' that encompass the cliff system and a 0.5-mile buffer around the cliff complex." (CDOW 2008b)
Bald Eagle	State Guidelines and Federal Recovery Plan (CDOW Raptor Guidelines 2008 and USWFS 1983; State Threatened, Federally Delisted but see Eagle Protection Act).	<p>The Bald Eagle Protection Act of 1940 provides for the protection of the bald eagle and the golden eagle. The USFWS recently amended the Act to allow permits to take eagles comparable to incidental take permits under the ESA (<i>Federal Register</i> 74:46835-46879; 11 September 2009). The regulations provide for individual and programmatic permits that are consistent with the goal of stable or increasing eagle breeding populations. Individual permits can authorize limited instances of disturbance, and in certain situations other take, but individual permits do not authorize landscape-scale mortalities and injuries.</p> <p>"Nest Site: No surface occupancy (beyond that which historically occurred in the area; see 'Definitions' below) within 0.25-mile radius of active nests (see 'Definitions' below). Seasonal restriction to human encroachment (see 'Definitions' below) within 0.5-mile radius of active nests from October 15 through July 31. This closure is more extensive than the National Bald Eagle Management Guidelines (USFWS 2007) due to the generally open habitat used by Colorado's nesting bald eagles.</p> <p>Winter Night Roost: No human encroachment from November 15 through March 15 within 0.25-mile radius of an active winter night roost (see 'Definitions' below) if there is no direct line of sight between the roost and the encroachment activities. No human encroachment from November 15 through March 15 within 0.5-mile radius of an active winter night roost if there is a direct line of sight between the roost and the encroachment activities. If periodic visits (such as oil well maintenance work) are required within the buffer zone after development, activity should be restricted to the period between 1000 and 1400 hours from November 15-March 15.</p> <p>Hunting Perch: Diurnal hunting perches (see 'Definitions' below) associated with important foraging areas should also be protected from human encroachment. Preferred perches may be at varying distances from human encroachment and buffer areas will vary. Consult the CDOW for recommendations for specific hunting perches." (CDOW 2008b)</p>
Fringed Myotis	BLM sensitive. No known management or active projects.	Species listed as sensitive by the BLM are being assessed or tracked due to downward trends, small populations, or other ecological sensitivities. These species should be prioritized for minimizing and/or mitigating impacts during project construction and estimating/monitoring cumulative impacts in the future.

Species	Summary	Implications
Golden Eagle	State Guidelines and Federal Recovery Plan (CDOW Raptor Guidelines 2008 and USFWS 1983; State Threatened, Federally Delisted but see Eagle Protection Act).	The Bald Eagle Protection Act of 1940 provides for the protection of the bald eagle and the golden eagle by prohibiting the taking of these species under penalty of federal law. "Nest Site: No surface occupancy (beyond that which historically occurred in the area) within 0.25-mile radius of active nests. Seasonal restriction to human encroachment within 0.5-mile radius of active nests from December 15 through July 15." (CDOW 2008b).
Greenback Cutthroat Trout	Federal Recovery Plan (USFWS 1998).	Various strategies are proposed for the recovery of the Greenback. Applicable on-site factors include habitat enhancement and restoration as well as maintaining barriers. Off-site mitigation factors are also discussed and include brood stock rearing for the Arkansas River Population.
Lewis' Woodpecker	USFS Sensitive. Nest identified in Project Area. No known management or active projects.	Species listed as sensitive by the USFS are being assessed or tracked due to downward trends, small populations, or other ecological sensitivities. These species should be prioritized for minimizing and/or mitigating impacts during the project construction and estimating/monitoring cumulative impacts in the future.
Lynx	Federal Recovery Outline, ongoing research program (USFWS 2005; State Endangered).	Lynx studies take place primarily at higher elevations. Coordination with CDOW should be made if Lynx are tracked into the project vicinity to limit conflict between the project and CDOW operations.
Southern Redbelly Dace	State endangered. This species occurs downstream from the Project Area near Pueblo and Chico Creek.	Applicable recommendations related to this project include maintaining downstream water quality and quantity. Thought should be given to the implications of fabric and/or other machinery or materials falling into or polluting the river ecosystem and/or disrupting downstream fish populations.
Texas Horned Lizard	BLM sensitive. No known management or active projects.	Species listed as sensitive by the BLM are being assessed or tracked due to downward trends, small populations, or other ecological sensitivities. These species should be prioritized for minimizing and/or mitigating impacts during project construction and estimating/monitoring cumulative impacts in the future.
Townsend's Big Eared Bat	BLM sensitive, State species of concern. There are two known maternity roosts for this species in the project vicinity. No known management or active projects.	Species listed as sensitive by the BLM are being assessed or tracked due to downward trends, small populations, or other ecological sensitivities. These species should be prioritized for minimizing and/or mitigating impacts during project construction and estimating/monitoring cumulative impacts in the future.
Yuma Myotis	BLM sensitive. No known management or active projects.	Species listed as sensitive by the BLM are being assessed or tracked due to downward trends, small populations, or other ecological sensitivities. These species should be prioritized for minimizing and/or mitigating impacts during project construction and estimating/monitoring cumulative impacts in the future.

3.8.2.2 Plant Species

The federal ESA requires "take" authorization and consultation with USFWS if federally listed species may be impacted. None of the plant species found during focused surveys are covered by the state or federal ESA. BLM's management objectives for special status plant/community species include (Proposed RMP/Final EIS [1995]):

- Inventory and monitor threatened, endangered, and sensitive plant/community species as necessary to provide information for proper management.
- Manage uses in areas with special status plants to comply with the ESA of 1973 (ESA), including avoiding actions that further jeopardize listed and sensitive species and to enhance these species when possible.
- Protect special status plants by special management actions, including elimination of identified and verified conflicting uses.

The associated management actions for special status plant/community species are presented in Table 3-28.

Table 3-28. Relevant Management Actions for Special Status Plant/Community Species

Current Management Decision	Decision Source
Threatened, endangered, and sensitive species and plant communities are inventoried and monitored as necessary to provide information for proper management.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Management of uses in areas with special status species are in compliance with ESA.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Any reintroduction of federal or state listed endangered, threatened, candidate, and sensitive species are achieved following environmental analysis and consultation with the USFWS, CNAP, CDOW, and other affected parties.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Desired Plant Community is determined in vegetation manipulation areas to enhance habitat for species.	Proposed RMP/Final EIS (1995)– Planning Area Wide
In all cases, full compliance with Sec. 7 of ESA is completed before invoking specific actions resulting from RMP decisions.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Clearances for special status species are completed for all proposed management actions.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Intensive recreation development is limited to protect existing and potential special status species habitat.	Proposed RMP/Final EIS (1995)– Planning Area Wide
Special status plants and plant communities habitat will be protected through elimination of conflicting uses.	1996 RMP ROD – Eco-Subregion 1 (Arkansas River), #1-27
Enhance habitat for special status, threatened and endangered, or other officially designated plant and animal species.	Statewide Standards and Guides Amendment 1996

PHYSICAL RESOURCES

3.9 ATMOSPHERE, AIR RESOURCES, AND AIR QUALITY

Air quality within the Project Area has the potential to be affected by such activities as emissions from the construction of facilities, access roads, and other elements of management activities, as well as tailpipe emissions from increased highway traffic during the visitor event. This section describes the existing air quality resources of the region and the applicable air regulations that would apply to the Proposed Action and alternatives.

3.9.1 Current Conditions and Trends

3.9.1.1 Regional Climate

The following description of the regional climate was derived from the *Climate of Colorado: Climatology of the United States No. 60* (Doesken et. al. 2003). Climate of local areas in Colorado is profoundly affected by differences in elevation, and by the orientation of mountain ranges and valleys with respect to general air movements. Wide variations occur within short distances. The difference (35°F) in annual mean temperature between Pikes Peak and Las Animas, 90 miles to the southeast, is about the same as that between southern Florida and Iceland. Statewide average annual precipitation is 17 inches, but ranges from only 7 inches in the middle of the San Luis Valley in south central Colorado to over 60 inches in a few mountain locations. While temperature decreases and precipitation generally increases with altitude, these patterns are modified by the orientation of mountain slopes with respect to the prevailing winds and by the effect of topographical features in creating local air movements.

Occasionally, strong westerly winds aloft work their way to the surface as a result of waves formed in the flow over and in the lee of the mountains. Warmed by rapid descent from higher levels, these winds can bring large and sudden temperature rises. This phenomenon is the "Chinook" of the high plains, and temperature rises of 25° to 35°F within a short time are not uncommon during the winter. Chinook winds greatly moderate average winter temperatures in areas near enough to the mountains to experience them frequently. Due to these wind patterns, some locations in the eastern foothills are warmer than adjacent areas on the eastern plains on many days during the winter. Mountain lee waves and strong downslope winds can occur during any season, although they are more common and more obvious in the winter.

Warm, moist air from the south moves into Colorado infrequently, but most often in the spring, summer, and early autumn. As this air is carried northward and westward to higher elevations, the heaviest and most general rainfalls (and sometimes wet snows) occur over the eastern portions of the state from April through early September. For southern and western Colorado, the intrusions of moist air are most common from mid-July into September, and are associated with wind patterns sometimes called the Southwest Monsoon. Frequent showers and thunderstorms continue well into the summer. At times during the summer, winds shift to the southwest and bring hot, dry air from the desert Southwest over the state. Such hot spells are usually of short duration.

3.9.1.2 Climate of the Mountain to Eastern Plains Transition Zone

Although the climate of the plains is comparatively uniform from place to place, at the western edge of the plains and near the foothills of the mountains there are a number of significant changes in climate. Average wind movement is less, but areas very near the mountains are subject to periodic, severe turbulent winds from the effects of high westerly winds over the mountain barrier. These winds are sometimes referred to as "Chinook winds" when they warm, and "Bora winds" when they are associated with a strong cold frontal passage downslope off of the mountains. Temperature changes from day to day are not quite as great; summer temperatures are lower, and winter temperatures are higher. Not surprisingly, this milder corridor close to the mountains is where the majority of Colorado's population now lives. Precipitation, which decreases gradually from the eastern border to a minimum near the mountains, increases rapidly with the increasing elevation of the foothills and proximity to higher ranges. The decrease in temperature from the eastern boundary westward to the foothills is less than might be expected with increasing altitude. This results from mountain and valley winds and greater frequency of the Chinook. Below the Royal Gorge of the Arkansas River, the mountain and valley winds are persistent

enough to modify the climate over a considerable area. Descending air currents frequently prevent the stratification of air necessary for the occurrence of excessive cold. As a consequence, the winter climate is milder near Cañon City and Penrose than anywhere else in the state.

3.9.1.3 Severe Storms

Thunderstorms are quite prevalent in the eastern plains and along the eastern slopes of the mountains during the spring and summer. These often become quite severe, and the frequency of hail damage to crops in northeastern Colorado is quite high. With an average frequency of 6 or more hail days per year, some counties of eastern Colorado are among the most hail prone areas in the entire country.

Tornadoes, once thought to be only a small threat to the residents of eastern Colorado, have been found to be quite common with the improvement in severe storm detection in recent decades. Tornadoes are relatively rare in the mountains and western valleys, but do occur. In most years, at least 40 tornadoes are confirmed. Most of these tornadoes are small and short lived, usually classified in intensity as F0 or F1. However, occasional strong tornadoes have been reported.

Lightning is one of the greatest weather hazards in Colorado. Each year there are typically several fatalities and injuries. Unlike tornadoes that are most common in selected areas of the state, lightning can and does occur everywhere. Lightning strike statistics indicate that the most lightning prone areas of Colorado are the high ground above tree line between Denver and Colorado Springs, and the Raton Plateau south and southeast of Trinidad near the New Mexico border.

A spring flood potential results from the melting of snowpack at higher elevations. In a year of near-normal snow accumulations in the mountains and normal spring temperatures, river stages become high, but there is no general flooding. In years when snow cover is heavy, or when there is widespread lower elevation snow accumulation and a sudden warming in the spring, there may be extensive flooding.

The greatest threat of flooding in Colorado, however, is not snowmelt. It is flash flooding from localized intense thunderstorms. The most flash flood prone regions of Colorado are found along the base of the lower foothills east of the mountains. A flash flood event occurred in the immediate Project Area in/or near August 2009, mere yards from the applicant's proposed staging area at Texas Creek. Flash flood damage required Fremont County grading of the dry arroyo to protect the county road in the vicinity of the proposed staging area access. The Badger Creek area upstream from the Vallie Bridge proposed panel section has also been affected by flash floods.

Several extreme floods, such as the infamous Big Thompson Canyon flood of July 31, 1976, have occurred in this vulnerable area. Flash floods occur on the western slopes as well, but with somewhat lower frequency and intensity due to a reduced supply of low level moisture to fuel such storms.

Table 3-29. Period of Record Monthly Climate Summary for Cañon City, Colorado (051294) (Period of Record: 3/1/1893 to 12/31/2008)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	49.7	51.7	57.2	65.3	74.3	84.2	89.0	86.9	80.1	69.8	58.2	50.4	68.1
Average Min. Temperature (F)	21.6	23.4	28.8	36.8	45.4	53.8	60.2	58.8	50.3	39.6	29.6	23.0	39.3
Average Total Precipitation (in.)	0.41	0.50	0.86	1.42	1.62	1.16	1.79	1.89	1.01	0.80	0.60	0.49	12.54
Average Total Snowfall (in.)	4.9	6.2	6.8	4.4	0.5	0.0	0.0	0.0	0.3	2.1	4.6	6.4	36.1
Average Snow Depth (in.)	1	1	0	0	0	0	0	0	0	0	0	1	0

Source: Western Regional Climate Center, 2009.

Table 3-30. Period of Record Monthly Climate Summary for Salida 3W, Colorado (057371) (Period of Record: 12/1/1970 to 5/31/1984)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	38.8	43.6	48.6	57.8	66.5	79.7	83.3	80.2	73.9	62.7	48.0	41.4	60.4
Average Min. Temperature (F)	14.3	17.0	22.6	28.1	36.1	44.1	48.8	47.2	40.5	31.2	20.9	16.6	30.6
Average Total Precipitation (in.)	0.23	0.19	0.59	0.57	0.60	0.41	1.31	0.87	0.64	1.12	0.37	0.42	7.32
Average Total Snowfall (in.)	4.3	3.6	7.6	2.7	1.0	0.1	0.0	0.0	0.8	3.5	4.6	6.3	34.6
Average Snow Depth (in.)	2	0	0	0	0	0	0	0	0	0	1	2	1

Source: Western Regional Climate Center, 2009.

Three important meteorological factors influence the dispersion of pollutants in the atmosphere: mixing height, wind (speed and direction), and stability. Mixing height is the height above ground within which rising warm air from the surface will mix by convection and turbulence. Local atmospheric conditions, terrain configuration, and source location determine dilution of pollutants in this mixed layer. Mixing heights vary diurnally, with the passage of weather systems and with season. Temperature inversions, where air temperatures near the ground are colder than the temperatures above, are common in the basins and other lower elevations of the region.

Inversions commonly occur in winter when snow accumulation on the ground combines with short daylight hours. In summer, inversions dissipate rapidly when early morning sunlight warms the air near the ground surface. Inversions can hinder air pollutant dispersion by preventing emissions from mixing with the ambient air in the vertical direction. On average, mean morning mixing heights in the area are

approximately 1,000 feet; mean afternoon mixing heights are more than 7,800 feet (Holzworth 1972). Mean morning mixing heights tend to be lowest in fall, and highest in spring.

Air pollutant dispersion in the Project Area is also dependent on wind direction and speed. Although wind direction is highly influenced by the local terrain, on-site measurements indicate that the wind direction tends to be parallel to the river valley, which is generally oriented west to east.

3.9.1.4 Air Quality

The federal Clean Air Act (CAA), and the subsequent federal Clean Air Act Amendments of 1990 (CAAA), require all states to control air pollution emission sources so that National Ambient Air Quality Standards (NAAQS) are met and maintained. The CAA and CAAA established NAAQS for seven pollutants, known as “criteria” pollutants. The ambient standards set for these pollutants satisfy “criteria” specified in the CAA.

Air quality in a given location is defined by pollutant concentrations in the atmosphere and is generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). One measure of a pollutant is its concentration in comparison to a national and/or state ambient air quality standard. The NAAQS are established by the Environmental Protection Agency (EPA) and are outlined in the Code of Federal Regulations (40 CFR 50). These standards represent the maximum allowable atmospheric concentrations that may occur without jeopardizing public health and welfare, and include a reasonable margin of safety to protect the more sensitive individuals in the population. The NAAQS represent maximum acceptable concentrations that generally may not be exceeded more than once per year, except the annual standards, which may never be exceeded. The EPA has developed classifications for distinct geographic regions. An area is classified as an “attainment” if the area has “attained” compliance with the NAAQS for that pollutant. It is classified as “nonattainment” if the levels of ambient air pollution exceed the NAAQS for that pollutant. If the monitored pollutants have fallen from nonattainment levels to attainment levels, it is classified as “maintenance.”

The CAA directs the EPA to delegate primary responsibility for air pollution control to qualified state governments that comply with certain minimum requirements. The Colorado Department of Public Health and Environment (CDPHE) is the agency in the State of Colorado that has been delegated the responsibility for maintaining air quality and attaining the NAAQS. The proposed project must conform to the NAAQS and to other restrictions, such as a dust control plan, as dictated by CDPHE. The State of Colorado has adopted the NAAQS as state air quality standards and has additional ambient air quality standards for other pollutants that are more applicable to oil and gas projects, which are not included in this document in an effort to retain clarity. The pollutants of interest for the proposed project are listed below.

3.9.1.5 National Ambient Air Quality Standards

The significant criteria for potential air quality impacts include NAAQS requirements for carbon monoxide (CO), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($\text{PM}_{2.5}$), sulfur dioxide (SO_2) and nitrogen oxides (NO_2/NO_x). Applicable federal and state criteria are presented in Table 3-31.

Table 3-31. National and Colorado Ambient Air Quality Standards (NAAQS)

Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time
Carbon Monoxide	9 ppm (10 mg/m ³)	8-hour (1)	None	
	35 ppm (40 mg/m ³)	1-hour (1)		
Lead	0.15 µg/m ³ (2)	Rolling 3-Month Average	Same as Primary	
	1.5 µg/m ³	Quarterly Average	Same as Primary	
Nitrogen Dioxide	0.053 ppm (100 µg/m ³)	Annual (Arithmetic Mean)	Same as Primary	
	0.100 ppm (189 µg/m ³)	1-hour	Same as Primary	
Particulate Matter (PM ₁₀)	150 µg/m ³	24-hour (3)	Same as Primary	
Particulate Matter (PM _{2.5})	15.0 µg/m ³	Annual (4) (Arithmetic Mean)	Same as Primary	
	35 µg/m ³	24-hour (5)	Same as Primary	
Ozone	0.075 ppm (2008 std)	8-hour (6)	Same as Primary	
	0.08 ppm (1997 std)	8-hour (7)	Same as Primary	
	0.12 ppm	1-hour (8)	Same as Primary	
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Mean)	0.5 ppm (1300 µg/m ³)	3-hour (1)
	0.14 ppm	24-hour (1)		

(1) Not to be exceeded more than once per year.

(2) Final rule signed October 15, 2008.

(3) Not to be exceeded more than once per year on average over 3 years.

(4) To attain this standard, the 3-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.

(5) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m³ (effective December 17, 2006).

(6) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008)

(7) (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

(7) (b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.

(8) (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is < 1.

(8) (b) As of June 15, 2005 EPA has revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone nonattainment Early Action Compact (EAC) Areas. For one of the 14 EAC areas (Denver, CO), the 1-hour standard was revoked on November 20, 2008. For the other 13 EAC areas, the 1-hour standard was revoked on April 15, 2009.

Other industrial, commercial, or government facilities in the general area may also be sources of the pollutants potentially emitted by the proposed project.

Volatile organic compounds (VOCs) are not in themselves considered a criteria air pollutant, but are largely responsible for the formation of ground level ozone, and are therefore reported in emissions inventories.

3.9.1.6 Conformity for General Federal Actions

According to Section 176I of the CAA (40 CFR 51.853), a federal agency must make a conformity determination in the approval of a project having air emissions that exceed specified thresholds in nonattainment and/or maintenance areas. The proposed project is not in a nonattainment or maintenance area; therefore, a general conformity analysis would not be required for the proposed project.

3.9.1.7 Air Quality Related Values

a. Visibility

In addition to the designations relative to attainment of conformance with the NAAQS, the CAA requires the EPA to place selected areas within the U.S. into one of three classes, which are designed to limit the deterioration of air quality when it is better than the NAAQS. Class I is the most restrictive air quality category. It was created by Congress to prevent further deterioration of air quality in National Parks and Wilderness Areas of a given size, which were in existence prior to 1977; or those additional areas that have since been designated Class I under federal regulations (40 CFR 52.21). All remaining areas outside of the designated Class I boundaries were designated Class II areas, which allows a relatively greater deterioration of air quality, although still below NAAQS. No Class III areas have been designated. The nearest Class I area is Great Sand Dunes National Park, located about 35 miles south of the proposed project.

Regional haze is visibility impairment caused by the cumulative air pollutant emissions from numerous sources over a wide geographic area. Visibility impairment is caused by particles and gases in the atmosphere. Some particles and gases scatter light while others absorb light. The primary cause of regional haze in many parts of the country is light scattering resulting from fine particles (i.e., PM_{2.5}) in the atmosphere. Additionally, coarse particles between PM_{2.5} and PM₁₀ can contribute to light extinction. Each of these components can be naturally occurring or the result of human activity. The natural levels of these components result in some level of visibility impairment, in the absence of any human influences, and will vary with season, daily meteorology, and geography (USEPA 2003).

b. Prevention of Significant Deterioration

Federal Prevention of Significant Deterioration (PSD) regulations limit the maximum allowable increase in ambient particulate matter in a Class I area resulting from a major or minor stationary source to 5 µg/m³ (annual geometric mean) and 10 µg/m³ (24-hour average). Increases in other criteria pollutants are similarly limited. Specific types of facilities (listed facilities) that emit, or have the potential to emit, 100 tons per year (tpy) or more of PM₁₀, PM_{2.5} or other criteria air pollutants; or any facility that emits, or has the potential to emit, 250 tpy or more of PM₁₀, PM_{2.5}, or other criteria air pollutants, are considered major stationary sources. Major stationary sources are required to notify federal land managers of Class I areas within 100 km (62 miles) of the major stationary source. The proposed project would not result in air emissions above these major source thresholds; therefore, the proposed project is not subject to PSD

rules. No individual Hazardous Air Pollutant (HAP) would be emitted in a quantity greater than the major source limit of 10 tpy, and the combined HAP emissions would be less than the major source limit of 25 tpy; therefore, the proposed project would not constitute a major HAP source. See Section 4.9, Atmosphere, Air Resources, and Air Quality for a detailed description of air quality impacts associated with the proposed project.

c. Atmospheric Deposition

Atmospheric deposition is the process whereby airborne particles and gases are removed from the atmosphere and deposited on the earth's surface.

Wet deposition is defined as the portion of atmospheric deposition contained in precipitation. Dry deposition is the fraction deposited in dry weather through such processes as settling, impaction, and adsorption. The factors that influence dry deposition include whether the substance is in gaseous or particulate form, the solubility of the species in water, the amount of precipitation in the region, and the terrain and type of surface cover.

d. Greenhouse Gases and Climate Change

Greenhouse gases (GHG) consist of compounds in the earth's atmosphere that absorb outgoing long-wave radiation emitted from the earth's surface, resulting in a warming of the atmosphere. Naturally occurring GHG include water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and ozone (O₃). Human activities also result in the release of GHG, including several compounds containing fluorine, chlorine, or bromine that result, for the most part, from industrial activities. Through a natural carbon cycle, CO₂ is absorbed by the oceans and by living biomass through plant photosynthesis, and then released to the atmosphere through natural processes. Primarily as a result of the combustion of fossil fuels, the atmospheric concentration of CO₂ has increased about 36% since the beginning of the industrial age (USEPA 2008).

In the U.S., the primary source of anthropogenic GHG emission is fossil fuel combustion. Burning of coal, oil, and natural gas accounted for 82% of 2006 GHG emissions. Fossil fuels are responsible for supplying approximately 85% of U.S. primary energy needs and approximately 98% of estimated anthropogenic CO₂ emissions. Nitrous oxide is another product of fossil fuel combustion, and CH₄ is also emitted by petroleum production operations (EIA 2008). The U.S. Supreme Court, on April 2, 2007, ruled that the EPA had authority to regulate GHGs as pollutants, and required the EPA to determine whether these gases cause or contribute to global warming (Ranchod 2007). In 2008, Congress directed the EPA to publish a mandatory GHG reporting rule based on their existing authority under the CAA. The EPA published an Advanced Notice of Proposed Rulemaking in response to the Court decision in July 2008 (USEPA 2008). EPA issued an endangerment finding in early December 2009, concluding that GHGs endangered public health and welfare. EPA also finalized the GHG reporting rules in late 2009 and EPA is expected to issue new rules governing GHG emissions from new motor vehicles in March 2010. In addition, the Council on Environmental Quality (CEQ) issued GHG guidance in February 2010. CEQ does not propose to make the new guidance applicable to Federal land and resource management actions, but is seeking public comment on the appropriate means of assessing the GHG emissions and sequestration that are affected by Federal land and resource management decisions.

As with any field of scientific study, there are uncertainties associated with the science of climate change. This does not imply that scientists do not have confidence in many aspects of climate change science.

Some aspects of the science are known with virtual certainty, because they are based on well-known physical laws and documented trends (USEPA 2008).

e. Air Quality Trends

Climate change is not shown to have a direct effect on any criteria pollutants other than ozone. It has been found that concentrations of ground level ozone are likely to increase due to increasing temperatures (Wise 2009). This indicates that areas currently designated as “maintenance” status for ozone are likely to have added difficulty maintaining levels below the ozone standard. Although no other criteria pollutants have been shown to be directly impacted by climate change, potential future regulations aimed to reduce GHG emissions may have an indirect effect on other pollutants (such as NO₂ or SO₂) co-emitted with GHG.

3.9.2 Current Management Considerations

Air quality goals identified in the Project Area are to minimize air quality degradation (Proposed RMP/Final EIS [1995]), maintain air quality standards throughout the corridor, and maintain visibility standards adjacent to Browns Canyon and McIntyre Hills WSA (Arkansas River Recreation Management Plan [AHRA 2001]). The BLM’s relevant management actions for minimizing air quality degradation include the following:

- Air quality degradation is minimized through strict compliance with federal, state, and local regulations and implementation plans.
- Additional air quality management activities include monitoring, analysis, and impact mitigation on a project-specific basis, which ensures compliance with applicable regulations and implementation plans.

3.10 WATER RESOURCES

Water resources include surface flows in rivers and streams, flows from springs, and groundwater stored in aquifer zones below the land surface. Stream channels, floodplains, and features such as reservoirs and wells, are also considered in water resource assessments. These resources have a vital role in supporting agricultural, municipal, and domestic water supplies, and provide a foundation for wildlife, aquatic species, and recreation.

Both water quantity and water quality are major considerations of most water resource investigations. Aspects of water quantity include the depths and yields of groundwater, flows from springs, and seasonal flow volumes and their variations in rivers and streams. In addition, access to existing water uses is a consideration. These existing or historical water uses also form a basis for water quality assessment. The maintenance or improvement of water quality to support beneficial uses is a major objective of local, state, and federal agencies.

If impacts were to occur to water resources, they could move between locations in flows or as a result of watershed adjustments. Because of this, the overall Analysis Area for water resources is the same as the Project Area, consisting of the 42-mile length of the Arkansas River canyon between Salida and Cañon City, Colorado. Due to the location of the proposed project and its associated activities, the primary

focus of this assessment is on the river and associated water resources between Wellsville and Parkdale, Colorado (see Map 3-55).

3.10.1 Current Conditions and Trends

3.10.1.1 Surface Water

Precipitation amounts along the Arkansas River canyon vary considerably with locale, elevation, and season. Within the canyon, the frequency and amount of snow or rain typically increase with elevation, and summer thunderstorms are common. General precipitation characteristics for the region are indicated in Section 3.9, Atmosphere, Air Resources, and Air Quality.

The Arkansas River and its numerous tributary streams are the major waterbodies in the Analysis Area. The USGS measures the river flow and other parameters at gaging stations located at Salida, Wellsville, Parkdale, and Cañon City. Selected basin characteristics at these gages are indicated in Table 3-32.

Table 3-32. USGS Gages on the Arkansas River

USGS Gaging Station	Drainage Area (square miles)	Gage Datum (feet above mean sea level)
07091500 Arkansas River at Salida, CO	1,218	7,050.45
07093700 Arkansas River near Wellsville, CO	1,485	6,883.40
07094500 Arkansas River at Parkdale, CO	2,548	5,720.0
07096000 Arkansas River at Cañon City, CO	3,117	5,342.13

Source: USGS-NWIS 2009.

Numerous tributary watersheds contribute flow to the river along the canyon. Major tributaries from Salida to Cañon City that drain the northern side of the canyon include Badger Creek, Sand Gulch, Bernard Creek, Fernleaf Gulch, Texas Creek Gulch, East Gulch, and Tallahassee Creek (Map 3-55). Notable alluvial fans are located at the mouths of Sand Gulch, Texas Creek Gulch, and Tallahassee Creek. Along the southern side of the river, numerous streams drain from headwaters in the Sangre de Cristo mountains or associated foothills. Such streams include Howard, Hayden, Cottonwood, Oak, and Texas creeks, and others.

Characteristic flow rates in cfs for selected USGS gages on the river are indicated in Table 3-33.

Table 3-33. Average Discharges for Selected Arkansas River Stream Gages, 1965-2007 (cfs)

Gage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wellsville	360	354	343	379	1,030	2,060	1,400	849	480	400	416	383
Parkdale	406	401	395	443	1,140	2,260	1,560	975	543	472	484	431
Cañon City	381	380	386	396	1,050	2,220	1,480	865	429	355	393	395

¹ At the Parkdale gage, winter measurements ceased in October 1994. No values from October through March were available for calculations after that date.

Source: USGS-NWIS 2009.

Flows in the Arkansas River vary with location, seasonal and annual moisture conditions, and management actions. The river is intensively administered to address water demands. For example, summer flows are managed for recreation, and water is also released and withdrawn for irrigation requirements. Such management activities modify flow velocities, depths, temperatures, and other parameters. In addition, intense summer thunderstorms may rapidly change flows as the river responds to runoff.

FEMA has delineated the 100-year floodplains for use on their FIRMs for both Fremont and Chaffee counties. The 100-year flood is the event that has been given the statistical probability of occurring once every 100 years, or has a 1% chance of occurring in any given year. Maps 3-29 through 3-39 and 3-55 depict the FIRMs and 100-year floodplains in the Project Area as delineated by FEMA. The 100-year floodplain closely follows the Arkansas River channel and its larger tributaries, with widths ranging from approximately 200 feet in multiple locations (such as near the Chaffee-Fremont county line and just downstream of Gobbler's Knob) to much wider areas of approximately 600 to 800 feet near Howard, 1,000 feet near Texas Creek, and greater than 1,000 feet at the mouth of Tallahassee Creek near Parkdale. The 100-year floodplain extends approximately 0.5 mile up Texas Creek Gulch in the area of a proposed project staging area (FEMA 2007). Flow-transported gravels, cobbles, and remnant overflow pathways at Texas Creek Gulch attest to its comparative frequency of flooding.

Surface water quality in the river has been characterized primarily by the USGS. The quality can be expected to vary with both downstream distance and with fluctuating flows associated with seasonal changes. Between Salida and Cañon City, water quality is generally better upstream towards Salida due to more precipitation and less water use. With the exception of mine drainage in the Leadville area near the headwaters of the river, water quality above Cañon City is suitable for domestic and municipal supply. Specific conductance is a measure that indicates dissolved solids concentrations in the water. The mean specific conductance at Parkdale is 252 microsiemens per centimeter at 25°C (Crouch et al. 1984). Recently, water quality in the upper Arkansas River (upstream of Granite) has improved as a result of environmental efforts to manage contaminants from historical mining activities. The area where improvements are most noticeable is well upstream of the study area. In addition, managed flow rates resulting from interagency agreements have seasonally improved some water quality parameters (e.g., temperature) in the study area.

Water quality is generally better during the spring and summer months when stream flows are greatest from snowmelt and precipitation events. During times of low-flows, the river has a higher ratio for both being fed by groundwater (which is higher in dissolved solids due to the extended periods of time it has been in contact with minerals) and for withdrawals and usage of the water (which in turn diminish the flows even further). Even during the low-flow periods, the water quality is generally suitable for domestic uses.

3.10.1.2 Groundwater

The majority of the Upper Arkansas River Valley's groundwater systems are characterized as alluvial aquifer systems near the Arkansas River and in its floodplain. These alluvial systems are present upstream of Salida, below Cañon City, and in relatively small localized pockets in between, near Howard (Sand Creek alluvial fan) and Coaldale (canyon constriction at Gobbler's Knob) (Topper et al. 2003, Crouch et al. 1984).

In the area between Salida and Cañon City, the valley’s groundwater is generally characterized as Precambrian crystalline rock aquifers, which are composed of water-bearing joints and fractured fault zones within the igneous or metamorphic bedrock. The Precambrian aquifers are overlain by a thin soil veneer, generally less than 5 feet in depth. This soil veneer acts as the medium for recharge of the crystalline formations through infiltration of precipitation and snowmelt (Topper et al. 2003).

Analysis of Colorado Division of Water Resources (CDWR) well data indicates that the majority of wells within 0.5 mile of the Arkansas River between Wellsville and Parkdale have water levels of record of less than 50 feet below ground surface (fbgs). The mean depth to water in these wells is 47 fbgs, and the median is 38 fbgs. The average well yield is approximately 10 gallons per minute and the vast majority of permitted uses are for domestic or household use only. Figure 3-2 indicates the frequency of the ranges of reported depths of these wells.

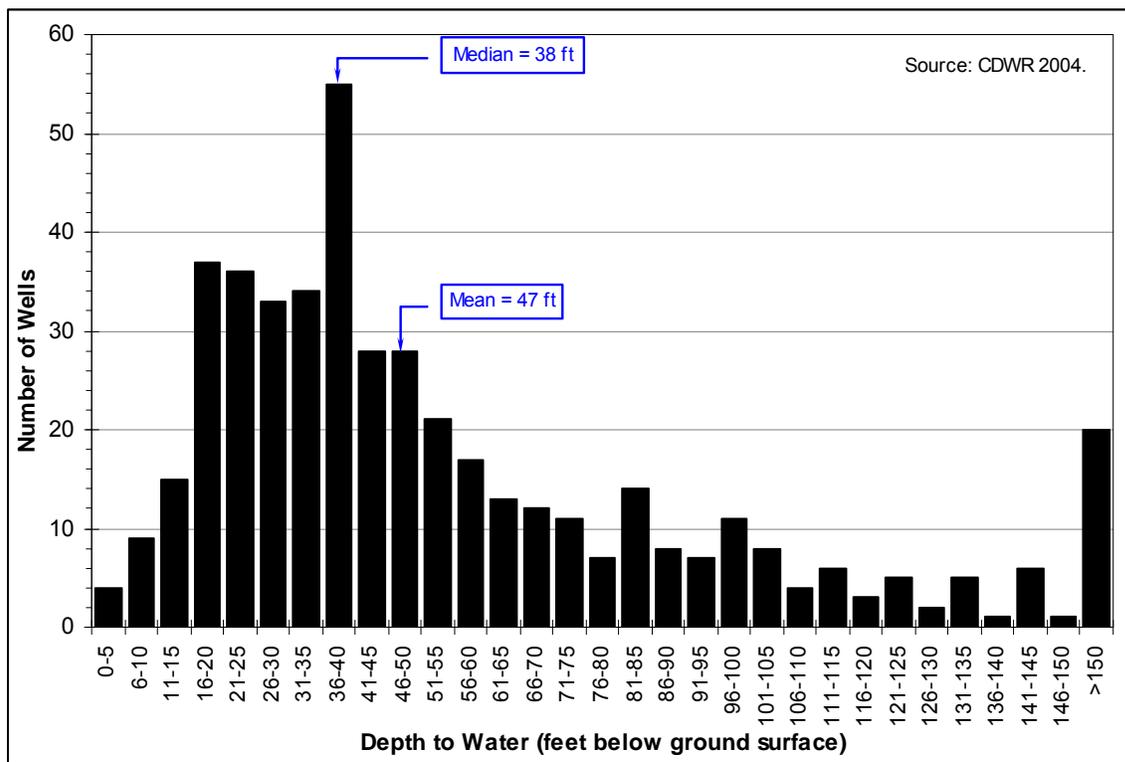


Figure 3-2. Well Depths near the Arkansas River from Wellsville to Parkdale

Groundwater quality in the Precambrian crystalline rock aquifers is generally good. However, water at this depth may be highly mineralized due to the length of time the water has been in contact with mineral-rich rock. Available water quality data from wells in the area show dissolved solids concentrations from 506 to 566 milligrams per liter (Crouch et al. 1984). The majority of the wells are relatively shallow, and the permitted uses reflect that the quality of water produced from area wells is sufficient for household use.

3.10.2 Current Management Considerations

3.10.2.1 Surface Water

Flows in the Arkansas River are administered through interagency agreements for agricultural, recreational, and fisheries uses. Since 1989, recreation on the Arkansas River has largely been administered according to a cooperative federal and state plan that addresses river resources and uses (BLM 2001). Subsequently, an intensive water needs assessment was developed between the CDNR, BLM, Bureau of Reclamation (BOR), and the USFS to manage the Arkansas River corridor and its reservoirs between Leadville, Colorado, and Pueblo Reservoir downstream (Smith and Hill 2000).

3.10.2.2 Groundwater

Well permitting and management of groundwater resources within Colorado fall under the statutory responsibilities of the State Engineer and the CDWR. The Colorado Groundwater Commission also oversees especially sensitive or highly utilized Designated Basins and Groundwater Management Districts, of which the majority are located on the eastern plains. The Upper Arkansas River Valley does not fall within one of these basins or districts. All new groundwater uses within the state must file an application and receive a permit from the State Engineer for beneficial use of groundwater prior to construction of the well. Permitted beneficial uses of groundwater, like surface water, are governed by the doctrine of prior appropriation, or “first in time, first in right.” As a general rule of thumb, household use only and most domestic wells have strict limits placed on pumping rates, and thus are exempt from the doctrine (CDWR 2008).

3.11 SOIL RESOURCES

3.11.1 Current Conditions and Trends

The Project Area lies within the Southern Rocky Mountain Foothills Major Land Resource Area (MLRA), which is a land resource category designated through the U.S. Department of Agriculture NRCS Soil Survey. The northern part of the MLRA consists of the Laramie Mountains. The central and southern parts generally are bounded on the east by the Great Plains and on the west by the Southern Rocky Mountains. Elevation ranges from 5,000 to 8,000 feet in most of the MLRA, but small mountains in the area are as high as 10,000 feet.

This area has been impacted by the geologic processes of uplift, folding, and faulting, and by subsequent erosion and deposition. The Southern Rocky Mountains were uplifted 50 to 70 million years ago during the Laramide uplift. Most of this MLRA is adjacent to this uplift and was also affected. The uplift induced erosion of the relatively soft Late Pennsylvanian to Cretaceous sedimentary rocks from the uplands and dissected the underlying crystalline Precambrian rocks.

The dominant soil orders in this MLRA are Mollisols, Alfisols, Inceptisols, and Entisols. The soils are very shallow to very deep and are dominantly well drained. The texture is dominantly loamy in soils that formed in material weathered from igneous and metamorphic rocks, and is dominantly loamy or clayey in soils that formed in material weathered from sedimentary rocks.

The soils in the Analysis Area are highly varied and range in depth from shallow (less than 20 inches) to very deep (greater than 60 inches). The shallow soils have thin “A” horizons reflecting poor nutrient

status. These soils are typically rocky and have coarse textured surfaces. Soils along ridge tops and shoulder slopes tend to be shallow and rockier with coarser textures.

Along the valley bottoms, floodplains, and terraces, the soils are deeper, forming in alluvium. The soils found within the Project Area developed from alluvial, residual, and colluvial parent materials derived from mixed rock sources.

In general, project disturbance along the Arkansas River would occur on fill materials composed of both native and nonnative fill materials. Staging areas primarily occur on native soils. The soil information for the study area is based on Soil Survey Geographic (SSURGO) database review and analyses (NRCS 2009) and field investigations. Data on fill characteristics was gathered during field investigations in October 2009 to verify fill textures, soil cover, existing erosion, slope, presence or absence of rock outcrop, and rock fragment content. Soil cover consists of rock, duff, litter, and vegetation, which acts as a protective cover on the soil surface and reduces raindrop impact and subsequent erosion. Slope was recorded at or near proposed anchor points. Native soil map units and sample collection locations are illustrated on Maps 3-56 through 3-68. Each panel location is described in further detail below.

County Line Area

The native soils along the Arkansas River in the County Line area are developed from alluvium and colluvium, primarily derived from limestone and sandstone. Alluvial fan deposits are present along a portion of the north bank. The north side of the County Line area transitions between rock outcrop and cobbly sandy loam fill material. The railroad fill materials consist of native soils in this location. Slopes range from 50% to 70%. Moderate erosion was noted at sample location 18, primarily related to slope and lack of soil cover. The south side of the County Line area primarily consists of gravelly sandy loams and loamy sands with scattered rock outcrop. The slopes range from 30% to 80%. Soil cover is high, from 78% to 90%, and consists of vegetation, rock, and vegetative litter. Boulders and stones are scattered across the surface of the soil. No soil erosion was noted in highly vegetated areas. Where highway pullouts are located, slight sheet erosion was noted due to foot paths related to recreation.

Tunnel Area

Generally, the Tunnel area transitions between soft weathered red sandstone and alluvial cobbly sandy loams. No erosion was noted in this area due to the high proportion of rock outcrop and cobble covered soils. Slopes are variable and range from 20% to 45%. Slopes on the western portion of the Tunnel area (highway side) range from 75% to 90%. Soil cover is moderately high and consists of stones, boulders, and vegetation. Rockfill increases at the base of the slope. Deep cobbly sandy loam soils occur on fans and fan terraces within meanders on the northern portion (railroad side) of the Tunnel area. Existing roads and bare areas are common on the northern portion of the Tunnel area. Based on field observations, many of the proposed anchors associated with the Tunnel panels would be located on rock outcrop.

Vallie Bridge Area

From west to east along the Vallie Bridge area on the north side of the river, sedimentary rock outcrop transitions to deep cobbly alluvial fans with very cobbly sandy loam surface textures. Railroad fill consists of native soil materials, and fill slopes range from 35% to 45% slopes as they grade down to the river. Existing sheet erosion and colluvial movement was noted, primarily

related to cattle trails and foot trails down the slope to the river. Soil deposition was also noted behind rocks, indicating erosion potential is high if the soil is disturbed in this area. Soil cover was variable along the alluvial fan and generally consisted of cobble/shrub vegetative cover. From west to east on the south side of the river, rock outcrop grades in and out of native colluvial fill materials. Rock outcrops decline on the eastern portion of this area. Stones and cobbles are scattered across the soil surface. Soil deposition was noted behind rocks and vegetation, primarily related to sheeting and colluvial soil movement. Soil erosion potential is high in this area. Slopes range from 65% to 85%.

The Vallie Bridge Staging Area is located on a site that is currently used as a parking lot and recreation area. The soil surface is graveled and compacted. The soil is mapped as aquolls, which occur on stream terraces and fan terraces. The soil is frequently flooded.

Texas Creek Area

From west to east on the south side of the river, soils are deep grading to short steep slopes and rock outcrops. Gravelly and cobbly sandy loam surface textures were recorded throughout this area. Slopes range from 20% to 40% on the western portion and up to 70% on the eastern portion. Cobble and vegetation cover is high. Where soils are bare from foot paths or other disturbances, erosion is moderate. Rockfill and rock outcrop were also encountered in the middle and eastern end. Deep cobbly sandy loam fill materials dominated much of the railroad corridor on the western and middle sections of the Texas Creek area. Moderate sheet erosion was noted in this area due to the lack of soil cover. Erosion potential is moderate to high if soils are disturbed or denuded of soil cover. Rockfill and rock outcrop were dominant on the eastern portion of the railroad in this area.

The Texas Creek Staging Area occurs on native soils. The soils in this area are derived from alluvium and occur on alluvial fans, fan terraces, and hills. The surface textures are sandy loams and loams, and are moderately erodible. The westernmost staging area occurs on an alluvial fan at the outlet of a drainage, which may flood occasionally.

Maytag Area

This area is dominated by granite and gneiss rock outcrop and shallow colluvial soils. Riprap composed of large stones and boulders covers the slopes in this area. Soil samples taken in this area indicate surface textures range from gravelly to boulder sandy loams to loamy sands. Fill materials are made up of native soils in this area. Soil cover was high and no soil movement was observed.

Three Rocks Area

This area is dominated by granite and gneiss rock outcrop and shallow colluvial soils. Riprap composed of large stones and boulders covers most of the slopes in this area. Soils have bouldery sandy loam surface textures and are shallow or moderately deep to bedrock. Light deposition was noted behind rocks, mostly due to sheet and colluvial movement. Soils are well protected from physical disturbance due to the substantial riprap and rockfill in this area.

Spikebuck Area

From west to east, the south side of the river in this area has red sandy clay loam topsoil with moderate soil cover. Slopes range from 8% to 35%. Soils are highly erodible in this area, and moderate sheet erosion was noted with deposition occurring near the river. Soils on the eastern proposed panel locations are a gravelly sandy loam. Heavy riprap and rockfill were noted at the base of the slopes along with occasional rock outcrop. Some sheeting was observed on bare soils due to traffic and foot trails. Alluvial and some colluvial native soils are found on the north side of the river, with gravelly sandy loam surface textures. Golder (2006) observed fan deposits along the north bank of the river.

Parkdale Area

The fill materials used by the railroad on the north side of the river are made up of both native and nonnative materials. Native materials consist of colluvium and alluvium. Slopes range from 0% to 60%. Samples collected indicate soils have a gravelly to cobbly sandy loam surface texture. In some areas, stones and boulders are scattered on the surface. Soils are deeper at meanders and on the eastern portion. Sheet erosion and colluvial soil movement were noted on the steeper slopes, with exposed soils. The middle of the Parkdale section had piled concrete slabs as fill material. The upper terrace soils on the meanders, where soils will be crossed to reach the proposed anchor points, are deep with substantial grass cover. No soil erosion was evident in these areas. Slopes along the western end are dominated by areas of rockfill and large riprap. Occasional rock outcrops were observed on the western end. On the south side of the river, highway fills are predominately colluvial fill with large stones and boulders. Soil textures range between loamy sands and cobbly sandy loams. Vegetation and rock cover are high in this area, and soil erosion was only observed on bare soils that had been disturbed by foot traffic or vehicular traffic. Slopes range from 40% to 75%. Rockfill, consisting of large stones and boulders, was observed on the western portion along the river.

Fremont Road Information Center

The Fremont Road Information Center is located on deep alluvial and eolian soils with loam surface textures. These soils occur on fans and fan terraces with slopes ranging from 3% to 8%. Erosion potential is severe on these soils.

3.11.2 Current Management Considerations

The BLM's management objective for soil resources, geologic substrate, and terrain is to avoid soil erosion and loss of watershed values throughout the planning area. The following management decisions are applied to achieve the objective (BLM 1995):

- Surface disturbing activities, including construction of roads, trails, utility lines, and special use facilities; grazing; mineral development; forest and woodland management; and off highway vehicle (OHV) use is managed to avoid soils erosion and loss of watershed values throughout the planning area.
- Allotment grazing adjustments and standards with stipulations for other resource actions will decrease erosion and potentially enhance watershed characteristics.
- Impacts from soil-disturbing activities are mitigated with standard operating practices for rehabilitation of disturbed sites.

- Preserve and protect upland soils that exhibit infiltration and permeability rates appropriate to soil type, climate, land form, and geologic process. Soil infiltration and permeability provide an adequate accumulation of soil moisture necessary for optimal plant growth and vigor while minimizing surface runoff.

3.12 GEOLOGIC SUBSTRATE AND TERRAIN

3.12.1 Current Conditions and Trends

The Project Area lies within the Southern Rocky Mountains physiographic province. The western portion of the Project Area, from Salida to Coaldale (including the County Line, Tunnel and Vallie Bridge sections), lies within the northern end of the Sangre de Cristo Range, while the remainder of the Project Area lies at the northern end of the Wet Mountains (which are the southern extension of the Colorado Front Range). The bedrock and surficial geologic units present at each of the proposed panel sections are described in the following subsections based on information from J.F. Sato (J.F. Sato 2007), Golder Associates Inc. (Golder 2000, Golder 2006), the Geologic Map of Colorado published by the Colorado Geological Survey (CGS 1979), and digital bedrock geology mapping from CGS as provided by BLM for this study (see J.F. Sato 2007 for digital bedrock geologic mapping by OTR section).

County Line Section

The County Line section traverses a relatively narrow east-west trending canyon with a steep southern slope and moderately steep northern slope. Bedrock underlying this section is believed to be composed primarily of limestone and/or dolomite, although gneissic metamorphic rock may underlie the western portion of the section. These units are typically hard and strong, but variably jointed and fractured near surface and in outcrop, commonly at spacings of 1 to 2 feet. Golder (2006) estimates that 20% to 60% of the anchor locations in the County Line section would encounter competent bedrock of these units.

Surficial deposits in the County Line section include alluvium and alluvial fan deposits, colluvium, fill derived primarily from colluvium, and rockfill typically comprised of locally acquired stone but sometimes including imported rock. The alluvium and alluvial fan deposits are typically composed of rounded cobbles and boulders in a matrix of gravel and sand; locally-derived, angular rock clasts are reported in some alluvial fans at the mouths of steeper drainages. Colluvium (and fill derived from colluvium) in this section generally has a relatively high rock (assumed greater than 3-inch size) content of 40% or more, except where derived from gneissic bedrock. In the later case, the colluvium appears to have lower rock content and to be supported by a finer-grained matrix (presumed as sand and gravel sizes). The rock fraction in both cases is composed of angular clasts that may be typically 1-foot diameter or larger. Rockfill in this section is comprised primarily of rock clasts with little finer-grained matrix of sand and gravel. Rockfill is used as embankment fill and riprap (erosion protection over less coarse embankment fill or natural soils). Rockfill particle sizes are predominantly 1-foot nominal dimension or larger, with some clasts up to a maximum of about 4 feet. The rockfill is usually derived from local sources, but some imported material is apparent in some portions of the railroad fill (particularly as riprap). Golder (2006) estimates that 30% to 70% of the anchoring locations in the County Line section would occur in colluvium or colluvial fill, 5% to 25% in alluvium or alluvial fan deposits, and 5% to 20% in rockfill.

Tunnel Section

The Tunnel section is underlain by sedimentary rocks of the Pennsylvanian-age Minturn and Belden Formations on both banks of the Arkansas River. These rocks are primarily interbedded sandstone, conglomerates, and shales over most of the section, with limestone/dolomite at the west end of the section. The bedrock units reportedly dip about 30 degrees to the east in this section. Golder (2006) estimates that 60% to 90% of anchorage locations in this section would encounter competent sedimentary rock, while less than 5% will be in weaker sedimentary rock.

Surficial units in the Tunnel section are similar to those described previously for the County Line section, with cobbly alluvium most common on the north riverbank and coarse rockfill (derived from local rock) typical on the south bank. Golder (2006) estimates that 10% to 20% of the anchoring locations in the Tunnel section would occur in colluvium or colluvial fill, 10% to 30% in alluvium or alluvial fan deposits, and 10% to 20% in rockfill.

Vallie Bridge Section

The bedrock in the Vallie Bridge section is described in Golder (2006) as predominantly competent sandstones and conglomerates with some softer, weathered shale interbeds. The shale interbeds are reportedly less than 3 feet thick and comprise about 10% to 20% of the bedrock in the section. The rock units dip steeply at 60 to 70 degrees to the southwest. This field description of the bedrock present in the Vallie Bridge section conflicts with the CGS digital bedrock mapping reviewed for this study, which indicates the section is underlain by evaporitic facies of the Minturn and Belden Formations; and with J.F. Sato (2007), who describe arkosic conglomerate sandstone and siltstone of the Sangre de Cristo Formation in the western portion of the section and gypsum sandstone and siltstone of the Minturn and Belden Formations in the eastern portion. Given that the work by Golder (2006) involved field reconnaissance at the Vallie Bridge section, and that the geologic mapping used as the basis of the CGS digital bedrock mapping was at very small scale and could be locally incorrect, the Golder (2006) description is adopted pending field verification under this study. Golder (2006) estimates that 20% to 50% of anchorage locations in this section would encounter competent sedimentary rock, while less than 5% will be in weaker sedimentary rock.

Surficial deposits at the Vallie Bridge section include predominantly fill derived from colluvium on the southwest bank (road side) of the river, alluvium and alluvial fan deposits with rounded cobbles on the downstream (southeastern) portion of the northeast bank (railroad side), and sedimentary bedrock outcrop on the upstream (northwestern) portion of the northeast bank. Golder (2006) estimates that 40% to 60% of the anchoring locations in the Vallie Bridge section would occur in colluvium or colluvial fill, 20% to 40% in alluvium or alluvial fan deposits, and 5% to 20% in rockfill.

Texas Creek and Maytag Sections

The Maytag sections include the otherwise designated Texas Creek section upstream and the Maytag section just downstream. The Texas Creek section is underlain by gneissic and schistose metamorphic rock over all but the most upstream reach, which is underlain by Precambrian-age granitic rock (that may include granites, quartz monzonites, and/or granodiorites). Golder (2006) estimates that 20% to 70% of anchorage locations in this section would encounter metamorphic rock. The Maytag section is shown on the CGS digital bedrock mapping as entirely underlain by

gneissic and schistose metamorphic rock, which is consistent with observations in the field reported by Golder (2006). It is estimated by Golder (2006) that about 5% to 20% of the anchorage locations in the Maytag section would encounter metamorphic bedrock.

Surficial deposits in the Texas Creek section include alluvium and alluvial fan deposits, colluvium, fill derived primarily from colluvium, and rockfill. The alluvium at the downstream end of this section is described as containing rounded cobbles but few boulders. Golder (2006) estimates that 30% to 70% of the anchoring locations in the Texas Creek section will occur in colluvium or colluvial fill, 5% to 20% in alluvium or alluvial fan deposits, and 10% to 40% in rockfill. The downstream Maytag section is characterized by banks with predominantly large rock riprap over finer-grained alluvial and colluvial deposits/fills. Areas of very large rounded boulders (which may actually be rock outcrops) are also described in this section. Golder (2006) estimates that 20% to 50% of the anchoring locations in the downstream Maytag section would occur in colluvium or colluvial fill, 5% to 50% in alluvium or alluvial fan deposits, and 20% to 50% in rockfill.

Three Rocks Section

The Three Rocks section is mapped on the CGS digital bedrock mapping as being underlain by gneissic and schistose metamorphic rock; J.F. Sato (2007) reports the presence of some granitic rock and intrusive dikes in this section. Golder (2006) infers the presence of metamorphic bedrock at shallow depth beneath the common surficial deposits in this section, but estimates that only about 5% to 15% of the anchorages in this section will be in metamorphic rock.

Surficial deposits on the riverbanks in the Three Rocks section are predominated by coarse rockfill and very rocky colluvium and fill derived from colluvium. Alluvial (outwash) fans from side drainages also are present in this section; these fan deposits are composed of relatively coarse, angular rock debris. Golder (2006) estimates that 20% to 50% of the anchoring locations in the Three Rocks section would occur in colluvium or colluvial fill, <5% in alluvium or alluvial fan deposits, and 30% to 70% in rockfill.

Spikebuck Section

The CGS digital bedrock mapping indicates that most of the Spikebuck section is underlain by granitic rock (that may include granites, quartz monzonites, and/or granodiorites). The eastern approximately half of the western segment of the Spikebuck section and the westernmost end of the longer eastern segment are shown as underlain by gneissic and schistose metamorphic rock. Golder (2006) confirms occasional outcrops of igneous (granitic) rock, but does not mention metamorphic rock outcrops in this section. It is estimated by Golder (2006) that about 15% to 40% of the anchorage locations in the Spikebuck section would encounter igneous bedrock.

Surficial deposits in the Spikebuck section are reported by Golder (2006) as predominantly rockfill with occasional outcrops of igneous rock on both banks of the river. Fills comprised of colluvium are present in some reaches, especially at the mouths of gullies on the south riverbank. Alluvial fan deposits were noted at two locations along the north bank of the river. Golder (2006) estimates that 20% to 40% of the anchoring locations in the Spikebuck section would occur in colluvium or colluvial fill, 5% to 15% in alluvium or alluvial fan deposits, and 40% to 60% in rockfill.

Parkdale Sections

All but the very easternmost (downstream) reach of the Parkdale sections is shown on the CGS digital bedrock mapping as underlain by granitic rock (that may include granites, quartz monzonites, and/or granodiorites). A short reach at the easternmost end of these sections is mapped as underlain by Niobrara Formation, which is typically composed of carbonate-rich shale and limestone. Golder (2006) estimates that 10% to 25% of anchorage locations in this section would encounter igneous rock.

The riverbanks at the extreme eastern (downstream) end of the Parkdale sections are composed mainly of alluvial and alluvial fan deposits. Further upstream, the banks are more typically composed of colluvium or fill derived from colluvium that is very rocky, with clasts up to 2 feet or greater in diameter. Still further upstream, the banks are mostly composed of rockfill, with some areas of finer-grained natural riverbanks at alluvial fans and with occasional to more frequent igneous bedrock outcrop further upstream. Approximately 0.25 mile of the north riverbank, approximately in the center of the Parkdale sections, is a natural or fill slope armored with large slabs of concrete rubble that appears to have been demolished from concrete pavement or bridge decking. This reach may also contain other debris (such as timber). Golder (2006) estimates that 20% to 50% of the anchoring locations in the Parkdale sections would occur in colluvium or colluvial fill, <5% in alluvium or alluvial fan deposits, and 30% to 70% in rockfill (including concrete rubble).

3.12.1.1 Slope Stability

No mention of slope instability or landsliding at any of the OTR sections was found in J.F. Sato (2007) or Golder (2006). Overall landslide incidence and susceptibility in the Project Area is first characterized based on the Landslide Overview Map of the Conterminous United States available in digital format at the following USGS website: <http://landslides.usgs.gov/learning/nationalmap/index.php> (accessed July 30, 2009). All of the proposed panel sections, except the Maytag (Texas Creek) sections, are classified as "Mod: Moderate landslide incidence (1.5% to 15% of the area is involved in landsliding)". The Maytag (Texas Creek) sections are classified as "Low: Low landslide incidence (less than 1.5 % of the area is involved in landsliding)". This mapping does not identify the specific type, scale, or location of the areas involved in landsliding.

CGS (Carlson 2009) provided currently available unpublished GIS files of mapped landslides in the project vicinity derived from Colton et al. (1975) as shown on Maps 3-69 through 3-81. No large, discrete landslides are mapped at or in the immediate vicinity of any of the proposed panel sections.

However, the entire project corridor lies within a Tier Two Debris Flow Area as originally mapped by CGS (Rogers 2005) and adopted by CDOT (Santi et al. 2006). Per Santi et al. (2006): "A debris flow, sometimes referred to as a mudslide, is a flowing mixture ranging from watery mud to thick, rocky mud that can carry large items such as boulders, trees, and other debris. Debris flows travel rapidly downslope along drainage channels or stream valleys, often transporting and depositing a large volume of material in areas where the gradient flattens, such as roadways. Because of their relatively high density and viscosity, debris flows can move, and even carry away, vehicles and other objects as large as bridges and railroad cars (Miller 1989). Debris flows can happen rapidly, striking with little or no warning, and moving at speeds up to 35 mph (USGS 2005). They can travel several miles from their sources, over relatively gentle gradients, growing in size and momentum as they pick up trees, boulders, cars, and other materials that will cause considerable destruction to anything in the path. When moving, debris flows

can resemble masses of wet concrete flowing downslope along channels or stream valleys (Case 2000). High-speed debris flows may climb valley walls on the outsides of bends, and their momentum may also carry them over obstacles (Miller 1989). The major hazard to human life from debris flows is from burial or impact by boulders and other debris" (Miller 1989).

A Tier Two Debris Flow Area is characterized as "Significant Activity and Potential Impact" from debris flows. More specifically, "Tier Two listings are very significant but less severe; or where adequate information and/or some mitigation is in place; or where current development pressures are less extreme" (Rogers 2005). The OTR project corridor is essentially coincident with Rogers' (2003) Salida to Parkdale reach, described as follows: "Lower reaches and alluvial fans of Arkansas River tributaries between Salida and Parkdale, debris flows and flash flooding, Fremont County (page 37) – US 50, SH 69, and county roads of this corridor have been flooded periodically with rock, mud, woody debris, and floodwater from tributary streams, requiring frequent cleanup and roadway repairs after the larger events. Year 2002 evaluation and recommendations – Detailed study and hazard mapping are badly needed, as these events are both a serious safety problem and a source of excessive maintenance costs. With hazard maps and process studies in hand, more effective plans for mitigation could be devised by the CDOT and affected counties." The mapping by Rogers (2003) is generalized and not intended to delineate specific existing or historic debris flows, or specific areas of high potential for future debris flows. Rather, it is intended to identify areas within which this hazard should be further evaluated, depending on the potential for damage to facilities or structures or for injury or death.

