Chapter 3: Affected Environment

This chapter describes the existing social, economic, and environmental conditions in the project area, which serve as a baseline for comparing the impacts of the Proposed Action and Alternatives. The project area analyzed in this Draft EIS extends from the connection with the UPRR's mainline near Juab to just south of the intersection of US 89 and US 50 near Salina. The project area is an agricultural valley generally bounded by the Pahvant Range and Valley Mountains to the west and the San Pitch Mountains to the east. Because there are no BLM-designated wilderness areas, areas of environmental concern, forestry resources, or herds of wild horses or burros in the project area, these resources are not discussed in Chapter 3, Affected Environment, or Chapter 4, Environmental Consequences.

Study Area Definition. A resource-specific study area has been defined for each resource in this chapter that establishes the geographic area analyzed in the EIS. The introduction to each resource defines the specific study area for that resource. The area around the alternatives is generally referred to as the project area.

3.1 Rail Operations and Safety

3.1.1 Background

The Board regulations found at 49 CFR 1105.7(e)(2) and 49 CFR 1105.7(e)(7) require the Applicant to analyze transportation systems and safety in relation to the proposed project. This section discusses the current rail operations in the study area, the transportation of hazardous materials, the land transportation network, current trucking operations, and navigable waters. See Section 3.14, Recreation, for information about access to recreation areas and navigation of recreational vessels and Section 3.11, Socioeconomics, for information about emergency vehicle access and response.

The rail operations and safety study area is bounded by I-15 on the west, US 89 and SR 28 on the east, I-70 on the south, and the UPRR load-out facility south of Juab on the north (see Figure 3-1, Land Transportation Network).

3.1.2 Rail Operations

Currently, the only rail operations in the study area are located at the north end of the proposed project. UPRR operates the Sharp Subdivision that connects to the northern terminus of the proposed project. This line parallels I-15 from Provo, 56 miles north of the study area, to just south of Juab, where it connects with the proposed load-out facility. At the proposed load-out facility, the UPRR line turns west, extends for 35 miles, and connects to the Lynndyl Subdivision at Lynndyl. The load-out facility is used by the local trucking

industry to load shipments onto rail for transport out of the valley. The proposed project would add rail capacity from the load-out facility south of Juab to Salina.

From 1896 to 1983, the Denver & Rio Grande Western (D&RGW) Railroad and its predecessor companies (now part of UPRR) provided rail service to Sanpete, Sevier, and Piute Counties. Rail service was provided to these counties over the Marysvale branch of the D&RGW, which ran from the railroad's east-west mainline at Thistle southward through the Sevier Valley for 132 miles to Marysvale (see Figure 3-1, Land Transportation Network). In 1983, the main rail line was buried by a landslide west of Thistle and damaged by a washout at several other locations along the rail line. In 1984, the D&RGW filed for abandonment of the line, which was granted. The former right-of-way has been sold to adjoining landowners and, in many instances, has been converted to farming. Most bridges and drainage structures have been removed.

3.1.3 Transportation of Hazardous Materials

Currently, no hazardous materials are being transported in the rail operations and safety study area.

3.1.4 Land Transportation Network

The study area is served by I-15, which parallels the project on the west side of the Valley Mountains, and I-70, which runs perpendicular to the southern portion of the project at Salina. US 89 and SR 28 serve the east side of the study area near the Sevier River, while US 50 provides highway access to the southern portion of the study area near Salina. See Figure 3-1, Land Transportation Network, for more information about existing roads and railroads in the study area.

3.1.5 Trucking Operations

Trucking is an important support industry for other industries in the study area. See Section 3.11.5, Trucking Industry, for more information on the trucking industry. For Sevier and Sanpete Counties, trucking is the only method for moving large amounts of freight. In Juab County, a rail freight terminal is available in Nephi, about 20 miles north of the proposed project. Currently, highways in the study area carry large volumes of truck traffic daily. Regional roadways currently carry high levels of truck traffic. Coal trucks currently use I-70, I-15, US 89, US 50, and SR 28 with about 1,500 trucks passing through downtown Salina each day at a rate of about one truck per minute. Currently, I-70 carries 750 trucks per day in each direction. Truck traffic runs in one direction on US 89, SR 28, I-15, and US 50 carrying 750 trucks per day (see Section 1.5, Need for Proposed Action). The coal trucks service the SUFCO (Canyon Fuels) mining operation, which is expected to continue at its current rate of production for 25 years.

Several manufacturing and mining companies in the study area use the trucking industry to move supplies into their facilities and move products out.

3.1.6 Navigation

The only navigation in the study area occurs on the Sevier Bridge Reservoir. Sevier River and the Sevier Bridge Reservoir are not considered navigable under Sections 9 and 10 of the Rivers and Harbors Act.

The Sevier Bridge Reservoir is used by ski boats, sailboats, canoes, and rafts. The use of these recreational boats is concentrated primarily in the north end of the reservoir near the dam because the water levels are deeper in this part of the reservoir. The majority of the boat launches are located at the north end of the reservoir (Utah Division of Water Quality 1993). In non-drought years, the water levels support recreational use in the southern part of the reservoir, including a popular sheltered area south of Yuba Narrows that is used for boating (Rasmussen 2005). See Section 3.14, Recreation, for more information about these recreation facilities.

3.1.7 Pipelines

One major pipeline company has facilities in the study area. Questar has a natural gas pipeline parallel to and near US 89 that would be crossed by either of the proposed alternatives. In addition, Questar has some local distribution lines that connect to the natural gas pipeline.

3.1.8 Rail Safety

Operation Standards

All locomotive engineers must be certified to Federal Railroad Administration (FRA) standards before they can operate a locomotive. Engineers also undergo an annual recertification.

Additionally, railroads operate trains according to a system of operating rules developed by each railroad and subsequently submitted to and approved by FRA. Railroad operating supervisors frequently check rail operations to ensure that all speed limits and other safety measures and operating rules are being followed. FRA employs five operations specialists in Salt Lake City whose collective area of influence includes the geography of the proposed project. FRA specialists include expertise in track, operating practices, motive power and equipment, hazardous materials, and signaling (including grade crossing warning devices and train control signals). Additionally, UDOT employs one specialist qualified by FRA in track inspection.

3.1.9 Fire

Over the last 20 years, residences, businesses, and associated infrastructure built adjacent to fire-prone lands has created wildland/urban interface areas. Development in these areas increases the risk of starting fires from industrial or human activities and could threaten public safety, threaten property, or disrupt natural fire regimes by spreading fire from developed areas into wildland areas. The increase in wildland/urban interface areas has led Federal agencies to create a more active hazardous fuel–reduction program (*fuel* refers to built-up dry vegetation) to reduce the number and severity of wildfires. The Fire Management Policy (2000) and the National Fire Plan (2001) have increased awareness of and funding for hazardous fuels management with the intent of actively responding to severe wildland fires and their impacts to communities.

Fire suppression and response is handled according to the 1995 Federal Wildland Fire Management Policy, as amended and updated in 2001, the National Fire Plan, and the Healthy Forests Restoration Act of 2003 and by local agencies such as fire departments and emergency management agencies. Railroad companies and shippers coordinate with local agencies and provide specialized expertise on handling specific equipment such as rail cars.

3.2 Land Use

NEPA regulations require an analysis of the effects of a proposed project on land use and the consistency of the project with existing land use plans. This section addresses land use (Federal, state, and local), zoning, and special land use designations in the study area. The study area for the land use analysis includes the area within 1 mile on either side of the proposed alternatives and includes portions of Juab, Sanpete, and Sevier Counties.

3.2.1 General Land Use Characteristics

Existing land use is defined as the human use of the land resource for various purposes including economic production, natural resource protection, or institutional and private uses (such as schools, churches, public facilities, individual developments, or rights-of-way or easements). The existing land use along the proposed alternatives is primarily rural residential and agricultural. The majority of land in the study area is privately owned with the remainder being either state-owned land or land that is Federally owned and administered by BLM (see Figure 3-2, Land Ownership). The privately owned land includes irrigated and non-irrigated farmland, semi-improved pasture land, open range, a turkey farm, a dairy, and a salt-mining operation.

3.2.2 Agriculture

A large portion of the land in the southern part of the study area is farmland. There are irrigated crops (such as alfalfa, corn, and small grains such as wheat, barley, and oats) west of

Gunnison, and the rest of the farmlands along the study area are non-irrigated. Alfalfa is grown for 5 to 7 years, and then small grain is grown for 1 year to break the disease and insect cycle (Gale 2003). Much of the farmland in the northern part of the study area consists of dryland crops as shown in Table 3.2-1 below.

All the irrigated croplands are privately owned, while most of the grazing lands are under state, Federal, or tribal administration. The main agricultural operation in the basin is cow/calf and beef production. Most of the pasture and rangelands in the region, as well as most of the crops grown, are used to support these activities. Several large dairy operations, including the Brown Dairy north of Redmond just east of the proposed alternatives, also depend on feed and pasture.

The most recent survey (1995) by the Utah Division of Water Resources inventoried the cropland by various categories of land use. The total irrigated cropland area in 1995 in the Sevier Basin, a foreland basin in southwestern Utah, was 354,320 acres. The major crops grown in the Sevier River Basin include alfalfa, 40%; small grains such as wheat, barley, and oats, 13%; pasture and grass/hay, 14%; and idle and fallow, 12% (Utah Division of Water Resources 1999).

Current cropland or farmland in the Central Utah Rail farmland study area is shown in Table 3.2-1 and in Figure 3-10, Prime and State Important Farmland. The table is based on the Utah Division of Water Resources *Water-Related Land Use Data Inventory* map dated 2004.

Table 3.2-1. Cropland or Farmland in the Study Area

Crop or Farmland Type	Acres
Irrigated Crops or Farmland	
Fallow	41.22
Grass hay	122.97
Pasture	1,518.82
Corn	587.47
Grain	603.51
Alfalfa	3,472.44
Total irrigated	**6,346.43**
Non-irrigated Crops or Farmland	
Alfalfa	44.00
Fallow	47.11
Pasture	564.72
Grain/beans/seeds	304.25
Total non-irrigated	**960.08**

Source: Utah Division of Water Resources 1999

Agricultural Land Protection. Juab, Sevier, and Sanpete Counties all have agricultural zones in their ordinances. These ordinances generally allow one residence per 40 acres in order to retain the agricultural and rural nature of the area. However, none of the counties has additional agricultural protection laws (Benson 2004).

3.2.3 Local Land Use and Zoning

The general land use plan for a jurisdiction represents the official position on long-range development and resource management. This position is expressed in goals, policies, plans, and actions regarding the physical, social, and economic environments, both now and in the long term. Zoning allows a jurisdiction to be divided into districts with different regulations for building height, open space, building coverage, building density, and type of future land uses. Zoning should conform to the general land use plan.

3.2.3.1 Juab County

The land use of the study area within Juab County is primarily agriculture and open space. This use is reflected in the county zoning districts in the study area. Most of the study area has one of two zoning designations: GMRF-1 (Grazing, Mining, Recreation, and Forestry District) or A-1 (Agricultural District). The zoning for most of the study area under Juab County's jurisdiction is GMRF-1, and the balance on the north end of the study area is designated A-1 (Greenhalgh 2005).

The primary use of the GMRF-1 District is for grazing, mining, recreation, forestry, and wildlife. Railroads are not a permitted use of the GMRF-1 District (Juab County, no date).

The A-1 District is established to provide areas where the primary use of the land is for agricultural and livestock-raising purposes. Residential development is limited in the A-1 District. Railroad tracks, spurs, switches, and facilities are permitted uses of the A-1 District (Juab County, no date).

3.2.3.2 Sanpete County

The land use of the Sanpete County portion of the study area is primarily agricultural (Utah Governor's Office of Planning and Budget 1997). The zoning for the portion of the county that would be traversed by the proposed project includes agricultural and sensitive land zones (Utah Governor's Office of Planning and Budget 2003). The Agricultural Zone (A) is for lands with agriculture production (food or fiber) or livestock-raising as their primary purpose. The Sensitive Land Zone (SL) is established to protect environmentally sensitive zones and generally covers grazing lands, mountains, and canyons. The portion of this zone that would be traversed by the proposed project includes primarily grazing lands. Railroads are not discussed in the ordinances for either of these zones.

3.2.3.3 Sevier County

As with Juab and Sanpete Counties, the land use in Sevier County is primarily agricultural. Several zoning districts apply to the study area, but all of the zones relate to agriculture: A5-25 (Agriculture), GRF 20 (Grazing Recreation Forestry), and GRF 5 (Grazing Recreation Forestry). A5-25 is for agricultural production (food or fiber production) and livestock. GRF 20 and GRF 5 are established for grazing, forestry, and wildlife purposes and occur in the large tracts of grazing lands, mountains, and canyons in the county. The difference between these zones is the number of buildings allowed per acre (Utah Governor's Office of Planning and Budget 2000). Railroads are not discussed in the zoning ordinances for the agricultural zones in Sevier County.

3.2.3.4 City Planning

Salina and Redmond are near the proposed project. None of the alternatives are within the city limits of either community.

3.2.4 State Land Use (Utah Trust Lands)

Juab, Sanpete, and Sevier Counties contain Utah trust lands held by the State of Utah School and Institutional Trust Lands Administration (SITLA). These lands were originally deeded to the State of Utah to benefit public schools. The lands can be sold or leased. The net revenues from SITLA's trust lands are put in SITLA's permanent fund as required by state law. Some activities that are allowed under leases on the trust lands include natural gas and oil production, mining, grazing, cell phone and telecommunications sites, open spaces, recreation, landfills, and forestry. Railroads are not specifically listed as allowable activities but are considered a commercial and industrial enterprise, which is an allowable activity (SITLA 2001).

3.2.5 Federal Land Use (Bureau of Land Management)

Each BLM field office prepares a Resource Management Plan (RMP) for the land under its jurisdiction. These RMPs provide future direction by establishing guidance, objectives, policies, and management actions for the land under the jurisdiction of the field office. The RMPs discuss the following issues, among others:

- Access and transportation on public lands
- Off-highway vehicle management
- Special management designations
- Balancing multiple uses
- Cultural resources
- Land and realty management
- Rangeland health
- Wild horses and burros
- Areas of critical environmental concern
- Wild and scenic rivers

- Fire management
- Forestry and woodland harvests
- Special-status species management
- Grazing

The proposed project would be within the jurisdictions of the Richfield and Fillmore Field Offices of the BLM. The proposed project has been reviewed for conformance with applicable land use plans described for each field office. Although railroad rights-of way are not specifically mentioned in the land use plans, it is clear that, subject to review and approval, railroad rights-of way are a use that is acceptable and consistent with the principles of multiple use.

Separate site-specific NEPA analysis would be prepared for ancillary facilities proposed on public land (such as access roads or power lines).

3.2.5.1 Richfield Field Office

The Richfield Field Office is currently updating its resource management plan. Until the update is complete, the Field Office lands are managed under the Mountain Valley Management Framework Plan that was approved on July 1, 1982. In the part of the study area managed by the Richfield Field Office, there are no areas of critical environmental concern, wild and scenic rivers, areas with special management designations, or areas dedicated to managing special-status species. The study area is managed as a multiple-use area that includes recreation, grazing, and wildlife uses. The study area is open to off-highway vehicles with no restrictions and includes multiple grazing allotments.

3.2.5.2 Fillmore Field Office

The land use plan for the Fillmore Field Office is the House Range Resource Management Plan that was completed in 1987 (BLM 1987). In the part of the study area managed by the Fillmore Field Office, the BLM lands are designated for multiple use. There are no areas of critical environmental concern or outstanding natural areas, but the Sevier Bridge Reservoir and the surrounding land are considered a Special Resource Management Area. The study area contains some grazing allotments as well as designated crucial mule deer winter range.

3.2.5.3 Prior Existing Rights-of-Way

Prior existing rights-of-way were reviewed by BLM and are included in Appendix D, Prior Existing Rights. Prior existing rights-of-way include power lines, county-maintained roads, ATV routes, range improvements (such as fences, pipelines, and guzzlers), the Sevier Bridge Reservoir, and material sites authorized under BLM right-of-way grant U-3801.

3.2.5.4 Grazing Allotments

The public lands administered by BLM in the study area are rangelands that encompass just over 5 million acres or 75% of the total Sevier Basin area. BLM has a well-established

program to administer private livestock that graze on agency land. Regionally, the land administered by the Richfield Field Office supports about 183 grazing allotments that supply 106,045 AUMs (animal unit month; the amount of forage required to sustain one cow for one month). Nearly all of these allotments are for cattle and horses, although some allotments support sheep and goats. The Fillmore Field Office supports about 170 grazing allotments that supply 273,805 AUMs. These allotments also primarily sustain cattle, horses, and sheep (BLM 2000b).

The study area crosses seven grazing allotments administered by the Richfield Field Office. These seven allotments contain about 11,604 acres of land (Williams 2005; Lichthardt 2006).

The study area crosses three grazing allotments administered by the Fillmore Field Office. These three allotments contain about 9,471 acres of land (Williams 2005; Lichthardt 2006). See Table 3.2-2 below and Figure 3-3, Grazing Allotments, for the location of the 10 grazing allotments currently issued by BLM in the study area.

Table 3.2-2. BLM-Administered Grazing Allotments along the Proposed Alternatives

Allotment	Total Allotment Acreage in Study Area[a]	Livestock Number and Kind	Season of Use	Permitted AUMs[b]	AUMs in the Farmland Study Area[c]
Richfield Field Office					
West Side	532	—	—	405	—
Denmark	2,255	350 cattle	Dec. 1 to Mar. 31	976	15
South Valley	3,593	200 cattle 61 sheep	Nov. 1 to Mar. 30 Dec. 1 to Apr. 31	849	30
Little Valley	970	—	—	798	—
Red Canyon	545	173 cattle	May 1 to Aug. 31	702	3
River	964	38 cattle	Nov. 1 to Jun. 15	34	4
Timber Canyon	2,745	4,360 sheep	May 1 to Jun. 30 Oct. 1 to Oct. 30	654	15
Fillmore Field Office					
Yuba	3,850	126 cattle	Jun. 1 to Feb. 15	539	—
Washboard	4,477	177 cattle	May 16 to Feb. 28	857	—
Chriss Creek	1,144	62 cattle	Jun. 1 to Aug. 15	78	—

[a] Acreage within 0.5 mile of each side of the proposed alternatives.

[b] AUM = animal unit month; the amount of forage required to feed one cow for 1 month. The total AUMs shown are for the entire allotment, not just for the portion of the allotment in the study area.

[c] No AUMs were determined for grazing allotments on state land even though the state land is administered in common with BLM. State land used in common with BLM would also be crossed by the rail line in the West Side, Little Valley, Salt Creek, Yuba, Washboard, Chriss Creek, and Garrett allotments.

Sources: Williams 2005; Lichthardt 2006

In order to continue livestock operations on BLM grazing allotments, the allotments themselves must be maintained as well as livestock access to water sources, vehicle and livestock access to the allotments, safety fencing, and signs for entrances and exits to the grazing allotments. Permittees and private land owners would be consulted to determine how to best address livestock watering and access.

3.3 Biological Resources

3.3.1 Background

This section describes the existing biological resources in the study area. These biological resources include dominant plant communities, fish and wildlife resources, and any threatened, endangered, or sensitive species that could occur in the study area.

These resources were surveyed to ensure that the proposed project would comply with the Endangered Species Act of 1973 (16 U.S.C. 1536) and the Migratory Bird Treaty Act (16 U.S.C. 703–712).

Study Area. The study area for biological resources includes the following:

- The proposed alternatives plus the surrounding area out to a distance of 400 feet from the edge of the rail alignments and associated load-out areas
- Surrounding regional areas as appropriate for different biological resources (see the discussion of each biological resource for a description of the associated study area)

To determine the existing biological resources in the study area, HDR Engineering, Inc. (HDR) obtained data from previously conducted studies such as the *Central Utah Rail Feasibility Study* (Washington Infrastructure Services Inc. and others 2001) (see Appendix K) and from aerial photography, U.S. Geological Survey (USGS) topography maps, vegetation maps, and special-status species maps. HDR also conducted field investigations on multiple dates to investigate existing biological resources.

3.3.2 Plant Communities

Large portions of the study area that once contained native plant communities have been converted to pastures and croplands for agricultural uses (see Figure 3-4, Vegetation). The remaining native plant communities are generally of moderate quality and are neither pristine nor highly degraded. At several locations, the field investigations found plant species, such as big sagebrush (*Artemesia tridentata*), rubber rabbitbrush (*Chrysothamnus nauseosus*), and bluebunch wheatgrass (*Elymus intermedium*), that are important to community health. However, the field investigations also found several species of invasive and non-native plants throughout the study area that dominated areas disturbed by human activity. Figure 3-4 shows

the plant communities in the study area and the surrounding regional area. The following sections describe the existing plant communities that are found in or adjacent to the study area.

3.3.2.1 Agricultural Vegetation

Much of the study area is cropland and pasture agricultural lands. Some pasture lands have remnants of native sagebrush and grassland communities, but introduced forage crops dominate most of these areas. Irrigated croplands include alfalfa, corn, and small grains (wheat, barley, and oats).

3.3.2.2 Sagebrush Community

Sagebrush communities are the main native community type in the valleys and lower foothills of the study area. The sagebrush communities are dominated by arid shrub species such as big sagebrush (*Artemesia tridentata*), rubber rabbitbrush (*Chrysothamnus nauseosus*), low rabbitbrush (*Chrysothamnus viscidiflorus*), broom snakeweed (*Gutierrezia sarothrae*), and some forbs and grasses. Although some areas have desirable native and non-native perennial grasses such as bluebunch wheatgrass (*Elymus intermedium*) and crested wheatgrass (*Agropyron cristatum*), many areas have non-native, invasive and undesirable species such as cheatgrass (*Bromus tectorum*).

3.3.2.3 Grasslands

Most grasslands in the study area are degraded to various degrees by the infestation of species such as cheatgrass (*Bromus tectorum*), Russian thistle (*Salsola iberica*), and tumbling mustard (*Sysimbrium altissimum*). The relatively pristine grasslands are dominated by desirable grasses such as Indian rice grass (*Oryzopsis hymenoides*), needle and thread grass (*Stipa comata*), bluebunch wheatgrass (*Elymus intermedium*), and sheep fescue (*Festuca ovina*). Although not native, crested wheatgrass (*Agropyron cristatum*) is present and desirable.

Additionally, other grasslands in more moist or saline conditions are dominated mainly by inland saltgrass (*Distichlis spicata*). Grasslands are interspersed all along the study area but are most common in the south-central part where the conditions are moist enough to support this vegetation type.

3.3.2.4 Salt Desert Scrub

Salt desert scrub communities are typically dominated by salt-tolerant species such as greasewood (*Sarcobatus vermiculatus*), four-wing saltbush (*Atriplex canescens*), and shadscale (*Atriplex confertifolia*). Invasive and non-native species are common to disturbed areas and include tumbling mustard (*Sysimbrium altissimum*), summer cypress (*Kochia scoparia*), and Russian thistle (*Salsola iberica*). This community type is uncommon in the study area and occurs in smaller patches on saline soils. There is salt desert scrub near the

northern project terminus around Chicken Creek Reservoir, at the Sevier Bridge Reservoir near Yuba Narrows, and along the foothills west of the study area near US 50. The condition of this plant community varies with the degree of grazing that has occurred.

3.3.2.5 Juniper Community

Utah juniper (*Juniperus osteosperma*) is the predominant overstory species in this plant community and is occasionally interspersed with pinyon pine (*Pinus edulis*). Juniper communities are not common in the study area but generally dominate the higher foothills east and west of the study area. Juniper communities are typically intermixed with sagebrush communities. Therefore, many of the species in the juniper community are also found in the arid shrub or sagebrush community.

3.3.2.6 Wet Meadow

Further information on wetland communities in the study area is provided in Section 3.4.5, Wetlands and Waters of the U.S. Vegetation species associated with wet meadows include wiregrass (*Juncus balticus*), inland saltgrass (*Distchlis spicata*), and salt cedar (*Tamarix ramossisima*). Wet meadows are located near the northern terminus and in the southern part of the study area.

3.3.2.7 Emergent Marsh

Marshy areas in the study area are vegetated by species such as alkali bulrush (*Scirpus ameritimus*), cattails (*Typha latifolia*), and common reed (*Phragmites australis*). Most emergent marshes in the study area are associated with the Sevier River floodplain.

3.3.2.8 Lowland Riparian

Riparian communities are rare in the study area and are associated with water bodies such as Chicken Creek Reservoir, Sevier Bridge Reservoir, Redmond Lake, the Sevier River, and some ephemeral washes. Riparian vegetation includes narrowleaf cottonwood (*Populus angustifolia*), Fremont cottonwood (*Populus fremontii*), box elder (*Acer negundo*), Russian olive (*Eleagnus angustifolia*), salt cedar (*Tamarix ramossisima*), rushes (*Scirpus* spp.), and sedges (*Carex* spp.).

3.3.2.9 Invasive and Non-native Plant Species

Various human disturbances in the study area have introduced invasive or non-native plant species. These disturbances include constructing roads and eliminating native vegetation to accommodate agricultural, commercial, industrial, and residential land uses. These invasive and non-native species have the potential to out-compete the native species and dominate the original vegetation communities. Some of these invasive and non-native species are listed in Table 3.3-1.

Table 3.3-1. Invasive and Non-native Plant Species in the Study Area

Common Name	Scientific Name
Cheatgrass	*Bromus tectorum*
Halogeton	*Halogeton glomeratus*
Russian thistle	*Salsola iberica*
Salt cedar	*Tamarix ramossisima*
Common reed	*Phragmites australis*
Curly cup gumweed	G*rindelia squarossa*

3.3.3 Wildlife Resources

The following sections discuss wildlife resources in the study area including wildlife corridors, habitat, and refuges.

3.3.3.1 Wildlife in the Area

The wildlife in the study area is typical of the region. Table 3.3-2 lists some of the more common wildlife species in the study area. The study area also includes various raptors (eagles, hawks, and falcons), miscellaneous songbirds (sparrows, robins, larks, vireos, etc.), and miscellaneous migratory waterfowl (ducks, geese, etc.).

Table 3.3-2. Common Wildlife Species in the Study Area

Common Name	Scientific Name
Mule deer	*Odocoileus hemionus*
Blacktailed jack rabbit	*Lepus californicus*
Desert cottontail	*Sylvilagus audubonii*
Bushytail woodrat	*Neotoma cinerea*
Elk	*Cervus elaphus*
Coyote	*Canis latrans*
Red fox	*Vulpes vulpes*
Badger	*Taxidea taxus*
Raccoon	*Procyon lotor*
Striped skunk	*Mephitis mephitis*
Muskrat	*Ondatra zibethicus*
Beaver	*Castor canadensis*
Meadow vole	*Macrotis pennsylvanicus*
Deer mouse	*Peromyscus maniculatus*
Northern pike	*Esox lucius*
Largemouth bass	*Micropterus salmoides*

Common Name	Scientific Name
Channel catfish	*Ictalurus punctatus*
Black bullhead	*Ictalurus melas*
Yellow perch	*Perca flavescens*
Walleye	*Stizostedion vitreum*
Carp	*Cyprinus carpio*

3.3.3.2 Wildlife Corridors

Migratory Birds

Wetlands associated with Chicken Creek Reservoir, the Sevier River, Sevier Bridge Reservoir, and the Redmond Wildlife Management Area provide important habitat for several migratory bird species including waterfowl. These wetlands are part of the integrated wetland habitats that support critical flyways for migratory waterfowl as part of the greater North American western flyway. In addition, the Sevier Bridge Reservoir and Chicken Creek Reservoir are managed as a Bird Habitat Conservation Area to identify, protect, restore, and enhance wetlands and other important habitats for waterfowl and migratory birds as well as native resident birds. Table 3.3-3 lists some of the species that typically use these wetland areas in the study area for a migratory stopover.

