3.0 Affected Environment

3.1 Introduction

The Affected Environment is described from existing environmental resource information and Overland Pass' responses to BLM and USFS data requests. BLM and USFS staff have evaluated and verified information supplied by Overland Pass and have conducted additional independent data collection efforts and data reviews.

The Affected Environment addresses the natural and human resources potentially affected by the proposed pipeline route and aboveground facilities associated with the proposed pipeline. Affected environment for the electrical powerlines is presented in Chapter 9.0. Environmental resources addressed include air quality and climate, geology, soils, surface water and groundwater resources, wetlands, vegetation, wildlife, aquatic resources, and special status species. Human resources addressed include land use and recreation as well as aesthetic, cultural, and socioeconomic resources. This chapter contains descriptions of affected resources for both the Proposed Action and the Southern Energy Corridor – Copper Ridge Bypass Alternative.

3.2 Climate and Air Quality

3.2.1 Proposed Action

3.2.1.1 Regulatory Framework

Air emission sources in Colorado, Wyoming, and Kansas are regulated at the federal level by the CAA, as amended, and at the state level by the Colorado Air Quality Control Commission (AQCC) Regulations, the Wyoming Air Quality Standards and Regulations (WAQS&R), and the Kansas Air Quality Regulations and Statues (KAQR&S). The significant federal regulations established as a result of the CAA and incorporated in the AQCC Regulations, the WAQS&R, and the KAQR&S that are potentially applicable to the project include:

- New Source Review (NSR)/Prevention of Significant Deterioration (PSD);
- New Source Performance Standards (NSPS);
- Title V Operating Permits;
- National Emission Standards for Hazardous Air Pollutants (NESHAPs);
- Federal Class I Area Protection;
- Conformity of General Federal Actions; and
- State regulations.

3.2.1.2 New Source Review/Prevention of Significant Deterioration Review

Separate procedures have been established for federal pre-construction review of certain large proposed projects in attainment areas versus nonattainment areas. In attainment areas, the PSD/NSR process constitutes the federal pre-construction review for new or modified major sources. The review process is intended to prevent the new source from causing existing air quality to deteriorate beyond acceptable levels. The federal pre-construction review for new or modified major sources located in nonattainment areas is commonly called Nonattainment New Source Review (NNSR). NNSR only applies to the pollutants that are classified as nonattainment; therefore, a new facility can undergo both types of review, depending on the emissions of the various pollutants and the attainment status.

Prevention of Significant Deterioration

The emission threshold for "major stationary sources" varies under PSD according to the type of facility. As defined by Title 40 CFR Part 52.21(b)(1)(i), a facility is considered major under PSD if it emits or has the potential to emit 250 tons per year (tpy) or more of any criteria pollutant, or 100 tpy for specified source categories. The pump station sources are not one of the specified source categories; therefore, the PSD threshold for these facilities is 250 tpy.

Nonattainment New Source Review

All facilities located in nonattainment areas with proposed emissions that exceed the applicable major source thresholds are subject to NNSR provisions, particularly the application of lowest achievable emission rate (LAER) and a requirement to obtain emission offsets. The facilities associated with this project would be located in attainment or maintenance areas; therefore; the project sources would not be subject to NNSR permitting.

3.2.1.3 New Source Performance Standards

NSPS, codified in Title 40 CFR 60, establish pollutant emission limits and monitoring, reporting, and recordkeeping requirements for various emission sources based on source type and size. The NSPS apply to

new, modified, or reconstructed sources. There are no NSPS regulations that apply to the emissions sources associated with this project.

3.2.1.4 Title V Operating Permits

Title V of the CAA requires states to establish an air operating permit program. The requirements of Title V are outlined in Title 40 CFR 70 and the permits required by these regulations are often referred to as Part 70 permits.

If a facility's potential to emit exceeds the criteria pollutant or hazardous air pollutant (HAP) thresholds, the facility is considered a major source. The major source threshold level for an air emission source is 100 tpy for criteria pollutants. The major source HAP thresholds for a source are 10 tpy of any single HAP or 25 tpy of all HAPs in aggregate. Potential HAP emissions estimates from the proposed pump station facilities would not exceed the 10/25 tpy major source thresholds. The potential emissions for each pollutant at the pump stations would not exceed the Title V thresholds; therefore, the proposed stations would not be major sources of air emissions requiring a Part 70 permit.