As shown on Map 3-69, 19 reaches (including a total of 46 distinct rockfall sites) of the project corridor are mapped from data provided by CDOT as "Rockfall Hazard Reported." These reaches include the upstream approximately half of the County Line section, the upstream approximately half of the Tunnel section, all of the Vallie Bridge section, all of the Maytag and Texas Creek sections, the downstream approximately half of the Three Rocks section, and nearly all of the Parkdale sections. These reaches include rockfall sites listed in the Colorado Rockfall Hazard Rating System (CRHRS) (Ortiz 2009). The data in these reaches are from 1998 and 2002. CDOT is in the process of updating these data and the CRHRS methodology, but is still using the current CRHRS for site prioritization. The 46 individual sites in the mapped reaches are ranked relative to the 756 sites statewide in the database. The lowest ranked rockfall site (relative to the total of 756) in these reaches is 27 and the highest ranked site is 691, where a lower rank indicates a more severe hazard. Three (3) of the 46 sites (or about 7%) are among the lowest 10% ranked (i.e., highest hazard) sites statewide.

Attesting to the known rockfall hazard in the Project Area, a rockfall occurred on February 14, 2011 at milepost 244 approximately 30 miles west of Cañon City (about one mile west of Cotopaxi) as described in more detail in Section 4.12.2.1. As shown on Map 3-69, this location was included in the CRHRS cited above but is outside of any of the proposed OTR panel reaches. The relatively low ranking of 136 and high total score of 408 at this location (as assigned in 2002) indicated a relatively high rockfall hazard as compared to the other rockfalls in the CRHRS. One of a number of news reports on this event is quoted as follows: "The reason for the slide is still under investigation, but it looks like the culprit is the freezing/thawing of snow from the past few weeks. While rockslides are nothing new to the area, the Colorado Department of Transportation crews will be monitoring this area for future movement. Right now we feel it's going to be stable, but over time you get water in there and that causes instability," Rockfall Specialist Ty Ortiz said (Malloy 2011). This information was confirmed and additional information acquired during an interview with Mr. Ortiz (Ortiz 2011), as further discussed in Section 4.12.2.1.

3.12.1.2 Seismotectonics

The Project Area is characterized by low historic seismicity as documented at the following USGS website: http://neic.usgs.gov/neis/epic/epic_circ.html (accessed July 30, 2009). A total of 28 earthquakes have been recorded in the USGS/NEIC (PDE) earthquake catalog of events from 1973 to present within a 100 km radius of the approximate center of the Project Area. These earthquakes ranged in magnitude (M) from 2.2 to 3.6, with the closest event (a M3.3 earthquake) occurring about 23 km from the center of the Project Area. Events of this size were very likely not felt within the Project Area, and almost certainly did no noticeable damage even to susceptible structures in the Project Area.

a. Potentially Active Faults

The U.S. Geological Survey's Quaternary Fault and Fold Database was reviewed at the following website: <http://gldims.cr.usgs.gov/qfault/viewer.htm> (accessed July 31, 2009) to identify faults and folds at and in the vicinity of the proposed panel sections that have been active in late Quaternary time (approximately the past 1.6M years). Faults (or folds) that have been active within this time span are considered as potentially seismogenic (i.e., capable of producing earthquakes) and/or capable of producing surface ground rupture (with a sufficiently large earthquake event). No potentially active faults are mapped traversing any of the proposed panel sections.

There are a series of potentially active faults in a north-northwest trending zone along the western flank of the Sangre de Cristo/Culebra Range, the eastern front of the Sawatch Range, and bounding the upper Arkansas Valley graben (a down-dropped structural basin). This zone of faulting occurs in the northern portion of the Rio Grande rift seismotectonic province. The closest of these faults to the Project Area – the unnamed fault of Missouri Park – is approximately 6 miles west of the County Line section. There are also potentially active faults of the Ute Pass fault zone bounding the eastern flank of the Front Range approximately 30 miles east-northeast of the Parkdale section at closest approach, and the East-Side Chase Gulch and associated faults approximately 28 miles north-northwest of Parkdale at closest approach. These faults will largely control the future seismicity and ground motions at the proposed panel sections due to their proximity. The influence of these potentially active faults is accounted for in the earthquake probability and probabilistic ground motions discussed in the following paragraphs. Other potentially active faults occur within 100 km of the Project Area (the radial distance within which seismogenic sources are typically evaluated for possible influence on future ground motions at a given site). However, these faults are not judged likely to be capable of producing sufficiently large earthquakes to result in greater ground motions in the site area than the similar and even smaller faults closer to the site.

b. Earthquake Probability

Estimates of the probability of future earthquakes in the vicinity of the Project Area have been made based on the following USGS Earthquake Hazards Program website: <http://eqint.cr.usgs.gov/eqprob/2002/index.php> (accessed July 30, 2009). All of the proposed panel sections are subject to a 90% to 100% probability of an earthquake of M5 or greater occurring within 2,475 years (the longest return period available in the model) and within 50 km of any of the sections. The probability of events greater than M5+ reduces to about 60% within 500 years and 50 km of the County Line, Tunnel, and Vallie Bridge sections; and 40% to 50% within 50 km of the Maytag, Three Rocks, Spikebuck, and Parkdale sections. For an exposure period of 50 years, the probability of a M5+ earthquake is only about 6% to 10% and about 4% to 8% for the western and eastern sections, respectively. M5 is the approximate threshold size of an earthquake capable of causing at least minor

damage to susceptible structures (including causing further movement of existing landslides or triggering new failures in marginally stable slopes). A 50-year return period is judged conservative for the very short life of the project (the approximately 3 months the fabric panels would be deployed from blossoming to removal).

c. Probabilistic Ground Motions

A common measure of potentially damaging ground motions generated by an earthquake is peak ground acceleration (PGA). Estimates of PGA and other probabilistic ground motions may be derived from the Ground Motion Parameter Calculator available at the following USGS website:

<http://earthquake.usgs.gov/research/hazmaps/design/> (accessed July 30, 2009). The estimated PGA with a 1% probability of exceedance in a 10-year exposure period (the shortest exposure period in the calculator) is 0.08g. The return period of this value of PGA is 995 years, which equates to an annual frequency of exceedance of 0.001 (or only a one in a thousand chance of a greater PGA occurring in any given year). This PGA is considered appropriate for the short period of exposure of the proposed panels and the low safety hazard presented by the proposed panel system. If needed for design of the anchor system, spectral accelerations, velocities, and displacements may be determined using the referenced calculator.

3.12.1.3 Mineral Resources

The Project Area is located in the Arkansas River ESR #1 of the Royal Gorge Resource Area (RGRA), within which there are “Very limited opportunities for commercial mineral development” (BLM 1995, page S-1). No large scale active commercial or apparent historic mining activities are present directly within the footprints of the proposed panel sections based on review of research by J.F. Sato (2007) of the CDNR permitted mine database (CDNR 2005), field reconnaissance, review of topographic mapping, and examination of aerial imagery (Google Earth™ 2009). Given the relatively short duration of the entire Project (approximately 2.5 years from initiating anchor drilling to completing system removal) and the location of the panels and anchorages over and on the banks of the river, it is judged unlikely that any new large scale nonplacer mining or oil/gas drilling would occur within the immediate footprint of the proposed project during the project life. Although judged not likely, there is some possibility that geothermal drilling may occur within the project footprint given the recent interest and past activity in the Wellsville area.

Smaller scale placer mining occurs throughout the project corridor, including in and adjacent to proposed panel locations as discussed below in this section. Placer mining typically involves recovering minerals (in this case primarily gold) from alluvial sands and gravels. These placer claims are very active during the summer months. In addition to the placer claims, some of the proposed panel locations overlie active lode claims. Lode mining typically involves extracting minerals from intact bedrock in an open excavation or underground workings. Permitting of these placer and lode mining activities under applicable mining law is discussed below in Section 3.12.2. Recreational placer mining opportunities that are not regulated under mining law are further described in Section 3.20.1.13.

a. Historic and Active Mining

Historic and active mining sites present within relatively close proximity to proposed panel sections are described in J.F. Sato (2007), together with additional information on placer and lode claims from BLM (2010)¹, as follows and as shown on Map 3-82:

County Line Section

J.F. Sato (2007): Two large gravel quarries east of the section developed in bedrock above the river valley; historical mines at approximate elevation 7,100 feet in an unnamed drainage north of the site; a terminated granite-gneiss mining operation in the uplands east of the site area; and travertine quarries near MM 227 (just east of this section).

Tunnel Section

J.F. Sato (2007): An upland gravel quarry northwest of this section; an upland mining prospect (i.e., exploratory site) immediately north of the site; and a terminated anhydrite/gypsum mine about 1 mile southwest of the site in an upland location.

BLM (2010): As shown on Map 3-82, the Arkansas Gold active placer claim underlies the full reach of the Tunnel section site; other active claims are present immediately upstream and downstream of the Tunnel section site.

Vallie Bridge Section

J.F. Sato (2007): One active bentonite mine (LBC Bentonite Pit) located upland and immediately southwest of the site; and two active sand and gravel pits (Vallie Gravel and Fremont Gravel) in the river valley about 0.5 mile downstream.

BLM (2010): Active lode claims (the L.B.C. and L.B.C. Amended) underlie essentially all of the Vallie Bridge section (Map 3-82).

Texas Creek and Maytag Sections

J.F. Sato (2007): One upland prospect (exploratory site) approximately 0.5 mile northwest of the Texas Creek (or upstream Maytag section) site.

BLM (2010): The viewing and information area and upstream-most portion of the Texas Creek section overlie the Boondoggle placer claim as shown on Map 3-82. There are no active mine claims underlying the Maytag section (based on the current BLM (2010) mine claims GIS).

Three Rocks Section

J.F. Sato (2007): One prospect located along the north side of the valley approximately 1 mile from the site.

¹ Note that new mining claims are processed and issued by the BLM with some frequency in the general Project Area, particularly smaller placer claims. The GIS shows a level of detail down to only 40 acres. As such, a claim may exist within the designated 40-acre area, but may not necessarily take up the entire area. All claims are included on Map 3-82, but are only displayed on a level that reveals 40 acres containing active claims.

BLM (2010): The Three Rocks section is underlain by the Spiker #3 lode claim as shown on Map 3-82.

Spikebuck Section

J.F. Sato (2007): A gravel quarry and prospect upland and within 1 mile south of the site area.

BLM (2010): The downstream-most reach of the Spikebuck section is underlain by the Lucky Miner placer claim.

Parkdale Section

J.F. Sato (2007): An active sandstone mining operation (Front Range Aggregates – Parkdale Project) east of the site area; numerous gravel pits in the river valley to the east of the site; see also the gravel quarry and upland prospect described above for the Spikebuck section.

BLM (2010): The very upstream-most reach of the Parkdale section is underlain by the Lucky Miner placer claim.

3.12.2 Current Management Considerations

3.12.2.1 Mineral Resources

Portions of all of the proposed panel sections lie within areas of Controlled Surface Use, and most of the Maytag (Maytag and Texas Creek), Three Rocks, Spikebuck, and Parkdale sections are also within areas of Seasonal Limitations on the Fluid Minerals Management Map in BLM (1995). Fluid minerals are defined as oil, gas, and geothermal resources in BLM (1995). These resources are judged as of low-minerals value, and the reasonably foreseeable development of fluid minerals throughout the BLM-administered portions of the RGRA study area is only about 20 acres per year (or about 0.02% of the BLM-administered mineral estate) (BLM 1995).

All of the locatable minerals in the proposed project area are open to entry under the mining law, with the exception of the Point Bar R&PP lease area, and are open to development under regulations codified at 43 CFR 3809. A majority of the salable minerals (such as sand and gravel) in the Project Area are also available for disposal by BLM under 43 CFR 3600.

Mining claims and associated permits are administered by BLM in accordance with regulations promulgated under 43 CFR 3809 and other applicable laws. A concise summary of BLM's administration of mining law is available at: http://www.blm.gov/wo/st/en/info/regulations/mining_claims.html. In addition to certain obligations and responsibilities under the law, mining claimants have rights to access their claims for permitted purposes, including exploration, mining, and reclamation.

OTHER RESOURCES

3.13 ENVIRONMENTAL JUSTICE/PROTECTION OF CHILDREN

3.13.1 Current Conditions and Trends

3.13.1.1 Environmental Justice

According to the EPA, environmental justice is defined as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”² In order to address environmental justice issues or concerns resulting from the existence of any part of the OTR project, minority and low income populations within the primary socioeconomic Analysis Area (PAA) and secondary socioeconomic Analysis Areas (SAA) are identified. Section 3.14, Socioeconomics, Social Impacts, defines the PAA as Chaffee and Fremont counties and the SAA as El Paso and Pueblo counties.³

a. Racial Composition of the Primary and Secondary Socioeconomic Analysis Areas

Section 3.14, Socioeconomics, Social Impacts, discusses the demographic characteristics of the PAA and SAA, including the racial breakdown of the population as provided in Table 3-34.

Table 3-34. Racial Composition of Primary and Secondary Analysis Areas, 2000

	Non-Hispanic						Hispanic
	White	African American	AIAN	Asian	NHPI	Other	All Races
Primary Analysis Area							
<i>Salida</i>	86.4%	0.1%	1.1%	0.4%	0.0%	1.3%	10.8%
Chaffee County	87.3%	1.6%	0.9%	0.4%	0.0%	1.2%	8.6%
<i>Canon City</i>	87.0%	1.6%	0.8%	0.5%	0.0%	1.7%	8.3%
Fremont County	81.1%	5.3%	1.3%	0.5%	0.0%	1.5%	10.3%
Secondary Analysis Area							
<i>Colorado Springs</i>	75.3%	6.3%	0.6%	2.8%	0.2%	2.9%	12.0%
El Paso County	76.2%	6.3%	0.6%	2.5%	0.2%	2.9%	11.3%
<i>Pueblo</i>	51.1%	2.2%	0.6%	0.6%	0.0%	1.3%	44.1%
Pueblo County	57.7%	1.7%	0.6%	0.6%	0.0%	1.4%	38.0%
State of Colorado	73.1%	5.2%	0.7%	2.2%	0.0%	1.8%	17.1%

- Notes: (1) 2000 is the most recent year that these data are available for all of the project areas.
 (2) AIAN= American Indian or Alaska Native; NHPI= Native Hawaiian or Pacific Islander.
 (3) Other includes people responding as some other race or reporting two or more races.

Source: U.S. Census Bureau, 2000 Decennial Census (Census Bureau 2000a).

² U.S. Environmental Protection Agency 2010a, <http://www.epa.gov/environmentaljustice/>.

³ Salida and Cañon City are the cities of note in the primary Analysis Area, and Colorado Springs and Pueblo are the cities of note in the secondary Analysis Area.

The total PAA population was 83% white in 2000, the most recent year for which data is available for the area. Almost 10% of all races were Hispanic. This area was generally less diverse than the state as a whole in 2000. About 72% of the SAA population was white and 17% of all races were Hispanic, similar diversity to the state.

b. Economic Conditions of the Primary and Secondary Socioeconomic Analysis Areas

Section 3.14, Socioeconomics, Social Impacts, discusses the economic conditions of the socioeconomic Analysis Areas in detail. The text and tables in this section focus on poverty levels of the population and on income levels by race.

In 2000, over 11% of the PAA population was living below the poverty level, with almost 15% of the Salida population below poverty level. With the exception of Salida, these levels were slightly less than the percent of the population in poverty at statewide level. More recent poverty level data is not available for most of the PAA due to relatively small population numbers, but data for Fremont County shows that the number of people living below the poverty level in that location has increased and was recently higher than the statewide average. For the SAA, the percent of the population in poverty has also increased since 2000. Colorado Springs and El Paso County poverty levels were below statewide poverty levels in all time periods, while Pueblo and Pueblo County populations have experienced relatively high levels of poverty. Poverty levels for the PAA and SAA are illustrated in Table 3-35.

Table 3-35. Percent of Primary and Secondary Analysis Areas Populations below Poverty Level

	Year 2000	2006-2008 Average
	<u>Persons below Poverty Level (%)</u> of total population)	<u>Persons below Poverty Level (%)</u> of total population)
Primary Analysis Area		
<i>Salida</i>	14.8%	NA
Chaffee County	11.7%	NA
<i>Canon City</i>	11.5%	NA
Fremont County	11.7%	17.9%
Secondary Analysis Area		
<i>Colorado Springs</i>	8.7%	11.1%
El Paso County	8.0%	10.0%
<i>Pueblo</i>	17.8%	21.9%
Pueblo County	14.9%	17.7%
State of Colorado	12.4%	13.2%

Notes: American Community Survey data is not available for geographic areas with fewer than 20,000 people.

Source: Census Bureau 2000a; U.S Census Bureau, 2006 – 2008 American Community Survey 3 Year Estimates (Census Bureau 2009).

Income data by race was gathered from the 2000 Census; this database contains the most recent economic information at the level of detail of individual races. Median household income and per capita income varies by race within the PAA and SAA. Income levels for the populations of each race are higher or lower than the statewide average, depending on location, and do not appear to follow a specific pattern. Income data is not available for several races within PAA geographies due to the small numbers

of people within each racial category. Median household income by race and per capita income by race for the PAA and SAA are shown in Tables 3-36 and 3-37.

Table 3-36. Median Household Income for Primary and Secondary Analysis Areas, 2008

	<u>Non-Hispanic</u>					<u>Hispanic</u>
	<u>White</u>	<u>African American</u>	<u>AIAN</u>	<u>Asian</u>	<u>NHPI</u>	<u>All Races</u>
Primary Analysis Area						
Chaffee County	\$44,267	NA	NA	NA	NA	\$40,061
Fremont County	\$44,944	\$67,606	\$32,716	NA	NA	\$35,175
Secondary Analysis Area						
El Paso County	\$63,046	\$51,789	\$50,526	\$59,189	\$64,615	\$46,362
Pueblo County	\$46,225	\$38,189	\$47,077	\$44,964	NA	\$34,742
State of Colorado	\$64,704	\$46,922	\$47,781	\$62,446	\$51,243	\$44,471

- Notes: (1) AIAN= American Indian and Alaska Native; NHPI= Native Hawaiian and Pacific Islander.
 (2) NA indicates that Census data is unavailable due to populations of less than 100 people.
 (3) Data from the 2000 Census has been adjusted for inflation to 2008 dollars.
 (4) Income data from the 2000 Census is not easily comparable to the Census' American Community Survey data, due to methodology differences.

Source: Census Bureau 2000a; Bureau of Labor Statistics 2009; Harvey Economics 2009.

Table 3-37. Per Capita Income for Primary and Secondary Analysis Areas, 2008

	<u>Non-Hispanic</u>					<u>Hispanic</u>
	<u>White</u>	<u>African American</u>	<u>AIAN</u>	<u>Asian</u>	<u>NHPI</u>	<u>All Races</u>
Primary Analysis Area						
Chaffee County	\$25,811	NA	NA	NA	NA	\$18,754
Fremont County	\$23,029	\$22,226	\$20,460	NA	NA	\$17,895
Secondary Analysis Area						
El Paso County	\$30,972	\$21,470	\$20,387	\$25,679	\$19,909	\$17,571
Pueblo County	\$26,307	\$17,047	\$27,161	\$28,827	NA	\$15,519
State of Colorado	\$34,928	\$23,032	\$21,077	\$26,962	\$21,968	\$16,689

- Notes: (1) AIAN= American Indian and Alaska Native; NHPI= Native Hawaiian and Pacific Islander.
 (2) NA indicates that Census data is unavailable due to populations of less than 100 people.
 (3) Data from the 2000 Census has been adjusted for inflation to 2008 dollars.
 (4) Income data from the 2000 Census is not easily comparable to the Census' American Community Survey data, due to methodology differences.

Source: Census Bureau 2000a; Bureau of Labor Statistics 2009; Harvey Economics 2009.

3.13.1.2 Protection of Children

Environmental health and safety are related to the topics of Air Quality (Section 3.9), Water Resources (Section 3.10), Hazardous Materials (Section 3.17), Sound Resources and Noise (Section 3.24) and Waste (Nonhazardous) (Section 3.18). These environmental resources are factors that affect the health and safety of both children and adults; however, children may be more sensitive to certain levels of pollutants or toxins or to specific types of materials or pollutants, depending on the resource. According to the EPA, “children may be more vulnerable to environmental exposures than adults because (1) their bodily systems are still developing; (2) they eat more, drink more, and breathe more in proportion to their body size; and (3) their behavior can expose them more to chemicals and organisms.”⁴ The sections of this EIS indicated above identify and discuss the current conditions and trends for environmental resources that may affect the health and safety of children.

Table 3-38 provides the median age of PAA and SAA populations, along with information on the number of children under the age of 18.

Table 3-38. Median Age of PAA and SAA Populations, Percent and Number of Children under the Age of 18 Years

	<u>Median Age (Years)</u>		<u>Percent of Population Under 18</u>		<u>Number of Children Under 18 Years</u>	
			<u>Years of Age</u>		<u>of Age</u>	
	<u>2000</u>	<u>2006-2008 Average</u>	<u>2000</u>	<u>2006-2008 Average</u>	<u>2000</u>	<u>2006-2008 Average</u>
Primary Analysis Area						
<i>Salida</i>	42.1	NA	21.4%	NA	1,180	NA
Chaffee County	41.8	NA	19.7%	NA	3,201	NA
<i>Canon City</i>	39.8	NA	23.5%	NA	3,624	NA
Fremont County	38.8	40.7	20.6%	16.0%	9,504	7,557
Secondary Analysis Area						
<i>Colorado Springs</i>	33.6	34.7	26.5%	25.4%	95,623	100,269
El Paso County	33.0	34.3	27.6%	26.0%	142,480	152,987
<i>Pueblo</i>	36.5	35.7	25.1%	24.0%	25,650	25,465
Pueblo County	36.7	36.7	25.8%	24.2%	36,546	37,367
State of Colorado	35.3	36.7	25.7%	24.5%	-	-

Notes: American Community Survey data is not available for geographic areas with fewer than 20,000 people.
Source: Census Bureau 2000a, Census Bureau 2009.

Between 2000 and recent years (2006-2008), the populations of the PAA and SAA have generally grown older, as evidenced by increasing median ages and smaller percentages of the population under 18 years of age. In 2000, the PAA was home to about 12,700 children and the SAA included just over 179,000 children under the age of 18. Of the approximately 9,500 children living in Fremont County in 2000, about 650 lived in areas west of Cañon City.⁵

3.13.2 Current Management Considerations

Neither the BLM’s Royal Gorge RMP nor the relevant county or city comprehensive plans, or other documents identified in the Analysis of the Management Situation (AMS) report, specifically address environmental justice issues or the protection of children. However, many documents do include general

⁴ USEPA 2010b, <http://yosemite.epa.gov/oachp/ochpweb.nsf/content/homepage.htm>.

⁵ U.S. Census Bureau, Census 2000, data for Census Tract 9790 in Fremont County, www.census.gov/.

goals or guidelines for economic development and social topics, and more specific regulations and standards for physical and other environmental resources. Section 3.14, Socioeconomics, Social Impacts, discusses the management documents relevant to economic and social issues. Sections 3.9, Atmosphere, Air Resources, and Air Quality; 3.10, Water Resources; 3.17, Hazardous Materials; 3.24, Sound Resources and Noise; and 3.18, Waste (Nonhazardous) discuss the regulations that pertain to those topics.

3.14 SOCIOECONOMICS, SOCIAL IMPACTS

3.14.1 Current Conditions and Trends

The social and economic effects of the OTR project would occur within the OTR Project Area and also go beyond the immediate proximity of the project. The definition of socioeconomic Analysis Areas is based upon an expectation of where OTR employees and visitors will be evident and might have a measurable effect on that jurisdiction.

The Primary Socioeconomic Analysis Area (PAA) includes Salida and Chaffee County, Cañon City and Fremont County, and the US 50 communities in between. Visitors would pass through these areas, perhaps staying overnight, and project employees would pass through, perhaps taking temporary residence. These people would produce a range of economic and social effects as discussed in Chapter 4.0 of the EIS.

Visitors and employees would also pass through or stay in intercepting communities. The city of Colorado Springs is sufficiently large and well equipped to accommodate substantial numbers of people. The city of Pueblo is also a capable and convenient location for visitors or employees. These two cities and the counties in which they reside are considered the Secondary Socioeconomic Analysis Area (SAA). Additional numbers of visitors would pass through or stay in Aspen, Leadville, Denver, or other areas of Colorado.

The socioeconomic environment of the PAA and SAA are described in terms of demographic and social measures upon which the projects effects will be gauged. These include population, demographic characteristics, employment patterns, income levels, public services and fiscal conditions, as well as social setting. Past trends and current conditions of each are described below.

3.14.1.1 Primary Socioeconomic Analysis Area (PAA)

a. Salida and Chaffee County

Chaffee County is located in the Upper Arkansas Valley on the western edge of the Project Area. The County occupies 1,014 square miles. About 79% of the county is federally controlled public land, including 53,866 acres managed by the BLM and 455,804 acres managed by the USFS (San Isabel National Forest). The State of Colorado manages about 3% of county lands.⁶ Of the private acreage in the county, about 71% is in agricultural use.⁷ The county's natural features make it a popular outdoor recreation and tourist destination. It is home to 15 of Colorado's 54 "fourteeners".⁸ The Arkansas River

⁶ Seidl, Andrew. *Chaffee County Economic Profile*. Department of Agricultural and Resource Economics, Colorado State University. May 2007.

⁷ Cline, Sarah and Andy Seidl. *Valuing Chaffee County's Working Landscapes and Water Quality: an Analysis of Summer Tourists*. Department of Agricultural and Resource Economics, Colorado State University. March 2008.

⁸ A "fourteener" is a mountain at least 14,000 feet tall.

also provides many opportunities for recreation in the county, including white-water rafting and fishing. The AHRA is partially located within Chaffee County and is jointly managed by the BLM and State Parks. US 50 is the principal east-west route through the county. Chaffee County is served by the Harriet Alexander Field, a general aviation airport located 2 miles northwest of Salida, as well as the Central Colorado Regional airport, a general aviation airport located south of Buena Vista.

Salida is one of the gateway cities for this project and would see a large percentage of OTR visitors and likely contribute workers and temporary housing related to the project. It is also the county seat and the most populous city in Chaffee County. The Arkansas River runs along the north side of the city, which is situated between the Sawatch Mountain Range to the northwest, Sangre de Cristo Mountain Range to the south, and the Mosquito Mountain Range to the north. The city was originally established by the Denver and Rio Grande (D&RG) railroad to serve as a division area, and also served as a mining and agricultural center. Tourism and recreation have replaced mining as the economic mainstay of Salida. The historic downtown has an active arts district and hosts a variety of festivals throughout the year.

b. Cañon City and Fremont County

Fremont County occupies 1,533 square miles to the southeast of Chaffee County. The western portion of the county is sparsely populated, largely rural, and includes more than 12,000 acres of land managed by the BLM. The eastern portion of Fremont County is home to 12 state and federal prisons, housing more than 8,000 inmates. County officials estimate that more than half the employment in the county is related to the prisons⁹. A new 900-bed state penitentiary is scheduled to open in 2010. The county also offers many recreational opportunities along the Arkansas River and at the Royal Gorge; recreation and tourism are important components of the local economy. The AHRA is partially located within Fremont County and is jointly managed by the BLM and State Parks. As in Chaffee County, US 50 is the principal east-west route through Fremont County. The Fremont County Airport, located 6 miles east of Cañon City, does not offer commercial flights, but does serve general aviation and military flights. Under the Artists' proposal, all but a small portion of the installation will be in Fremont County.

Cañon City is the county seat of Fremont County and the second gateway city for the project. The nearby Royal Gorge Bridge is owned by the city. Its location on US 50 between Interstate 25 (I-25) and the Project Area suggests that a large percentage of tourists would travel through the city. In addition, it would likely be a source of workers and temporary housing during the installation, exhibition, and removal of OTR.

3.14.1.2 Secondary Socioeconomic Analysis Area (SAA)

a. Colorado Springs and El Paso County

El Paso County occupies 2,158 square miles, with prairie land in the eastern portion of the county and mountains in the western portion, closest to the PAA. County population is concentrated in the Colorado Springs area. There are five military installations in the county, including the Air Force Academy, Cheyenne Mountain Air Force Station, Fort Carson, Peterson Air Force Base, and Schriever Air Force Base.

Colorado Springs is the county seat of El Paso County and the second most populous city in the state. Located near the base of Pike's Peak, Colorado Springs offers a variety of attractions, including Garden of the Gods and the U.S. Olympic Training Center. A popular tourist destination, more than 2 million

⁹ Colorado Independent, *Fremont County: Home to 7,955 Inmates and Counting*, May, 2008.

passengers pass through the Colorado Springs Airport each year. Colorado Springs is located about 46 miles from the eastern edge of the project.

b. Pueblo and Pueblo County

Pueblo County is located to the east of Fremont County. Traditionally an agricultural county, the area has also benefited from its proximity to military installations in El Paso County, in terms of economic growth and job opportunities¹⁰. The city of Pueblo is about 40 miles from the eastern starting point of the project. It is the largest city in the county and ninth largest city in Colorado. The Colorado State Fair is held in Pueblo for 11 days, from the later part of August through early September. The event attracts about a half a million visitors each year. The Pueblo Memorial Airport offers daily commercial service to Denver.

3.14.1.3 Other Areas of Colorado and Out of State Locations

As mentioned earlier, a portion of OTR visitors would likely pass through or stay overnight in areas of Colorado outside the PAA or SAA, including Aspen, Leadville or Denver, and may even visit neighboring states as part of their trip (New Mexico is within easy driving distance and has an active arts community). A number of OTR visitors would potentially include day or overnight trips to attractions in surrounding counties, such as Gunnison, Saguache, Lake, and Alamosa in their trip. These areas include a range of accommodations, attractions, and services that cater to visitors, including hot springs, Great Sand Dunes National Park, Mesa Verde, National Forest areas, and other scenic, historic, or unique places of interest. OTR visitors who travel to areas outside the PAA or SAA would spend additional dollars in those areas; however, the social and economic effects on these locales due to the occurrence of OTR and visitation to OTR are likely to be small and widely dispersed for a number of reasons, including the following:

- Total visitation estimates include both established visitors to the PAA who would become OTR visitors, as well as new visitors attracted to the area because of OTR. The travel and spending patterns of established visitors who would also be OTR visitors would not be considered an effect of OTR, i.e., their visits to other parts of the state and spending in those areas would occur even without OTR. New visitors to the area, due to the existence of OTR, are a subset of total visitation.
- In order to complete their visit within a short time period, most day visitors from within the PAA and SAA would likely return to their domiciles after viewing OTR, without further impact outside the PAA or SAA.
- The majority of day visitors from the Denver or Boulder areas would also not be likely to make trips to areas outside the PAA or SAA as part of their OTR trip, and would return home after their OTR experience to arrive back home at a reasonable time.
- A large portion of overnight OTR visitors would stay overnight in PAA or SAA accommodations, located within a short driving distance to the artwork. These visitors are likely to participate in other local activities within the PAA and SAA during their OTR trip. The PAA and SAA include numerous attractions to keep visitors busy, and many OTR visitors may remain in the local area for the majority of their trip. It is likely that the majority of OTR visitor spending would occur within the PAA and SAA.

¹⁰ U.S. Department of Housing and Urban Development, *Comprehensive Housing Market Analysis, Pueblo, Colorado*, May 2006.

- Overnight OTR visitors who lodge in accommodations within the PAA or SAA may visit attractions in other areas of the state using PAA or SAA accommodations as their base, especially if outside attractions are relatively close, i.e., an easy drive back and forth. Although these visitors would spend some money at their destination, the majority of visitor spending would occur in the vicinity of their accommodations within the PAA or SAA.
- The majority of out-of-state and international visitors to OTR are assumed to stay overnight in the PAA or SAA. For those visitors with multiple purposes or destinations, the extent to which OTR or another attraction justified the trip to Colorado is unknown. Some out-of-state tourists drawn by OTR might visit other Colorado sites but keep the PAA or SAA as their home base, suggesting modest effects at other tourist destinations.

International visitors would be most likely to visit other areas of Colorado or other states as part of their OTR trip, and a portion of those will stay overnight elsewhere in Colorado. The number of international visitors to OTR is assumed to be a small portion of overall visitation and their effects outside the PAA or SAA would likely be highly dispersed. In summary, overnight and day visitation to areas outside the PAA or SAA by OTR visitors is likely to be relatively small in number and be dispersed among a number of different areas within Colorado or even outside Colorado. The number of people visiting areas outside the PAA or SAA and the specific destinations of those people is uncertain. OTR visitors have the potential to visit numerous locations around the state or neighboring states, depending on their interests; but it is likely that only small numbers of people would visit any specific area, resulting in small amounts of additional spending in any one area.

Therefore, the demographic and economic conditions of other Colorado locations or other states are not detailed in this EIS. However, social and cultural effects resulting from state and even regional interest in the Artists are addressed in the environmental consequences section (Chapter 4.0). Effects on state tax revenues are also noted in that section.

a. Population

The populations for PAA and SAA from 1990-2007 are shown in Table 3-39.

Table 3-39. Estimated Population for Primary and Secondary Analysis Areas, 1990-2007

	<u>1990</u>	<u>2000</u>	<u>2007</u>	<u>Avg Annual Change 1990 - 2000</u>	<u>Avg Annual Change 2000 - 2007</u>
Primary Analysis Area					
<i>Salida</i>	4,737	5,504	5,272	1.5%	-0.6%
Chaffee County	12,684	16,242	16,942	2.5%	0.6%
<i>Canon City</i>	12,687	15,431	15,913	2.0%	0.4%
Fremont County	32,273	46,145	48,005	3.6%	0.6%
Secondary Analysis Area					
<i>Colorado Springs</i>	280,430	361,215	394,177	2.6%	1.3%
El Paso County	397,014	516,929	587,590	2.7%	1.8%
<i>Pueblo</i>	98,640	102,121	106,079	0.3%	0.5%
Pueblo County	123,051	141,472	155,723	1.4%	1.4%
State of Colorado	3,294,393	4,301,261	4,919,884	2.7%	1.9%

Source: DOLA 2010a

Between 1990 and 2000, the State of Colorado and the PAA and SAA experienced solid population growth. The population of Fremont County grew about 43% during that 10-year period, while Chaffee County grew by about one third. In the SAA, El Paso County population also grew by about a third, while Pueblo County experienced a 15% increase in population.

Between 2000 and 2007, the population of the State of Colorado grew by more than 14%, but the PAA participated little in that growth. The population of Chaffee County grew from about 16,200 to about 16,900 between 2000 and 2007, or about 4%. During that same time period, the population of Salida, the largest municipality in the county, declined more than 4% to about 5,300. In 2007, the population of Fremont County was about 48,000, up 4% since 2000. During the same period, Cañon City grew 3% to almost 16,000. In 2000, 8,499 of the 46,145 total Fremont County population (or almost 20%) were persons living in correctional institutions within the county.

Because the PAA and SAA have sizable prison populations, and El Paso and Pueblo counties have a strong military presence, it is useful to consider the group quarters populations as a component of total population. In addition to prison housing and military quarters, other group quarters living arrangements include college residence halls, residential treatment centers, nursing homes, group homes, and workers' dormitories.

Table 3-40 provides 2007 total population and group quarters population and estimated correctional and military institution populations for the four Analysis Area counties.

Table 3-40. Group Quarters Population for Primary and Secondary Analysis Area Counties, July 2007

	<u>Total Population</u>	<u>Correctional Institutions</u>	<u>Military Installations</u>	<u>Group Quarters</u>	<u>Percent of Total Population</u>
Primary Analysis Area					
Chaffee County	16,942	1,250	0	1,347	8%
Fremont County	48,005	8,667	0	9,324	19%
Secondary Analysis Area					
El Paso County	587,590	1,533	8,639	15,984	3%
Pueblo County	155,723	1,037	0	4,212	3%

Note: Correctional institution and military installation populations are components of the total group quarter's population; total group quarters also includes college dormitories, nursing homes and other group homes. Estimates are based on 2000 Census data percentages.

Source: DOLA 2010a, Census Bureau 2000a, Harvey Economics 2009.

Seasonal Population

Fremont County. Seasonal population for Fremont County comes from seasonal employment (mainly tourism and construction jobs) and from seasonal homeowners who are residents in other locations. As of 2006, Fremont County had a seasonal population from second homes of about 4,000.¹¹ Tourists make up the other temporary population in the county. In 2008, almost 300,000 people visited the Royal Gorge Bridge and Park, which is located in Fremont County. In addition, almost 800,000 people visited the AHRA from July 2007 to July 2008, many of which are located in Fremont County. Although an unknown portion of these are repeat visitors or locals, it is likely that Fremont County sees up to half a million tourists each year.

Chaffee County. Chaffee County has seasonal population due to second home ownership, tourism, and seasonal employment, mainly from summer tourism. A recent study estimated that Chaffee County had about 118,000 tourists in 2005, with about 100,000 of them visiting during the summer months.¹² Second home ownership in Chaffee County increased between 2000 and 2005 with 1,100 new homes built, but only 270 new year-round households. Most of the remaining 830 homes were second homes. In 2005, there were 2,199 second homes in Chaffee County, or about 23% of total housing units.¹³ The average size per household is 2.3 persons. This would suggest a second home population of about 5,100 in 2007.

¹¹ Upper Arkansas Area Housing Needs Assessment Lake, Fremont and Custer Counties, May 2008RRC Associates, Inc. Rees Consulting, Inc. and Harvey Economics, 2009.

¹² Colorado State University, Department of Agricultural and Resource Economics, *Valuing Chaffee County's Working Landscapes and Water Quality: An Analysis of Summer Tourists*, 2008.

¹³ *Chaffee County Housing Needs Assessment*, January 2007.

Population Projections

The population of the PAA and SAA as a whole is projected to grow at an average annual rate of 1.7% between 2010 and 2030, the same rate as the state. Chaffee County is projected to experience the most rapid percentage growth of the PAA and SAA counties. Projections are not available at the municipal level. Population projections for the four Analysis Area counties and the state are provided in Table 3-41.

Table 3-41. Population Projections for Primary and Secondary Analysis Areas and Colorado, 2010 through 2030

	<u>2007</u>	<u>2010</u>	<u>2020</u>	<u>2030</u>	<u>Avg Annual Change 2010 - 2030</u>
Primary Analysis Area					
Chaffee County	16,942	17,525	22,957	28,039	2.4%
Fremont County	48,005	50,168	60,614	70,805	1.7%
Secondary Analysis Area					
El Paso County	587,590	622,858	754,745	868,281	1.7%
Pueblo County	155,723	164,783	194,008	226,710	1.6%
Total Analysis Areas	808,260	855,334	1,032,324	1,193,835	1.7%
State of Colorado	4,919,884	5,218,144	6,287,021	7,331,876	1.7%

Source: DOLA 2010a

b. Demographic Characteristics of the Population (PAA and SAA)

Descriptions of the demographic characteristics of PAA and SAA residents provide information about the current population of the area and provide a baseline of information that can be used to assess potential impacts of OTR (Chapter 4.0).

Table 3-42 provides data on the median age, educational levels, and poverty levels for the PAA and SAA and the state. As compared to the state, the PAA population tends to be older, less college educated, and has a higher percentage of the population living in poverty. The PAA, which is generally rural, has an older population and higher poverty levels than the SAA. Colorado Springs and El Paso County are exceptions, with a younger, more educated population and a lower poverty rate.

Table 3-42. Selected Demographic Characteristics of Primary and Secondary Analysis Areas, 2000

	<u>Median Age</u>	<u>Percent of Total</u>		
		<u>High School Graduate or Higher</u>	<u>Bachelors Degree or Higher</u>	<u>Persons below Poverty Level</u>
Primary Analysis Area				
<i>Salida</i>	42.1	86.5%	21.2%	14.8%
Chaffee County	41.8	88.5%	24.3%	11.7%
<i>Canon City</i>	39.8	85.2%	17.0%	11.5%
Fremont County	38.8	80.5%	13.5%	11.7%
Secondary Analysis Area				
<i>Colorado Springs</i>	33.6	90.9%	33.6%	8.7%
El Paso County	33.0	91.3%	18.3%	8.0%
<i>Pueblo</i>	36.5	78.6%	16.8%	17.8%
Pueblo County	36.7	81.3%	18.3%	14.9%
State of Colorado	34.3	86.9%	32.7%	9.3%

Note: 2000 is the most recent year that these data are available for all of the Analysis Areas.

Source: Census Bureau 2000a

The racial and ethnic characteristics of the primary and secondary Analysis Areas are provided in Table 3-43. The nonHispanic white population comprised 83% of the total PAA population in 2000, the most recent year for which data is available for the area. Almost 10% of the PAA population was Hispanic at that time. This area was less diverse than the state as a whole in 2000. About 72% of the SAA population was white and 17% of all races were Hispanic, similar diversity to the state.

Table 3-43. Racial Composition of Primary and Secondary Analysis Areas, 2000

	<u>Non-Hispanic</u>			<u>Hispanic</u>
	<u>White</u>	<u>African American</u>	<u>Other</u>	<u>All Races</u>
Primary Analysis Area				
<i>Salida</i>	86.4%	0.1%	2.8%	10.8%
Chaffee County	87.3%	1.6%	3.1%	8.6%
<i>Canon City</i>	87.0%	1.6%	3.1%	8.3%
Fremont County	81.1%	5.3%	3.7%	10.3%
Secondary Analysis Area				
<i>Colorado Springs</i>	75.3%	6.3%	6.4%	12.0%
El Paso County	76.2%	6.3%	7.4%	11.3%
<i>Pueblo</i>	51.1%	2.2%	2.6%	44.1%
Pueblo County	57.7%	1.7%	4.8%	38.0%
State of Colorado	73.1%	5.2%	6.6%	16.4%

Note: 2000 is the most recent year that these data are available for all of the Project Areas.

Source: Census Bureau 2000a

c. Housing Characteristics

The installation, viewing period, and removal of OTR will bring jobs and tourists to the PAA and SAA. This influx will likely increase demand for various types of housing.

Permanent

Table 3-44 provides permanent housing data for the PAA and SAA. Permanent housing includes fixed residents and structures as opposed to transient housing, whose residents change continuously.

Table 3-44. Permanent Housing Data for Primary and Secondary Analysis Areas, 2007

	Primary Analysis Area (2007)		Secondary Analysis Area (2007)	
	Chaffee County	Fremont County	El Paso County	Pueblo County
Total Housing Units	9,891	19,227	246,074	67,920
Vacant Housing Units	3,011	3,314	27,765	8,075
Housing Vacancy Rate	30	17	11	12
Average Household Size	2.7	2.4	2.6	2.5
Second Homes	2,353 ^[1]	3,076 ^[1]	2,841 ^[2]	973 ^[2]

Note: Total housing units, vacant housing units and vacancy rates include second homes.

Source: DOLA 2010a; [1] Estimates based on Chaffee County 2007 and RRC and Rees 2008; Harvey Economics 2010. [2] Census Bureau 2008, Harvey Economics 2009.

By 2010, more than 30% of total housing units in Chaffee County are projected to be second homes. The number of second/seasonal homes in the area may provide an opportunity for these homeowners to rent these properties during the duration of the event. These rentals could be to OTR personnel, other temporary workers, or tourists.¹⁴ Fremont County has also seen a shift in ownership from primary residences to second homes. In 2000, second homes accounted for 11% of all housing. By 2008, second homes made up 16% of all Fremont County housing.

Table 3-45 provides permanent housing by type of unit for the PAA.

Table 3-45. Permanent Housing Units by Type, Primary Analysis Areas

	Primary Analysis Area	
	Chaffee County ^[1]	Fremont County ^[2]
Permanent Housing		
Single Family Homes	7,138	13,837
Multifamily Units	912	1,725
Manufactured/Other Housing	1,464	3,467

Source:

[1] Chaffee County 2007, Harvey Economics 2009.

[2] RRC and Rees 2008.

¹⁴ *Chaffee County Housing Needs Assessment*, Final Report. January 25, 2007

Transient Short-Term Housing

To estimate total motel and hotel capacity, beds per facility are counted, and each bed is assumed to accommodate two people. Short-term housing units by type and capacity are provided in Table 3-46.

Table 3-46. Estimated Short-Term Housing Capacities for Primary and Secondary Analysis Areas

<u>Location</u>	<u>Total Beds</u>	<u>Total Estimated Capacity</u>
<i>PAA</i>		
Buena Vista	813	1,626
Canon City	1,100	2,200
Florence	110	220
Salida	<u>1,400</u>	<u>2,800</u>
PAA Total	3,423	6,846
<i>SAA</i>		
Colorado Springs	25,000	50,000
Pueblo	<u>3,400</u>	<u>6,800</u>
SAA Total	28,400	56,800
Estimated Total Daily Hotel Capacity		63,646

Note: Includes hotels, motels, B&Bs, guest ranches and vacation rentals.
Sources: Buena Vista Chamber of Commerce website <http://www.buenavistacolorado.org/>; Salida Chamber of Commerce website, <http://www.salidachamber.org/>; Over the River Design and Planning Report, J.F. Sato and Associates, April 2007; Southern Colorado Economic Forum 2005 Booklet, November 3, 2005, College of Business and Administration, University of Colorado at Colorado Springs; and various area hotel websites.

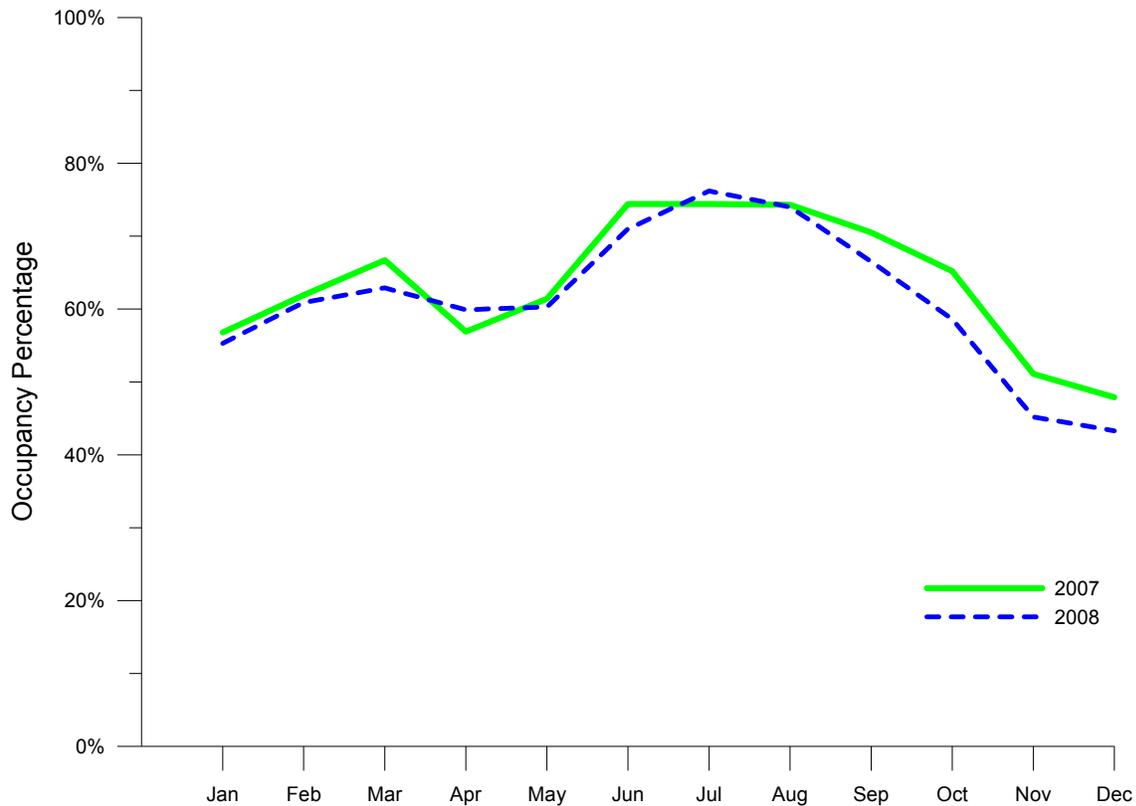
Additional hotel rooms are under construction in Salida and will open in fall 2009; plans for at least one additional hotel are underway in Salida.

Occupancy Rates

Hotel occupancy rates for Colorado peak in July at about 75%. August occupancy is slightly lower overall, but occupancy is higher in the first part of the month compared with the last 2 weeks. In general, occupancy is highest for weekend nights, with Thursday, Friday, and Monday being the busiest week nights. Occupancy rates in the PAA and SAA follow a similar pattern as the state as a whole.¹⁵ This trend is likely driven by schools starting in August. Colorado occupancy rates for 2007 and 2008 are shown in Figure 3-3.

¹⁵ Terry Sullivan, President and CEO, Colorado Springs Convention and Visitor Bureau and April Prout, Chaffee County Visitor's Bureau Marketing Director. September 2009.

Figure 3-3. Transient Unit Occupancy Rates for Colorado, 2007 and 2008



Source: Colorado Tourism Office 2008.

Camping

Three Colorado State Parks are located within the PAA and SAA, in addition to National Forests and BLM lands. Developed campsites in the area can accommodate more than 3,000 campers daily. However, both developed and undeveloped campsites are available, which makes it difficult to estimate the total number of campers that could be accommodated on any one day. More about available camping can be found in the Section 3.20, Recreation Resources.

d. Employment

Labor Force

As of June 2009, unemployment rates in the state and in the PAA and SAA were higher than in recent years, reflecting the widespread economic malaise. Between June 2008 and June 2009, the state lost more than 104,000 jobs. Tables 3-47 and 3-48 provide labor force, employment, and unemployment data for the PAA and SAA.

Table 3-47. Labor Force Summary, Primary Analysis Area, 1990, 2000, June 2008 & June 2009

	Primary Analysis Area							
	Chaffee County				Fremont County			
	1990	2000	2008	2009	1990	2000	2008	2009
Civilian Labor Force	5,837	7,365	9,076	8,850	12,931	17,895	19,818	19,771
Employed	5,446	7,120	8,700	8,291	12,112	17,193	18,528	17,963
Unemployed	391	245	376	559	819	702	1,290	1,808
Unemployment Rate	6.7	3.3%	4.1%	6.3%	6.3%	3.9%	6.5%	9.1%

Note: Not seasonally adjusted.

Source: CDLE 2009b

The total number of employed persons for the PAA was about 26,000 persons in 2009. PAA employment grew by about 50% between 1990 and 2009.

Table 3-48. Labor Force Summary, Secondary Analysis Area, 1990, 2000, June 2008 & June 2009

	Secondary Analysis Area							
	El Paso County				Pueblo County			
	1990	2000	2008	2009	1990	2000	2008	2009
Civilian Labor Force	190,855	265,291	305,181	302,698	52,355	64,099	73,807	73,614
Employed	177,561	257,560	287,194	277,460	48,640	61,584	69,171	67,095
Unemployed	13,294	7,731	17,984	25,238	3,715	2,515	4,636	6,519
Unemployment Rate	7.0%	2.9%	5.9%	8.3%	7.1%	3.9%	6.3%	8.9%

Note: Not seasonally adjusted.

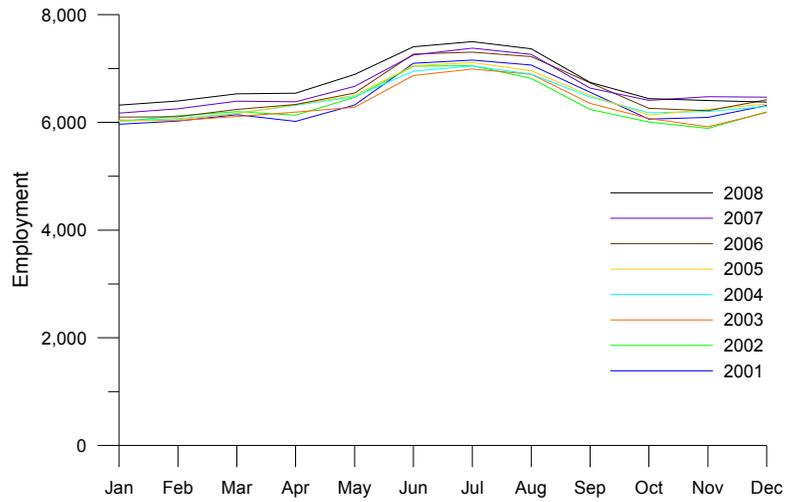
Source: CDLE 2009b

Between 1990 and June 2009, total SAA employment increased by more than 118,000.

Employment by month (2001-2008) for each of the PAA and SAA is shown in Figures 3-4 through 3-7. Employment within the PAA and SAA has some seasonal variation, particularly evident in Chaffee County and to a lesser extent in Fremont County.

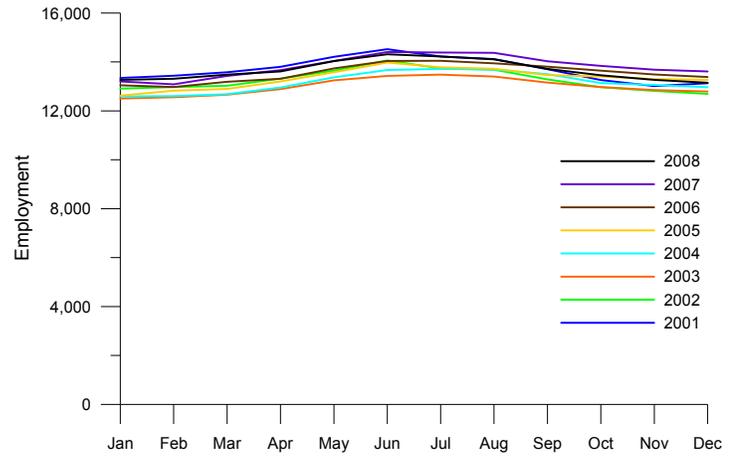
**Figure 3-4. Chaffee County
Monthly Employment 2001-2008**

Source: CDLE 2009b



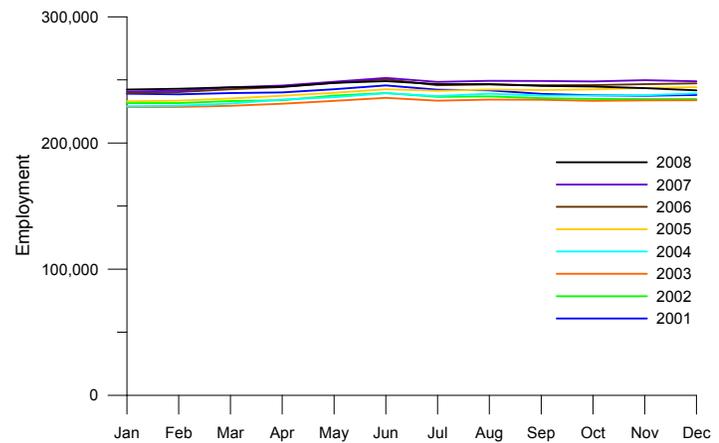
**Figure 3-5. Fremont County
Monthly Employment 2001-2008**

Source: CDLE 2009b



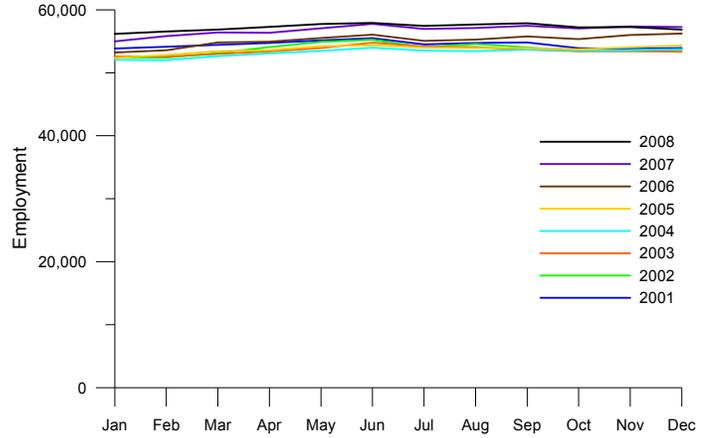
**Figure 3-6. El Paso County
Monthly Employment 2001-2008**

Source: CDLE 2009b



**Figure 3-7. Pueblo County
Monthly Employment 2001-2008**

Source: CDLE 2009b



Chaffee County attracts rafting industry summer seasonal employment, primarily river guides and related workers. Except for the rafting season, these employees reside outside Chaffee County. Some rafting companies provide housing, some employees rent housing, and others camp on BLM or USFS lands to the extent allowed by BLM and USFS camping regulations.¹⁶

In the PAA, employment levels rise moderately from the spring through the summer and decline by fall. This is the time of year when workers will be needed – both directly for OTR and by service industries to accommodate the increased tourism in the region. Seasonal employment in the PAA is driven primarily by tourism and to a lesser extent, construction. Little variation in seasonal employment is seen in the SAA.

¹⁶ Don Reimer, Chaffee County Development Director, September 2009.

Economic Sectors and Employment

Table 3-49 provides the percentage of persons employed in each of the Analysis Areas by place of work; it also provides the percentage of total employment in each of the industries for the state.

Table 3-49. Percent of Total Employment by Industry, Primary and Secondary Analysis Areas, 2007

	Primary Analysis Area		Secondary Analysis Area		State of Colorado
	Chaffee County	Fremont County	El Paso County	Pueblo County	
Farm employment	2.6%	3.2%	0.3%	1.3%	1.4%
Forestry, fishing, related activities	(D)	(D)	0.1%	(D)	0.4%
Mining	0.8%	0.6%	0.2%	(D)	1.2%
Utilities	0.4%	0.4%	0.2%	0.6%	0.3%
Construction	11.1%	8.6%	6.8%	8.1%	7.9%
Manufacturing	1.4%	4.5%	5.0%	6.1%	5.0%
Wholesale trade	2.2%	1.0%	2.0%	2.0%	3.5%
Retail trade	13.6%	11.4%	11.0%	12.0%	10.2%
Transportation & warehousing	1.2%	2.4%	1.7%	2.8%	2.7%
Information	1.2%	1.0%	2.5%	(D)	2.8%
Finance & insurance	3.6%	2.8%	5.2%	3.3%	5.2%
Real estate & rental & leasing	7.2%	4.4%	4.7%	4.0%	5.6%
Prof., scientific, & tech. services	6.0%	(D)	8.2%	2.9%	8.4%
Mgmt of companies & enterprises	(D)	(D)	0.3%	0.2%	1.0%
Administrative & waste services	(D)	(D)	6.9%	7.8%	6.2%
Educational services	0.9%	0.7%	2.0%	0.9%	1.7%
Health care & social assistance	5.5%	12.1%	7.6%	14.2%	8.1%
Arts, entertainment, & recreation	6.0%	2.4%	2.3%	1.8%	2.6%
Accommodation & food services	11.6%	6.7%	7.2%	8.0%	7.5%
Other serv., except public admin	5.6%	5.7%	5.1%	5.6%	5.3%
Government & gov. enterprises	<u>15.9%</u>	<u>25.5%</u>	<u>20.5%</u>	<u>16.7%</u>	<u>13.2%</u>
Total	100%	100%	100%	100%	100%

Source: BEA 2005, Harvey Economics 2009.

The largest employment sector in Chaffee County is government. Consistent with a tourism and recreation based economy, retail trade, accommodation and food services, construction, arts, entertainment and recreation, and real estate provide a larger percentage of jobs in Chaffee County than at the state level.

In Fremont County, the government sector is large due to the number of state and federal prisons located there. Health care and social assistance provide the second most jobs, followed by retail trade and construction. There are some new manufacturing facilities in Fremont County, accounting for higher relative employment.

El Paso County also has the most jobs in the government sector due to the large number of military installations in the county. Professional, scientific, and technical services are much higher than any other Analysis Area counties. According to the visitor’s bureau, tourism is the third largest industry in Colorado Springs. Almost 5 million tourists visited the Colorado Springs region in 2008. The Colorado Springs

Airport provides about 50 daily departures to most major cities across the U.S. In 2008, the airport served about two million passengers.¹⁷

Pueblo County also has more employed in the government than any other sector, followed by health care and social assistance. Retail trade employment is high, owing to its role as a regional center and its I-25 location. Construction, accommodations and food services, and administrative services are important sectors in the county as well. Agriculture is also an important economic sector for the county. In 2007, the market value of Pueblo County agriculture was almost \$50 million, 24th in the state.

Economic Sectors in the PAA

Tourism is an important sector in the PAA. Other economic sectors that may be impacted by the project include agriculture, mining, and transportation.