Table 3.3-3. Migratory Birds That Use Wetland Areas in the Study Area

Common Name	Scientific Name
Great blue heron	*Ardea herodias*
Canada goose	*Branta canadensis*
Mallard	*Anas platyrhynchos*
Red-winged blackbird	*Agelaius phoeniceus*
Cinnamon teal	*Anas cyanoptera*
Marsh wren	*Cistothorus palustris*

Big Game

Figure 3-5, Elk and Mule Deer Seasonal Range, shows mule deer and elk seasonal habitats in the regional area. The study area is not located in any areas identified as seasonal habitat for elk. The closest seasonal habitat for elk is one area identified as winter/spring habitat for elk that is east of the study area on the east side of SR 28.

The study area bisects critical and high-value deer winter range for one deer herd in the Valley Mountains and one herd in the San Pitch Mountains.

3.3.3.3 Habitat Fragmentation

The existing habitat in the study area has been fragmented due to previous construction of highway corridors and smaller roads and conversion of land for agricultural, residential, commercial, and industrial uses. These land use changes have disrupted the continuity and function of the original wildlife habitat by affecting the foraging habits, reproductive habits, and migratory movement of many species. For some species, these changes created barriers to movement between mountains and valleys in the region. However, converting land to agricultural purposes does not present a significant migration barrier to many larger transient species such as birds and big game.

Based on the observed condition of the fragmented wildlife habitat in the study area, SEA presumes that wildlife in the study area has experienced reduced species diversity, population densities, and distributions in response to the cumulative long-term effects of these land use changes. Nevertheless, the vegetation communities and aquatic habitats in the study area provide beneficial habitat to a wide variety of wildlife species.

Some of the earliest documented Anglo-European settlement of the area occurred around 1863 (OnlineUtah.com, no date). Since that time, large portions of the study area that once had native plant communities have been converted to pastures and/or croplands for agricultural uses. This conversion of land uses has included the construction of homes, fences, paved and unpaved roads, and irrigation canals, all of which have contributed to the fragmentation of once-contiguous plant communities.

3.3.3.4 Wildlife Mortality

In addition to natural causes of death such as predation and disease, some wildlife is struck and killed by vehicles on existing roads in the area. Currently, no roads exist where the proposed alternatives would be built. Therefore, information on wildlife strikes in the area does not exist. Wildlife mortality from vehicle impacts is most apparent when it involves big-game animals and predators and scavengers then feed on the carcasses.

3.3.3.5 Wildlife Sanctuaries, Refuges, and State Parks

Areas that are legally designated for protecting biological resources include wildlife sanctuaries, refuges, and state parks. These areas are typically managed for the purpose of protecting and enhancing wildlife habitat. Human activities that could harm wildlife habitat are prohibited in these designated areas. The two wildlife protection areas in the study area are Yuba Lake Recreation Area and the Redmond Wildlife Management Area (see Section 3.14, Recreation).

Yuba Lake Recreation Area. The Sevier Bridge Reservoir is also known as Yuba Lake. Yuba Lake Recreation Area is located near the Sevier Bridge Reservoir dam. The park provides

habitat for many wildlife species. Yuba Lake Recreation Area is managed for multiple uses and not specifically as a refuge for any one species of wildlife.

Redmond Wildlife Management Area (WMA). The Redmond WMA is located in Sevier County between Salina and Redmond and is south of and adjacent to Redmond Lake. The Redmond WMA covers 567 acres and is a complex of marshes, wet meadows, and open water (Utah Division of Wildlife Resources 2002). A small portion of the WMA is also set aside for alfalfa production.

A conservation easement for the WMA was established in 1998 for protecting wetlands and preserving habitat for high-priority resident and migratory wildlife species such as waterfowl and shore/wading birds. Examples of the species that use the Redmond WMA are listed above in Table 3.3-3, Migratory Birds That Use Wetland Areas in the Study Area. Special-status wildlife species that might use the Redmond WMA are addressed in Section 3.3.4, Threatened, Endangered, and Sensitive Species.

3.3.4 Threatened, Endangered, and Sensitive Species

USFWS determines whether a Federal action would be likely to adversely affect, harm, or jeopardize the continued existence of any threatened, endangered, or candidate (T&E) species or its habitat (see Appendix B, U.S. Fish and Wildlife Coordination). USFWS designates Federally protected threatened, endangered, and candidate species. The Utah Division of Wildlife Resources also designates state species of concern (SPC) for Utah (see Appendix A, Agency and Public Scoping Summary Report). Table 3.3-4 below lists the special-status species that have the potential to occur in the study area according to coordination letters from these agencies (see Appendix A).

No locations within the study area have been designated by USFWS as critical habitat for any Federally listed species. However, according to correspondence from the Utah Division of Wildlife Resources, the State has designated critical and high-value mule deer winter range in the study area for two separate herds located on the Valley Mountains and the San Pitch Mountains.

HDR performed literature reviews to research the biology and habitat requirements of each of the species listed below in Table 3.3-4. In addition, in the fall of 2004 and the spring and summer of 2005, HDR performed pedestrian (walking) surveys to identify any species habitat that might exist in the study area. If potential habitat was identified for any Federally or state-listed species, a more detailed observation for individuals of those species was conducted by foot in the area that would be affected by the project. As part of mitigation for impacts from this project, surveys for specific species would be conducted prior to construction, if required by the affected land management agency. These surveys would be conducted according to agency-approved protocols.

Field surveys were conducted in the spring and summer of 2005 to determine the presence of any Federally listed or state-listed endangered, threatened, or sensitive plant species in the study area. In addition, surveys were conducted for other Federally listed and state-listed endangered, threatened, or sensitive species (namely raptors, amphibians, small mammals, migratory birds, and mollusks) to determine if any suitable habitat or individuals existed in the study area. As part of mitigation for impacts from this project, and if appropriate, protocol surveys for specific species might be conducted before construction. No aquatic surveys were performed. The results of these literature reviews and field investigations are presented below.

Table 3.3-4. Federal and State-Listed Threatened, Endangered, or Sensitive Species of Concern with Potential to Occur in the Study Area

Common Name	Scientific Name	State Status	Federal Status
Birds			
Bald eagle	*Haliaeetus leucocephalus*	SPC	T
Burrowing owl	*Althene cunicularis*	SPC	—
Ferruginous hawk	*Buteo regalis*	SPC	—
Long-billed curlew	*Numenius americanus*	SPC	—
Northern goshawk	*Accipiter gentiles*	SPC	—
Southwestern willow flycatcher	*Empidonax traillii extimus*	SPC	E
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	SPC	C
Mammals			
Kit fox	*Vulpes macrotis*	SPC	—
Utah prairie dog	*Cynomys parvidens*	SPC	T
Fish			
Bonneville cutthroat trout	*Oncorhynchus clarki utah*	CS	—
Least chub	*Lotichthys phlegethontis*	CS	—
Leatherside chub	*Gila copei*	SPC	—
Amphibians			
Columbia spotted frog	*Rana luteiventris*	CS	—
Mollusks			
Toquerville springsnail	*Pyrgulopsis kolobensis*	SPC	—
Plants			
Heliotrope milkvetch	*Astragalus montii*	SPC	T
Last chance townsendia	*Townsendia aprica*	SPC	T
Wright fishhook cactus	*Sclerocactus wrightiae*	SPC	E

Federal Status
- T = Threatened
- E = Endangered
- C = Candidate for Listing

State Status
- SPC = State Species of Concern
- CS = Conservation Species. This designation indicates that these species have a conservation agreement in place. Conservation agreements are voluntary cooperative plans among resource agencies. These agencies include Federal, state, and tribal agencies, typically with the State of Utah being the lead management agency. The purpose of the conservation agreement is to take measures to conserve and protect the species and its habitat so that it will not become Federally listed.

3.3.4.1 Birds

Bald Eagle and Burrowing Owl

During the field surveys, bald eagles and burrowing owls were observed near the study area. The bald eagles were observed perched on rocks near Yuba Narrows at the Sevier Bridge Reservoir. Bald eagles prefer habitat with nesting areas such as large, mature trees or standing dead trees (snags), usually near water (Texas Park and Wildlife 2005). There are very few mature trees or snags near any body of water in the study area that would provide ideal nesting habitat for bald eagles.

The burrowing owls were observed in the study area nesting in various locations in the foothills of the Valley Mountains. Burrowing owls are ground nesters in grasslands and prairie habitats (Center for Biological Diversity 2003).

Ferruginous Hawk

Ferruginous hawks occur in grasslands, agricultural lands, and sagebrush/saltbrush/greasewood shrub lands and along the edges of pinyon-juniper zones. The study area includes grasslands, agricultural lands, sagebrush/saltbrush/greasewood shrub lands, and pinyon-juniper zones.

Long-Billed Curlew

The long-billed curlew nests in meadows and mixed fields that are higher and drier than those inhabited by many other shore birds (UDWR 2005a). The study area includes some meadows and mixed fields near bodies of water that could provide suitable nesting habitat.

Northern Goshawk

The northern goshawk nests in trees in mature mountain forests. Northern goshawks fly through forests and riparian zones to hunt and also perch and watch for prey. Although there are no mature forests in the study area, there are some riparian zones (UDWR 2005b).

Southwestern Willow Flycatcher and Yellow-Billed Cuckoo

The southwestern willow flycatcher and yellow-billed cuckoo have similar habitat requirements. Both species nest in habitat that is classified as dense lowland riparian areas and characterized by a dense subcanopy or shrub layer. The overstory can be developing trees or large gallery-forming trees (willow or cottonwoods) (UDWR 2005c, 2005d). There are some riparian zones with low, dense vegetation in the study area.

3.3.4.2 Mammals

Kit Fox

Kit fox occurs most often in open prairie, plains, and desert habitats (UDWR 2005e). The study area has some open prairie/desert habitat in the foothills of the Valley Mountains, and this habitat might be suitable for kit fox.

Utah Prairie Dog

The Utah prairie dog is similar to other species of prairie dogs in its habitat requirements. Prairie dogs form colonies and spend much of their time underground (UDWR 2005f). The study area has prairies with low-growing shrubs and grasses in the foothills of the Valley Mountains. No prairie dog colonies or mounds were observed during field surveys.

3.3.4.3 Plants

Heliotrope Milkvetch

Heliotrope milkvetch grows in rocky soils derived from the Flagstaff Formation at elevations ranging from 10,600 feet to 10,900 feet. The study area does not have any terrain within this elevational range (UDWR 2005g).

Last Chance Townsendia

Last chance townsendia occurs in clay soils derived from the Mancos Formation (UDWR 2005h). The Mancos Formation was not observed in the study area during field surveys.

Wright Fishhook Cactus

Wright fishhook cactus occurs in clay to fine sandy soils in salt desert scrub and widely scattered pinyon-juniper communities with well-developed biological soil crusts (UDWR 2005i). There are some salt desert scrub and widely scattered pinyon-juniper communities in the study area.

3.3.4.4 Aquatic Animal Species

Bonneville Cutthroat Trout

Correspondence from USFWS stated that Bonneville cutthroat trout are found in Chicken Creek (Maddux 2003). Chicken Creek occurs in the study area.

Columbia Spotted Frog

Correspondence from the Utah Division of Wildlife Resources stated that the Columbia spotted frog exists in several known locations in Juab Valley (D. Hintze 2003). Parts of the study area are in Juab Valley.

Toquerville Springsnail

Correspondence from the Utah Division of Wildlife Resources stated that Toquerville springsnail has historically occurred near the study area (D. Hintze 2003).

Least Chub and Leatherside Chub

Correspondence from USFWS stated that the least chub and leatherside chub are both found in tributaries of the Sevier River (Maddux 2003). Additionally, correspondence from the Utah Division of Wildlife Resources stated that the leatherside chub exists in the Sevier River (Maddux 2003). The Sevier River and some of its tributaries occur in the study area.

3.4 Water Resources

3.4.1 Background

This section describes the existing surface water and groundwater in the study area including streams, lakes, wetlands, floodplains, wells, and public water sources.

Study Areas. The study area for water resources includes the surface water drainage basins, groundwater aquifers, floodplains, and wetland vicinity that contain the proposed alternatives. See Figure 3-6, Water Resources, and Figure 3-7, Floodplains, for a depiction of the study area.

The surface water drainage basins that intersect with the proposed alternatives were included in the study area except for some upland areas near Redmond, Salina, and Aurora. These areas were excluded from the study area due to their elevation.

The portions of groundwater aquifers within 5 miles of the proposed alternatives were included in the study area. Due to distance and elevation, SEA did not evaluate groundwater aquifers that were more than 5 miles from the study area.

The study area for wetlands consists of the area 300 feet on each side of the proposed alternatives and lies entirely within the study areas for surface water and groundwater (see Figure 3-8, Preliminary Wetland Estimation).

3.4.2 Surface Waters and Beneficial Uses

3.4.2.1 Existing Surface Waters

The surface water bodies in the water resources study area include mountain streams that generally do not flow year-round, canals used for agricultural water, Chicken Creek Reservoir, Sevier Bridge Reservoir, the Sevier River, and Redmond Lake. Figure 3-7, Floodplains, shows the approximate location of the larger intermittent mountain streams.

The largest water body in the study area, the Sevier River, generally flows from south to north. The Sevier River Basin is about 170 miles long and encompasses about 16,000 square miles of central and south-central Utah. Hydraulic studies show that the average annual stream flow of the Sevier River near the Piute County–Sevier County border is 137.300 acre-feet. Water is diverted from the river for agricultural purposes and returned to the river, leading to its classification as one of the "most completely consumed rivers in the United States" (Bishop 1997).

The Utah Department of Environmental Quality (UDEQ) classifies surface water bodies in the state according to how the water is used, and each classification has an associated numerical standard. The major water bodies in the study area and their associated beneficial uses are described in Table 3.4-1.

Table 3.4-1. Surface Waters in the Study Area

County	Water Body	Beneficial Uses
Juab County	Chicken Creek Reservoir	2B (secondary contact), 3A (cold-water species of game fish and other aquatic life), 4 (agriculture)
Juab County	Sevier Bridge Reservoir	2B, 3C (species of nongame fish and other aquatic life), 4 (agriculture)
Sanpete County	Sevier River	2B, 3C (species of nongame fish and other aquatic life), 4 (agriculture)
Sevier County	Sevier River	2B, 3C (species of nongame fish and other aquatic life), 4 (agriculture)
Sevier County	Salina Creek	2B, 3C (species of nongame fish and other aquatic life), 4 (agriculture)

Source: Utah Administrative Code R317-2-13, Classification of Waters of the State, as in effect December 1, 2004

The other creeks and canals in the study area are not specifically designated in Utah Administrative Code R317-2-13, and so they are assigned the default beneficial use classifications of 2B, 3C, and 4 (Utah Administrative Code R317-2-13.14).

3.4.2.2 Impaired Waters

Under the Clean Water Act, every state must establish and maintain water quality standards designed to protect, restore, and preserve the quality of waters in the state. When a lake, river,

or stream fails to meet water quality standards, Section 303(d) of the Clean Water Act requires that the state place the water body on a list of "impaired" waters (303(d) list) and prepare an analysis called a total maximum daily load (TMDL) analysis.

The TMDL analysis for the Middle and Lower Sevier River Watershed was submitted by UDEQ on February 9, 2004, and approved by EPA on August 17, 2004.

3.4.2.3 High-Quality Waters

UDEQ regulations state that waters whose existing quality is better than the established standards for their designated uses must be maintained at high quality; that is, the project cannot cause the existing water quality to be degraded. There are no high-quality waters in the study area (Utah Administrative Code R317-2-12, High-Quality Waters, as in effect December 1, 2004).

3.4.2.4 Surface Water Rights

A total of 862 points of diversion, of which 71 are surface water rights, exist within 5 miles of the proposed alternatives. Of these 71 surface water rights, the majority are for agricultural purposes. None of these water rights are for drinking water purposes (see Figure 3-6, Water Resources).

3.4.3 Canals and Irrigation

Settlers in the mid-1800s developed the Sevier River water system by excavating hundreds of miles of irrigation canals and constructing several creeks and reservoirs. In doing so, they transformed much of the desert of south-central Utah into productive farmland (Sevier River Water Users Association 2003).

Diverted canal water is generally used for stock watering and irrigation. Irrigation methods in the water resources study area include flood irrigation, center-pivot sprinklers, and wheel line sprinklers. These irrigation systems are fed through pipes by gravity flow from several (about six) small reservoirs.

In the southern portion of the study area (primarily Sevier County), several canals run along the foothills west of the farmlands. The largest of these canals is the Piute Canal. The canal is about 40 miles long, and its width varies from 2 feet to 12 feet. The canal is filled with irrigation water from the Sevier Bridge Reservoir (Gale 2003). There are a few irrigated crops west of Gunnison, and the rest of the farmlands along the proposed alternatives are non-irrigated. See Figure 3-7, Floodplains, for the locations of the canals.

Currently, the Applicant is proposing to maintain reasonable access to irrigation water for the agricultural parcels in the water resources study area. Further discussion regarding access to waters is in Section 4.4, Impacts to Water Resources.

3.4.4 Floodplains

For the purpose of this analysis, floodplains are defined as areas inundated by stormwater runoff by a 100-year storm. Encroachment (development) into these areas can reduce the flood-carrying capacity of the floodplain and extend the flooding hazard beyond the encroachment area.

In response to escalating taxpayer costs for flood disaster relief, Congress established the National Flood Insurance Program in 1968. This program is administered by the Federal Emergency Management Agency (FEMA). In the 1980s, FEMA performed hydrologic and hydraulic studies to identify and map special flood hazard areas within communities. A special flood hazard area is defined as an area with a 1% chance of being flooded in any given year. Such a flood is known as a 100-year storm event. A result of the FEMA studies is the development of flood insurance rate maps (FIRM) that depict the floodplains for each river and creek analyzed.

Several drainage basins in the floodplain study area convey stormwater runoff; however, not all of these washes, creeks, and rivers have a regulatory floodplain boundary. The information in the following sections was taken from the available flood insurance rate maps produced by FEMA and a review of topographical maps. The floodplains are described below from north to south according to the three counties traversed by the project. The FEMA floodplains are shown in Figure 3-7, Floodplains.

3.4.4.1 Juab County

Chicken Creek Reservoir, Chicken Creek, and the Sevier Bridge Reservoir originate in Juab County; however, no floodplains are defined by FEMA in Juab County near or in the floodplain study area.

3.4.4.2 Sanpete County

The Sevier River floodplain has not been defined by FEMA in Sanpete County.

3.4.4.3 Sevier County

A FEMA-designated floodplain of the Sevier River is located east of the study area. The floodplain is adjacent to the proposed alternatives and extends from a point just north of Redmond Lake southward to the turnout at the southern project terminus. The Denmark Wash runs east-west adjacent to SR 63 and joins the Sevier River. The proposed alternatives run parallel to and west of the Sevier River and crosses the Denmark Wash near SR 63. These FEMA floodplains are zoned A. Zone A floodplains require that the maximum allowable rise in water surface elevation for the 100-year floodplain as a result of development within the floodplain boundary be limited to 1 foot.

3.4.5 Wetlands and Waters of the U.S.

Waters of the U.S. in the study area include springs, wetlands, riparian zones, open water, dry washes, and ephemeral drainages. Figure 3-8, Preliminary Wetland Estimation, shows the types of waters of the U.S. in the study area. These wetlands function by reducing the severity of floods, removing nutrients, retaining particulates, recharging groundwater, and providing hydrologic support for plants and wildlife.

Several ephemeral drainages in the study area have been disturbed or modified by human activities including road construction and agricultural practices. The remaining capacity of an ephemeral drainage to function as waters of the U.S. and provide wildlife habitat depends on the extent of disturbance from pristine conditions.

Wetlands associated with the Sevier River, Chicken Creek Reservoir, Sevier Bridge Reservoir, Redmond Lake, and the Redmond WMA provide important habitat for many species of waterfowl. Detailed information regarding the wetland types and locations in the study area can be found in Appendix E, Waters of the U.S.

Hydrological support for waters of the U.S. in the study area is provided by various sources. These sources include direct precipitation, storm events and snowmelt runoff in ephemeral drainages, the impoundment of surface waters in human-made physical features, shallow groundwater (usually associated with the floodplain of a river), seeps, and artesian springs.

The Natural Resources Conservation Service (NRCS) has completed soil surveys for the project area in Juab and Sanpete Counties, and digital soil data are available for these counties (NRCS 1984). Complete NRCS digital soil data for Sevier County are not yet available. However, analog (hard-copy) data for hydric soils in Sevier County were available (Parslow 2005).

No hydric soils (soils that are sufficiently wet in the upper part to develop anaerobic conditions during the growing season) are known to occur in the study area in Sevier County. Published soil data for Juab and Sanpete Counties (NRCS 1984) indicates that there are small areas of hydric soils in the study area in these counties (see Figure 3-8, Preliminary Wetland Estimation).

The results of the field survey were documented and submitted to USACE in July 2005. USACE concurred with the report findings in October 2006 (see Appendix E, Waters of the U.S.).

The following sections describe waters of the U.S. in the study area that occur in Juab, Sanpete, and Sevier Counties. Table 3.4-2 below summarizes the waters of the U.S. in the study area.

Table 3.4-2. Waters of the U.S. in the Study Area

Type of Waters of the U.S. / Hydric Soil Presence	Juab County	Sanpete County	Sevier County
Wet meadow	Near Chicken Creek	Near Sevier Bridge Reservoir	Redmond Lake and Sevier River floodplain
Emergent marsh	Near Chicken Creek	Near Sevier Bridge Reservoir	Redmond Lake and Sevier River floodplain
Riparian vegetation	Near Chicken Creek	Near Sevier Bridge Reservoir	Redmond Lake and Sevier River floodplain
Ephemeral drainages[a]	8	61	10
Hydric soils present	Yes	Yes	No[b]

[a] This is the number of ephemeral drainages that could be affected by the proposed alternatives.

[b] Digital soil data were not available for Sevier County. Analog data were used to extrapolate soil types in Sevier County.

Source: NRCS 1984

3.4.5.1 Juab County

Waters of the U.S. in the Juab County portion of the study area consist of wet meadows (WM), emergent marsh (EM), riparian vegetation zones (RIP) surrounding open water, and ephemeral drainages (ED). Table 3.4-3 below describes the vegetation associated with these wetland types. The hydrological sources for these wetlands are seeps, springs, impoundment of surface waters, and direct precipitation.

There are wet meadows near the northern project terminus in the vicinity of Chicken Creek. These wet meadows appear to be hydrologically supported by springs and shallow groundwater. Water from these springs ultimately collects in Chicken Creek Reservoir. Near Chicken Creek are two soil series that are on the state hydric soils list: Roshe Springs silt loam and Saltair silt loam. Common characteristics of these two soil types include slopes of 0% to 1%, poor drainage, and supporting wet meadows or salt-tolerant grasses.

Table 3.4-3. Vegetation in the Study Area Associated with Waters of the U.S.

Common Name	Scientific Name	Associated Waters of the U.S.
American bulrush	*Scirpus ameritimus*	EM
Big sagebrush	*Artemesia tridentata*	ED
Box elder	*Acer negundo*	RIP
Broom snakeweed	*Gutierrezia sarothrae*	ED
Cattails	*Typha latifolia*	EM
Cheatgrass	*Bromus tectorum*	ED
Common reed	*Phragmites australis*	EM
Crested wheatgrass	*Agropyron cristatum*	ED
Curly cup gumweed	*Grindelia squarossa*	ED
Curly dock	*Rumex crispus*	ED
Four-wing saltbush	*Atriplex canescense*	ED
Fremont cottonwood	*Populus freemontii*	RIP
Greasewood	*Sarcobatus vermiculatus*	ED
Inland saltgrass	*Distchlis spicata*	WM
Low rabbitbrush	*Chrysothamnus viscidiflorus*	ED
Narrowleaf cottonwood	*Populus angustifolia*	RIP
Rubber rabbitbrush	*Chrysothamnus nauseosus*	ED
Rushes	*Scirpus* spp.	EM
Russian olive	*Eleagnus angustifolia*	WM/RIP
Russian thistle	*Salsola iberica*	ED
Salt cedar	*Tamarix ramossisima*	WM/EM/RIP
Sedges	*Carex* spp.	WM/EM
Shadscale	*Atriplex confertifolia*	ED
Wiregrass	*Juncus balticus*	WM

WM = wet meadow
EM = emergent marsh
RIP = riparian
ED = ephemeral drainage

The wet meadows around Chicken Creek are used for grazing domestic livestock and for wildlife habitat. The open water that collects at Chicken Creek provides hydrology for riparian vegetation and emergent marsh vegetation. These areas of emergent marsh and open water provide habitat for migratory waterfowl.

Proceeding south, the remaining waters of the U.S. in Juab County are ephemeral drainages. These ephemeral drainages convey water during storm events and spring snowmelt. Additionally, they provide migration corridors, escape cover, and food sources for a variety

of wildlife species. The vegetation usually associated with these drainages varies depending on the local soil characteristics. The drainages are typically vegetated with either an arid shrub community (sagebrush) or a salt desert scrub community (chenopods) depending on soil salinity and available moisture.

3.4.5.2 Sanpete County

Waters of the U.S. in the Sanpete County portion of the study area consist of ephemeral drainages to the north, riparian areas associated with the Sevier Bridge Reservoir, and additional ephemeral drainages to the south. The hydrological sources for these wetlands are impoundments of surface waters, storm events, snowmelt runoff, and accumulation of shallow groundwater associated with river floodplains. There is only one hydric soil type within the study area: a xerofluvent (excessively drained to poorly drained soil) associated with the floodplain of the Sevier River (see Figure 3-7, Floodplains).

The ephemeral drainages at the northern Sanpete County border are similar in character and nature to those in the study area in Juab County. The vegetation present varies depending on soil salinity and available moisture.

The riparian areas in the study area in Sanpete County are associated with the Sevier Bridge Reservoir. The proposed alternatives cross the Sevier Bridge Reservoir at a geologic feature called Yuba Narrows. At this location, both riparian and emergent marsh vegetation are present. The open water and associated vegetation communities provide habitat for many species of wildlife including migratory waterfowl.

The remainder of the waters of the U.S. from Yuba Narrows south to the Sevier County border are ephemeral drainages. These ephemeral drainages convey storm event precipitation and snowmelt from the Valley Mountains. Wildlife habitat associated with these drainages varies with the type and density of vegetation present. These drainages are typically vegetated with a combination of arid and salt desert shrub communities. Some of these ephemeral drainages have been cleared of native vegetation and are currently used for agriculture. In these drainages, the vegetation present varies depending on individual management practices. Consequently, the value of these drainages for wildlife habitat as well as the number of species that inhabit them are variable as well.

3.4.5.3 Sevier County

Waters of the U.S. in the Sevier County portion of the study area consist of ephemeral drainages, wet meadows, emergent marsh, and open water. The hydrological sources for these wetlands are surface waters, impoundment of surface waters, and shallow groundwater associated with river floodplains. The ephemeral drainages are similar in size, function, and vegetation to those in Juab and Sanpete Counties. The wet meadows, emergent marsh, and open water in the Sevier County portion of the study area are associated with Redmond Lake, the Sevier River, and the Sevier River floodplain.

Vegetation in the wet meadows is similar to that found near Chicken Creek with one exception—the additional hydrology in Sevier County allows the vegetation to be much more lush than that in Juab County. The hydrological source for these wetlands is shallow groundwater associated with the Sevier River floodplain. Due to the low gradient and sinuosity through this reach of the river, the vegetation cover in these wet meadows is considerably greater than at the northern project terminus. With the greater amount of vegetative cover and more available water, the quality of wildlife habitat is considerably better.

The study area crosses the Redmond WMA, a 567-acre complex of marshes, open water, and wet meadows managed by the Utah Division of Wildlife Resources. The Redmond WMA is discussed further in Section 3.3, Biological Resources.