3.2.1.5 National Emission Standards for Hazardous Air Pollutants

The NESHAPs, codified in 40 CFR Parts 61 and 63, regulate HAP emissions. Part 61 was promulgated prior to the 1990 Clean Air Act Amendments (CAAA) and regulates only eight types of hazardous substances: asbestos, benzene, beryllium, coke oven emissions, inorganic arsenic, mercury, radionuclides, and vinyl chloride.

The 1990 CAAA established a list of 189 HAPs, resulting in the promulgation of Part 63. Part 63, also known as the Maximum Achievable Control Technology (MACT) standards, regulates HAP emissions from major sources of HAP emissions and specific source categories that emit HAPs. Part 63 defines a major source of HAPs as any source that has the potential to emit 10 tpy of any single HAP or 25 tpy of HAPs in aggregate.

The proposed pump stations are not one of the source categories regulated by Part 61; therefore, the requirements of Part 61 are not applicable. Additionally, there are no MACT standards that apply to the facilities proposed as a part of this project; therefore the requirements of Part 63 do not apply.

3.2.1.6 Federal Class I Area Protection

The U.S. Congress designated certain lands as mandatory federal Class I (Class I) areas in 1977. Class I areas were designated because air quality was considered a special feature of the area (e.g., national parks or wilderness area). Class I areas are given special protection under the PSD program. The PSD program establishes air pollution increment increases that are allowed by new or modified air emission sources. If the new source is a major PSD source and is near a Class I area, the source is required to determine its impacts on the nearby Class I area(s). The source also is required to notify the appropriate federal land manager(s) for the nearby Class I area(s).

As determined previously, the proposed pump stations are not anticipated to be subject to the PSD regulations. Therefore, the federal Class I area protection provisions would not apply to this project.

3.2.1.7 Conformity for General Federal Actions

According to Section 176(c) of the CAA (Title 40 CFR Section 51.853), a federal agency must make a conformity determination in the approval of a project having air emissions that exceed specified thresholds in nonattainment and/or maintenance areas. The project does not pass through nonattainment or maintenance areas. Consequently, general conformity analysis would not be required for this project.

3.2.1.8 State Regulations

Wyoming

Wyoming air emissions are regulated by the WAQS&R. Chapter 3 of the WAQS&R addresses emissions of particulates, nitrogen oxides (NO_x), sulfur oxides (SO_x), carbon monoxide (CO), volatile organic compounds, hydrogen sulfide (H_2S), and asbestos. There would be no quantifiable emissions of the regulated pollutants from the proposed pump stations during normal operation. This regulation also requires the control of fugitive dust generated during the construction. Overland Pass would comply with the fugitive dust requirements by implementing the dust control measures outlined in the Traffic and Transportation Management Plan.

Chapter 6 of WAQS&R requires construction permits for any source of air emissions; however, emergency equipment generally receives waivers of permit requirements. Overland Pass would submit a letter describing the proposed pump stations and would request a written notice of a waiver for emergency flaring.

Colorado

Colorado air emissions are regulated by the AQCC per AQCC-1001. The Colorado regulations incorporate much of the federal regulatory requirements for air quality.

Regulation 1 of AQCC-1001 addresses emissions of particulates, smoke, CO, and SO_x. Specific requirements in this regulation can potentially apply to the operation and construction of the proposed Overland Pass pump stations. Such requirements address opacity emissions from stationary sources, particulate matter from fuel burning sources, roadway emissions, and construction activities. The proposed pipeline construction would require a fugitive dust permit under Regulation 3 of the Colorado AQCC. Therefore, Overland Pass would be required to submit a fugitive particulate dust control plan as part of the construction permit application.

Kansas

Kansas air regulations 28-19-20 through 28-19-31 contain specific emissions limitations for particulate matter, sulfur compounds, carbon monoxide and hydrocarbons, in addition to general emissions limitations. The emission limitations and restrictions generally apply to full time operation of process equipment or combustion units. The emergency flares would not emit pollutants that exceed the allowable emission rates. Regulation 28-19-300 contains the requirements for construction permits. Flaring at the pump stations are exempt from the construction permit requirements based on emission rates.

3.2.1.9 Climate

The regional climate of the proposed project area is predominantly classified as continental with some areas in Wyoming and Kansas classified as temperate semi-arid. Surface wind direction and precipitation vary in the proposed project area due to significant geographical features. However, the specific characterization of the local weather based on data from Fort Collins, Colorado, indicates an average annual maximum temperature of 63 degrees Fahrenheit (ºF) and an average annual minimum temperature of 35.8ºF with an average annual precipitation of 15.8 inches. The average annual snowfall in Fort Collins from January 1900 through December 2001 was 47.1 inches. A representative station in Cheyenne, Wyoming, with wind observations from 1930 to 1996 indicates an annual average wind speed of 13 miles per hour and a predominant wind direction of west-northwest.