Agriculture in the PAA

Agriculture is a small but important part of the Chaffee County economy. Multiplier effects from agriculture are substantial, meaning that impacts from growth or losses in this sector have a greater ripple effect through the local economy than other sectors. In 2002, total agriculture output in Chaffee County was \$36.9 million, but the total economic output from agriculture was estimated to be \$73.7 million.¹⁸

In 2007, agriculture provided more than 3% of employment in Fremont County. One goal of the Fremont County Master Plan is to, “encourage farm and rural ranch land to remain in active and productive use.”¹⁹ The county has seen large tracts of land subdivided into 35-acre parcels, often referred to as hobby farms or ranchettes. Between 2002 and 2007, the number of farms grew by more than 30%, while the average size fell almost 60 acres.

Cattle ranching is the principal agricultural sector in Fremont County. Most ranchers also grow hay for their cattle; many of them have hay fields they either own or lease that are not adjacent to their principal location. A number of Fremont County ranchers own or lease hay fields in Chaffee County. In the lower elevations, farmers get three or four cuttings each year, one or two at higher elevations.²⁰ The timing of the harvests varies and is dependent on a number of factors, including temperature and rainfall. Many ranchers also graze their cattle on BLM land. These conditions require ranchers to move equipment, including hay trucks, stock trailers, rakes, stack wagons, balers and swathers, and cattle in order to maintain their operations. US 50 is the main route used by Fremont County ranchers. Other agricultural activities in the area include fruit and vegetable farms (including organic farms) and grape growers.

Between 2002 and 2007, the amount of land in agricultural use grew in the PAA. Selected agriculture statistics are shown in Table 3-50.

¹⁷ 2008 Annual Stakeholders Report, Colorado Springs Convention and Visitors Bureau.

¹⁸ Seidl, Andrew. *Chaffee County Economic Profile*, Department of Agricultural and Resource Economics Colorado State University, May 2007

¹⁹ URS, *Fremont County Master Plan*, 2002.

²⁰ Interview with Richard Green, President Fremont County Cattleman’s Association. September 2009.

Table 3-50. Selected Agriculture Statistics for the PAA and Colorado, 2002 and 2007

	Primary Analysis Area					
	Chaffee County		Fremont County		State of Colorado	
	2007	2002	2007	2002	2007	2002
Number of Farms	223	212	927	700	37,054	31,369
Land in Farms (acres)	79,405	71,188	295,893	264,650	31,604,911	31,093,336
Average Size of Farms (acres)	356	336	320	378	853	991
Crop Sales (millions)	\$3.1	\$2.2	\$4.8	\$4.7	\$1,981	\$1,216
Livestock Sales	\$5.0	\$6.3	\$14.5	\$10.0	\$4,080	\$3,309

Source: USDA 2009a, USDA 2009b

The largest crop in the PAA for 2002 and 2007 was forage, including hay and haylage, grass silage, and greenchop. This reflects the importance of livestock, especially in Fremont County. For the state, wheat for grain was the top crop, followed by forage.

Mining and Minerals

Mining has long been a part of the Chaffee and Fremont County economies. As of 2009, sand, gravel, borrow, clay, and shale account for most PAA mining activity.²¹ In 2006, oil production in Fremont County was valued at more than \$1 million.²² Exploratory drilling for uranium was permitted in Fremont County in the Tallahassee Creek area in 2008. Chaffee County also has gemstone mining.

Truck Traffic and Commuting

US 50 will be the route used by those viewing the project. About 8% of the vehicles on US 50 between Cañon City and Salida are trucks, including commercial vehicles. The average daily number of trucks on various segments of US 50 in the Project Area range from about 160 to more than 1,500. The variation in truck traffic counts along US 50 suggests that much of the traffic is local. More information on transportation can be found in Section 3.16, Transportation and Traffic.

e. Commuting

About 74% of Fremont County residents also work in their home county. More than 8% commute to El Paso County and about 5.5% to Pueblo County. About 3% commute to Chaffee County. Over 2,000 people commute into Fremont County for work from surrounding counties. About 92% of employed residents of Chaffee County work within the county. Of those that work outside Chaffee County, about 500 persons commute to a number of surrounding counties, including Fremont County. About 760 people commute into Chaffee County for work.

Commuting also occurs between communities within Fremont County and within Chaffee County. For example, residents of small communities located along US 50, such as Howard or Cotopaxi, may commute to the larger areas of Salida or Cañon City for work. No data exists on the specific commuting

²¹ Directory of Active and Permitted Mines in Colorado – 2002, <http://geosurvey.state.co.us/portals/0/Active%20Permitted%20Mines%2054%20x%2042.pdf>

²² Cappa, James, et.al., *Colorado Mineral and Energy Industry Activities, 2006*, Colorado Geological Survey 2007.

patterns of these smaller communities; however, the number of commuters is likely small given the populations of these areas (about 3,200 total residents in Cotopaxi and 906 in Howard).²³

More than 95% of El Paso County working residents are employed in the county. About 1.1% of the county’s working residents are employed out of state. Over 14,000 people commute into El Paso County for work. Pueblo County workers commute to 28 other counties. More than 5% work in El Paso County and almost 2% in Fremont County. The balance is dispersed throughout the state, with less than 1% commuting to any other single county.

Commuting patterns for the PAA and SAA are shown in Table 3-51.

Table 3-51. Commuting Patterns for Primary and Secondary Analysis Areas, 2000

	Employed Persons in County	Work in Home County		Commute into County
Primary Analysis Area				
Chaffee County	6,665	6,151	92.3%	763
Fremont County	16,077	12,770	79.4%	2,117
Secondary Analysis Area				
El Paso County	263,805	251,105	95.2%	14,323
Pueblo County	58,749	52,721	89.7%	4,112

Source: Census Bureau 2000a

f. Income

Personal income is comprised of wages earned, assistance from social programs (income maintenance), unemployment compensation, retirement income, and investment income (dividends, interest and rent). A much larger percentage of Chaffee County income comes from investment returns and retirement as compared with the state. Retirement income is more important in Fremont County than the state as a whole.

²³ Colorado Tourism Office, www.colorado.com/Cotopaxi.aspx and www.colorado.com/Howard.aspx, accessed on March 18, 2010.

Table 3-52. Source of Income for Primary Analysis Area and State of Colorado, by Place of Residence, 2007 (thousands of dollars)

	Primary Analysis Area (2007)					
	Chaffee County		Fremont County		State of Colorado	
Net earnings from work ^[1]	\$ 240,787	49%	\$ 662,935	61%	\$ 143,722,788	72%
Income maintenance ^[2]	\$ 5,496	1.1%	\$ 19,667	1.8%	\$ 1,577,008	0.8%
Unemployment insurance compensation	\$ 1,123	0.2%	\$ 3,299	0.3%	\$ 313,749	0.2%
Retirement and other	\$ 93,755	19%	\$ 240,097	22%	\$ 18,123,346	9.1%
Dividends, interest, and rent	\$ 151,668	31%	\$ 169,686	15%	\$ 35,746,484	18%
Total Personal income	\$ 492,829	100%	\$ 1,095,684	100%	\$ 199,483,375	100%

Notes:

[1] Total earnings less contributions for government social insurance adjusted to place of residence.

[2] Consists largely of supplemental security income payments, family assistance, general assistance payments, food stamp payments, and other assistance payments, including emergency assistance.

Source: BEA 2009a

Table 3-53. Source of Income for Secondary Analysis Area and State of Colorado, by Place of Residence, 2007 (thousands of dollars)

	Secondary Analysis Area (2007)					
	El Paso County		Pueblo County		State of Colorado	
Net earnings from work ^[1]	\$ 14,985,775	72%	2,473,713	59%	\$ 143,722,788	72%
Income maintenance ^[2]	\$ 193,324	0.9%	113,787	2.7%	\$ 1,577,008	0.8%
Unemployment insurance compensation	\$ 35,262	0.2%	9,245	0.2%	\$ 313,749	0.2%
Retirement and other	\$ 2,221,177	11%	1,104,955	26%	\$ 18,123,346	9.1%
Dividends, interest, and rent	\$ 3,462,812	17%	512,550	12%	\$ 35,746,484	18%
Total Personal income	\$ 20,898,350	100%	4,214,250	100%	\$ 199,483,375	100%

Notes:

[1] Total earnings less contributions for government social insurance adjusted to place of residence.

[2] Consists largely of supplemental security income payments, family assistance, general assistance payments, food stamp payments, and other assistance payments, including emergency assistance.

Source: BEA 2009a

Chaffee and Fremont County residents receive less personal income from earnings than the state.

Of the four counties, El Paso has the highest percentage of income from wages and the lowest for retirement income, very similar to the state percentages in all categories. This reflects a younger workforce making relatively high wages, as shown in Table 3-53. Pueblo has a somewhat low earnings percentage and high retirement percentage, suggesting an older population. While all of the counties have higher income maintenance percentages than the state as a whole, Pueblo's percentage is more than 3 times the state figure, suggesting a relatively less affluent population.

Table 3-54 provides earnings by industry for the primary and secondary Analysis Areas.

Table 3-54. Earnings by Industry for Primary and Secondary Analysis Areas, 2007 (thousands of dollars)

Industry	Primary Analysis Area		Secondary Analysis Area	
	Chaffee County	Fremont County	El Paso County	Pueblo County
Forestry, fishing, related activities	(D)	\$ 258	\$ 3,714	\$ 173
Mining	\$ 3,669	\$ 8,323	\$ 103,382	\$ 10,168
Utilities	\$ 4,297	\$ 6,664	\$ 75,444	\$ 39,999
Construction	\$ 34,526	\$ 57,849	\$ 1,135,495	\$ 269,426
Manufacturing	\$ 4,089	\$ 44,797	\$ 1,274,728	\$ 282,590
Wholesale trade	\$ 7,060	\$ 6,257	\$ 394,290	\$ 72,906
Retail trade	\$ 32,844	\$ 45,169	\$ 1,026,638	\$ 234,512
Transportation and warehousing	\$ 3,518	\$ 19,681	\$ 262,677	\$ 112,177
Information	\$ 4,812	\$ 7,820	\$ 646,475	\$ 30,771
Finance and insurance	\$ 14,134	\$ 16,175	\$ 828,379	\$ 81,494
Real estate and rental and leasing	\$ 11,382	\$ 17,694	\$ 296,699	\$ 49,809
Professional, scientific, and technical services	\$ 15,984	(D)	\$ 2,052,607	\$ 81,406
Management of companies and enterprises	(D)	(D)	\$ 92,950	\$ 9,000
Administrative and waste services	(D)	\$ 3,852	\$ 767,637	\$ 118,204
Educational services	\$ 950	\$ 2,331	\$ 182,163	\$ 11,058
Health care and social assistance	\$ 17,936	\$ 73,083	\$ 1,215,050	\$ 449,465
Arts, entertainment, and recreation	\$ 10,384	\$ 6,607	\$ 101,199	\$ 22,026
Accommodation and food services	\$ 19,095	\$ 18,251	\$ 497,784	\$ 85,876
Other services, except public administration	\$ 10,502	\$ 24,234	\$ 514,086	\$ 101,288
Government and government enterprises	\$ 75,757	\$ 297,649	\$ 5,266,218	\$ 623,261
Total Non-farm Earnings by Place of Work	\$ 274,949	\$ 679,041	\$ 16,737,615	\$ 2,703,357

Notes: (D) Not shown to avoid disclosure of confidential information, but the estimates for these items are included in the totals. Earnings include wages and salaries; supplements to wages and salaries, such as employer contributions for employee pension and insurance funds; and proprietors' income.

Source: BEA 2009a

The Fremont County economy is substantially larger and more diverse than Chaffee County. Government accounts for more than a quarter of Chaffee County earnings and more than 40% of Fremont County earnings. Retail trade and construction are also important earnings generators for both counties. Health care represents more than 10% of Fremont County earnings. Agriculture is not reflected in these income figures because most farmers and ranchers are self-employed.

The economies of El Paso and Pueblo counties are orders of magnitude larger than the PAA. Both are highly diversified.

Per capita personal income for the PAA and SAA are shown in Table 3-55.

Table 3-55. Per Capita and Household Personal Income for Primary and Secondary Analysis Areas, 2007

	Primary Analysis Area		Secondary Analysis Area		
	Chaffee County	Fremont County	El Paso County	Pueblo County	Colorado
Per capita personal income	\$ 29,453	\$ 23,149	\$ 35,658	\$ 27,245	\$ 41,192
Median Household Income	N/A	\$ 35,879	\$ 54,839	\$ 39,570	\$ 54,262

Note: American Community Survey data are only available for areas with populations over 20,000; therefore Chaffee County data are not available. Income in the Past 12 Months (In 2007 Inflation-Adjusted Dollars).

Source: BEA 2009a , Census Bureau 2009

Per capita income was lower for the PAA and SAA in 2007 than for Colorado. El Paso County per capita personal income was the highest at about 87% of Colorado income. Fremont County had the lowest per capita income at about 56% of state income. However, this figure is likely skewed by the relatively large number of inmates living in the county. In the PAA, Fremont County household income was about 66% of Colorado income. In the SAA, Pueblo County household income was about 73% of Colorado income, while El Paso County household income slightly exceeded state income.

g. Tourism Economy

As discussed in this chapter, travel and tourism are important parts of the PAA economy and to a lesser extent, the larger SAA economy, as well as the overall statewide economy. Overnight visitor trips to Colorado were estimated to be about 28 million in 2007, while day trips were estimated at 21.5 million.²⁴ The majority of these trips were for leisure purposes. In 2007, total direct visitor spending (spending on all purchases during the trip, including activities, food, lodging, and souvenirs) in Colorado was about \$12.6 billion. Visitor spending supported over 133,000 jobs and earnings of over \$3.4 billion, and generated \$763 million in local and state tax revenues.²⁵

The PAA and SAA include a variety of natural and man-made attractions, which provide incentives for a number of people to visit the area each year. In addition, numerous recreational activities are supported by local guides and outfitters. Colorado Springs and the Pike’s Peak region (parts of the SAA) draw millions of visitors each year. In 2008, almost 5 million people visited the Pike’s Peak region for business or pleasure, creating over \$1 billion in total economic impact.²⁶ It is likely that many of those visitors also participate in the activities and attractions available in Fremont and Chaffee counties. Published estimates of visitation at the county level are unavailable; however, total annual visitation to Chaffee County has been estimated at about 117,000 people.²⁷ About 86% of these tourists visit during the summer months.²⁸

²⁴ Longwoods International, *Colorado and Denver 2007 Travel Year*.

²⁵ Dean Runyan Associates, *The Economic Impact of Travel on Colorado, 1996 – 2007p*, June 2008. Prepared for the Colorado Tourism Office.

²⁶ Colorado Springs, Annual Stakeholders Report, 2008.

²⁷ Colorado State University, Department of Agricultural and Resource Economics, Economic Development Report 08-05, *Valuing Chaffee County’s Working Landscapes and Water Quality: An Analysis of Summer Tourists*, 2008.

²⁸ Leisure Trends Group, *Chaffee County Visitor Bureau Visitation Survey*, 2006.

Economic Effects of Visitors in the PAA and SAA

A 2008 survey of visitors to Colorado’s 10 welcome centers estimated that each Colorado visitor spends an average of \$80 per night while in the state.²⁹ The survey also found that an average sized party of about 2.7 people spends about \$187 per night in the state.

A detailed survey of the estimated spending patterns of summertime visitors to Chaffee County found that visitors spent \$110.62 per person per trip day.³⁰ Average per party (2.1 people) per day spending was about \$227.

The effects of visitor spending produce employment opportunities and earnings for employees and owners of businesses that receive visitor dollars in the PAA and SAA; indirect and induced effects of these expenditures; and impacts to local and state tax receipts.³¹ Tables 3-56 through 3-59 illustrate the effects of travel spending in the PAA and SAA.

Annual travel spending in Chaffee County varied slightly over the 1996-2007 period, but increased by about 7% overall between 1996 and 2007. Travel spending in Fremont County generally increased annually, increasing by about 33% between 1996 and 2007.

Table 3-56. Economic Impacts of Overnight Visitor Spending in Chaffee County, 1996-2007

Year	Travel Spending (\$M)	Earnings (\$M)	Employment (jobs)	Local Taxes (\$M)	State Taxes (\$M)
1996	\$50.7	\$16.4	1,030	\$1.7	\$1.6
1997	\$48.7	\$15.6	960	\$1.5	\$1.5
1998	\$51.4	\$16.9	1,020	\$1.6	\$1.6
1999	\$51.3	\$16.7	980	\$1.7	\$1.6
2000	\$53.7	\$17.3	980	\$1.8	\$1.7
2001	\$55.3	\$18.0	990	\$1.9	\$1.6
2002	\$54.3	\$17.8	990	\$1.8	\$1.6
2003	\$54.6	\$17.9	980	\$1.8	\$1.6
2004	\$56.0	\$18.1	1,000	\$1.8	\$1.7
2005	\$48.1	\$15.6	860	\$1.6	\$1.5
2006	\$50.2	\$15.9	870	\$1.6	\$1.5
2007	\$54.2	\$17.3	910	\$1.8	\$1.6

Note: Data does not include the spending of day visitors. All data have been adjusted for inflation to constant 2007 dollars.

Sources: Dean Runyan Associates 2008, BLS 2009, Harvey Economics 2009.

²⁹ University of Colorado, Leeds School of Business, *Colorado Welcome Centers, 2008 Visitor Survey*. Prepared for the Colorado Tourism Office.

³⁰ Colorado State University, Department of Agricultural and Resource Economics, Economic Development Report 08-05, *Valuing Chaffee County’s Working Landscapes and Water Quality: An Analysis of Summer Tourists*, 2008.

³¹ Indirect and induced effects of visitor spending include purchases made by businesses and households that receive visitor dollars.

Table 3-57. Economic Impacts of Visitor Spending in Fremont County, 1996-2007

Year	Travel Spending (\$M)	Earnings (\$M)	Employment (jobs)	Local Taxes (\$M)	State Taxes (\$M)
1996	\$45.1	\$12.5	860	\$1.0	\$1.6
1997	\$45.7	\$12.7	850	\$1.0	\$1.5
1998	\$46.6	\$13.2	860	\$1.0	\$1.6
1999	\$47.4	\$13.4	880	\$1.0	\$1.6
2000	\$48.4	\$13.4	860	\$1.1	\$1.6
2001	\$47.6	\$13.3	830	\$1.1	\$1.5
2002	\$47.0	\$13.2	840	\$1.2	\$1.5
2003	\$47.4	\$13.1	830	\$1.1	\$1.5
2004	\$51.6	\$14.1	900	\$1.2	\$1.5
2005	\$53.9	\$14.8	960	\$1.3	\$1.6
2006	\$56.6	\$15.2	1,020	\$1.3	\$1.7
2007	\$60.0	\$16.3	1,070	\$1.4	\$1.8

Note: Data does not include the spending of day visitors. All data have been adjusted for inflation to constant 2007 dollars.
Sources: Dean Runyan Associates 2008, BLS 2009, Harvey Economics 2009.

Travel spending in El Paso County increased by about 10% between 1996 and 2007, although the county did experience reductions in annual spending in several years. Travel spending in Pueblo County increased by about 33% between 1996 and 2007.

Table 3-58. Economic Impacts of Visitor Spending in El Paso County, 1996-2007

Year	Travel Spending (\$M)	Earnings (\$M)	Employment (jobs)	Local Taxes (\$M)	State Taxes (\$M)
1996	\$1,191.8	\$335.0	14,090	\$22.8	\$32.0
1997	\$1,298.6	\$364.3	14,820	\$24.5	\$34.1
1998	\$1,245.7	\$342.8	13,780	\$23.2	\$33.7
1999	\$1,262.6	\$330.7	13,630	\$24.0	\$33.4
2000	\$1,264.5	\$327.5	13,160	\$24.1	\$32.7
2001	\$1,128.4	\$309.6	11,880	\$21.8	\$29.3
2002	\$1,012.0	\$287.8	10,470	\$19.0	\$26.3
2003	\$1,108.1	\$296.9	10,780	\$19.0	\$26.8
2004	\$1,208.8	\$314.2	12,200	\$20.4	\$28.7
2005	\$1,215.3	\$301.2	11,950	\$20.1	\$28.2
2006	\$1,234.8	\$309.2	11,950	\$20.1	\$28.7
2007	\$1,307.0	\$321.0	12,980	\$12.1	\$30.6

Note: Data does not include the spending of day visitors. All data have been adjusted for inflation to constant 2007 dollars.
Sources: Dean Runyan Associates 2008, BLS 2009, Harvey Economics 2009.

Table 3-59. Economic Impacts of Visitor Spending in Pueblo County, 1996-2007

Year	Travel Spending (\$M)	Earnings (\$M)	Employment (jobs)	Local Taxes (\$M)	State Taxes (\$M)
1996	\$102.4	\$36.6	1,950	\$3.3	\$3.5
1997	\$104.5	\$37.6	1,980	\$3.6	\$3.7
1998	\$106.2	\$38.8	2,010	\$3.8	\$3.9
1999	\$108.3	\$39.1	1,980	\$3.8	\$3.9
2000	\$111.0	\$39.4	1,940	\$3.9	\$3.8
2001	\$105.3	\$37.2	1,800	\$3.8	\$3.5
2002	\$105.0	\$37.6	1,840	\$3.8	\$3.4
2003	\$110.1	\$39.4	1,880	\$3.7	\$3.5
2004	\$123.6	\$43.5	2,070	\$4.1	\$3.8
2005	\$119.9	\$41.6	1,980	\$3.9	\$3.6
2006	\$123.6	\$42.0	2,020	\$4.0	\$3.7
2007	\$136.4	\$46.6	2,160	\$4.6	\$4.1

Note: Data does not include the spending of day visitors. All data have been adjusted for inflation to constant 2007 dollars.

Sources: Dean Runyan Associates 2008, BLS 2009, Harvey Economics 2009.

Tourism spending and earnings are reflected in retail sales. Historical sales focusing on touristic components, such as activities, lodging, and restaurants, are presented below. Whereas tourism is an important element of the PAA economy, it represents a small portion of total PAA retail sales.

Tables 3-60 and 3-61 provide retail sales data for the PAA.

Table 3-60. Total Annual Retail Sales for the PAA, 2000-2008 (in thousands)

Year	Salida Retail Sales	Canon City Retail Sales	Chaffe County Retail Sales	Fremont County Retail Sales
2000	\$201,762	\$402,799	\$383,944	\$534,503
2001	\$208,183	\$410,801	\$388,392	\$554,373
2002	\$208,691	\$405,252	\$392,168	\$538,072
2003	\$218,968	\$406,749	\$382,176	\$537,410
2004	\$226,433	\$421,538	\$398,619	\$557,003
2005	\$226,402	\$416,348	\$406,332	\$597,586
2006	\$234,824	\$446,654	\$436,972	\$644,241
2007	\$241,655	\$441,700	\$441,498	\$645,150
2008	\$234,953	\$432,256	\$433,599	\$610,523
Avg. Annual Change	1.9%	0.9%	1.5%	1.7%

Note: All data has been adjusted for inflation to constant 2008 dollars.

Sources: Colorado Department of Revenue, BLS 2009b, Harvey Economics 2009.

The seasonality of PAA tourism is an important consideration for the OTR project. Countywide, Chaffee and Fremont reach peak tourism expenditures in June and July, respectively. August and September are also active tourism periods, but below the peaks. Weekly information is unavailable.

Table 3-61. Total Monthly Retail Sales and Tourism Sector Sales for Chaffee County and Fremont County, 2008 (in thousands)

Month	Chaffee County				Fremont County			
	Total Retail Sales	Arts/Enter.	Lodging	Food Services	Total Retail Sales	Arts/Enter.	Lodging	Food Services
January	\$30,515	\$1,656	\$801	\$1,710	\$32,669	\$124	\$388	\$2,828
February	\$29,283	\$1,607	\$898	\$1,867	\$31,751	\$172	\$227	\$2,502
March	\$36,420	\$2,415	\$1,437	\$2,219	\$38,421	\$213	\$513	\$2,828
April	\$29,738	\$388	\$622	\$1,820	\$33,172	\$149	\$307	\$2,866
May	\$32,652	\$73	\$1,275	\$2,272	\$41,355	\$192	\$1,259	\$3,533
June	\$43,904	\$202	\$2,739	\$3,295	\$46,154	\$248	\$1,497	\$3,702
July	\$45,430	\$84	\$3,575	\$3,927	\$38,825	\$191	\$997	\$3,442
August	\$41,639	\$115	\$2,408	\$3,369	\$42,750	\$170	\$1,385	\$3,853
September	\$41,239	\$211	\$1,882	\$3,014	\$42,354	\$458	\$943	\$2,994
October	\$31,071	\$51	\$946	\$1,868	\$32,387	\$214	\$574	\$2,701
November	\$26,891	\$124	\$812	\$1,628	\$28,532	\$174	\$308	\$2,316
December	\$42,104	\$1,775	\$758	\$1,604	\$42,400	\$315	\$315	\$2,515
Total	\$430,886	\$8,701	\$18,153	\$28,593	\$450,770	\$2,620	\$8,713	\$36,080
% of Total	100%	2.02%	4.21%	6.64%	100%	0.58%	1.93%	8.00%

Note: Monthly retail sales data may differ from annual data due to nondisclosure of several sectors for privacy reasons.

Sources: Colorado Department of Revenue, Harvey Economics 2009.

The third and second quarters are the peak periods for Salida and Cañon City also. Overall, tourism accounts for less than 15% of total retail sales in Salida, Cañon City, Chaffee County, and Fremont County.

Regional Commercial Rafting and Kayaking Industry

The Arkansas River is a popular rafting location with more than 60 miles of white water, including both slower, milder sections and several more advanced technical stretches of water.³² The Arkansas River experiences the most commercial use of any river in Colorado; since 1998, between 42% and 50% of all Colorado rafting user days have occurred on the Arkansas River annually. Table 3-62 illustrates the annual commercial rafting use on the Arkansas River since 1998. The variation in user days on Colorado's rivers is likely due to a number of factors, including local and national economic conditions and stream flows. Section 3.20, Recreation Resources, provides additional information on commercial rafting on the Arkansas River.

³² Colorado River Outfitters Association (CROA), www.croa.org.

Table 3-62. Annual Commercial Rafting User Days on the Arkansas River and Statewide, 1998-2008

Year	Commercial User Days		Arkansas % of Total
	Arkansas River	Statewide	
1998	250,098	520,812	48.0%
1999	243,709	525,537	46.4%
2000	250,861	503,524	49.8%
2001	252,213	515,704	48.9%
2002	139,178	309,129	45.0%
2003	214,555	462,882	46.4%
2004	203,840	445,816	45.7%
2005	228,091	510,544	44.7%
2006	237,160	510,304	46.5%
2007	239,887	539,222	44.5%
2008	214,234	507,882	42.2%

Note: A commercial user day is defined as a paying guest on the river for any part of the day.

Source: CROA 2008, Harvey Economics 2009.

In 2008, 52 different commercial rafting or kayaking companies or other groups provided trips on the Arkansas River.^{33,34} These 52 groups ran a total of about 16,850 raft or kayak trips between March and November, including about 44,690 boats and over 200,000 clients. Although commercial boating use in 2008 was down about 10% compared to previous years, the patterns of use remained consistent. About 65% of trips were half-day trips, another 26% were full-day trips, and the remaining trips included multi-day, instructional, or other trip types. The cost of commercial boat trips on the Arkansas River varies, depending on the length of the trip and the location; trips can range from about \$45 to \$55 for a half-day float trip to between \$65 and \$110 for a longer or more technical trip.³⁵

Over 85% of 2008 trips occurred in June, July, and August, accounting for over 90% of annual clients. During August, the OTR preferred viewing period, raft visitors averaged 51,300 from 2006 through 2008. This is below the July peak, which averaged 98,800 on a comparable basis. June and September might be alternative OTR viewing periods; rafting visitors averaged 62,800 and 3,800, respectively, for those months from 2006 through 2008. Even during July, capacity is not a concern; according to the Association, the industry is at capacity only a few days a year.

About 95% of employment related to rafting/ kayaking on the Arkansas River is seasonal, running from about mid-May through early September.³⁶ Full-time positions generally only include company owners. During the peak boating season, companies may employ between 20 and 50 people each, including guides and administrative staff. Guides are generally paid a flat rate per trip, with new guides earning about \$55 per day for one trip and experienced guides making up to \$120 per day for several shorter

³³ Boating Use 2008, BLM and Colorado State Parks.

³⁴ In addition to commercial rafting companies offering tours to the general public, groups such as the Boy Scouts, Fort Carson and Peterson Air Force Base also ran tours on the Arkansas River.

³⁵ Kodi Rafting, www.whitewatercolorado.com; Wilderness Aware Rafting, www.inaraft.com; Arkansas River Tours, www.arkansasrivertours.com; River Runners, riverrunnersltd.com; Joe Greiner, Wilderness Aware Rafting, September, 2009.

³⁶ John Kreski, Colorado State Parks, AHRA, September 2009 and Joe Greiner, Colorado River Outfitters Association and Wilderness Aware Rafting, September 2009.

trips per day. In addition to the cost of a rafting trip, commercial rafting customers also spend money on food, lodging, souvenirs, and other items during the course of the trip. In 2008, total per customer expenditures on these items (direct expenditures) was estimated to be \$111.³⁷ Additional economic impacts result from spending by rafting companies, their employees, and other vendors that serve rafting customers (indirect and induced expenditures). A recent report conducted by the Colorado River Outfitters Association suggests that each dollar of direct spending results in \$2.56 dollars of total economic impact.³⁸ Direct expenditures by rafting customers on the Arkansas River amounted to about \$23.8 million in 2008, with total economic impacts (direct, indirect and induced expenditures) of \$60.9 million. Table 3-63 details per customer expenditures, direct expenditures, and total economic impacts from commercial rafting on the Arkansas River from 1998 through 2008.

Table 3-63. Commercial Rafting Expenditures and Total Economic Impacts of Commercial Rafting on the Arkansas River and Statewide, 1998-2008

Year	Arkansas River			Statewide
	Per Customer Expenditure	Total Direct Expenditures	Total Economic Impact	Total Economic Impact
1998	\$86.77	\$21,701,003	\$55,554,569	\$115,688,595
1999	\$89.11	\$21,716,909	\$55,595,287	\$119,886,341
2000	\$92.14	\$23,114,333	\$59,172,691	\$118,770,435
2001	\$93.89	\$23,680,279	\$60,621,513	\$123,953,788
2002	\$95.95	\$13,354,129	\$34,186,570	\$75,931,975
2003	\$97.78	\$20,979,188	\$53,706,721	\$115,867,141
2004	\$101.00	\$20,587,840	\$52,704,870	\$115,270,185
2005	\$104.44	\$23,821,824	\$60,983,870	\$136,502,311
2006	\$106.53	\$25,264,655	\$64,677,516	\$139,168,474
2007	\$110.89	\$26,601,069	\$68,098,738	\$153,073,479
2008	\$111.00	\$23,780,977	\$60,879,301	\$144,325,838

Notes:

- (1) Per customer expenditures have been adjusted for inflation to 2008 constant dollars.
- (2) Direct expenditures are the total spending by all Arkansas River commercial rafting customers on rafting, food, lodging and other items.
- (3) Total economic impacts include direct, indirect and induced spending.

Sources: CROA 2008, Harvey Economics 2009.

Arkansas River Fishing Activity

Section 3.20, Recreation Resources, provides information about fishing activity in the Project Area, including numbers of anglers, seasonality, and popular fishing locations. This section discusses the economic aspects of those activities.

In 2007, Colorado resident and nonresident anglers participated in about 10.5 million days of fishing in the state. As part of each trip, anglers spend money on a variety of items, including food and lodging, equipment, transportation, guide fees, and other items. These are referred to as direct expenditures.³⁹ Direct expenditures of anglers in Colorado amounted to about \$725 million in 2007. Additional economic benefit results from the spending of suppliers, outfitters, and others that receive angler dollars. Total

³⁷ Colorado River Outfitters Association (CROA), *Commercial River Use in the State of Colorado, 1998-2008*.

³⁸ Colorado River Outfitters Association (CROA), *Commercial River Use in the State of Colorado, 1998-2008*. This report cites the Colorado Tourism Board for the multiplier of 2.56.

³⁹ BBC Research and Consulting, *The Economic Impacts of Hunting, Fishing and Wildlife Watching in Colorado*, September 2008.

economic impacts of fishing in Colorado amounted to over \$1.2 billion in 2007, including spending of anglers as well as additional spending by businesses and households. The spending of anglers, businesses, and households also provides support for local employment. The 2007 activity and spending patterns of anglers in Colorado are outlined in Table 3-64.

Table 3-64. Angler Activity and Spending Patterns of Colorado Resident and Nonresident Anglers in Colorado, 2007

	Colorado Resident	Non-Resident	Total
Angler Activity Days	9,995,000	471,000	10,466,000
Direct Expenditures	\$669,700,000	\$55,500,000	\$725,200,000
Total Economic Impact	\$1,163,000,000	\$96,400,000	\$1,259,400,000
Jobs Supported by Angler Spending	13,492	1,118	14,610
Avg. Expenditure per Angler per Day	\$67	\$118	\$69

Notes: Direct expenditures include trip and equipment expenditures and CDOW expenditures in support of fishing. Total economic impacts include direct expenditures plus secondary spending by businesses and households.

Sources: BBC Research and Consulting 2008, Harvey Economics 2009.

Table 3-65 illustrates the economic benefits of fishing in Chaffee and Fremont counties.

Table 3-65. Angler Activity, Expenditures and Economic Impacts of Fishing in Chaffee and Fremont Counties, 2007

County	Resident Angler Activity Days	Non-Resident Angler Activity Days	Total Direct Fishing Expenditures	Jobs Supported by Angler Spending	Total Economic Impact from Fishing	Percent of Statewide Economic Impact
Chaffee	315,002	17,554	\$16,288,198	301	\$27,840,000	2.2%
Fremont	133,636	629	\$7,489,817	131	\$12,690,000	1.0%

Note: Jobs supported by angler spending reflect jobs resulting from the direct spending of anglers as well as the subsequent re-spending of those revenues. These jobs include guides; outfitter and other retail employees; hotel and restaurant employees; and other employees supported by angler dollars.

Sources: BBC Research and Consulting 2008, Harvey Economics 2009.

Several commercial fishing outfitters provide services to anglers on the Arkansas River, including supplies and guide services. These outfitters rely on the reputation of the area as a desired location to fish and depend on angler activity to support business. Guided trips on the Arkansas River include float-fishing trips from rafts, as well as “walk and wade” trips, which allow shoreline access to both private and public sections of the river. The cost of these trips generally ranges from about \$150 per person for a half-day walk and wade trip up to about \$400 dollars per person for full day or multi-day shoreline and float fishing experiences.⁴⁰

⁴⁰ ArkAnglers, www.arkanglers.com; Royal Gorge Anglers, www.royalgorgeanglers.com; Arkansas River Tours, www.arkansasrivertours.com; and Anglers Junction Fishing, www.anglersjunctionfishing.com.

In 2008, the average annual wage for Chaffee County workers employed in fishing related jobs was \$15,737; and in Fremont County; the average annual pay was \$19,697 for employment in the fishing industry.⁴¹

Hunting Activity

Section 3.20, Recreation Resources, provides information about hunting activities available in the Project Area, including the types of game hunted, hunting seasons for each species, and the number of annual licenses sold. This section discusses the economic aspects of hunting activities.

In 2007, Colorado residents and nonresidents participated in over 2.2 million days of hunting in Colorado, including hunting activity for big game and small game species. These hunters spent over \$292 million on food and lodging, equipment, transportation, guide fees, and other items. Additional economic benefit results from the spending of suppliers, outfitters, and others that receive hunter dollars. Total economic impacts of hunting in Colorado amounted to over \$501 million in 2007, including spending of hunters as well as additional spending by businesses and households. Hunting activity and hunter spending in Colorado supported over 6,000 jobs statewide. The 2007 activity and spending patterns of big game and small game hunters in Colorado are outlined in Table 3-66.

Table 3-66. Hunter Activity and Spending Patterns of Colorado Resident and Nonresident Hunters in Colorado, 2007

	Colorado Resident	Non-Resident	Total
<i>Big Game</i>			
Hunting Activity Days	1,005,000	596,000	1,601,000
Direct Expenditures	\$106,900,000	\$128,800,000	\$235,700,000
Avg. Expenditure per Hunter per Day	\$106	\$216	\$147
Total Economic Impact	\$183,095,000	\$220,605,000	\$403,700,000
Jobs Supported by Hunter Spending	2,114	2,546	4,660
<i>Small Game</i>			
Hunting Activity Days	582,000	23,000	605,000
Direct Expenditures	\$54,900,000	\$2,000,000	\$56,900,000
Avg. Expenditure per Hunter per Day	\$94	\$87	\$94
Total Economic Impact	\$94,031,000	\$3,426,000	\$97,457,000
Jobs Supported by Hunter Spending	1,303	47	1,350

Notes: (1) Big game includes deer, elk, bighorn sheep, antelope and other big game species.

(2) Direct expenditures include trip and equipment expenditures and CDOW expenditures in support of fishing.

(3) Total economic impacts include direct expenditures plus secondary spending by businesses and households.

Sources: BBC Research and Consulting 2008, Harvey Economics 2010.

⁴¹ Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2008 preliminary data for the Agriculture, Forestry, Fishing and Hunting Industry, www.bls.gov.

Table 3-67 illustrates the economic benefits of hunting in Chaffee and Fremont counties.

Table 3-67. Hunter Activity, Expenditures and Economic Impacts of Hunting in Chaffee and Fremont Counties, 2007

County	Resident Hunter Activity Days	Non-Resident Hunter Activity Days	Total Direct Hunter Expenditures	Jobs Supported by Hunter Spending	Total Economic Impact from Hunting	Percent of Statewide Economic Impact
Chaffee	5,935	235	\$4,025,244	74	\$6,880,000	1.4%
Fremont	3,978	157	\$1,646,697	29	\$2,790,000	0.6%

Sources: BBC Research and Consulting 2008, Harvey Economics 2010.

Several hunting outfitters and guides provide supplies and services in Chaffee and Fremont counties.

Wildlife Watching Activity

Wildlife watching is a popular activity in many areas of Colorado, both for state residents and visitors alike. As described in Section 3.20, Recreation Resources, the Arkansas River provides excellent opportunities for wildlife viewing and bird watching. Section 3.1, Terrestrial Wildlife and Habitat, and Section 3.2, Avian Wildlife and Habitat, describe the numerous species that live in the Arkansas River Canyon, including bighorn sheep, deer, elk, mountain lion, raptors, waterfowl, and other species. Table 3-68 describes the level of annual wildlife watching activity in Colorado, in terms of activity days for residents and nonresidents.

Wildlife watching also generates a considerable amount of economic activity in Colorado. In 2006, the economic impact of wildlife watching amounted to over \$1.2 billion dollars statewide. During that year, spending related to wildlife watching provided support for almost 12,800 jobs. Table 3-68 provides information on the economic impacts of wildlife watching activity in the state of Colorado.

Table 3-68. Wildlife Watching Activity and Spending Patterns of Colorado Residents and Nonresident Viewers in Colorado, 2006

	Colorado Resident	Non-Resident	Total
Wildlife Watching Activity Days	7,010,000	2,394,000	9,404,000
Direct Expenditures	\$285,800,000	\$417,400,000	\$703,200,000
Total Economic Impact	\$497,900,000	\$720,300,000	\$1,218,200,000
Jobs Supported by Viewer Spending	5,560	7,220	12,780
Avg. Expenditure per Viewer per Day	\$41	\$174	\$75

- Notes: (1) Direct expenditures include trip and equipment expenditures in support of wildlife watching.
 (2) Total economic impact includes direct expenditures plus secondary spending by businesses and households.
 (3) Jobs supported by spending include job creation from direct and secondary expenditures.
 (4) Per day expenditures are measured in 2007 dollars.

Sources: BBC Research and Consulting 2008, Harvey Economics 2010.

No data or information is available specific to wildlife watching activity or associated spending in Chaffee or Fremont counties; the USFWS gathers data only at the state level and CDOW does not collect activity day data for wildlife watching.

Other Regional Recreation

Recreational opportunities available in the PAA and SAA include seasonal and year-round tourist attractions; local arts and music festivals; use of the AHRA; and outdoor recreational activities supported on other public lands within the region. These opportunities are described in detail in Section 3.20, Recreation Resources. The economic impacts of visitor spending in the PAA and SAA were described earlier in this section.

In 2008, AHRA revenues amounted to just over \$1 million, which was about 7.7% lower than in 2007.⁴² Revenue sources included park passes, camping permits and reservations, registrations, special use agreements, special activity agreements, penalties, donations, and other miscellaneous revenues. Special use agreements made up about 75% of AHRA revenues in 2008. Revenues from camping permits and reservations were highest in July of 2008, with over 67% of camping permit revenues occurring in June, July, and August.

h. Fiscal Conditions by PAA and SAA

Revenues and expenditures for PAA and SAA jurisdictions are discussed below. Total revenues and expenditures are discussed by major category for each jurisdiction, as of 2007.⁴³ Total revenues and sales and use tax revenue are provided for the period 1997 through 2007. Total operating expenses and public safety expenses are provided for that same time period. The historical fiscal data and trends described below provide a general picture of the level and scale of revenues and expenditures for each PAA and SAA jurisdiction.

In late 2007, the U.S. officially entered a recessionary period.⁴⁴ As a result of rising unemployment rates, decreasing home values, and other economic factors, sales tax revenue and other types of revenue have decreased and many federal, state, and local entities find themselves facing substantial budget shortfalls. The State of Colorado, as well as the counties and municipalities in the PAA and SAA, continue to try to find ways to cut expenditures and balance their budgets, but this has proven a difficult task for many. In the short term, projects may be delayed or cut and services may be reduced or eliminated as they become unaffordable. However, by the time OTR is in place, it is assumed that the U.S. would be through the current recession and that revenues would have begun to increase, improving the budget conditions of federal, state, and local governments.

Revenues

Revenue trends for the PAA (city of Salida, city of Cañon City, Chaffee County, and Fremont County) are described below.⁴⁵ Total revenues and sales tax revenues for each jurisdiction are illustrated in Table 3-69.

⁴² Colorado State Parks, *The Arkansas Headwaters Recreation Area 2008 End of Year Report*.

⁴³ This is the most current data available from the Colorado Department of Local Affairs at the time of preparation of this section.

⁴⁴ National Bureau of Economic Research

⁴⁵ Colorado Department of Local Affairs, Division of Local Government, Municipality Trend Analysis Reports.

City of Salida. In 2009, Salida's total general government revenues amounted to about \$8.2 million. Excluding one-time grants for capital projects totaling \$2.1 million, the majority of total revenues came from sales and use tax collections (about 77%). Other major sources of revenues were user charges (6%), other intergovernmental revenues (5%), and franchise fees (5%).⁴⁶ The city's total revenues grew by an average 0.95% per year between 1997 and 2007, after adjustment for inflation. The city had a 2% sales tax rate and a total mill levy of 4.475 in 2007. As of January 1, 2009 the Salida sales tax rate is 3%.

City of Cañon City. Cañon City's total general government revenues amounted to about \$11.2 million in 2007. Sales and use tax revenue made up almost half of total revenues. Other major sources of revenues were intergovernmental revenues (12.3%) and franchise taxes (5.7%). The city's total revenues grew by an average 2.48% per year between 1997 and 2007, after adjustment for inflation. The city had a 2% sales tax rate and a total mill levy of 2.791 in 2007. The current 2009 Cañon City sales tax rate remains at 2%.

Chaffee County. Total general government revenues for Chaffee County were about \$18.4 million in 2007. Revenues were generally comprised of intergovernmental revenues (41%), sales and use taxes (15.2%), and property tax (13.6%). Social service payments are the bulk of intergovernmental revenues for the PAA counties. The county's total revenues grew by an average 4.8% per year between 1997 and 2007, after adjustment for inflation. In 2007, the Chaffee County sales tax rate was 2% and the county mill levy was 8.519. The current 2009 Chaffee County sales tax rate remains at 2%. Chaffee County also collects a 1.9% county lodging tax on hotel, motel, condo, and camping accommodations.

Fremont County. Total general government revenues for Fremont County were about \$23.5 million in 2007. Revenues were generally comprised of intergovernmental revenues (41.5%), sales and use taxes (21.7%), and property tax (17.7%). The county's total revenues grew by an average 2.7% per year between 1997 and 2007, after adjustment for inflation. In 2007, the Fremont County sales tax rate was 1.5% and the county mill levy was 12.315. The current 2009 Fremont County sales tax rate remains at 1.5%. Fremont County also collects a 2% county lodging tax on hotel, motel, condo and camping accommodations.

⁴⁶ Total general government expenditures include operating expenses, capital outlay expenditures, debt service and transfers to other funds.

Table 3-69. Total Revenues and Sales and Use Tax Revenues for PAA Jurisdictions, 1997-2007 (in thousands)

Year	Salida		Canon City		Chaffe County		Fremont County	
	Total Revenues	Sales and Use Tax Revenue	Total Revenues	Sales and Use Tax Revenue	Total Revenues	Sales and Use Tax Revenue	Total Revenues	Sales and Use Tax Revenue
1997	\$4,996	\$2,979	\$8,800	\$4,057	\$11,522	\$1,856	\$17,965	\$3,917
1998	\$4,876	\$3,328	\$9,117	\$4,332	\$11,178	\$2,141	\$19,712	\$4,274
1999	\$4,963	\$3,434	\$9,717	\$4,624	\$12,441	\$2,266	\$20,229	\$4,482
2000	\$5,317	\$3,590	\$12,249	\$4,859	\$12,781	\$2,468	\$21,689	\$4,792
2001	\$5,465	\$3,665	\$12,168	\$5,081	\$13,666	\$2,551	\$21,801	\$4,833
2002	\$5,047	\$3,545	\$10,940	\$5,128	\$13,336	\$2,449	\$22,976	\$4,900
2003	\$5,436	\$3,668	\$11,326	\$5,066	\$15,623	\$2,529	\$24,139	\$4,879
2004	\$5,247	\$3,635	\$11,208	\$5,113	\$16,094	\$2,495	\$22,189	\$4,881
2005	\$5,099	\$3,550	\$10,951	\$5,358	\$15,541	\$2,509	\$23,208	\$4,817
2006	\$5,991	\$3,573	\$11,289	\$5,569	\$17,149	\$2,645	\$25,567	\$5,112
2007	\$5,489	\$3,637	\$11,245	\$5,571	\$18,423	\$2,809	\$23,465	\$5,092
Avg. Ann. Growth	0.95%	2.02%	2.48%	3.22%	4.81%	4.23%	2.71%	2.66%

Note: All data has been adjusted for inflation to constant 2007 dollars.

Sources: DOLA 2009, BLS 2009b, Harvey Economics 2009

The average annual growth rate for total revenues and for sales and use tax revenues for all Colorado municipalities was 4.3% and 4.0%, respectively. Compared with other municipalities in Colorado, total revenues and sales and use tax revenues for Salida and Cañon City grew at a relatively slow annual rate. The average annual growth rate for total revenues and for sales and use tax revenues for all Colorado counties was 4.2% and 5.6%, respectively. Chaffee County’s total revenues grew at a faster annual rate than other counties in Colorado, while annual growth of Fremont County’s total revenues was slower than the annual county average. Sales and use tax revenues in both Chaffee and Fremont counties grew at a slower pace than in other counties.

Revenue trends for the SAA (city of Colorado Springs and city of Pueblo) are described below.⁴⁷ Total revenues and sales tax revenues for each jurisdiction are illustrated in Table 3-70.

City of Colorado Springs. In 2007, total general government revenues collected for Colorado Springs were about \$314 million. The majority of total revenues came from sales and use tax collections (about 51%). Other major sources of revenues were intergovernmental revenues (16%) and property taxes (6.4%). The city’s total revenues grew by an average 2.4% per year between 1997 and 2007, after adjustment for inflation. In 2007, the city’s mill levy was 4.944. The current 2009 sales tax rate in Colorado Springs is 2.5%.

City of Pueblo. Total government revenues for the city of Pueblo were just over \$98 million in 2007. Over half were sales and use taxes (54%), about 17% were intergovernmental revenues, and 10% were the result of property taxes. Pueblo’s total revenues grew by an average of 2.5% per year between 1997 and 2007. In 2007, the city’s mill levy was 15.633. The current 2009 sales tax rate in Pueblo is 3.5%.

⁴⁷ Colorado Department of Local Affairs, Division of Local Government, Municipality Trend Analysis Reports.

El Paso County. In 2007, total general government revenues for El Paso County amounted to over \$230 million, with taxes making up about half of total revenue. Sales and use taxes made up about 30% of total revenues for the county in that year. El Paso County’s revenues grew at an average annual rate of about 1.6% between 1997 and 2007. The current 2009 sales tax rate in El Paso County is 1%.

Pueblo County. Total government revenues for Pueblo County were almost \$110 million in 2007. Property taxes, ownership taxes, and sales and use taxes together made up about half of the county’s total revenues. The county’s total revenues grew at an average annual rate of about 3.1% between 1997 and 2007. The current 2009 sales tax rate in Pueblo County is 1%.

Table 3-70. Total Revenues and Sales and Use Tax Revenues for SAA Jurisdictions, 1997-2007 (in thousands)

Year	Colorado Springs		Pueblo		El Paso County		Pueblo County	
	Total Revenues	Sales and Use Tax Revenue	Total Revenues	Sales and Use Tax Revenue	Total Revenues	Sales and Use Tax Revenue	Total Revenues	Sales and Use Tax Revenue
1997	\$248,672	\$113,307	\$76,720	\$43,467	\$196,161	\$57,088	\$80,729	\$13,305
1998	\$258,316	\$122,998	\$79,724	\$46,189	\$195,144	\$60,380	\$85,261	\$14,328
1999	\$274,845	\$130,233	\$81,781	\$46,956	\$206,398	\$64,321	\$86,520	\$14,888
2000	\$298,234	\$139,796	\$81,269	\$46,936	\$225,936	\$69,819	\$91,422	\$15,239
2001	\$287,623	\$136,161	\$82,567	\$47,308	\$223,447	\$71,431	\$91,129	\$15,394
2002	\$308,767	\$152,772	\$83,505	\$46,771	\$222,119	\$68,779	\$92,969	\$15,255
2003	\$298,221	\$151,364	\$83,599	\$45,989	\$231,870	\$67,586	\$93,971	\$15,220
2004	\$298,406	\$159,277	\$83,039	\$48,062	\$222,798	\$70,229	\$91,735	\$15,373
2005	\$304,247	\$159,289	\$86,292	\$48,013	NA	NA	NA	NA
2006	\$314,230	\$159,557	\$99,359	\$46,678	NA	NA	NA	NA
2007	\$314,066	\$159,712	\$98,009	\$52,539	\$230,194	\$69,041	\$109,525	\$16,193
Avg. Ann. Growth	2.36%	3.49%	2.48%	1.91%	1.61%	1.92%	3.10%	1.98%

Note: All data has been adjusted for inflation to constant 2007 dollars.

Sources: DOLA 2009, BLS 2009b, Harvey Economics 2009

Both total revenues and sales and use tax revenues for Colorado Springs and Pueblo grew at a slower rate than the average Colorado municipality. The same is true for El Paso and Pueblo counties compared to the average Colorado county.

Expenditures

Expenditure trends for the PAA (Salida, Cañon City, Chaffee County and Fremont County) are described below.⁴⁸ Total operating expenditures and public safety expenditures for each jurisdiction are illustrated in Table 3-71.^{49,50}

⁴⁸ Colorado Department of Local Affairs, Division of Local Government, Municipality Trend Analysis Reports.

⁴⁹ Total general government expenditures include operating expenses, capital outlay expenditures, debt service and transfers to other funds.

⁵⁰ Public safety expenditures include law enforcement, jail, fire and other public safety expenses.

Table 3-71. Total Operating Expenditures and Public Safety Expenditures for PAA Jurisdictions, 1997-2007 (in thousands)

Year	Salida		Canon City		Chaffe County		Fremont County	
	Total Operating Expenses	Public Safety Expenses						
1997	\$3,489	\$1,863	\$7,127	\$2,689	\$8,803	\$1,545	\$15,791	\$2,937
1998	\$3,361	\$1,783	\$7,040	\$2,549	\$8,380	\$1,597	\$16,450	\$3,416
1999	\$3,710	\$1,786	\$8,224	\$2,836	\$9,335	\$1,823	\$17,867	\$3,999
2000	\$4,199	\$1,809	\$8,398	\$2,870	\$10,561	\$2,031	\$19,353	\$4,299
2001	\$4,199	\$1,846	\$8,888	\$3,069	\$10,973	\$2,246	\$20,161	\$4,591
2002	\$4,474	\$1,896	\$9,046	\$3,258	\$11,318	\$2,282	\$19,490	\$4,484
2003	\$3,580	\$1,746	\$9,125	\$3,441	\$13,539	\$2,544	\$21,565	\$4,758
2004	\$3,453	\$1,640	\$8,783	\$3,438	\$15,155	\$3,563	\$20,585	\$4,983
2005	\$3,912	\$1,730	\$8,822	\$3,474	\$13,729	\$3,325	\$20,528	\$5,385
2006	\$3,628	\$1,558	\$8,788	\$3,530	\$14,692	\$3,508	\$19,990	\$4,907
2007	\$3,831	\$1,577	\$9,701	\$3,727	\$15,690	\$3,502	\$19,442	\$4,901
Avg. Ann. Growth	0.94%	-1.66%	3.13%	3.32%	5.95%	8.53%	2.10%	5.25%

Note: All data has been adjusted for inflation to constant 2007 dollars.

Sources: DOLA 2009, BLS 2009b, Harvey Economics 2009

City of Salida. The city’s total general government expenditures were just over \$5.3 million in 2007, including about \$3.8 million in operating expenses. Operating expenses included about \$1.6 million on public safety expenditures (42%), including police and fire department expenditures. In addition to public safety, operating expenses for the city included culture and recreation and general government expenditures. Capital outlay expenditures amounted to about 18% of total expenditures in 2007. The city’s operating expenses increased by an average of 0.94% per year between 1997 and 2007, after accounting for inflation.

City of Cañon City. The city’s total general government expenditures were about \$11.3 million in 2007, including about \$9.7 million in operating expenses. This amount included about \$3.7 million for public safety expenditures (38%), including police and fire department expenditures. In addition to public safety, operating expenses included public works (water, sewer, streets, etc.), general government expenditures, and culture and recreation expenses. Total operating expenses increased by an average of 2.1% per year between 1997 and 2007, accounting for inflation.

Chaffee County. Chaffee County’s total general government expenditures amounted to about \$17.8 million in 2007. Operating expenses of \$15.7 million made up over 88% of total expenditures. Public safety expenditures were 22.3% of the county’s operating expenses. Other larger expenditures for the county were social services, general government, and public works expenses, including roads. Total operating expenses increased by an average of 6% per year between 1997 and 2007, accounting for inflation.

Fremont County. Fremont County’s total general government expenditures amounted to \$22.6 million in 2007. The \$19.4 million of operating expenses included \$4.9 million (25%) in public safety expenditures. Other larger expenditures included social services and general government expenses. Total operating expenses increased by an average of 2.1% per year between 1997 and 2007, accounting for inflation.

The average annual growth rate for total operating expenditures and for public safety expenditures was 4.0% and 4.8%, respectively for all Colorado municipalities and 4.8% and 6.4%, respectively for all Colorado counties. Compared with other municipalities in Colorado, total operating expenditures and public safety expenditures for Salida and Cañon City grew at a relatively slow annual rate. Chaffee County’s expenditures grew at a faster annual rate than other counties in Colorado, while annual growth rates of Fremont County’s expenditures were lower than the annual county average.

Expenditure trends for the SAA (city of Colorado Springs, city of Pueblo, El Paso County, and Pueblo County) are described below⁵¹ and illustrated in Table 3-72.

City of Colorado Springs. Total government expenditures for the city were \$321 million in 2007. Total operating costs were about \$228.5 million, including about \$116.4 million in public safety expenditures (51%). General government expenditure was the next largest expense category at 19% of operating costs. Total operating expenses increased by an average of 1.2% per year between 1997 and 2007, accounting for inflation.

City of Pueblo. Total government expenditures for the city of Pueblo were \$82.8 million in 2007. Operating expenditures amounted to \$63.9 million in that year. The city spent \$37.6 million on public safety (59% of operating expenditures). Public works and general government expenditures together made up another 25% of operating expenditures. Total operating expenses increased by an average of 3.1% per year between 1997 and 2007, accounting for inflation.

Table 3-72. Total Operating Expenditures and Public Safety Expenditures for SAA Jurisdictions, 1997-2007 (in thousands)

Year	Colorado Springs		Pueblo		El Paso County		Pueblo County	
	Total Operating Expenses	Public Safety Expenses						
1997	\$202,235	\$93,199	\$47,242	\$22,314	\$169,934	\$36,723	\$64,070	\$14,436
1998	\$211,863	\$98,139	\$50,171	\$23,622	\$174,644	\$42,112	\$70,756	\$16,322
1999	\$218,250	\$102,986	\$50,670	\$24,576	\$178,794	\$45,323	\$75,023	\$18,351
2000	\$222,461	\$109,299	\$51,622	\$25,638	\$194,808	\$45,713	\$76,767	\$18,675
2001	\$221,166	\$110,633	\$58,588	\$26,929	\$193,074	\$48,387	\$80,408	\$19,142
2002	\$230,232	\$110,379	\$53,489	\$29,105	\$210,274	\$50,762	\$80,423	\$19,767
2003	\$225,033	\$111,936	\$59,951	\$32,995	\$210,015	\$50,994	\$83,202	\$20,335
2004	\$214,794	\$111,053	\$56,725	\$33,447	\$192,827	\$50,782	\$79,877	\$20,905
2005	\$223,530	\$116,798	\$63,260	\$35,696	NA	NA	NA	NA
2006	\$230,181	\$122,790	\$65,024	\$37,264	NA	NA	NA	NA
2007	\$228,462	\$116,346	\$63,931	\$37,644	\$203,916	\$55,721	\$82,669	\$22,612
Avg. Ann. Growth	1.23%	2.24%	3.07%	5.37%	1.84%	4.26%	2.58%	4.59%

Note: All data has been adjusted for inflation to constant 2007 dollars.

Source: DOLA 2009, BLS 2009b, Harvey Economics 2009

⁵¹ Colorado Department of Local Affairs, Division of Local Government, Municipality Trend Analysis Reports. Total general government expenditures include operating expenses, capital outlay expenditures, debt service and transfers to other funds.

El Paso County. El Paso County's total government expenditures were about \$242 million in 2007, with operating costs making up about 84% of that total (\$204 million). Total public safety expenditures of about \$56 million were about 27% of total operating costs. Social services and health services made up about 19% and 13% of operating costs, respectively. Total operating expenditures grew by about 1.8% per year between 1997 and 2007.

Pueblo County. In 2007, Pueblo County's total government expenditures amounted to just over \$109 million, including almost \$83 million of operating expenses. Public safety expenses made up over 27% of operating expenses, with social services expenses making up another 30%. Total operating expenses grew by about 2.6% per year between 1997 and 2007 in Pueblo County.

Both total operating expenditures and public safety expenditures for Colorado Springs and Pueblo grew at a slower rate than the average Colorado municipality. The same is true for El Paso and Pueblo counties compared to the average Colorado county.

i. Community Services

Community services that may be affected by various aspects of the project include law enforcement agencies, fire departments, medical facilities, and other emergency responders. Personnel providing these services may be called upon to respond to construction related incidents during the installation or removal phases, and to respond to various visitor needs during the exhibition phase. These services are described below under Public Safety. Additionally, water and wastewater providers would be required to provide services to hotels, restaurants, and other facilities that may be used by OTR visitors. If the OTR construction and viewing period occurs during the school year, schools in the PAA may also experience some impacts.

Law Enforcement, Fire Protections and Other Emergency Services

The specific training and resources available from emergency service providers is detailed in Section 3.15, Public Health and Safety. From a financial standpoint, these state, county, and municipal agencies are currently experiencing strains on their budgets due to the economic recession and the resulting decreases in various types of revenues. Police and fire departments, as well as medical service providers, are generally funded by tax revenues, and these agencies likely feel financial pressures on their budgets and activities during the 2008-2010 period. The pressures to reduce costs may result in the laying off of workers, reduction of hours, or cutbacks to services. However, by the time OTR is in place, it is assumed that the recession will be over and that tax revenues to fund emergency service providers will be on the rise.

Water and Wastewater Providers

City of Salida. The City of Salida operates a water treatment plant and wastewater treatment plant to provide quality water and sewer services to its customers. The city has a Colorado Water Conservation Board (CWCB) approved Water Conservation Plan (2008), which includes information on current water supplies and demands.⁵² Salida has three sources of water: the South Arkansas River, Pasquale Springs, and the South Arkansas Gallery System (Galleries). According to the Water Conservation Plan, the Arkansas River water and the Galleries water is used year-round, while the Pasquale Springs water is only used during the summer irrigation season to meet peak demands. The city has several concerns related

⁵² City of Salida, 2008 Water Conservation Plan.

to meeting current and future demands, including water storage, water quality, aging infrastructure, and growth among others. Several capital improvement projects are planned to deal with these issues.