3.4.6 Groundwater and Wells

3.4.6.1 Groundwater

The Sevier River cuts across the Little Valley faults and travels near the Wasatch faults near the Sanpete County–Juab County border (at the Sevier Bridge Reservoir) and discharges to the dry basin of Sevier Lake. Two groundwater basins underlie the study area: the Central Sevier Valley groundwater basin and the Southern Juab Valley groundwater basin. The Central Sevier Valley groundwater basin extends along the Sevier River from the Sevier Bridge Reservoir in the north to the Piute Reservoir in the south. The Southern Juab Valley groundwater basin is bounded by the San Pitch Mountains on the east and the West Hills and South Hills on the west. This part of the valley is about 16 miles long and 2 miles to 6 miles wide.

Within the larger Central Sevier Valley groundwater basin are five groundwater aquifers separated by mostly-impermeable underground geologic formations. These groundwater aquifers are supplied by water from rivers and irrigation canals, percolation from precipitation and irrigation, and groundwater inflow. The proposed project would cross four of the five groundwater aquifers in the Central Sevier Valley groundwater basin: the Aurora-Redmond aquifer, the Redmond-Gunnison aquifer, the Gunnison–Sevier Bridge aquifer, and the Southern Juab Valley aquifer (Utah Division of Water Resources 1999).

Groundwater in the Juab Valley is typically shallow in depth and is encountered under both static and artesian conditions. Numerous springs and seeps from artesian pressures were noted near Chicken Creek Reservoir in the southern portion of the Juab Valley where clays and silts are interbedded with coarser alluvial materials. The proposed project would cross one of the two groundwater aquifers in the Juab Valley: the Southern Juab Valley aquifer. The project would not cross the smaller Mills Valley aquifer. Figure 3-6, Water Resources, shows the groundwater aquifers that would be affected by the proposed project.

Groundwater in the Sevier Valley is typically shallow and is encountered mostly under static conditions. There are several flowing wells in the northern part of the valley near the Sevier Bridge Reservoir.

Aurora-Redmond Aquifer

This groundwater aquifer is located in the southern part of the study area near the project's southern terminus. This aquifer is 9 miles long and about 3 miles wide with a maximum depth of about 660 feet east of Aurora. This aquifer contains three distinct layers of clay deposited by the Sevier River and its tributaries. Recharge comes from precipitation, seepage from the Sevier River and canals, and infiltration of irrigation water. Most of the groundwater in the Aurora-Redmond aquifer is suitable for all types of uses. Well withdrawals are for municipal and industrial, domestic, and stock-watering purposes (Utah Division of Water Resources 1999).

Redmond-Gunnison Aquifer

Beginning near the Sevier County–Sanpete County border, the Redmond-Gunnison groundwater aquifer has an arm that stretches to the north toward the Gunnison–Sevier Bridge aquifer. Near the proposed project, the groundwater-bearing soils range in depth from about 120 feet west of Centerfield to 320 feet west of Gunnison. Groundwater in this part of the aquifer nearest the project is of acceptable quality for most uses. Irrigation is the primary use. Of the 4,500 acre-feet of groundwater withdrawn in 1999, 4,200 acre-feet were used for irrigation with the balance used for municipal and industrial purposes (Utah Division of Water Resources 1999).

Gunnison–Sevier Bridge Aquifer

This groundwater aquifer extends from midway between Gunnison and Fayette to the Sevier Bridge Reservoir dam. It is 18 miles long and about 3 miles wide. The thickness of water-bearing soils varies. The aquifer is about 500 feet deep near Fayette and 320 feet deep near Gunnison. Near Yuba Narrows, the aquifer is confined to a thin soil layer. Because of the poor groundwater quality, irrigation is the only suitable use for groundwater from the Gunnison–Sevier Bridge aquifer (Utah Division of Water Resources 1999).

Southern Juab Valley Aquifer

The Southern Juab Valley groundwater aquifer is bounded by the San Pitch Mountains on the east and the West Hills and South Hills on the west. This part of the valley is about 16 miles long. Chicken Creek and Pigeon Creek are the primary streams that supply water to the aquifer. Groundwater is discharged from springs and is ultimately stored in Chicken Creek Reservoir near the project's northern terminus. Groundwater entering this reservoir is high in calcium and sulfate. Much of the water in Chicken Creek is used for irrigation in the Mills

area about 4 miles south of Chicken Creek Reservoir (Utah Division of Water Resources 1999). There is a high concentration of springs and possibly flowing wells near the project's northern terminus, which indicates shallow groundwater or artesian conditions.

3.4.6.2 Wells

Figure 3-6, Water Resources, and Table 3.4-4 show the location and density of public water sources in the study area.

Table 3.4-4. Public Water Sources within 5 Miles of the Proposed Alternatives

Utah Division of Drinking Water System Source Number	System Owner	Source Name	Source Type
12001-01	Levan	Levan well	Well GW
12001-04	Levan	Tunnel Spring	Spring GW
12001-06	Levan	500 East well	Well GW
12006-01	State of Utah	Blue Springs	Spring GW
20002-01	Fayette	Well	Well GW
20004-04	Gunnison	New well (1991)	Well GW
21002-01	Aurora	Broadhead Spring	Spring GW
21002-02	Aurora	Denmark Spring	Spring GW
21002-03	Aurora	Cemetery well	Well GW
21002-04	Aurora	Standby well	Well GW
21002-05	Aurora	White bally	Spring GW
21012-01	Redmond	Redmond Lake	Spring GW
21012-02	Redmond	1987 well	Well GW
21012-03	Redmond	1976 well	Well GW
21012-04	Redmond	1998 well	Well GW
21012-05	Redmond	Cemetery well	Well GW
21014-02	Salina	Salina well	Well GW
20074-01	BLM	2006 well	Well GW[a]
20074-06844	BLM	Golden Ranch	Well GW

[a] BLM well is currently not public, but is anticipated to be public by CURP construction.

GW = groundwater

Source: Jensen 2004

3.4.6.3 Drinking Water Source Protection Zones

The Utah Division of Drinking Water requires owners of systems that supply water to the public for domestic (drinking water) purposes to submit a Drinking Water Source Protection (DWSP) plan as required by the Drinking Water Source Protection Rule (Utah Administrative Code R309-600). The Division of Drinking Water generally defines public systems as those that serve more than 25 people.

There are 18 groundwater wells and springs with DWSP zones in the study area as shown in Figure 3-6, Water Resources. The others are either not in use, are planned for use in the future, or are not approved by the Division of Drinking Water. There are no surface water sources for drinking water in the study area.

The Utah Division of Drinking Water requires the DWSP plan to identify four distinct DWSP zones for each well:

- Zone 1 is the area within a 100-foot radius from the wellhead.
- Zone 2 is the area within a 250-day groundwater time of travel to the wellhead.
- Zone 3 is the area within a 3-year groundwater time of travel to the wellhead.
- Zone 4 is the area within a 15-year groundwater time of travel to the wellhead.

In general, certain types of development are not allowed within a designated DWSP zone unless the developer can show that the withdrawal point is isolated from the development by a confining layer, or that the development would not be a source of contamination. Construction is not generally allowed within Zone 1, but railroad construction within Zones 2, 3, and 4 would not typically be a major water quality concern and would be allowable (Martin 2005). In addition to the Division of Drinking Water, the Central Utah Public Health Department has jurisdiction over public drinking water. However, this department does not place any additional requirements on public drinking water other than the requirements of the Division of Drinking Water (Costa 2005).

3.4.6.4 Groundwater Rights

The Utah Division of Water Rights classifies groundwater wells according to their use: domestic (drinking water), irrigation, stock watering, municipal, or recreational. The municipal classification indicates that the well is owned by a city or county for a variety of uses, including drinking water or agriculture. The Division of Water Rights tracks groundwater rights according to an inventoried water right number. Each water right number represents one or more groundwater wells. The approximate locations of the wells that water rights owners may draw from are shown in Figure 3-6, Water Resources.

3.5 Geology and Soils

3.5.1 Background

This section discusses the existing topography, geology, and soils along the proposed project where new construction would occur. For minerals and mining, the study area is Juab, Sanpete, and Sevier Counties with most of the analysis focusing on the southeast portion of Juab County near Levan to the northwest portion of Sevier County to just south of Aurora. For the remaining topics in Section 3.5, the study area is the Juab and Sevier Valleys.

The topography of the terrain along the project area is relatively flat and would require cuts and fill of 20 feet to 30 feet to construct the project. Ground elevations in the Juab Valley range from about 5,075 feet on the north end to about 5,200 feet near the Sevier Bridge Reservoir. The ground surface elevations of the alternatives vary depending on their positions within the Sevier Valley.

South of the Sanpete County–Sevier County border, two alternatives are under evaluation. Alternative C (the western alternative) is situated within the somewhat hilly and dissected alluvial fan deposits below the Valley Mountains. Ground elevations along Alternative C range from about 5,400 feet near the county border to about 5,150 feet at the southern end of the project. The Proposed Action (the eastern alternative) is located within the relatively flat portion of the valley where ground elevations range from about 5,150 feet to 5,200 feet.

3.5.2 Topography

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The elevation of the study area ranges from 5,020 feet to 5,325 feet. This elevation places the study area in the Foothill Vegetation Community that falls within the 5,000-foot to 6,500-foot zone (Wullstein 2004).

3.5.3 Geologic Setting

The Sevier Valley portion of the study area lies within the Sanpete–Sevier Valley and Gunnison Plateau–Valley Mountains physiographic units, and the Juab Valley portion of the study area lies within in the Pahvant Range–Canyon Range subsection (Stokes 1986). The Sanpete–Sevier Valley section consists of a narrow depression formed by two rivers: the Sevier and the San Pitch. The streams join near the town of Gunnison, and the Sevier River continues to flow northward between the Valley Mountains and the Gunnison Plateau. The Gunnison Plateau–Valley Mountains section consists of two distinct ranges: the Valley Mountains and the Gunnison Plateau, which is also referred to as the San Pitch Mountains at the north end of this range. Exposed bedrock in the Gunnison Plateau is Jurassic to Tertiary in age, and in the Valley Mountains, predominantly Tertiary. The formations are sedimentary, consisting variably of conglomerate, sandstone, mudstone, and limestone. The valleys that separate the ranges contain predominately Quaternary alluvium and valley fill.

Central Utah has undergone a complex history of faulting and folding, which includes thrust faulting (Late Cretaceous) related to the Sevier Orogeny, regional folding (latest Cretaceous–early Tertiary) related to the Laramide Orogeny, normal faulting (beginning about 20 million years ago), and salt diapirism related to movement of soft sediments in the Arapien Shale. The present-day landforms of plateaus (ranges) and valleys began to form about 20 million years ago with formation of the Basin and Range and development of normal faults (L. Hintze 1980). In general, the plateaus are uplifted blocks relative to the valleys, which are down-dropped.

The project is located in the Intermountain Seismic Belt. This belt is a zone of active earthquakes with displacement related to movements on faults (Bishop 1997). For more information, see Section 3.5.3.4, Seismicity.

The study area is situated in a transitional zone between the Colorado Plateau and the Basin and Range physiographic provinces. The zone of transitional physio-tectonic characteristics includes the High Plateaus and consists of high-elevation tablelands separated by generally narrowing north-trending structural valleys (Hecker 1993).

3.5.3.1 Juab Valley

The Juab Valley is a structural trough formed between the Wasatch fault and San Pitch Mountains on the east and east-dipping bedrock on the West Hills on the west (Anderson and others 1994). The region has undergone various episodes of deformation including compression, extension, and uplift. The present-day valley is largely a result of extension of the local bedrock. The material in the valley is primarily alluvial fan and floodplain deposits. The southern part of the valley was not totally inundated by Lake Bonneville, which reached a maximum water surface elevation of about 5,090 feet.

Chicken Creek delivers runoff into Chicken Creek Reservoir near the southern end of the valley. The reservoir is bounded by a county road to the north and the Union Pacific Railroad to the west. The spillway elevation of Chicken Creek Reservoir is 5,050 feet.

Groundwater in the Juab Valley is typically shallow in depth and is encountered under both static and artesian conditions. Numerous springs and seeps from artesian pressures were noted near Chicken Creek Reservoir in the southern part of the Juab Valley, where clays and silts are interbedded with coarser alluvial materials.

3.5.3.2 Sevier Valley

The Sevier Valley is similar to the Juab Valley but is a separate valley formed primarily by the uplift of the adjacent mountain ranges. In the vicinity of the project, the ranges include the Valley Mountains and Pahvant Range on the west and the Gunnison Plateau (San Pitch Mountains), Wasatch Plateau, and Sevier Plateau on the east (Stokes 1986). The valley is bounded on the east by the Sevier fault along the Sevier Plateau and the Fayette segment of the Wasatch fault along the Gunnison Plateau and on the west by the Elsinore fault along the Pahvant Range and an east-dipping monocline along the Valley Mountains.

The Sevier River is a meandering stream that that runs through the center of the valley and flows from south to north. The Sevier Bridge Reservoir is a topographic low spot within the valley that collects runoff from the Sevier River and the numerous drainages from the adjacent mountains and hills. The spillway elevation of the Sevier Bridge Reservoir is 5,014 feet.

The upland soils at the base of the Valley Mountains were deposited as broad alluvial fans that have coalesced to form an extensive system of aprons. The rock debris in these aprons is Tertiary-Quaternary in age, and subsequent erosion has cut the older alluvium to form pediments that are capped with sand and gravel.

Groundwater in the Sevier Valley is typically shallow in depth and is encountered mostly under static conditions. Numerous flowing wells are present in the northern part of the valley near the Sevier Bridge Reservoir.

3.5.3.3 Subsurface Soil Conditions

The subsurface materials in the Juab and Sevier Valleys are primarily unconsolidated granular soils of Quaternary age that were deposited from the Sevier River that fed Lake Bonneville during the Holocene epoch and from runoff of the adjacent mountains and hillsides. These alluvial deposits consist primarily of sand and gravel with occasional layers of clay, silt, and sand with some zones of gravel. The sediments deposited in such alluvial and deltaic environments are generally loose in nature. The alluvial fan material generally becomes progressively finer toward the center of the valleys. Available well logs show that the thickness of the alluvium in the Juab and Sevier Valleys ranges from 130 feet to 380 feet.

3.5.3.4 Seismicity

The proposed project is located in the Intermountain Seismic Belt, which is dominated by the Wasatch fault zone. This fault zone trends in a north-south direction across the study area and the entire state. The zone is considered active and consists of a series of smaller related and independent faults that generally align parallel to the trend of the fault system.

Past activity demonstrates that the Wasatch fault zone and related fault segments can generate moderate to large earthquakes of Richter magnitudes ranging from 6.5 to 7.25 with a recurrence interval of 250 to 280 years. The Nephi, Levan, and Fayette segments are the most active parts of the Wasatch fault near the study area. See Figure 3-17, Geologic Map, for the mapped locations of these faults and other features near the proposed project. There is abundant evidence that earthquake events associated with the Wasatch fault zone have produced surface ruptures during the Holocene epoch (Hecker 1993).

The seismicity map from Stover and others (1986) is presented in Figure 3-17 for the central Utah region. This map, which displays the approximate epicenter location, modified Mercalli intensity, and the year of the earthquake event, shows that there has been some significant seismic activity in the region, most notably the 1901 event with an intensity of IX.

Other faults that could affect the project include the Elsinore fault and the Sevier fault. These faults are considered capable of producing earthquakes with magnitudes ranging from 6.0 to 6.5. Table 3.5-1 presents a summary of the known faults in the study area.

Table 3.5-1. Known Faults in the Study Area

Fault	Location	Type of Fault	Approx. Distance to Proposed Alternatives	Last Movement
Wasatch fault – Nephi segment	Juab Valley	Normal fault	< 5 miles	300 to 500 years
Wasatch fault – Levan segment	Juab Valley	Normal fault	< 5 miles	1,000 years
Wasatch fault – Fayette segment	Juab Valley	Normal fault	< 5 miles	10,000 to 15,000 years
Elsinore fault	Sevier Valley	Normal fault	< 1 mile	Quatemary
Sevier fault – Northern portion	Sevier Valley	Front fault	< 2 miles	Late Quatemary

3.5.4 Geologic Hazards

Several potential geologic hazards are associated with the seismicity of the region, which is dominated by the Wasatch fault zone. These hazards include ground shaking, liquefaction, and tectonic subsidence. Surface fault ruptures and earthquake-induced seiches (waves from oscillation of a water surface) are less significant geologic hazards. Landslides also present a geologic hazard that can be directly or indirectly related to seismic activity.

3.5.4.1 Ground Shaking

The Wasatch fault zone is active and capable of producing damaging seismic waves generated during an earthquake. The bridges, walls, and embankments for the project would have to be designed to withstand the anticipated ground shaking and earthquake accelerations associated with movement along the Wasatch fault zone and other nearby active faults. For an earthquake event with a 10% probability of being exceeded in 50 years, a maximum ground acceleration of about 0.25 g (0.25 times the acceleration of gravity) can be expected. For an earthquake event with a 10% probability of being exceeded in 250 years, a maximum ground acceleration of 0.6 g can be expected (AREMA 2004).

3.5.4.2 Liquefaction Potential

Liquefaction is defined as the sudden loss of strength and stiffness in a saturated, cohesionless soil during strong earthquake shaking. During liquefaction, the water pressure in the pores of the soil matrix rises to the point where the material transforms from a solid state to a liquid state. The phenomenon of liquefaction can be manifested in the form of subsidence, sand boils, lateral spreading, and loss of bearing support for structures.

The liquefaction potential maps created by USGS define areas where liquefaction has a certain probability of occurring. Based on SEA's review of these maps, most of the study area is situated in areas with a very low potential for liquefaction. Two areas in the project area with a moderate potential for liquefaction were noted: near Chicken Creek Reservoir and between the Sevier Bridge Reservoir and Gunnison. No sites in the study area have a high potential for liquefaction.

3.5.4.3 Tectonic Subsidence

A major earthquake along the Wasatch fault zone could cause some degree of tectonic subsidence. Although ground subsidence is recognized as a potential hazard, incorporating measures in the design of future facilities to mitigate this risk is not practical.

3.5.4.4 Fault Rupture

Several traces of known faults have been mapped near the study area (Hecker 1993). However, due to the thickness of the overburden soils and the lack of surface indications of underlying faults, no segments of the Wasatch fault zone or other faults are presently believed to underlie or traverse the study area.

3.5.4.5 Seiches

Earthquake-induced seiches (oscillation of water from seismic shaking) could occur along the central part of the proposed project that is closest to the Sevier Bridge Reservoir. SEA

considers the risk of this hazard to the project to be minor since the project alignment in this area would be at a significantly higher elevation than the spillway elevation of the reservoir.

3.5.4.6 Landslide Potential

The term *landslide* is defined as gravity-induced downward and outward movement composed of slope-forming materials or natural rock and soil and combinations of the two. Landslides can range in size from tiny popouts on soil slopes to massive earth movements (Jahns 1982).

Review of the landslides mapping indicates that there is no landslide activity in the study area and very little landslide activity in the adjacent uplands and mountains.

3.5.5 Farmland Soils

3.5.5.1 Prime Farmland

The Farmland Protection Policy Act of 1981 requires that Federal projects minimize conversion of prime farmland to nonagricultural uses and that such projects consider state and local farmland protection policies to the extent practical. Specially classified farmlands receive close scrutiny under this Act. Figure 3-10, Prime and State Important Farmland, shows prime farmland, as designated by NRCS, in the study area.

Based on information from NRCS and as shown in Table 3.5-2, the study area contains 1,055 acres of prime farmland. This farmland is primarily in dryland wheat. A representative from NRCS stated that farmland existed in the study area that was considered prime *when farmed*. However, due to drought conditions and crop rotation, certain farmlands are not being currently farmed and irrigated and so are not included as prime farmland (Parslow 2004).

Table 3.5-2. Prime and State Important Farmland within 0.5 Mile of the Proposed Alternatives

Farmland Designation	Farmland (acres)			
	Sevier County	Juab County	Sanpete County	Total
Prime	202	201[a]	652[a]	1,055
Unique	0	0	0	0
State important	0	23	1,056	1,079
Total	**202**	**224**	**1,708**	**2,134**

[a] Prime if irrigated

Source: Parslow 2004

3.5.5.2 Unique Farmland

Unique farmland is defined as land other than prime farmland used for the production of specific high-value food and fiber crops. Based on information from NRCS (Parslow 2004) and as shown in Table 3.5-2 above, Prime and State Important Farmland within 0.5 Mile of the Proposed Alternatives, the study area contains 0 acres of unique farmland.

3.5.5.3 Farmland of State Importance

State important farmland is classified by NRCS as farmland of lesser quality than prime farmland but having the soil, water supply, and other characteristics that, with good management, yield productive crops (Utah Agricultural Experiment Station 1983). Based on consultation with NRCS (Parslow 2004) and as shown in Table 3.5-2 above, Prime and State Important Farmland within 0.5 Mile of the Proposed Alternatives, the study area contains 1,079 acres of state important farmland. This farmland is primarily in pasture and alfalfa. Figure 3-10, Prime and State Important Farmland, shows state important farmland in the study area as designated by NRCS.

3.5.6 Paleontological Resources

The bedrock formations exposed at the surface within the vicinity of the project that have a likelihood for fossils include the Tertiary North Horn, Colton, Flagstaff, Green River, Crazy Hollow, Moroni, and Dipping Vat Formations. When fossils have been reported within these formations, they most commonly include plant and invertebrate fossils.

Paleontological resources are integrally associated with the Tertiary-Quaternary alluvial deposits in which they are located. Sedimentary formations are formed through depositional processes that lead to characteristic traits and varying potential for certain types of fossils. More than half of the sedimentary formations (23 of 40) in the BLM Richfield Field Office jurisdiction are known to contain vertebrate or trace vertebrate fossils. However, some formations have a higher potential than others to contain significant numbers of vertebrate fossils. Several complete fossil skeletons have been scientifically excavated from several specific localities in the BLM Richfield and Fillmore Field Office jurisdictions.

Under policy dictated by the BLM Manual and Handbook H-8270-1 (July 1998), formations are ranked according to their paleontological potential.

- **Condition 1** applies to areas that are known to contain fossil localities. Evaluation and special consideration of the known resources are necessary.
- **Condition 2** applies to areas that have exposures of geologic rock known to have produced fossils elsewhere.
- **Condition 3** applies to areas that are unlikely to produce fossils based on surface geology.

Although these guidelines apply mostly to vertebrate fossils on lands under the direction of BLM, they are equally designed to help protect rare plant and invertebrate fossils on state lands.

The Utah Geological Survey (UGS) and SITLA were contacted regarding the potential for the study area to contain sensitive paleontological resources. UGS reviewed available geologic maps to determine whether the proposed alternatives could encounter exposures of the Tertiary Dipping Vat and Green River Formations, formations that have yielded significant fossils in past excavations. UGS responded that the proposed alternatives are situated entirely in Quaternary alluvium, alluvial fan deposits, and terrace deposits and did not intersect any materials mapped as Tertiary age. Based on the geologic maps of the project area and a review of available paleontological inventories, Condition 2 is considered appropriate for this project, and site-specific inventories are not necessary.

In addition, on August 4, 2006, SITLA conducted a surface inspection for paleontological resources on lands within the project area that were identified as having the potential for containing fossil remains under Condition 2. The survey was conducted on Utah trust lands on the Golden Ranch Formation within the right-of-way for the proposed alternatives; this formation is known to yield plant fossils of the Eocene age. These lands are identified as the E½ E½ of section 32, T.16S., R.1W. SLB&M. The inspection revealed that the proposed alternatives would pass through areas that are covered with undifferentiated Quaternary alluvium and colluvium. No fossil remains were found, and no paleontological restrictions are recommended for the development of the proposed project (Stokes 2006).

3.5.7 Minerals and Mining

The National Energy Policy Act of 2005 (Public Law 109-58) seeks to provide reliable, affordable energy to our nation's consumers and to lessen the impact on Americans of volatile energy prices and uncertain supplies. Access to coal reserves by the proposed alternatives would reduce fuel waste by shortening the transport routes and would help maintain supplies of diverse and traditional forms of energy within the U.S. (domestic oil, gas, and coal). The National Energy Policy Act promotes such improvements in the productive and efficient use of energy (Demille 2007).

Oil and gas leases have been issued on BLM-administered land within the BLM Richfield and Fillmore Field Office jurisdictions. Oil and gas leases have also been issued within the right-of-way for the proposed project; however, the presence of a lease does not necessarily mean that oil and gas drilling will occur. No active or approved oil and gas activities such as drilling within the project right-of-way are recorded with BLM (Jackson 2006).

No mining claims for locatable or leasable minerals nor authorized mining law operations exist within the project right-of-way.

Vast amounts of sand and gravel aggregate are exposed at the base of the Wasatch and Gunnison Plateaus and the Valley Mountains (Witkind and others 1987). The majority of the aggregate was formed from carbonate rocks such as limestone and dolomite. Numerous gravel pits and quarries are noted on the USGS quadrangles and geologic maps that describe the study area. The sand and gravel are generally crudely sorted and contain oversized material that requires the sand or gravel to be crushed and screened before its use in concrete production and highway construction. The particle size of these materials ranges from fine sand to cobbles and boulders.

Other mineral resources are present in the Sevier Valley. These include gypsum, bentonite, and salt. Figure 3-9, Mines, shows the mining operations in the area. These mining operations are discussed in the following sections.

3.5.7.1 Canyon Fuel Company

Canyon Fuel Company is a coal company that owns and operates the SUFCO Mine in Sevier County. The SUFCO Mine, Utah's largest producer of coal, is located in the northeast portion of Sevier County outside the area shown in Figure 3-9, Mines. The distance from the mine to the coal-loading facility is about 30 miles. Table 3.5-3 shows the level of coal production at the SUFCO Mine in tons from 2001 through 2004 as reported by the Utah Geological Survey (2006). Canyon Fuel Company would haul about 38,000 carloads per year of SUFCO coal if the proposed project is constructed (Washington Infrastructure Services, Inc. and others 2001).

Table 3.5-3. SUFCO Mine Coal Production (2001–2004)

Year	Production (tons)
2001	7,001,000
2002	7,600,000
2003	7,126,000
2004	7,568,000

Source: Utah Geological Survey 2006

3.5.7.2 Redmond Minerals Incorporated

Redmond Minerals is primarily a salt-mining company but is also a producer of bentonite and fuller's earth. Redmond Minerals has about 85 employees and owns Utah's only underground salt mine (Washington Infrastructure Services Inc. and others 2001). Within the study area, Redmond Minerals owns the underground salt mine (the Sanpete County Mine), which is located near Redmond, and one bentonite mine (the Clay Mine) located on the Sanpete County–Sevier County border. In addition to the salt mine, Redmond Minerals has a salt-bagging plant, which is located along the Sevier River west of US 89 in Sanpete County. Redmond Minerals produces about 400,000 tons of salt per year.

A small portion of that salt is ground, screened, and packaged to be sold under the company's table salt brand, RealSalt. The rest of the salt mined is sold to de-ice roads or as salt blocks for livestock. The Feasibility Study suggests that as much as 2,200 to 3,000 carloads of salt per year could be hauled if the proposed project is constructed (Washington Infrastructure Services Inc. and others 2001).

3.5.7.3 Western Clay Company

Western Clay Company operates the Redmond Mine, a bentonite mine, which is located in Aurora and the Sevier Plant which is located just east of Aurora near the southern terminus of the proposed project. Bentonite is used for waterproofing in civil engineering applications, as a pet-waste absorbent, as an additive in oil and gas-drilling fluids, and as a binder in foundry molds (Bon and Krahulec 2004). According to the Feasibility Study, Western Clay Company could haul between 1,000 and 1,400 carloads per year from its mine and plant if the proposed project is constructed (Washington Infrastructure Services Inc. and others 2001).