Salida's wastewater treatment plant services Salida, Poncha Springs, and surrounding areas. Treated wastewater is discharged into the Arkansas River. The city recently conducted a 20-year planning study on the plant's ability to meet current and future growth needs and Colorado Discharge System Permits (CDSP) limits.⁵³ Although designed to treat up to 2.1 million gallons per day (mgd), the plant can currently only treat about 1.2 mgd due to current effluent quality requirements. The city is currently planning on upgrading and expanding the treatment facility to 2.7 mgd.

Cañon City. Cañon City operates a water treatment plant to provide quality water to its customers. Cañon City obtains its water supply from the Arkansas River.⁵⁴ According to the city's website, the Water Distribution Division of the Public Works Department has developed "an aggressive capital improvement program that extends 20-25 years into the future that addresses growth, major projects and routine replacements of the transmission and distribution system."⁵⁵

The Fremont Sanitation District provides sewer (wastewater treatment) services to residents of Cañon City and the City of Florence.

School Districts and Calendar

Salida. The Salida School District R-32-J serves the City of Salida, Poncha Springs, surrounding Chaffee County, parts of western Fremont County, and northern Saguache County.⁵⁶ The district includes one early childhood center, one elementary school, one middle school, and one high school. The school year begins mid to late August and concludes in mid-June.

Cañon City. The Fremont RE-1 School District includes five elementary schools, one K-8 school, one middle school, and one high school that serve Cañon City.⁵⁷ In addition, the Garden Park High School (an alternative high school) and the Mountain View Core Knowledge School also offer educational services to Cañon City children. The school year generally begins at the end of August and concludes in early June.

Fremont. The Fremont RE-2 School District serves Florence, Williamsburg, Rockvale, Coal Creek, Penrose and Wetmore. The consolidated district has two elementary schools, one middle school and one high school. The school year begins around the third week of August and continues until late May.⁵⁸

Cotopaxi. School District RE-3 serves five small communities with facilities located in Cotopaxi. The Cotopaxi Early Learning Center, Elementary School and the Cotopaxi Junior-Senior High School serve a combined total of more than 200 students. The school year is typically from mid-August through the end of May.⁵⁹

⁵³ Schmueser Gordon Meyer, Inc., *Preliminary Engineering Report for the Salida Wastewater Treatment Facility*, 2009.

⁵⁴ City of Cañon City, *2009 Drinking Water Consumer Confidence Report for Calendar Year 2008*.

⁵⁵ City of Cañon City, Public Works Department, <http://www.canoncity.org/PublicWorks/publicworks.htm>.

⁵⁶ <http://www.salida.k12.co.us/Page.aspx?PageID=2934>.

⁵⁷ <http://www.canoncityschools.org/>.

⁵⁸ <http://www.re-2.org/>

⁵⁹ <http://www.cotopaxire3.org/index.html>

j. Social Setting

Arts Climate

The activities and actions of many communities and residents within the Project Area and PAA indicate an expressed interest in and value for the arts in the area. Numerous local and regional arts festivals take place in the Project Area each year, including the Salida Riverside Fine Arts Festival, Salida Art Walk, Buena Vista Art Gallery Tour, and Chaffee County Open Awards Art Show. In Fremont County, the Fremont Center for the Arts hosts a number of art related events throughout the year, including Art on the Arkansas, an annual juried arts and crafts fair. Many of these festivals have occurred for a number of years and are anticipated annual events. These events showcase and support local artists and their work. Visitors to the arts festivals are likely to come from the Project Area, but also from communities outside the local area, perhaps even statewide.

The arts are also important on a regional level outside the Project Area and within the SAA. Events include the Pikes Peak Arts Festival.

Quality of Life

Chaffee and Fremont counties offer a relatively rural experience as evidenced by the demographic data above and the descriptions included in Section 3.7, Range Resources, and Section 3.21, Visual/Aesthetic Resources. The scenic beauty of the region, along with numerous outdoor recreational activities and relatively low housing prices attract residents and visitors alike.

Chaffee County is located in a mountain valley that includes rolling hills, high mountain peaks, alpine rivers and streams, ranch lands, and meadows; in fact, much of the county is made up of public lands. According to the Chaffee County Comprehensive Plan, residents place high value on the scenic quality of the area and natural resources of the county, believing that these are essential elements of the county's quality of life.⁶⁰ Chaffee County residents are interested in protecting the rural nature of the county; the comprehensive plan includes objectives that "give high priority to protecting the scenic and visual quality of the valley," "preserve agricultural land, open space, and wildlife habitat throughout the valley," "provide access to public lands and river/ stream corridors," and "protect sensitive natural areas and cultural resources." Residents believe that a combination of regulations and incentives will help to meet these objectives without compromising private property rights. Outdoor-based recreational activities are also important to Chaffee County residents and tourism is an important economic base; fishing, hunting, and hiking are popular activities. County services, such as medical facilities and schools, are concentrated in Salida and Buena Vista; generally, these appear to be adequate at the current time, but county growth has placed pressure on facilities and infrastructure.

Fremont County includes a variety of natural and scenic resources, including high mountain peaks on its western edge and semi-arid plains on its eastern edge; distinct differences exist between the eastern and western portions of the county in terms of population, employment, and rural versus urban character. As with Chaffee County, much of Fremont County land is publicly owned. The county's economy is varied and includes mining, agriculture, tourism, prison industry, and other commercial and retail activities. According to the Fremont County Master Plan, "the County recognizes the importance of environmental factors, natural and cultural amenities, or quality of life issues that play a key role in the health of the economy."⁶¹ The plan also states that "County residents enjoy the rural and agricultural character of the

⁶⁰ Chaffee County Comprehensive Plan, 2000.

⁶¹ Fremont County Master Plan, 2001.

area” and that the “spectacular scenery, clean air and sense of community are important factors to residents.” In terms of both urban and rural development, the county’s master plan includes goals aimed at “locating future development within or adjacent to existing communities or growth areas” and “minimizing the impacts of urban development on the rural character of the County.” The county identifies these goals as a way to minimize sprawl and contain costs of providing services to residents. Other county goals include encouraging “farm and ranch land to remain in active and productive use,” encouraging “a land use pattern which considers the ecological and environmental sensitivity of the land,” preserving the cultural resources of the County and protecting “the unique scenic and rural quality of the County.”

In addition to experiencing their physical environment first hand, most PAA residents have a prolonged experience in sharing their environment and communities with visitors. Considerable highway traffic passes through both counties to other destinations. Tourists also swell the local population in the PAA at different times of year, but especially during summer.

3.14.2 Current Management Considerations

Several agencies within the Project Area and the PAA have jurisdictional responsibilities that focus on economic development and various social impacts. These agencies are identified in the AMS report, along with relevant plans, regulations, and other documents that provide guidance on the goals and objectives related to economic and social issues. The following list provides a summary of the agencies, plans, and guidance information included in the AMS, as related to socioeconomic resources:

- Bureau of Land Management, Royal Gorge Resource Management Plan (RMP), 1996: The RMP does not specifically address management objectives for socioeconomic, social impacts, or public safety, but does state the following: “Recognizing that social and economic factors must be considered in achieving healthy public lands, the Authorized Officer will coordinate, consult and cooperate with the local cooperators and interested publics during all phases of implementing standards and guidelines...As greater understanding of ecosystems, including socio-economic factors, becomes available, it is applied to the management of public lands within the RMP Planning Area.”
- Fremont County, Fremont County Master Plan, 2002: The county’s economic development goals are stated as follows: “Widen the existing economic base and broaden employment opportunities on a County-wide basis. The role of Fremont County government in economic development is to support and facilitate other public and private economic development efforts which are consistent with the economic development objectives for the County.” The Master Plan’s objectives include the following: “Encourage economic development activities that will provide additional employment opportunities” and “Recognize the importance of tourism and recreation and encourage the continuation and expansion of these industries within the County by providing the necessary services and facilities, without compromising other strategies of the Plan.”
- City of Salida and Chaffee County, Joint Planning Agreement: This intergovernmental agreement states that “The City and County agree to consult and cooperate in assessing and requiring new developments, whether in the City or the County, to mitigate impacts resulting from developments, which may include impacts from roads, utility services and other impacts.”
- Chaffee County, Chaffee County Comprehensive Plan, 2000: According to the plan, one of the county’s guiding objectives is to coordinate economic diversity and economic development. This

includes continued participation “with the existing economic development agencies in the valley to discuss a more unified, directed approach to economic development in Chaffee County;” undertaking “a joint multi-county effort in cooperation with the Colorado Division of Wildlife to focus on watchable wildlife for tourism development;” and encouraging “home occupation uses” (“lone eagle” entrepreneurs and the arts community) with standards that ensure compatibility with surrounding residential development. An economic report developed in preparation for the creation of the Comprehensive plan focused on the need to diversify the local economy, which “relies significantly on tourism and related development activity.”

- City of Salida, Salida Comprehensive Plan, 2000: Salida addresses several issues related to economic conditions in the comprehensive plan. City objectives include creating “a balanced and sustainable economy that offers a variety of quality employment opportunities;” making available “an appropriate range of housing types to serve the varied lifestyles, ages and income levels of residents;” and creation of “a vibrant downtown that is the cultural activity center of the community and the region and provides a variety of shopping, entertainment, civic, residential and recreational uses.” The plan also states that “the economic success of the Highway 50 corridor is key to the success of Salida and their ability to fund infrastructure needs.”
- The Cañon City Comprehensive Plan does not specifically address economic development, other economic topics or related social issues.

Management considerations for emergency service providers are discussed in the following section, Public Health and Safety.

3.15 PUBLIC HEALTH AND SAFETY

3.15.1 Current Conditions and Trends

Natural events play a significant role in the health and safety of the public within the Project Area. Natural events requiring emergency response may occur during the summer months. Summer storms can potentially bring floods, wind, lightning, and hail, as well as contribute to rockfall onto US 50. Additionally, nonnatural events can occur, such as car accidents, including accidents that have blocked US 50 in the summer for up to 24 hours (Morrisey 2009a). Also, injuries regularly occur on the Arkansas River during the peak recreational boating months from June-August.

Severe floods, while infrequent, do occur in the Project Area. Flood records are available from three flood gauges located in the Project Area at Wellsville, Parkdale, and Cañon City. During the period of record for the Wellsville gauge, 1961-1994, two severe seasonal floods occurred in the month of June, one of which was rated a 100-year flood. The period of record for the Parkdale gauge was 1946-2004. During this time, the river peaked two times over flood stage. Two events above flood stage also occurred at the Cañon City flood gauge. These floods occurred in June and August. US 50 was blocked in July 2006 because of seasonal flooding. US 50 was designed to account for seasonal flooding and normally is high above seasonal flooding danger.

Unlike seasonal flooding that generally occurs in June and early July, flash floods occur in July and August and pose a greater threat for highway closure. Flash flooding generally is associated with afternoon severe thunderstorms that occur in July and August. While the Arkansas River generally does not

experience substantial flooding at this time, side canyons can experience flash flooding events capable of exceeding drainage capacity and can overtop US 50, resulting in road closures.

Afternoon thunderstorms occur in the Project Area, primarily from June through August. These storms can bring cloud to ground lightning, strong winds in the form of microbursts, heavy rain, and hail. Wind studies in the Project Area have shown that average 1-minute wind speeds of 53 mph could occur during a 10-year period, although the study showed that a once in 10-year wind speed of 42 mph was more representative of the Project Area. In general, these winds tended to align with the river valley, although there were measurements of winds at 45 to 90 degrees to the river valley, indicating the erratic nature of the canyon environment. Based on precipitation records from Salida and Cañon City, the month of August experiences the most rainfall, followed by July. While not common, heavy rains of 3 to 5 inches in a day can occur during the spring and summer. Rockfall events take place, especially after heavy summer rains. Typically, 2 to 3 times a year, rockfalls occur that are severe enough for CSP and/or CDOT to close the highway or regulate the flow of traffic until the debris is cleared (Morrisey 2009b). Hail up to 1.5 inches in diameter has been recorded in the Project Area. Historically, the highest probability of receiving a short-term extreme storm is in August. Snow can fall within the project corridor from September-June; however, snowfall has not been recorded in the Project Area from June through August. Data for injuries or accidents associated with these weather phenomena were either nonexistent or not obtainable.

Boating on the Arkansas River within the Project Area is a very common recreational activity during the summer months. Data obtained from the AHRA regarding the number of injuries associated with boating on the Arkansas River is depicted in Table 3-73. The yearly average injury count is slightly less than 15 injuries. Of these 15 injuries, on average, almost 3 will be classified as severe. A fatality is recorded within the Project Area approximately once every 3 to 4 years (Pappenfort 2009).

Table 3-73. Number of Boating Injuries on the Arkansas River within the Project Corridor

Year	Number of Injuries	Number of Serious Injuries	Number of Injuries Resulting in a Fatality
1991	6	1	1
1992	2	0	0
1993	14	0	0
1994	18	0	0
1995	36	0	0
1996	23	6	1
1997	32	9	0
1998	20	7	0
1999	27	4	1
2000	18	5	1
2001	12	1	0
2002	3	1	0
2003	11	3	0
2004	5	3	0
2005	5	1	0
2006	6	2	0

Year	Number of Injuries	Number of Serious Injuries	Number of Injuries Resulting in a Fatality
2007	4	1	0
2008	20	3	1
Total	262	47	5
Yearly Average	14.6	2.6	0.3*

*1 fatality every 3-4 years

Wildfires can and do occur in the Project Area. The majority of these fires (84%) are caused by lightning from summer storms. The remainder is human-caused fires, caused either by campfires or in the past, railroad operations. Approximately 95% of the fires are small (less than 10 acres in size) and 92% burn at a low intensity. Most of these fires occur between June 1 and September 5. Fires do not often burn along the canyon floor due to the low fuel availability. When fires do burn, the greatest danger along US 50 is often the increased traffic hazard caused by reduced visibility from smoke; however, the closure of US 50 due to smoke and visibility issues is a relatively infrequent event (Morrisey and Walker 2009).

3.15.1.1 Local Emergency Services, Fire and Law Enforcement

The following section explains the general network of emergency, fire, and law enforcement services that are active in the area of the proposed project. The following local agencies are each responsible for services in and near the Project Area:

3.15.1.2 Emergency Management

The Colorado Division of Emergency Management (CDEM) is responsible for the state’s comprehensive emergency management program, which supports local and state agencies. Activities and services cover the four phases of emergency management – preparedness, prevention, response, and recovery – for disasters such as flooding, tornadoes, wildfire, hazardous materials incidents, and acts of terrorism. During an actual emergency or disaster, CDEM coordinates the state response and recovery program in support of local governments (see <http://www.dola.state.co.us/oem/aboutus.htm>). The Chaffee County Office of Emergency Services (Salida) and the Fremont County Emergency Management Agency (Cañon City) are the local agencies that coordinate with CDEM.

The AHRA is co-managed by the BLM and State Parks. Both State Parks and BLM provide personnel for this 150-mile length of the Arkansas River.

The Ranger Section patrols all portions of the AHRA, both land and river, throughout the year. The five full-time staff members typically hire 8 to 12 seasonal staff members to assist them with their patrol responsibilities. BLM staff members in 2005 included the river manager, seasonal recreation technician, and a winter seasonal administrative position. The State Parks manager and BLM river manager are responsible for the overall operations and maintenance of this unique, multi-agency partnership. The BLM river manager works closely with the State Parks park manager (AHRA 2006 and White 2010).

The AHRA officers are capable of enforcing state laws and the rules and regulations of State Parks, and they are Swiftwater Rescue Technicians Level 1 Certified (SRT-1s). The rangers/officers patrol the area daily by land and water. River rangers are responsible for conducting commercial boating inspections, rescues, and informing the public about river safety. Land rangers are responsible for parks pass

compliance, rules and regulation compliance, and land-based emergencies. The rangers/officers are dispatched out of the Chaffee and Fremont County dispatch centers and are coordinated with county sheriff operations. The AHRA takes the lead over other agencies with river-related emergencies. River crime scenes are handled by the county sheriff departments. The AHRA staff is based in Salida at AHRA headquarters. The AHRA also has a mutual aid agreement with the county sheriff departments and with the CSP.

The law enforcement capabilities of the BLM RGFO and San Isabel Forest Service near the Project Area are both similar. Each agency has one federal law enforcement officer as well as one marked patrol vehicle. Law enforcement for the USFS is based out of Salida and is responsible for land and resource protection within the San Isabel National Forest. BLM law enforcement is based out of the RGFO in Cañon City near the Project Area, and is responsible for land and resource protection within the RGFO boundary.

The Fremont County Emergency Operations Plan is in draft stage, with the purpose of “identifying roles, responsibilities and actions required of county departments and other agencies in preparing for and responding to major emergencies and disasters,” to “ensure a coordinated response by local, state and federal governments,” to “provide a framework for coordinating, integrating, and administering the emergency operations plans and related programs of local, state, and federal governments,” and to “provide for the integration and coordination of volunteer agencies and private organizations involved in emergency response and relief efforts.” No specific management is stated that refers directly to the Arkansas River corridor. A county organized Incident Management Team is a new, currently unfunded team managed by the sheriff’s department for response to events outside of fire districts (Morrisey 2009a).

3.15.1.3 Local Emergency Services, Fire and Law Enforcement

a. Hospitals and Emergency Medical Service

Fremont County. The 51-bed St. Thomas Moore Hospital in Cañon City is the major medical facility in Fremont County. Emergency response providers include Arkansas Valley Ambulance (Coaldale), as well as American Medical Response (a national service with providers in Cañon City with 15 ambulances) in Cañon City, and Northwest Fremont EMS (two ambulances), located approximately 20 miles northwest of Cañon City.

The Fremont County Master Plan states that “emergency and normal medical services are provided through independent entities without public funding, with the exception of those associated with fire departments, Fremont County Search and Rescue, and Arkansas Valley Ambulance Service.”

Fremont County search and rescue is capable of swiftwater rescue, high angle rescue, rope rescue, mobile command, and searches for lost persons. The search and rescue team is comprised of 20 volunteers with a response time of about 2 hours. They are not first responders. Most members are trained in emergency medical response.

Chaffee County. The Heart of the Rockies Regional Medical Center in Salida underwent an expansion and now has 49 beds. Chaffee County EMS has six ambulances (three in Salida and three in Buena Vista) and is serviced by Flight for Life Air Service through a mutual aid agreement with Summit County when needed.

Chaffee County EMS (CCEMS) is responsible for coverage of only a small section of the proposed corridor; however, a mutual aid agreement is in place with Western Fremont and Fremont AMR to provide assistance covering calls that Western Fremont and Fremont AMR cannot cover. CCEMS has 27 crew members, 14 of which are Advanced Life Support (ALS) certified. The remainder are Basic Life Support (BLS) with IV certification.

b. Fire Protection

Bureau of Land Management. The BLM has its own wildfire management team, currently made up of ten permanent full-time firefighting staff, six permanent career seasonal staff, and thirteen seasonal staff.

The wildfire management team has three trucks. Equipment and personnel are based out of the Cañon City BLM office, and dispatched out of the Pueblo Interagency Dispatch Center in Pueblo. The BLM fire management team has a mutual aid agreement with Fremont County and will respond to fires outside of its jurisdiction. Additionally, the BLM also participates in a mutual aid agreement with Chaffee County. The BLM team is trained to work only on the suppression of wildfires.

The 2004 Royal Gorge Field Office Fire Management Plan authorizes fire management on BLM lands for resource benefit. Not all fires are managed for full suppression objectives. Additionally, the most recent revision in National Fire Policy (2009) allows the BLM and USFS to manage fires for multiple objectives, which includes full suppression and other strategies intended to benefit affected resources or enhance firefighter safety.

c. Fire Management Organization

The Fire Management Organization is an interagency entity, which includes the USFS and associated resources that are co-located in the same office. The existing Fire Management staff is made up of 9 permanent full-time and 19 seasonal personnel.

Fremont County. The area is mostly rural; therefore, a large majority of the Emergency Medical Technicians (EMT) and firefighters are volunteers and can respond only when available. As noted in Table 3-74, volunteer firefighters from multiple jurisdictions are trained in a wide array of response capabilities, ranging from wildland and structure fires to hazardous materials and swiftwater rescue. The Cañon City Fire Protection District (CCFPD), mostly volunteers, has two stations in Cañon City, which services a 122-square-mile area. The district owns and operates 1 ladder truck, 2 engines, 2 brush trucks, a converted Hazmat vehicle, 2 rescue trucks, 1 water tender, and 1 tanker. The CCFPD also serves as the Hazmat Response Team for Fremont County. The Tallahassee Volunteer Fire Protection Agency (TVFP) has 5 fire stations located within their 200-square-mile service area, which overlaps Parkdale within the Project Area. TVFP has 9 vehicles as well as 31 trained volunteers. The Florence Fire Protection District is outside the Project Area. Western Fremont Fire Protection District (WFFPD) has 5 engines and 15 firefighters, with 8 first responders trained to deliver pre-hospital medical care. The Deer Mountain Fire District includes the Cotopaxi Volunteer Fire Rescue, Coaldale Volunteer Fire Department, and a station at Texas Creek and covers 236 square miles of western Fremont County. This district includes 32 all volunteer members, 3 brush trucks, 2 tenders, and 2 attack tenders. The Indian Springs Volunteer Fire Department (Cotopaxi) and the Howard Volunteer Fire Department (Howard) are also located in Fremont County within the Project Area. Howard Volunteer Fire Department has five fire trucks made up of two brush trucks (500 gallon), two type-2 pumpers (1,200 gallon tender), and one 1,200 gallon tender. The department is staffed by 6 to 10 firefighters, all volunteer. The fire department works directly with

Arkansas Valley Ambulance when needed and has in the past provided backfill for other departments. Availability of water can be an issue for fire protection in Fremont County. Fremont County residents outside of Cañon City have wells for their water supply. There is no public water supply within the unincorporated parts of the Project Area. There is limited tanker service available for trucking water to holding tanks.

The Fremont Community Wildfire Protection Plan mainly refers to homeowners and would not affect the proposed project (Morrisey 2009a).

Chaffee County. Chaffee County Fire Protection District and Buena Vista Fire Department are outside the Project Area.

The South Arkansas Fire Protection District (SAFPD) includes the Salida Fire Department. No other fire protection services for Chaffee County overlap the Project Area. The service area extends from Salida downstream to Swissvale. The fire house for this area is located in Salida. Available resources include 14 response staff and 9 vehicles, including water tenders, pumpers, command vehicles, and rescue trucks. All staff are certified EMT-B IV, and are firefighter and hazardous and specialty rescue certified. There is no public water available in the west end of the proposed Project Area. Public water is available only within the city limits of Salida. There is no tanker service available for trucking water to holding tanks. The SAFPD has signed a mutual aid agreement with many of the agencies in the Project Area. As a result of the mutual aid agreement, SAFPD has been the response agency for multiple incidents in the Project Area.

Table 3-74. Emergency Responders By Type*

Ambulance
American Medical Response – Cañon City
American Medical Response – Fremont County
Arkansas Valley Ambulance
Chaffee County EMS
Northwest Fremont EMS, Inc.
Fire
Buena Vista Fire Department
BLM Royal Gorge Field Office
Cañon City Area Fire Protection District
Chaffee County Fire Protection District
Coaldale Volunteer Fire Department (Deer Mountain Fire Protection District)
Cotopaxi Volunteer Fire Rescue (Deer Mountain Fire Protection District)
Deer Mountain Fire Protection District (headquarters)
Florence Fire Protection District #1
Fremont County Sheriff's Office of Wildland Fire (for areas not covered by other fire districts)
Front Range Interagency Fire Staff (BLM & USFS)
Howard Volunteer Fire Department
Indian Springs Volunteer Fire Department
Penrose Volunteer Fire Department (Florence Fire Protection District)
Rockvale Volunteer Fire Department (Florence Fire Protection District)
Salida Fire Department (South Arkansas Fire Protection District)
Tallahassee Volunteer Fire Department

Williamsburg Volunteer Fire Department (Florence Fire Protection District)
Forest
Colorado State Forest Service – Cañon City District
Colorado State Forest Service – Salida District
Law Enforcement
Buena Vista Police Department
BLM Royal Gorge Field Office
Cañon City Police Department
Chaffee County Sheriff's Office
Colorado State Patrol – Troop 2A Post 2 (Cañon City)
Colorado State Patrol – Troop 2A Post 3 (Salida)
Colorado State Parks/AHRA
Florence Police Department
Fremont County Sheriff's Office
Salida Police Department

*Agencies that are adjacent to the Project Area were included as well, as they may potentially contribute resources

d. Law Enforcement

Colorado State Patrol

The CSP has offices in both Cañon City (Troop 2A Post 2) and Salida (Troop 2A Post 3). The CSP provides highway traffic enforcement, public safety, hazardous materials issues, and truck inspection services in the study area. The Cañon City office is staffed with 5 troopers and 1 sergeant, with 4 cars to patrol between Cañon City and Cotopaxi. There are typically 1 or 2 patrols of this area each day. The Salida CSP office is staffed with 2 troopers, 1 corporal, and 1 sergeant. These officers patrol the area between Salida and Cotopaxi about 1 or 2 times per day. In addition to their regular patrols, CSP officers in the Project Area are dispatched out of the Pueblo Dispatch Center to respond to emergencies and accidents. Each patrol car is equipped with new DTR and VHF radio as a backup. Neither radio system is fully reliable in the US 50 canyon area, with coverage gaps that were estimated at about 10% of the route. The CSP has a mutual aid agreement with all other law enforcement agencies in the area to deal with major accidents and other emergencies.

Fremont County Law Enforcement

The Fremont County Sheriff's Office is headquartered in Cañon City. The main sheriff's office has 18 deputies. There is a field office serviced by 4 deputies in Cotopaxi within the Project Area. The sheriff's office has a total staff of more than 80 people, including the deputies noted above, administrative personnel, and correctional officers. The sheriff's office is equipped with 30 patrol cars.

The Fremont County Sheriff's Office has primary jurisdiction for law enforcement in the Project Area. Currently, there is 1 deputy from the Fremont County Sheriff's Department that covers the entire Project Area in the evening (after 7 p.m.). According to the Fremont County Emergency Management Director Morrissey 2009a), this position may be a casualty of future budget cuts. Concerns were noted that the Fremont County Sheriff's Office is currently understaffed and underfunded for both law enforcement and the detention center (Biecker 2009).

Communication is a challenge in the canyon. In the approximately 60 miles of canyon, there are only approximately 5 miles of cell phone reception. However, 90% of the Fremont County responders should have DTR by the end of the summer of 2009. The process of adding the DTR system is prolonged because all programming is done at the state level (Morrissey 2009a).

Chaffee County Law Enforcement

The Chaffee County Sheriff's Office is headquartered in Salida; the county jail is also housed at this location. There is a field office in Buena Vista. The sheriff's department has 15 officers, including the sheriff and under-sheriff. Deputies are directed to respond to calls in conjunction with the Chaffee County EMS and fire department. The sheriff's office has 23 vehicles, including 18 patrol cruisers, and utilizes VHF and DTR radios for communication.

City Police Departments

Salida, Buena Vista, Cañon City, and Florence have their own police departments. Buena Vista and Florence are outside the Project Area. The Cañon City police department has approximately 47 employees, 35 of which are officers. The Salida Police Department has approximately 2 to 3 officers with 2 to 3 vehicles on duty per shift.

The specific capabilities and resources of the local response agencies are provided in Table 3-75.

Colorado Division of Wildlife

CDOW provides law enforcement for wildlife-specific laws and regulations on all public and private lands within the Project Area. CDOW has an area service center in Salida. Three District Wildlife Managers patrol the Project Area.

Colorado State Forest Service

The Colorado State Forest Service has district offices in both Cañon City and Salida; however, there are no Colorado State Forest Lands within the Project Area (Guralski 2009).

1 **Table 3-75. Response Agencies: Specific Capabilities and Resources (2009)**

Agency	Response Capabilities	Vehicle Resources	Staff Resources	Notes
South Arkansas Fire Protection District (SAFPD)	Structure Fire Wildland Fire Motor Vehicle Crashes Motor Vehicle Extrication Heavy Vehicle Extrication Emergency Medical Service (EMS) (basic life support [BLS]) Nontransport EMS (BLS) Nontransport Hazardous Materials (HAZMAT) Swiftwater Rescue Ice Rescue High Angle Rescue Rope Rescue Confined Space	Ambulances (0) Type1 Structure Engines (2) Command Vehicle (1) Hazmat Trailer (1) Heavy Rescue (1) 75' Quilt With Platform (1) Type 6 Engines (2) Type 2 Tactical Tenders (1)	14 response staff/certified EMT	
Western Fremont Fire Protection District (WFFPD)	Structure Fire Wildland Fire Traffic Flowing During Emergencies	Engines (5)	15 firefighters 8 first responders trained to deliver pre-hospital medical care	
Tallahassee Volunteer Fire Protection (TVFP)	Structure Fire Wildland Fire	Engines (5) Possible Access to Helicopter	10 firefighters	
Howard Volunteer Fire Department (HVFD)	Structure Fire Wildland Fire Traffic and/or Any Other Support Required/Requested	500-gallon Brush (2) Type 2 1,200-gallon Pumpers (2) 1,200-gallon Tender (1)	6-10 firefighters (all volunteer)	Work directly with AVA when needed and provide backfill for other departments. Response time is generally 6-10 minutes.
Deer Mountain Fire Protection District (DMFD)	Structure Fire Wildland Fire Motor Vehicle Crashes Medium Vehicle Extrication EMS Basic Life Support Nontransport (2 Stations)	Brush Trucks (3) Tenders (2) Attack Tenders (2)	32 members (all volunteer); approximately 10 people can respond on short notice, the remaining as available	Not directly in Project Area, but will respond to backup DMFD station 2 in Cotopaxi with 2-3 people. Cotopaxi Volunteer Fire is part of this district.
Cañon City Fire Protection District	Structure Fire Wildland Fire Motor Vehicle Crashes HAZMAT	Brush Trucks For Brush Type Fires (2) HAZMAT Truck (this is for the entire county except U.S. highways) (1) Rescue Trucks (2) Ladder Truck (1) Pumpers (1) Tender (1)	30 paid and 25 volunteer firefighters	

Agency	Response Capabilities	Vehicle Resources	Staff Resources	Notes
Chaffee County EMS	EMS BLS transport EMS Advanced Life Support (ALS) transport	Type I ambulances (4) with the ability to care 3 to 4 pts per ambulance Type II ambulance (1) QRV (1)	11 full-time and 16 part-time crew members, 14 are ALS and the remainder are BLS with IV certification 4 full-time staff 24 hours/day utilizing 2 ambulances; one on each end of the county serving Salida and Buena Vista	Only responsible for coverage for a small section of the project corridor but have a mutual aid agreement with Western Fremont and Fremont AMR to aid so long as an ambulance is available. Use 2 different radio systems: UHF and VHF; all of the CCEMS's paging and communication with dispatchers uses the UHF system and law enforcement and fire use the VHF system. Depending on the location of the incident in the canyon and which ambulance has to respond, anywhere from 5 minutes to an hour. For 2008 between May and August they ran 720 calls.
American Medical Response (AMR)	EMS BLS transport EMS ALS transport			
Arkansas Valley Ambulance (AVA)	EMS BLS transport EMS ALS transport			
Northwest Fremont EMS, Inc.	EMS BLS transport EMS ALS transport	2 ambulances, one with BLS capabilities and the other with ALS capabilities.		
Fremont County Search and Rescue (SAR)	Swiftwater Rescue High Angle Rescue Rope Rescue Mobile Command Search for lost persons		20 volunteers	Response time of about 2 hours.
Chaffee County Sheriff's Office	Law Enforcement Wildland Fire Protection	18 Patrol Cruisers	18 law enforcement staff	Trainings occur all year, including the summer. They use VHF and DTR radios and have a 3-10 minute response time to incidents in the canyon. They report that 3-4 rafting and car accidents usually occur during the summer months.

Agency	Response Capabilities	Vehicle Resources	Staff Resources	Notes
Colorado State Parks Arkansas Headwater Recreation Area (AHRA)	Law Enforcement	8 fully equipped vehicles.	5 full-time officers and 8-10 Title 33 temporary officers	When necessary, all rangers can take the appropriate law enforcement action necessary to protect our visitors, preserve the resource, and ensure compliance with other administrative regulations. AHRA rangers work closely with other local, state and federal peace officers. State Parks currently utilize DTR equipment.
Fremont County Sheriff's Office	Law Enforcement Wildland Fire Protection	30 Patrol Vehicles ~7 Unmarked Vehicles	37 law enforcement staff (consists of the Sheriff, Under-Sheriff, 4 detectives, and 30 officers used for routine calls for service, divided into two 12-hour shifts)	<p>Communication is via DTR radios. Response time to the canyon can vary substantially. Calls for service in the last two years have increased approximately 20% each succeeding year. There are no large event protocols in place.</p> <p>The Fremont County Sheriff's Office noted that it is underfunded and understaffed in both the patrol division and the detention center. There are concerns that insufficient 24-hour patrol coverage is currently being provided to area residents. The county has lacked sufficient funds to hire additional patrol staff since 2003, and positions are being eliminated.</p>
City of Salida Police Department	Law Enforcement	2-3 officers with 2-3 vehicles on duty per shift so any demand for more officers are on a call out basis		No jurisdiction in Project Area; will only respond for a request for mutual aid by either CSP or the Fremont County Sheriff's Office. Attend several trainings and special events throughout the summer, which would reduce our manpower at any given time. Depending on conditions, the average response time to a site in the canyon is 1-30 minutes. Communicates via cell phone and mobile radio and encounters many "dead" zones in the canyon where no communication is possible. The typical number of law enforcement responses during the summer months is 1-3.

Agency	Response Capabilities	Vehicle Resources	Staff Resources	Notes
Cañon City Police Department	Law Enforcement	17 marked police vehicles. Of those, 3 are SUV's. They also have 6 unmarked traffic/supervisor vehicles, 1 Harley Davidson Motorcycle for traffic and 2 dirt bikes for off-road enforcement activities.	35 sworn police officers which includes the Chief and two Captains	<p>No jurisdiction in Project Area; will assist Fremont County Sheriff's Office if necessary under a MOU that details the duties and responsibilities of their officers. Short-staffed the first weekend of May each year for annual blossom festival weekend and July 4th. Patrol officers work 12-hour shifts at this time and they are not interested in overtime for projects.</p> <p>Operate on the Statewide DTR system. Each of the 35 officers is equipped with portable DTR radios and 23 of their vehicles have mobile DTR radios. Typical travel response from Cañon City to Salida is 1 hour, 5 minutes. Department uses the National Incident Management System (NIMS) to manage large pre-planned events to establish goals, objectives, safety protocols, assignments, incident command center, etc. to handle incidents of this magnitude. Dispatched 23,156 police calls for service in 2007. Police officers handled approximately 4,100 separate criminal offenses during 2007. They made 1,570 arrests during that same year. May through September are the busiest months for the police department in relation to call for service demand.</p>

3.15.2 Current Management Considerations

The majority of the agencies in the Project Area are response-oriented with numerous medical, fire, and police responders. A multitude of agencies such as CSP, Fremont and Chaffee County sheriffs, and State Parks take pre-emptive action regarding public health and safety within the Project Area.

CSP typically services the Project Area with 1 or 2 patrols a day from Cañon City and Salida. The Fremont County sheriff typically has at least one deputy who covers the Project Area. While the Fremont and Chaffee County sheriffs as well as CSP respond to emergencies in the Project Area, both agencies also use preventative measures through the enforcement of traffic laws to mitigate the number of accidents.

The AHRA provides response service along the Project Area corridor and also engages in preventative fire and safety measures through the State Parks law enforcement arm. Law enforcement personnel provide preventative safety measures by the enforcement of not only the laws of the State of Colorado, but also the laws and regulations of State Parks and CDOW. AHRA personnel also inform the public about river safety as well as other State Parks safety concerns.

All agencies are challenged by funding and staffing limitations, which are unlikely to improve in the current economic environment. Communication is also an important emergency management issue due to the limitations of radio and cell phone coverage. Finally, the natural features of the area provide limitations to both routine and emergency transportation.

3.16 TRANSPORTATION AND TRAFFIC

The transportation issues raised by the Proposed Action and alternatives relate to the movement of people and goods within the regional setting of the project. Key transportation issues relate to motor vehicle traffic, safety, mobility, and access; railroad facilities, uses, and operations; and aircraft operations over and within the Project Area. More specifically, transportation considerations include:

- Traffic congestion
- Increased vehicle travel times
- Detours and alternate routes
- Increased accident rates or risks for automobiles, trucks, bicycles, and/or pedestrians
- Limits and/or constraints on residential, commercial, recreation, and/or school bus travel
- Limits and/or constraints on emergency vehicle response times and new demands for emergency service providers
- Possible uses of passenger rail services and airspace to accommodate visitors

3.16.1 Current Conditions and Trends

The following discussion presents information about the transportation network and related infrastructure, traffic congestion, safety, mobility, and access.

3.16.1.1 Transportation Network and Infrastructure

The Analysis Area for transportation and traffic issues is focused in central Colorado, but the context for understanding the role of US 50 in the regional roadway network encompasses the Interstate 80 (I-80) corridor in Wyoming, the Interstate 70 (I-70) and I-25 corridors in Colorado, and the Interstate 40 (I-40) corridor in New Mexico.

a. National, State, Regional, and Local Setting

Roads

I-80, I-70, and I-40 provide primary east-west access across the U.S. in Wyoming, Colorado, and New Mexico, respectively. US 50 is another key east-west corridor across the country. In Colorado, US 50 connects to Grand Junction and I-70, Pueblo and I-25, and to several towns in eastern Colorado, such as La Junta and Lamar.

The primary roads in the regional roadway network include I-25, US 50, US 285, US 24, and SH 9, 17, 115, 96, 69, 67, 160, and 291. Other important roads include a variety of county roads in the Analysis Area of US 50 between Cañon City and Salida. The key county roads include High Park Road (to Cripple Creek), CR 1A (from Cotopaxi to SH 69), CR 3 (back side of Royal Gorge), and CR 3A (main entrance to Royal Gorge). Other county roads include CR 2 (from SH 9 to Chaffee County north of the river), CR 12 (from Cotopaxi to CR 2), CR 28 (from Royal Gorge south toward SH 69), and CR 45 (from Wellsville to Coaldale). The major roadways can be seen Map 1-1.

US 50 is the most important roadway in the OTR Analysis Area, and therefore the primary focus of the following discussions. However, other roadways in the Analysis Area are important in relation to routes that are used to access US 50, alternate routes to US 50, and possible detour or evacuation routes when US 50 is closed or capacity is limited by accidents, construction activity or natural phenomena, such as snow, avalanche, landslide, rockfall, or flooding.

The roads other than US 50 in the Analysis Area handle traffic associated with residential, commercial, and industrial development and tourism. These roads typically operate with traffic volumes below capacity, and delay is generally limited to isolated locations and incidental occurrences.

There are no weekday or weekend morning peak periods, except in the vicinity of Colorado Springs. Seasonal traffic peaks occur in the summer months in relation to tourism.

The following is a brief description of the roadway characteristics in the Analysis Area as classified by CDOT. Characteristics vary depending on exact location.

- SH 9 – Rural, two- to four-lane mountainous or rolling highway. Average Daily Traffic (ADT) volumes range from 600 to 1,500.
- SH 17 – Rural, two-lane mountainous, rolling, or flat highway. ADT volumes range from 1,100 to 4,000.
- US 24 – Ranges from an urban, four-lane rolling highway near Colorado Springs to a rural, two- to four-lane mountainous or rolling highway traveling west towards the junction with US 285. ADT volumes range from 1,400 to 43,000.
- SH 67 – Rural, two-lane rolling highway. ADT volumes range from 1,600 to 4,000.

- SH 69 – Rural, two-lane rolling highway. ADT volumes range from 500 to 3,800.
- SH 96 – Ranges from an urban, two- to four-lane rolling highway near Pueblo to a rural, two-lane mountainous or rolling highway traveling west towards the junction with SH 69. ADT volumes range from 1,000 to 32,000.
- SH 115 – Ranges from an urban, two- to four-lane rolling highway near Colorado Springs to a rural, two- to four-lane rolling highway traveling south towards the junction with US 50. ADT volumes range from 4,300 to 32,500.
- SH 160 – Rural, two- to four-lane mountainous, rolling, or flat highway. ADT volumes range from 1,000 to 21,600.
- US 285 – Rural, two- to four-lane mountainous, rolling, or flat highway. ADT volumes range from 1,600 to 7,100.
- SH 291 – Rural, two-lane rolling or flat highway. ADT volumes range from 3,200 to 4,600.

US 50 is an important national, state, regional, and local roadway providing: a route for interstate commerce; primary access between Grand Junction, Montrose, Salida, Cañon City, and Pueblo; and a key route for travel along the Arkansas River in the mountainous areas west of Pueblo. If US 50 is inaccessible due to weather, landslide, motor vehicle accident, or for other reasons that can result in closure, the best alternate routes increase mileage and travel times for motorists.

The lane, median, and shoulder characteristics of US 50 change substantially between Pueblo (where the roadway passes through urban areas) and Grand Junction. Between Cañon City and Salida, US 50 is primarily a two-lane undivided highway with occasional passing lanes, at-grade signalized and unsignalized intersections, pullouts with parking, and small pulloffs. Lane widths are 12 feet and shoulders vary, but can be as narrow as 2 feet in areas where the topography dictates. Maps 3-83 and 3-84 present the features of US 50 between Parkdale and Texas Creek and Texas Creek and Salida, respectively (lane configurations, key intersections, passing lanes, pullouts and pulloffs).

Bus Transit

Greyhound Bus Line provides limited scheduled service for a large number of locations that do not support a full-service terminal or agency. Greyhound has one of these limited bus stops located in Salida.

Also, the school districts of Salida, Cotopaxi, and Cañon City utilize US 50 in the Analysis Area. The Salida and Cotopaxi school districts operate bus service in the Project Area, while the Cañon City School District is outside of the Project Area limits.

The Cotopaxi School District's limits encompass MM 232 in Howard to MM 260 near Spikebuck. All five Cotopaxi routes access US 50 in the mornings and afternoons. There are two westbound routes and three eastbound routes from the school, which is located near MM 246. The routes run between MM 232 in Howard with a turnaround at the Broken Arrow to MM 253 at Texas Creek, then continuing south on SH 69. Cotopaxi has 16 assigned stops on US 50 on the morning and afternoon routes. A total of 13 stops are located on the westbound routes in Coaldale and Howard. A total of three stops are located on the eastbound route toward Texas Creek. Buses access US 50 Monday through Thursday, from approximately 6 a.m. to 8 a.m. and 4 p.m. to 6 p.m. According to Dean Ward, Transportation Director for the Cotopaxi School District, a total of 212 of 223 students are currently assigned to the five bus routes, and actual ridership typically equates to about 80% of the assigned students (170 riders).

The Salida School District operates as far east as MM 230 by Swissvale. They operate one route in the Project Area in the morning and afternoon from approximately 6 a.m. to 8 a.m. and 4 p.m. to 6 p.m., as well as one kindergarten mid-day route. The only stop on US 50 in the Project Area is in front of the Frontier Café located in Howard. According to Kay Blum, Director of Transportation for the Salida School District, a total of 17 students use this bus service.

Freight Rail

Freight rail tracks exist in the Analysis Area and along the Arkansas River and US 50, as shown in Maps 1-2 and 1-3. The tracks in the Project Area are owned by UPRR and at this time, they are not being used for freight transportation. Consultation with UPRR indicates that substantial track bed, rail, signal, and other improvements and corresponding permitting would need to be completed before the anticipated route would be ready for freight operations and/or passenger service. An extensive examination of the conditions of the track bed, rail, and related systems would be needed before a detailed program of improvements and corresponding costs could be determined. UPRR anticipates that central traffic control, a specialized method for controlling trains and signals, would be required as part of the improvements necessary to run trains on this section of track in the future. Use of these tracks for passenger rail service would require permission from UPRR.

Passenger Rail

Passenger rail service is provided in the Analysis Area. The existing service provides tourists with a trip into the Royal Gorge area from a train depot in Cañon City (see Map 3-85). The route is a one-way linear alignment to a location near Parkdale, with a reverse operation on the way back on the same tracks (no turnaround). Rail passengers are not allowed to exit their railcars at any point. Large windows and “open air” railcars provide desirable views.

Ticket prices for adults and children in 2009 range from \$32.95 to \$57.95 and \$21.50 to \$46.50, respectively. There are various classes of service offering varying levels of food, drink, and entertainment. High-end services can cost \$110 per person.

There are up to 17 cars available on this route. Each car has a passenger limit, but the railcar limits vary. Three departures are offered per day, with an additional evening trip. Demand for existing seats on Royal Gorge trains is high in the summer months, and is typically highest in July and early August.

Airports, Heliports, and Airspace Use (Commercial, Private, Military)

Public, private, and military airports and heliports are found throughout the region. Denver International Airport is located 130 miles from Cañon City. Colorado Springs International Airport is located 50 miles from Cañon City. The U.S. Air Force Academy is also located in Colorado Springs and has an active airfield.

There are also smaller airports and heliports located closer to the Project Area. Fremont County Airport is located southeast of the intersection of US 50 and SH 67 in Cañon City. Air traffic using this airport includes single, multi-, and jet engine aircraft, as well as helicopters, ultra-light aircrafts, and gliders.

Brown’s Fort Heliport is located on US 50 just outside of Cañon City. It operates from November-March, 7 days a week, from 8 a.m. to 7 p.m. It supports one helicopter and does not allow low altitude flyovers.

All aircraft in the Analysis Area are required to adhere to the Federal Aviation Administration (FAA) regulations; in particular, Part 91 and subsequent subparts, which outline general operating and flight rules. NOTAM may be distributed to alert aircraft pilots of any hazards enroute or at a specific location. NOTAM's would alert pilots to any of the following:

- Hazards, such as air shows, parachute jumps, kite flying, rocket launches, etc.
- Temporary Flight Restrictions (TFRs)
- Closed runways
- Inoperable radio navigational aids
- Military exercises with resulting airspace restrictions
- Inoperable lights on tall obstructions
- Temporary erection of obstacles near airfields (e.g., cranes)
- Passage of flocks of birds through airspace
- Notifications of runway/taxiway/apron status with respect to snow, ice, and standing water
- Notification of an operationally significant change in volcanic ash or other dust contamination

NOTAM's would supersede normal FAA regulations.

3.16.1.2 Traffic

The following discussion presents information about traffic volumes, levels of service, and travel times.

a. Traffic Volumes

Trip Generation, Origins, and Destinations/Attractions

Trip generation in the Project Area is attributed to residential, commercial, institutional, recreational land uses, and/or opportunities. Cañon City and Salida are tourist attractions, along with the Arkansas River, BLM lands, and the facilities and services associated with the Royal Gorge Bridge and railroad. Most trips along US 50 between Cañon City and Salida are through trips with few to no stops within the Project Area. The number of stops and percentage of vehicles stopping within the Project Area increases between May and September, when more tourists are using US 50 and stopping at fishing areas, rafting sites, restaurants, shops, and other establishments in the Project Area.

Traffic Volumes, Vehicle Mix, Roadway Characteristics

Traffic data from 2008 was collected from CDOT's permanent traffic count station #000248, which is located west of Coaldale. The 2008 data was compared to similar 2005 data collected and reported in the Over the River Project Traffic Operations Analysis report prepared by David Evans and Associates, Inc. (June 2006). Comparing the 2005 traffic volumes to the 2008 traffic volumes shows there has been little to no growth in the Project Area. Therefore, the 2005 traffic volumes will be considered as the local existing background traffic so not to duplicate previous analysis.

Table 3-76 shows the local traffic volumes for different segments of US 50. Table 3-77 shows automobile/truck vehicle mix percentages on US 50. Table 3-78 shows the roadway characteristics on US 50.

Table 3-76. Background Traffic Volumes for Segments of US 50

US 50 Roadway Segment	Peak Summer Weekend Daily Traffic Volumes
West of Coaldale	5,150
West of CR 1A	6,350
East of CR 1A	6,400
West of SH 69	5,250
East of SH 69	5,200
East of CR 3	5,350
West of SH 9	7,550
East of SH 9	9,150
West of CR 3A (Royal Gorge)	9,800
East of CR 3A (Royal Gorge)	11,450
West of SH 115	18,400
East of SH 115	9,900

Source: CDOT ATR #000248

Table 3-77. US 50 Vehicle Classification Data

Vehicle Type/Class	Peak Summer Weekend Percent
Cars	93.7%
Motorcycles	0.9%
Recreational Vehicles	1.1%
Buses	0.3%
Trucks	4.0%
Totals	100%

Source: CDOT ATR #000248

Table 3-78. US 50 Roadway Characteristics

US 50 Roadway Segment	Length	Characteristics	Posted	Shoulder
Parkdale to Texas Creek	2.5 miles	3-lane (1 EB, 2 WB)	45-50 mph	2 ft. both directions
	1.2 miles	3-lane (2 EB, 1 WB) e/o Texas Creek		
	9.1 miles	2-lane (P = .2 mi, NP = 6.8 mi, AP = 2.1 mi)		
	12.8 miles total			
Texas Creek to Cotopaxi	2.7 miles	3-lane (1 EB, 2 WB)	55 mph	2 ft. both directions
	3.9 miles	2-lane (P = .3 mi, NP = 1.5 mi, AP = 2.1 mi)		
	6.6 miles total			
Cotopaxi to Salida	1.0 mile	3-lane (1 EB, 2 WB)	35-50 mph	0-4 ft. (1-2 ft. average)
	20.1 miles	2-lane (P = 2.3 mi, NP = 7 mi, AP = 10.8 mi)		
	21.1 miles total			

Source: David Evans & Associates

EB = East Bound

WB = West Bound

P = Passing

NP = No Passing

AP = Alternate Passing

b. Levels of Service

Roadway Level of Service

As described in the Over the River Project Traffic Operations Analysis (June 2006), the roadway segments comprising the US 50 corridor are generally two lanes west of Cañon City and four lanes east. The *Highway Capacity Manual - TRB 2000* (HCM) bases the capacity analysis for highways like US 50 in the Project Area (Class I two-lane highway) on average travel speed, percent time spent following, and capacity utilization. Average travel speed is calculated for the entire segment and reflects the speeds of both directions of travel. Percent time spent following represents the freedom to maneuver and the comfort and convenience of travel. It is a measure of “platooning” on the roadway, and is impacted by the number of passing zones, range in travel speeds, and distribution of vehicle types. Capacity utilization measures the ratio of the demand flow rate to the capacity of the facility. On highways like US 50, motorists expect to travel at relatively high speeds. US 50 in the Project Area is a major intercity route, primary arterial connecting major traffic generators, daily commuter route, and a primary in-state and national highway link.

The relationship between the volume and capacity of a facility is reported through Level of Service (LOS). LOS is a qualitative measure that ranges from LOS-A, describing the highest quality of traffic flow, to LOS-F, describing heavily congested flow with traffic demand exceeding the capacity of the roadway.

Table 3-79 presents definitions of LOS-A through F for two-lane highways and unsignalized intersections.

Table 3-79. Levels of Service (LOS) Definitions

CLASS I TWO LANE HIGHWAYS

A	Average speed is in excess of 55 mph. Motorists are able to drive at their desired speed. Passing demand is well below passing capacity, platoons of three or more vehicles are rare. Percent time following is not greater than 35%.
B	Average speed is at least 55 mph. Passing demand needed to maintain desired speeds becomes significant and approximates the passing capacity. Percent time following is no greater than 50%.
C	Average speed is at least 45 mph. There are noticeable increases in platoon formation, platoon size and frequency of passing impediments. Passing demand exceeds passing capacity. Percent time spent following is no greater than 65%
D	Average speed is at least 40 mph. Traffic flow is unstable. Passing demand is high, while passing capacity approaches zero. Mean platoon sizes of 5-10 vehicles are common. Turning vehicles and roadside distractions cause major shock waves in the traffic stream. Percent time spend following is no greater than 80%.
E	Average speed drops below 40 mph. Passing becomes virtually impossible and platooning becomes intense as slower vehicles or other interruptions are encountered. Percent time spent following is greater than 80%.
F	Traffic flow is heavily congested with traffic demand exceeding capacity. Passing demand is high, yet no opportunities are available.

UNSIGNALIZED INTERSECTIONS

Level of Service	Delay Range (in seconds)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Source: Transportation Research Board 2000

Table 3-80 shows the existing roadway LOS for segments of US 50 during the weekend mid-day peak hour.

Table 3-80. Existing (2008) Roadway Level of Service

Roadway Segment	Weekend Mid-Day Peak Hour		
	Average Travel Speed (mph)	Percent Time Spent Following	Level of Service
West of Coaldale	51.5	52.5	C
West of CR 1A	50.4	59.0	C
East of CR 1A	50.5	58.5	C
West of SH 69	50.9	56.4	C
East of SH 69	50.8	57.4	C
East of CR 3	50.8	57.0	C
West of SH 9	50.1	60.7	C
East of SH 9	48.7	67.1	D
West of CR 3A	49.3	64.6	C
East of CR 3A	46.6	74.3	D

Weekend Mid-Day Peak Hour			
Roadway Segment	Average Travel Speed (mph)	Percent Time Spent Following	Level of Service
West of SH 115	59.5	6.9	A
East of SH 115	59.5	4.1	A

Source: OTR 2006

pc/mi/ln = passenger cars per mile per lane

As shown in Table 3-80, all roadway segments were operating at an acceptable Level of Service (LOS-D or better) in the year 2008.

Intersection Level of Service

Currently, there are no signalized intersections in the Project Area. The HCM bases the capacity analysis for unsignalized intersections on the average control delay per vehicle. For two-way stop controlled intersections, control delay is estimated for each minor (yielding) movement. The delay to side street movements is generally controlled by the availability of gaps in the major street (US 50) traffic. LOS is again used to report operational performance. For two-way stop controlled intersections, LOS is defined as a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Similar to LOS on roadways, six categories categorize operating performance with LOS-A, representing the best operating conditions, and LOS-F, the worst (see Table 3-79).

Table 3-81 shows the weekend mid-day peak hour delay, volume, and LOS for the worst case approach, as detailed in the table. Existing turning movement volumes and intersection geometry characteristics were used in the analysis.

Table 3-81. Existing (2005) Intersection Level of Service

Weekend Mid-Day Peak Hour				
Intersection	Delay (sec)	Approach	Volume (veh/hr)	Level of Service
US 50 at SB US 285	20.0	SBL	183	C
US 50 at NB US 285	23.6	WBL	134	C
US 50 at CR 1A	14.0	NB	27	B
US 50 at SH 69	10.2	NB	30	B
US 50 at CR 3	9.5	NB	58	A
US 50 at SH 9	13.1	SBL	72	B
US 50 at 3A	37.3	NBL	47	E
US 50 EB at SH 115	18.8	EBL	264	C
US 50 WB at SH 115	18.8	WBL	55	C

Source: OTR 2006

NBL = North Bound Left Turn
WBL = West Bound Left Turn

SBL= South Bound Left Turn
NB = NB

EBL = East Bound Left Turn
veh/hr = vehicles per hour

As shown in Table 3-80, only the existing unsignalized intersection at US 50 and CR 3A performed at an unacceptable LOS (LOS-D or below) in the year 2008. This is due to a high volume of vehicles traveling northbound on CR 3A and turning left onto westbound US 50. The analysis performed in the Over the River Project Traffic Operations Analysis report shows the vehicles making this turning movement experience an average delay of 37 seconds. All other analyzed intersections performed at acceptable LOS (LOS-C or better) in the year 2008.

c. US 50 Travel Times

Travel times along US 50 are relatively steady and reliable, except during hazardous weather conditions or delays caused by an accident, construction, or slow moving vehicles. Travel times between Cañon City and Salida are typically characterized by travel at or near the posted speed limit. Travel between the two cities (58 miles) typically takes about one hour and ten minutes. The Project Area is approximately 42 miles long and the travel time through the Project Area is estimated to be 55 minutes.

Incremental travel times accounting for the 55-minute travel time are as follows:

WB	WB	EB	EB
Fremont Road to SH 9	1.9	County Line to Howard	2.1
SH 9 to SH 69	21.3	Howard to SH 69	19.7
SH 69 to Howard	20.9	SH 69 to SH 9	22.6
Howard to County Line	11.3	SH 9 to Fremont Road	10.1
TOTAL	55.4	TOTAL	54.5
Cañon City to Salida	61	Salida to Cañon City	61

3.16.1.3 Traffic Safety

a. US 50 Roadway Accident Data

In September 2008, CDOT performed a safety assessment report of US 50. The primary intent of the report was to aid CDOT Regions 2 and 5 in their assessment of US 50 from MM 221.00 to 275.00, which includes the entire Project Area. The report analyzed accident data history for a period of five years (January 1, 2000 through December 31, 2004).

The analyzed portion of US 50 was broken into 15 segments of varying lengths and analyzed individually. The Project Area is included in 12 of the 15 segments. When comparing each segment individually and considering total accidents, the safety assessment indicates that the majority of the segments exhibit accident frequency that is well within the expected range when compared with other rural mountainous two-lane highways in Colorado. The same outcome can be said when analyzing injury plus fatality accidents.

Although each segment exhibits accident frequency within the expected range, there are isolated locations and accident types that stand out. Table 3-82 presents traffic safety information for US 50 based on the pattern recognition analysis done in the safety assessment study. The table provides a summary of the accident types with higher than expected frequency when compared to similar rural mountainous, two-lane highways, and notes the factors and comments associated with those types. It should be noted that

the safety study only assessed the accident history and provided general suggestions on appropriate ways of mitigating a particular accident type.

Table 3-82. Higher than Expected Accident Frequency on US 50 by Specific Location and Accident Type

US 50 Roadway Segment	TOTAL – PDO/INJ/FAT	Accident Types (concentrated)	Factors
1 – MM 222.67 to MM 227.15	43 – 30/12/1	Embankment, guard rail, head-on	Driver unfamiliarity, adverse road conditions, fell sleep
2 – MM 227.22 to MM 230.0	31 – 20/11/0	Embankments, rear-ends	Driver unfamiliarity, adverse road conditions
3 - MM 230.01 to MM 233.35	36 – 16/18/2	Overtuning, head-on, fixed object (guard rail and boulders)	Adverse road conditions
4 - MM 233.65 to MM 235.26	17 – 12/5/0	Wild animal (234.0-235.2)	<i>(No pattern)</i>
5 - MM 235.72 to MM 239.37	22 – 12/9/1	Wild animal (235.9-238.3), overturn	Adverse road conditions, narrow clear zone (geometry)
6 - MM 239.41 to MM 242.07	32 – 20/12/0	Fence (239.4-241.4), wild animal (239.9-241.9)	Narrow clear zone (geometry)
7 - MM 242.13 to MM 245.38	30 – 17/12/1	Guard rail, overturns (242.7-244.4)	<i>(No pattern)</i>
8 - MM 245.42 to MM 249.0	29 – 16/12/1	Overtun (245.7-247.4)	<i>(No pattern)</i>
9 - MM 249.01 to MM 252.57	19 – 16/3/0	Large boulder, wild animal (250.1-252.5)	At night, unlighted
10 - MM 252.71 to MM 257.0	18 – 10/8/0	Embankment, guard rail	Adverse road conditions
11 - MM 257.01 to MM 262.0	34 – 21/12/1	Rocks in roadway, guard rail, large boulders	Adverse road conditions
12 - MM 262.01 to MM 267.29	40 – 21/19/0	Large boulder, embankment (262.9-265.2)	Adverse road conditions

Source: CDOT 2008

(262.9-265.2) = Mile Marker References Along US 50

MM = Mile Marker

PDO = Property Damage Only

INJ = Injury

FAT = Fatality

b. Other Accident Data

There has been some concern expressed about the segment of the Project Area with multiple curves between MM 229.5 and MM 231.5, east of the Chaffee County line. As presented in the Over the River Project Traffic Operations Analysis (June 2006), there were a total of 26 crashes within that segment of the corridor in the three-year study period. The location between MM 230 and MM 231 has a series of back-to-back horizontal curves that have influenced numerous truck rollovers and cross-over accidents. In 2008, CDOT Region 5 received a Rural Innovation Safety Grant from FHWA to implement dynamic messaging signs to warn drivers of the tight curvature of the roadway to reduce vehicle and truck accidents. Additionally, CDOT has improved the guardrail in the MM 230-231 area to prevent heavier vehicles from leaving the roadway.

Some characteristics of these segment crashes are shown in Table 3-83.

Table 3-83. US 50 Accident Characteristics (MM 229.5-MM 231.5) (2001-2003)

	Number of Crashes	Percent of Total Crashes
Number of Vehicles		
Single Vehicle	21	81%
Multiple Vehicle	4	15%
Unknown	1	4%
Season		
Winter (December - February)	7	27%
Spring (March - May)	4	15%
Summer (June - August)	5	19%
Fall (September - November)	10	38%
Pavement Condition		
Dry	18	69%
Wet	1	4%
Snowy/Icy	6	23%
Unknown	1	4%
Lighting Condition		
Daylight	15	58%
Dark-Unlighted	9	35%
Dusk/Dawn	1	4%
Unknown	1	4%
Accident Type		
Overturning	5	19%
Head-on	2	8%
Rear-end	1	4%
Culvert	1	4%
Guard Rail	4	15%
Embankment	3	12%
Sideswipe	1	4%
Not Reported	9	35%
Contributing Factor		
None Apparent	14	54%
Asleep	2	8%
Driver Inexperience	1	4%
Driver Preoccupied	4	15%
Unfamiliar Driver	3	12%
Driver Emotionally Upset	1	4%
Unknown	1	4%

Source: OTR 2006

In summary, the regional roadways and key intersections have accident rates that are within the normal range for similar roads.

c. Road Rage

Road rage is aggressive or angry driver behavior. This behavior may include rude gestures, verbal insults, deliberately driving in an unsafe or threatening manner, or making threats. Road rage can lead to altercations, assaults, and collisions, which result in injuries and even deaths. Road rage is considered an extreme case of aggressive driving. Examples of road rage exist in Colorado and elsewhere.

3.16.1.4 Mobility and Access

The following discussion briefly describes issues involving the ability of motorists to move within the Project Area and Analysis Area and to access public and private properties.

a. National, State, and Regional Issues

The U.S. Interstate System and U.S. Highway System provide high-level mobility and access across the U.S. These systems handle the vast majority of interstate travel and intrastate commerce (freight truck traffic). US 50 serves a role in intrastate and interstate travel and is a key regional access route in central Colorado.

b. Residential and Business Issues

US 50 is the only access route for many residents and businesses and, in some instances, is the only available access route. Disruptions of traffic flow on US 50 and/or across the Arkansas River can have substantial mobility and access impacts, including economic and fiscal effects if the disruptions alter travel volumes for an extended period of time.

c. Emergency Access

Map 1-1 presents the regional roadway network. This figure also clarifies potential US 50 detours and evacuation routes, which could be used by the traveling public as evacuation routes or by police cars, fire trucks, and ambulances in the event that US 50 is closed. These alternate routes add travel time for travelers and emergency service personnel during US 50 closures.

d. Parking (Along US 50)

Parking in the Project Area involves informal turnouts, pulloffs, and formalized parking areas. The formalized parking is associated with retail and other commercial establishments, and various recreational facilities and resources.

Parking demand is higher between May and September, and is typically highest in May and late August for angling activities and late June, all of July, and early August for white-water boating activities. Existing facilities typically are able to handle peak demand for parking. Some overflow can occur on summer weekends for short periods of the day.

3.16.2 Current Management Considerations

The following discussions summarize current management considerations associated with transportation issues. The key agencies and organizations include the BLM, CDOT, CSP, and UPRR. These discussions summarize the discussions presented in the Draft Analysis of the Management Situation for the Over the River Project, dated June 2009.

3.16.2.1 Bureau of Land Management

a. Responsibilities and Procedures

The BLM's responsibilities and procedures for managing transportation and transportation issues are set forth in the RGFO RMP.

b. Plans, Policies, Goals and Objectives

BLM's management objective for transportation and traffic is to improve and maintain the transportation system, to facilitate public access and administrative monitoring, as well as minimize roads on BLM-administered lands (BLM 1995). BLM's management actions focus on roads and trails that are not managed by other federal agencies (Federal Highway Administration [FHWA]), CDOT, local governments (counties and cities), or private property owners. The management actions address the need to match BLM maintenance and access controls (open, closed, or limited) with public access needs and appropriate resource management.

3.16.2.2 Colorado Department of Transportation

a. Responsibilities and Procedures

CDOT is responsible for a 9,161-mile highway system, including 3,775 bridges. Each year, this system handles over 28.6 billion vehicle miles of travel. CDOT maintains the highway system, supports aviation interests statewide, provides assistance to numerous transit systems, and helps local law enforcement agencies with special funds.

CDOT's vision is "to enhance the quality of life and the environment of the citizens of Colorado by creating an integrated transportation system that focuses on moving people and goods by offering convenient linkages among modal choices." CDOT's mission is "to provide the best multi-modal transportation system for Colorado that most effectively moves people, goods, and information."

b. Governing Plans, Programs, and Policies

CDOT, along with Metropolitan Planning Organizations (MPOs), Transportation Planning Regions (TPRs), regional and local governments (cities, counties, and special districts), the FHWA, Federal Transit Administration, Federal Railroad Administration, and FAA oversee transportation planning, programming, design, construction, and operation of transportation facilities in Colorado.

CDOT's Rural Liaison Planning Unit (RPU) coordinates planning efforts for Colorado's 15 TPRs. There are 10 rural TPRs and 5 urban TPRs, also called MPOs. The RPUs coordinate efforts with planning staff in each of CDOT's six regions, discussing planning policy and ensuring consistency around the state. The Project Area is located within TPR 14 Central Front Range and TRP 8 San Luis Valley. CDOT Regions 2 and 5 share the responsibilities for US 50 and the state roadway network in the Project Area. Region 2 covers over 90% of the US 50 corridor between Cañon City and Salida and the surrounding roadway network. Region 2 is taking the lead on the project, but Region 5 is also involved.

CDOT's Statewide Planning and Support Unit coordinates planning efforts for inclusion in the Long Range Statewide Transportation Plan, as well as the State Transportation Improvement Plan (STIP). Current efforts include working with the Transportation Commission and CDOT's Regional / MPO Planning Unit on an update to the 2030 Statewide Transportation Plan Moving Colorado - Vision for the Future. The

improvements in the current plans are summarized in the following discussion under the heading Management Actions.

On February 17, 2009, President Obama signed the American Recovery and Reinvestment Act of 2009 (ARRA). As a result, Colorado will receive over \$500 million for transportation projects statewide, with CDOT receiving approximately \$330 million in federal highway funding and another \$12.5 million in federal transit funding for transit projects in nonurbanized rural areas. The ARRA will also provide the additional transportation funding directly to transit agencies and the three large MPOs in the state (Denver Regional Council of Governments, Pikes Peak Area Council of Governments, and the North Front Range Metropolitan Planning Organization) for their prioritized projects. As a requirement of ARRA, CDOT must have 50% of its funding committed to projects within 120 days. The ARRA improvements in the Analysis Area are summarized in the following discussion under the heading Management Actions.

c. Management Actions

State Transportation Improvement Plan (STIP)

Based on a review of the most recently approved Pueblo Area Council of Governments / Transportation Planning Region 2008-2013 Transportation Improvement Program (TIP) and the CDOT 2008-2013 STIP, there are no substantial projects anticipated between 2009 and 2014 that would impact US 50 between Cañon City and Salida, either positively or negatively. There are many projects that would impact key roads, which could be used as alternative routes. Most of these projects are resurfacing projects, bridge repair projects, or isolated safety improvements.

American Recovery and Reinvestment Act of 2009 (ARRA)

The only project in the list that involves roadways in the Analysis Area is 12.5 miles of asphalt resurfacing of US 24 and US 285 in and near the US 24/US 285 intersection, Johnson Village, and the Central Colorado Regional Airport.

d. Regular and Scheduled Activities and Timeframes

In addition to management actions that are planned and programmed within the STIP or are being advanced as a result of ARRA, CDOT operations and maintenance include various actions that relate to the roadway network, such as routine and emergency snow and rock removal and emergency road repair. These activities are routine and scheduled in advance, or are implemented in response to unanticipated or unplanned events.

e. Guidance

CDOT guidance covers a wide range of topics, from asphalt paving to environmental impact documentation to interchange design. The primary guidance includes:

- CDOT "Standard Specifications for Road and Bridge Construction, 2005"
- CDOT "M&S Standard Plans, 2006"
- CDOT "Roadway Design Guide, 2005"
- American Association of State Highway and Transportation Officials "Roadside Design Guide, 2004"

- American Association of State Highway and Transportation Officials “Geometric Design of Highways and Streets, 2004”
- U.S. Department of Transportation “Manual of Uniform Traffic Control Devices for Streets and Highways, 2009”

3.16.2.3 Colorado State Patrol

a. Responsibilities and Procedures

CSP is one of five divisions of the Colorado Department of Public Safety (CDPS). The mission of the CDPS is to provide a safe environment in Colorado by maintaining, promoting, and enhancing public safety through law enforcement, criminal investigations, fire and crime prevention, recidivism reduction, and victim advocacy. The CDPS also provides professional support of the criminal justice system, fire safety community, other governmental agencies, and private entities. Throughout, the CDPS goal is to serve the public through an organization that emphasizes quality and integrity.

b. Governing Plans, Programs, and Policies

CSP led the state’s remarkable improvements in traffic safety during the last three years, recording the nation’s greatest reduction in traffic fatalities among states. Figures for 2006 reflect a continuing trend of improvement while the nation experienced additional traffic deaths. CSP’s accomplishments result from targeting sections of highway with the highest rates of unsafe driver behavior.

CSP is a progressive law enforcement agency and relies heavily upon state-of-the-art technology, such as in-car video cameras, mobile data computers, DTR systems, and laser speed measuring devices to perform its traffic safety mission. CSP has committed to a safe and secure future for the citizens of Colorado, and will contribute to that future through:

- Building partnerships with citizens and communities to enhance public safety.
- Building partnerships with other state, county, and municipal agencies to enhance law enforcement services in the state.

3.16.2.4 Union Pacific Railroad

UPRR parallels the Arkansas River throughout the proposed Project Area. This portion of the rail line is currently inactive, and UPRR has indicated that the line is not anticipated to become active in the foreseeable future. The line has not been abandoned but has been “rail banked,” which is an important distinction. The line has not been operational since the mid-1990s.

If the tracks were to be reactivated, a substantial amount of upgrade to the track, along with signals and other infrastructure would be required at a significant cost.

UPRR does not allow public access to rail corridors and requires fencing, in some cases, to prevent public access. Special arrangements and requirements apply to passenger service operations if they occur on UPRR tracks.

3.16.2.5 Other

The responsibilities and procedures of the Fremont County Sheriff, Chaffee County Sheriff, Salida Police and Fire Departments, Cañon City Police and Fire Departments, and county emergency response providers

are discussed in Section 3.14, Socioeconomics, Social Impacts. Sheriff and police services provide important traffic control and safety services in support and in cooperation with CSP.

3.17 HAZARDOUS MATERIALS

The study area for hazardous materials encompasses the 8 proposed panel areas and the primary transportation route within the area along US 50 that parallels the Arkansas River. The affected environment for hazardous materials includes air, water, soil, and biological resources that potentially could be affected by an accidental release of hazardous materials during transportation by the proponent to and from the study area, and during storage and use or other activity within the study area.

3.17.1 Current Conditions and Trends

3.17.1.1 Hazardous Materials to be Used In the Project

The installation, removal, and restoration phases of the proposed project would require the use of the following materials classified under one or more regulatory programs as hazardous or potentially hazardous: diesel fuel; gasoline; hydraulic oil; motor oil; greases/lubricants; anti-freeze; lead-acid batteries, paints, and cement and water reducing agents; and solvents used for equipment operation and maintenance.

3.17.1.2 Potentially Uncontrolled Hazardous Materials in the Project Area

There is a potential for the presence of uncontrolled hazardous materials within the Project Area, and hence the potential for the presence of such materials in areas/locations that might be disturbed by any project-related activities. If present in sufficient quantities and concentrations, disturbance of these materials by project activities could potentially result in releases to the environment. The potential presence of such materials is associated with four activities.

Operation of the railroad currently owned by UPRR in the study area began (as the Denver and Rio Grande Western Railroad [D&RGWRR]) in 1879, and there is a potential for the presence of hazardous materials as a result of historic railroad operations. During the period of operation of this railroad (the track segment through the Project Area having been taken out of operation in 1997), normal railroad operational practices throughout the western U.S. sometimes included application of herbicides to control plant growth within the ROW, and placement of track ballast rock (during original construction and subsequent track maintenance) obtained from various convenient off-site sources, including mine waste rock and smelter slag. The potential is also present along any operational rail line for accidental spills/releases of locomotive fuel and transported materials, which could have resulted in the current presence of hazardous materials within the study area. Since UPRR does not allow public access to rail corridors and requires fencing, in some cases, to prevent public access, there is no potential for public exposure to hazardous materials. All workers hired by the applicant would be required to comply with applicable OSHA regulations to reduce the potential for worker exposure to possible hazardous materials present along the rail line.

To understand and evaluate the potential for railroad-related hazardous materials to be present, interviews were conducted with UPRR representatives and publicly available relevant information was researched. The following subsections summarize the information:

- Information provided by UPRR;
- Information relative to the use and nature of smelter slag used as track ballast;
- Information relative to the use and nature of inorganic herbicides; and
- Information relative to the use and nature of organic herbicides.

a. Information Available From UPRR

UPRR reports it has no reason to believe that hazardous substances have been used or applied along the segment of ROW within the Project Area. UPRR keeps no records on the composition of ballast. Operational staff are aware that significant portions of track within the Project Area are underlain with slag ballast (recognizable by its black coloration and glass-like appearance). UPRR operational staff indicate that use of mine waste rock is very unlikely because the physical properties would not be suitable for ballast use. UPRR keeps no records on chemicals historically used for vegetation control, and notes that any contractor hired for vegetation control is required to be in compliance with applicable laws and regulations. Operations staff note that the normal practice for applying herbicides for ROW weed control is annual application, limited to spraying to near the toe of ballast.

b. Smelter Slag Used as Track Ballast

Slag is a partially vitreous by-product of smelting ore to purify metals. During smelting when the ore is exposed to high temperatures, impurities (generally silicates and nontargeted metals) are separated from the molten metal and removed as slag. It is generally a mixture of metal oxides; however, slag can contain metal sulfides and metal atoms in the elemental form.

The use of smelter slag from a wide variety of sources as railroad track ballast material (historically and currently) is widely documented, and such material is observable on track sections through the Project Area. CF&I Steel Corporation provided steel smelting slag for railroad ballast use from the 1870s and it is likely some was used in construction of the line through the Project Area (Scamehorn 1976, Scamehorn 1992). Slag from steel production contains somewhat elevated concentrations of a variety of metals, the constituents of potential environmental concern being chromium and vanadium. However, the vitrified nature of the material results in a very low potential for contained metals to leach into the environment (Procter et al. 2000). Steel slag is widely used today as both roadbase and railroad track ballast.

Smelter slag from copper, zinc, and particularly lead smelting typically contains elevated concentrations of a number of heavy metals of potential environmental concern, including lead, arsenic, cadmium, copper, and zinc (USEPA 1998a). Records from the EPA work to assess and remediate mining and smelting impacts in the Leadville, Colorado area (the California Gulch Superfund Site) provide an appropriate basis for assessing the potential nature and environmental significance of slags used as track ballast within the Project Area. The California Gulch Superfund Site is subdivided into a number of Operable Units (OUs). OU3 contains three slag piles owned (and used to produce slag for use as track ballast) by the D&RGWRR (USEPA 2007a, USEPA 1998a). OU5 contains four additional smelter sites with slag piles with historic connections to D&RGWRR (USEPA 2007a, USEPA 2000).

EPA documented its assessments of these slag piles in a ROD for both OU3 and OU5 (USEPA 1998a and USEPA 2000, respectively). As expected, metals concentrations are significantly elevated. In OU3, the mean concentrations of the four primary metals of concern were found to be:

- Arsenic at 435 milligrams per kilogram (mg/kg) in the sorted fines and 909 mg/kg in the water quenched fines;
- Cadmium at 11.9 mg/kg in the sorted fines and 16.6 mg/kg in the water quenched fines;
- Lead at 10,800 mg/kg in the sorted fines and 9,650 mg/kg in the water quenched fines; and
- Zinc at 44,000 mg/kg in the sorted fines and 909 mg/kg in the water quenched fines.

In OU5, the results from composite slag pile samples were found to be comparable:

- Arsenic ranging from 2.35 to 414 mg/kg;
- Cadmium ranging from <0.4 to 29.5 mg/kg;
- Lead ranging from 793 to 16,000 mg/kg; and
- Zinc ranging from 26,888 to 63,200 mg/kg.

At both OU3 and OU5, EPA testing determined the potential for metals to leach from the slag was very low. At OU3, the selected remedy was the No Action Alternative; and at OU5, the selected remedy was the Institutional Controls Alternative (to prevent residential use). At both OU3 and OU5, EPA determined that conducting no remediation of the slag piles was protective of human health and the environment.

Based on this information, there is little to no potential for metals in the slag used as ballast within the Project Area to have impacted underlying soils, and disturbance of ballast material during project-related activities does not pose a potential for releasing metals contained in slag to environmental receptors.

c. Use of Inorganic Herbicides

From before the turn of the century through World War II, solutions of sodium arsenite were widely and routinely used as an herbicide. Arsenic trioxide preparations were also widely used (Ware and Whitaker 2004). Arsenic and arsenic compounds exhibit significant (though varying) human and environmental toxicological effects. As an element, arsenic does not, after application, degrade to breakdown products. Arsenical herbicides effectively act as soil sterilization agents for a broad spectrum of plants. Use of arsenical herbicides to control weed growth along railroad ROWs during this timeframe is widely documented (Ayers 2004, RTC 2004, and USEPA 2009a). Also well documented is the typical presence of elevated residual soil concentrations of arsenic (attributed to herbicidal use) in soils underlying and immediately adjacent to railroad tracks throughout the U.S. (RTC 2004, LACMTA 2008, DTSC 1995, and DTSC 2004). The range of residual soil concentrations of arsenic reported in the sources noted above are:

- Up to 70 mg/kg
- 8.4 to 72 mg/kg
- 3.3 to 140 mg/kg
- 0.99 to 546 mg/kg
- 689 mg/kg

These data are consistent with data reported from other sites where the impacts from arsenical herbicide application along rail lines have been assessed. In its Best Management Practices for Controlling Exposures to Soil during the Development of Rail Trails (MDEP undated), the Massachusetts Department of

Environmental Protection (MDEP) advises that based on national experience, it is not uncommon to encounter arsenic at up to ten times natural background concentrations.

Because arsenic is a naturally occurring metal, the extent to which measured concentrations represent residual impacts requires a comparison against site-specific background concentrations. No data are available establishing background soil arsenic concentrations in soils along the Arkansas River within the Project Area. The USGS (USGS 1984), however, reports that background soil concentrations of arsenic in the western U.S. range from 0.1 to 97 mg/kg. Given the extensive mineralization (including arsenic mineralization) in areas drained by the Arkansas River, expected background levels in the Project Area would tend to be more toward the upper end of this range than the lower.

Factors that significantly influence the fate and transport of soil arsenic residuals include organic matter content, clay content, and microbial activity. Soil containing high levels of adsorptive materials, such as clay or organic matter, and those containing higher levels of iron oxide, magnesium oxide, and aluminum oxide are likely to retard the leachability of arsenic in soils. However, arsenic may leach more freely from soils with low adsorptive capacity (ADEC 2009 and WHO 2001). The lower mobility in fine-grained soil materials reflects the affinity of arsenic to bind to fine soil particles.

Based on this information, there is a potential for elevated arsenic concentrations, to a depth of a few feet, in soils under and in close proximity to the rail line within the Project Area. Disturbance (unearthing) of these soils (during drilling for placement of anchor points) could increase the potential for subsequent migration of arsenic-bearing fine soil particles to environmental receptors.

d. Use of Organic Herbicides

Shortly after World War II, the first of an extensive series of synthetic organic contact herbicides were developed. Earlier arsenical herbicides achieved the desired weed control effect along railroad ROWs by acting as a soil sterilant (by absorption into the near-surface soil, and then absorption into the target plants through their root systems). The various types of organic herbicides generally act through direct absorption into the exposed parts of target plants (leaves, stems). The human and ecological toxicity of the organic herbicides, as a broad family, is much lower than that of arsenicals.

While the persistence in the environment varies considerably for specific organic herbicides, the environmental half-life (the time required after application for half of the residual concentration to degrade to nonactive breakdown products) varies from days to less than one and one half years (CSU 1995). To put the concept of measuring environmental persistence by half-life in perspective, if a chemical has an environmental half-life of one year, at the end of one year the residual concentration would be one-half of the starting concentration; at the end of two years it would be one-quarter, and at the end of ten years it would be one one-thousandth of the original concentration.

Of the wide variety of organic herbicides that came into use for weed control after World War II, two merit evaluation for the potential to be of concern within the Project Area. These related chemicals are 2,4,-Dichlorophenoxyacetic acid (2,4-D), and 2,4,5-Trichlorophenoxyacetic acid (2,4,5-T). Both are members of the chlorophenoxy acetic acid chemical group. 2,4-D remains the most widely used herbicidal compound today; 2,4,5-T was banned from use by EPA in 1985 (SLI 2003). Until this regulatory action, both compounds were widely used by railroads for weed control along tracks (USEPA 2009b).

Given its moderate toxicity, continuing EPA approval for use (including residential use), its short to very short environmental persistence (CSU undated), and its short (4-10 days) half-life in soil (SLI 2003 and CSU 1995), historic use of 2,4-D does not represent a potential environmental concern. 2,4,5-T is of generally comparable toxicity to 2,4-D (Kaloyanova and El Batawi 1991) with an environmental half-life approximately three times that of 2,4-D (SLI 2003). As with 2,4-D, the presence of detectable residual concentrations within the Project Area would not be expected.

The potential environmental concerns associated with use of 2,4,5-T (and the basis for EPA regulatory action to first restrict its use, and then ban use) relate to the presence in 2,4,5-T of dioxin as a production contaminant (USEPA 2009c). Dioxins are a broad chemical group. As a chemical family, dioxins (which come from many anthropogenic sources) are ubiquitous in the environment at low trace levels. A study by EPA in 2001 (USEPA 2001) found the mean background concentration of dioxins in the Denver Front Range area to be approximately 3.25 parts per trillion.

Of particular environmental interest within this group are the polychlorinated dibenzodioxins (PCDDs). PCDDs are organic compounds, chemically classified as halogenated aromatic hydrocarbons. There are 75 congeners (closely related compounds with different molecular structures) in the PCDD family. The specific dioxin compound produced (in parts per million concentrations) in the synthesis of 2,4,5-T is 2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD), recognized as the most toxic of the various dioxin congeners (USEPA 2009c).

EPA evaluated the potential presence and concentrations (and environmental significance) of 2,3,7,8-TCDD in its 1987 National Dioxin Study (USEPA 1987). This study noted the compound to be relatively persistent in soil, but of very low mobility (binding to fine soil particles and organic materials in soil). One of the category of sites studied ("Tier 5 sites") were sites where 2,4,5-T was known to have been used; and of the 26 Tier 5 sites sampled, three were railroad ROWs. At two of the railroad ROW sites, 2,3,7,8-TCDD was detected at concentrations ranging from 8 to 35 parts per trillion. The maximum concentrations of 2,3,7,8-TCDD were detected at USFS sites where 2,4,5-T was loaded onto helicopters for spraying; four such sites had concentrations greater than 1,000 parts per trillion, with the highest recorded at 6,623 parts per trillion (or 6.6 parts per billion).

The Alaska Department of Environmental Conservation (ADEC) has reported (ADEC 2004) the results of a study conducted by the USACE along a pipeline route where it was believed 2,4,5-T had been used for weed control, and the potential for associated dioxin contamination was of concern. This study found that while total dioxin levels ranged from approximately 3 to 30 parts per trillion, no dioxin associated with herbicide use was detected.

Studies conducted on the environmental fate and transport of Agent Orange (a 50-50 mixture of 2,4-D and 2,4,5-T) found that 2,3,7,8-TCDD rapidly breaks down when exposed to sunlight on plant leaves (less than 1% remaining after 24 hours) (Young et al. 2004). These studies also showed that from 1% to 6% of herbicide sprayed reached the soil.

Given the data from these studies, there is some potential (if, in fact, 2,4,5-T was used for weed control along the operational history of the rail line in the Project Area) for low trace residual soil levels of 2,3,7,8-TCDD to be present. Available data suggest that the potential for concentrations above 100 parts per trillion is very low, and the potential for concentrations above 1,000 parts per trillion (i.e., 1 part per billion) is extremely remote. Current EPA policy for cleanup at dioxin-contaminated sites under its Superfund and RCRA Hazardous Waste regulatory programs (USEPA 1998b) sets 1 part per billion as the

target cleanup level for dioxin in residential soils at Superfund and RCRA cleanup sites where dioxin is a principal contaminant of concern at the facility. EPA has also, to date under this policy, generally selected a cleanup level for dioxin within the range of 5 to 20 parts per billion for commercial/industrial soils at Superfund and RCRA cleanup sites where dioxin is a principal contaminant of concern at the facility. EPA has determined that these levels are protective of human health and the environment.

Based on this information, there is a limited potential for detectable levels of residuals from organic herbicide application, to a depth of a few feet, in soils under and in close proximity to the rail line within the Project Area. It is extremely unlikely that detectable residuals of any organic herbicides remain, given their expected lifetimes in the environment. Low trace levels of various dioxins are expected at background levels (<10 parts per trillion). There is some potential for these soils to contain 2,3,7,8-TCDD at levels somewhat above background. However, the potential for these concentrations to exceed or even approach EPA's current soil cleanup target levels appears remote. Disturbance (unearthing) of these soils (during drilling for placement of anchor points) could, however, increase the potential for subsequent migration of 2,3,7,8-TCDD-bearing fine soil particles to environmental receptors.

In addition to railroad-related hazardous materials, there is the potential for uncontrolled releases (and hence the presence) of hazardous materials within the study area due to highway vehicle accidents involving hazardous materials transportation. Also, there is the potential for underground storage tank releases to have occurred. Last, there is the potential for the presence within the study area of other facilities or locations at which uncontrolled releases of hazardous materials may have occurred.

Finally, other hazardous materials not related to the project may be present along US 50 due to transportation of such materials by others.

A field inspection was conducted, and federal and state environmental databases documenting reported spills and releases and facilities/locations handling potentially hazardous materials were reviewed to determine the presence of sites in the study area where project-related activities could disturb such materials. The results of the database review are presented below.

3.17.1.3 Site Reconnaissance and Database Review

A reconnaissance of the Project Area and a series of environmental database searches have been performed. The purpose of these activities was to identify possible locations within and proximal to the Project Area where hazardous materials that might be disturbed by project-related activities could potentially be located. The site reconnaissance was conducted by a professional geologist from Dames & Moore, Inc. on December 10, 1999 (J.F. Sato 2007), which focused on the areas of the Arkansas River Canyon where the proposed fabric panels would be installed. The original database search was performed in 1997 and a follow-up database search was performed in January 2006, which involved reviews of information gathered from several environmental databases through Entrac Site Assessment (J.F. Sato 2007). The ASTM Standard (E-1527-97) for Phase I Environmental Site Assessments due diligence search radius distances was employed for this search, ranging from adjacent to the site and adjoining properties to a distance of 1 mile from the site, and varied among databases. The site reconnaissance and database search did not identify any facilities or conditions of environmental concern located within the immediate Project Area.

Based on the lack of findings of environmental concern in the Project Area during the previous site reconnaissance and database searches, an environmental database review was performed in July and

August 2009 to adequately update information pertaining to the potential presence of hazardous materials in the Project Area. The database search involved reviews of information obtained through Environmental Data Resources, Inc. (EDR) (EDR 2009a – 2009e). The ASTM Standard (E-1527-05) for Phase I Environmental Site Assessments due diligence search radius distances was employed for this search, ranging from adjacent to the site and adjoining properties to a distance of 1 mile from the site. These distances varied among the databases and are indicated below and in the EDR report (EDR 2009a – 2009e).

Table 3-84 lists the databases searched, the type of database, the radius around the Project Area considered, and the number of pertinent sites identified within that radius.

Table 3-84. Site Assessment Database Report Summary

Type of Database	Description of Database/Effective Date	ASTM Radius*	Number of Sites Identified (within the search area)
NPL	The National Priorities List (NPL) identifies uncontrolled or abandoned hazardous waste sites. To appear on the NPL, sites must have met or surpassed a predetermined hazard ranking system score, have been chosen as a state's top priority site, pose a significant health or environmental threat, or be a site where the EPA has determined that remedial action is more cost-effective than removal action. Effective date: 07/09	1 mile	0
SPL	The Colorado Department of Public Health and the Environment (CDPHE) maintains the database of sites scheduled for voluntary cleanup, and maintains the database of State Voluntary Cleanup Sites. Effective date: 07/09	1 mile	0
RCRA TSDs	The EPA's Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA Facilities database is a compilation by the EPA of RCRA TSD facilities that report storage, transportation, treatment or disposal of hazardous waste. Effective date: 07/09	0.5 mile	0
CORRACTS	The EPA maintains a list of Corrective Action Reports (CORRACTS) identifying hazardous waste handlers with RCRA corrective action activity. Effective date: 07/09	1 mile	0
CERCLIS	The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database (USEPA 2009f) identifies hazardous waste sites that require investigation and possible remedial action to mitigate potential negative impacts on human health or the environment. Effective date: 07/09	0.5 miles	0

Type of Database	Description of Database/Effective Date	ASTM Radius*	Number of Sites Identified (within the search area)
SWLF	The Colorado inventory of solid waste facilities and landfill sites (SWLF) contains a listing of both active and inactive solid waste disposal facilities. Effective date: 07/09	0.5 miles	1 (Depending on actual location of facility-Lone Wolf Disposal in Vallie Bridge EDR)
LUST	The LUST database is a list of information pertaining to all reported leaking underground storage tanks. Effective date: 07/09	0.5 miles	0
RCRA Generators	RCRA Large Quantity Generators are facilities that generate at least 1000 kg/month of nonacutely hazardous waste, or one kg/month of acutely hazardous waste. Small and Very Small generators are facilities that generate less than 1000 kg/month of nonacutely hazardous waste. Both Large and Small Quantity Generators are included in this list. Effective date: 07/09	Site and adjoining properties	0
UST and AST	The UST and AST lists contain the state underground and aboveground registered storage tank sites listings. Effective date: 07/09	0.25 miles	0**
TRIS	Toxic Release Inventory System (TRIS) facilities are facilities that release toxic chemicals above threshold quantities and are required to submit a Toxic Chemical Release Form (Form R) for specified chemicals. Effective date: 07/09	0.5 miles	0
FINDS	The Facility Index System (FINDS) is a compilation of any property or site that the EPA has investigated, reviewed, or been made aware of in connection with its various regulatory programs. Effective date: 07/09	Site and adjoining properties	2
RCRAVIOLS/ENF	RCRA violators are facilities that have been cited for RCRA violations at least once since 1980. RCRA enforcements are enforcement actions taken against RCRA violators. Effective date: 07/09	Site and Adjoining properties	0
SPILL	Colorado Spill Events (Same as ERNS-NRC database) Effective date: 07/09	Site and Adjoining properties	0
ERNS	EPA's Emergency Response Notification System (ERNS) list contains reported spill records of oil and hazardous substances. Effective date: 07/09 (These are currently housed at the National Response Center database).	Site and adjoining properties	7***

*The radius area is defined per ASTM Standard Designation E-1527-05 requirements. For the LUST, UST/AST, and ERNS online database research, the actual research areas were larger than the ASTM standard radii to account for EDR Orphan Sites (not mapable). In these cases, the number of sites located per ASTM standard may be different than the number of sites identified during online database research.

** UST/AST sites with unknown locations were assumed to be outside of the ASTM standard radius of 0.25 miles.

*** ERNs sites with unknown locations were assumed to be outside of the ASTM standard radius.

One solid waste facility (SWF) reported in the Vallie Bridge section EDR report, located at Lone Wolf Disposal, 9477 CR 45, Howard, Colorado, is listed in the local facilities database (CDPHE 2009b). Additional research on the facility location indicated that this facility is a transfer station for local refuse prior to delivery to the landfill. The facility can receive and pick up refuse from local residences and business. The facility is located greater than 1 mile west (upstream) of the Vallie Bridge section and would not be a concern related to the Project Area due to distance and site activity.

a. National Response Center Spills Database

An online search was performed of the National Response Center (NRC) spills database for all spills of record in Chaffee and Fremont counties (NRC 2009). The search yielded 14 spills, as summarized in Table 3-85. Most of these spills were caused by traffic accidents on US 50 and resulted in releases to the Arkansas River. In all cases, releases to the Arkansas River, because of response and cleanup actions, would not be expected to have resulted in the placement of such materials within the Project Area where they might be affected or disturbed during project activities. Two spills were caused by railroad accidents (NRC 2009). In February 2006, a semi-trailer carrying uranium ore rolled on its side near Swissvale (Starr 2006). The spilled ore did not reach the Arkansas River and was contained and cleaned up immediately. However, US 50 was closed in both directions for approximately 5 hours during the cleanup process (J.F. Sato 2007). Since 2009, an additional tanker truck accident occurred near Wellsville resulting in a fuel spill.

Table 3-85. NRC Database Search Results

Site Location	Location Description (Approximate) ¹	Date	Incident	Substance
Texas Creek 3 miles west	4 miles upstream of Texas Creek area	3/20/94**	55-gal drum in Arkansas River; concrete curing agent in barrel lodged against rock shelf on river	Unknown
Swissvale 1 mile east	Near or within Tunnel area	7/6/94**	Semi-tractor trailer turned over off a bridge released to Arkansas River	55,000 pounds of dry cement
8 miles east of Salida	Near or within Tunnel area	11/23/94**	Tanker truck accident/rupture, released to Arkansas River	8,196 gallons of gasoline
Royal Gorge	Unknown	6/14/97	Motor vehicle left in Royal Gorge – releasing materials to Arkansas River	Oil, etc.
Near Vallie	2 miles downstream of Valley Bridge area	3/08/98	Freight train fuel tank rupture due to rocks on track; diesel on soil (spill contained with booms and absorbent pads); Railroad MM 197.2	2,800 gallons diesel
Agile Stone System near Cañon City	1 mile downstream of Parkdale area	1/29/03**	Materials released from a locomotive due to an unknown cause	Oil/fuel No. 2-Diesel
11 miles east of Salida	2 miles downstream of Tunnel area	8/21/03**	Tractor trailer truck accident, released to Arkansas River	2,000 gallons of liquid Asphalt
Swissvale	0.7 mile upstream of Tunnel area	8/21/03**	Asphalt oil tank truck overturned, released to Arkansas River	Asphalt oil
Near Swissvale* (MM 231) -7 miles east of Salida	0.5 mile downstream of Tunnel area	2/15/06**	Semi-trailer truck rolled on side in accident – spilling ore (it did not reach the river); Environmental crew was onsite	25 tons of uranium ore

Site Location	Location Description (Approximate) ¹	Date	Incident	Substance
Near Swissvale (MM 228)	2 miles upstream of Tunnel area	5/27/07	Semi-tractor trailer carrying Butane overturned, Butane dissipated to air, no ground / water contamination.	Unknown
US 50 (MM 231)	0.5 mile downstream of Tunnel area	4/02/08	Tractor trailer hauling propane tanks overturned and some propane tanks went to the Arkansas River	Propane tanks
Arkansas River (MM 212 – MM 266)	Entire Project Area	4/18/07	From unknown source, only Arkansas River affected; no actions taken.	Whitish, brown sudsy scum
US 50 (MM 259)	Near or within Three Rocks area	5/21/08	Passenger car went into the Arkansas River and at that time had not been pulled out.	Vehicle fluids (motor oil, anti-freeze)
Texas Creek (1163 23th Trail)	10 miles south of Project Area	10/3/08	A homeowner dumped automobiles containing motor oil, antifreeze, and other materials, material containing asbestos, fiber glass, and other objects in a hole near her house, then covered it up with dirt.	Motor oil, antifreeze, and other materials, material containing asbestos, fiber glass, and other objects

¹ Location descriptions proximate to the proposed Project Area were identified during a desk top analysis. Actual locations were not confirmed with property owners or site visits.

*Based on Starr 2006 (not NRC database).

**Confirmed by search of NRC records (NRC 2009).

b. Colorado Storage Tank Information System Database

The Colorado Storage Tank Information System (COSTIS) database (CDLE 2009a) was searched for underground and aboveground storage tank (UST/AST) sites in the COSTIS database search area along the Arkansas River/US 50 corridor between Salida and Cañon City in August 2009. UST/AST sites found in the research corridor are listed in Table 3-86. Twenty-four sites were located near or within the Project Area. Based on a distance of greater than 0.5 mile from the Project Area, status ("Closed," "Temporarily Out-of-Use," or containing a liquid propane gas tank), and indicating that there are no "Event" investigation or cleanup activities in progress, none of these sites would be recognized as a concern with respect to the Project Area.

Table 3-86. Underground and Aboveground Storage Tank Sites

Site Name	Location	Location Description (Approximate) ¹	# Inactive Tanks	# Active Tanks	Substance
Pleasant Valley RV Park	Howard	4 miles downstream of Tunnel area	0	1	LPG-AG
Jim Foster Property	Howard	Unknown – closed	1	0	Unknown
Lois Perniciaro	Howard	Unknown - closed	1	0	Gasoline UST
Frontier Cafe	Howard	2.5 miles downstream of Tunnel area	3	0	Temp. Out-of-use: 1 diesel, 2 gasoline USTs
Broken Arrow Resort	Howard	2.1 miles downstream of Tunnel area	2	1	2 Closed gasoline USTs, 1 LPG
Chuck Knutzen Property	Howard	2.1 miles downstream of Tunnel area	0	0	Unknown
Lazy J Resort (Bighorn Park)	Coaldale	3.4 miles south of Project Area	2	1	2 Closed Gasoline USTs; Open 1 LPG
Domtar Gypsum Quarry	Coaldale	1.2 miles south of Project Area	2	0	1 gasoline UST, 1 diesel UST
Wild Willies LLC	Cotopaxi	Unknown – closed	2	0	1 Temp. Out-of-use diesel, 1 Temp. Out-of-use unleaded gasoline
Barry's Den	Cotopaxi	1 mile upstream of Texas Creek area	0	2	1 Diesel UST, 1 Gasoline UST
Arkansas River KOA	Cotopaxi	6.6 miles upstream of Texas Creek area	1	1	1 Closed LPG, 1 Open LPG
Cotopaxi Store Inc.	Cotopaxi	8.3 miles upstream of Texas Creek area	0	4	2 gasoline and 1 diesel USTs; 1 LPG
Cotopaxi Texaco	Cotopaxi	8.3 miles upstream of Texas Creek area	3	0	2 gasoline UST, 1 diesel UST
Verda M. Young	Cotopaxi	Unknown – closed	2	0	1 gasoline UST, 1 diesel UST
Cañon Trading Post	Cotopaxi	1 mile west of Cotopaxi	3	0	Unknown; no longer in use
Former Service Station	Cotopaxi	8.3 miles upstream of Texas Creek area	0	0	Unknown
CDOT Cotopaxi	Cotopaxi	7 miles upstream of Texas Creek area	2	0	1 gasoline UST, 1 diesel UST
Cotopaxi Section HQ (Railroad)	Cotopaxi	8.3 miles upstream of Texas Creek area	1	0	Gasoline UST

Site Name	Location	Location Description (Approximate) ¹	# Inactive Tanks	# Active Tanks	Substance
Cotopaxi County Shop	Cotopaxi	North of Arkansas River and 8.3 miles upstream of Texas Creek area	5	0	2 Closed diesel USTs, 3 Closed gasoline USTs
Cotopaxi Trading Post-BLM owned	Cotopaxi	1 mile upstream of Texas Creek area	0	0	Unknown
Fremont County Department of Transportation Maintenance and Storage Facility	Cotopaxi	North of Arkansas River and 8.3 miles upstream of Texas Creek area	0	2	1 diesel AST 1 gasoline AST
Fremont School District RE-3	Cotopaxi	North of Arkansas River and 8.3 miles upstream of Texas Creek area	1	1	1 Closed gasoline UST 1 Open LPG
Sterling Homes	Cotopaxi	South of Project Area	1	0	1 LPG
Copper Gulch Midway Store	Texas Creek	South of Project Area	2	0	2 Closed gasoline USTs

¹ Location descriptions proximate to the proposed Project Area were identified during a desk top analysis. Actual locations were not confirmed with property owners or site visits.

c. Leaking Underground Storage Tank Sites

Table 3-87 shows former and current leaking underground storage tank (LUST) sites in the Colorado Department of Labor and Employment (CDLE) LUST search area along the Arkansas River/US 50 corridor between Salida and Cañon City, where cleanup activities have been completed or are currently in progress. There are a total of 10 LUST sites in the research corridor (CDLE 2009a). Nine sites are listed as Closed. The Cotopaxi County Shop is listed as a Priority 3 Further Action Needed. Further investigation into this site location indicated it was on CR 12 north of the town of Cotopaxi. Based on a distance of greater than 1 mile from any of the Project Areas, this site would not be recognized as a concern with respect to the Project Area.

Table 3-87. Former/Current Leaking Underground Storage Tank Sites

Site Name	Location	Location Description (Approximate) ¹	Date of Site Closure
Lois Perniciaro Property	Howard	Unknown	5/12/98
Chuck Knutzen Property	Howard	2.1 miles downstream of Tunnel area	4/30/96
Jim Foster Property	Howard	Unknown	5/12/98
Lazy J Resort	Coaldale	3.4 miles south of Project Area	6/22/00
Verda M. Young	Cotopaxi	Unknown	11/19/97
Cotopaxi County Shop	Cotopaxi	North of Arkansas River and 8.3 miles upstream of Texas Creek area	NA – Recent reports received (05/18/09)
CDOT Cotopaxi	Cotopaxi	7 miles upstream of Texas Creek area	3/28/95
Cañon Trading Post-BLM owned	Cotopaxi	1 mile upstream of Texas Creek area	7/26/95
Fremont County Road and Bridge	Cotopaxi	North of Arkansas River and 8.3 miles upstream of Texas Creek area	7/22/97
Cotopaxi Texaco	Cotopaxi	8.3 miles upstream of Texas Creek area	2/9/98

¹ Location descriptions proximate to the proposed Project Area were identified during a desk top analysis. Actual locations were not confirmed with property owners or site visits.

The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS; USEPA 2009f) and RCRA Information System (RCRIS; USEPA 2009d) databases were searched in August 2009. No CERCLIS sites were identified in the Project Area. Three RCRIS sites were found in the project corridor: US Soils (CR 55, Wellsville, Fremont County), Rocky Mountain Photograph (160 Bremer Howard) (inactive facility), and CDOT Cotopaxi (US 50, MM 245.26) (also a UST site). These three sites were also identified during a search of EPA's Enforcement & Compliance History Online (ECHO) database (USEPA 2009e).

3.17.1.4 Transport of Hazardous Materials

Specific counts of vehicles transporting hazardous materials are not available for the project corridor. However, general counts and projections for truck traffic along the project corridor are shown in Table 3-88. Truck traffic increases eastward across the corridor from 8.8% of total traffic from MMs 222 to 233, to 17.6% from MMs 253 to 267. According to the CSP, US 50 from the north junction of SH 141 near Grand Junction to the Kansas border is a designated east-west route for the transport of hazardous materials, but is not a designated route for the transport of nuclear materials (J.F. Sato 2007).

Table 3-88. US 50 Truck Traffic Data (CDOT 2009)

Mile Marker Interval	AADT Single-Unit Trucks (Year)				AADT Combination-Unit Trucks (Year)				Percent Trucks	
	2005*	2008	2011 Forecast	2012 Forecast	2005*	2008	2011 Forecast	2012 Forecast	2005*	2008
222-233	--	150	158	161	--	220	232	235	--	8.8
233-245	60	60	63	64	170	100	105	107	7.7	5.6
245-253	90	110	115	116	270	300	313	317	13.5	14.1
253-267	130	130	135	137	360	400	416	422	15.6	17.6

-- = data not available

AADT: average annual daily traffic (2-way).

Single-Unit Trucks: delivery vans, UPS trucks, etc.

Combination-Unit Trucks: semi-tractor trailers.

* CDOT 2006 as cited in J.F. Sato 2007.

3.17.2 Current Management Considerations

3.17.2.1 Regulatory Overview

“Hazardous materials,” which are defined in various ways under a number of regulatory programs, can represent potential risks to both human health and the environment when not properly managed. Hazardous materials emergencies are handled according to the District Emergency Response Hazardous Materials Contingency Plan. The term, hazardous materials, includes the following materials that may be utilized or disposed of in conjunction with project operations:

- Substances covered under Occupational Safety and Health Administration (OSHA) Hazard Communication Standards (29 CFR 1910.1200): The types of materials that would be subject to these regulations would include almost all of the materials identified in Section 3.17, Hazardous Materials.
- “Hazardous materials” as defined under U.S. Department of Transportation (USDOT) regulations at 49 CFR, Parts 170-177: The types of materials that would be subject to these regulations would include explosives, cement, fuels, some paints and coatings, and other chemical products.
- “Hazardous substances” as defined by Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and listed in 40 CFR Table 302.4: The types of materials that may contain hazardous substances that would be subject to these requirements would include solvents, solvent-containing materials (e.g., paints, coatings, degreasers), and other chemical products.
- “Hazardous wastes” as defined in RCRA: Procedures in 40 CFR 262 are used to determine whether a waste is a hazardous waste. The types of materials that could be subject to these requirements could include liquid waste materials with a flash point of less than 140°F, spent solvent containing wastes, and corrosive liquids. Hazardous wastes are regulated under Subtitle C of RCRA.
- Any “hazardous substances” and “extremely hazardous substances,” as well as petroleum products such as gasoline, diesel, or propane that are subject to reporting requirements if volumes on hand exceed threshold planning quantities under Sections 311 and 312 of SARA. The types of

materials that could be subject to these requirements would include fuels, coolants, and solvent-containing products, such as paints and coatings.

- Petroleum products defined as “oil” in the Oil Pollution Act of 1990. The types of materials that would be subject to these requirements include fuels, lubricants, hydraulic oil, and transmission fluids.

In conjunction with the definitions noted above, the following lists provide information regarding management requirements during transportation, storage, and use of particular hazardous chemicals, substances, or materials:

- The SARA Title III List of Lists or the Consolidated List of Chemicals Subject to Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(r) of the CAA.
- The USDOT listing of hazardous materials in 49 CFR 172.101.

Certain types of waste materials, while they may contain identified hazardous waste constituents, are partially or fully exempt from regulation as hazardous wastes. The slag from primary processing of lead, copper, zinc, and iron processing, regardless of metals concentrations, is exempt from hazardous waste regulation. Used oil, as another example, may contain regulated metals that would classify it as a hazardous waste, but would not be considered a hazardous waste unless it contained specified levels of halogenated solvents. Other wastes that might otherwise be classified as hazardous are managed as “universal wastes” and are exempted from hazardous waste regulation as long as those materials are handled in ways specifically defined by regulation. An example of a material that could be managed as a universal waste is lead-acid batteries. As long as lead-acid batteries are recycled appropriately, requirements for hazardous waste do not apply.

Pursuant to regulations promulgated under CERCLA, as amended by SARA, release of a reportable quantity of a hazardous substance to the environment must be reported within 24 hours to the National Response Center (40 CFR Part 302). Also, pursuant to regulations under the Clean Water Act as amended by the Oil Pollution Act, any discharge, or threat of discharge, of a harmful quantity of oil (any quantity that causes a sheen on the water surface) to navigable waters of the United States or adjoining shorelines must likewise be reported within 24 hours to the National Response Center.

Pursuant to State of Colorado reporting requirements under 25-8-601(2), a spill of any chemical, oil, petroleum product, sewage, etc., which may enter waters of the state of Colorado (which include surface water, groundwater, and dry gullies and storm sewers leading to surface water), must be reported immediately to the CDPHE.

Pursuant to State of Colorado reporting requirements for reporting incidents involving hazardous materials during transportation under 8 CCR 1507-25 Parts I and IV and 6 CCR 1007-3 Part 263, releases along a highway must be reported to the National Response Center, nearest local law enforcement agency, CSP, and Colorado Environmental Release and Incident Reporting Line. Additionally, if the incident involves the release of hazardous waste, the transporter must notify the CDPHE.

As a matter of course, reported releases are responded to and remediated in accordance with the requirements of the appropriate regulatory agencies.

3.17.2.2 Other Project Considerations

Appropriate environmental management planning documents will be addressed in subsequent chapters of this EIS. These documents may include the management, transportation, and storage of hazardous materials (including soils containing or potentially containing hazardous materials); secondary containment where appropriate; emergency response; and unanticipated discoveries of uncontrolled hazardous substances, wastes, and/or petroleum products. All environmental management planning documents will meet or exceed associated local, state, and federal requirements, and will include requirements for training in required management and release response activities.

3.18 WASTE (NONHAZARDOUS)

The study area for nonhazardous waste encompasses the proposed Project Area and the counties that the Project Area resides in and/or may be affected by the project. The affected environment for nonhazardous waste includes water and soil resources, capacities of county landfills and sanitation services, and aesthetic resources associated with the Arkansas River. Each of these resources could potentially be affected either directly or indirectly by mismanagement of nonhazardous waste.

3.18.1 Current Conditions and Trends

The discussion provided below regarding trash and recycling management services, sanitation services, and wastewater treatment along the Project Area was obtained from the project design and planning report (J.F. Sato 2007) and follow-up research in 2009 performed by AECOM.

3.18.1.1 Trash and Recycling Services

Trash pickup services for homes and businesses in Chaffee County are managed through private trash hauling companies, and the local disposal facility is a county-owned landfill. The Chaffee County Landfill is located off US 285 and has several recycling sites in Salida. Chaffee County Landfill can only receive waste generated in Chaffee County; as such, the landfill could not receive trash generated from the Project Area within Fremont County. The Chaffee County Landfill currently maintains a landfill capacity of at least 12 years (Wilcox 2009). The Chaffee County Landfill can receive recyclables from both Chaffee and Fremont counties. One of the primary waste and recycle transporters in Chaffee County is Waste Management. Since Waste Management does not service Fremont County, special conditions would apply if Waste Management is needed to haul recyclables from Project Areas within Fremont County. Chaffee County does not have a solid waste management district.

Trash and recycling management services for homes and businesses in Fremont County are managed by private companies. Solid waste transfer facilities in Cañon City and Howard service the Project Area in Fremont County. Waste Connections of Colorado, Inc. is located in Cañon City, and they currently transport their waste to a landfill in Pueblo. Howard Disposal is operated in the Cañon City area by the John Howard Family; they offer residential pickup and a transfer station, and they transport their waste to a landfill in Colorado Springs. Neither solid waste facility can receive recyclables. Lone Wolf Disposal offers a residential pickup service in Howard. The nearest Fremont County landfill is Phantom Landfill, located in Penrose. Phantom Landfill is privately owned and can provide trash bins and pickup services throughout Fremont County as well as the portion of the project within Chaffee County. The Phantom Landfill also has the ability to profile waste prior to disposal, if needed. The Phantom Landfill currently maintains a capacity of approximately 30 years, and currently there are no limitations on the quantity of

trash delivered to the landfill, number of trash bins available, or waste transport frequencies (Fuselier 2009). Fremont County does not have a solid waste management district.

Due to the current downmarket status for recyclables, it is difficult to identify recycle companies that service the Project Area along the Arkansas River between Cañon City and Salida. Although recycle bins are located within both Salida and Cañon City for local residents and businesses, the availability of recycle bins and recycle pickup services for project-specific services is limited. The Upper Arkansas Area Council of Governments supports a recycling program within its four-county area, which includes Chaffee and Fremont counties, and can provide assistance regarding a project recycling program.

3.18.1.2 Sanitation Services

Within the project study area are 11 site facilities that generally provide boating and fishing access and some campsites. All 11 sites have limited restroom facilities, intended to serve the existing uses of the recreational site. These locations from west to east are Salida East, Point Barr, Rincon, Vallie Bridge, Canyon Trading Post, Lone Pine, Texas Creek, Pinnacle Rock, Five Points, Spikebuck, and Parkdale. Royal Gorge Park, which is located east of Parkdale but west of Cañon City, has restrooms for its existing users. Except as associated with the recreation area sites, restroom facility availability between Salida and Cañon City is limited.

There are currently multiple companies that provide portable toilets and servicing in the area. One company, Twin Enviro Services, currently has the capacity to provide over 125 portable toilets as well as servicing of those at least three times per week as preliminarily proposed during the exhibition phase.

3.18.1.3 Wastewater Treatment

The Salida municipal wastewater plant services the community and discharges into the Arkansas River.

The Fremont Sanitation District owns and operates the sanitation system and Rainbow Park Regional Wastewater Treatment Plant within the district comprised of Cañon City, Florence, Lincoln Park, and the prisons within Fremont County. The Fremont Sanitation District is a quasi-private public enterprise, which is a nonprofit corporation, owned by the residents within the district's boundaries. All of the wastewater within the district is processed at the Rainbow Park Regional Wastewater Treatment Plant and the treated water is discharged to the Arkansas River under the guidelines of the National Pollutant Discharge and Elimination System. Wastewater treatment associated with the portable toilets would be profiled and transported under waste manifest to Phantom Landfill for proper disposal in the solidification basin.

3.18.2 Current Management Considerations

Management will consider the wastewater, sanitation, and trash removal and recycling requirements for the installation, viewing, and removal phases of OTR to eliminate increased litter and debris, minimize impacts to area landfills, and ensure there are no impacts to the Project Area resulting from nonhazardous waste facilities. Since recycling services along the project route are limited, coordination and consultation with the Upper Arkansas Area Council of Governments will be necessary to ensure proper recycling is available during the project to minimize impacts to area landfills and the environment.

3.19 REALTY AUTHORIZATIONS AND LAND USE

3.19.1 Current Conditions and Trends

The Analysis Area for this section includes a 547-yard (500-meter) buffer on either side of the Arkansas River/US 50, between the towns of Salida on the west and Cañon City on the east (Map 3-86).

The Analysis Area is an approximately 42-mile stretch of the Arkansas River Valley, which contains US 50 and the UPRR, in Chaffee and Fremont counties. It begins east of Cleora, Colorado near MM 225 in Chaffee County, and spans approximately 2 miles in Chaffee County before entering Fremont County near MM 227 and continuing approximately 40 miles, ending near MM 267 just west of Cañon City, Colorado. The largest communities found within the vicinity are Salida to the west and Cañon City to the east. Other small communities or developed areas located along US 50 and the Arkansas River include (from west to east) Cleora, Wellsville, Swissvale, Howard, Vallie, Coaldale, Pleasanton, Cotopaxi, Texas Creek, Parkdale, Echo, and Fink.

The Analysis Area between MM 225 and 267 is predominately rural, with uses that include residential, small commercial and recreational business, and small-scale agricultural activities. Other uses include mining and mineral resource extraction, dispersed grazing, transportation along US 50, and utilities.

Commercial and retail development within the vicinity is located primarily on either end of the Analysis Area in Salida and Cañon City. Schools, libraries, local government buildings, and airports (one in each) are also located in these municipalities.

Salida schools (District R-32-J) serve Chaffee County communities and western Fremont County. Fremont District RE-3, K-12 school system is located in Cotopaxi, serving Howard, Coaldale, and Cotopaxi. Cañon City schools (Fremont District RE-1) serve the eastern portion of the Analysis Area.

Commercial land uses from within the Analysis Area consist of commercial river outfitters, private campgrounds and lodging, restaurants, and small commercial stores. For more information regarding the land managed along the Arkansas River for recreation, see Section 3.20, Recreation Resources.

The land administration within the Analysis Area consists of land either owned or managed by the BLM, the SLB, or private entities (Map 3-86). Table 3-89 summarizes the land area by owner.

Table 3-89. Land Area by Owner / Manager

Owner	Approximate Area (Acres)
BLM	12,900
Private	8,900
State Parks	400
State Parks/AR River Ranch	200
State Parks/AR River Ranch/BLM	55
CDOW	30

Source: Theobald, et al. 2008.

3.19.1.1 BLM Lands

BLM lands found within the Analysis Area are managed by the RGFO in Cañon City, and are managed under the guidance of the 1996 Royal Gorge RMP. The primary objective of the Royal Gorge RMP is to “provide a variety of levels, methods, and mix of multiple use resource management, utilization, and protection... Generally, management practices and prescriptions will favor maintaining or enhancing the natural setting (e.g., wildlife habitat, visual resources, recreation areas, etc.).” Management of BLM lands also includes the management of commodities and uses that benefit local and regional economies. Per the Royal Gorge Resource Area ROD and Approved RMP (May 1996), the following guidelines apply to ROWs within the Arkansas River Subregion #1:

- 1-54) The Western Utility Group’s study for corridor designation will be adopted for major ROWs with exception of the existing transportation corridors. Minor ROWs will be authorized on a case-by-case basis on proposals outside of exclusion areas. Minor ROWs could be authorized in avoidance areas only when stipulations will protect values.
- 1-55) Areas will be excluded from ROWs to protect:
 - WSAs
 - Raptor nesting/fledging areas
 - Special status plants
 - Special status animals (only nesting/fledging areas)
 - Potential NRHP sites
- 1-56) Areas will be avoided for ROWs to protect:
 - Big game birthing habitat
 - Big game critical winter habitat
 - VRM Class II
 - Areas within ACECs
 - Developed recreation sites
- 1-57) ROW corridors are designated.
- 1-58) All other areas are nonexcluded for ROWs.

Additionally, the following is included as “Decisions Common to All Subregions”:

- C-114) Do not grant major ROWs or areal sites in exclusion areas unless mandated by law.

Both minor and major ROW exists within the study area. Two such ROWs follow the UPRR rail line and US 50, which is discussed in more detail in 3.15, Transportation.

Most BLM lands are also authorized for sale or lease to state and local governments and to qualified nonprofit organizations for recreation and public purposes, through the Recreation and Public Purposes Act (68 Statute 173; 43 United States Code 869 et. seq.). The act was enacted by Congress in 1954, as a complete revision of the Recreation Act of 1926 (44 Stat. 741), recognizing the strong public need for a nationwide system of parks and other recreational and public purposes areas. The Recreation and Public Purposes Act (R&PP) authorizes the sale or lease of public lands for recreational or public purposes to State and local governments and to qualified nonprofit organizations. However, BLM lands along the river are not available for sale in the Project Area because they are designated as “retention lands” by the Royal

Gorge Resource Management Plan. This law is administered by the BLM and applies to all public lands, with the exception of lands within national forests, national parks and monuments, national wildlife refuges, Indian lands, and acquired lands. Examples of typical uses under the act are historic monument sites, campgrounds, schools, fire houses, law enforcement facilities, municipal facilities, landfills, hospitals, parks, and fairgrounds.

Within the study area, the CDPOR has one lease that applies to 16 locations within the AHRA, totaling 483 acres. Individual locations range in size from 2-90 acres. Eight of the AHRA sites under this lease are included in the Project Area, including Point Barr, Rincon, Canyon Trading Post, Lone Pine, Pinnacle Rock, Salt Lick, Five Points, and Spikebuck. These recreational sites total 140 acres of AHRA land within the Project Area. An amendment to this lease was issued on March 23, 1999 for the duration of 25 years.

Additionally, there is an R&PP lease issued by the BLM to the Fremont School District RE-3 Cotopaxi (COC-57771), which authorizes land for a baseball diamond and bathroom facility.

Mining is an allowable use on BLM lands. There are 22 mining claims found presently within the study area, which are discussed in detail in Sections 3.11, Soil Resources and 3.12, Geologic Substrate and Terrain.

3.19.1.2 BLM - Special Management Areas

Two special management areas exist within the Project Area: the McIntyre Hills WSA and the Arkansas Canyonlands ACEC. The McIntyre Hills WSA is located on the south side of the Arkansas River between Texas Creek and Parkdale. The ACEC spans US 50 and extends from west to east along US 50, from approximately Texas Creek to Cottonwood Creek. The Arkansas Canyonlands ACEC is managed to protect scenic, historic, and cultural values; and key habitat for raptor, bighorn sheep, and fisheries. These special management areas are discussed in further detail in Section 3.1, Terrestrial Wildlife and Habitat, and Section 3.20, Recreation Resources.

3.19.1.3 State Land Board Lands

There are several parcels that fall within the Analysis Area that are owned by the SLB. According to the 1992 Multi-Use Policy (Policy #92-8):

- When Colorado entered the Union in 1876, the state received approximately 4.5 million acres of land from the federal government to support common schools and other public purposes. The Colorado Board of Land Commissioners, with its three full-time commissioners, was established by the State Constitution specifically to administer these lands.
- Today, approximately 3 million surface acres remain of the original grants. These lands are not truly "public" in the same sense as federal public lands managed by the BLM and the Forest Service. On the contrary, state trust lands are specifically to be managed to generate revenues for the beneficiaries while preserving their long-term productivity and value.
- When managing Colorado's trust lands, the SLB must, as a matter of basic trust law, comply with the same fiduciary obligations that apply to private trustees. Thus in carrying out its responsibility under the State Constitution, the SLB is specifically required to manage its lands for the public purpose of benefiting the schools and other trust recipients.