3.5.7.4 U.S. Gypsum Company

U.S. Gypsum Company is a subsidiary of USG Corporation that operates the Jumbo-Jensen Mine near Sigurd just outside the southern boundary of the study area. The Jumbo-Jensen Mine is a surface gypsum mine with about nine employees (U.S. Department of Labor, Mine Safety and Health Administration 1999). There are many uses for gypsum including agriculture applications for fertilizer and erosion control, cements and plasters for art, metal casting, manufacture of wallboard and floor underlayment, and as polymer, chemical, and food additives. HDR was unable to determine how much gypsum is produced at the Jumbo-Jensen mine, but the Feasibility Study suggests that the mine could haul between 600 and 900 carloads per year if the proposed project is constructed (Washington Infrastructure Services Inc. and others 2001).

3.5.7.5 Georgia-Pacific Corporation

The Georgia-Pacific Corporation operates the Sigurd mine and plant in Sigurd. The mine and plant are gypsum facilities that are located just south of the study area. In June 2002, Georgia-Pacific closed the 65,000-ton plaster plant located at Sigurd (Georgia-Pacific Corporation 2002). Georgia-Pacific resumed mining operations in November 2005, and the Sigurd plant is also currently operating.

3.5.7.6 Aggregate Mining

Two aggregate companies have been located within the study area: G.W. Johansen Construction Company, Inc. and Hales Sand and Gravel, Inc. Both companies operate sand and gravel facilities. Hales Sand and Gravel operates a pit located just south of Redmond. The Johansen sand and gravel mine is located along the proposed project just north of the Sanpete County–Sevier County border. As stated in the Feasibility Study, Hales Sand and Gravel could haul between 130 and 190 carloads of asphalt products and cement per year if the proposed project is constructed (Washington Infrastructure Services Inc. and others 2001).

3.6 Vibration

Vibration is a function of the activities occurring within an area. Land use along the proposed alternatives in Sevier and Sanpete Counties is primarily cultivated agriculture with scattered mining operations, grazing, and open space. Vibrations with very low frequencies and intensities are produced by trucks and cars along roadways and by farming activities. Vibration associated with mining is a function of the mining method. Although gravel mines produce high levels of noise from earth-moving equipment and sorting machinery, they do not produce significant levels of vibration. Salt-mining activities include the use of earth-moving equipment and occasional blasting. The blasting produces locally intense vibration of short duration.

3.7 Hazardous Materials and Waste Sites

3.7.1 Background

Board regulations require the Applicant to discuss transport of hazardous materials (49 CFR 1105.7(e)(7)(ii)) and to identify the location of any “known hazardous waste sites or sites where there have been known hazardous materials spills on the right-of-way” (49 CFR 1105.7(e)(7)(iii)). This section discusses the occurrence of known and potential hazardous waste sites in and near the study area. The hazardous waste study area includes all sites within 1 mile of the proposed alternatives.

3.7.2 Potentially Hazardous Waste Sites

SEA identified potentially hazardous waste sites by reviewing the Utah Division of Environmental Response and Remediation (DERR) interactive map viewer on February 21, 2006 (DERR 2006). SEA reviewed DERR's interactive map viewer to determine sites close to the proposed alternatives that are listed in the following categories:

- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), a database of Superfund sites
- National Priorities List (NPL), a list of priority CERCLIS sites
- Brownfield sites[1]
- Voluntary Cleanup Program (VCP)
- Leaking underground storage tanks (LUST), either open (under investigation) or closed (no additional remedial actions are required or ever took place)
- Underground storage tanks (UST), either active (currently regulated by UDEQ) or out of use

HDR also conducted a field survey on October 5, 2004, to help identify other potentially hazardous sites that were not identified in the DERR databases. In addition, HDR reviewed a summary of all spill incidents that were reported to DERR between 1988 and 2003 to evaluate the potential for construction workers to encounter contamination from a large spill or other event involving hazardous materials. As a supplement to the DERR incident summary, HDR queried the National Response Center spills database for incidents in the study area (NRC 2005).

HDR identified seven potentially hazardous waste sites in the study area. Table 3.7-1 below lists the sites from north to south, and the sites are shown in Figure 3-11, Potential Hazardous Waste Sites. A total of 26 underground storage tanks (USTs) are listed for the seven sites. Of these 26 USTs, 18 have been removed, six are currently in use, and two have been closed in place. A total of three leaking underground storage tanks (LUSTs) have been identified at two of the sites. During the October 2004 field survey, HDR personnel identified a junk yard near the crossing of US 50 and Alternative C. HDR did not find any spill incidents in the DERR and National Response Center databases.

[1] In general, the term "brownfield site" means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

Table 3.7-1. Potentially Hazardous Waste Sites within 1 Mile of the Proposed Alternatives

Site ID	Type	Notes
2000654	UST (gasoline)	Tank 1 was removed in 1992.
2000114	UST (diesel)	Tank 1 was removed in 1993.
2000366	UST (diesel)	Tank 1 was removed in 1990.
	LUST (diesel)	LUST (DERR ID: FYL) was closed in 1995.
2000117	UST (gas/diesel)	Tank 1 (compartmented) is currently in use.
	UST (diesel)	Tank 2 is currently in use.
	UST (used oil)	Tank 8 was removed in 1991.
	UST (diesel)	Tank 9 was removed in 1991.
	UST (gasoline)	Tank 10 was removed in 1991.
	UST (diesel)	Tank 11 was removed in 1996.
2000595	UST (used oil)	Tank 1 was closed in place in 1991.
2000223	UST (gasoline)	Tank 1 was removed in 1997.
	UST (gasoline)	Tank 2 was removed in 1997.
	UST (new oil)	Tank 3 was removed in 1991.
	UST (new oil)	Tank 4 was removed in 1991.
	UST (new oil)	Tank 5 was removed in 1991.
	UST (new oil)	Tank 6 was removed in 1991.
	UST (gasoline)	Tank 8 was removed in 1997.
	UST (gasoline)	Tank 9 is currently in use.
	UST (diesel)	Tank 10 is currently in use.
	UST (gasoline)	Tank 11 is currently in use.
	UST (diesel)	Tank 12 is currently in use.
	LUST (new oil)	LUST (DERR ID: GTP) was closed in 1993.
	LUST (gasoline)	LUST (DERR ID: JZI) was listed in 1997.
2000018	UST (diesel)	Tank 1 was removed in 1992.
	UST (diesel)	Tank 2 was removed in 1992.
	UST (diesel)	Tank 3 was removed in 1992.
	UST (gasoline)	Tank 4 was removed in 1992.
	UST (used oil)	Tank 5 was closed in place in 1991.

Source: DERR 2006

Removed or closed USTs typically indicate a site that has been remediated or that did not require remediation when the UST was removed or closed in place. Because these sites are not listed as LUST occurrences, there is a low probability of environmental degradation. However, contamination (if any) could have been left in place if it did not pose a threat to human health or the environment. Direct impacts to these sites could require DERR to re-examine the status of the site.

Typical contaminants of concern associated with the fuel and used oil USTs are petroleum-based hydrocarbons, also known as BTEX (benzene, toluene, ethylbenzene, and xylene). However, nothing in the DERR databases indicated that the sites listed above in Table 3.7-1, Potentially Hazardous Waste Sites within 1 Mile of the Proposed Alternatives, ever leaked contaminants into the surrounding soils or groundwater.

3.8 Air Quality

3.8.1 Background

The Board's regulations, found at 49 CFR 1105.7(e)(5), set thresholds for analyzing the anticipated effects of a proposed rail project on air emissions. The Board analyzes air impacts for projects that would involve an increase of at least eight trains per day, an increase in rail traffic of at least 100% (measured in gross ton-miles annually), or an increase in rail yard activity of at least 100% (measured by carload activity). The proposed project involves operations on a new rail alignment and anticipates up to two trains per day, so it would not meet the Board's threshold requirement of eight trains per day which would require an analysis of air quality impacts.

USEPA regulations specify the maximum acceptable ambient concentration level for six types of air pollutants. As defined by the Clean Air Act, there are two types of National Ambient Air Quality Standards (NAAQS): primary standards that establish limits to protect public health, and secondary standards that set limits to protect public welfare. USEPA's Office of Air Quality Planning and Standards has set NAAQS for six primary, or "criteria," pollutants: ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), respirable particulate matter (PM), and lead (Pb). UDEQ has adopted these same standards for Utah. The primary and secondary standards are summarized in Table 3.8-1 below.

Table 3.8-1. National Ambient Air Quality Standards (NAAQS)

Pollutant	National (USEPA) Standard[a] Primary	Secondary
Lead (Pb)		
Quarterly average	1.5 µg/m^3	1.5 µg/m^3
Particulate Matter (PM_{10})		
Annual arithmetic mean	50 µg/m^3	50 µg/m^3
24-hour average	150 µg/m^3	150 µg/m^3
Particulate Matter ($PM_{2.5}$)		
Annual arithmetic mean	15 µg/m^3	15 µg/m^3
24-hour average	65 µg/m^3	65 µg/m^3
Sulfur Dioxide (SO_2)		
Annual average	0.03 ppm	(no standard)
24-hour average	0.14 ppm	(no standard)
3-hour average	(no standard)	0.50 ppm
1-hour average	(no standard)	(no standard)
Carbon Monoxide (CO)		
8-hour average	9 ppm	(no standard)
1-hour average	35 ppm	(no standard)
Ozone (O_3)		
8-hour average	0.08 ppm	0.08 ppm
1-hour average[b]	0.12 ppm	0.12 ppm
Nitrogen Dioxide (NO_2)		
Annual average	0.05 ppm	0.05 ppm

Annual standards are never to be exceeded. Short-term standards are not to be exceeded more than 1 day per calendar year unless noted otherwise.

ppm = parts per million

PM_{10} = particulate matter 10 microns in diameter or less

$PM_{2.5}$ = particulate matter 2.5 microns in diameter or less

µg/m^3 = micrograms per cubic meter

[a] Primary standards are set to protect public health. Secondary standards are based on other factors (for example, protection of crops and materials, avoidance of nuisance conditions).

[b] Standard is not to be exceeded more than 1 day per calendar year.

Source: USEPA 2003

3.8.2 Existing Air Quality

The Clean Air Act Amendments of 1990 require that all areas with recorded violations of the NAAQS be designated as non-attainment areas. A State Implementation Plan must be developed for non-attainment areas that identifies control strategies for bringing the region back into conformance with the NAAQS. The proposed project would be constructed in Sevier, Sanpete, and Juab Counties, which are in attainment for all of the criteria pollutants.

Since the air quality study area is in air quality attainment, no air pollution control district has been established that defines the air basin. Nearly the entire right-of-way for the proposed project is undeveloped terrain, and there is little data available on existing air quality. The nearest air quality monitoring station is in Provo, about 100 miles north of the study area. Monitoring data from this distant location would not reflect the air quality in the study area. The nearest Class I area is Capitol Reef National Park, about 50 miles southeast of Salina, the southern terminus of the project.

The majority of the study area is in areas that are undeveloped or that are used for agricultural purposes such as growing row crops or cattle grazing. The expected air pollutants associated with the study area are wind-blown dust and particulates from exposed agricultural soil and vehicle emissions (primarily CO) from traffic on existing roads. Vehicle emissions would be slightly higher near established communities such as Salina than in undeveloped areas.

3.9 Noise

3.9.1 Background

Under the proposed project, the rail line would carry one round trip (two movements which equals one full load and one empty back-haul) per day, which is below the Board's threshold for environmental noise analysis. This threshold is an increase in train traffic of at least eight trains per day or an increase in rail traffic of at least 100% measured in gross ton-miles annually. Consequently, no noise analyses are required for this project according to the Board's thresholds for noise impact assessment. However, because of public interest in the project, SEA performed a noise analysis.

For this analysis, the noise study area is the land adjacent to the proposed alternatives that could be affected by an increase in noise from the project. To give a general context for the noise environment in the study area, a regional overview is provided. This section also describes the general characteristics of noise, provides a regulatory overview of noise standards, lists the sensitive noise receptors in the study area, and summarizes monitored noise levels.

3.9.2 Characteristics of Noise

Noise is defined as unwanted sound. The decibel (dB) is the accepted standard unit for measuring noise. Since human hearing is not equally sensitive to all sound frequencies, only certain frequencies can be considered when measuring noise in decibels. The A-weighted decibel scale corresponds to the sensitivity range for human hearing; noise levels for this scale are measured in dBA. A noise level change of 3 dBA is barely perceptible to humans, but a 5-dBA change is noticeable. A 10-dBA change in noise is perceived as a doubling of noise loudness, while a 20-dBA change is considered a dramatic change. Table 3.9-1 shows noise levels associated with everyday sources.

Table 3.9-1. Weighted Sound Levels and Human Response

Examples of Sound Sources	dBA[a]	Response Criterion
	0	Threshold of hearing
	10	Just audible
Broadcasting studio background	20	
Soft whisper at 15 feet	30	Very quiet
In living room, bedroom, or library	40	
	50	Quiet
Air conditioner at 20 feet; light auto traffic at 50 feet	60	
Freeway traffic at 50 feet	70	Intrusive; telephone use difficult
Passenger train at 100 feet; freight train at 50 feet; helicopter at 500 feet	80	Annoying
Heavy truck at 50 feet; pneumatic drill at 50 feet	90	Hearing damage after 8 hours
Shout at 0.5 foot; inside New York subway station	100	Very annoying
Riveting machine; jet takeoff at 2,000 feet	110	
Jet takeoff at 200 feet; auto horn at 3 feet; inside discotheque	120	Threshold of feeling and pain
	130	Painfully loud
Carrier deck jet operation	140	Limit of amplified speech

[a] Typical A-weighted sound levels taken with a sound-level meter and expressed as decibels weighted on the "A" scale (dBA), which approximates the frequency response of the human ear.

Source: CEQ, Executive Office of the President 1970

3.9.3 Regulatory Overview

Equivalent Sound Level. Federal regulatory agencies often use the equivalent sound level (L_{eq}) scale to evaluate noise impacts (USEPA, 40 CFR 201 to 211). With this scale, noise is defined as a constant sound with the same sound energy as a more realistic, fluctuating sound. When reporting sound levels, it is crucial to identify the time period under consideration. For example, $L_{eq}(24)$ is the equivalent sound level for a 24-hour period. Unless otherwise noted, all sound levels provided in this report use $L_{eq}(1)$, the hourly equivalent noise level.

Day-Night Average Sound Level. Average noise exposure over a 24-hour period is often presented as a day-night average sound level (L_{dn}). L_{dn} values are calculated from hourly L_{eq} values, with the L_{eq} values for the nighttime period (10 PM to 7 AM) artificially increased by 10 dBA to reflect the greater disturbance caused by noises at night.

The Federal Noise Control Act of 1972 (40 CFR 201 to 211) recognized that major transportation noise sources associated with commerce should be regulated the same way in every state. Different regulations, particularly in the case of railroads, could interfere with interstate commerce. USEPA and the Federal Railroad Administration developed noise regulations (49 CFR 210) in response to the Noise Control Act that establish noise level limits for individual pieces of railroad equipment. However, these regulations do not address the effects of multiple or cumulative noise events.

Other transportation agencies, such as the Federal Highway Administration, the Federal Transit Administration, and the Federal Aviation Administration, have developed noise assessment and mitigation policies that take multiple noise events into account. These policies, typically based on L_{dn} noise metrics, were developed in response to public concerns over increased noise due to increased transportation activity.

The Board's noise regulations address the effects of multiple noise events in a similar fashion to the policies developed by other transportation agencies. Railroad noise mitigation includes noise barriers, sound insulation for buildings, directional horns or quiet zones, and changes in land use planning.

3.9.4 Definition of Railroad Noise

The principal types of noise that SEA considered in evaluating rail line segments are horn noise and wayside train noise.

- **Horn noise** occurs near grade crossings and warns motorists and pedestrians of approaching trains.
- **Wayside train noise** refers to all train-related operational noise adjacent to the right-of-way, excluding warning horn noise. Wayside train noise results from steel train wheels contacting steel rails and from locomotive exhaust and engine noise. The amount of noise created by the locomotive depends on the throttle setting.

3.9.5 Existing Noise Conditions

The majority of the study area is undeveloped open space with a very small number of residential and recreational land uses (such as campgrounds) interspersed throughout the study area. The principal sources of background noise in the project area are occasional vehicle traffic on ranch roads, aircraft overflights, and wind.

To determine existing noise levels, SEA monitored the noise level at four locations in the study area that the team felt represented existing noise conditions (see Figure 3-12, Noise Monitoring Locations). The associated noise levels at each monitoring location are provided in Table 3.9-2.

Table 3.9-2. Ambient Noise Monitoring Data

Monitoring Location	Location	Monitored L_{eq} (dBA)
1	Along SR 28 near the Juab County–Sanpete County border, near Painted Rocks Campground	36.6
2	Near Sevier River south of the Sevier Bridge Reservoir	41.4
3	Just south of the Juab County–Sanpete County border near Redmond	45.8
4	Near southern project terminus east of the Sevier River	48.3

3.10 Energy Resources

3.10.1 Background

The NEPA regulations (40 CFR 1502.16) require an examination of the energy requirements of a proposed project and the project's potential to conserve energy. This section describes the existing energy demands of transportation (truck traffic) in the study area that would be affected by the proposed project. This section also describes the existing energy resources in the study area. The energy resources study area is the proposed alternatives plus the surrounding area out to a distance of 500 feet on either side of the alternatives.

3.10.2 Existing Energy Use

The proposed project would convert truck traffic hauling coal to and from the SUFCO mine to rail traffic. To evaluate changes in energy use, this section analyzes existing truck traffic and projected future truck traffic.

About 750 trucks per day pass through Salina, Centerfield, Gunnison, and Levan. Each truck travels 163 miles round trip from the coal mine northeast of Salina to the Sharp load-out facility just south of Levan (see Figure 3-13, Energy).

Fuel consumption varies with vehicle type. Most trucks that haul coal through the study area are heavy single-unit trucks[2] with an average fuel efficiency of 6.0 mpg (miles per gallon) (EIA 2004). This fuel efficiency is projected to increase to 6.5 mpg by 2025, an increase of 8%. Currently, coal trucks traveling from Salina to the Sharp load-out facility use about 20,375 gallons of diesel fuel per day. This equals 2,832 million Btu (British thermal units) of energy consumed each day by coal truck traffic.

Table 3.10-1 shows the current truck vehicle-miles traveled (VMT), fuel consumption, and energy consumption in the study area.

Table 3.10-1. Existing Average Daily Energy Consumption in 2003

Coal Truck Traffic (trips per day)	Coal Truck Traffic (VMT)	Fuel Consumption (gallons)	Energy Consumption (million Btu)
1,500	122,250	20,375	2,832

1 gallon diesel fuel = 139,000 Btu. Heavy single-unit trucks are assumed to achieve diesel fuel efficiency of 6.0 miles per gallon.

Source: EIA 2004

3.10.3 Other Energy Resources

Other energy resources in the study area include transmission lines. These are shown in Figure 3-13, Energy. The transmission lines are owned by PacifiCorp and administered by Rocky Mountain Power. The lines shown from west of Levan to Aurora include two 345-kilovolt lines and one 46-kilovolt line. The line from Scipio to Aurora is a 46-kilovolt line, and the lines from Aurora to the east are two 345-kilovolt lines.

[2] As defined by the Energy Information Administration, a single-unit truck is "a motor vehicle consisting primarily of a single motorized device with more than two axles or more than four tires." In comparison, a combination truck "consists of a power unit (a truck tractor) and one or more trailing units (a semi-trailer or trailer)" (EIA 2004).

3.11 Socioeconomics

3.11.1 Background

NEPA regulations (40 CFR 1508.14) require an analysis of the socioeconomic effects of a proposed project when the "economic or social and natural or physical environmental effects [of the project] are interrelated." In addition, the courts have ruled that socioeconomic issues are closely linked to quality of life and should be studied under NEPA. For this EIS, SEA analyzed socioeconomic issues including employment, income, commerce, and tax base.

The socioeconomic study area includes parts of the three counties (Juab, Sanpete, and Sevier) that would be affected by the proposed project. When possible, SEA evaluated the portions of the study area that are immediately adjacent to the proposed project.

3.11.2 Population and Demographics

3.11.2.1 Juab County

Juab County is the northernmost county in the socioeconomic study area. The county has five main communities—Nephi, Levan, Eureka, Mona, and Rocky Ridge—with most of the population residing in Nephi (4,962 people out of 8,713). Of these five communities, Levan is the closest to the proposed project and has a population of 782. About 10% of Juab County residents live in rural areas of the county (Utah Department of Workforce Services 2004a).

Population growth in the county has historically outpaced employment growth. Juab County is the sixth-fastest-growing county in Utah in terms of population and grew at an average rate of 3.5% per year between 1990 and 2000. Many Juab County residents commute outside the county for work. In contrast, some people who work along the Wasatch Front (Utah and Salt Lake Counties) are building homes in Juab County. New residential building permits averaged 55 per year from 1998 to 2002 with 39 of those for homes in Nephi. The value of residential building permits in Juab County was about $6.3 million in 2003 (Utah Department of Workforce Services 2004a).

3.11.2.2 Sanpete County

The majority of the proposed rail line would run through Sanpete County. Within the county, the communities of Fayette, Gunnison, and Centerfield are the closest to the proposed project. In 2003, the total population of Sanpete County was 23,391. Fayette, Gunnison, and Centerfield had populations of 206, 2,484, and 1,068, respectively. The rural population in Sanpete County is about 15% of the total population (Utah Department of Workforce Services 2004b).

Sanpete County grew at an average rate of 3.4% per year between 1990 and 2000. The county averaged 190 new residential building permits per year from 1999 to 2003; however, the

number has been declining since 2000. Residential building permits in 2003 were valued at nearly $14 million. The location of new homes being built has been concentrated in areas outside the county's major townships (Utah Department of Workforce Services 2004b).

3.11.2.3 Sevier County

Sevier County is the southernmost county in the study area. Within the county, the closest communities to the proposed project are Aurora, Redmond, and Salina. In 2003, the population of Sevier County was 19,318 with the rural population about 19% of the total population. The populations of Aurora, Redman, and Salina were 939, 778, and 2,378, respectively (Utah Department of Workforce Services 2004c).

Over the past decade, Sevier County has had an average annual growth rate of about 2.0%, which is below the average annual growth rate for Utah overall (2.3%). Salina, near the proposed project, added about 450 residents and averaged 130 new residential building permits per year from 1999 to 2003 (Utah Department of Workforce Services 2004c).

3.11.3 Employment

3.11.3.1 Juab County

In 2003, government employment had the largest share of total employment in Juab County (23%). The manufacturing; trade, transportation, and utilities; and leisure and hospitality industries also provided a large percentage of employment in the county. Table 3.11-1 below shows job distribution by industry for nonfarm jobs in 2003 (Utah Department of Workforce Services 2004a). Table 3.11-2 below shows the size of the labor force and the distribution of jobs for all industries including farm jobs in 2000.

Table 3.11-1. Job Distribution by Industry for Nonfarm Jobs in 2003

Industry	Percent of Total Employment		
	Juab County	Sanpete County	Sevier County
Construction	8%	5%	5%
Education/Health/Social Services	6%	8%	10%
Financial Activities	2%	3%	2%
Government	23%	39%	23%
Information	0%	2%	1%
Leisure/Hospitality	15%	7%	11%
Manufacturing	14%	12%	7%
Mining	2%	0%	5%
Other Services	3%	2%	2%
Professional/Business Services	6%	4%	4%
Trade/Transportation/Utilities	16%	15%	29%

Source: Utah Department of Workforce Services 2004a, 2004b, 2004c

Table 3.11-2. Job Distribution by Industry for Farm and Nonfarm Jobs in 2000

Industry	Percent of Total Employment		
	Juab County	Sanpete County	Sevier County
Labor Force (16 years and older)	3,547	9,274	8,053
Agriculture, Forestry, Fishing, and Hunting	3.8%	6.9%	4.8%
Arts and Entertainment	11.7%	5.8%	9.4%
Construction	11.3%	9.6%	9.0%
Education and Social Services	17.4%	24.9%	21.2%
Finance, Insurance, and Real Estate Rental and Leasing	3.0%	3.8%	3.3%
Information	2.0%	2.0%	2.1%
Manufacturing	17.5%	13.3%	6.6%
Mining	0.9%	3.3%	3.4%
Other Services	2.8%	4.4%	4.7%
Professional Services	4.6%	3.6%	2.9%
Public Administration	4.5%	5.9%	6.9%
Retail Trade	11.7%	11.1%	14.3%
Transportation and Utilities	5.2%	3.7%	8.0%
Wholesale Trade	3.5%	1.7%	3.3%

Source: U.S. Census Bureau 2000

Most of the employers in Juab County are small businesses. Forty percent of all employers in the county have three or fewer employees. The Juab School District is the largest employer in Juab County, followed by Central Valley Medical Center and Nephi Rubber Products.

During 2003, Juab County had a substantial loss in construction employment (119 jobs or 37%). The education, health, and social services industry and the leisure and hospitality industry had job losses of 48 jobs (8%) and 42 jobs (13%), respectively. In 2002, the unemployment rate in the county increased to an all-time high of 7.8% and decreased only slightly in 2003 to 7.3%.

3.11.3.2 Sanpete County

In Sanpete County, government employment makes up the greatest percentage of nonfarm jobs with 39%. The trade, transportation, and utilities industry has the next-highest percentage of employment with 15%, and the manufacturing industry accounts for 12%. Table 3.11-1 above shows job distribution by industry for nonfarm jobs in 2003, and Table 3.11-2 above shows the distribution of jobs for all industries including farm jobs in 2000.

Sanpete County has more large businesses than Juab County. Major employers in Sanpete County include the State of Utah, Moroni Feed, and Snow College. The county's school districts, North Sanpete School District and South Sanpete School District, also employ a large number of people. Gunnison Valley Hospital is a large employer in Sanpete County near the proposed project (Utah Department of Workforce Services 2004b). Gunnison, which is located near the proposed project, relies heavily on the agriculture industry but also houses a state correctional facility.

Unlike employment in Juab County, employment in Sanpete County is increasing overall. However, some of the job growth in the county was offset by a loss of employment in the construction and manufacturing industries. The unemployment rate for Sanpete County reached 7.1% in 2002 and remained at that level in 2003.

3.11.3.3 Sevier County

In Sevier County, the trade, transportation, and utilities industry has the largest share of employment with 29%. The large percentage of jobs in this industry is due to trucking associated with the coal mines in Sevier County. Other major industries in Sevier County include government (23%), leisure and hospitality (11%), and education, health, and social services (10%). Table 3.11-1 above shows job distribution by industry for nonfarm jobs in 2003, and Table 3.11-2 above shows the distribution of jobs for all industries including farm jobs in 2000. The largest employers in the county are the Sevier County School District, Canyon Fuels, US Gypsum Company, Richfield Care Center, and Barney Trucking.

Although agriculture is still an important industry in the county, other sources of economic activity are being developed. Mining has contributed significantly to the county's economy (see Section 3.5.6, Paleontological Resources).

3.11.3.4 Employment Growth in the Study Area

Employment in the study area is projected to continue to increase by an average of 1.93% per year between 2005 and 2030 (see Table 3.11-3).

Table 3.11-3. Projected Total Employment in the Study Area (2005–2030)

County	2000	2005	2010	2015	2020	2030	AARC[a] 2005–2030
Juab County	3,547	4,131	4,777	5,450	6,043	6,859	2.22%
Sanpete County	9,274	11,049	12,087	13,175	14,050	14,983	1.61%
Sevier County	8,053	10,647	11,652	12,686	13,531	14,428	1.96%

[a] AARC = average annual rate of change

Sources: U.S. Census Bureau 2000; Utah Governor's Office of Planning and Budget 2002

3.11.4 Income

3.11.4.1 Juab County

The median household income reported by the 2000 U.S. census for Juab County was $38,139. In comparison, the median household income for Utah overall was $45,726 (U.S. Census Bureau 2000). In 2001, the total personal income for Juab County was $134.3 million. The county's per-capita income was $15,849, which ranked fifth lowest among Utah's 29 counties. This per-capita income was 65.9% of the state average ($24,033) (Utah Department of Workforce Services 2003).

3.11.4.2 Sanpete County

The median household income reported by the 2000 U.S. census for Sanpete County was $33,042 (U.S. Census Bureau 2000). In 2001, the total personal income for Sanpete County was $349.7 million. The county's per-capita income was $15,077, which ranked second lowest among Utah's 29 counties. This per-capita income was 62.7% of the state average (Utah Department of Workforce Services 2003).

3.11.4.3 Sevier County

The median household income reported by the 2000 U.S. census for Sevier County was $35,822 (U.S. Census Bureau 2000). In 2001, the total personal income for Sevier County was $351.8 million. The county's per-capita income was $18,505, which was 77.0% of the state average (Utah Department of Workforce Services 2003).

3.11.5 Trucking Industry

Most of the large trucking companies in the study area are located in Sevier County. Major employers in the trucking industry include Barney Trucking, Robinson Transport, Gurney

Trucking, and DP Curtis Trucking. Barney Trucking and Robinson Transport are the main freight carriers for the SUFCO mine. In December 2004, Barney Trucking employed 225 people and had 200 drivers at the company's Salina location. In December 2004, Robinson Transport employed 140 people and had 110 drivers. See Section 0,

Trucking Operations, for more information on the trucking operations in the study area.

3.11.6 Agriculture

Agriculture has historically played an important role in all the counties in the study area. The 2002 Census of Agriculture (U.S. Census Bureau 2002) found that Juab County had 236 farms and 122 people who operated a farm as their principal occupation. Both of these numbers increased during the 10-year census period (1992 to 2002). Sanpete County had 759 active farms with an average size of 471 acres. The number of farm operators in Sanpete County increased during the census period and accounted for nearly 400 jobs in the county. In Sevier County, there were about 300 farm operators and 568 farms.

3.11.6.1 Juab County

In Juab County, the value of agricultural products sold continues to increase, but the amount of land in farms and the average size of farms continue to decrease. In 2002, the market value of agricultural products produced in Juab County was about $22.0 million. Farms averaged 1,146 acres and accounted for 270,350 acres of land in the county.

3.11.6.2 Sanpete County

The economy of Sanpete County has always relied heavily on agriculture. The county is one of the United States' top producers of turkeys and is a Utah leader in sheep production. Sanpete County is also home to a large fish hatchery. Sanpete County ranks as one of Utah's top producers of barley, oats, and alfalfa and is also a producer of cattle, calves, and milk cows. In 2002, the market value of agricultural products produced in Sanpete County was about $93.7 million.

3.11.6.3 Sevier County

Sevier County's historic economic activity has been dominated by agriculture. Cattle, sheep, turkeys, and dairy products are the main outputs of the county's agricultural production. In 2002, the market value of agricultural products produced in Sevier County was over $52.3 million.

3.11.7 Tax Base

Sales tax revenues and property tax revenues are the major sources of funds for all three counties in the study area.

3.11.7.1 Juab County

In 2003, the total gross taxable sales for Juab County were about $99.2 million, down about 5% from 2002 gross taxable sales when taxable sales were at a 5-year high of about $104.5 million. The majority of gross taxable sales comes from retail trade sales. The total assessed property value for the county in 2001 was about $391.2 million.

3.11.7.2 Sanpete County

The assessed property value in Sanpete County was about $671.8 million in 2001. Gross taxable sales in Sanpete County were over $162 million in 2003, which was a 2.5% increase over 2002 and a 5-year high for the county. About 60% of gross taxable sales for Sanpete County come from retail trade sales.

3.11.7.3 Sevier County

The assessed property value in Sevier County for 2001 was about $658.2 million. Gross taxable sales for 2001 for Sevier County were almost $230 million in 2002 (2003 gross taxable sales were not available).

3.11.8 Community Facilities

There are very few community facilities in the study area along or near the proposed project. The only community facilities within 4 miles of the proposed alternatives are in Salina. These facilities include churches, schools, law enforcement facilities, post offices, and a medical facility (see Table 3.11-4 below).

Table 3.11-4. Community Facilities within 4 Miles of the Proposed Alternatives

Facility	Name	Address	City
Church	First Baptist Church	165 South 400 East	Salina
Church	Church of Jesus Christ of Latter-day Saints	87 South 100 East	Salina
Church	Church of Jesus Christ of Latter-day Saints	98 West 400 North	Salina
Church	Church of Jesus Christ of Latter-day Saints	355 West 400 North	Salina
School	Salina Elementary School	210 West 300 North	Salina
School	North Sevier Middle School	135 North 100 West	Salina
School	North Sevier High School	350 West 400 North	Salina
Senior center	Salina Senior Citizens Center	330 W. Main Street	Salina
Law enforcement	Salina Police Department	90 W. Main Street	Salina
Library	Salina City Library	90 W. Main Street	Salina
U.S. post office	Post Office – Salina	35 North 100 East	Salina
U.S. post office	Post Office – Redmond	19 South 100 West	Redmond

3.11.9 Emergency Response

Emergency response to areas near the proposed project is currently being provided by facilities and services in Levan, Gunnison, Salina, Nephi, Manti, and Sigurd. Emergency responders for the study area include fire departments (Salina, Gunnison, and Nephi), ambulance services (Juab and Sevier Counties, Levan, and Gunnison), the Utah Highway Patrol, and police and sheriff's departments (Gunnison, Salina, Juab, and Sanpete and Sevier Counties).

Emergency responders travel to emergencies using SR 28, US 89, and rural roads. All ambulance and law enforcement agencies in the study area are located east of the proposed project. With the exception of the Sigurd Fire Department, which is located south of the southern terminus of the project, all fire departments in the study area are located east and northeast of the proposed project.

3.12 Cultural Resources

3.12.1 Introduction

This section summarizes the Board's process for identifying, evaluating, and assessing historic properties[3] located within the project's area of potential effect (APE)[4] pursuant to Federal laws and regulations. For purpose of this project, the APE consists of a corridor predominantly 160 feet wide with some portions that are 900 feet wide. SEA is overseeing the completion of environmental and historic reviews required to comply with its legislative requirements for historic properties that are eligible for or listed on the National Register of Historic Places (National Register).[5]

3.12.2 Legislative Requirements

The National Historic Preservation Act (NHPA) of 1966, as amended, is the principal Federal law governing the consideration of historic properties. Section 106 of the NHPA requires the Board to consider impacts to National Register eligible or listed historic properties prior to approving a major Federal action or undertaking, while the Section 106 regulations (36 CFR part 800) outline the specific steps the Board must follow to identify, assess, and mitigate any impacts to significant cultural resources as a result of such actions. NEPA and the regulations of the President's Council on Environmental Quality (CEQ) implementing NEPA (see 40 CFR 1500–1508) also require Federal agencies to assess the direct and indirect impacts of a major Federal action on the affected human environment including National Register eligible or listed cultural resources.

In addition to being required by the NHPA and NEPA, the consideration of historic properties for Federal actions that could affect such properties is required by a number of Federal laws, regulations, Executive Orders, and Utah state laws including the American Indian Religious Freedom Act of 1978; the Archaeological and Historic Data Preservation Act of 1974; the Native American Graves Protection and Repatriation Act (NAGPRA); the Archaeological

[3] A historic property is defined as any prehistoric or historic district, site building, structure, or object included or eligible for inclusion in the National Register of Historic Places maintained by the Secretary of the Interior. The term includes artifacts, records, and remains that are related to and located within such properties. It includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meet the National Register criteria [36 CFR Part 800.16(l)(1)].

[4] The area of potential effect (APE) is the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exit. The area of potential effect is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by an undertaking" [36 CFR Part 800.16(d)].

[5] The National Register was established under Section 101 of the NHPA to serve as the nation's formal list of significant cultural resources.

Resources Protection Act (ARPA); and Utah Administrative Code 9-9-401 to 9-9-405. Both NAGPRA and ARPA apply to Federal lands only.

3.12.3 Chronology and Background of Historic Preservation Review Process

In spring of 2003, SEA contacted the Utah State Historic Preservation Office (SHPO), the Bureau of Land Management (BLM), the Bureau of Indian Affairs (BIA), and five Federally recognized tribes (the Paiute Indian Tribe of Utah, the Ute Indian Tribe, the Goshute Indian Tribe, the Skull Valley Band of Goshute Indians, and the Hopi Tribe) by letter to request their initial comments on the proposed project (see Appendix J, Agency and Tribal Consultation). Comments that were received in response to the letters generally acknowledged the potential for significant cultural resources in the project area and requested additional information once resource identification surveys were completed (see Appendix F, Cultural Resource Comments). In an April 13, 2003, letter, the Hopi Tribe stated that the project area contained Hopi ancestral sites and traditional cultural properties.

On May 20, 2003, SEA held a site visit to which the above Federally recognized tribes were invited to attend. Representatives from the Hopi Tribe and Navajo Nation attended the site visit. The Navajo Nation attended the site visit on its own initiative and stated that it had potential ancestral connections to the project area. Tribal representatives from the Paiute Indian Tribe of Utah attended the agency scoping meeting the following day.

SEA conducted archaeological background research and field studies beginning in January 2004. SEA began its investigations with a literature search of existing cultural resources records on file at the SHPO (see Appendix G, Cultural Report). The records reviewed included completed archaeological site forms, field inventory reports, and other archival materials encompassing the APE and a buffer zone to account for potential shifts in the proposed alternatives. The results of the Class I existing data review were included in a report completed by SEA in 2004 (MOAC 2004).

From April to July 2005, SEA completed an intensive pedestrian (walking) survey of the project APE that identified both previously recorded and newly identified cultural resources. The results of the survey were provided in the cultural resources report, *Cultural Resources Inventory of the Central Utah Railroad Project in Sevier, SanPete and Juab Counties, Utah* (MOAC 2006). The report includes a summary of field methods, inventory results, a historic and prehistoric context for the project area, and survey forms completed for each of the sites identified (see Appendix G). Copies of the report were provided to BLM, BIA, SHPO, and the Advisory Council on Historic Preservation (ACHP).

In May 2006, SEA sent letters to the SHPO, the six Federally recognized tribes originally identified in 2005, and six additional Federally recognized tribes: the Southern Ute Tribe of Colorado, the Ute Mountain Ute of Colorado, the White Mesa Ute, the San Juan Southern Paiute of Arizona, the Kaibab Paiute Tribe of Arizona, and the Moapa Band of Paiute Indians of Nevada. The letters summarized the results of the cultural resource studies conducted by

SEA and requested input regarding the National Register eligibility of the identified sites. Letters sent to the tribes were specific in requesting information regarding properties of traditional and cultural significance to the tribes including the potential of the project area to contain burial items.

In its letter to the SHPO, SEA requested the names of potential Section 106 consulting parties that should be invited to participate in the Section 106 process. In response, the SHPO provided the names of recommended consulting parties. Based on the SHPO's recommendations, letters were also sent to a number of organizations including local museums and statewide archaeological societies requesting their participation in the Section 106 review process for the project.[6] No responses have been received from the potential consulting parties recommended by the SHPO. Also, in its letter to SEA, the SHPO requested additional information regarding SEA's preliminary National Register eligibility determinations for some of the identified sites. This requested information was provided to the SHPO in July 2006 in a letter report. In addition, some of the archaeological site forms were updated to reflect the SHPO's National Register eligibility recommendations. Copies of the updated site forms were provided to the SHPO and ACHP.

SEA has received letters from the Hopi Tribe, the Paiute Indian Tribe of Utah (the Koosharem Band and Kanosh Band each responded), and the Kaibab Band of Paiute Indians stating their interest in acting as Section 106 consulting parties throughout the Section 106 and NEPA processes. All three tribes were subsequently provided with a copy of the cultural resources report for their review and comment. The Hopi Tribe responded to SEA's request for input regarding the National Register eligibility determinations of the identified sites and agreed with SEA's preliminary National Register eligibility assessments.

In a letter dated May 30, 2006, SEA notified ACHP that the proposed project will likely adversely affect historic properties within the APE. As part of its next steps, SEA will be developing a Memorandum of Agreement (MOA) in consultation with the SHPO, Federally recognized tribes, the Applicant, and other Section 106 consulting parties, as appropriate. The agreement document would stipulate steps to resolve anticipated adverse effects to historic properties and outline the means and schedule to implement any agreed-on mitigation measures. Additional information regarding proposed measures to mitigate adverse effects to historic properties is included in Section 4.12, Impacts to Cultural Resources.

[6] Letters were sent to the following organizations requesting their participation as Section 106 consulting parties: Western Mining and Railroad Museum, Ramsey Historical Museum, Fremont Indian Park and Museum, Great Basin Museum, Utah Historical Trails Consortium, Utah Statewide Archaeological Society, and Utah Professional Archaeological Association. To date, none of these organizations have indicated their interest in participating as Section 106 consulting parties.

3.12.4 Prehistoric Context

3.12.4.1 Paleoindian Period

The Paleoindian period in the continental United States extends from the end of the Pleistocene Epoch (about 11,000 BC) to the early Holocene Epoch (7500 BC). In Utah, three Paleoindian complexes are recognized: Clovis (about 11,500–11,000 BC), Folsom (about 11,000–10,000 BC), and Plano (about 10,000–7500 BC). Despite minor differences in tool kits and tool-manufacturing technology, the three complexes share a variety of traits including big-game hunting, low population densities, and wide spatial distributions. Chronologically, Paleoindians were contemporaries with extinct megafauna, and evidence outside the study area shows the early human dependency on megafauna such as mammoths and giant sloths (Spangler 1995).

Utah Clovis sites were generally surface sites commonly interpreted as temporary camps. Diagnostic cultural materials attributed to the Clovis complex have been found in sand dunes along the Sevier River, including a lithic (artifact) scatter containing a Clovis projectile point (Copeland and Fike 1988). In western Utah, the Hell'n Moriah Clovis site, a single component retooling station, yielded seven Clovis fluted projectile points, flaked tools, and lithic debitage (waste materials produced during the manufacture of stone tools) (Davis and others 1994). More recently, an early Paleoindian lithic procurement locality was investigated from an obsidian source in the Mineral Mountains (Montgomery and others 2001).

The distribution of Folsom sites in Utah is very similar to that of the Clovis period distribution (Schroedl 1991). The Plano tradition, which incorporates several early Holocene Paleoindian complexes, dates from 8300 BC to about 7800 BC.

3.12.4.2 Archaic Period

The material culture of the Archaic period includes projectile points smaller than those found at Paleoindian sites, an increased frequency of ground stone implements, perishables (baskets, sandals, split-twig figurines), and pit structure architecture (Horn and others 1994). The warmer, drier environment following the Paleoindian period resulted in a change from the big-game subsistence pattern of the Paleoindian to a small-game hunting, seed-gathering, and nut-gathering subsistence pattern (Cordell 1984). Tipps (1988) believes that Archaic peoples "followed an annual round in response to changing resource availability, living in small, kin-related groups throughout most of the year."

Toward the end of the Archaic period, the hunter-gatherer tradition was gradually incorporated into supplemental agricultural subsistence (BLM 1982). Evidence of agriculture exists in southern and southeastern Utah, dated to early Anasazi cultures around 1000 BC (BLM 1982). Archaic sites are common in the area and are managed by the BLM Richfield or Fillmore Field Offices. A few places in the area that were inhospitable to later Formative occupation seemed to favor earlier Archaic use.

3.12.4.3 Formative Period

Sometime between AD 1 and AD 400, the Formative cultures emerged on the northern Colorado Plateau and in portions of the Great Basin. Maize, ceramics, and the bow and arrow were adopted in different spatiotemporal patterns (Madsen and Simms 1998, 260). Formative cultures led a more sedentary life than did their Archaic predecessors. Consequently, Formative cultures resulted in more-permanent settlements and the associated collection of cultural resources in a given area. By AD 700, a ceramic tradition is well-presented at hundreds of sites attributed to the Fremont complex in central Utah.

Evidence of the Anasazi is limited to areas east of Capitol Reef National Park, and it does not extend much farther north than the Henry Mountains area. Archaeological evidence of the Fremont people is generally found north of the Puebloan areas throughout much of central and eastern Utah. Archaeological evidence from north of the Henry Mountains area contains evidence of the Fremont and Puebloan cultures.

3.12.4.4 Late Prehistoric/Protohistoric Period

Following the disappearance of the Fremont from the archaeological record, a largely nomadic hunting and gathering economic strategy resumed. Numic-speaking Southern Paiute and Ute groups were present throughout much of Utah upon the arrival of Europeans. These cultures relied on late Archaic hunting-gathering traditions rather than the agriculturally augmented Formative subsistence patterns. Although the name Paiute was originally applied only to the Southern Paiute, it was extended to additional groups as the exploration of the Great Basin proceeded. Linguistic evidence suggests that a wavelike spread of Numic peoples advanced to the north and east across the Great Basin from a southeastern California homeland in or near the Owens Valley roughly 1,000 years ago (Bettinger and Baumhoff 1982).

Numic occupation in the study area is evidenced by Desert Side-notched projectile points, Southern Paiute Utility Ware ceramics, and distinct perishables. In the vicinity of the study area, several radiocarbon dates have been obtained from Late Prehistoric occupations in Clear Creek Canyon. The North Cedars Cave contained numerous brownware sherds, or pieces of ceramic (in mixed deposits) and yielded dates of AD 1400s and 1600s (Janetski and others 2000).

3.12.5 Historic Context

Occupying the study area at the time of European-American arrival were the Pah Vent (or Pahvant) Utes. According to Steward (1938, 227), the traditional territory of the Pah Vent Utes stretched from “the deserts surrounding Sevier Lake west of the Wasatch Mountains nearly to the Nevada border.” Known villages were located near the modern communities of Kanosh, Deseret, Black Rock, Holden, Lynndyl, and Scipio. The first documented Europeans in Utah arrived in 1776–1777, led by the Spanish Catholic Fathers Dominguez and Escalante.

Trappers, explorers, and emigrants passing through to the Pacific coast followed them. Between the early 1830s and the late 1840s, users of what is now known as the Old Spanish Trail navigated numerous routes, many of which cross parts of the BLM Richfield and Fillmore Field Office jurisdictions (NPS 2005). European settlement of the study area ranged from 1848 in Sanpete County to the 1880s in Wayne County and was predominantly accomplished by Mormon pioneers. There were about 500 Pah Vent Utes when the Mormons arrived in the 1860s to build Cove Fort (Van Cott 1997). Mormon pioneers noted the presence of Indian corn cultivation along a nearby creek bed, which indicated that these Utes practiced maize horticulture to some extent.

A gold and silver boom in the Tushar Mountains in the 1890s and early 20th century spawned several small towns in Piute County. When the mines were no longer productive, the population boom reversed itself. Later, lead, zinc, alunite, and uranium were mined. Over the years, ranching has been continued as a use of public lands.

3.12.6 Historic Properties Identified

A total of 55 historic and prehistoric properties were identified within the APE for the project encompassing both Alternatives B and C (see Appendix G). All cultural resources identified within the APE were evaluated for eligibility for listing on the National Register in consultation with the SHPO and Federally recognized tribes as previously noted. SEA has subsequently determined that 36 properties meet the National Register eligibility criteria. Table 3.12-1 below summarizes the results of the cultural resources inventory survey completed for the project (MOAC 2005). For a detailed review of the cultural resources identified in the project area, see the cultural resources report, *Cultural Resources Inventory of the Central Utah Railroad Project in Sevier, SanPete and Juab Counties, Utah* (MOAC 2005), attached as Appendix G.

Criteria for evaluating the significance of resources for listing on the National Register are outlined in 36 CFR 800.10, National Register Criteria, and in handbooks that describe the National Register evaluation process. Four criteria are used to evaluate the significance of properties—Criterion A through Criterion D. Under all the criteria, the quality of significance is considered present in sites that possess integrity of location, design, setting, materials, workmanship, feeling, and association. However, quality of significance also serves to differentiate the criteria.[7]

[7] Criterion A: The quality of significance is present in sites that are associated with events that have made a significant contribution to the broad patterns of our history. Criterion B: The quality of significance is present in sites that are associated with the lives of persons significant in our past. Criterion C: The quality of significance is present in sites that embody the distinctive characteristics of a type, period, or method of construction, or 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. Criterion D: The quality of significance is present in sites that have yielded, or may be likely to yield, information important in prehistory or history.

Table 3.12-1. Historic Properties Identified within the Project Area

Site Number	Site Age/Type	Description	NRHP Eligibility and Criterion	Site Location	Comments
42Sv2342 Addendum	Historic – Rocky Ford Canal	15.6-mile earthen canal	Eligible – A	Crosses Alternatives B and C	Previously recorded in 1994, built in 1872, still in use; located on private land.
42Sv2343 Addendum	Historic – Vermillion Canal	24.2-mile earthen canal	Eligible – A	Crosses Alternatives B and C	Previously recorded in 1994, built around 1878; located on private land.
42Sv2344 Addendum	Historic – Piute Canal segment	36-mile earthen canal	Eligible – A	Crosses Alternative C	Previously recorded, built around 1910.
42Sv2502 Addendum	Historic – Former Denver & Rio Grande Western Railroad	Rail bed only as tracks removed 1987–1988	Eligible – A	Crosses Alternatives B and C	Previously recorded; located on private land.
42Sv2737	Prehistoric – LIthic scatter	Small, low-density lithic scatter on a slope	Not Eligible	Within APE of load-out facility area	Lithic material testing location; located on private land.
42Sv2738	Historic – Farmstead	Consists of 2 single-room structures, roads, fences, 2 corrals	Eligible – D	Within APE of Alternative B	Historic artifacts scattered throughout the site; located on private and state land.
42Sv2739	Prehistoric – Lithic scatter	Small, dispersed lithic scatter in plowed field	Eligible – D	Within APE of Alternative B	Artifacts include lithic debitage, 2 cores, 1 mano; located on private land.
42Sv2740	Historic – Corral	Large corral with numerous enclosures	Not Eligible	Within APE of Alternative B	Much of the structure disassembled; located on private land.
42Sv2741	Historic – Hay derrick	Partially collapsed, 11.75 feet tall	Not Eligible	Within APE of Alternative B	No associated artifacts.
42Sv2742	Historic – Hay derrick	Intact, 22.8 feet tall	Eligible – C	Within APE of Alternative B	No associated artifacts.
42Sv2743	Historic – Corral	Large corral and fence	Not Eligible	Within APE of Alternative B	Also includes collapsed wood shelter; located on private land.
42Sv2744	Historic – Little ditch	2- to 3-foot-wide earthen ditch	Not Eligible	Within APE of Alternative B	Merges with Rocky Ford Canal; located on private land.
42Sv2746	Prehistoric – Lithic scatter	Low-density scatter on a small ridge	Not Eligible	Within APE of Alternatives B and C	Artifacts include debitage and hammerstone; located on private land.
42Sv2747	Historic – Farmstead	Collapsed wood and brick structure with associated features	Eligible – D	Within APE of Alternatives B and C	Artifacts include a plow that could date to mid-1800s; located on private land.
42Sv2748	Historic – Farm equipment	Concentration of abandoned farm equipment	Not Eligible	Within APE of Alternative C	Equipment could date to early 1900s; located on private land.
42Sv2749	Prehistoric – LIthic scatter	Low-density scatter on a gentle slope	Not Eligible	Within APE of Alternative C	Artifacts include 12 pieces of debitage; located on state land.
42Sv2750	Prehistoric – Lithic scatter	Small scatter on Sevier Valley floor	Not Eligible	Within APE of Alternative C	Artifacts include 3 bifaces/ fragments; located on state land.
42Sv2751	Prehistoric – Lithic scatter	Low-density scatter on a low ridge	Not Eligible	Within APE of Alternative C	Artifacts include debitage and several bifaces; located on BLM land.

Site Number	Site Age/Type	Description	NRHP Eligibility and Criterion	Site Location	Comments
42Sv2752	Historic – Trash scatter	Historic trash dump	Not Eligible	Within APE of Alternative C	Artifacts date to early 1900s; located on BLM land.
42Sp18 Addendum	Prehistoric – Temporary camp	High-density lithic scatter	Eligible – D	Within APE of Alternative B	Originally recorded in 1975, re-recorded as 42SP211 in 1989; located on state and private land.
42Sp19 Addendum	Prehistoric – Temporary camp	High-density dispersed scatter on a ridge	Eligible – D	Within APE of Alternative B	Originally recorded in 1975. Material testing and processing area; located on state and private land.
42Sp213 Addendum	Prehistoric – Temporary camp	Large, dispersed lithic scatter	Eligible – D	Within APE of Alternative B	Originally recorded in 1989. Archaic and Formative period artifacts found on site. Heavily looted; located on state and private land.
42Sp570	Prehistoric – Lithic scatter	Medium-density scatter on a low ridge	Eligible – D	Within APE of Alternative B	Artifacts include debitage, 7 bifaces, 2 cores; located on private land.
42Sp571	Prehistoric – Lithic scatter	Small scatter on low ridge	Eligible – D	Within APE of Alternative B	Site shows signs of core-reduction activities; located on private land.
42Sp572	Historic – Piute Canal segment	Historic earthen dam	Eligible – A and D	Within APE of Alternatives B and C	36 miles long. Extension of Sevier River Canal; state, BLM, and private land; note different portions previously recorded under 42Sv2344; located on state, BLM, and private land.
42Sp573	Prehistoric – Lithic scatter	Small scatter on gentle, south-facing slope	Eligible – D	Within APE of Alternatives B and C	Apparent material testing area; located on private land.
42Sp575	Historic – Trash scatter	Large dispersed trash scatter	Not Eligible	Within APE of Alternatives B and C	Appears to represent multiple dumping episodes; located on private land.
42Sp579	Historic – Trash scatter	Small. dispersed scatter adjacent to a road	Not Eligible	Within APE of Alternatives B and C	Artifacts date to early to mid-1900s; located on state land.
42Sp580	Historic – Trash scatter	Low-density can scatter	Not Eligible	Within APE of Alternatives B and C	Appears to date to post-1920; located on state and private land.
42Sp581	Prehistoric – Lithic scatter	Small scatter on an east/southeast-facing slope	Not Eligible	Within APE of Alternatives B and C	Artifacts include lithic debitage, a core, and a biface fragment; located on private land.
42Sp582	Historic – Powerline poles	Series of collapsed or dismantled poles	Not Eligible	Within APE of Alternatives B and C	Probably provided power to small towns in Sevier Valley; located on state and private land.
42Sp583	Historic – Trash scatter	Small, isolated scatter	Not Eligible	Within APE of Alternatives B and C	Artifacts could date to 1930–1950; located on private land.
42Sp584	Prehistoric – Lithic scatter	Large, dispersed scatter	Eligible – D	Within APE of Alternative B	Artifacts suggest Archaic or Fremont cultural affiliation; located on state land.