The primary use found on most SLB properties is agricultural; however, their multi-use policy allows land to be leased for recreation as well, creating additional opportunities for revenue. Recreational uses on SLB land require access from surrounding lands, therefore, properties that are bordered on all sides by public lands are not suitable. The same policy states:

- “It is the judgment of the Land Board that implementing a multiple-use policy will provide an opportunity to increase total revenues from surface uses which until now have mainly come from agricultural rentals. Under a multiple-use policy, the State-Land Board can both increase revenues and create opportunities for public agencies lessees and others interested in leasing state trust lands for recreation purposes.”
- Within the study area, there are both active agricultural and recreation leases on SLB property. Recreation leases typically have active periods (i.e., hunting season) and off-seasons, and parcels may have both recreation leases and agricultural leases overlapping.

3.19.1.4 Private Lands

Private lands found within the Analysis Area consist of single family residential properties, mining operations, and other uses. There are approximately 700 structures that are known to exist within the Analysis Area, though it is unclear if these are improved, historic, or vacant. Most of the development along US 50 is clustered around the small, unincorporated communities previously mentioned.

The following is a summary of residential development by unincorporated community, based on aerial imagery, adjacent to US 50 and the Arkansas River:

- Wellsville consists of 3 to 6 large residential properties on the north side of the river.
- Swissvale consists of approximately 40 homes or buildings, 36 of which are on the south side of the river; subdivisions include Embry Tracts and Shrlin Subdivision.
- Howard includes approximately 200 homes or buildings along either side of US 50 and the river; subdivisions include Howard-Holliday Hill, Leisure Hills, Wildwood Estates, Cloud 9 Subdivision, Acres of Ireland, and others.
- Vallie includes approximately 20 homes or buildings; subdivisions include Pleasant View Acres.
- Coaldale and Pleasanton are next to one another and have several residential developments, including Hayden Creek Meadows, Guilliford’s Tracts, Lazy T-H Tracts, Fox Creek Canyon, and Hidden Valley subdivisions.
- Cotopaxi occurs at the intersection of CR 161 and US 50, and has approximately 70 residential properties; however, no known subdivisions by name.
- Just west of Texas Creek lies the Golden Acre Subdivision, which consists of 46 homes or buildings.
- From Echo to 1 mile west of Fink, there is no residential development, as the land is part of the BLM’s Arkansas Canyonlands ACEC and/or the McIntyre Hills WSA.
- Fink consists of numerous small subdivisions, including Meadowdale/Parkdale, Star Ranch, Royal Gorge Bluffs, and others.

3.19.2 Current Management Considerations

3.19.2.1 BLM Special Management Areas

a. Wilderness Study Areas

Under the BLM's interim management guidelines, proposed activities in WSAs must (1) be temporary, (2) not cause any substantially noticeable impact following reclamation, and (3) not impair the suitability of the WSA for wilderness designation (BLM 1993).

Area of Critical Environmental Concern

Arkansas Canyonlands ACEC includes 40,000 acres across subregions 1, 2, 6, and 7, as stated in the 1996 RGFO RMP. Subregion 1, Arkansas River, is within the Project Area. The ACEC is subject to management decisions for each subregion.

Management considerations for the ACEC within Arkansas River Subregion 1 are described as follows: "All or portions of Browns Canyon, Mosquito Pass, Grape Creek, and Arkansas Canyonlands are designated as ACECs and will be managed to protect and enhance their special values."

3.19.2.2 Fremont County Master Plan

The Fremont County Master Plan was last updated in 2001, and adopted in January 2002 by Fremont County Planning Commission and County Commissioners. The master plan "is the official document for guiding land use decisions for the County," and "addresses the planning period up to the year 2011," (Fremont County 2002). The master plan (Chapter 4) contains the county's goals, objectives and implementation strategies, several of which may pertain to the Artists' proposed project. Goals, objectives, and strategies are listed for each of 12 categories: Transportation, Urban and Rural Development, Economics Development, Agriculture, Water, Sewer and Utility Services, Housing, Community Services and Facilities, Environmental and Cultural Resources, Visual Resources, Open Space and Recreation, Solid Waste, and Stormwater Drainage.

Fremont County is comprised of six planning districts, which are specifically addressed in Chapter 5 of the master plan. The proposed project would fall within District 4, The Royal Gorge Impact District. The Royal Gorge Impact District currently is a nearly rectangular area straddling US 50 along the plateau immediately north of the Royal Gorge. Encompassed in this area are approximately 4 miles of the SH 9 corridor north from its intersection with US 50, and 6 miles of the Royal Gorge road leading south. The objectives for the District include the following:

- The District boundaries will be enlarged to encompass US 50 west past the Parkdale Bridge, across the Arkansas River to the intersection with Copper Gulch Road. The boundary will then follow the Copper Gulch Road and Royal Gorge Road south to the south rim of Royal Gorge Park, then along the rim of the gorge east to a connection with the Cañon City boundary. All areas north to the boundary with the current northern section of the Mountain District and east to the Cañon City urban growth boundaries will be included in the Royal Gorge Impact District.
- A sub-area Preferred Development Plan will be generated for the Royal Gorge Impact District, including goals and objectives for land use, commercial and industrial development, and infrastructure provision. Emphasis in the plan should be on balanced land use to retain the integrity of the natural features of the District upon which tourism-related businesses depend.

The timeline for development of this subarea plan is not known.

3.19.2.3 Fremont County Temporary Use Permits

As part of the zoning resolution, each event is required to obtain a “temporary use permit.” More information regarding zoning regulations will need to be obtained from the county (Butler 2009).

3.19.2.4 Fremont County Activities

Numerous local and tourist-driven events occur in Fremont County in the summer months. The town of Howard holds a community chili cook-off every year in late spring or early summer, as well as other small community events (Butler 2009).

Recreation creates much of the tourism draw in Fremont County, especially during the rafting season. Other recreational uses include fishing, hiking, OHVs, and camping. These activities are discussed in detail in 3.20, Recreation Resources.

3.19.2.5 Cañon City Comprehensive Plan

The Cañon City Comprehensive Plan was updated in 2001 (Cañon City 2001). The comprehensive plan addresses both the Arkansas River as well as US 50.

a. Arkansas River

During the visioning for the plan, citizen participants voiced their desires to include “preservation of agricultural/rural land in the county” and “wiser use of land adjacent to the Arkansas River.” The Royal Gorge and the Arkansas River are listed as valuable assets, which the plan is designed to preserve and enhance. Other public desires related to land use included:

- Preservation of open space and natural areas
- More efficient traffic flow throughout community (east/west, north/south)
- Historical, cultural, and natural feature preservation
- Diverse economic conditions (employment base)
- Strategic tourism effort
- Responsible growth and development options/opportunities

The city’s “natural setting,” including quality of the natural environment and connection to the Arkansas River, were identified as community values that contribute toward achieving the community’s vision and local character, which the community wants to preserve.

Both the Arkansas River corridor and its floodplain are included as major elements and contributors to the Trails and Open Space Master Plan adopted in 1997 by the City of Cañon City and the Cañon City Area Metropolitan Recreation and Park District.

b. U.S. Highway 50

The comprehensive plan states the traffic volumes on US 50 fluctuate throughout the year, peaking in the summer months as tourists travel to and through town, “using Highway 50 as the major east-west artery.”

A US 50 bypass is included in the Colorado State Transportation Improvement Plan as an unfunded project requiring further study. The plan states that until the US 50 bypass is possible, options to maximize traffic handling ability of US 50 should be investigated.

3.19.2.6 Chaffee County Comprehensive Plan

The Chaffee County Comprehensive Plan was adopted in March 2000, and “is designed to serve as a guide for revising local development regulations and review processes, reviewing development and annexation proposals, and making local infrastructure investment decisions.” Only the southeastern corner of Chaffee County falls within the proposed Project Area, adjacent to the city of Salida. The key goals and overall objectives for the Chaffee County Comprehensive Plan include the following:

- Target most new residential and commercial development to smaller lots (1 acre or less) in and around existing communities. Allow only larger lot zoning in rural areas.
- Improve county land use regulations to protect air/water quality, scenic areas, historic and cultural resources, and wildlife habitat. Be sensitive to private property rights.
- Use incentives as well as regulations to help protect river corridors, wildlife habitat, agricultural lands, and ranching.
- Maintain existing public access to state and federal lands, including river corridors.
- Minimize the tax burden on citizens. Require development to assess impacts on public facilities and to pay fair share of costs for necessary services.

The importance of the county’s rural character and visual resources is indicated throughout the comprehensive plan, which applies to the Project Area located in Chaffee County. Other topics covered in this plan include public lands access, recreation, and protection of sensitive natural areas, such as river corridors. The guiding objectives for Community Character/Natural/Cultural Resources (Chapter 5) include the following:

- Guiding Objective 1: Give high priority to protecting the scenic and visual quality of the valley.
- Guiding Objective 2: Encourage protection of rural areas throughout the county outside designated growth areas. Preserve agricultural land, open space, and wildlife habitat throughout the valley through a variety of nonregulatory and regulatory techniques.
- Guiding Objective 3: Provide access to public lands and river/stream corridors. Require that all development application for property adjacent to public lands take special steps to ensure appropriate public access is maintained, improved, or limited as appropriate.
- Guiding Objective 4: Preserve and enhance critical wildlife habitat and river and stream corridors throughout the county.
- Guiding Objective 5: Protect other sensitive natural areas.
- Guiding Objective 6: Protect cultural resources.

3.19.2.7 Chaffee County Special Use Permits

A special land use permit would be required from Chaffee County for the proposed project. More information regarding zoning regulations will need to be obtained from the county.

3.19.2.8 Chaffee County Activities

AHRA rafting occurs until early fall, much of which originates in Salida. Based in Salida, FIBArk is one of the oldest white-water festivals in America and occurs over several days every summer (June 18-21, 2009). The festival includes an array of events, including recreational and competitive kayak races.

The annual Chaffee County Fair generally occurs in late July or early August at the county fairgrounds, located 3 miles west of Salida.

Recreation creates much of the tourism draw in Chaffee County, especially during the rafting season. Other recreational uses include fishing, hiking, and camping, all of which take place mostly during the summer. Recreation is discussed in detail in 3.20, Recreation Resources.

3.19.2.9 City of Salida Comprehensive Plan

The City of Salida Comprehensive Plan was adopted in June 2000, and is “the official policy document of the City of Salida Planning and Zoning Commission and the City Council.” Given the urban character found within the city, and that the Project Area is well beyond city limits, most of the comprehensive plan does not pertain to the proposed project. The key directions for the future stated in the City of Salida Comprehensive Plan are as follows:

1. Improved standards for structures, landscaping, and signage will improve the overall attractiveness and livability of Salida.
2. New development will be focused within or adjacent to the city to preserve the rural, scenic character of the surrounding area’s open spaces and agricultural lands.
3. US 50 will be an attractive commercial corridor that safely and efficiently accommodates pedestrians, bicycles, and automobiles.
4. Community gateways along major roadway corridors will create a positive and unique identity.
5. A balanced and sustainable economy will offer a variety of quality employment opportunities.
6. An appropriate range of housing types will be available to serve the varied lifestyles, ages, and income levels of residents.
7. A vibrant downtown will be the cultural activity center of the community and the region, and provide a variety of shopping, entertainment, civic, residential, and recreational uses.
8. A system of interconnected parks, open spaces, and trails will protect important natural areas and open spaces around Salida and serve the recreational needs of residents and visitors.
9. Public facilities and services will be provided in an efficient and cost-effective manner.

Chapter IV of the Comprehensive Plan establishes the policy framework to accomplish the city’s key directions.

3.19.2.10 City of Salida and Chaffee County Joint Planning Agreement

In April 2008, the City of Salida and Chaffee County signed an intergovernmental agreement for joint planning of the areas around the municipality. While the Project Area is beyond the city of Salida municipal boundaries, it may infringe upon the joint planning and growth area.

- **Impacts of Municipal Development:** The City and the County agree to consult and cooperate in assessing and requiring new developments, whether in the City or the County, to mitigate impacts resulting from developments, which may include impacts from roads, utility services and other impacts. In addition, the City agrees to submit development applications within the City limits to the County for comment when there is potential that those developments may impact County services.

3.19.2.11 Arkansas Headwater Recreation Area

The AHRA is a landmark cooperative effort of the BLM, State Parks, CDOW and USFS. Through this partnership, the agencies provide visitors with outstanding recreational opportunities and care for the nationally significant natural resources of the Arkansas Valley. The AHRA Recreation Management Plan (January 2001) covers the entire OTR Project Area (see Section 3.20, Recreation Resources for additional discussion).

Public land access to the Arkansas River is complicated by four major impediments according to the AHRA Management Plan: private land, the river, topography, and the railroad tracks. For more information regarding the management of the AHRA, see Section 3.20, Recreation Resources.

3.20 RECREATION RESOURCES

The Analysis Area specific to recreation resources consists of the corridor along the Arkansas River between Salida and Parkdale. This analysis primarily focuses on recreation sites and activities occurring on, or directly adjacent to, the Arkansas River. However, recreation sites and activities not immediately bordering the river, which may be affected by the project, are also considered. Information used to describe the affected environment for recreation was collected from a variety of sources, including both published reports as well as personal interviews with the BLM, State Parks, AHRA, and USFS, among others (Map 3-87).

Bureau of Land Management

The BLM manages over 250 million acres of public lands nationwide and more than 8 million acres of land in Colorado. Diverse recreational opportunities are available to nearly 5 million annual visitors on Colorado's BLM-managed land, ranging from camping, hiking, mountain biking, birding, wildlife viewing, horseback riding, photography, and heritage site visits to hunting, fishing, boating, white-water rafting, hang gliding, OHV trail use, climbing, shooting, winter sports, and scenic driving.

BLM land in the Analysis Area is managed by the RGFO located in Cañon City. The RGFO manages more than 653,000 acres of surface lands in addition to another 2.3 million subsurface acres. Recreational opportunities managed by the RGFO include hiking/backpacking, camping, OHV use, shooting, fishing, hunting, boating, horseback riding, and scenic/nature viewing among others (BLM 2009a).

While the BLM manages the majority of land in the AHRA, the AHRA itself is primarily a partnership between the BLM and State Parks to manage recreational resources and activities along 150 miles of the river, from the Lake Fork of the Arkansas down to Lake Pueblo State Park (J.F. Sato 2007). State Parks assumes most of the day to day management of recreation on the

lands and waters in the AHRA, including BLM lands within the CMA. CDOW and USFS are also signatories to the AHRA Management Plan but play a more informal role. The Project Area for OTR, between Salida and Cañon City, contains around 43 miles of river within the AHRA.

Throughout the Analysis Area, BLM-managed land lies adjacent to the Arkansas River. These public lands include the McIntyre Hills WSA and the Texas Creek Travel Management Area, both directly accessible from US 50.

Intensive recreation management is provided on lands along the Arkansas River (109,063 acres) by BLM. These lands are identified as special recreation management areas (SRMAs) and are managed in accordance with existing and new plans and in accordance with BLM policy. The remaining lands outside the SRMAs (approximately 417,689 acres) are managed as an extensive recreational management area (ERMA) (BLM 1995).

SRMAs require specific recreational management to achieve BLM recreational objectives and to provide specific recreational opportunities. SRMAs are identified in the RMP, which also defines the management objectives for the area. BLM recreational investments also tend to be concentrated in these areas. The Arkansas River SRMA is located within the Project Area. Management for this SRMA is intended to provide upland recreational opportunities in semi-primitive, rural, semi-primitive motorized, and nonmotorized settings (i.e., watchable wildlife, natural resource interpretation, hiking, biking, and OHV use), which complement the water-based opportunities along the Arkansas River (BLM 1995).

ERMAs are BLM administrative units where recreational management is only one of several management objectives, and where only custodial management of resources is required to provide extensive and unstructured type of recreational activities. The Royal Gorge ERMA lies adjacent to the study area. Management of this area provides a variety of dispersed recreational opportunities and experiences (camping, hunting, hiking, OHV use, biking, and horseback riding) in motorized, nonmotorized, or primitive settings, as is determined appropriate. Facility development is less intensive than in the SRMAs, and provides for reduction of user conflicts and impacts to the natural resources and public health and sanitation (BLM 1995).

Colorado State Parks

State Parks manages a system of 42 parks and recreation areas, including the AHRA. In addition to the management of natural resources, a primary goal of State Parks is to provide high-quality experiences for park visitors. Recreational opportunities within the State Parks system include trail recreation, boating, OHV use, and snowmobiling.

Arkansas Headwaters Recreation Area

As it descends from its headwaters in the mountains of Leadville to the Pueblo Reservoir on the Front Range, the Arkansas River provides an array of outstanding recreational experiences. A 150-mile stretch of the Arkansas River lies within AHRA and offers world-class white-water rafting, kayaking, fishing, wildlife viewing, bird watching, camping, hiking, mountain biking, rock climbing, OHV trail use, hunting, horseback riding, sight-seeing, picnicking, and gold placer mining opportunities.

Cooperatively managed by the BLM and State Parks, the AHRA attracts local area residents and nonresidents alike to the Arkansas River corridor. The Arkansas River is conveniently accessible from Colorado's Front Range, contributing to the attractiveness of the AHRA (J.F. Sato 2007). The Arkansas River is a premier destination for both novice and expert white-water enthusiasts, and is possibly the most commercially rafted river in the world.

As stated in the 2001 Arkansas Headwaters Recreation Area Management Plan, the vision of AHRA is:

The Arkansas Headwaters Recreation Area shall be managed to emphasize its natural resources, resource sustainability, and the standards for public land health, recognizing and respecting private property, while embracing numerous recreational, educational, and commercial activities. Such management will require balancing the many uses that preserve the existing natural settings and conditions as well as recognizing existing agriculture, rural, and urban conditions throughout the river corridor. Maintaining these expectations and settings for visitors and residents alike will require individualized management through different sections of the river, in recognition of varying natural and manmade influences. Where conflict over goals and objectives occurs, balance and compromise should be found that recognizes the value of authorized recreational activities without diminishing the standards for public land health or the water resources (AHRA 2001a).

Visitation for various recreational activities in the entire AHRA, from Leadville to Pueblo, from the year 2000 through 2008 is illustrated in Table 3-90.

Table 3-90. AHRA Recreational Use for the Years 2000 through 2009¹

Activity	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sightseeing	266,676	282,472	217,648	286,598	283,669	273,664	252,132	256,577	235,221	259,169
Fishing										
<i>Shore</i>	66,426	70,011	59,377	73,975	68,570	72,939	69,390	71,206	67,053	68,191
<i>Boat</i>	6,631	7,089	5,446	7,441	6,895	6,897	7,241	10,615	10,211	11,661
Picnicking	44,160	44,826	33,324	47,293	42,740	45,660	42,173	43,879	41,909	42,520
Boating										
<i>Commercial²</i>	301,152	312,784	170,164	255,788	243,862	271,180	282,381	295,172	265,422	254,431
<i>Private</i>	28,105	30,669	23,912	31,816	28,691	30,127	29,385	30,118	27,488	25,433
Other (Minerals, Visitor Center, Hunting, and Swimming)	N/A	N/A	N/A	N/A	N/A	27,311	29,131	44,839	29,008	31,880
Trail	26,445	21,646	16,742	22,065	20,715	24,445	22,898	23,980	22,640	23,424
Interpretive	11,574	12,753	20,986	29,129	29,029	13,428	9,829	10,111	7,803	7,868
Camping ³	22,973	24,189	14,936	23,141	17,429	19,692	28,537	35,183	30,058	33,682
Activities Total	774,142	806,439	562,535	777,246	741,600	785,343	773,097	821,680	736,813	758,259

¹Counts may include participants in multiple activities

²Includes both guides and clients

³Total number of nights camping

Source: AHRA 2000-2008 Year End Reports

AHRA User Fees

The AHRA depends on annual revenue from user fees. Fees are charged for annual passes, individual passes, vehicle passes, camping permits, snowmobile registrations, OHV registrations, boat registrations, group picnic, special use agreements, and commercial agreements (AHRA 2009b).

- **Annual passes.** Annual State Parks passes include a vehicle sticker and are available for \$70 per vehicle per year. Free or discounted annual passes are available for disabled, income-qualifying, veterans, and senior Colorado residents.
- **Daily passes.** Vehicle passes can be purchased for \$7 per vehicle per day for all vehicles that enter a fee location, such as a recreational site. These self-serve passes are valid until noon the following day. Daily individual passes for visitors entering the site can be purchased for \$3 per person per day. These self-serve passes are available to visitors traveling by bike, boat, on foot, or by other nonmotorized means (2009).
- **Camping permits.** Camping permits are required for all AHRA campsites. Basic campsite permits can currently be purchased for \$16 per campsite per night. Permits must be purchased in addition to daily passes (2009).
- **Group picnic area rental.** Group picnic areas at AHRA recreational sites can currently be reserved for private groups for \$30 per day, plus vehicle and/or individual park passes. The group picnic rental fee must be paid in addition to daily passes (2009).

Table 3-91 shows the number of annual pass and permit sales and associated revenue for the entire AHRA for 2008 (2009). About 34% of the total user fees from private groups and individuals in the AHRA are collected within the Project Area (between the Salida East and Parkdale AHRA sites). Approximately 50% of the AHRA's overall revenue from commercial agreements is collected within the Project Area (AHRA 2010).

Table 3-91. Administrative Sales and Revenue for January through December 2008

Revenue Source	Number of Sales	Revenue
Annual passes	449	\$22,460.00
Aspen Leaf (age 64+) passes	274	\$5,440.00
Daily individual and vehicle passes	-	\$95,045.09
Camping permits	-	\$629,828.18*
Snowmobile and OHV registrations	1,790	\$46,462.25
Commercial agreements	-	\$754,549.34**
Total		\$1,553,784.86

*Not including reservations revenue

**Including administrative fees and fines

Source: AHRA 2008 Year End Report (AHRA 2009c)

Over half of the user fees in the AHRA are collected in the months of June, July, August and September. In the Project Area specifically, approximately \$409,100.00 in fees are collected in this timeframe. Based on AHRA field observation, about 60% of visitors to the AHRA purchase daily permits, and about 40% purchase annual passes (AHRA 2010).

United States Forest Service

The USFS manages recreation on 17 national forests and 7 national grasslands throughout the Rocky Mountain Region. Hiking, mountain biking, OHV trail use, camping, hunting, fishing, sightseeing, wildlife viewing, and winter activities offer a full range of recreational experiences to the public.

The Pike-San Isabel National Forest, including the Sangre de Cristo Wilderness, neighbors portions of the Analysis Area. Trails, campgrounds, and other recreational opportunities within the San Isabel National Forest are accessible from US 50, the AHRA, and BLM lands. These areas provide additional recreational opportunities within the Arkansas River corridor.

The most recent visitor use data for the Pike-San Isabel National Forest is available in the 2006 National Visitor Use Monitoring Study. In 2006, the USFS estimated over 6,464,300 visitors in the Pike-San Isabel National Forest, including visits to designated wilderness areas, special events and organizational camp use, and other site visits (USFS 2009a).

3.20.1 Current Conditions and Trends

From Leadville, the Arkansas River flows through the communities of Granite, Buena Vista, Johnson Village, Salida, Swissvale, Howard, Coaldale, Cotopaxi, Texas Creek, Cañon City, and Florence. While some sections of the river are bordered by roads and towns, other sections are more remote. Each section has different resource and visitor use characteristics. Six distinct river segments are described in the AHRA Management Plan. Two of these segments encompass the Analysis Area. Details of these segments and the recreational use that occurs in each are described below.

3.20.1.1 Salida to Vallie Bridge Segment

The relatively flat waters from Salida to Vallie Bridge provide excellent conditions for fishing, the primary recreational use for this segment. Easements that cross private land offer increased fishing access above Point Barr and above Vallie Bridge. Other popular activities include camping, hiking, picnicking, wildlife viewing, and recreational gold placering. The First in Boating on the Arkansas (FIBArk) event takes place on this segment every June. The vertical drop of the river in this segment is 24 feet per mile (AHRA 2001a).

This segment contains four developed AHRA recreational sites. These sites are managed by State Parks as a part of the AHRA, and include parking and restroom facilities in addition to recreational access. These recreational opportunities include boating access, camping, fishing, hiking and wildlife viewing, among others.

Salida East

Salida East recreation site is located approximately 2 miles southeast of Salida. This site provides fishing access, picnic amenities, and primitive (undeveloped) camping. The site is primarily used by boaters in the summer, while angling is the predominant use during lower flows in the spring and fall. Facilities include a two-door vault toilet and changing facility, picnic tables, fire grills, and

two large parking areas. A network of social trails and access roads are concentrated within the site as well. Private property borders both ends of Salida East, so trail connectivity is limited (Arrowhead 2004).

Salida East is a relatively heavily used rafting put-in point for both private and commercial float fishing in the spring and fall, and a relatively moderately used white-water boating put-in/take-out point for both private and commercial boating in the summer (AHRA 2001a). Commercial boating use at Salida East is displayed in Tables 3-94 and 3-95.

Point Barr

The Point Barr recreational site is located along US 50, east of the town of Swissvale on the north side of the river across from the Rincon recreational site. This site provides access for fishing, hiking, mountain biking, equestrian use, and primitive camping. Point Barr is also a major destination point for recreational gold placering activities in the AHRA (AHRA 2001a). A one-door vault toilet is available at this site.

A 7.3-mile section of CR 45 connects Point Barr to Wellsville, Howard, and Vallie Bridge. Sections of the road are accessible to four-wheel drive vehicles, OHVs, and mountain bikes only. This road offers access to less-traveled areas and scenic views (Arrowhead 2004).

Rincon

The Rincon recreational site is located off US 50 near MM 231, between the towns of Swissvale and Howard. This site provides access for camping, fishing, picnicking, and boating. Rincon is primarily used by anglers, rafters, and RV campers. Facilities include an AHRA self-service fee station, a two-door vault toilet/change facility, a two-door vault toilet, and a picnic area. The Rincon campground has 8 designated sites with a capacity of 6 people per site, for a maximum capacity of 48 people per night. Each campsite consists of a tent pad, fire grill, and picnic table. The campground includes one site equipped for ADA (Americans with Disabilities Act of 1990) accessibility (AHRA 2009b).

Two designated trails provide river access at Rincon, and an additional social trail accesses a secluded fishing and swimming location on the north end of the site. Two ADA accessible trails (concrete sidewalks) are available at Rincon. Private property borders both ends of the site, limiting trail connections (Arrowhead 2004).

Rincon is also a relatively heavy used rafting put-in/take-out point for float fishing and boaters seeking a calmer boating experience, and a moderately used rafting put-in/take-out point for white-water boaters (AHRA 2009b). Commercial boating use at Rincon is displayed in Tables 3-94 and 3-95.

Vallie Bridge

Vallie Bridge recreational site is located across the river from US 50 on Fremont CR 45 in Bighorn Sheep Canyon. This heavily used site provides access for camping, fishing, picnicking, and boating. Vallie Bridge is primarily used by tent campers and anglers, for both float and walk and wade fishing. In addition, this recreational site is also utilized by boaters on overnight trips and offers special needs fishing access. Due to steep terrain, special needs fishing is primarily concentrated at

a few AHRA sites and is therefore limited throughout the canyon. Facilities include an AHRA self-service fee station, a two-door vault toilet/change facility, a day use picnic site with two picnic tables, a boat ramp, and a boat landing near the campground with tie-off posts. The campground consists of 16 tent sites, which are boat-in or walk-in only. Each site has a capacity of 6 people, for a total campground capacity of 96 people per night. Equipment must be packed in to the campsites. The campground is accessed by a 250-foot walking trail from the parking area, as well as by a beach for campers who boat in (AHRA 2009b). Because the parking lot is adjacent to the river, ADA river access is readily available (Arrowhead 2004).

Vallie Bridge is a relatively heavily used rafting put-in/take-out point for float fishing and boaters seeking a calmer boating experience, and a moderately used rafting put-in/take-out point for white-water boaters. Commercial boating use at Vallie Bridge is displayed in Tables 3-94 and 3-95.

Upriver from Salida, there are numerous developed AHRA campgrounds and day use areas that will most likely see some level of increased use as a result of the project. However, given that they will not be directly impacted by project activities and are well outside of the actual Analysis Area, they are not described in detail.

3.20.1.2 Vallie Bridge to Parkdale Segment

Commercial and private boating are the dominant uses between Vallie Bridge and Parkdale. This segment has a vertical drop of 30 feet per mile and up to Class IV rapids. Included in this segment are the Maytag, Lose-Your-Lunch, Three Rocks, and Shark's Tooth rapids. In general, visitors in the early rafting season (from May to early June) are experienced boaters, seeking the challenge associated with higher flows from spring runoff. As water levels drop, more families and less experienced boaters visit the river (J.F. Sato 2007).

Opportunities for wildlife viewing and bird watching are abundant along the river. Widespread access to the river and various recreational activities are available at the 8 AHRA recreational sites along this segment. Fishing, camping, hiking, picnicking, and recreational gold placering are accessible within this segment as well (AHRA 2001a).

This segment contains 8 developed AHRA recreational sites, in addition to smaller informal use areas and pull-offs along the river.

Canyon Trading Post

The Canyon Trading Post recreational site is located on US 50 between the towns of Coaldale and Cotopaxi, west of MM 244. This day use site provides access for boating, fishing, picnicking, wildlife viewing, and rock climbing. Facilities include an AHRA self-service fee station, a two-door vault toilet/change facility, picnic tables and grills, access for boating, and a wildlife viewing exhibit. There are several social trails located within Canyon Trading Post, though trail connectivity is limited by private property downstream of the site. Natural rock formations near Canyon Trading Post are well-suited for rock climbing activities (Arrowhead 2004).

Canyon Trading Post is a moderately used boating put-in/take-out. The boating stretch from Salida to Canyon Trading Post is recommended for private boaters by AHRA, and consists of Class III and IV rapids (AHRA 2009b). Commercial boating use for Canyon Trading Post is displayed in Tables 3-94 and 3-95.

Lone Pine

The Lone Pine recreational site is located along US 50 near MM 248, between the towns of Cotopaxi and Texas Creek. This day use site provides facilities and access for boating, fishing, hiking, picnicking, and wildlife viewing. It also offers special needs fishing access. Lone Pine is primarily used for boating, fishing, and picnicking. Facilities include an AHRA self-service fee station, a two-door fault toilet/change facility, and picnic tables and grills. A 0.5-mile designated river trail provides opportunities for wildlife viewing, river viewing, and fishing access.

Lone Pine is a moderate to heavily used put-in/take-out point for private and commercial boating. The boating stretch from Lone Pine to Pinnacle Rock is recommended for private boating by AHRA, and is less crowded than other segments of the river. Commercial boating use for Lone Pine is displayed in Tables 3-94 and 3-95.

Texas Creek

The Texas Creek recreational site is located on the north side of US 50 and the town of Texas Creek, near MM 252 ½ (Map 3-88). The 240-acre site includes an historic ranch house and associated structures. Private property, including a café, is located on the southeast side of the Texas Creek Bridge. In addition, private property, including a commercial boat put-in/take-out facility, is located on the southwest side of the Texas Creek Bridge. In addition to serving as an access point for hunting, boating, fishing, hiking, mountain biking, and equestrian activities, this day use area is heavily used by OHVs. Facilities at the site include a seasonal porta-john, a one-door vault toilet facility, a boat ramp, and a short trail to the Texas Creek Rapid (Arrowhead 2004).

Texas Creek is a heavily used put-in/take-out point for boating. The stretch of river between Texas Creek and Parkdale is a popular boating run, especially from May to September (White and Nahomenuk 2009). Commercial boating use for Texas Creek is displayed in Tables 3-94 and 3-95.

As described above, the Texas Creek Travel Management Area is managed by the BLM and is located adjacent to the Texas Creek AHRA site. Motorcycles, ATVs and four-wheel drive vehicles are permitted in Texas Creek. Table 3-92 displays the total number of vehicles that entered Texas Creek annually from 2001-2008. The number of vehicles does not necessarily indicate number of OHV trail users, though OHV trail use is the primary recreational activity in Texas Creek (Skinner 2009).

Table 3-92. Total annual vehicle numbers in Texas Creek from 2001 to 2008

Year	Number of Vehicles*
2008	7,383
2007	8,778
2006	7,857
2005	7,777
2004	9,810
2003	10,210
2002	17,995
2001	14,484

*Based on monthly counts of vehicles that crossed Texas Creek gate and include vehicles entering and exiting the area. Vehicle numbers were determined by dividing the total counts by two, to account for vehicles both entering and leaving the area.

Source: BLM Texas Creek Vehicle Counts (BLM 2009b)

Pinnacle Rock

The Pinnacle Rock recreational site is located off US 50 at MM 258, northeast of the town of Texas Creek and about 1 mile upstream from Three Rocks Rapid. This day use site provides access for boating, fishing, picnicking, and wildlife viewing. Pinnacle Rock is primarily used for boating and some fishing and picnicking. Facilities include an AHRA self-service fee station, a two-door vault toilet/change facility, a two-door vault toilet, picnic tables and grills, and two boat ramps. A sloped boat ramp at Pinnacle Rock allows anglers with special needs easy access to the water. This area also provides access for bighorn sheep hunting (Game Management Unit [GMU] S-49) and deer hunting (GMU 691). There are few social trails at this site, but trail connectivity is limited by the site's proximity to the highway and the river (Arrowhead 2004).

Pinnacle Rock is one of the most heavily used put-in/take-out points for boating in the AHRA. Commercial boating use for Pinnacle Rock is displayed in Tables 3-94 and 3-95. The stretch of river from Pinnacle Rock to Parkdale, also known as the Bighorn Sheep Run, is the most popular boating run in the Analysis Area and can be very challenging when river flows are high (White and Nahomenuk 2009).

Salt Lick

The Salt Lick recreational site is located off US 50, between the Pinnacle Rock and Five Points recreational sites. This developed nonfee day use site provides access for boating and restroom facilities. Commercial traffic is only able to enter this site from the east. There are no designated or social trails at Salt Lick (Arrowhead 2004). Salt Lick is a heavily used put-in point for commercial boating. Commercial boating use for Salt Lick is displayed in Tables 3-94 and 3-95.

Five Points

The Five Points recreational site is located off US 50 near MM 260, between the towns of Cotopaxi and Cañon City. This site provides facilities and access for camping, fishing, hiking, picnicking, hunting, and wildlife viewing. No boating access is available at this site. Five Points is primarily used by boaters coming from upstream sites, drive-through campers, and visitors viewing wildlife. Facilities include an AHRA self-service fee station, two single restrooms with vault toilets, a wildlife viewing exhibit, and a scenic overlook (steel pier) near the river.

Five Points is the most southeastern campground in AHRA (Arrowhead Trails 2004). The campground consists of 20 campsites, each with a tent pad, fire grill, and picnic table. Each campsite has a capacity of 6 people per night, for a total of 120 people per night in the campground. An ADA accessible concrete walkway leads visitors from the campground to the river, crossing underneath US 50 (AHRA 2009b).

This area provides access for bighorn sheep hunting (GMU S-49) and deer hunting (GMU 691). In addition, Five Points is the only AHRA site in the Project Area that offers a concrete, wheelchair-accessible platform that can be used by anglers and wildlife viewers with special needs. During low water, this platform is heavily used by anglers.

Five Points provides access to the McIntyre Hills WSA. A designated trail leads from the campground into the WSA, and is over 1 mile long. A map at the Five Points entrance station displays the trail to the WSA.

Spikebuck

The Spikebuck recreational site is located off US 50 near MM 261 ¾, between the towns of Texas Creek and Parkdale. This day use site provides access for boating, fishing, and picnicking. Spikebuck is primarily used for fishing and boating. Facilities include an AHRA self-service fee station, a two-door vault toilet/change facility, picnic tables and grills, interpretive signs, and two small boat ramps. A designated trail leads from the parking lot to the river, and a second designated trail leads to the restrooms (Arrowhead 2004).

Spikebuck is a moderately used put-in point for boating. Commercial boating use for Spikebuck is displayed in Tables 3-94 and 3-95.

Parkdale

The Parkdale recreational site is located along US 50, west of Parkdale. This heavily used recreational site provides access for boating, fishing, and picnicking. It also offers special needs fishing access. Facilities include an AHRA self-service fee station, a four-door vault toilet/change facility, a seasonal porta-john, picnic tables and grills, and a large boat ramp. One designated trail leads from the lower parking lot to the boat ramps and restrooms. A designated trail provides access to the river and several picnic tables, and another designated trail leads from a one-way boat launching road to the upper parking lot. In addition, a number of gravel surfaced areas provide access to picnic sites and river overlooks (Arrowhead 2004).

Parkdale is a heavily used put-in/take-out point for boating. This is the final access point for rafting before the river enters the Royal Gorge, and many boaters enter and exit the river at this point. Commercial boating use for Parkdale is displayed in Tables 3-94 and 3-95.

3.20.1.3 Special Use Permits

The AHRA permits a wide variety of commercial uses along the Arkansas River. The Special Use Agreements section of the AHRA exists to administer the Special Use Agreements for the river, as well as administer the Rationing Plan for Commercial Boating on the Arkansas River within the AHRA. AHRA had 82 commercial contractors in 2008. Permitted contractors provided various combinations of activities such as white-water rafting, float fishing, walk and wade fishing, shuttle services, and photo/video imaging to over 215,763 clients in 2008. The number and distribution of AHRA commercial Special Use Agreements are illustrated below in Table 3-93.

Table 3-93. AHRA Commercial Special Use Agreements (by type)

Type	2008	2007
Boating	55	55
Imaging	9	10
Walk and Wade Fishing	15	15
Shuttle Services	3	4
Total	82	84

3.20.1.4 Boating

The Arkansas River is the most heavily rafted river in Colorado and the most commercially rafted white-water river in the world. The peak white-water use season is from June through mid-August, though boating occurs on the Arkansas from March through October.

AHRA contains 10 designated public river access sites between Salida and Parkdale, 9 of which are accessible for boating. Some regularly used commercial and private put-in points are located on private property as well. These sites include Swissvale Manor, the Rocky Mountain Outdoor Center in Howard, a point downstream of the Cotopaxi KOA campground, and the Texas Creek Store (J.F. Sato 2007).

Recreational boating vehicles often have unique transportation needs. Due to the nature of river trips, shuttles are required to transport clients and boats. Commercial operators may travel a specific section of highway multiple times in a single trip to drop off or pick up clients and equipment. Outfitters may be accompanied by photographers or other support staff that also travel the corridor for each trip.

Private boaters often use multiple cars to operate shuttles for a trip. One car will park at the launch point, and another will park downstream at the take out. As a result, these vehicles may travel a stretch of highway more than once for a trip.

Boating pressure is high throughout the Analysis Area, and the highest levels of use occur between Vallie Bridge and Parkdale. This segment contains numerous white-water rapids (Class III-IV), and the river drops in elevation rapidly, creating ideal boating conditions (Bridges, et al. 2000). Between Salida and Vallie Bridge, in contrast, the river is calmer and the rapids less challenging. There is less boating pressure on this segment, as it is primarily managed for fishing. The commercial boating that occurs in this section primarily consists of float fishing trips. Tables 3-94 and 3-95 list the number of commercial boat put-ins and take-outs for the primary boating access points along the river in the Analysis Area over the four-year period from 2005-2008. Use is displayed during the peak boating months of June, July, and August.

Table 3-94. Commercial Boat Put-Ins at Primary Boating Access Points in the Analysis Area

Segment	Boating Access Point	2005			2006			2007			2008		
		June	July	Aug									
<i>Salida to Vallie Bridge</i>	Salida East	17	31	27	16	30	16	3	18	17	23	38	30
	Rincon	13	16	18	8	26	6	7	19	7	32	22	21
	Vallie Bridge	30	38	18	37	49	23	41	48	39	43	51	37
<i>Vallie Bridge to Parkdale</i>	Canyon Trading Post	0	2	5	0	4	2	7	1	0	27	9	0
	Lone Pine	78	66	16	81	30	8	97	56	14	205	163	17
	Texas Creek	55	117	61	79	157	84	67	166	94	59	111	78
	Pinnacle Rock	671	716	298	678	759	452	803	800	487	461	618	358
	Salt Lick	292	581	451	349	576	419	398	649	506	545	651	556
	Spikebuck	52	43	61	26	57	21	5	22	20	1	10	45
	Brown's Landing	113	116	86	46	54	43	58	63	50	14	33	35
	Parkdale	420	603	440	522	647	511	673	745	554	165	568	587

Source: Kreski 2009a.

Table 3-95. Commercial Boat Take-Outs at Primary Boating Access Points in the Analysis Area

Segment	Boating Access Point	2005			2006			2007			2008		
		June	July	Aug									
<i>Salida to Vallie Bridge</i>	Salida East	21	51	28	15	30	23	17	42	28	27	17	24
	Rincon	58	97	62	55	69	37	39	68	47	58	71	66
	Vallie Bridge	31	39	30	26	30	9	28	39	21	38	50	32
<i>Vallie Bridge to Parkdale</i>	Canyon Trading Post	3	0	3	6	6	5	1	7	5	0	15	14
	Lone Pine	1	5	2	0	8	2	8	7	2	27	13	4
	Texas Creek	2	16	13	9	8	3	7	16	6	28	18	19
	Pinnacle Rock	17	17	5	14	16	7	11	16	4	231	107	3
	Salt Lick	11	1	0	22	1	0	28	0	0	32	1	0
	Spikebuck	1	2	0	1	0	0	0	0	0	1	0	0
	Brown's Landing	287	379	230	190	301	184	233	331	248	283	282	171
	Parkdale	451	626	370	591	777	476	773	857	540	904	869	516

Source: Kreski 2009a.

Ideal river flows for boating range from 600-3500 cfs throughout the Project Area. Flows of 600 cfs are considered the minimum acceptable flow for boating (American Whitewater 2010, Eddy Flower 2010). According to USGS surface water data for the Project Area, flows typically remain above 600 cfs throughout August, but quickly drop below 600 cfs in September, limiting rafting opportunities. Data collected from 1988 to 2009 show an average drop in flows from 1,010 cfs on August 1 to 561 cfs on September 1 (USGS-NWIS 2010).

In accordance with the *Upper Arkansas Voluntary Flow Management Plan (VFMP)*, water providers have agreed to maintain a target flow of 700 cfs from July 1 through August 15 to ensure a high quality white-water experience for recreationists. The BOR may augment flows within this period in order to maintain this target level. Because minimum flows for boating are rarely achieved after August 15, commercial boating use falls dramatically after that date. Table 3-96 compares the number of commercial boats in the AHRA prior to August 15 to the number of boats on the river after August 15, for 2005 through 2008.

Table 3-96. Commercial Boating Use Before and After August 15*

Year	August 1 to August 15	August 16 to August 31
2005	7,355	2,282
2006	7,462	2,390
2007	8,044	2,714
2008	7,725	2,864

Source: Kreski 2009a.

*Total rafts and kayaks at all put-in points in the AHRA (including points outside the Project Area).

The AHRA administers a rationing plan for commercial rafts and kayaks during boating season. Commercial outfitters report their actual annual use based on date and day of the week for each section of the river. Rationing for each outfitter is then determined from average historic use on the river in comparison to other outfitters.

Capacity of use on the river is measured in boats per day, and varies by day of the week, date, section of the river, and year. Rationed days are recalculated annually based on whether the number of boats on a river segment exceeded daily capacities. Rationing occurs in three-year cycles, so once rationing has been triggered for a segment, it will take effect for that length of time. If the number of commercial boats on a particular day within a specific segment does not exceed 80% of capacity for two consecutive years, then the following year's rationing for that particular day within that specific segment will be discontinued. Capacities for private and commercial use on segments of the river within the Analysis Area, as well as special use windows and notes, are displayed in Table 3-97 (AHRA 2001a).

Rationing is determined by day for each segment of the river. Currently, specific days are rationed on the river segments from Salida to Vallie Bridge and from Texas Creek to Parkdale. There were no rationed days for the segment between Vallie Bridge and Texas Creek for 2006, 2007, or 2008. Table 3-98 shows the days that were rationed in 2008. Exceptions to the rationing plan occur during periods of high water or low water, and special treatment is given to certain holidays, such as July 4th, Memorial Day, and Labor Day. The BLM River Manager and State Parks AHRA Park Manager have the authority to temporarily waive or modify rationing based on extenuating circumstances. In addition, the BLM River Manager and State Parks AHRA Park Manager have the authority to permanently modify rationing if conditions warrant. (See also the Colorado State Parks discussion in this chapter).

Table 3-97. Carrying Capacities for Private and Commercial Boating Use

Segment	Carrying Capacities		Use Seasons	Special Use Windows & Notes
	Private	Commercial		
<i>Salida to Vallie Bridge</i>	150	150	May 15-July 14	Commercial boats off river by 5 p.m.
	30	10	July 15-May 14	Commercial boats off river by 5 p.m. Allow one commercial boat trip per day, with a maximum of four boats, to enter the river stretch from Stone Bridge to Texas Creek above capacity for pass through camping
<i>Vallie Bridge to Texas Creek</i>	100	150	May 15-Aug 15	Commercial boats off river by 5 p.m.
	30	10	Aug 16-May 14	Commercial boats off river by 5 p.m. Allow one commercial boat trip per day, with a maximum of four boats, to enter the river stretch from Stone Bridge to Texas Creek above capacity for pass through camping
<i>Texas Creek to Parkdale</i>	150	300	May 15-Sept 7	Commercial boats off river by 5 p.m. Allow one safety boat with paid staffer per commercial boat trip above capacity
	40	30	Sept 8-May 14	Commercial boats off river by 5 p.m. Allow one safety boat with paid staffer per commercial boat trip above capacity

Source: AHRA 2001a.

Table 3-98. Days Rationed for Commercial Boating in 2008

	Salida to Vallie Bridge		Texas Creek to Parkdale
<i>Total Rationed Days</i>	34		4
<i>Days Rationed</i>	Apr 18	July 27	May 2
	Apr 19	July 29	May 3
	Apr 26	July 30	May 10
	Apr 27	Aug 3	June 30
	Apr 28	Aug 7	
	May 2	Aug 10	
	May 3	Aug 11	
	May 4	Aug 12	
	May 6	Aug 13	
	May 7	Aug 14	
	July 16	Aug 15	
	July 19	Aug 16	
	July 20	Aug 20	
	July 21	Aug 23	
	July 23	Aug 24	
	July 25	Sept 9	
July 26	Sept 19		

Source: AHRA 2009d

The AHRA collects use data on private boats on the Arkansas River in sporadic intervals and without regularity. Unlike the commercial boating data, it is not known which put-in or take-out was used by private boaters nor does it indicate the total number of people in the boats. This data was reviewed and considered as part of this analysis, but was found to be inadequate as baseline information on private boating in the Project Area. However, the data does indicate that private boating occurs extensively throughout the Project Area, from Salida to Parkdale (Kreski 2009a).

Commercial rafting use typically begins in May and ends in September. Use increases during the month of June, and peak commercial season occurs between July 1 and the first week of August. During the second week of August, use is comparable to the third and fourth weeks of June, and drops significantly after August 15. In general, these trends equate to the total visitation trend for the AHRA. Private boating use differs slightly from commercial boating use. As private boaters take greater advantage of high water levels than commercial boaters, private use is at its peak in early to mid-June (White 2009).

3.20.1.5 Angling

The Arkansas River is highly regarded for its brown trout fishery and is a popular angling destination in Colorado. The stretch of the river from the Stockyard Bridge (just southeast of Salida) to Texas Creek offers excellent brown trout fishing opportunities, particularly in the spring and fall months (J.F. Sato 2007). Fly, lure, and bait fishing are all popular on the river, though the majority of anglers fish with flies. In 2007, CDOW found that the majority of anglers in the Project Area fish by fly (77%). Compared to the 1995 CDOW creel census, the percentage of anglers fishing with flies has increased, while the percentage of anglers fishing by lure or bait has decreased. The majority of angling that occurs is “walk and wade,” but many users also “float fish,” or fish by boat. Local commercial outfitters offer both walk and wade and float fishing experiences (Bridges, et al. 2000).

a. Access

While 60% of the overall Arkansas River corridor is in private ownership, much of the river between Salida and Parkdale is accessible to the public for angling on fishing easements and at recreational sites. Public river access is available at AHRA recreational sites, BLM lands, and CDOW fishing easements that cross private land. Streamside parking areas, including pull-outs along US 50 and dirt roads on the north side of the river, are heavily used for fishing access and parking (Bridges, et al. 2000 and Woodruff 2009).

Recreational fishing vehicles often have unique circulation needs. Due to the nature of river trips, shuttles are required for commercial outfitters to transport clients and boats for float fishing trips. Commercial operators may travel a specific section of highway multiple times in a single trip to drop off or pick up clients and equipment. For commercial float fishing trips, outfitters may use large vans, trailers, or other oversized vehicles to transport clients and equipment. Like commercial boating outfitters, commercial float anglers require access to boat ramps and parking for oversized vehicles at AHRA sites.

Float fishing trips may require the use of multiple vehicles and a shuttle system to transport clients and equipment from one stretch of river to another. One car will park at the launch point, and another will park downstream at the take out. As a result, these vehicles may travel a stretch of highway more than once for a trip. Private anglers may use a similar shuttle system.

b. Season

Previously conducted monthly counts show that angling use occurs year-round on the Arkansas River, with peaks in the early spring and fall. Only the high runoff during late May through late June causes fishing activity to decrease significantly. The peak season for angling is dependent on annual fly hatches (J.F. Sato 2007). Blue wing olive mayflies begin hatching in mid-March and continue hatching through May, while pale morning dun and red quill mayflies hatch from July-September. Stoneflies typically hatch in May and June. Caddisflies hatch from mid-April through September (Ark Anglers 2009a). Prime fishing use on the Arkansas River generally occurs between mid-April and mid-May, when the caddisfly hatch is at its peak (Salida Chamber of Commerce 2009). Angling use increases again in July, when flows begin to drop at higher elevations.

While angling pressure for the overall AHRA is not at its highest level in the late summer, there is increased angler demand in the Project Area in August as anglers return to Bighorn Sheep Canyon. Flows drop dramatically between mid-August and early September throughout the Project Area, which creates conditions that are conducive to fishing in Bighorn Sheep Canyon in the fall.

c. Setting and Experience

The Arkansas River offers a scenic, yet accessible, natural setting for angling. The river is located adjacent to US 50, which offers convenient access to fishing sites. Although the stretch of river in the Project Area lies within a corridor filled with human activity, it also offers scenery and a quality fishing experience. Views of the canyon walls, signs of wildlife, and high water quality and clarity all contribute to the desired setting for angling. See Section 3.21, Visual/Aesthetic Resources, for more information on the setting and scenic quality of the Project Area.

Anglers often seek a fishing experience that is based on solitude and limited human interaction. Not only does quiet, calm water provide better habitat for fish, it also creates a relaxing environment for anglers. This type of fishing experience is preferable for many anglers.

d. Concentration of Use

Although angling occurs extensively throughout the Analysis Area, use is concentrated along particular sections of the river. Angling pressure is heaviest between Salida and Vallie Bridge, as the river contains deep pools, rock banks, and gravel bars that create ideal habitat for fish (Bridges, et al. 2000). As a result, there are higher densities of fish in this section than there are in steeper stretches of the Arkansas River. This river segment is primarily managed for angling recreation, and both float and walk and wade fly angling are very popular. The commercial boating that occurs in this section primarily consists of float fishing trips.

Angling use is heavy on the stretch of river directly southeast of Salida, as it is easily accessible from the town. Within this stretch of approximately 10 miles, use is concentrated near the County Line (from Cleora to Wellsville) and in the Tunnel Area southeast of Swissvale (MM 230 of US 50). Farther downstream, heavy use occurs on the Ogden fishing easement (near MM 238 of US 50) between Howard and Coaldale. Fishing pressure is also heavy at the nearby Vallie Bridge and Lone Pine recreational sites.

The stretch of the river from Texas Creek to Parkdale experiences lower levels of angling use overall, as the river drops sharply and contains more challenging white-water rapids and less desirable fishing conditions (Bridges, et al. 2000). However, heavier use does occur on the SLB land southwest of Parkdale, near MM 263 of US 50 (Aragon 2009). Float fishing and bait/lure angling are popular on this segment.

Walk and wade and float anglers depend on a number of factors when selecting a time and place for fishing, including: the location of caddis and other flies, timing of fly hatches, weather conditions, water flow levels, permits and daily allocations, boat ramp locations, required times for commercial boats to be off the river, and trip length.

e. Use Patterns

Total angling use on the Arkansas River has been difficult to estimate. The most recent CDOW creel census, used to estimate angling use, was conducted on three stretches of the Arkansas River between Salida and Lone Pine (Policky 2008). The first segment runs from the Stockyard Bridge (immediately southeast of Salida) to the confluence of the Arkansas River with Badger Creek (southeast of Swissvale). The second segment runs from the confluence of the Arkansas River and Big Cottonwood Creek (near Coaldale) to the Lone Pine recreational area. The third segment runs for 3 miles between the floodplain area to the Pinnacle Rock AHRA site. Table 3-99 shows the estimated number of anglers on these three sections of the river from April to September of 2007. Angling estimates for these segments do not represent the total number of anglers on the Arkansas River over the course of the year, or the total number of anglers within the Project Area. However, these estimates do indicate peak season angling pressure on three key segments of the river.

Table 3-99. Total Estimated Anglers Counted on Segments of the Arkansas River (by Month)

Month	Floodplain to Pinnacle Rock ¹	Stockyard Bridge to Badger Creek ²	Lone Pine to Big Cottonwood Creek ²	Total
April	479	1,847	1,295	3,142
May	836	674	273	947
June	48	324	231	555
July	152	385	318	703
August	473	519	264	783
September	372	918	653	1,571
Total	2,360	4,667	3,033	10,060

Source: CDOW 1995 and CDOW 2007.

¹Based on 1995 CDOW creel census data.²Based on 2007 CDOW creel census data.

Data from the 2007 and 1995 creel censuses can be extrapolated to estimate total annual angling use between Salida and Parkdale. The same extrapolation methodology that was used to estimate total annual use for the 1995 CDOW creel census was applied to the data from the 2007 creel census. Table 3-100 displays angling use estimates for both public and private stretches of the river. Because the stretch of river between Floodplain and Pinnacle Rock was censused in 1995 but not 2007, the 1995 data is used to estimate use between Texas Creek and Parkdale. The 2007 creel census data was used to estimate use for the other two stretches. The total estimated annual angling use between Salida and Parkdale is 33,123 anglers.

Table 3-100. Overall Angling Use Estimates for Salida to Parkdale in 2007.

Creel Census Area (Name and Miles)	Extrapolated River Reach and Miles	Public			Private ¹			Total Anglers
		Anglers per Mile	Miles	Total Anglers	Anglers per Mile	Miles	Total Anglers	
Floodplain to Pinnacle Rock ² (3 miles)	Parkdale – Texas Creek (13.3 miles)	786	13.3	10,454	0	0	0	10,454
Lone Pine to Big Cottonwood Creek (3 miles)	Texas Creek – Lazy J (12 miles)	1,011	4.8	4,853	253	7.2	1,822	6,675
	Lazy J – Upper Howard Brdg (8.3 miles)	1,011	3.1	3,134	253	5.2	1,316	4,450
Badger Creek to Stockyard Bridge (6.4 miles)	Howard Brdg – Stockyard Brdg (11.4 miles)	729	5.2	3,791	182	6.2	1,128	4,919
Totals		-	13.1	11,778	-	18.6	4,266	26,498
Total Estimated Annual Anglers								33,123 ³

Source: CDOW 1995 and CDOW 2007.

¹ Private anglers per mile are 25% of public anglers per mile.²Based on 1995 CDOW creel census data.³Extrapolated by 25% to include the remaining months of the year not covered by the creel census.

Table 3-101 compares the number of anglers and angler hours on segments #6D and #6B of the Arkansas River in 1995 and 2007. Angler use was lower than expected in 2007 as a result of early spring runoff and summer rainstorms that created poor fishing conditions. However, the 2007 creel census report states that angler use in 2007 could have increased fivefold compared to 1995 if fishing conditions had been optimum that year. It can be assumed that overall angling use in the Project Area has notably increased in recent years. Longer average trip lengths account for the increased number of angler hours and fishing pressure from 1995-2007 (Policky 2008).

Table 3-101. Estimated Anglers and Angler Hours on Segments of the Arkansas River in 1995 and 2007*

Segment	1995	2007
Stockyard Bridge to Badger Creek (#6D)		
Angler Hours	6,628	14,914
Anglers	5,060	4,667
Lone Pine to Big Cottonwood Creek (#6B)		
Angler Hours	5,670	6,787
Anglers	4,651	3,033
Totals		
Angler Hours	12,298	21,701
Anglers	9,711	7,700

Source: Policky 2008.

*Total anglers and angler hours from April to September.

f. Commercial Use

Many anglers choose to take fishing trips with commercial outfitters rather than on their own. Outfitters offer angling trips on the Arkansas River throughout the year, as displayed in Table 3-102. In 2009, 2,865 float and walk and wade anglers took commercial fishing trips in the Project Area.

Table 3-102. Commercial Float and Walk-and-Wade Angling Estimates by Month for 2009.

Month	Section 3		Section 4a		Section 4b		Total
	Float	Walk-Wade	Float	Walk-Wade	Float	Walk-Wade	
January	-	-	-	-	-	-	-
February	-	7	-	-	-	-	7
March	9	53	2	-	-	7	71
April	214	120	130	13	-	24	501
May	141	124	44	3	-	16	328
June	41	15	15	-	-	17	88
July	178	115	144	17	-	34	488
August	307	184	201	9	2	28	731
September	238	128	84	10	-	46	506
October	61	45	8	-	-	15	129
November	13	-	3	-	-	-	16
December	-	-	-	-	-	-	-
Total	1,202	791	631	52	2	187	2,865

Source: AHRA 2009e.

3.20.1.6 Wildlife Viewing and Bird Watching

The Arkansas River provides excellent opportunities for wildlife viewing and bird watching. Rocky Mountain bighorn sheep, raptors (including bald eagles and golden eagles), waterfowl, shorebirds, and migrant birds can all be observed along the river corridor. Opportunities to view Rocky Mountain bighorn sheep are best along the rocky slopes near the river between Wellsville and Parkdale. Viewing is heaviest in the mid-morning and late afternoon, when the sheep are most active. Bird watching is most popular in the spring and fall, during peak migration (J.F. Sato 2007).

A 2001 study by CDOW and Colorado State University (CSU) found that over one-third of Colorado residents expressed interest in seeing big game animals, such as moose, bighorn sheep, mountain goats, mountain lions, bears, and pronghorn antelope. Approximately 41% of Coloradoans were most interested in Rocky Mountain bighorn sheep, the state animal. In addition, more than 90% of Colorado residents and visitors are interested in going to wildlife viewing locations with the primary purpose (or a primary purpose) of viewing wildlife. In terms of vacationing or taking trips, around 85% of Coloradoans were interested in taking recreational trips where the primary purpose (or a primary purpose) was to view wildlife (Vaske, et al. 2001).

3.20.1.7 Camping

a. Arkansas Headwaters Recreation Area

Three AHRA established campgrounds are located within the Project Area: Rincon, Vallie Bridge, and Five Points. Total capacity of the campgrounds is 258 people per night. All three sites fill to near or at capacity on weekdays and weekends during the peak camping season (from mid-July to mid-August), and AHRA recommends reservations ahead of time to ensure a campsite during peak season. Campsite use is restricted to a maximum of 14 days within a 45-day period for a single party. These campsites do not supply water or electricity for campers. AHRA does not make provisions for overflow camping, but various other camping opportunities exist within the Analysis Area (AHRA 2009a).

b. U.S. Forest Service

The Analysis Area for recreation is broader than the Project Area, and includes areas upland of the Arkansas River that may experience increased recreation pressure as a result of the project. There are four developed USFS campgrounds within the Analysis Area: O'Haver Lake, Hayden Creek, Coaldale, and Oak Creek. These campgrounds are located south of the Arkansas River in the San Isabel National Forest and are typically accessed from US 50. Coaldale and Hayden Creek campgrounds, located southwest of the town of Coaldale, receive fair to moderate visitor use. O'Haver Lake campground, located southwest of Salida and west of US 285, is heavily used as both a day use site and an overnight campground. Oak Creek campground is located south of Cañon City (Weierbach 2009).

These developed campgrounds provide a parking spot, tent pad, and covered grill. Hayden Creek, Coaldale, and O'Haver Lake campgrounds are operated and maintained by Rocky Mountain Recreation Company (a third-party company), while Oak Creek campground is maintained by volunteers. The O'Haver Lake campground also offers an accessible fishing area and a toilet (Weierbach 2009).

The USFS recommends that visitors reserve campgrounds in advance during peak season, as campsites often reach capacity. Reservations are made through a national 1-800 phone number (1-800-280-CAMP). Table 3-103 displays the number of campsites, fees, and reservation status for each campground in the Analysis Area.