Site Number	Site Age/Type	Description	NRHP Eligibility and Criterion	Site Location	Comments
42Sp585	Prehistoric – Temporary camp	Large, dispersed scatter on top and slopes of a low ridge	Eligible – D	Within APE of Alternative B	Contains 2 artifact concentrations and 3 fire-related features; located on state land.
42Sp586	Prehistoric – Temporary camp	Small camp on slopes of a small ridge	Eligible – D	Within APE of Alternative B	Site contains a hearth feature; located on state land.
42Sp587	Prehistoric – Temporary camp	High-density scatter on small ridge	Eligible – D	Within Alternative B	Presence of 2 Elko Series projectile points suggests Archaic or Fremont affiliation; located on state land.
42Sp588	Prehistoric – Lithic scatter	Medium-sized dispersed scatter on eastern slope of a ridge	Eligible – D	Within Alternative B	Fire-cracked rock scattered throughout the site; located on state land.
42Sp589	Prehistoric – Temporary camp	Dispersed scatter on a knoll	Eligible – D	Within Alternative B	Presence of Rose Spring Series projectile point suggests Late Prehistoric affiliation; located on state land.
42Sp590	Prehistoric – Temporary camp	On eastern slope of a low knoll	Eligible – D	Within Alternative B	Site contains lithic scatter, 2 cores, groundstone and biface fragments, and a hearth feature; located on state land.
42Sp591	Prehistoric – Temporary camp	Large scatter on ridge top and slopes	Eligible – D	Within Alternative B	Site contains numerous tools, debitage, and 2 hearth features; located on state land.
42Sp592	Prehistoric – Lithic scatter	High-density scatter on top and slopes of a knoll	Eligible – D	Within Alternative B	Site contains numerous cores, bifaces, and an Archaic projectile point; located on state and private land.
42Sp593	Prehistoric – Lithic scatter	Small scatter on eastern slope of a low knoll	Eligible – D	Within Alternative B	Site exhibits potential for additional buried materials; located on private land.
42Sp594	Prehistoric – Habitation AREA	Large, dispersed lithic scatter with tools and 2 rock alignments	Eligible – D	Within Alternative B	Presence of Rose Spring Series projectile point suggests Late Prehistoric affiliation; located on state land.
42Sp595	Prehistoric – Camp; and Historic – Trash site	Artifact scatter on top and slopes of a low ridge	Eligible – D	Within Alternative B	Very large lithic scatter with numerous tools, possible features; located on state land.
42Sp596	Prehistoric – Lithic scatter	Moderately dense scatter on a knoll	Eligible – D	Within Alternative B	Artifacts include lithic debitage, 7 tools; located on state land.
42Sp597	Prehistoric – Lithic scatter; Historic – Trash site	Dual-component dispersed site	Eligible – D	Within Alternative B	Artifacts include debitage and tools; located on BLM land.
42Sp598	Prehistoric – Lithic scatter	Sparse scatter on westward ridge slope	Eligible – D	Within Alternative B	Site contains debitage, tools, and 2 hearth features; located on BLM land.
42Sp603	Prehistoric – Lithic scatter	Low-density scatter on low ridge	Not Eligible	Within Alternative C	Consists of 2 loci, no diagnostics; located on BLM land.

Site Number	Site Age/Type	Description	NRHP Eligibility and Criterion	Site Location	Comments
42Sp604	Prehistoric – Lithic scatter	Medium-density scatter on a very low ridge	Eligible – C	Within Alternative C	Artifacts include debitage and bifacial tools; located on BLM land.
42JB1041 Addendum	Historic – Union Pacific Railroad	Two tracks and remains of 2 stockyard buildings	Eligible – A, D	Within Alternative B	Referred to as Track 106, Station 133, crossing #806-789T; located on private land.
42JB1396	Prehistoric – Lithic scatter	Large, dispersed scatter in pasture	Eligible – D	Within Alternative B	Artifacts include debitage, bifaces; small point fragment.
42JB1397	Prehistoric – Lithic scatter	High-density scatter in a pasture	Eligible – D	Within Alternative B	Artifacts include debitage, 5 bifaces; 1 core.
42JB1398	Prehistoric – Lithic scatter	Small scatter in a pasture	Not eligible	Within Alternative B	Artifacts include debitage and portable slab metate.
42JB1399	Prehistoric – Lithic scatter	Low-density scatter on relatively flat terrain	Eligible – D	Within Alternative B	Artifacts include debitage, 3 tools, fire-cracked rock, and a Rose Spring series projectile point.
42JB1400	Prehistoric – Lithic scatter	Large dispersed scatter on a knoll	Eligible – D	Within Alternative B	Artifacts include debitage, tools, fire-cracked rock. Elko and Pinto Series projectile points suggest Archaic affiliation.

3.13 Environmental Justice

3.13.1 Background

Environmental justice addresses equity in all Federally funded programs and activities in compliance with Title VI of the 1964 Civil Rights Act and Executive Order 12898, Federal Actions To Address Environmental Justice in Minority and Low-Income Populations. The Board has not issued rules or guidance that specifically address environmental justice. For this EIS, guidance from other Federal agencies including the U.S. Department of Transportation (USDOT), the Council on Environmental Quality, and the Federal Highway Administration has been used.

Environmental justice guidelines for public outreach do not require that more public outreach be conducted for low-income and minority populations than for other populations. Rather, these guidelines require that the public outreach process be designed with attention given to some of the particular obstacles that environmental justice communities might face. Multilingual advertisements and presentation materials, diverse means of outreach and publicity, and careful selection of public hearing times and locations are all elements of such an approach.

SEA took steps to ensure that public outreach was conducted so that minority and low-income communities were informed about the proposed project and were able to voice any concerns and requests regarding the environmental review process. These procedures are summarized in Section 1.8.1, Public Participation.

Definitions. *Environmental justice* is a term used to describe the fair and equitable treatment of minority[8] and low-income[9] people with regard to all Federally funded projects. Fair treatment means that no minority or low-income population should be forced to bear a disproportionately high share of negative environmental effects. Fair treatment also includes meaningful involvement and opportunities for minority and low-income people to participate in the decision-making process.

Study Area. The proposed project would travel through portions of Juab, Sanpete, and Sevier Counties. The social study area includes the actual alternatives, land adjacent to the alternatives, and any populations in these counties that might be affected by the proposed project. The proposed alternatives would not enter any city limits (one or more alternatives would pass within 1,100 feet of the Salina city limits and within 2,900 feet of the Redmond city limits). However, Salina and Redmond city data were included for the purpose of examining existing conditions regarding the truck traffic currently affecting these communities. This section provides a summary of the environmental justice communities in the social study area.

Census Block Data. For this analysis, the 2000 U.S. census data were used as a starting point to gain a general understanding of the minority and low-income populations in the social study area. Additional sources of information were used to supplement census data because census block groups are relatively large (the entire project crosses through only four census blocks), census information was likely collected in 1998 and 1999, and the proposed project would be primarily located in non-populated areas. Additional sources of information included public meetings, community coordination, local school data, housing authority information, and discussions with local agency officials. See the *CURP DEIS Agency and Public Scoping Summary Report* for details about the project's public involvement efforts (HDR 2004).

Figure 3-14, Environmental Justice, shows the location of the census block groups in the study area.

[8] FHWA and USDOT define a minority as a person belonging to one of the following five groups: Black, Hispanic, Asian, American Indian or Alaskan Native, or Native Hawaiian or other Pacific Islander (USDOT 1998).

[9] FHWA and USDOT define a low-income person as having a household or median income below the poverty thresholds defined by the U.S. Department of Health and Human Services. For 1999 (the year that census data were collected), the poverty threshold was $16,700 per year for a family of four and $8,240 per year for a single person (USDOT 1998).

3.13.2 Minority Populations

Table 3.13-1 presents information on the racial and ethnic populations, as well as low-income populations, in the study area using 2000 U.S. census data for the state, counties, cities, and census tracts. The study area is predominantly made up of Caucasian, non-Hispanic persons. All the areas that were evaluated have percentages of racial minorities and ethnic or Hispanic persons that are lower than the percentages for Utah overall.

Table 3.13-1. Minority and Low-Income Populations in Utah and the Study Area

Area	Total Population	Caucasian	Racial Minorities	Ethnic Minorities	Persons below Poverty Level
State					
Utah	2,233,169	89.2%	10.8%	9.0%	9.4%
County					
Juab County	8,489	96.6%	3.4%	2.6%	10.4%
Sanpete County	23,376	92.4%	7.6%	6.6%	15.9%
Sevier County	18,961	95.6%	4.4%	2.6%	10.8%
City/Town					
Salina	2,393	96.7%	1.5%	2.8%	13.8%
Redmond	788	98.2%	0.2%	1.9%	12.3%
Census Tract					
102 (Juab County)	3,383	96.0%	4.0%	2.9%	11.2%
9723 (Sanpete County)	4,139	89.8%	10.3%	7.6%	14.9%
9725 (Sanpete County)	4,144	89.5%	10.5%	2.8%	11.3%
9751 (Sevier County)	4,562	97.4%	2.6%	2.1%	10.5%

Source: U.S. Census Bureau 2000, Summary File 3

Minority Students. To verify the information indicated by the census data, SEA obtained information about minority students in the Sevier County School District. Three schools in this district draw students from the study area (see Table 3.13-2).

Table 3.13-2. Minority and Low-Income Students in Utah and the Study Area

School (Area)	Racial Minority Students	Ethnic Minority Students	Students Eligible for Free or Reduced-Price Lunch
Utah (state average)	1.07%	10.44%	34.24%
North Sevier High (Salina)	0.91%	1.52%	30.30%
North Sevier Middle (Salina)	1.19%	0.40%	39.29%
Salina Elementary School (Salina)	1.75%	2.62%	46.07%
Three-school average	**1.28%**	**1.51%**	**38.55%**

Source: National Center for Education Statistics 2005

Two of the schools have percentages of racial minorities that are slightly higher than the Utah state average (North Sevier Middle and Salina Elementary School have three and seven racial minority students, respectively). All three schools have percentages of ethnic minorities that are lower than the Utah state average.

Summary of Minority Populations. There are few minority populations present in the study area. However, all the areas that were evaluated have percentages of racial minorities and ethnic or Hispanic persons that are lower than the percentages for Utah overall.

3.13.3 Low-Income Populations

Table 3.13-1 above, Minority and Low-Income Populations in Utah and the Study Area, presents information on low-income populations in the study area according to the 2000 U.S. census data for state, county, city, and census tracts. All the areas that were evaluated have greater percentages of households below the poverty level than for Utah overall.

Low-Income Students. To verify the information indicated by the census data, SEA obtained information about low-income students in the Sevier County School District. Three schools in this district draw students from the study area. Students are eligible for reduced-price lunch when their parents' income is 185% or less of the U.S. Department of Health and Human Services poverty guidelines, and they are eligible for free lunch when their parents' income is 130% or less of these guidelines.

Two of the schools have percentages of students eligible for free or reduced-price lunch that are higher than the percentage for Utah overall. This is consistent with census data that indicated higher percentages of persons under poverty level in the study area than for Utah overall.

Low-Income Housing. To further define low-income communities in the study area, SEA examined several resources including data from the U.S. Department of Housing and Urban Development. This agency reports that there are no low-income housing developments or subsidized apartments in the study area (HUD 2006).

Summary of Low-Income Populations. The study area contains low-income populations. These populations are primarily located within the city limits in portions of Juab, Sanpete, and Sevier Counties.

3.13.4 Vulnerable Age Groups

Although children (age 18 and under) and senior citizens (age 65 and over) are not specifically defined as environmental justice populations in Title VI and Executive Order 12898, they are considered vulnerable age groups. According to the census data, all of the counties and cities (Salina, Redmond, and Aurora) in the study area have percentages of senior citizens that are higher than the percentage for Utah overall, and there is one senior citizen center in the study area in Salina (see Figure 3-14, Environmental Justice).

3.14 Recreation

3.14.1 Background

This section discusses recreation resources along the proposed alternatives. The study area for recreation resources includes any recreation areas and recreation access points within 500 feet of the proposed alternatives (see Figure 3-15, Recreation). Recreation activities in the study area include off-highway vehicle (OHV) use, camping, fishing, hiking, horseback riding, hunting, and boating. On BLM-administered land, camping, backpacking, sightseeing, and OHV use are the most common recreational uses (BLM 1987).

3.14.2 Recreation Resources

3.14.2.1 BLM Recreation

Although there is BLM-administered land west of the proposed alternatives through most of the study area, only a small portion of the proposed alternatives actually passes through BLM-administered land. BLM lands are designated multiple use, with recreation being one of several designated multiple uses. Recreation uses include hiking, camping, and OHV use.

Two BLM field offices oversee the BLM-administered lands in the study area. The Richfield Field Office has not designated any Special Recreation Management Areas, but the Fillmore Field Office has designated the Sevier Bridge Reservoir as a Special Recreation Management Area (BLM 1987).

3.14.2.2 Paiute ATV Trail System

The Paiute all-terrain vehicle (ATV) trail system is located in Sevier, Piute, Beaver, and Millard Counties. Its network of trails crosses mountain ranges, canyons, and deserts and links the local communities with public lands and national forests. The Paiute trail system receives approximately 70,000 visitors a year and is a major recreational attraction and investment for the local communities (Utah.com 2005). This trail is primarily south of Salina, but the northern part of the trail is near the project's southern terminus.

3.14.2.3 Chicken Creek Reservoir

Chicken Creek Reservoir is located near the northern terminus of the study area and is a popular spot for bird watching. The proposed project would be about 0.5 mile north of Chicken Creek Reservoir (see Figure 3-15, Recreation).

3.14.2.4 Yuba Lake Recreation Area and Sevier Bridge Reservoir

The Sevier Bridge Reservoir is located between the Valley Mountains and the San Pitch Mountains between Gunnison and I-15. The Sevier Bridge Reservoir is privately owned by multiple irrigation companies and is primarily used for irrigation. The primary use of the

water is for irrigation with recreational use of the reservoir as a secondary use (Utah Division of Water Quality 1993).

The Sevier Bridge Reservoir is also known as Yuba Lake. Yuba Lake Recreation Area is located near the Sevier Bridge Reservoir dam, and the recreation area and lake are popular recreation sites for outdoor enthusiasts. About 150,000 visitors use the Sevier Bridge Reservoir area every year (BLM 2004). Due to dam repair and low water levels during the past 8 years, visitation had dropped. Visitation began to increase between 2002 and 2004 with 2004 having 138,233 visitors (Finger 2006).

Activities include boating, camping, OHV use, fishing, and waterfowl hunting (during the designated hunting season). The recreation area has many public-use beaches, boat ramps, and campgrounds including Oasis Campground, Eagle View Campground, and Painted Rocks Campground (Utah Division of Parks and Recreation 2005). Oasis Campground is located northwest of Scipio. Eagle View and Painted Rocks Campgrounds are located on the east side of the Sevier Bridge Reservoir near Fayette along SR 28.

The reservoir is accessible from many points on SR 28 north of Gunnison as well as from the old US 91 north of Scipio. Northern accesses to the reservoir are preferred because the south end of the reservoir is often shallow or dry.

The study area parallels the Sevier Bridge Reservoir on the east side for about 2 miles, then crosses the reservoir at a point called Yuba Narrows and parallels the reservoir on the west side for about 3 miles. The proposed project would cross the access road to Painted Rocks Campground about 200 yards east of the campground entrance.

For more information on existing noise levels near the Sevier Bridge Reservoir, see Section 3.9, Noise.

3.14.2.5 Sevier River

The Sevier Bridge Reservoir is an impoundment of the Sevier River. On the north side of the reservoir, the Sevier River is west of the proposed alternatives, but south of the reservoir the Sevier River is east of the proposed alternatives. The river is used for fishing and recreation. Several private and public hunting areas are located along the river, including the Sanpete Fish and Game Club hunting area.

3.14.2.6 Redmond Lake

Redmond Lake is located just south of Red Knolls about 0.25 mile southwest of Redmond near the southern terminus of the proposed project. The lake is used for irrigation, fishing, and boating, although the shallow, muddy water does not support extensive recreation. The Redmond WMA is located south of Redmond Lake. The management area is 567 acres of marshes, open water, and wet meadows. The management area allows bird watching and

waterfowl hunting and is accessed by foot only (Utah Division of Wildlife Resources, no date; Utah Division of Parks and Recreation 2001).

3.15 Aesthetics

3.15.1 Visual Resources

The scenic quality of an area depends on its visual resources—the physical features that make up the visible landscape including land, water, vegetation, and human-made features such as buildings, roadways, railways, and structures.

The study area for the visual resources analysis includes the proposed alternatives and the viewshed of the alternatives. The viewshed is defined as all areas from which physical changes associated with the proposed alternatives could be seen. The viewshed is influenced by existing topography, vegetation, and structures. Within the study area, viewer groups consist of residents of the towns of Fayette, Gunnison, Centerfield, Redmond, and Salina and people engaging in farming and recreation activities on public or private lands.

3.15.2 Conformance with BLM Visual Resource Management Program

Because parts of the proposed project would cross BLM-administered land, the visual quality assessment is based on BLM's Visual Resource Management (VRM) program. According to the current revision of the Richfield Resource Management Plan (BLM 2005), BLM has two VRM class designations for the visual study area: primarily Class IV with some Class III. The objective of Class III is to partially retain the existing character of the landscape, while the objective of Class IV is to allow major modifications to the character of the landscape (see Figure 3-16, Visual Resource Management).

3.15.3 Visual Characteristics

The landscape was inventoried for existing foreground, middle ground, and background views. Several critical views, called key observation points (KOPs), were selected to represent different types of views. Eleven KOPs in the study area were chosen to represent the visual resources of the area as shown in Figure 3-16, Visual Resource Management, and discussed in detail in Appendix I, Visual Resource Management.

The proposed project would extend northward from the Salina area up the Sevier River Valley to the southern reaches of the Juab Valley near Levan. The Sevier Valley is generally a broad, flat-to-rolling area that is divided by the Sevier River and its flanking alluvial terraces. The valley is generally bounded by the Pahvant Range and Valley Mountains to the west and the San Pitch Mountains to the east. A large portion of the valley floor supports farms that rely on an irrigation system composed of an extensive canal and ditch network.

Foreground and middle ground views in the study area largely consist of pasturelands and irrigated crops, while background views are largely dominated by the Pahvant Range, Valley Mountains, and San Pitch Mountains. Existing roadways, rail lines, utility rights-of-way (power lines), canals, and recreational infrastructure (campground and parking lots) contribute to the visual character of the study area.

3.15.4 Wild and Scenic Rivers

The Wild and Scenic Rivers Act of 1968 is designed to preserve free-flowing rivers with special values in their natural condition for the use and enjoyment of the public. The Act states that "in all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic, and recreational river areas…" (Wild and Scenic Rivers Act, Section 5(d)(1)).

As part of the current revision of the Richfield Resource Management Plan, the BLM Richfield Field Office performed a preliminary review of eligible rivers and streams and documented the findings in the *Wild and Scenic River Preliminary Eligibility and Tentative Classification Report* (BLM 2005). As described in the report, there are no potentially eligible wild, scenic, or recreational river segments in the study area.

The current Fillmore Field Office Resource Management Plan does not address wild and scenic river considerations (BLM 1987).

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Figure 3-1. Land Transportation Network

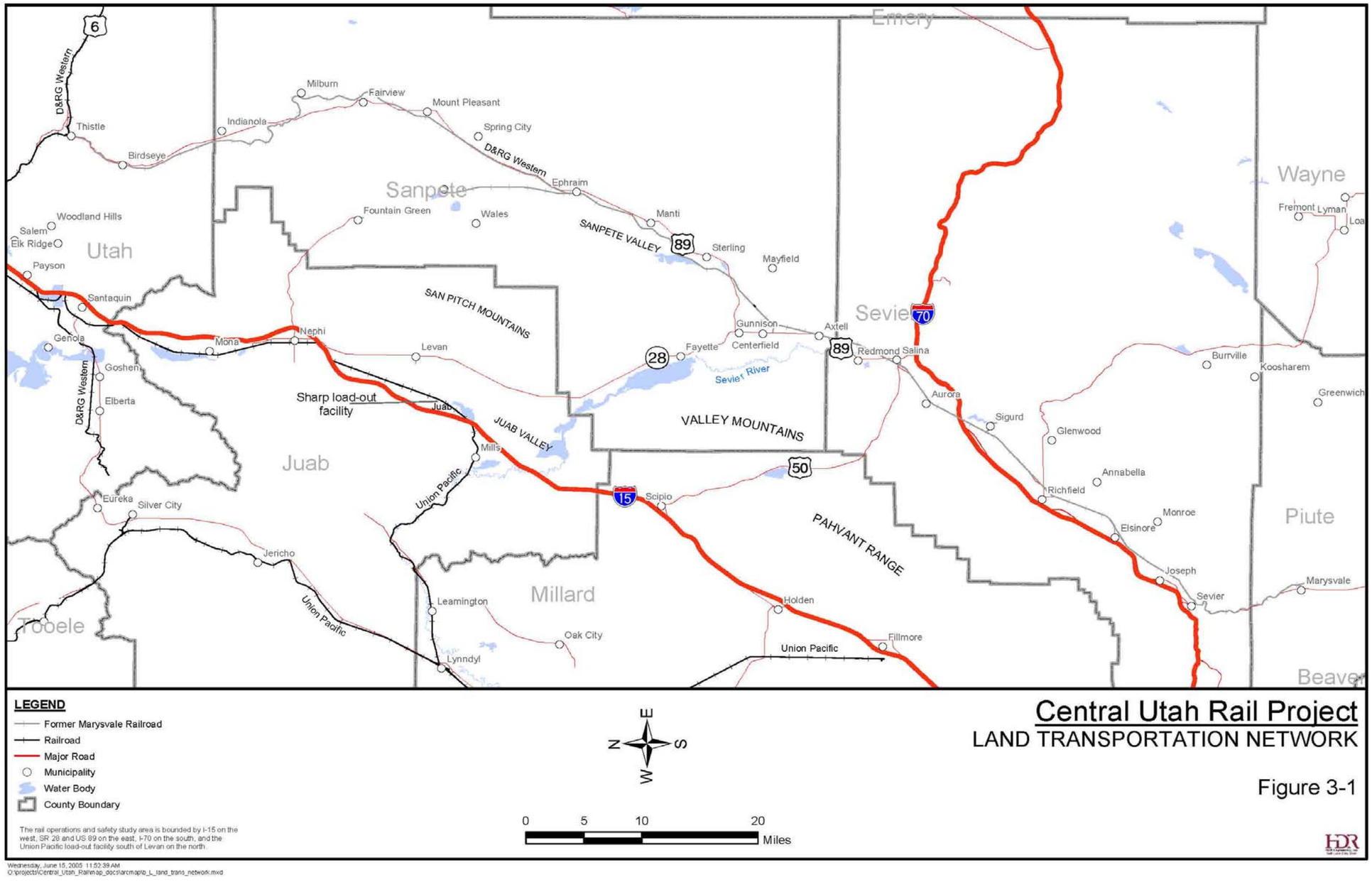


Figure 3-2. Land Ownership

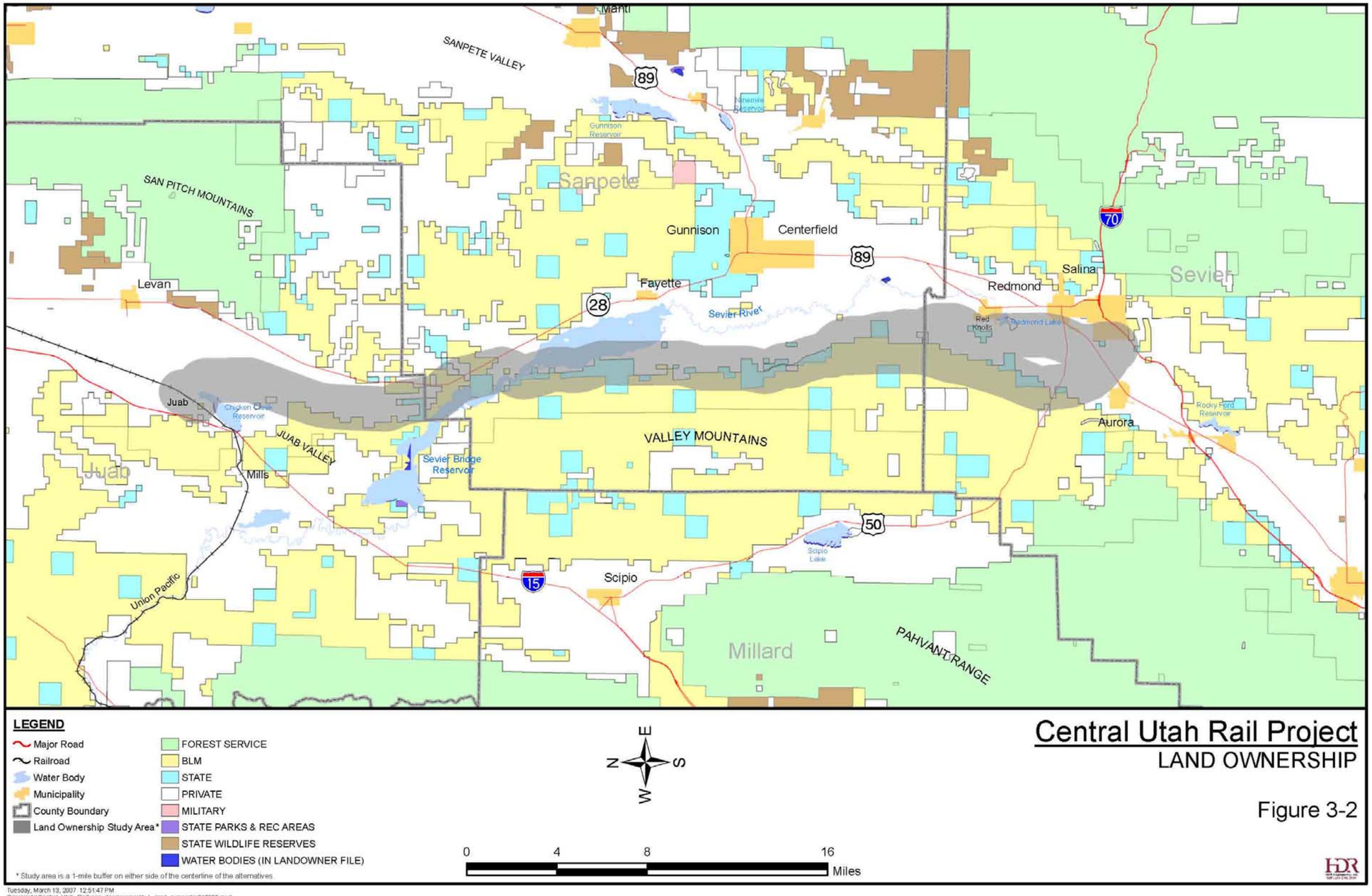


Figure 3-3. Grazing Allotments

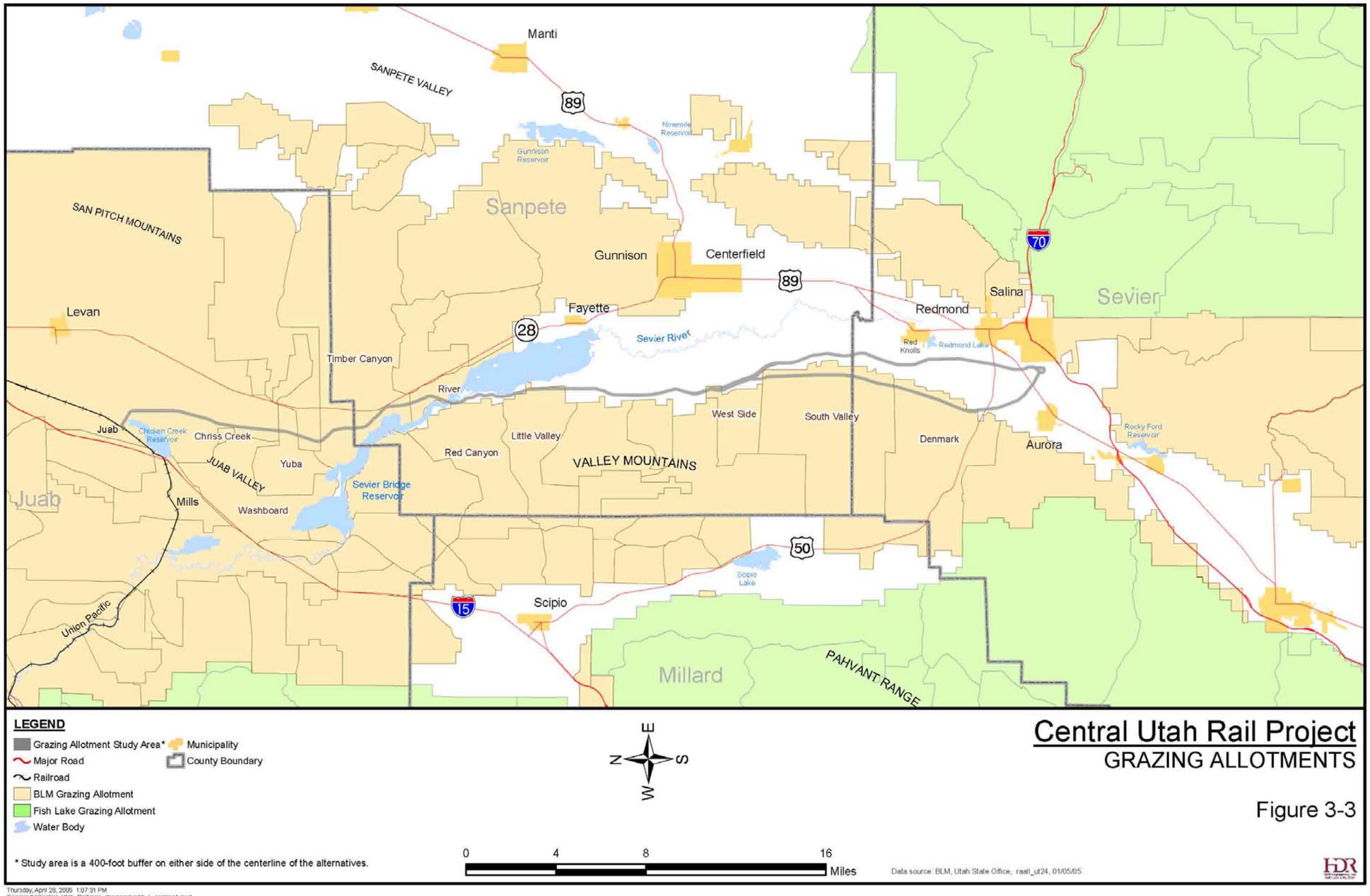


Figure 3-4. Vegetation

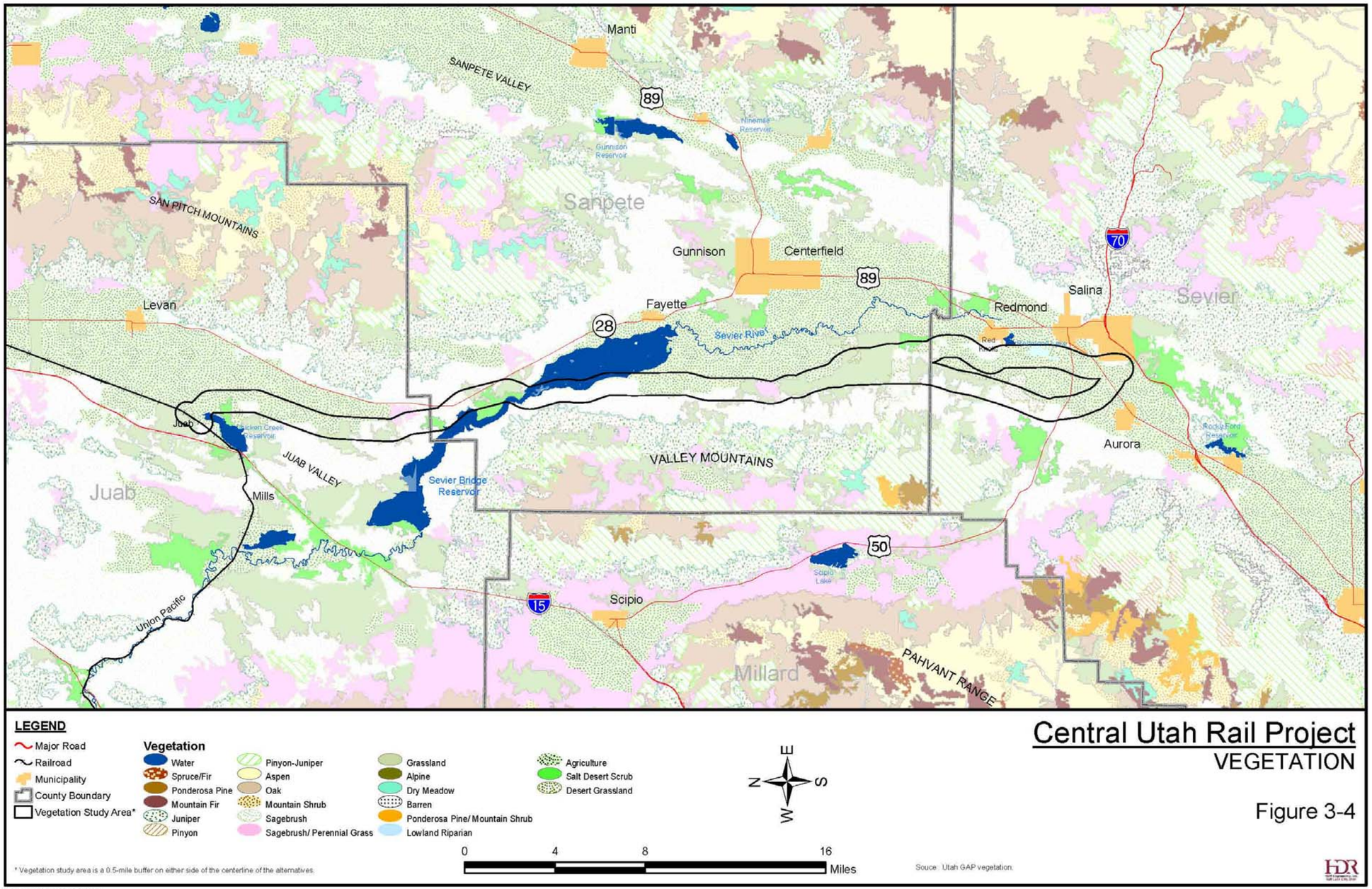


Figure 3-5. Elk and Mule Deer Seasonal Range

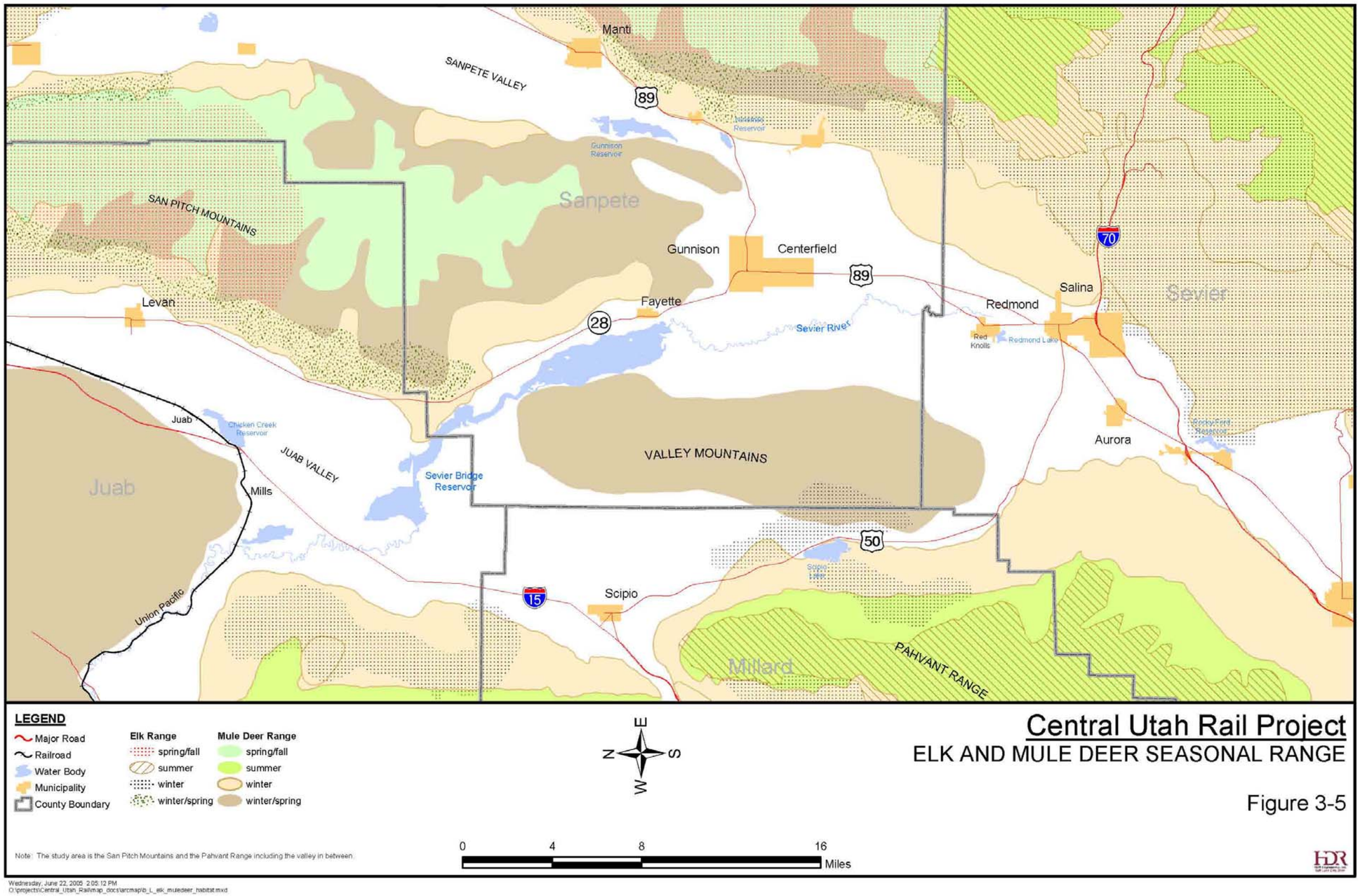


Figure 3-6. Water Resources

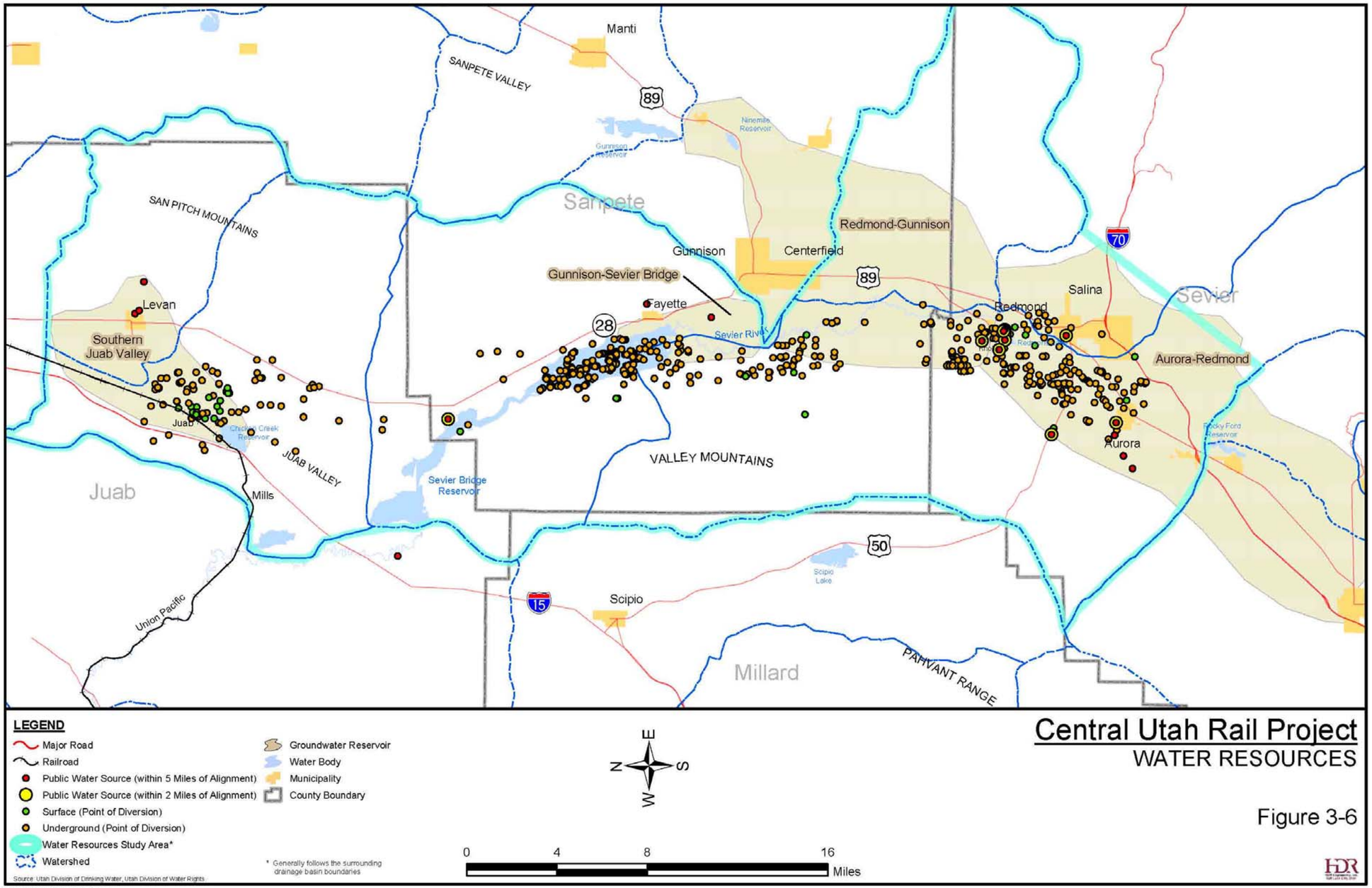


Figure 3-7. Floodplains

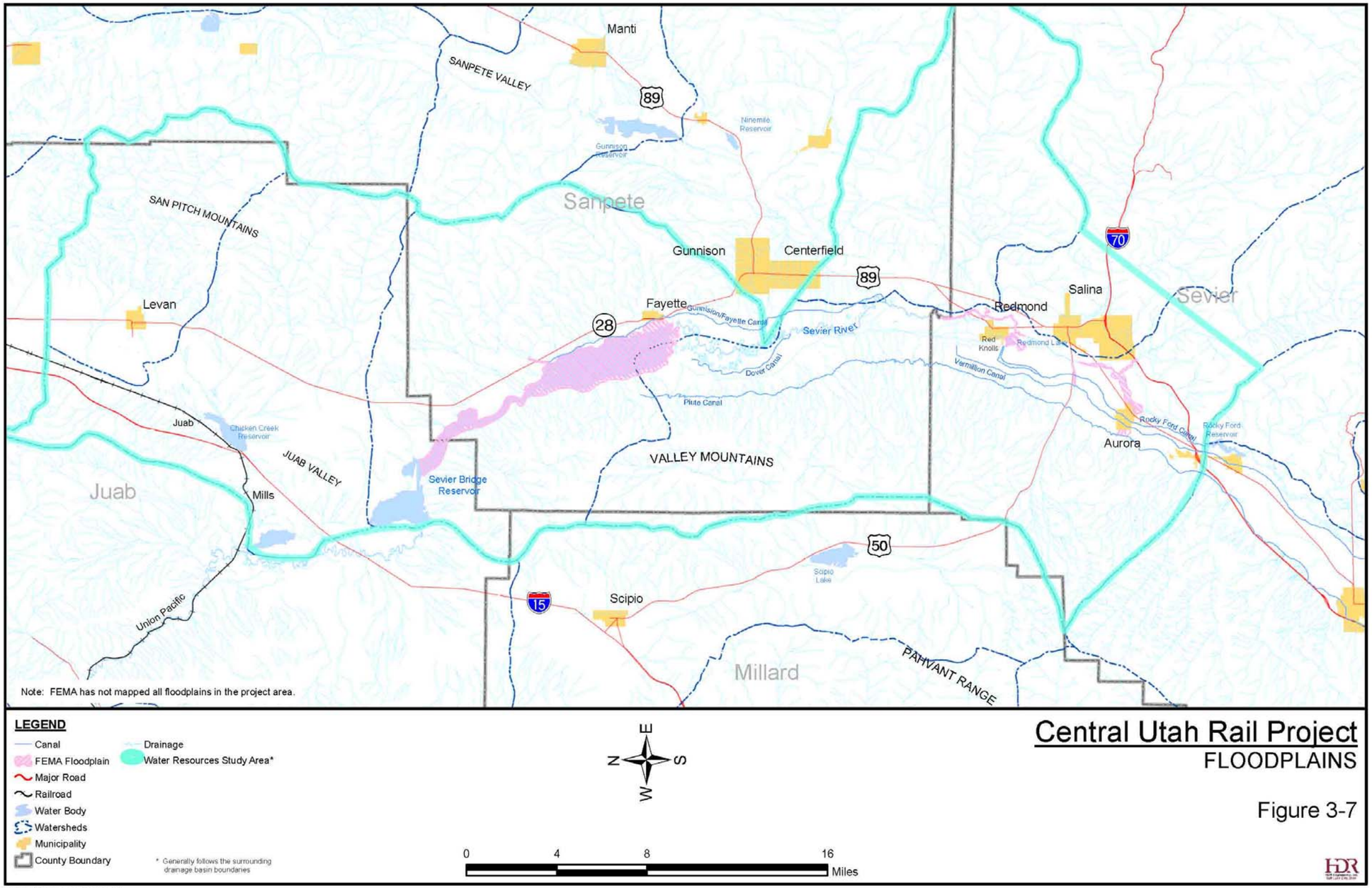


Figure 3-8. Preliminary Wetland Estimation

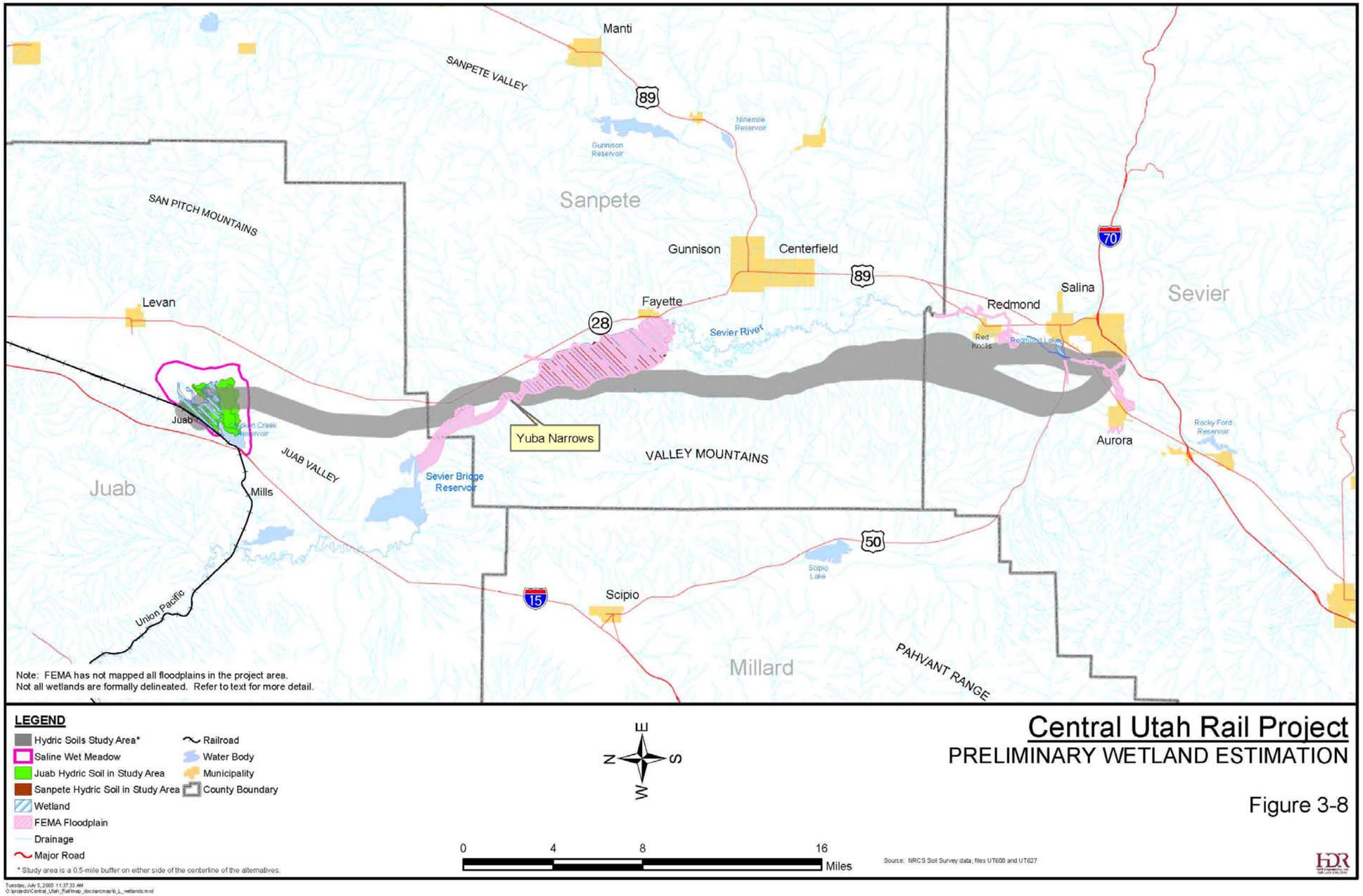


Figure 3-9. Mines

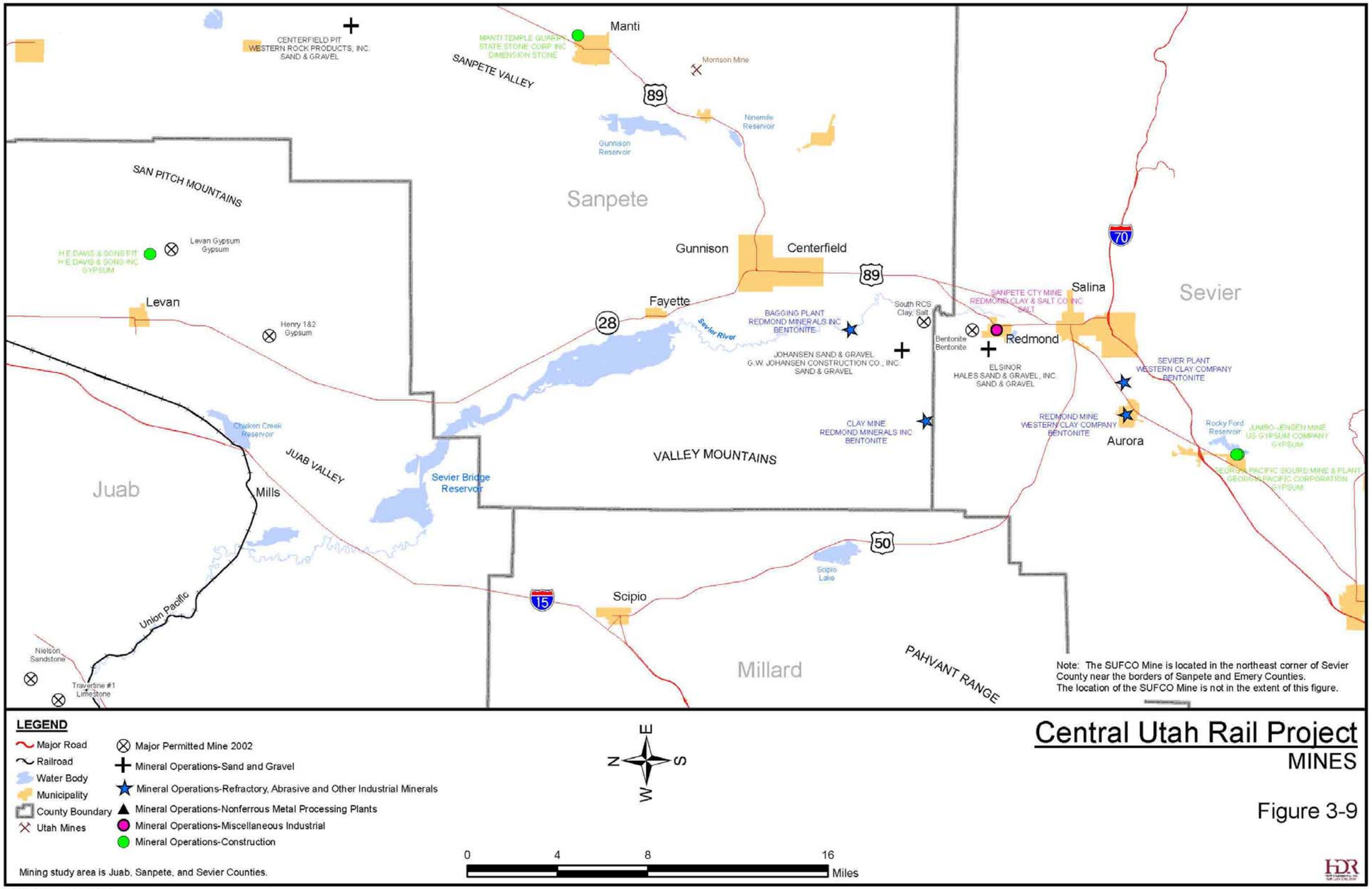