Dispersed camping is also permitted on USFS lands. The USFS requests that campers choose campsites at least 200 feet from water, and concentrate impacts in areas that have already been heavily used. Dispersed camping is primitive in nature, so no amenities are provided and campers are responsible for proper waste disposal (USFS 2007).

Human impacts, such as trash and improper waste disposal, can occur in both designated and dispersed camping areas. Where adequate waste disposal facilities are not available, the likelihood of these impacts may also increase. Conflicts with wildlife may also occur near campsites, and frequent bear conflicts have occurred near the Hayden Creek campground, in particular.

Table 3-103. Sites, Fees, and Reservation Status for National Forest Service Developed Campgrounds in the Analysis Area

Campground	Number of Sites	Fee per Night	Reservation Status
O'Haver Lake	29	\$15	Reservable
Hayden Creek	11	\$15	Reservable
Coaldale	11	\$12	Reservable
Oak Creek	15	Free	Nonreservable

Source: USFS 2009b

c. Bureau of Land Management

In addition to designated AHRA and National Forest Service campsites, dispersed camping is permitted on BLM-managed lands adjacent to the AHRA, unless otherwise noted. Dispersed camping regularly occurs in the Maytag area, located between the Texas Creek and Pinnacle Rock AHRA sites. Visitors to this area are typically boaters on overnight trips, as the Maytag area provides access to the river and a series of popular rapids. Dispersed camping frequently occurs at the Point Barr, Salida East, and Texas Creek AHRA sites. Boaters on overnight trips also camp in undeveloped sites along the river. In the Texas Creek Travel Management Area, vehicle travel is prohibited more than 100 feet from a designated road; however, dispersed camping is permitted anywhere within the Travel Management Area. Some backcountry camping occurs in the McIntyre Hills WSA south of US 50, between Texas Creek and Parkdale (J.F. Sato 2007). All BLM camping regulations apply to BLM land in the Project Area, including the following (BLM 2010d):

- Vehicle travel must occur within 100 feet of a designated road.
- Camping in the Project Area is limited to 14 days within a 30-day period.
- After the 14 days have been reached, a user must move at least 30 air miles away from the previously occupied location.
- Users must not leave any personal property or refuse after vacating the campsite.
- Users must not leave personal property unattended in a campground, designated recreation area, or on any other public lands for more than 48 hours. Vehicles left parked for the purpose of overnight camping, hiking, river rafting, or other authorized recreation activities are exempt.
- Users must not violate any State of Colorado or county laws or regulations relating to public health, safety, sanitation, building or fire codes while camping, occupying, or using public land.

All visitors to dispersed camping areas within the AHRA Cooperative Management Area are required to have portable toilets and fire pans at campsites to reduce human impacts to natural resources on these lands.

d. Private Campgrounds

Various private RV parks and campgrounds are located between Salida and Cañon City. Many of these campgrounds provide hook-ups for water and electricity, showers, laundry services, and other amenities. Most are located directly off US 50 along the Arkansas River.

- Heart of the Rockies Campground, Salida
- Four Seasons RV Park, Salida
- Riverside Lodge Campground, Salida
- Cotopaxi/Arkansas River KOA, Cotopaxi
- Royal Gorge/Cañon City KOA, Cañon City
- Fort Gorge RV Park and Campground, Cañon City
- Indian Springs Ranch Campgrounds, Cañon City
- Mountain View RV Park and Café, Cañon City
- Royal View Campground, Cañon City
- Prospector Campground, Cañon City
- Bighorn Sheep RV Park, Coaldale
- Sweetwater River Ranch RV Park, between Salida and Cañon City
- Pleasant Valley Campground, Howard
- Sugarbush Campground, Howard
- Hidden Valley Ranch, Coaldale

3.20.1.8 Hiking and Mountain Biking

Hiking and mountain biking opportunities are limited in the AHRA, though mountain biking is growing in popularity in the area. Four recreation sites between Salida and Parkdale provide hiking access: Point Barr, Lone Pine, Texas Creek, and Five Points. Additional hiking and biking trails on BLM lands are accessible north of Texas Creek and in the Badger Creek, Castle Gardens, and Salida areas. Salida Mountain Trails, a local group, has been working to establish trails near Salida and Castle Gardens. Some trails near the Arkansas River connect to the Rainbow Trail south of US 50 near Vallie Bridge in the San Isabel National Forest, at the west end of the Project Area at Bear Creek, and southeast of Salida at CR 108 (J.F. Sato 2007).

a. McIntyre Hills Wilderness Study Area

The Five Points recreational site offers access to the McIntyre WSA. A trail leads into the WSA from the Five Points campground. The majority of the trails within the WSA are undesignated or social trails. Mountain biking is not permitted in the WSA.

3.20.1.9 Rock Climbing

There are limited opportunities for rock climbing in the AHRA. Some climbing is available within the Badger Creek area north of Texas Creek, and on the rock face east of Coaldale below Cottonwood rapid (near MM 243 on US 50) (J.F. Sato 2007). Local outfitters offer rock climbing trips on BLM lands in the Analysis Area through permits with the RGFO as well.

a. Shelf Road Recreation Area

Located off Shelf Road, approximately 25 miles North of Cañon City along Fremont CR 115, Shelf Road Recreation Area is a popular destination for more than 32,000 rock climbers annually. In addition to over 700 challenging climbs on Shelf Road’s limestone walls, hiking and mountain biking are available on trails in that area (Cañon City 2009). Although Shelf Road is located outside the immediate Analysis Area, visitors to the project could potentially utilize this area for recreation.

3.20.1.10 OHV Trail Use

Opportunities for OHV use are available within or adjacent to the AHRA and on the BLM and USFS lands surrounding the Analysis Area. OHV trail use is only permitted on designated motorized trails. The Texas Creek Travel Management Area is a heavily used access point for OHV trail use.

The Texas Creek Travel Management Area is managed by the BLM and located adjacent to the Texas Creek AHRA site. Trails and routes in the Texas Creek Travel Management Area are managed primarily for motorized recreation. Motorized recreation groups assist the BLM in developing and maintaining motorized trails and routes in this area. Currently, motorcycles, ATVs and four-wheel drive vehicles are permitted in Texas Creek.

3.20.1.11 Hunting

Hunting of various wildlife species is a major recreational activity around the Analysis Area. CDOW GMUs 57, 58, 581, 69, 691, and 86 are located within the Analysis Area. The GMUs bordering the Project Area are displayed in Map 3-89. Bighorn sheep management units are shown in Map 3-90. Table 3-104 shows the total hunting licenses sold and estimated animals harvested in 2009 by game species. While seasons for different game species vary, the main hunting seasons occur in the fall and winter.

Table 3-104. Total Licenses Sold and Estimated Animals Harvested in 2009 within the Analysis Area, by Species

	Total Licenses Sold*	Total Animals Harvested**
Bighorn Sheep	12	10
Deer	5,990	2,451
Elk	6,201	1,682
Pronghorn Antelope	768	437
Black Bear	890	53
Mountain Lion	N/A***	36

*Actual number of licenses sold for the 2009 hunting season in GMUs 57, 58, 581, 69, 691, and 86.

**Estimated number of animals that will be harvested in the 2009 hunting season in GMUs 57, 58, 581, 69, 691, and 86. Based on the three-year (2006-2008) average success rate multiplied by the actual number of licenses sold.

***Mountain lion licenses are sold on a statewide basis and are not specific to lion populations.

Source: CDOW 2009d.

Many of the GMUs located adjacent to the river in the Project Area require access from US 50 for hunters, even if the hunting site itself is not located near US 50. There are not always roads leading into a specific hunting location in the GMU, so informal pullouts along US 50 are important parking areas and access points for hunters.

a. Bighorn Sheep

While hunting is not permitted for some bighorn sheep herds in Colorado, sheep hunting is permitted along the Arkansas River. Bighorn sheep seasons run from August 1 to early October, with archery season in August and rifle season from September-October. The Analysis Area contains CDOW bighorn sheep populations S7, S47, S49, and S68.

Hunters often use pullouts along US 50 to scout bighorn sheep herds before hunting season opens. In particular, hunters tend to scout the S47 herd (County Line herd) from US 50 near the Fremont-Chaffee County line.

As displayed in Table 3-105, Colorado allocated a total of 231 bighorn sheep licenses to Colorado residents for 2010; in comparison, Colorado only allocates 20 bighorn sheep licenses to nonresident hunters. Of the resident archery licenses, 4 are available for sheep unit S49 in the Analysis Area; and of the nonresident archery ram licenses, only one is allocated to sheep unit S49. Therefore, a total of only 5 archery sheep licenses are available annually within the Project Area during the August archery season (CDOW 2010a). In 2009, there were more than 12,000 applications for bighorn sheep hunting licenses in Colorado, and only 265 licenses were allocated (CDOW 2010b). From 1999-2009, Colorado has had 127 international applicants for bighorn sheep, of which only one hunter was awarded a license (in 2009), which indicates how competitive it is to obtain a bighorn sheep license (CDOW 2010b).

Table 3-105. 2010 Resident and Nonresident Bighorn Sheep Licenses in Colorado (Statewide)

	Resident*	Nonresident**
Rifle		
Ram	128	14
Ewe	34	0
Archery		
Ram	63	6
Ewe	6	0
Total	231	20

Source: CDOW 2010 Sheep and Goat Brochure (CDOW 2010a)

*Licenses allocated for Colorado state residents

**License allocated to nonresidents of Colorado, including international hunters

The cost of the license and application fee is \$254 for residents and \$1,819 for nonresidents. Special raffle and auction licenses, which allow hunters to hunt during extended seasons, are also available. For licenses that are auctioned, hunters are willing to pay even more. From 2005-2009, the average auction price for a bighorn sheep license was \$70,400, and the highest price paid (2007) was \$92,500 (CDOW 2010b).

b. Big Game

Mule deer and elk seasons run from late August-December. Pronghorn antelope season lasts from mid-August to late October. Various black bear seasons run from early September through November. The

Analysis Area contains CDOW mule deer populations D16 and D34; elk herd populations E22, E23, E27, and E28; pronghorn antelope populations A20 and A 30; and black bear populations B2 and B7.

c. Mountain Lion

Mountain lion season begins after the end of deer and elk season in November and runs through March. The Analysis Area includes CDOW mountain lion populations L11 and L16.

d. Turkey

Hunting seasons for Merriam's turkey occur in both the spring and fall in the Analysis Area. Spring turkey hunting runs from April through May (April 10-May 23 in 2010). West of I-25, fall turkey hunting season runs from early September to early October.

e. Small Game

Small game seasons primarily occur in the fall and early winter, but some run year-round.

f. Licensing

All hunters must obtain Colorado hunting licenses to hunt any game species in the state. Hunter education is required before a hunter can apply for or purchase a hunting license. Some licenses are available for "over-the-counter" purchase and do not require an application, while others are awarded through an application process and an annual drawing. Separate drawings occur for each species, and leftover licenses can be purchased from CDOW after the drawing has taken place. The number of licenses allowed per person varies by game species, and hunters may apply for more than one permit per year for specific species if certain requirements are met.

g. Shooting

Recreational and target shooting are permitted on BLM lands where not specifically prohibited. Much of the Project Area is open for recreational and target shooting.

Colorado Revised Statutes (33.6.126 Shooting from a Public Road) state that no shooting is allowed 50 feet from the center line of any federal highway, state highway, or county road. This includes shooting from, near, or across roads.

3.20.1.12 Horseback Riding

Horseback riding occurs on the public lands surrounding the AHRA. Trails in these areas offer extensive opportunities for equestrian recreation.

3.20.1.13 Placer Mining

Recreational placer mining is permitted along the Arkansas River in places such as the Point Barr area. This traditional activity includes panning, dry washing, and sluicing in search of valuable minerals, particularly gold. Other activities, which involve motorized equipment such as high bankers and dredges, are also permitted along the Arkansas River and require coordination with BLM. Within the Analysis Area, motorized placer mining activities are concentrated at the Point Barr AHRA site, and the season runs from April 1 through September 30 at this site. The Gold Prospectors of Colorado (GPOC) claim block will soon be managed under a Mining Plan of Operations, rather than under multiple notices as it is currently managed. This will not affect on-the-ground placer mining activities.

3.20.1.14 Winter Activities

Winter recreation occurs in the Analysis Area as well. Monarch Ski and Snowboard Area is located along US 50, west of Poncha Springs and Salida. This ski area is a popular winter destination for skiers on both the Front Range and the Western Slope. Mountainous areas and trails near the Project Area also offer opportunities for snowmobiling, cross-country skiing, and snowshoeing in the winter. Users may travel to this area from all parts of the state to participate in these activities.

3.20.1.15 Scenic Driving

Recreational driving is popular along the US 50 corridor. Drivers are attracted to scenic views, such as the fall colors, and may or may not stop at AHRA designated recreational sites during their trip. Four-wheel drive trails branching off of US 50 draw additional drivers.

a. Gold Belt Tour Colorado National Scenic Byway

The Gold Belt Tour National Scenic Byway is located near the Analysis Area. This 131-mile route runs along a section of US 50 through Cañon City and runs north toward Florissant. Three roads are included in this byway: High Park Road, Upper Shelf Road, and Phantom Canyon Road. Scenic drives along these roads allow travelers to follow historic gold mining routes from Cripple Creek and the Victor Mining District to Florence, Cañon City, and Florissant. Grasslands, mountains, deep canyons, and interesting geologic formations characterize these routes. Angling, wildlife viewing, picnicking, trail activities, and camping are also common activities along the Gold Belt Tour. Special events occur throughout the summer in nearby towns. This tour is managed through a formal Cooperative Agreement between the cities of Florence, Florissant, Cripple Creek, Victor, and Cañon City; the BLM; Royal Gorge Resource Area; Florissant Fossil Beds National Monument; CDOT Region 2; and Fremont and Teller counties.

b. Collegiate Peaks Scenic and Historic Byway

The Collegiate Peaks Scenic and Historic Byway, designated in 2007, runs from Salida west to Poncha Springs along US 50 and north along US 285 and US 24 past Granite. The route travels past the Collegiate Peaks of the Sawatch Range (Yale, Harvard, Princeton, Columbia and Oxford), the highest concentration of fourteeners (14,000-foot peaks) in the U.S. Highlights of the route include downtown Salida, Poncha Springs and Buena Vista; ghost towns and historic buildings; hot springs; and Colorado's only concentration of aquamarine, the state gemstone. The Arkansas River is a major attraction along the byway as well (Collegiate Peaks Byway 2010).

3.20.1.16 BLM Commercial Upland Recreation Permits

The BLM RGFO issues permits for commercially guided upland recreation within the Analysis Area. The outfitters that hold RGFO recreational permits are shown in Table 3-106.

Table 3-106. RGFO Upland Recreation Permits

Outfitter	Timing	Activity	Location
AHRMA	May	Motorcycle Trials Competition	Turkey Rock
Chaffee County Running Club	March	Foot Race	Salida Area
Collegiate Peaks Outfitters	Sep-Mar	Hunting - Big Game & Lion	GMUs 49,481,561,58,86,681
Dvorak's	May- Sep	Mountain Biking, Travel from US 50	Four-mile, Midland Trail
Echo Canyon River Expeditions	Year-round	Jeep Tours	Gold Belt - Shelf Road, Seep Springs
Heart of the Rockies Outfitters	Winter	Hunting - Lion	GMUs 56, 57, 86
Horizon Adventure	Jun-Aug	Rock Climbing, Camping, Mountain Biking	Shelf Road, Sand Canyon, Poncha Pass
Loco Mountain Outfitters	Sep-Mar	Hunting - Big Game, Antelope, Lion, Bear & Bighorn Sheep	GMUs 58, 69, 86, 581, 691
Lookin Up Outfitters	Sep-Mar	Hunting - Big Game, Lion	GMUs 57, 58, 69, 84, 86, 581, 691 & 861
Matschee Guide Service	Sep-Mar	Hunting - Big Game, Sheep, Bear	GMUs 57, 58, 59, 581, S47, S7, S60
Play Dirty ATV Tours	Year-round	ATV Tours	Texas Creek
Road Less Traveled	May-Sep	Rock Climbing	Four-mile, Turtle Rock, Falls Gulch, Pumphouse Rock
Rock-N-Row, Inc	Apr-Dec	Horseback Riding, Rock Climbing, Big Game Hunting	Falls Gulch, McCoy Gulch Shelf Road, Pole Gulch, GMU 86
Rocky Mountain Outdoor Center	Summer	Camping, Travel to Shelf Road	Sand Gulch
Rocky Mountain Trails Association	Jun-Sep	Motorcycle Trails Competition	Texas Creek, Volcano Gulch, Turkey Rock
Sangre De Cristo Outfitters	Sep-Mar	Hunting - Big Game, Lion, Sheep	GMUs 58, 59, 69, 84, 86, 581, 691, S7, S49, S50, S51, S60
Southern Colorado Outfitters	Sep-Mar	Hunting - Big Game, Lion, Sheep, Mountain Goat	GMUs 6, 57, 58, 59, 69, 84, 86, 91, 581, S7, S8S9, S49, S50, S35, S60, S17, S47, S68, S20, S11, S17, S12, S6 G13,G1,G2,G3
Track Em Outfitters	Sep-Mar	Hunting - Big Game, Lion, Sheep	GMUs 86, 561, 56, 57, 58, 48, 681, 581, 59, 56, 69, 84, S9

3.20.1.17 Festivals and Events

Various festivals and events occur throughout the year along or near the Arkansas River.

a. First in Boating on the Arkansas

FIBArk is a major festival that takes place in June, and is the largest annual event that occurs within the AHRA. The event is planned by the nonprofit FIBArk board and hosted within the City of Salida, with the

center of activity at Riverside Park. Since 1949, FIBArk has celebrated white-water recreation and spring runoff, and attracts boaters throughout the region and the state. The event consists of 4 days of activities, races, and other events.

FIBArk is supported by community volunteers and sponsors, and includes food, music, arts, crafts, vendors, a carnival, and a beer tent, in addition to boating-specific activities that occur on the river. The 25.7-mile downriver boating race runs from Salida to Cotopaxi, and included more than 100 competitors in 2009. Other boating events include kayak wildwater and freestyle competitions, a raft rodeo, slalom races, sprint races, and more (FIBArk 2010).

b. Fairs

The Chaffee County Fair usually takes place in late July or early August, west of Salida in Poncha Springs. The Fremont County Fair is usually held at the end of July and beginning of August in Cañon City. The Colorado State Fair lasts from late August through Labor Day weekend in Pueblo.

c. Ride the Rockies

The *Denver Post* Ride the Rockies is a long-distance bike ride that travels a different route in Colorado in mid-June each year. Over 2,000 cyclists participate in this event annually. Route information is not released until the February before the ride. The route has included sections of US 50 in the past, and could potentially include part of the Analysis Area. For 2010, Ride the Rockies was scheduled for June 12-19, and the route ended in Salida (Ride the Rockies 2009).

d. Salida

Salida hosts an Art Walk event in late June, which brings visitors and nationally known artists to the town. The Chaffee County Open Awards Art show annually spotlights local artists in September. The Annual Colorado Brewers Rendezvous brings together brewers from around the state for a weekend festival in July.

e. Cañon City

The Cañon City Music and Blossom Festival in May includes a parade, band competition, carnival, pageant, and 5K running race. This is Cañon City's largest community event of the year. Western Heritage Days is a weekend festival that takes place at the end of May to celebrate Cañon City's history.

3.20.1.18 Other Local Attractions

a. Royal Gorge

The Royal Gorge Bridge and Park is a major tourist attraction located west of Cañon City. The one-lane toll bridge is the highest suspension bridge in the world, crossing the Royal Gorge 1,053 feet above the Arkansas River. An aerial tram and incline railway offer additional activities for visitors (J.F. Sato 2007).

The Royal Gorge Tourist Train travels from Cañon City to Parkdale, and is also a visitor attraction in the area. The train operates every day during the summer months and on weekends only from October through May (J.F. Sato 2007).

b. National Attractions

Several national attractions, including National Park Service units, are located within the Analysis Area. Great Sand Dunes National Park is located 35 miles northeast of Alamosa, and is accessed from US 160 and US 285. Great Sand Dunes include the tallest dunes in North America and support a diverse and complex water- and wind-driven ecosystem. The scenic beauty, important archaeological sites, and ecological significance of the Great Sand Dunes offer unique recreational opportunities for visitors. Around 300,000 people visit Great Sand Dunes National Park each year (NPS 2008).

Florissant Fossil Beds National Monument is located near the town of Florissant, off US 24. The fossil beds are home to petrified redwood trees, fossilized insects and plants, and other paleontological resources. Visitors have the opportunity to view pre-historic remnants and observe signs of ancient life in Colorado. About 60,000 people visit Florissant Fossil Beds National Monument annually (NPS 2006).

Black Canyon of the Gunnison National Park is located along US 50 between Crawford and Gunnison, and can also be access from SH 92. The narrow Black Canyon of the Gunnison is a dramatic geological attraction, with steep walls that plunge toward the river below. This National Park is a popular attraction in southwestern Colorado, and provides opportunities for a variety of recreational activities. Visitation data is not readily available.

Curecanti National Recreation Area is located along US 50 between Cimmaron and Gunnison in the Black Canyon of the Gunnison. It can also be accessed from SH 92. Curecanti contains U.S. Morrow Point Reservoir, East Portal Reservoir, and Blue Mesa Reservoir, Colorado's largest body of water. Over one million visitors are expected to visit the Curecanti National Recreation Area each year (NPS 2003).

3.20.2 Current Management Considerations

3.20.2.1 Bureau of Land Management (BLM)

Management direction for recreation on BLM lands in the Project Area is guided primarily by the 1996 *Royal Gorge Resource Area Record of Decision and Approved Resource Management Plan* (BLM 1996). Details regarding cooperative management of the AHRA and BLM's role are discussed later in this section. The overall objective of the Royal Gorge RMP is:

...to provide a variety of levels, methods, and mix of multiple use resource management, utilization, and protection. These decisions are based on policies and regulations...BLM lands and resources will continue to be managed to provide for needed commodities and uses (e.g., livestock grazing, mineral materials sales, etc.) to assist in the support of local and regional economies...Generally management practices and prescriptions will favor maintaining or enhancing the natural setting (e.g., wildlife habitat, visual resources, recreation areas, etc.). Specific emphasis will be given to enhance dispersed recreation opportunities, wildlife habitats, and related values (e.g., riparian, recreation, etc.) and uses. Necessary constraints, stipulations, and mitigating measures will be included to protect these resources from irreversible damage. (BLM 1996, p. 2-1).

Furthermore, the RMP states that:

BLM policy regarding recreation management is to ensure the continued availability of BLM-administered lands and related waters for a diversity of resource-dependent outdoor recreation opportunities. Commitments to manage these lands as a national resource in harmony with the

principle of balanced multiple-use will also be maintained. These efforts are based on two levels of management: (a) intensive management of certain areas of lands with high priority outdoor recreation (special recreation management areas, SRMAs) and (b) custodial management of the majority of BLM-administered lands for traditional dispersed recreation use (extensive recreation management areas, ERMAs).

The Arkansas River SRMA consists of approximately 109,000 acres encompassing the area along the Arkansas River corridor between Cañon City and Leadville, including upland areas surrounding the corridor. The area is characterized by the Arkansas River and its many drainages, steep rugged canyons, open expanses of irrigated pastures, high mountain peaks, and lush riparian zones. The management direction for the Arkansas River SRMA is to “provide upland recreational opportunities that complement the water-based opportunities in semi-primitive, rural, semi-primitive motorized and nonmotorized settings (i.e., watchable wildlife, natural resource interpretation, hiking, biking, and OHV use).” The remainder of the BLM lands encompassing the Project Area is identified as an ERMA. The intended management direction for the ERMA is to “provide for a variety of dispersed recreational opportunities and experiences (camping, hunting, hiking, OHV use, biking, and horseback riding) in semi-primitive motorized, nonmotorized, and primitive settings” (BLM 1996).

Other specific management decisions and actions from the RMP include:

- A continued proactive approach in the use of volunteers and the development of partnerships is pursued in support of recreational opportunities throughout the planning area.
- Visitor safety and resource protection is provided as necessary.
- New initiatives or demands within the Royal Gorge ERMA will continue to be evaluated for benefits to the public and impacts to the natural resources. Appropriate management actions will accommodate new activities and provide opportunities for the public.
- Recreation is managed to provide for:
 - A variety of recreational opportunities and settings
 - Additional opportunities for mountain biking, hiking, OHV use, interpretation, and horseback riding
 - Facility development is accomplished to reduce user conflicts and to improve visitor health and safety
- Recreation is managed intensively in the SRMA. Recreation is managed nonintensively in semi-primitive, nonmotorized settings.
- Various actions occur to enhance recreation:
 - River corridor and upland recreational opportunities emphasizing a balance between resource protection and tourism
 - Coordination with various volunteer and user groups
 - Monitoring visitor contacts to ensure visitor safety, resource protection, and visitor information availability
- Provide for acquisitions or easements to enhance water-based recreation, mountain biking, OHV use, hiking, horseback riding, hunting, and natural/cultural resource interpretation.

3.20.2.2 Colorado State Parks

State Parks administers the AHRA jointly with the BLM under a CMA.

As stated in Chapter 1.0, State Parks would be required to issue a permit for OTR separate from the BLM permit. State Parks is currently reviewing the various “permitting options” they could select from with regard to the proposed OTR event. Although a Special Activity Agreement may be the “permit option” the State Parks Board utilizes for this project, a final decision regarding this issue has not yet been made.

a. Cooperative Management Agreement for Providing Recreation Management of the AHRA

The Cooperative Management Agreement for Providing Recreation Management of the AHRA defines the responsibilities and provision of each signatory of the CMA. There are four managing agencies that have signed onto this document:

- The BLM RGFO, Arkansas River Recreation Management Area
- Colorado Division of Parks and Outdoor Recreation (CDPOR)
- CDOW
- USFS, Pike/San Isabel National Forests and Comanche/Cimarron National Grasslands, Leadville Ranger District.

The management role for each signatory, as it relates to this project, is described below.

State Parks agrees to provide the on-ground presence and “lead” agency responsibility in managing recreational activities on the lands and waters within the AHRA, to include:

- BLM-administered lands within the AHRA, including all Recreation and Public Purposes Lease lands
- CMA lands
- Lands under special use permit with the USFS
- State Parks-owned lands within the AHRA.

The CMA also defines State Parks’ ability and responsibility to collect user fees within the AHRA, and defines how these funds can be spent and what developments and improvements State Parks can make on the other signatories’ lands.

The BLM agrees to continue to manage all resources in the AHRA (other than recreation) on BLM-administered lands within the AHRA Recreation and Public Purpose (R&PP) Leases, CDPOR lands, and CMA lands. The BLM also agrees to continue to participate in and provide review of recreation management, including:

- Allocating and rationing river use of the AHRA, to ensure that FLPMA is carried out on the lands and waters within the recreational area.
- Continue to enforce applicable federal laws and regulations pertaining to the AHRA, including FLPMA and NEPA.

- Monitor user preference and visitor use in order to assess environmental effects and identify appropriate mitigating measures.
- Provide the lead role in implementation of identified mitigating measures.

CDOW agrees to:

- Work cooperatively with the entities in developing any proposed regulations for the AHRA.
- Implement and enforce applicable state laws and regulations on public lands within the AHRA, particularly those involving wildlife regulations, safety, littering, resource protection, and public conduct.
- Act as the lead and cooperate with other entities in managing wildlife and all recreation on CDOW controlled lands within the corridor.
- Provide the “lead” on-ground presence in managing wildlife related activities on lands and waters within the recreational area.

USFS agrees to:

- Continue management of all resources in the AHRA other than river related recreation on USFS lands.
- Participate in and provide review of recreational management and use of the AHRA to ensure that Forest Plan Direction is carried out on USFS lands and waters.
- Allow river recreation management by AHRA on USFS lands through a special use permit.

3.20.2.3 Arkansas River Recreation Management Plan

The ARRMP was revised in January 2001. The plan revision efforts began in the spring of 1998 as a revision of the ARRMP, which was originally completed in October of 1989 as part of the establishment of the AHRA. AHRA is a partnership between the BLM and CDPOR to manage recreational resources and activities along 148 miles of the river, from its headwaters near Leadville down to Pueblo Reservoir. The revised plan further expands the scope of the recreation management partnership to include USFS and CDOW. The ARRMP provides multiple-use goals for AHRA resources. The ARRMP also provides areawide recreational goals to reflect agency goals and mission statements. The goals also project a picture of what the future character of the river and its associated recreational opportunities will be. There are a total of 23 areawide recreational goals. Those that could potentially be affected as a result of this project include:

- Minimize adverse effects of recreational use and reduce conflicts between recreationists, public and private landowners, and other users.
- Reduce the problem of river recreation trespass on private lands.
- Protect the rights of public land users to utilize public land resources for a variety of multiple uses.
- Gain a better understanding of the needs and requirements of public and private landowners along the river.
- The recreational area partners will continue to respect the rights and property of the railroad within the river corridor.

- Recognize that federal and state highways, as well as county and city roads, provide the primary, and sometimes only, means of access for residents, recreationists, and other users in the area.
- Improve coordination to integrate the management of federal and state highways with recreation management in the river corridor.
- Provide law enforcement and visitor services that are adequate to protect natural resources, private property, and visitor health and safety.
- Provide adequate on-the-ground/on-the-river law enforcement.
- Pursue cooperative management agreements to ensure/ provide adequate visitor safety services.
- Provide access and facilities to ensure visitor health and safety.
- Protect the environment while providing for diversity in recreational opportunities.
- Monitor effects of recreation on the environment and take protective actions when necessary.

Segment-specific recreation management objectives are provided in Chapter 2 of the ARRMP, which identify primary uses within each segment, including those for specific recreational sites; use seasons; specific capacities for each recreational use; and any additional notes related to special uses on each segment. Specific areawide implementation actions are listed in a series of categories. Categories potentially impacted by this project include:

- Resource management (protection and rehabilitation).
- Visitor management (information and interpretation, indirect and direct controls, permits and concessions, emergency services).
- Facility management and development (site development, maintenance).
- Administrative action (coordination, studies and monitoring, supplemental staffing) planned to accomplish prescribed management objectives on all river segments.

3.20.2.4 Recreation and Public Purpose Act

Through the Recreation and Public Purpose (R&PP) Act of 1954, State Parks leases land from the BLM to provide day use areas, campgrounds, picnic facilities, fishing access, and boat put-ins/take-outs, among other uses within the AHRA. This act was a complete revision of the Recreation Act of 1926. The act authorizes the sale or lease of public lands for recreational or public purposes to state and local governments and to qualified nonprofit organizations. The lease agreements for each of the properties that State Parks manages allow them to make capital improvements on the properties themselves in support of the AHRA. The Analysis Area also includes an R&PP lease to Fremont County School District RE-3 for 5 acres of land near Cotopaxi, to be utilized for a baseball field and bathroom facilities.

3.20.2.5 Rationing Plan

The Rationing Plan provides the method by which commercial outfitters are allocated rafts and/or kayaks on rationed days during the year based on historic use. Annually, commercial outfitters identify their own actual use by reporting their use numbers to the AHRA. Actual use is represented in terms of date, day of the week, rafts, kayaks, clients, staff, and sections of river utilized by each outfitter. To determine the current year's rationed use, historic use numbers are compared with historic use of all other outfitters to determine the percentage of boats allocated to each outfitter. The Rationing Plan is updated each year

based on the previous year's reported actual use. Not all segments of the river are currently rationed, but rationing for each segment is considered annually.

3.20.2.6 Upper Arkansas Voluntary Flow Management Plan

This document details how water users of the Arkansas River voluntarily agree to keep minimum flows in the river to ensure a quality recreational experience and to maintain the fisheries habitat. The agreement was signed in 2006 by several parties, including:

- Southeastern Colorado Water Conservancy District (Southeastern)
- CDNR
- CDOW
- CDPOR
- Chaffee County
- Arkansas River Outfitters Association
- Trout Unlimited

Southeastern participates in the VFMP as holder of the water rights for the water supplied by the Fryingpan-Arkansas Project. The other parties participate, as they have strong interests in the continued operation of the VFMP, in a manner similar to how the VFMP has traditionally been conducted. Highlights of the VFMP as they relate to this project state that:

- The highest priority of the VFMP is to maintain 250 cfs at Wellsville year-round to protect the fishery.
- Any flow augmentation for recreational use will be limited to the period from July 1 through August 15. However, flow augmentation above 250 cfs to benefit the fishery may occur year-round.
- BOR should augment flows from July 1 through August 15 to maintain flows at a target of 700 cfs.
- Any deliveries in excess of 10,000 AF of project water for VFMP for Recreation Flow should be subject to review and consideration by BOR, CDNR, and Southeastern.

3.20.2.7 Arkansas Headwaters Recreation Area Trails Master Plan

The Trails Master Plan includes a comprehensive existing trail inventory, recommended trail maintenance, potential trail development, and trails recommended for rehabilitation or closure on 46 individual AHRA sites. The overall goal of the Trails Master Plan is to provide AHRA management with detailed information to effectively manage trails within each site. The intended output of this goal is to provide well-constructed, attractive, recreational areas offering a wide variety of opportunities and the highest quality of enjoyment and satisfaction attainable within each AHRA site included in the study area.

Specific objectives to reaching the above goal include:

- Improving user's trail experience
- Decreasing degradation of natural resources

- Increasing trail sustainability
- Increasing interpretive opportunities
- Improving camping experiences
- Decreasing social trail development
- Assisting AHRA staff with writing grants, budgeting, planning, and implementing trail related improvements to each recreational site.

For each of the 19 AHRA sites within the study area between Salida East and Parkdale, the Trails Master Plan provides a detailed site description; details of the primary use of the recreational site; a detailed description of existing trails on the site; a description of potential trails on the site; and recommendations for existing and potential trails on the site.

Lastly, the Trails Master Plan provides detailed trail specifications, including minimum criteria for designated trails; trail design standards for sustainable multi-use trails; trail specifications for accessible trails; suggested trail signage; trail maintenance and safety inspection form; and detailed cross-sections for a variety of trail types.

3.20.2.8 Arkansas Headwaters Recreation Area Interpretive Prospectus

The Interpretive Prospectus gives direction to interpretive services for the AHRA. As defined, interpretation is:

- A communication process designed to reveal meanings and relationships of our cultural and natural heritage, to the public, through firsthand involvement with objects, artifacts, landscapes, and sites.

The Interpretive Prospectus is a comprehensive document that provides a visitor analysis; specific interpretive goals and objectives for the AHRA; interpretive themes for the AHRA; recommended media for interpretation; possible support services for interpretation in the AHRA; and a comprehensive interpretive inventory, story development, and recommendations for interpretive services and media for specific sites in the AHRA. Specific sites in the study area that were examined include Parkdale, Spikebuck, Five Points, Pinnacle Rock, Texas Creek, Lone Pine, Vallie Bridge, and Wellsville. The document also includes a detailed implementation plan with cost estimates, a method for evaluating interpretive services, and proposed interpretive panel layouts.

The interpretive goals for the AHRA as detailed in the Interpretive Prospectus are:

- Expand the public's awareness, appreciation, and curiosity for the natural, cultural, and scenic values of the upper Arkansas Valley.
- Instill wise river and public land use ethics to assist in the protection of public land resources.
- Educate visitors to promote a better understanding between visitors with differing interests and values.
- Increase economic benefits to the region while maintaining the character and quality of local communities.
- Encourage the visitor to have a safe experience.

- Improve local support and partnerships to assist with management of the upper Arkansas Valley.

3.20.2.9 CDOW

As described in the Terrestrial Wildlife and Habitat section, CDOW manages wildlife throughout the State of Colorado. The mission of CDOW is to “perpetuate the wildlife resources of the state and provide people the opportunity to enjoy them.” CDOW bases wildlife management in the Project Area on both the Colorado Comprehensive Wildlife Conservation Strategy (CWCS) and specific habitat (land) based plans and activities, including two habitat partnership programs (North of Arkansas River—Arkansas River Committee and South of Arkansas River—Sangre de Cristo Committee). Management of wildlife is relevant to recreation for such activities as hunting and fishing in the Project Area. These management goals and strategies are discussed in detail in Section 3.1, Terrestrial Wildlife and Habitat.

3.20.2.10 USFS, Pike/San Isabel National Forests & Comanche/Cimarron National Grasslands, Leadville Ranger District

The Pike-San Isabel National Forests and Comanche/Cimarron National Grasslands, Leadville Ranger District is a signatory on the CMA for Providing Recreation Management of the AHRA, as described above. The Forest is managed under the National Forest Land and Resource Management Plan 1984. This plan establishes the long-term direction for managing the Pike-San Isabel National Forests and Comanche and Cimarron National Grasslands. It also serves to inform prospective users as well as other interested publics that any occupancy or use of National Forest System lands must be consistent with the management requirements listed in the Forest and Management Area Direction Sections of the Forest Plan (USFS 1984).

Specific goals of the 1984 National Forest Land and Resource Management Plan that may potentially be impacted as a result of this project (as it relates to recreation) are listed below:

- Maximize present net value while emphasizing opportunities to improve water, fish and wildlife, outdoor recreation, and other amenity values.
- Manage resources at economically and environmentally feasible levels, consistent with the emphasis on amenity values.
- Provide a broad spectrum of developed and dispersed recreational opportunities in accordance with identified needs and demands.
- Maintain approximately the current ratio of Recreation Opportunity Spectrum classes for dispersed recreation.

Management objectives and requirements are also provided in the Forest Plan, which set the baseline conditions that must be maintained throughout the Forest in implementing this Forest Plan.

3.20.2.11 County/City Plans and Activities

The majority of the Project Area is located in Fremont County; however, a small portion at the western end of the project is also located in Chaffee County. Cañon City and Salida are the nearest incorporated population centers.

a. Fremont County Master Plan

The Fremont County Master Plan was last updated in 2001, and adopted in January 2002 by the Fremont County Planning Commission and County Commissioners. The master plan “is the official document for

guiding the public and private sector in land use decision for the County,” and “addresses the planning period up to the year 2011” (Fremont County 2002). Chapter 4 of the Master Plan contains 12 categories for the County’s Goals, Objectives, and Implementation Strategies, one of which may be relevant to recreation and the proposed project.

Category: Open Space and Recreation

Goal:

Ensure that adequate parks, recreational facilities, and open space are provided throughout the County for resident and visitor recreational opportunities, while maintaining the rural character of the County.

Objectives and Strategies:

J1.1 The Open Space Plan will consider reservation of sections of the Arkansas River Corridor from Cañon City east to the County Line as an open space/trail corridor.

J2. Parks and open space planning will be integrated with tourism development and promotion undertaken by the Cañon City Chamber of Commerce, the Mainstreet U.S.A. organization, the Arkansas River Outfitters Association, Royal Gorge, Inc., and other private and public sector groups actively involved in tourism planning.

J2.2 Encourage private recreation-related businesses and properties to expand to help meet future demand for recreational activities, provided they meet development standards and other County strategies.

b. Cañon City Comprehensive Plan

The Cañon City Comprehensive Plan was updated in 2001 (Cañon City 2001). As it relates to recreation in the Project Area, the plan addresses the Arkansas River. Both the Arkansas River corridor and its floodplain are included as major elements and contributors to the Trails and Open Space Master Plan adopted in 1997 by the City of Cañon City and the Cañon City Area Metropolitan Recreation and Park District.

c. Chaffee County Comprehensive Plan

The Chaffee County Comprehensive Plan was adopted in March 2000 and “is designed to serve as a guide for revising local development regulations and review processes, reviewing development and annexation proposals, and making local infrastructure investment decisions” (Chaffee County 2000). Only the southeastern corner of Chaffee County falls within the proposed Project Area, adjacent to the City of Salida.

The importance of the county’s rural character and visual resources is indicated throughout the comprehensive plan, which applies to the Project Area. Other topics covered in this chapter include public lands access, recreation, and protection of sensitive natural areas, such as river corridors. The guiding objectives for recreation relevant to this project include:

- Guiding Objective 3: Provide access to public lands and river/stream corridors. Require that all development applications for property adjacent to public lands take special steps to ensure appropriate public access is maintained, improved, or limited as appropriate.

d. City of Salida Comprehensive Plan

The City of Salida Comprehensive Plan was adopted in June 2000 and is “the official policy document of the City of Salida Planning and Zoning Commission and the City Council” (City of Salida 2000). Given the urban character found within the city, most of the comprehensive plan does not pertain to the proposed project, and there are no specific key issues or guiding principles/strategies specific to recreation. The Project Area lies outside city limits, but within the 3-mile planning area authorized by statutes.

3.21 VISUAL/AESTHETIC RESOURCES

The visual Analysis Area includes the entire 42-mile Project Area along the Arkansas River between Salida and Cañon City, though emphasis is placed on those areas of the proposed project within the Bighorn Sheep Canyon that would be visible to the public from US 50 and the Arkansas River. The visual Analysis Area is within the BLM’s Royal Gorge Field Office planning area and subject to visual management guidelines described in the Royal Gorge RMP (BLM 1996).

3.21.1 Current Conditions and Trends

The proposed project’s effects on visual resources depend on the existing scenic quality, viewer sensitivity, and distance from Key Observation Points (KOPs) of the Analysis Area (Map 3-91). As BLM Visual Resource Inventory data for the Analysis Area is not available, field observations with BLM staff in October 2009 evaluated scenic quality, viewer sensitivity, and distance zones as described below.

3.21.1.1 Scenic Quality

Per the BLM’s Visual Resource Management (VRM) system, scenic quality is defined as the degree of harmony, contrast, and variety that influences the overall impression of a landscape (BLM 2007a). The overall landscape of the Analysis Area centers on a highly scenic river corridor containing many outstanding features that are visible from the river, as well as from roads, trails, and a railroad. The river itself, with its wide gravel bars, boulder fields, and impressive rapids, is one of the scenic highlights of the region. Several canyon reaches along the river serve as focal points of the Analysis Area, while the Sangre de Cristo Mountains serve as a prominent backdrop within the larger viewshed. Topographic relief in the Analysis Area is considerable, with towering granite and sandstone cliffs rising over 1,000 feet from the river in places. OTR Corp cited the scenic nature of the Analysis Area as an important criterion for the siting of the project (OTR 2008a).

Past modifications to the canyon’s scenic quality include US 50 (grading, pavement, signage, terracing, vehicle movement, etc.), local road networks, and UPRR (embankments, tracks, terracing, railcar storage, railroad operations, etc.), all of which have resulted in strong horizontal form, line, and color contrasts to the natural appearing V-shape of the canyon. Reservoir and water development projects have significantly modified water flows and the appearance of rapids and gravel bars. Development on private lands (homes, outbuildings, etc.) is visible from US 50, though generally screened from river views. Although these constructed features are highly visible from US 50 and the river, screening from vegetation and terrain and the impressive scale of the canyon reaches negates their impacts on the scenic quality of the river corridor. Major nighttime light sources (nightglow) originate from Salida and Cañon City, with localized nighttime lighting from Howard, Cotapaxi, Texas Creek, and US 50 at Fremont Road. Antiquated relics of the region’s railroad, mining, and ranching history (tunnels, tailings, homesteads, barbed-wire fences) and recreational river facilities (picnic benches, interpretive signage, boat ramps, etc.) generally contribute positively to the

existing landscape character. In general, the scenic quality, interest of the river, and steep mountains compensate for these past modifications.

Still photographs and text do not adequately communicate the experiential qualities of contrast and movement in Bighorn Sheep Canyon. Viewer experience changes daily and seasonally through contrasts: sunrise and sunset (light/dark), sun and shade (warm/cold), winter and summer (dead/life), spring and fall (renewal/decay), overcast or clear (wet/dry), rapids and gravel bars (high/low flows), canyons and valleys (closed/open), boulders and water (solid/fluid). Movement is also a unique consideration in the canyon, as the wind, river, trains, vehicles, and boaters continually compete for viewer attention.

3.21.1.2 Sensitivity Levels

Sensitivity levels are defined as the public's concern for the maintenance of scenic quality (BLM 2007a). The majority of recreational activities within the Analysis Area are scenery-dependent: rafting, driving for pleasure, wildlife viewing, outdoor photography, picnicking, rock climbing, and fly-fishing. The Arkansas River is arguably the most popular white-water boating river in the U.S.; use levels and seasons are described in Section 4.20, Recreation Resources.



Figure 3-8. KOP 17, Spikebuck looking west (upstream). The visual forms and lines (in red) of the canyon, highway, railroad, and river converge at the river, drawing viewer attention to the water and riverbank conditions.

The majority of the project is proposed within enclosed spaces of the Bighorn Sheep Canyon, where steep canyon slopes form V-shapes and the eye is naturally drawn to the center. When seen from a boat (see Figure 3-8), the lines and forms in the canyon converge on the river as distance increases, heightening viewer sensitivity to modifications in or along the focal point of the river. In addition to the project's enclosed and focal setting, prominent features or landmarks, such as turbulent rapids, rock outcrops, or trees, attract attention as shown in Figure 3-9. Prominent features where viewer sensitivity increases include Pinnacle Rock, Maytag, Three Rocks, Spikebuck, and the Tunnels.



Figure 3-9. KOP 14, Three Rocks looking west (upstream). Prominent features, such as specimen trees or steep rock outcroppings, attract attention.

3.21.1.3 Distance Zones and Visibility

The narrow, steep canyon offers two primary viewsheds in the Analysis Area: land-based and water-based views of the river corridor and surrounding landscape. Land-based views follow US 50 and include local roads, recreational facilities, and the UPRR. Multiple pullouts and short spur roads along the highway provide exceptional foreground views of the river and its scenic features. Due to the highway elevation, field observations found that the majority of the proposed panel displays would not be visible to eastbound highway travelers. Westbound traffic may potentially see the majority of the panels (BLM 2009f).

Water-based views (generally by boat) provide outstanding views of the river, its canyons, and mountains for the hundreds of thousands of recreationists who boat the river annually. US 50 and the UPRR are highly visible adjacent to the river. Both US 50 and river-based views offer close observations (within 100 feet) of the proposed project, which would rarely be viewed beyond 0.5 mile due to terrain.

3.21.2 Current Management Considerations

There are no designated scenic byways, trails, or wild, scenic, or recreational rivers or study rivers within view of the proposed project. The Gold Belt Tour and Collegiate Peaks scenic byways are within 3 miles of the proposed project, originating in the Cañon City and Salida vicinities, respectively (Colorado Scenic Byways 2009, BLM 2009f, National Wild and Scenic Rivers System 2009).

FLPMA of 1976 states, "...public lands will be managed in a manner which will protect the quality of the scenic (visual) values of these lands." BLM accomplishes this through its Visual Resource Management system, a system that involves inventorying scenic values and establishing management objectives for those values through the resource management planning process, and then evaluating proposed activities to determine whether they conform with the management objectives (BLM 2009f). Current VRM Class

objectives in the Analysis Area were established in the 1995 Royal Gorge RMP. VRM objectives are generally aimed at protecting the scenic quality of BLM-managed lands. The proposed project is located within a VRM Class II area (Map 3-91). The objective of VRM Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape

Generally, a Class II area contains very high scenic quality, is highly visible to a large number of visitors or to highly sensitive viewers, and tends to be in the foreground of viewsheds. The Royal Gorge RMP (1995) acknowledges that

The Arkansas River, paralleled by the major travel routes of Colorado State Highways 50 and 285/24, provides the visitor with some of the most scenic driving in the planning area. The high levels of recreational use encountered along the corridor, along with the outstanding scenery, make this area very sensitive to impacts that could affect the scenic quality.

Areas further back from the river and located beyond the canyon rim are primarily designated as VRM Class III. An area designated as VRM Class IV is located south of Three Rocks in an upland position, with limited visibility from the US 50 corridor. Middle ground and background views from the river corridor are generally classified as VRM Class III (BLM 1996). VRM classes and associated objectives do not apply to nonBLM lands in the Analysis Area.

Portions of the Proposed Action are located in the Arkansas Canyonlands ACEC. The management objectives for the Arkansas Canyonlands ACEC is to manage sensitive resources “to protect, enhance, and interpret the significant scenic, historic, and archaeological values, the threatened and endangered peregrine falcon, key raptor habitat area, bighorn sheep habitat, and important fisheries” (BLM 1993, Table 3-23, p. 3-46 and Appendix K). The Arkansas Canyonlands ACEC is designated as VRM Class II and protected by the following visual management guidance:

- Closed to mineral entry
- Closed to mineral materials development
- Avoided by major ROW
- OHV use limited to designated roads and trails
- Retained in public ownership

There are no visual resource management guidelines for SLB lands affected by the project.

Visual resources are inextricably tied to land use, and both Fremont and Chaffee counties’ planning documents speak to the importance of preserving the visual character of the area on private lands. The Fremont County Master Plan states that Visual and Scenic Quality was rated as the most valuable factor to the community for “County Conditions as They Affect Quality of Life in Fremont County”, and directly refers to the BLM’s VRM guidelines for managing visual resources on public lands (Fremont County 2002). In addition, specific goals, objectives, and strategies pertaining to private lands outlined in that document include:

Plan Element	Goals, Objectives, and Strategies
A. Transportation	Objective A9. Maintain the scenic quality of the BLM Scenic Byways and other designated scenic corridors through phased implementation of a county VRM plan.
C. Economic Development	Strategy C5. Encourage the preservation and enhancement of the natural and cultural amenities of the county, and the unique recreational and priceless scenic features of the natural environment.
I. Visual Resources	Goal. Protect the unique scenic and rural quality of the county for current and future residents and visitors.
	Objective I1. The county will adopt a VRM program to protect the county's highest quality and most threatened scenic resources over time.
	Objective I2. The county will develop a sign ordinance designed to protect the scenic quality of the county in the Arkansas Valley District and the Royal Gorge Impact District, in coordination with the VRM program.
	Strategy I3. The county will develop industrial site development standards and mine site visual protection criteria to ensure that the highly scenic quality of the county is maintained.
	Implementation: The master plan declares that a VRM program will be developed over a 10-year period.

To date, Fremont County has not been completed a VRM Plan.

The Chaffee County Comprehensive Plan also sets forth land use guidance to preserve visual resources, stating that a key objective of the plan is to “Improve county land use regulations to protect air/water quality, scenic areas, historic and cultural resources, and wildlife habitat” (Chaffee County 2000). One policy statement under the Community Character/Natural/Cultural Resources element states, “Give high priority to protecting the scenic and visual quality of the valley” (Guiding Objective 1).

3.21.3 Visual Resource Concerns

Primary visual resource concerns associated with the proposed project are as follows:

- **The subjective nature of art.** What constitutes “good” or “satisfying” works of art is highly subjective and based on individual opinions, preferences, and experiences. While the proposed project would constitute a short-term change in the landscape character of the Analysis Area, the nature of this change (positive or negative) from an aesthetics perspective is likely highly debatable.
- **The temporary nature of the proposed project.** The proposed project would be installed and available for public viewing over an approximately 2-week period, with installation and removal of the proposed project anticipated to take up to 3 years. Potential effects from the proposed project may continue after restoration activities have been completed. The proper chronological context and timeframe (e.g., 2 weeks [temporary], 3 years [short term], and beyond 5 years [long term]) are thus tantamount to the consideration of potential effects.
- Short-term visual resource changes during installation, exhibition, and removal from panel displays and staging areas, and visitor traffic and traffic control activities.
- Long-term and residual effects of the project from construction and deconstruction and compliance with VRM Class II long-term objectives. Restoration of native habitats, specifically

riparian and wetland habitats, may continue beyond 5 years. Herbaceous vegetation is expected to recover in the short term (3 to 5 years) and any woody shrubs would likely take longer to recover (5 to 8 years).

3.22 WILD AND SCENIC RIVERS

3.22.1 Current Conditions and Trends

The National Wild and Scenic Rivers Act of 1968 (WSRA; Public Law 90-542; 16 U.S.C. 1271-1287) is the nation's primary river conservation law. The act was specifically intended to balance the existing policy of building dams on rivers for water supply, power, and other benefits, with a new policy of protecting the free-flowing character and outstanding values of other rivers. The act provides a mechanism for the preservation of selected rivers and streams in a free-flowing condition for the benefit and enjoyment of present and future generations. To accomplish this goal, Congress established the National Wild and Scenic Rivers System (NWSRS) as well as a process to add rivers to the system in 1968. Today there are 156 rivers totaling nearly 11,000 miles in the national system; the Cache la Poudre River is Colorado's only designated Wild and Scenic River (WSR). On all designated rivers or river segments, the act:

- Bans all new dams and other potentially harmful water development projects.
- Restricts activities that would impair a designated river's "outstandingly remarkable values."
- Ensures that water quality at the time of designation is maintained and enhanced.
- Creates a federal reserved water right for the amount of unappropriated water that is necessary to protect a designated river's special values.
- Requires the development of a cooperative river management plan to govern future management of a designated river.

The WSRA study process is comprised of two phases: the eligibility phase and the suitability phase.

To be eligible for designation, a river segment must be "free-flowing" and must possess at least one river-related value considered to be "outstandingly remarkable." Free-flowing is defined by Section 16(b) of the WSRA as "existing or flowing in natural condition without impoundment, diversion, straightening, riprapping, or other modification of the waterway." The river segment must possess one or more of the following outstandingly remarkable values: scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. BLM Manual 8351 provides standards and guidelines for interpreting these values on BLM-administered lands.

Eligible river segments must be tentatively classified according to the category most appropriate for each eligible segment. Classification is based on the type and degree of human developments associated with the river and adjacent lands as they exist at the time of the evaluation. The three classification categories for eligible rivers are defined in the WSRA, Section 2(b) as:

Wild River Areas. Wild river areas are those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

Scenic River Areas. Scenic river areas are those rivers or sections of rivers that are generally free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

Recreational River Areas. Recreational river areas are those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past. Parallel roads or railroads, existence of small dams or diversions can be allowed in this classification. (A recreational river area classification does not imply that the river will be managed or prioritized for recreational use or development [BLM Manual 8351].)

Tentative classification establishes guidelines for management until either a suitability determination or Congressional designation decision is reached.

If any river or stream segments are found to be eligible for inclusion in the NWSRS, a suitability study is conducted. River or stream segments must be found eligible *and* suitable to be considered for designation in the NWSRS, and only Congress or the Secretary of Interior can designate segments. Upon designation, specific management strategies would be designed to protect and enhance the outstandingly remarkable values of the river area that contribute to the designation; these strategies may vary according to the level of classification – wild, scenic, or recreational.

As part of the current RMP planning process, a study group was formed in 1989 to analyze all potential wild and scenic streams/rivers within the Royal Gorge planning area and to determine eligibility for wild, scenic, or recreational designation. A total of 61 streams were analyzed; two streams – Beaver Creek below Skagway Reservoir to the Fremont/Teller county line, and six segments of the Arkansas River between Leadville and Royal Gorge Park – were identified as eligible and were classified for suitability analysis. Of these two streams, only two segments of the Arkansas River (Segments #3 and #4) occur within the OTR Project Area. Therefore, for the purposes of this EIS, only these segments, located between Salida and Parkdale, will be discussed and analyzed. (Results of the Beaver Creek and other Arkansas River segments WSR study process are available in Appendix L of the 1993 RGFO RMP DEIS.)

Arkansas River Segment #3 begins at Salida and continues downstream to Vallie Bridge (approximately 20 miles). Segment #4 begins at Vallie Bridge and continues downstream to the western boundary of Royal Gorge Park, in the vicinity of Parkdale (approximately 31 miles).

3.22.1.1 Free-Flowing Characteristics

Although several minor agricultural diversions are present on Segment #3, they do not affect the segment's free-flowing characteristics. There are no dams present on this segment. It was determined that Segment #3 meets the WSRA free-flowing criteria.

Similarly, on Segment #4, several minor agricultural diversions are present, but do not affect the segment's free-flowing characteristics. Despite considerable riprapping of the shoreline on both banks to accommodate transportation developments, channelization of the streambed, and creation of white-water areas, it was determined that nearly 90% of the segment still exhibited "essentially natural state" characteristics. Additionally, the river is actively managed as a conduit for downstream water rights and flow needs. The WSRA criteria require that a river be free-flowing, but not necessarily naturally flowing. For this reason, it was determined that Segment #4 meets the WSRA free-flowing criteria.

a. Outstandingly Remarkable Values

For all segments, the following criteria were used to determine whether recreational and historic resources offered outstanding remarkable values:

Recreation values: Recreational opportunities are or have the potential to be unique enough to attract visitors from outside the geographic region. Visitors would be willing to travel long distances to use the river resources for recreational purposes. River-related opportunities include, but are not limited to, sightseeing, wildlife observation, photography, hiking, fishing, hunting, and boating (i.e., canoeing, rafting, and kayaking). Interpretative opportunities are exceptional and attract or have the potential to attract visitors from outside the geographic region. The river provides settings for national or regional commercial usage or competitive events (BLM Manual 8351).

Historical values: The river or area within the corridor contains a site(s) or feature(s) associated with a significant event, an important person, or a cultural activity of the past that was rare or unusual in the region. An historic site(s) and/or feature(s), in most cases, is 50 years old or older. Sites or features listed in, or eligible for inclusion in, the National Register of Historic Places (NRHP), may be of particular significance (BLM Manual 8351).

In general, the Arkansas River is one of the most heavily boated white-water rivers in the U.S. River-related recreational opportunities include all of the activities listed in the eligibility criteria. All segments are used commercially and attract visitors from outside the region as well as the State of Colorado.

Segment #3 offers less white water than other segments of the river. However, this segment does accommodate an annual kayak race, numerous recreational opportunities, some commercial usage, and out-of-region visitors.

Segment #4 receives heavy recreational use, including commercial boating and numerous roadside activities, such as picnicking, fishing, wildlife observation, and photography.

Historic values occur on both Segments #3 and #4. Historic rail features date back to the late 1800s. Additionally, evidence of an historic stage road, early settlements, and mining developments are present throughout the corridor. Remnant features of the "Royal Gorge Railroad Wars" are extant throughout the lower canyon corridor, including "DeRemer" Forts, which have been determined to be eligible for the NRHP (see also Section 3.25, Historic Properties and Native American Religious Concerns).

Because these segments are free-flowing and offer extensive recreational opportunities and historical resources eligible for the NRHP, these two study segments were determined eligible for wild and scenic river designation.

b. Tentative Classification

The entire length of both segments is closely paralleled on both sides of the river by a major U.S. highway and the UPRR, as well as private residences, a patchwork of private and federal land ownership, and various commercial developments. Therefore, these segments do not meet the "wild" or "scenic" classification criteria per Section 1(b) of the WSRA, but were determined to meet the criteria for a tentative "recreational" classification.

c. Suitability Determination

As part of the study report process, the following factors were considered, consistent with Section 4(a) of the WSRA, in determining the suitability of Segments #3 and #4 for inclusion in the NWSRS: characteristics that do or do not make the area a worthy addition to the NWSRS; status of landownership, minerals (surface and subsurface), use in the area; existing and reasonably foreseeable potential uses of the land and related waters; federal, state, public, tribal, local, or other interests in designation or nondesignation of the river, including the extent to which estimated costs may be shared by state, local, or other agencies and individuals; ability of the BLM to manage and/or protect the river area or segment as a WSR river; historical or existing rights that could be adversely affected; and any other relevant issues and concerns.

The study report determined that Segments #3 and #4 satisfied all suitability criteria identified in Section 4(a) of the WSRA.

d. Recommendation for Designation

In the 1996 Approved RMP/FEIS and ROD, neither segment was recommended for Congressional designation in the NWSRS due to the potential implications and complications of securing the federal reserved water right on native flows, as mandated by the WSRA (Sec. 13, c.), and the potential of prior existing rights to a dam site that pre-dates the WSRA.

The BLM determined that although the recreational and historic values of the river are significant and worthy of “strong protection,” the river is also of significance to nearly one-quarter of the state’s residents for domestic water and agricultural supplies. The federal reserve water right on native flows, implicit with WSRA designation, would have encumbered cooperative efforts to manage flows for downstream users as well as the very “outstandingly remarkable values” that made the river eligible and suitable for designation. The BLM therefore determined that National Recreation Area (NRA) designation would instead be the preferred mechanism for providing adequate protection to the river. Ultimately, neither WSRA nor NRA designation was given to the river.

Currently, there are no other Project Area streams under WSRA review, and no other eligible streams have been identified in the Project Area.

3.23 WILDERNESS AND SPECIAL MANAGEMENT AREAS

3.23.1 Current Conditions and Trends

3.23.1.1 Wilderness

In 1964, Congress passed the Wilderness Act, legally designating certain federal lands as Wilderness Areas, to ensure that increasing population and expanding settlement did not modify all areas within the U.S. (The Wilderness Act, P.L. 88-577). According to the Wilderness Act, designated wilderness is:

...Recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially

unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation (Sec. 2(c), P.L. 88-577).