Figure 3-10. Prime and State Important Farmland

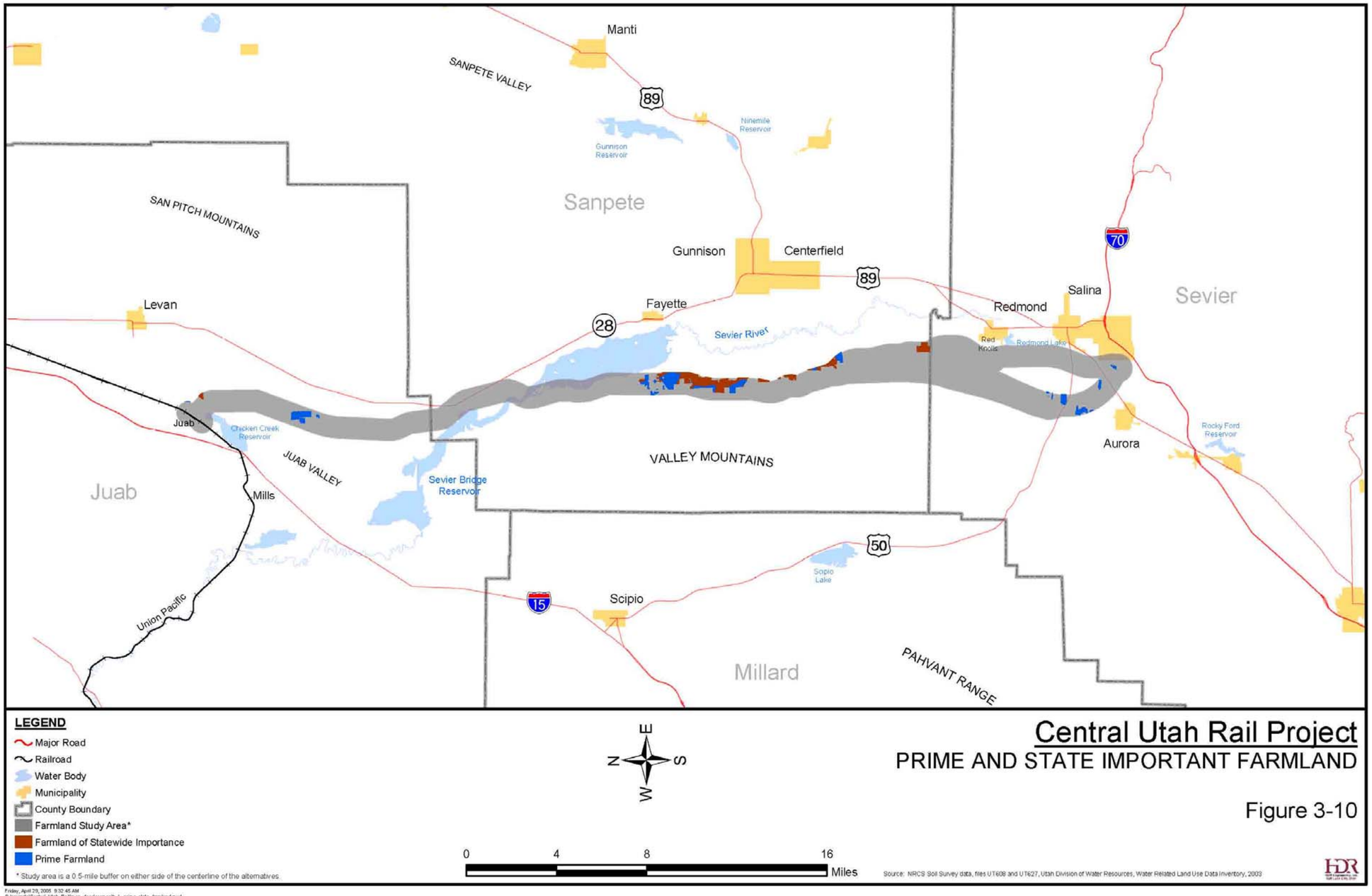


Figure 3-11. Potential Hazardous Waste Sites

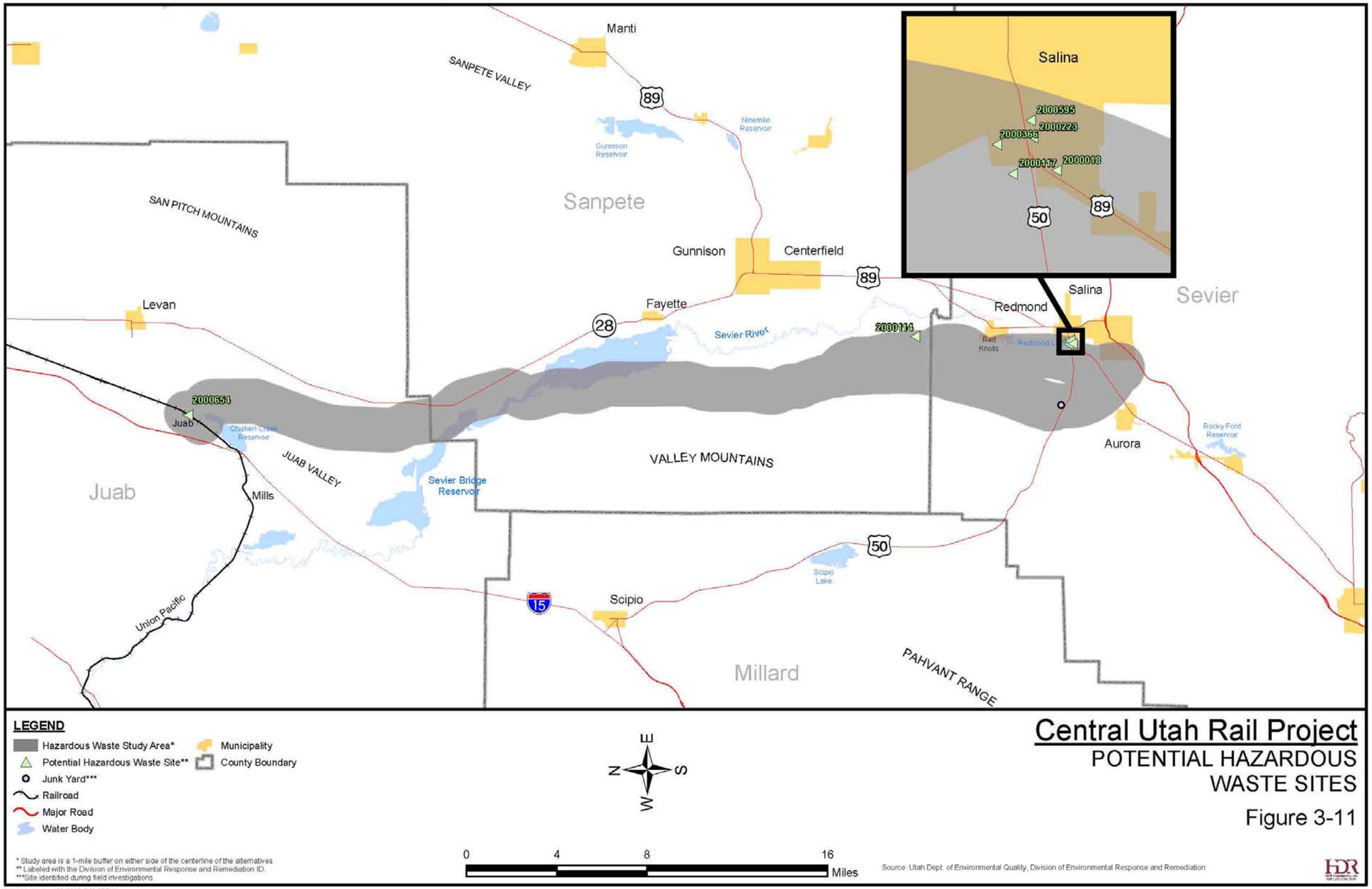


Figure 3-12. Noise Monitoring Locations

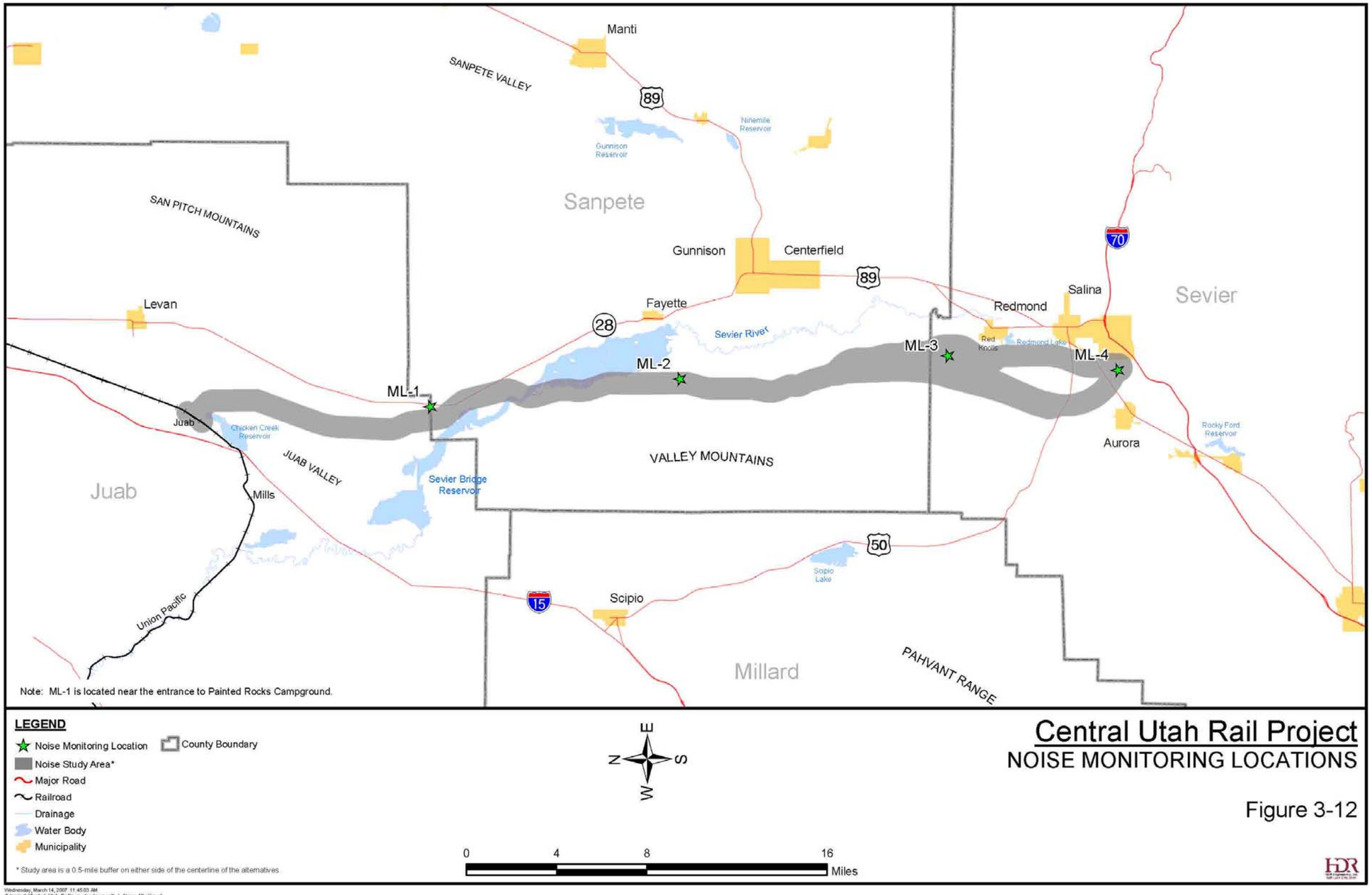


Figure 3-13. Energy

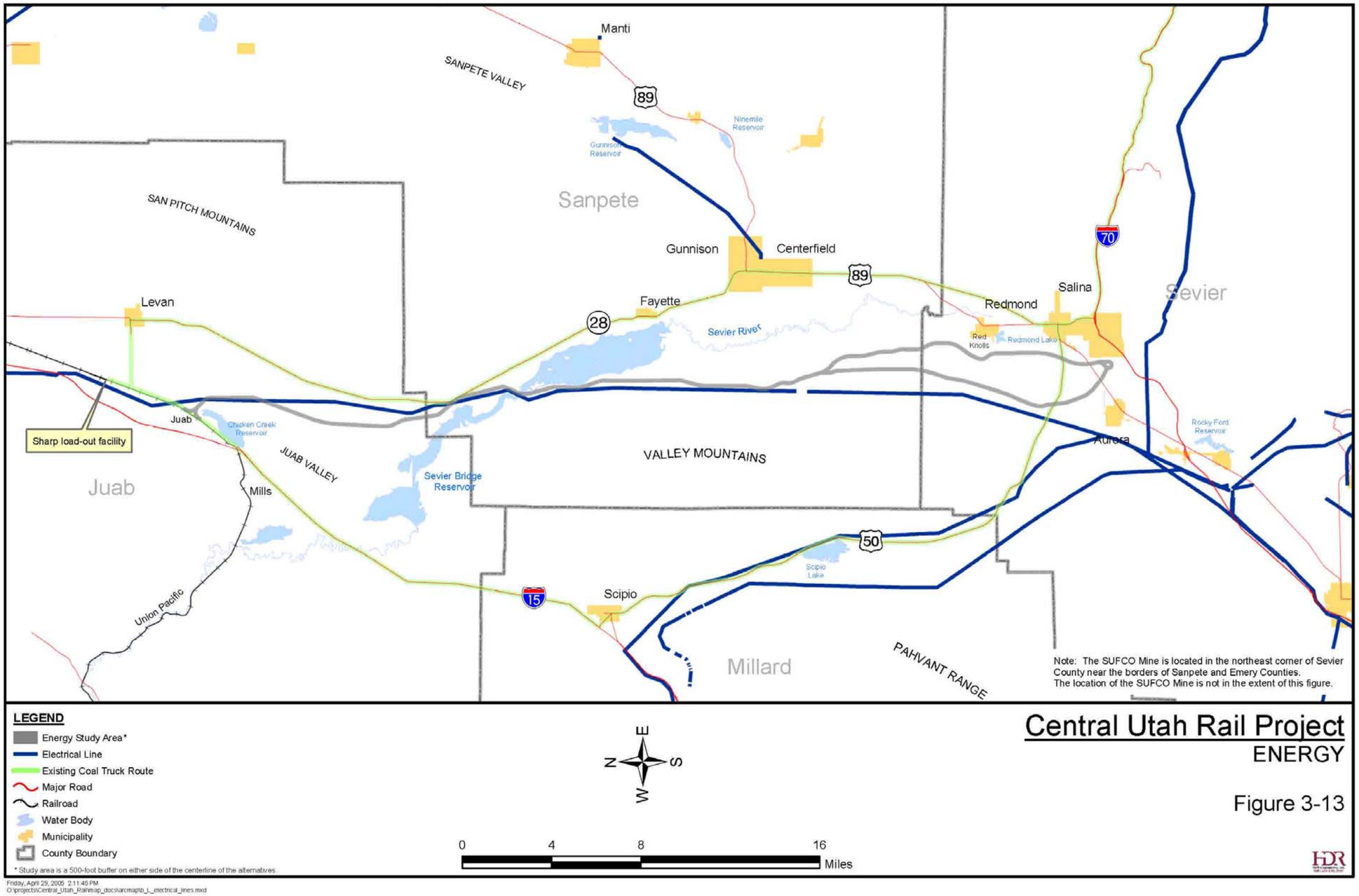


Figure 3-14. Environmental Justice

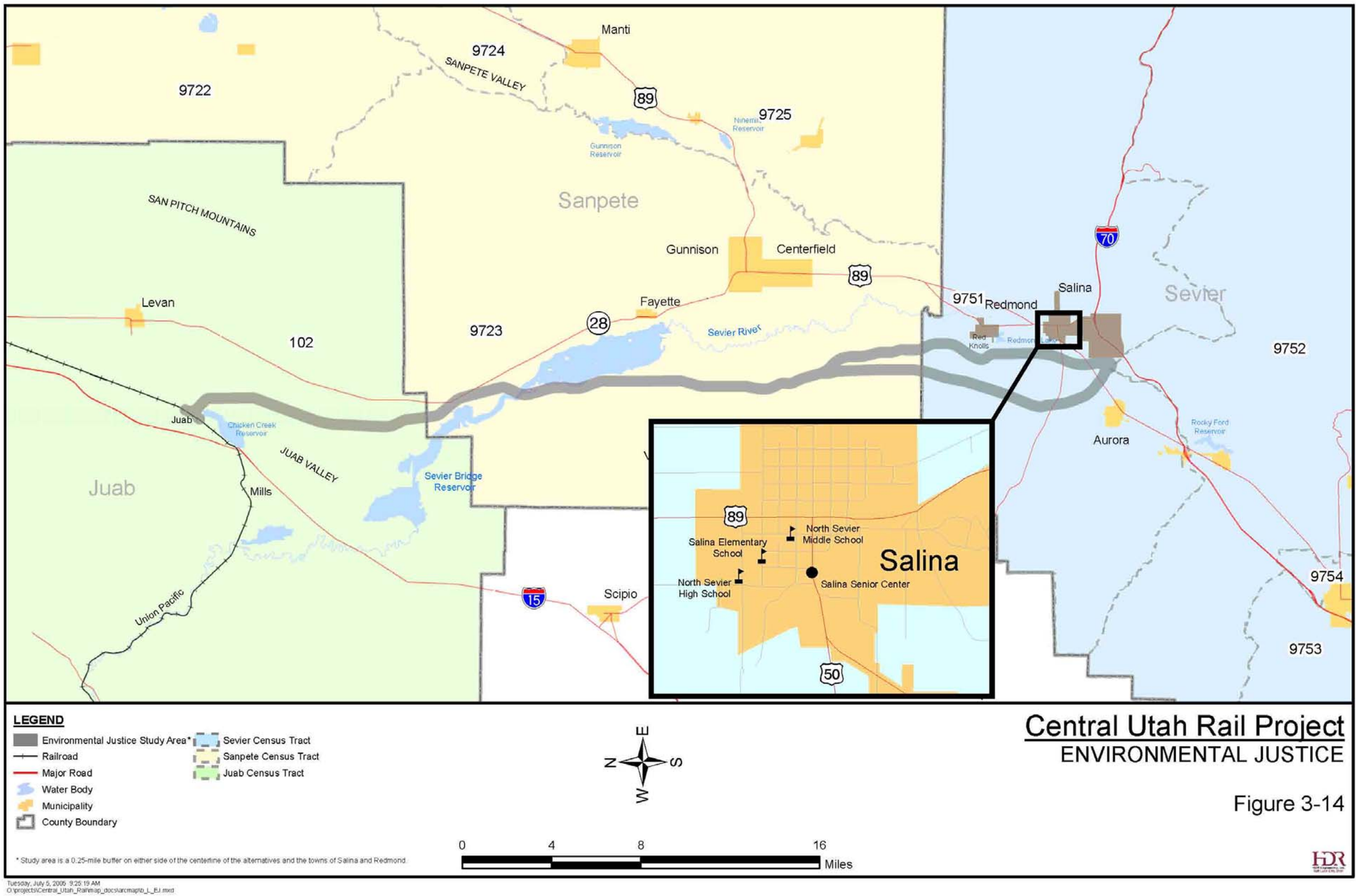


Figure 3-15. Recreation

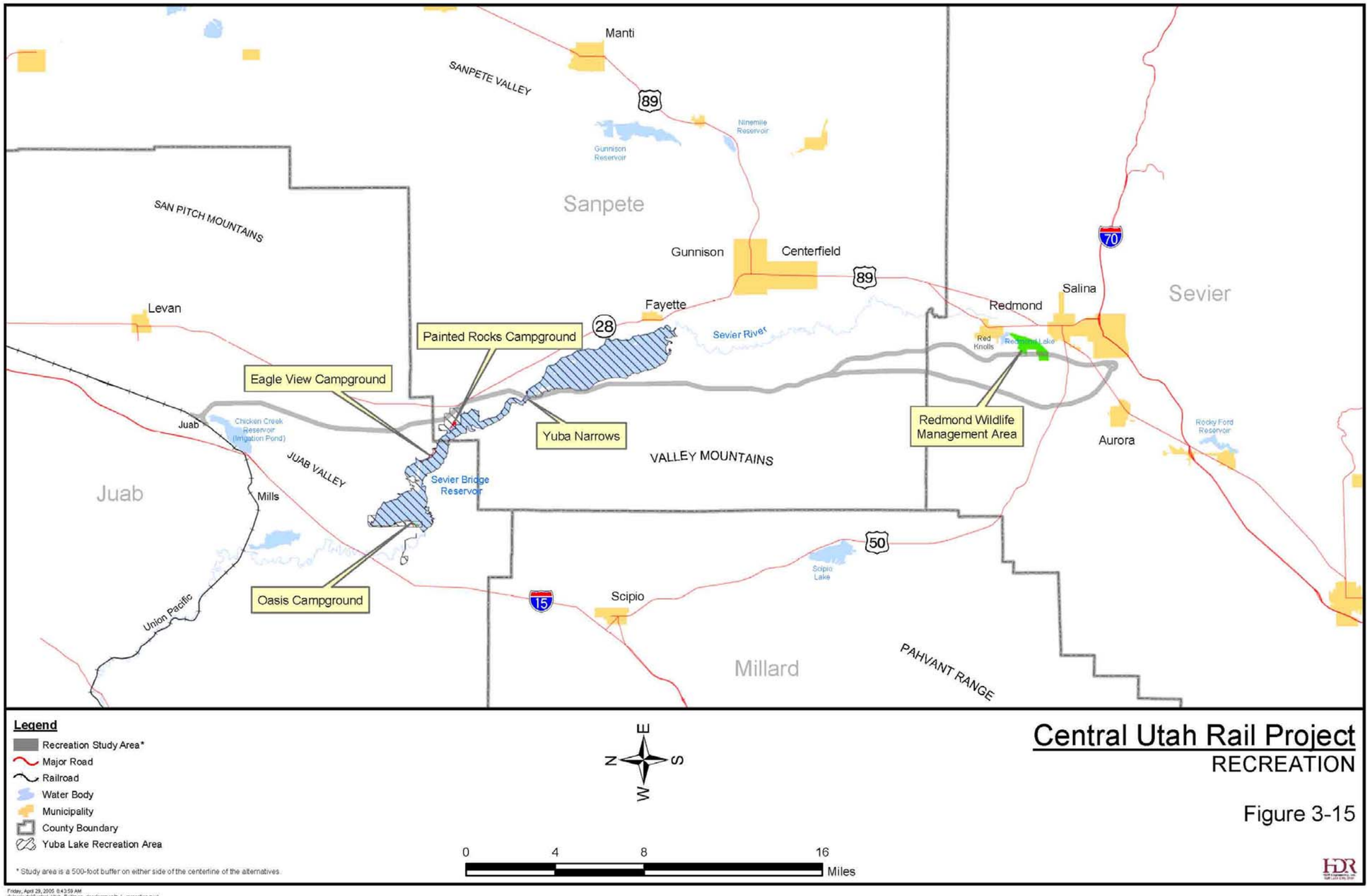


Figure 3-16. Visual Resource Management

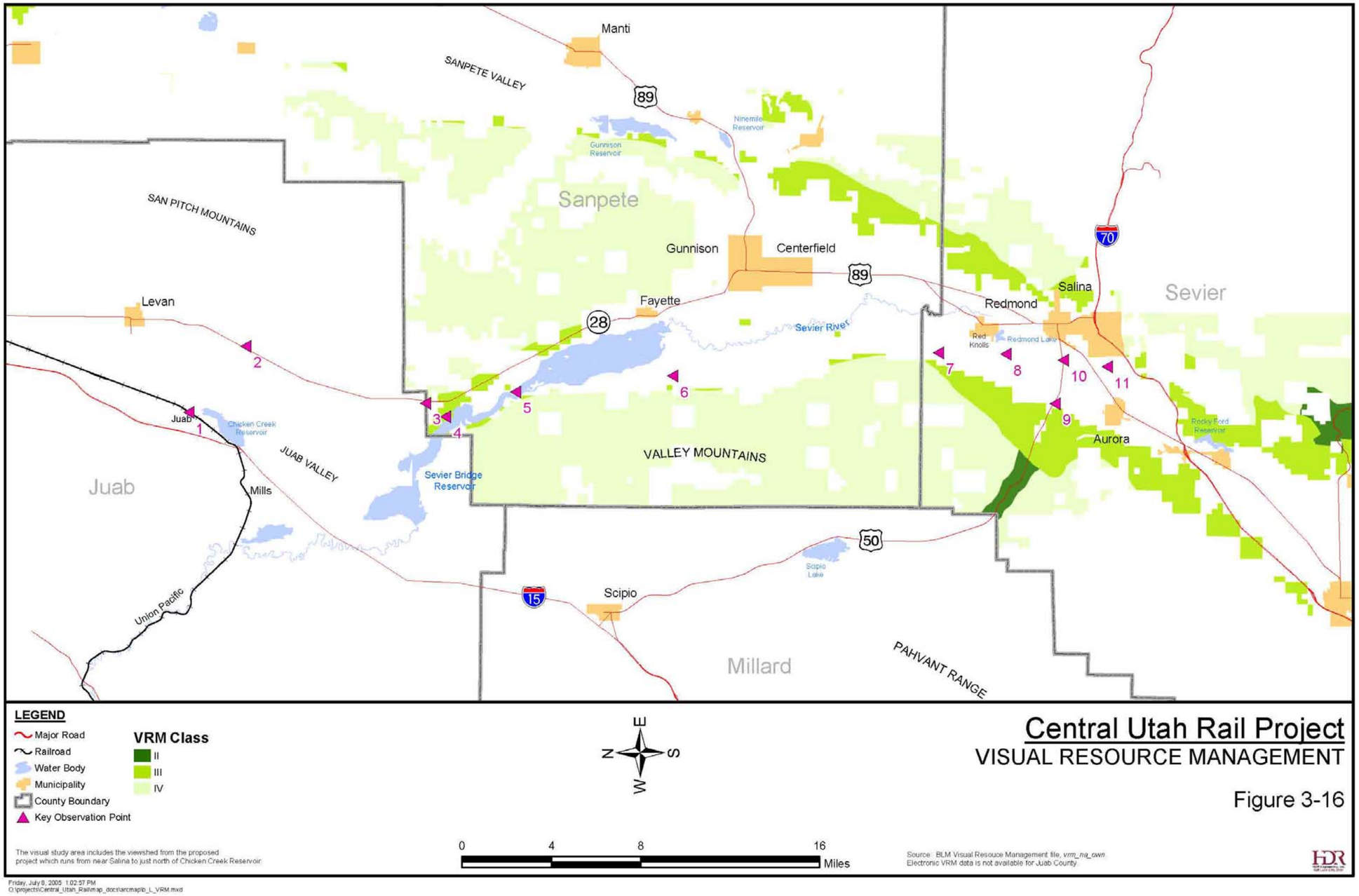
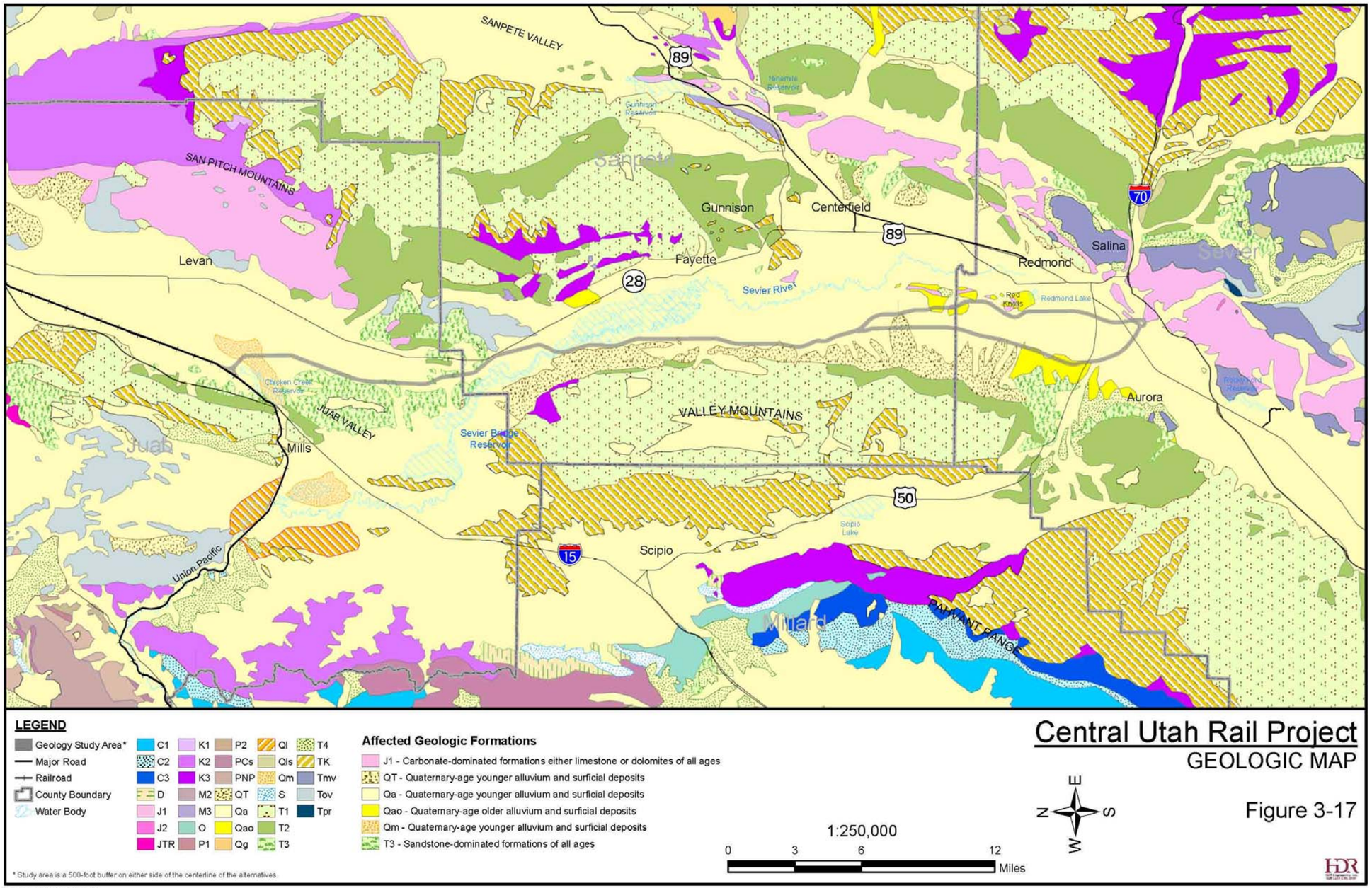


Figure 3-17. Geologic Map



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