The Sangre de Cristo Wilderness, on the Pike-San Isabel National Forest, is the only designated wilderness in proximity to the Arkansas River corridor (Table 3-107). To access the wilderness from US 50, it is an approximately 5-mile drive on an unimproved Forest Road. Because of the distance from the Project Area and lack of direct or improved access to this area, the Sangre de Cristo Wilderness is not included for further analysis.

Five BLM WSAs in the RGFO were previously identified and inventoried under FLPMA, Sec. 603(a) (16 U.S.C. 1782(a)). Descriptions and analysis of these areas are found in the *BLM Colorado State Office Intensive Wilderness Inventory* (November 1980), *Cañon City District Wilderness Final Environmental Impact Statement* (December, 1987), and *BLM Colorado State Office Wilderness Study Report* (October 1991). Of these, only the McIntyre Hills WSA is located in the Analysis Area. The Upper Grape Creek WSA is located within 10 miles of the Analysis Area. However, because access to the Grape Creek WSA is not available directly from US 50, it is not included for further analysis. The High Mesa Grasslands Instant Study Area is also found on the north side of the river in the Analysis Area. A report submitted by the BLM Cañon City District in 1979 to the Colorado State Director states “the area does not meet the size requirement, is not natural within the context of wilderness requirements, and does not offer outstanding opportunities for solitude or a primitive and unconfined type of recreation.”

Table 3-107. Designated Wilderness and Wilderness Study Areas within 10 miles of the Project Area/Arkansas River Corridor

Area	Responsible Agency	Distance from Arkansas River Corridor
Beaver Creek WSA	BLM	>10 miles
Browns Canyon WSA	BLM	>10 miles
Lower Grape Creek WSA	BLM	10 miles
McIntyre Hills WSA	BLM	0 miles
Sangre de Cristo Wilderness	USFS	5 miles
Upper Grape Creek WSA	BLM	10 miles

The McIntyre Hills WSA is located in Fremont County, 12 miles west of Cañon City and immediately south of US 50 (Map 1-2). The McIntyre Hills WSA is comprised of approximately 17, 210 acres of semiarid rolling hills covered with piñon-juniper forests and steep, rugged drainages. The rugged nature of McIntyre Hills creates outstanding opportunities for solitude and unconfined, primitive recreational experiences within a three-hour drive of the majority of Colorado’s population. The area is generally accessible year-round for hiking, backpacking, and other nonmotorized and nonmechanized recreational activities. There are no developed trailheads or trails within this area (BLM 2009b). Recreational access is limited due to surrounding private land (BLM 2009e).

Elevations in the McIntyre Hills range from 5,900 feet near the Arkansas River to 8,100 feet in the southern portion of the area. The higher elevations host some ponderosa pine and Douglas fir stands. A rare species of penstemon, known to exist in only five locations, occurs in McIntyre Hills. Springs and pools in the major drainages provide a reliable water source for wildlife and recreation. The rugged topography and dense vegetation are excellent habitat for mule deer, black bear, mountain lion, turkey, and small mammals. Golden eagles and prairie falcons nest here.

There are no significant resource conflicts with wilderness designation of McIntyre Hills. There is little possibility that salable, leasable, or locatable minerals exist in economic quantities in the WSA, according to the BLM (Colorado Wilderness Network 2006).

Within the proposed wilderness lie 1,260 acres of Colorado state land and 40 acres of private inholdings. These lands and their potential uses are basically indistinguishable from the condition and uses existing on surrounding BLM lands in the WSA, and thus there is no logical reason to exclude them (Colorado Wilderness Network 2006).

Grazing inside WSAs, which existed when FLPMA was enacted, is "grandfathered in" and can continue as long as the use does not degrade the wilderness values in a manner that constrains the area's suitability for preservation as wilderness (BLM 2009a). McIntyre Hills falls within two grazing allotments that have a total of 231 and 469 AUMs, respectively. BLM considers the area to be generally poor for livestock forage production. The impact of wilderness designation on livestock forage would be minimal to nonexistent (Colorado Wilderness Network 2006).

There are no perennial streams or surface water within the boundaries of the proposed wilderness (Colorado Wilderness Network 2006).

All wilderness characteristics identified and inventoried during the inventory phase (1978 through 1980) remain intact and stable (BLM 1995). WSAs are monitored through ground and aerial observation to ensure wilderness characteristics are not degraded to the extent that would affect eligibility for wilderness designation. The Project Area is also adjacent to the Table Mountain Citizens Wilderness Proposal, which would encompass 27,888 acres north of the Arkansas River. This area is separated from the McIntyre Hills Wilderness Study Area (WSA) to the south by only the Arkansas River, US 50, and the former D&RGW railroad line, which follows the Arkansas and defines the southern boundary of the proposed wilderness.

Public lands that would be directly affected by the project do not have wilderness character within the meaning of Wilderness Act. The Wilderness Act includes in the definition of wilderness an area that is without permanent improvements or human habitation, where the imprint of man's work is substantially unnoticeable, and that has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition. 16 U.S.C. 1131(c).

Public lands that would be directly affected by the project do not meet these criteria.

3.23.1.2 Special Management Areas

The Project Area includes one designated Area of Critical Environmental Concern (ACEC). ACEC is a BLM-specific designation that recognizes areas where special management attention is needed to protect and prevent irreparable damage to outstandingly remarkable values and/or to protect life and safety from natural hazards.

The 40,000-acre Arkansas Canyonlands ACEC is located immediately adjacent to and encompasses much of the lands on the north side of the Arkansas River between Texas Creek and Parkdale (Map 1-2). The Arkansas Canyonlands ACEC contains scenic, historic, and cultural values; peregrine falcons, key raptor habitat, bighorn sheep, and fisheries. The High Mesa Grassland Research Natural Area (1,510 acres), a

unique relict plant community and key raptor habitat, is located within this ACEC. High Mesa Grassland is also a Colorado Natural Area.

3.23.2 Current Management Considerations

3.23.2.1 Wilderness

In accordance with Sec. 603(2) of the FLPMA, the BLM is required to manage all lands under wilderness review so not to impair suitability for wilderness designation until Congress releases the area from further wilderness consideration. Specific guidance for interim management is provided in the 1995 BLM Interim Management Policy (IMP) and Guidelines for Lands Under Wilderness Review (BLM Handbook H-8550-1). The IMP is temporary and applies only during the time an area is under wilderness review and until Congress acts on WSA; or where applicable, by a final decision by the BLM. After Congress acts on the President's recommendation for each WSA, a different policy will apply to the area, depending on whether or not Congress designates the area as wilderness. Areas designated as wilderness will be managed under BLM Manual 8560 – Management of Designated Wilderness Areas and under the regulations at 43 CFR 8560. Areas released from wilderness study will no longer be subject to the IMP, and will be managed under general BLM management policies and applicable land use plans. For now, the McIntyre Hills WSA remains subject to the management guidelines of the IMP.

Under the interim guidance, a proposed activity in a WSA must meet three requirements before it can be approved. The activity must (1) be temporary, (2) not cause an impact that will be substantially noticeable following reclamation, and (3) not impair the suitability of WSAs for wilderness designation (this is also referred to as the “nonimpairment standard”).

Under the interim guidance, a proposed activity with valid rights does not have to meet these three requirements. Valid existing rights, such as mining claims, mineral leases, and ROW authorizations granted prior to October 21, 1976, the inception date of FLPMA, would be allowed to continue. The OTR project would not exercise any valid existing rights in the McIntyre Hills WSA. Therefore, the exemption does not apply to the OTR project and the three requirements for proposed activities must be satisfied.

Temporary uses are defined as those that do not create new surface disturbance nor involve permanent placement of structures. The term “suitability” originated in the Wilderness Act of 1964, which directed the Secretaries of Agriculture and Interior to review wilderness candidate lands for their “suitability or nonsuitability for preservation as wilderness.”

3.23.2.2 Special Management Areas

RMP management objectives and decisions for the Arkansas Canyonlands ACEC are as follows:

Sensitive resources would be managed to protect, enhance, and interpret the significant scenic, historic, and archaeological values, peregrine falcons, key raptor habitat area, bighorn sheep habitat, and important fisheries. Additional public access along a nationally significant recreational river would be considered. The area would receive special management as an ACEC (BLM 1993, Table 3-23, p. 3-46 and Appendix K).

3.24 SOUND RESOURCES AND NOISE

This section describes the general noise sources and levels in the Project Area. Because traffic is the main noise source, USDOT, FHWA, and CDOT guidance for noise studies and noise abatement were used for this assessment.

Sound is quantified using a logarithmic unit called a decibel (dB). Because the human ear is more sensitive to middle and high frequency sounds than it is to low frequency sounds, sound levels are often weighted to more closely reflect human perceptions. This type of weighting is called “A weighting,” and is expressed as dB(A), which corresponds to the threshold of hearing.

Although a human ear can detect a sound level change as small as 1 dB, 3 dB is considered the smallest noticeable change for a time-varying source. An increase, or decrease, of 10 dB is perceived by most people to be a doubling, or halving, of the loudness of sound. Noise is often defined as “unwanted sound.” Sounds are described as noise if they interfere with an activity or disturb the person hearing them.

Sound levels fluctuate with time depending on the sound source audible at a specific location. Additionally, the degree of annoyance associated with certain sounds can vary by time of day, depending on other sound sources affecting a receiver and the activities of the receiver. For example, the interruption of sleep can be very annoying. For these reasons, sound levels are usually reported using statistical or mathematical descriptors of the time history of sound.

Table 3-108 presents examples of noise levels common to everyday activities using the dB(A) scale.

Table 3-108. Noise Levels for Specific Activities

Sound Level [dB(A)]	Type of Noise
110	Rock band
105	Jet flyover at 1,000 feet
95	Gas lawn mower at 3 feet
85	Diesel truck at 50 feet
80	Same truck at 110 feet
70	Gas lawn mower at 100 feet
65	Normal speech at 3 feet
50	Birds chirping
40	Leaves rustling
30	Very soft quiet whisper
0	Threshold of hearing

Source: US Department of Transportation 1980.

3.24.1 Current Conditions and Trends

The Project Area is located within a river canyon, with a highway along the river. The roadway traffic is the main source of noise in the corridor, along with the sound of moving water near the river. Land uses within the corridor are predominantly recreation, open space, and residential. There are two small communities in the Project Area—Coaldale and Cotopaxi—as well as smaller unincorporated named enclaves (residential and/or commercial buildings) along the corridor, including Cleora, Wellsville,

Swissvale, Howard, Vallie, Texas Creek, Echo, Spikebuck, Parkdale Siding, and Parkdale. The larger communities of Salida and Cañon City form more general west and east boundaries for the corridor.

Noise receptors in the Project Area include residents of and visitors to the corridor communities and persons participating in Arkansas River Valley recreational activities, including fishing, rafting, kayaking, hiking, and sightseeing. Additional noise receptors in the Project Area include terrestrial and avian wildlife species inhabiting or occupying the Arkansas River corridor, as described in Section 3.1, Terrestrial Wildlife and Habitat, and 3.2, Avian Wildlife and Habitat. The Project Area is most representative of land use category B related to FHWA/CDOT noise abatement criteria (NAC) (see Table 3-109). General noise levels are likely to be represented by the descriptions in Table 3-108. The proposed work of art would cause only temporary effects on area noise and a noise analysis is not generally considered necessary for such work (CDOT 2006b).

3.24.1.1 Anchor Test Noise Study

Background noise levels and those from drilling operations associated with proposed anchor installation for the temporary work of art were measured during anchor testing on June 24, 2006. The test was located in the Parkdale Area along the Arkansas River (J.F. Sato 2007). Two types of drills were used based on the geological materials where the anchors would be installed. Noise measurements were taken during the drilling operations at specific distances from the drilling and associated compressor equipment as well as at different representative background locations, including near the river and near US 50. Noise levels were also recorded for a nearby gravel pit operation.

The noise study indicated that the drilling noise would be audible at distances of at least 1,000 feet and would be audible along the river within about 300 feet of the drilling operation. It is expected that drilling along the US 50 side of river would be audible to persons traveling in vehicles.

When drilling is occurring on the other side of the river, however, people in vehicles would likely not notice the noise from drilling above the traffic noise. Gravel pit noise levels (measured at the property line) were 47 to 48 dBA. It is not known if the pit was in full operation, though some activity was audible. The maximum drill noise levels measured along the river range from 80 to 90 dBA.

The physical location of the noise test is likely only representative of the direct impacts from the equipment tested, and would not be representative of the entire Project Area. The tests were performed in a particular area and time, and as such would not necessarily demonstrate or fully represent noise levels at any other particular location or time.

3.24.2 Current Management Considerations

FHWA procedures for highway traffic noise analysis and abatement for federal-aid highway projects are contained in 23 CFR Part 772. CDOT is responsible for interpretation of this guidance within the state. See Table 3-109 for FHWA/CDOT NAC. The criteria are used to identify noise levels at which noise abatement should be considered for general land use activities. To describe or measure the noise levels, Leq(h) is used. The Leq(h) is the equivalent steady-state sound level, which for one hour contains the same acoustic energy as the time-varying sound level during that same time period (USDOT 1995).

Table 3-109. FHWA Noise Abatement Criteria

Land Use Activity Category	Leq(h) dB(A)	Description of Activity Category
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	No limit	Undeveloped lands.
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: CDOT 1995.

3.25 HISTORIC PROPERTIES AND NATIVE AMERICAN RELIGIOUS CONCERNS

3.25.1 Current Conditions and Trends

Cultural resources include both prehistoric and historic remains 50 years of age or older. Prehistoric sites generally include artifacts and/or features representing one or more events. Artifacts most often consist of flaked stone, ground stone, ceramics, bone, metal, and wood. Common features include the remains of fire pits, storage pits, and habitations such as stone circles and wood pole structures. Prehistoric rock art is also known in the region.

Historic sites include a wide array of site and feature types. Pertinent to this project are railroads, roads, utility lines, railroad-related sites, mining sites, and ranching sites. Artifacts most often include construction materials and domestic items, such as cans and bottle fragments.

3.25.1.1 Culture History of the Upper Arkansas River Basin

The prehistoric and historic culture histories of the Upper Arkansas River Basin and the Arkansas River Canyon in Colorado have been summarized most recently in two contexts (Church et al. 2007, Zier and Kalasz 1999). The reader is referred to these documents for additional references regarding the prehistory and history of the study area.

Paleoindian stage (11,500 – 7800 B.P.) sites in the Colorado mountains are still poorly understood because of the paucity of identified sites (Zier 1999). However, progress is being made in finding and recording the earliest sites of human activity in the state (e.g., Brunswig 1999, 2001a, 2001b; Lincoln et al. 2003). A Colorado SHPO Compass database search indicates that there are several Paleoindian sites in the mountains around the Arkansas Canyon, but none have been systematically excavated. During the Paleoindian stage, the cultures of the mountains appear to have subsisted on large game (based on associated lithic tools), and supplemented their diets with a variety of small game and vegetal materials. Unfortunately, information about the period is limited to little more than environmental and lithic data. Because of the difficulties of preservation, sociocultural inferences are only very speculative. It appears

that Paleoindian populations were living in relatively small groups, and seem to have been mostly nomadic.

Much more cultural material dating to the Archaic stage in the mountains (7800 – 1850 B.P.) has been found. The general size reduction of lithic tools, coupled with the presence of ground stone, vegetal and faunal evidence, suggests that a gradual shift in subsistence focus from large game to a more broad-spectrum strategy, possibly including horticulture, was taking place (Butler 1997). As early as 7800 B.P., Archaic populations were living in basin houses and later in structures with stone foundations (Guthrie 1981; Metcalf and Black 1991; Shields 1998). Based on these and other data, it appears that Archaic groups were becoming more sedentary than their Paleoindian predecessors.

Recorded evidence of the Late Prehistoric stage (1850 – 225 B.P.) occupation is sparse in the mountain region, which is largely due to the lack of intensive inventory as compared to the Arkansas River Basin in the Plains (Kalasz et al. 1999:156). Buckles (1979) posits a continuation of Archaic-stage lifeways and settlement patterning. Black suggests that an indigenous population with ties to the Great Basin might have occupied the Colorado mountains year-round (Black 1991), but other data indicate that surrounding groups (Anasazi, Fremont and Woodland) utilized the resources in the mountains near them. The Arkansas Canyon lies within an area of the mountains that appears to have been used by Plains-oriented groups. However, there is little to indicate substantial Late Prehistoric settlement in the mountains (see Gilmore et al. 1999, and Zier and Kalasz 1999 for more details).

Aboriginal populations during the Protohistoric period (500 – 225 B.P.) underwent significant changes due to the influence and encroachment of Euro-American culture. The Utes occupied the mountains, perhaps even as far east as the foothills, but other Plains tribes were present in the mountains as well. The Comanche, Apaches, Kiowa, Cheyenne, Arapaho, and Sioux utilized the area to varying degrees. Most likely because of small populations, along with the relatively nomadic lifestyle of the Plains tribes, there are very few sites attributed to the Protohistoric. Sites with identifiable Ute features (e.g., wickiups and distinctive Ute pottery) are rare east of the Continental Divide.

Euro-American activity in the mountain region was dominated by fur trapping and mining during most of the historic period. Exploration by the Spanish began in the early 1700s, and fur trapping was at its height from 1812 through the 1840s. By 1848, Spanish control of the region was finally surrendered. The Colorado Gold Rush occurred in 1859; prospecting and mining continued, with varying intensity. Construction of towns, roads, and railroads followed and greatly facilitated access into the once-remote mountains. Serious labor problems in the early part of the 20th century resulted in a disastrous decline in mine production. By World War I, other minerals were in demand, and gold and silver mining dropped off sharply. More information and references regarding the history of the Colorado mountains are available in Mehls (1984) and Church et al. (2007).

3.25.1.2 Culture History of the Arkansas River Canyon

The most common prehistoric sites in the canyon are open or sheltered lithic scatters and camps, and quarry sites. Projectile point typologies indicate American Indian occupation started during the Late Paleoindian and persisted through the Late Prehistoric, from about 8000 B.C. on. Historically, the canyon has been used as a travel corridor and home to American Indian tribes of the Great Plains and Rocky Mountain West, most notably, but not limited to, the Ute, Cheyenne, Arapaho and Comanche.

Historic Euro-American sites in the canyon are associated primarily with mining and railroading, with some homesteading and ranching. The most prominent site within the APE in the canyon, physically and historically, is the D&RGWRR (5FN779). Other sites include a historic telegraph and transmission line that follows the D&RGWRR, US 50, DeRemer Forts, and camps associated with the railroad.

The D&RGWRR Tennessee Pass Subdivision was organized in 1870 by General William J. Palmer to serve the Front Range corridor and mining areas as far west as Dotsero. The railroad reached Pueblo in 1871 and Cañon City in 1874.

Competition for the right to construct a railroad through the Arkansas River Canyon escalated into the “Royal Gorge War” of 1878-1880, a conflict between the D&RGWRR and the Atchison, Topeka, and Santa Fe Railroad for the rights to lay tracks to Leadville (Little 1957, Beebe and Clegg 1958). Several historic sites along the canyon are associated with the Royal Gorge War. At least 11 sites consist of dry-stacked stone wall structures positioned high on the canyon walls, which provided gunmen with strategic overlooks to the river and canyon below. These structures are referred to as the “DeRemer Forts,” named after James R. DeRemer, chief engineer of the D&RG, who directed their construction. A number of these structures are now located on land managed by the BLM.

The D&RGWRR gained legal control of the canyon in February 1880. The railroad is now owned by the Union Pacific Railroad Company. The Arkansas River Canyon corridor portion of the railroad has been suggested as a NRHP district, which is significant at the state and possibly national level (DeLeuw et al. 1996).

3.25.1.3 Cultural Resources File and Literature Search

Based on searches in the SHPO Compass database and other materials in BLM records, prior to the most recent inventory, 39 cultural resources are known to lie within or to intersect the OTR project APE (Table 3-110). Only five of these resources contain prehistoric remains, and one of the sites has been destroyed. The remaining previously recorded sites are related primarily to transportation in the canyon, including the railroad and railroad war, and the Cañon City to Salida Wagon Road (5FN1950). No segments of Historic US 50 have been recorded previously within the APE.

Table 3-110. Previously Recorded Cultural Resources within the APE

Resource Number	Type	NRHP Eligibility ⁶²
5CF927	Prehistoric Open Camp and Historic Trash Scatter	Field Eligible
5CF1137	Salida Hot Springs Aquatic Center	Officially Not Eligible
5FN51	Jay Hill Placer Area	Officially Not Eligible
5FN66	Prehistoric Open Lithic Scatter	Field Not Eligible
5FN83	Rockshelter	Field Not Eligible - Destroyed
5FN585.1	Denver and Rio Grande Western Railroad	Field Eligible
5FN779.16	Denver and Rio Grande Western Railroad	Field Not Eligible
5FN779.17	Denver and Rio Grande Western Railroad	Field Not Eligible
5FN779.18	Denver and Rio Grande Western Railroad	Field Not Eligible
5FN779.27	Denver and Rio Grande Western Railroad	Field Not Eligible
5FN779.78	Historic Check Dam	Field Not Eligible

⁶² Field Eligible = The site has been assessed as eligible by the recorder. Field Not Eligible = The site has been assessed as not eligible by the recorder. Officially Eligible = The site has been determined eligible by SHPO. Officially Not Eligible = The site has been determined not eligible by SHPO.

Resource Number	Type	NRHP Eligibility ⁶²
5FN779.79	Historic Trash Scatter	Officially Not Eligible
5FN779.80	Historic Stone Alignment and Berm	Officially Not Eligible
5FN779.81	Historic Stone Structure	Officially Eligible
5FN805	Historic Camp	Field Eligible
5FN806	Historic Stone Structures	Officially Eligible
5FN807	Historic Stone Structures	Field Eligible
5FN808	Historic Stone Structures	Officially Eligible
5FN809	Historic Camp	Officially Eligible
5FN897	Abandoned County Road	Officially Not Eligible
5FN1029.2	Unused Railroad Bed	Officially Eligible
5FN1029.4	Unused Railroad Bed	Officially Eligible
5FN1029.6	Unused Railroad Bed	Officially Eligible
5FN1029.7	Unused Railroad Bed	Officially Eligible
5FN1029.8	Unused Railroad Bed	Officially Eligible
5FN1029.9	Unused Railroad Bed	Officially Eligible
5FN1029.10	Unused Railroad Bed	Officially Eligible
5FN1029.11	Unused Railroad Bed	Officially Eligible
5FN1029.12	Unused Railroad Bed	Officially Eligible
5FN1029.13	Unused Railroad Bed	Officially Not Eligible
5FN1029.14	Unused Railroad Bed	Officially Not Eligible
5FN1240	Taylor Ranch	Officially Not Eligible
5FN1550	Multicomponent Rockshelter	Officially Eligible
5FN1551/5FN1948	Compressor Site and Prehistoric Lithic Scatter	Officially Not Eligible
5FN1575	Retaining Wall	Officially Not Eligible
5FN1576	Historic Platform	Officially Not Eligible
5FN1950.2	Cañon City - Salida Road (Segment)	Officially Eligible
5FN1950.3	Cañon City - Salida Road (Segment)	Officially Eligible
5FN1950.4	Cañon City - Salida Road (Segment)	Officially Eligible
5FN1950.8	Cañon City - Salida Road (Segment)	Officially Eligible

3.25.2 Current Management Considerations

Cultural resources are nonrenewable and are protected under Section 106 of the NHPA of 1966, as amended (Section 106); 16 USC 470 et seq; revised Advisory Council on Historic Preservation (ACHP) 36 CFR 800, as well as under Section 4(f) of the U.S. Department of Transportation Act of 1966.

Authorized under the NHPA, the NRHP is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archaeological resources. Properties listed in the NRHP include districts, sites, buildings, structures, and objects that are significant in American history.

Cultural resources are regarded as significant if they are enrolled in or meet the eligibility criteria of the NRHP. NRHP eligibility criteria are enumerated in 36 CFR 60 and are described as follows:

- The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
 - A. that are associated with events that have made a significant contribution to the broad patterns of our history; or,

- B. that are associated with the lives of persons significant in our past; or,
- C. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or,
- D. that have yielded, or may be likely to yield, information important in prehistory or history.

In order to be eligible for inclusion on the NRHP, a property must meet two separate types of requirements. It must meet one or more of the four additional criteria **and** exhibit integrity in the areas enumerated above. The NHPA makes clear that a site need not be of national historic significance to be considered eligible; sites of local, state, and regional importance may also be listed, and thus are significant in the legal sense. The phrasing of the NHPA is critical with respect to actual management of cultural resources. A site does not have to be included in the NRHP to receive protection under the law, but must simply meet the requirements of eligibility.

Section 106 of the NHPA requires the BLM to conduct consultation with the ACHP regarding historic properties⁶³ that will be impacted by federal undertakings. Regulations detailed in 36 CFR 800 (Protection of Historic Properties) guide this consultation process, and include provisions for the development of programmatic agreements that substitute for the regulated process. Because of a National Programmatic Agreement among the BLM, the ACHP, and the National Conference of State Historic Preservation Officers (signed March 26, 1997), as well as the Colorado State Protocol between the Colorado BLM and the Colorado SHPO (signed April 29, 1998), BLM now makes determinations of eligibility (DOEs) and effect, asking for concurrence only in certain circumstances⁶⁴.

Pursuant to Section 106 of the NHPA (as amended) and revised ACHP 36 CFR 800 regulations, determinations of the APE require lead agency (in this case BLM) consultation with SHPO, as well as with project consulting parties. Typically, all areas where the undertaking may cause changes to land or structures or to their uses, whether the changes would be direct or indirect, beneficial or adverse, are included within the APE. Once the APE has been identified, the focus shifts to the identification and evaluation of historic properties⁶⁵, which are sites eligible for the NRHP (the NRHP is the nation's official list of cultural resources worthy of preservation). BLM consults with the SHPO on the identification of historic properties and their determinations of eligibility to the NRHP. BLM also seeks concurrence with their assessment of effects and treatment from the SHPO and consulting parties.

In consultation with the Colorado SHPO, BLM defined the APE for the proposed OTR undertaking, within the following parameters:

⁶³ In the present document, "historic property" is used as defined in 36 CFR 800.2 (a cultural resource that is eligible for listing in the NRHP).

⁶⁴ When the project (1) is a nonroutine interstate and/or interagency project or program; (2) directly affects a National Register eligible or listed property; (3) has been determined by BLM, SHPO, or the Council to be highly controversial; (4) is one of the following: a land exchange, land sale, Recreation and Public Purpose lease, or transfer; (5) has been analyzed by a BLM staff person with limited experience or lacking appropriate expertise; (6) is one which BLM wishes to bring to the attention of the SHPO.

⁶⁵ 36 CFR 800. 16 (l)(1), definition: "*Historic property* means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria."

- For the predicted area of disturbance associated with each of the eight proposed OTR panel locations, the APE was defined as a corridor extending from the railroad on the north of the river to US 50 on the south, with a 100-foot buffer to the outside of the railroad and highway. The buffer was also 100 feet upriver and downriver from the ends of the usage and disturbance areas in each section. The buffer was agreed upon to ensure that unanticipated impacts are minimized outside of inventoried areas.
- Ancillary facilities such as staging areas, visitor information centers, and newly established parking areas, including (where feasible) a 100-foot buffer around the perimeter, were included in the APE.
- Historic US 50 is being analyzed from Parkdale to Salida for this undertaking. The history of this entire section is being researched and the highway within each portion of the APE evaluated for its potential to support the NRHP eligibility of the resource as a whole, and for effect. This process entails determining whether each segment has elements that illustrate the important features of the historic highway and possesses good integrity. It also involves assessing whether the undertaking will have no effect, no adverse effect, or an adverse effect on each historic property.
- The D&RG grade is also being analyzed within each portion of the APE using the same methods as for US 50.
- Any segments of Fremont CR 45 (Site 5FN1950) that fall within the APE associated with panel locations or ancillary facilities are being assessed for NRHP supporting status and potential effects.
- The “DeRemer Forts” associated with the 19th century Royal Gorge War, which are situated in close proximity to the proposed OTR segments, even though they may lie outside of the 100 to 250-foot buffer defining the APE, have been relocated, rerecorded, and reevaluated.
- In some places, the final APE did not require 100% pedestrian inventory. This was the case where: Overlap exists between the current project footprint and the configuration inventoried for OTR by Native Cultural Services in 1997. However, known sites recorded by Native Cultural Services that lie within the current APE have been relocated and reevaluated.

More than half of the US 50 route through the Arkansas Canyon has been inventoried by the CDOT, although some of the inventory projects are quite old. Some segments were reinventoried, and known sites were relocated and reevaluated.

3.25.2.1 Inventory and Recording Methodology

A prehistoric site is defined as any locality exhibiting at least one structure or feature (for example, a stone circle or hearth), or having five or more artifacts in apparent association with one another and occurring within a restricted area. A locality with fewer than five artifacts may also be regarded as a site if the potential exists for buried materials, or if the area is disturbed and other materials are likely to have been removed. Prehistoric isolated finds (IFs) are nonstructural remains and consist of four or fewer artifacts. A historic site is defined as any structure or structural remnant (e.g., house, outbuilding, root cellar), any trash concentration or scatter suggesting residential or industrial use of the area, or any linear feature suggesting sustained or long-term use (e.g., transportation corridors such as old roads or railroad lines, or irrigation canals). Historic IFs are individual historic artifacts or small clusters of artifacts that do not represent established refuse dumps. The minimum age criterion for historic sites and isolates is 50 years.

The APE, uninventoried areas, and previously recorded cultural resource locations were uploaded to hand-held Garmin 60CSx and Trimble Juno GPS units using ArcGIS and MXGPS software. The GPS units were then used to guide the crew within the inventory boundary. Intensive inventory of the Project Area was conducted by three-person crews that walked parallel transects spaced no more than 15 meters apart. Surface visibility ranged from excellent (no ground cover) to poor (70%-80% ground cover) in areas of thicker vegetation.

The inventory was halted for the discovery of any cultural materials, whether historic or prehistoric, and an intensive inspection of the immediate area was initiated to determine whether additional artifacts and/or features were present. Efforts were initially focused on defining the spatial limits of the resource. The site boundary is defined as the encircling line connecting the most outward lying occurrences of cultural materials. The data collection phase of the investigation was initiated upon completion of site flagging and boundary delineation. The site was assigned a unique field number. Sites were recorded on Colorado Cultural Resource Survey Forms and with a GPS unit (a track log was created to show the boundary and a GPS waypoint was recorded for the site datum). The site was further documented through digital photography.

An effort was made to relocate all of the previously recorded cultural resources that are within or intersect the APE. When necessary, the same methodology described above was used to re-record the previously recorded sites.

3.25.2.2 Cultural Resources Inventory Results

During the course of the inventory for the OTR project, 117 cultural resources were recorded. These include 5 prehistoric sites, 3 prehistoric isolated finds, 11 sites with both prehistoric and historic components, 95 historic sites, and 3 historic isolates (see Table 3-111). Twenty-nine previously recorded sites were revisited. Three of those sites are segments of the Cañon City to Salida Road (5FN1950) that were recorded as one segment during this inventory. One site, a compressor station foundation and prehistoric lithic scatter, has two Smithsonian numbers in the SHPO database, 5FN1551 and 5FN1948. It is referred to hereafter as 5FN1551. While an attempt was made to relocate them, 5FN66 and 5FN1576 were not found during the inventory. It is believed that what was originally recorded as 5FN807 is actually part of 5FN806 as it was recorded for the OTR project. Attempts to relocate five of the previously recorded sites failed. Improvements to US 50 have likely destroyed 5FN66 and 5FN1029.11, while 5FN83 is listed as “destroyed” by the Colorado Department of Highways in 1976. Site 5FN779.80 is probably part of the newly recorded 5FN779.85; but because of the lack of photographs in the original site form, it is impossible to be sure about the location of 5FN779.80. Site 5FN1576 was not relocated and may be outside of the APE.

As described above, 5 single-component prehistoric components were documented. Test excavations were undertaken at three of the five sites to facilitate NRHP eligibility evaluations. All three sites were found to harbor intact subsurface cultural deposits and were assessed as NRHP-eligible. It is recommended that these sites be avoided; if avoidance is not possible, it is recommended that impacts be mitigated in the context of agency-approved treatment plans. These sites are:

- 5CF2690/5FN2509
- 5FN2511
- 5FN2513

One prehistoric site could not be evaluated for NRHP eligibility on the basis of surface indications and was not test excavated because it lies outside direct impact areas. The site was assessed as “Needs Data,” and until such time that it is evaluated, it should be afforded the protection of a significant site. It is recommended that the site be avoided. This site is:

- 5FN2521

The remaining prehistoric site was evaluated as not eligible based on the absence of potential to yield buried cultural materials in combination with evidence of considerable disturbance. No further work is recommended at this site. This site is:

- 5CF2698

a. Historic Sites

The site inventory includes 95 single-component historic sites. Four linear historic resources with multiple segments were assessed as NRHP-eligible in their entirety, or have been officially determined eligible. Individual segments were assessed as supporting the overall eligibility of the resource. The sites are:

- D&RGWRR, including Westcliffe Branch (5CF644.60 - .64, 5FN779.85 - .106, 5FN1501.3)
- D&RG – Unused Sections (5FN1029.2, .4, .6 - .10, .12 - .15)
- Cañon City – Salida Road (5CF2697.1 - .3, 5FN1950.9)
- US 50 (5CF938.2, 5FN2535.1 - .10)

It is recommended that the segments of 5FN1029 be avoided. However, avoidance is not feasible in the case of active segments of the D&RGWRR and US 50, which are currently in use as transportation facilities. While traffic on these routes is an ongoing impact that may be adverse in the cumulative sense, the proposed undertaking would not impose new impacts to the sites. Sixteen segments of the D&RGWRR are abandoned, and it is recommended that these segments be avoided: 5CF644.61, .62, .64, 5FN779.85, .87 - .89, .92, .94, .98, .99, .103 - .106, 5FN1501.3. In the case of the Cañon City – Salida Road, segments 5CF2697.1 - .3 have been abandoned and should be avoided. Segment 5FN1950.9 is currently used for local traffic. Continued use of this nature would not constitute an adverse effect. No further work is necessary at the active road and railroad segments.

Other segments of two of these sites are no longer intact and do not support the eligibility of the greater resource. No further work is recommended for these sites:

- Cañon City – Salida Road (5FN1950.10)
- US 50 (5CF938.3, 5FN2535.11 - .12)

Several other linear sites do not meet NRHP criteria because of lack of association with historically important events or persons. Many of these sites also lack physical integrity. No further work is recommended for these sites:

- Unnamed telegraph and telephone line (5CF2691.1 - .2, 5FN2518.1 - .8)
- Unnamed utility line (5CF2694.1)

- Unnamed utility line (5FN2528.1 - .2)
- Abandoned county road (5FN897)
- Miscellaneous abandoned roads (5FN2531.1, 5FN2532.1)
- Unnamed flume segment (5FN1553.2)

Two historic sites associated with the Kerr Quarry are assessed as “needs data” because the associated quarry site has not been recorded and the relationship of the wagon road and bridge abutment to the quarry site has not yet been determined. These sites should be avoided, but if that is not feasible, the nearby quarry should be evaluated in order that a final determination can be made on these sites:

- Kerr Quarry wagon road and associated feature (5FN2519.1 - .2)

Six sites were identified as DeRemer Forts or railroad construction camps. Four of the six have been officially determined eligible for the NRHP. The remaining two sites have not been evaluated. These six sites are associated with the Royal Gorge War of 1878-1879 and/or with construction of the railroad, which was a historically important regional event. All six sites retain physical integrity. BLM concurred with the determination of eligibility for the previously recorded sites and assessed the two newly recorded sites as eligible as well. It is recommended that the sites be avoided. These sites are:

- 5CF2692
- 5FN805
- 5FN806
- 5FN808
- 5FN809
- 5FN2533

Two nonlinear historic sites were evaluated as NRHP-eligible. The Fremont County Fish Retaining Ponds site is eligible under Criterion A because of its importance to the recreational development of the area and its association with historically important local persons. While partially deteriorated, portions of the site retain physical integrity. The Historic Townsite is eligible under NRHP Criteria A and D. The site played a significant role in the early economic development of the region, and although most structures have been razed, buried archaeological materials remain and thus the site retains research potential. It is recommended that both of these sites be avoided; if avoidance is not feasible, mitigative actions should be undertaken within the context of comprehensive treatment plans. These sites are:

- 5FN2522 (Fremont County Fish Retaining Ponds)
- 5FN2536 (Historic Townsite)

One nonlinear site has been officially determined not eligible for the NRHP, and BLM concurred with this assessment. No further work is recommended. This site is:

- 5FN1240 (Taylor Ranch)

The remaining nine nonlinear historic sites are not eligible for the NRHP, and no further work is recommended. These sites have negligible potential to yield historically important information beyond that obtained at the time of recording. Several are highly disturbed and thus exhibit little or no physical integrity. The Salida Hot Springs Aquatic Center originated as a Depression-era Works Progress Administration project, but has been extensively rebuilt and renovated over the years to the degree that its architectural integrity has been fully compromised. These sites are:

Trash scatters or concentrations

- 5FN779.79
- 5FN2508
- 5FN2524

Rock piles, rock walls, or a combination of both

- 5FN1575
- 5FN2510

Mine sites

- 5CF2693
- 5FN2523

Abandoned railroad facilities

- 5FN2630

Salida Hot Springs Aquatic Center

- 5CF1137

b. Multicomponent Prehistoric – Historic Sites

Eleven sites are multicomponent with both prehistoric and historic cultural remains. The historic components of three sites are DeRemer Forts or railroad construction camps. These sites are:

- 5CF2695/FN2526
- 5FN779.81
- 5FN1550

The first two sites listed are in open settings and site 5FN1550 occurs in a rockshelter. The historic components of the open sites were evaluated as NRHP-eligible due to their association with the Royal Gorge War of 1878-1879 and/or with construction of the railroad, which was a historically important regional event. Both of these sites retain physical integrity. The prehistoric components consist of lithic scatters that do not contribute to the eligibility of the sites. Site 5FN1550 has been officially determined eligible for the NRHP, and BLM concurred with this determination. The prehistoric component includes surface artifacts as well as buried charcoal lenses, and was assessed as contributing to the eligibility of the site. It is recommended that all three of these sites be avoided.

Three prehistoric open lithic scatters include historic components as well. The prehistoric components of the sites were test excavated to facilitate NRHP assessments. These sites are:

- 5FN2515
- 5FN2516
- 5FN2517

Test excavations at 5FN2515 and 5FN2517 did not expose significant buried cultural materials. The historic components of both sites consist of small trash scatters. These sites were evaluated as not eligible for the NRHP, and no further work is recommended. Test excavation at site 5FN2516 (which also includes prehistoric ceramics) demonstrated that the site has the potential to harbor significant intact buried archaeological remains, and it was evaluated as NRHP-eligible. The historic component, composed of two low rock walls, does not contribute to the eligibility of the site. It is recommended that site 5FN2516 be avoided; if avoidance is not possible, it is recommended that impacts be mitigated in the context of an agency-approved treatment plan.

One prehistoric lithic scatter with a historic component consisting of a trash scatter was previously determined not eligible for the NRHP. Although not subjected to test excavation, the prehistoric component was evaluated as NRHP-eligible based on evidence of deep deposition as well as thermal features visible on the surface. The historic component does not contribute to the eligibility of the site. It is recommended that the site be avoided, or that impacts be mitigated in the context of an agency-approved treatment plan. This site is:

- 5CF927

The four remaining multicomponent sites are made up of both prehistoric and historic components that do not meet NRHP eligibility criteria. These sites are:

- 5CF2696/FN2527
- 5FN51
- 5FN1551
- 5FN2514

Two of these sites have been officially determined not eligible for the NRHP. Site 5FN51 is the Jay Hill Placer Area and 5FN1551 consists of a compressor site that may be associated with construction of US 50. The prehistoric components of both sites are small, open lithic scatters. BLM concurred with the previous eligibility determinations for both sites. Site 5CF2696/5FN2527 is a scatter of historic cans and small piled stone features in spatial association with a prehistoric lithic scatter of minimal size. Site 5FN2514 consists of a complex of abandoned railroad facilities in spatial association with a small lithic scatter. These sites are not NRHP-eligible, and no further work is recommended.

3.25.2.3 Native American Consultation

BLM invited the following groups into consultation for OTR: Apache Tribe of Oklahoma, Cheyenne and Arapaho Tribes of Oklahoma, Cheyenne River Lakota Tribe, Comanche Tribe of Oklahoma, Crow Creek Sioux, Eastern Shoshone Tribe, Jicarilla Apache Nation, Kiowa Tribe of Oklahoma, Northern Arapaho Tribe, Northern Cheyenne Tribe, Oglala Sioux Tribe, Pawnee Nation of Oklahoma, Rosebud Sioux Tribe, Southern Ute Tribe, Standing Rock Sioux Tribe, Ute Mountain Ute Tribe and the Ute Tribe. BLM requested information regarding areas or sites of specific concern to tribes, and if concerns were identified, measures to mitigate those concerns were to be developed. Such measures might include, but are not limited to: site avoidance, closure of an area, protective barriers, and signage. Three Ute tribes, as well as 13 Plains tribes, have been consulted and have not expressed any concerns regarding sacred sites.

Table 3-111. Sites and Isolated Finds within the Affected Environment

Smithsonian Trinomial Assignment	Site Type	Official Evaluation ⁶⁶
5CF644.60	Denver and Rio Grande Western Railroad	Eligible
5CF644.61	Denver and Rio Grande Western Railroad – Abandoned	Eligible
5CF644.62	Denver and Rio Grande Western Railroad - Abandoned	Eligible
5CF644.63	Denver and Rio Grande Western Railroad	Eligible
5CF644.64	Denver and Rio Grande Western Railroad - Abandoned	Eligible
5CF927	Prehistoric Open Camp; Historic Trash Scatter	Eligible
5CF938.2	US Highway 50	Eligible
5CF938.3	US Highway 50	Eligible
5CF1137	Salida Hot Springs Aquatic Center	Not Eligible
5CF2690/ 5FN2509	Open Lithic Scatter	Eligible
5CF2691.1	Telegraph and Telephone Line	Not Eligible
5CF2691.2	Telegraph and Telephone Line	Not Eligible
5CF2692	Historic Stone Structures	Eligible
5CF2693	Historic Mine Site	Not Eligible
5CF2694.1	Historic Utility Line	Not Eligible
5CF2695/ 5FN2526	Historic Stone Structures; Prehistoric Open Lithic Scatter	Eligible
5CF2696/ 5FN2527	Historic Rock Piles; Prehistoric Open Lithic Scatter	Not Eligible
5CF2697.1	Cañon City - Salida Road	Eligible
5CF2697.2	Cañon City - Salida Road	Eligible
5CF2697.3	Cañon City - Salida Road	Eligible
5CF2698	Open Lithic Scatter	Not Eligible
5FN51	Historic Jay Hill Placer Area; Prehistoric Open Lithic Scatter	Not Eligible
5FN779.79	Trash Scatter	Not Eligible
5FN779.81	Historic Wall/Blind; Prehistoric Lithic Scatter	Eligible
5FN779.85	Denver and Rio Grande Western Railroad - Abandoned	Eligible

⁶⁶ Each site and isolated find in this table has received an official determination of eligibility for listing in the National Register of Historic Places, which is the result of consultation between the BLM and the SHPO.

Smithsonian Trinomial Assignment	Site Type	Official Evaluation ⁶⁶
5FN779.86	Denver and Rio Grande Western Railroad	Eligible
5FN779.87	Denver and Rio Grande Western Railroad - Abandoned	Eligible
5FN779.88	Denver and Rio Grande Western Railroad - Abandoned	Eligible
5FN779.89	Denver and Rio Grande Western Railroad - Abandoned	Eligible
5FN779.90	Denver and Rio Grande Western Railroad	Eligible
5FN779.91	Denver and Rio Grande Western Railroad	Eligible
5FN779.92	Denver and Rio Grande Western Railroad - Abandoned	Eligible
5FN779.93	Denver and Rio Grande Western Railroad	Eligible
5FN779.94	Denver and Rio Grande Western Railroad - Abandoned	Eligible
5FN779.95	Denver and Rio Grande Western Railroad	Eligible
5FN779.96	Denver and Rio Grande Western Railroad	Eligible
5FN779.97	Denver and Rio Grande Western Railroad	Eligible
5FN779.98	Denver and Rio Grande Western Railroad - Abandoned	Eligible
5FN779.99	Denver and Rio Grande Western Railroad - Abandoned	Eligible
5FN779.100	Denver and Rio Grande Western Railroad	Eligible
5FN779.101	Denver and Rio Grande Western Railroad	Eligible
5FN779.102	Denver and Rio Grande Western Railroad	Eligible
5FN779.103	Denver and Rio Grande Western Railroad - Abandoned	Eligible
5FN779.104	Denver and Rio Grande Western Railroad - Abandoned	Eligible
5FN779.105	Denver and Rio Grande Western Railroad - Abandoned	Eligible
5FN779.106	Denver and Rio Grande Western Railroad - Abandoned	Eligible
5FN805	Historic Camp	Eligible
5FN806	Historic Stone Structures	Eligible
5FN808	Historic Stone Structures	Eligible
5FN809	Historic Camp	Eligible
5FN897	Abandoned County Road	Not Eligible
5FN1029.2	Unused Railroad Bed	Eligible
5FN1029.4	Unused Railroad Bed	Eligible
5FN1029.6	Unused Railroad Bed	Eligible
5FN1029.7	Unused Railroad Bed	Eligible
5FN1029.8	Unused Railroad Bed	Eligible
5FN1029.9	Unused Railroad Bed	Eligible
5FN1029.10	Unused Railroad Bed	Eligible
5FN1029.12	Unused Railroad Bed	Eligible
5FN1029.13	Unused Railroad Bed	Eligible
5FN1029.14	Unused Railroad Bed	Eligible
5FN1029.15	Unused Railroad Bed	Eligible
5FN1240	Taylor Ranch	Not Eligible
5FN1501.3	Abandoned Denver and Rio Grande Western Railroad Westcliffe Branch Grade	Needs data
5FN1550	Multicomponent Rockshelter	Eligible
5FN1551	Historic Compressor Site; Prehistoric Open Lithic Scatter	Not Eligible
5FN1553.2	Flume Remnant	Not Eligible
5FN1575	Retaining Wall	Not Eligible
5FN1950.9	Cañon City - Salida Road	Eligible

Smithsonian Trinomial Assignment	Site Type	Official Evaluation ⁶⁶
5FN1950.10	Cañon City - Salida Road	Eligible
5FN2508	Historic Trash Dump	Not Eligible
5FN2510	Historic Rock Walls and Piles	Not Eligible
5FN2511	Open Camp	Eligible
5FN2513	Open Camp	Eligible
5FN2514	Historic Abandoned Railroad Facilities; Prehistoric Open Lithic Scatter	Not Eligible
5FN2515	Prehistoric Open Lithic Scatter; Historic Trash Scatter	Not Eligible
5FN2516	Historic Stone Wall; Prehistoric Open Lithic and Ceramic Scatter	Eligible
5FN2517	Prehistoric Open Camp; Historic Trash Scatter	Not Eligible
5FN2518.1	Telegraph and Telephone Line	Not Eligible
5FN2518.2	Telegraph and Telephone Line	Not Eligible
5FN2518.3	Telegraph and Telephone Line	Not Eligible
5FN2518.4	Telegraph and Telephone Line	Not Eligible
5FN2518.5	Telegraph and Telephone Line	Not Eligible
5FN2518.6	Telegraph and Telephone Line	Not Eligible
5FN2518.7	Telegraph and Telephone Line	Not Eligible
5FN2518.8	Telegraph and Telephone Line	Not Eligible
5FN2519.1	Bridge Abutment	Needs Data
5FN2519.2	Kerr Quarry Wagon Road	Needs Data
5FN2521	Open Lithic Scatter	Needs Data
5FN2522	Abandoned Trout Hatchery Ponds	Eligible
5FN2523	Historic Mine Site	Not Eligible
5FN2524	Trash Dump	Not Eligible
5FN2528.1	Utility Line	Not Eligible
5FN2528.2	Utility Line	Not Eligible
5FN2531.1	Abandoned Road	Not Eligible
5FN2532.1	Abandoned Road	Not Eligible
5FN2533	Stone Structures	Eligible
5FN2535.1	US Highway 50	Eligible
5FN2535.2	US Highway 50	Eligible
5FN2535.3	US Highway 50	Eligible
5FN2535.4	US Highway 50	Eligible
5FN2535.5	US Highway 50	Eligible
5FN2535.6	US Highway 50	Eligible
5FN2535.7	US Highway 50	Eligible
5FN2535.8	US Highway 50	Eligible
5FN2535.9	US Highway 50	Eligible
5FN2535.10	US Highway 50	Eligible
5FN2535.11	US Highway 50	Eligible
5FN2535.12	US Highway 50	Eligible
5FN2536	Historic Townsite	Eligible
5FN2630	Abandoned railroad facilities	Not Eligible
5FN2512	Flakes (Isolated Find)	Not Eligible

Smithsonian Trinomial Assignment	Site Type	Official Evaluation ⁶⁶
5FN2520	Flakes and Biface Fragment (Isolated Find)	Not Eligible
5FN2525	Trash Scatter (Isolated Find)	Not Eligible
5FN2529	Glass Scatter (Isolated Find)	Not Eligible
5FN2530	Flake (Isolated Find)	Not Eligible
5FN2534	Cairn (Isolated Find)	Not Eligible

3.26 PALEONTOLOGICAL RESOURCES

3.26.1 Current Conditions and Trends

The study area for the affected environment regarding paleontological resources consists of the proposed ATF sites, access roads, staging areas, parking, and viewing areas. The various sites are underlain by rock types with varying degrees of potential to contain scientifically important fossils (Map 3-92). The following provides a discussion of the regulatory framework under which the BLM protects fossil resources, a summary of how fossil potential is evaluated, and a description of the fossil potential in the bedrock and deposits in the proposed project areas.

3.26.1.1 Regulatory Framework

Federal legislative protection for paleontological resources stems from the Antiquities Act of 1906 (PL 59-209; 16 United States Code 431 et seq.; 34 Stat. 225), which calls for protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federally administered lands. Federal protection for scientifically important paleontological resources would apply to construction or other related project impacts that would occur on federally owned or managed lands. Another federal law regulating paleontological resources is the Archaeological and Paleontological Salvage Act (23 USC 305). The act provides for funding for mitigation of paleontological resources discovered during Federal aid highway projects, provided that "excavated objects and information are to be used for public purposes without private gain to any individual or organization." In addition to the foregoing, the National Registry of Natural Landmarks provides protection to paleontological resources.

The BLM manages paleontological resources (fossils) on federal lands under the following statutes and regulations (BLM 2010c):

- FLPMA of 1976 (P.L. 94-579)
- NEPA of 1969 (P.L. 91-190)
- Various sections of BLM's regulations found in Title 43 of the CFR Title 43 C FR that address the collection of invertebrate fossils and, by administrative extension, fossil plants
- A recently enacted statute, the Paleontological Resources Preservation Act (PRPA), was passed in March 2009. The law authorizes the BLM and USFS to manage and provide protection to fossil resources using "scientific principles and expertise" (BLM 2010c)

In addition to the statutes and regulations listed above, fossils on public lands are managed through the use of internal BLM guidance and manuals. Included among these are the BLM Manual 8270 and the BLM

Handbook H-8270-1 (BLM 2010c). Various internal instructional memoranda have been issued to provide guidance to the BLM in implementing management and protection to fossil resources.

3.26.1.2 Potential Fossil Yield Classification

Recently, the BLM has adopted the Potential Fossil Yield Classification (PFYC) system to identify and classify fossil resources on federal lands (BLM 2007b). Paleontological resources are closely tied to the geologic units (i.e., formations, members, or beds) that contain them. The probability for finding paleontological resources can be broadly predicted from the geologic units present at or near the surface. Therefore, geologic mapping can be used for assessing the potential for the occurrence of paleontological resources.

The PFYC system is a way of classifying geologic units based on the relative abundance of vertebrate fossils or scientifically significant fossils (plants and invertebrates) and their sensitivity to adverse impacts. A higher class number indicates higher potential. The PFYC is not intended to be applied to specific paleontological localities or small areas within units. Although significant localities may occasionally occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher class; instead, the relative abundance of significant localities is intended to be the major determinant for the class assignment.

The PFYC system is meant to provide baseline guidance for predicting, assessing, and mitigating paleontological resources. The classification should be considered at an intermediate point in the analysis, and should be used to assist in determining the need for further mitigation assessment or actions. The BLM intends for the PFYC System to be used as a guideline as opposed to rigorous definitions. Descriptions of the potential fossil yield classes are summarized in Table 3-112.

Table 3-112. Potential Fossil Yield Classification

Class	Description	Basis	Comments
1	Igneous and metamorphic (tuffs are excluded from this category) geologic units or units representing heavily disturbed preservation environments that are not likely to contain recognizable fossil remains. Example: Pikes Peak Granite	Fossils of any kind known not to occur except in the rarest of circumstances. Igneous or metamorphic origin. Landslides and glacial deposits.	The land manager's concern for paleontological resources on Class 1 acres is negligible. Ground disturbing activities would not require mitigation except in rare circumstances.
2	Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant invertebrate fossils. Example: Fountain Formation	Vertebrate fossils known to occur very rarely or not at all. Age greater than Devonian. Age younger than 10,000 years before present. Deep marine origin. Aeolian origin. Diagenetic alteration.	The land manager's concern for paleontological resources on Class 2 acres is low. Ground disturbing activities would not likely require mitigation.

Class	Description	Basis	Comments
3	<p>Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence. Also sedimentary units of unknown fossil potential.</p> <p>Example: Minturn Formation</p>	<p>Units with sporadic known occurrences of vertebrate fossils. Vertebrate fossils and significant invertebrate fossils known to occur inconsistently; predictability known to be low.</p> <p>Poorly studied and/or poorly documented. Potential yield cannot be assigned without ground reconnaissance.</p>	<p>The land manager's concern for paleontological resources on Class 3 acres may extend across the entire range of management. Ground disturbing activities would require sufficient mitigation to determine whether significant paleontological resources occur in the area of a Proposed Action. Mitigation beyond initial findings would range from no further mitigation necessary to full and continuous monitoring of significant localities during the action.</p>
4	<p>Class 4 geologic units are Class 5 units (see below) that have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation.</p> <p>Example: Morrison Formation</p>	<p>Significant soil/vegetative cover; outcrop is not likely to be impacted. Areas of any exposed outcrop are smaller than 2 contiguous acres. Outcrop forms cliffs of sufficient height and slope that most is out of reach by normal means.</p> <p>Other characteristics that lower the vulnerability of both known and unidentified fossil localities.</p>	<p>The land manager's concern for paleontological resources on Class 4 acres is toward management and away from unregulated access. Proposed ground disturbing activities would require assessment to determine whether significant paleontological resources occur in the area of a Proposed Action and whether the action would impact the paleontological resources. Mitigation beyond initial findings would range from no further mitigation necessary to full and continuous monitoring of significant localities during the action.</p>
5	<p>Highly fossiliferous geologic units that regularly and predictably produce vertebrate fossils and/or scientifically significant invertebrate fossils, and that are at risk of natural degradation and/or human-caused adverse impacts.</p> <p>Example: Exposed bedrock of the Morrison Formation.</p>	<p>Vertebrate fossils and/or scientifically significant invertebrate fossils are known and documented to occur consistently, predictably, and/or abundantly.</p> <p>Unit is exposed; little or no soil/vegetative cover.</p> <p>Outcrop areas are extensive; discontinuous areas are larger than 2 contiguous acres.</p> <p>Outcrop erodes readily; may form badlands.</p> <p>Easy access to extensive outcrop in remote areas.</p> <p>Other characteristics that increase the sensitivity of both known and unidentified fossil localities.</p>	<p>The land manager's highest concern for paleontological resources should focus on Class 5 acres. Mitigation of ground disturbing activities would be required and may be intense. Areas of special interest and concern should be designated and intensely managed.</p>

Sources: BLM (2007); BLM (2008)

3.26.1.3 Paleontological Resources in the Project Area

The following summarizes the fossil potential in each of the proposed project designated sections. For those formations or rock units that are likely to contain fossils, the general types of fossils are listed that have been found regionally in those formations and the PFYC classifications are based upon a limited review of published literature and information on file at the BLM RGFO. The fossils listed in the discussion below would be reasonably expected to occur in these formations. Also, documented fossil occurrences in the vicinity of the project elements are also noted. In all of the project sections, surficial deposits (alluvium, alluvial fan, colluviums, etc.) and Precambrian igneous or metamorphic rocks, as described in Section 3.12, Geologic Substrate and Terrain, would be considered to have a low to no fossil potential or PFYC of 1.

County Line Section

As described in Section 3.12 (Geologic Substrate and Terrain), the County Line section crosses gneissic metamorphic rock and sedimentary rock composed of limestone and dolomite. The sedimentary rocks in this section are a combined unit of lower Paleozoic rocks (map symbol MDO) composed of the Leadville Limestone and Chaffee Group made up of the Dyer Dolomite, Parting Formation, Fremont Dolomite, Harding Sandstone, and the Manitou Limestone (Scott et al. 1978). The rocks in these units contain invertebrate fossils including corals, bryozoans, brachiopods, pelecypods, gastropods, arthropods, and echinoderms (Berg and Ross 1959; Berg 1960; Chronic 1961). Fish have been found in Parting Formation and Harding Sandstone (Frederickson 1961). No fossil localities have been identified in the ATF sites in the County Line section, however, fossil fish have been found in the Parting Formation in the immediate vicinity. Since the arthropods that have been found in the Fremont Dolomite are trilobites (Berg and Ross 1959), this grouping of lower Paleozoic rocks would be ranked 4 in the PFYC system. This ranking is due to the likelihood of finding significant invertebrate fossils in any exposure of the formation.

Tunnel Section

Most of the Tunnel section is underlain by rocks of Pennsylvanian-aged Minturn and Belden Formations composed of interbedded sandstone, conglomerates, and shales. Limestone and dolomite are also present and may contain marine fossils (Brill 1960). The marine fossils include fusulinids, single-celled animals with a calcium carbonate shell or test that are used by paleontologists for age determination and correlation of rock units. The other formation along the Tunnel Section is the Sangre de Cristo Formation. Although the Sangre de Cristo Formation has been characterized as “essentially nonfossiliferous” by Bolyard (1960), he indicated that reptile bones have been reported in the formation “on the Arkansas River”. No precise location was given, but the context of Bolyard’s paper would indicate that the locality was in the general vicinity of the proposed project. Based on the reported occurrences of fossils in the Minturn-Beldon and Sangre de Cristo Formations, the PFYC system rank would be 3. There are identified plant fossil localities in the Sangre de Cristo Formation near the proposed section, but not within areas likely to be disturbed.

Vallie Bridge Section

The Vallie Bridge section is underlain Minturn-Beldon and Sangre de Cristo Formations. The same PFYC system rank (3) would be applied to these formations as described in the discussion of the Tunnel section.

Texas Creek, Maytag, Three Rocks, and Spikebuck Sections, and Texas Creek Staging Area and Limited Rest Stop

The Texas Creek, Maytag, three Rocks, and Spikebuck sections and the Texas Creek staging area and limited rest stop are underlain by Precambrian-aged igneous and metamorphic rock and surficial deposits and the PFYC system rank for these rocks and deposits would be 1.

Parkdale Section

Most of the Parkdale section is underlain by Precambrian-aged granite and surficial deposits. The eastern portion of the section (beginning east from approximate milepost 265.89) is underlain by upper Cretaceous-aged Colorado Group rocks including the Niobrara Formation and possibly the Carlile Shale, Greenhorn Limestone, and Graneros Shale (Taylor et al. 1975). The Precambrian rocks and surficial deposits would be rated 1 in the PFYC system. The Niobrara is highly fossiliferous and locally contains abundant fossil clams and oysters (Scott and Cobban 1964), but regionally also can contain a wide variety of invertebrate and vertebrate fossils (Berman et al. 1980). The fossiliferous nature of the Niobrara would merit a 3 rating in the PFYC, due to the likelihood of finding invertebrate fossils. It is unlikely to find vertebrate fossils in the Niobrara Formation. The other formations in the Colorado Group would also be fossiliferous and would be ranked 4 or 5 according to the PFYC system, but because of the structural complexities where the Colorado Group is present (the rocks occur in an overturned syncline)(Taylor et al. 1975), it is not certain if project elements would occur on Colorado Group formations other than the Niobrara.

Fremont Road Information Center

The Fremont Road Information Center is located on bedrock of the Jurassic Morrison Formation. The Morrison is widely known for its abundant dinosaur bones, but the formation also contains invertebrates, including snails and clams (Peterson 1972). Garden Park, near Cañon City, Colorado, has yielded abundant dinosaur fossils from the Morrison Formation and is where the first dinosaur bones were discovered in Colorado (Colorado Paleontological Society 2010). Any surface disturbing activities would be heavily mitigated due to Morrison Formation the PFYC system rating for the Morrison Formation at the site would be 4.