3.2.1.10 Air Quality

Federal and state air regulations are designed to ensure that ambient air quality, including background, existing, and new sources are in compliance with the ambient standards. The USEPA has designated all areas of the U.S. as “attainment,” “non-attainment,” or “unclassified” with respect to ambient air quality standards.

Air Quality Data Reports from the Colorado Department of Public Health and Environment (CDPHE), Wyoming Department of Environmental Quality (WDEQ), Kansas Department of Health and Environment (KDHE), and monitoring data provided by the USEPA were reviewed to characterize background air quality related to regulated criteria pollutants. The criteria pollutants are sulfur dioxide (SO_2), CO, nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and lead (Pb). The USEPA has established National Ambient Air Quality Standards (NAAQS) for these seven pollutants. The NAAQS were set at levels the USEPA believed were necessary to protect human health (primary standards) and human welfare (secondary standards). The federal NAAQS for criteria pollutants are the same as the state standards established by the CDPHE, KDHE, and WDEQ, except the WDEQ regulates SO_x instead of SO_2. All parts of Colorado, Wyoming, and Kansas, through which the proposed project would be located, are classified as attainment for all criteria pollutants. The USEPA classifies the southern portion of Weld County, Colorado, as non-attainment for 8-hour O_3. However, the proposed pipeline route and associated facilities would be located only in the northern portion of Weld County outside of the non-attainment area. Weld County also was redesignated from "non-attainment" to "maintenance" for CO in 2003. The federal and state air quality standards are listed in **Table 3.2-1**.

Table 3.2-1 National and State Ambient Air Quality Standards

Air Pollutant	Averaging Period	NAAQS/CDPHE/ KDHE Standards	WDEQ Standards	Significant Impact Level (µg/m^3)
SO_2	3-Hour [1]	0.5 ppm	1,300 µg/m^3 / 0.5 ppm	NA
	24-Hour [1]	0.14 ppm	260 µg/m^3 / 0.10 ppm	25
	Annual [2]	0.03 ppm	60 µg/m^3 / 0.02 ppm	5
CO	1-Hour [1]	35 ppm	40 mg/m^3 / 35 ppm	2,000
	8-Hour [1]	9 ppm	10 mg/m^3 / 9 ppm	500
NO_2	Annual [2]	0.05 ppm	100 µg/m^3 / 0.05 ppm	1
O_3	8-Hour	0.08 ppm	0.08 ppm	NA
PM_{10}	24-Hour [1]	150 µg/m^3	150 µg/m^3	5
	Annual [2]	50 µg/m^3	50 µg/m^3	1
$PM_{2.5}$	24-Hour [1]	65 µg/m^3	65 µg/m^3	NA
	Annual [2]	15 µg/m^3	15 µg/m^3	NA
Pb[3]	1-Month	1.5 µg/m^3	Not Applicable	NA
	3-Month	1.5 µg/m^3	1.5 µg/m^3	NA

[1]The second high designation indicates that the concentration listed is representative of the second high concentration measured at the monitoring station.

[2]Annual average concentration.

[3]The Colorado lead standard is a 1-month average. The federal lead standard is a 3-month average.

µg/m^3 = micrograms per cubic meter.

mg/m^3 = milligrams per cubic meter.

ppm = parts per million.

NA = Not Available.

3.2.2 Southern Energy Corridor – Copper Ridge Bypass Alternative

Climate and air quality are the same as the Proposed Action.

3.3 Geology

3.3.1 Proposed Action

3.3.1.1 Physiography and Geology

Physiography

The Proposed Action would be located within three major physiographic provinces: the Wyoming Basin, the Southern Rocky Mountains, and the Great Plains (Howard and Williams 1972). (**Table 3.3-1**). Each of these major physiographic provinces is defined as having common topography, rock types and structure, and geologic and geomorphic history, although the boundaries between the provinces are transitional. Within these physiographic provinces, the landscape has been modified to its present form and character through erosion, deposition, and mass wasting by the actions of glaciers, flowing water, wind, and gravity.

Table 3.3-1 Geologic Conditions Along the Proposed Overland Pass Pipeline Route

Physiographic Province/ Section	RP Range[1]	General Surface Geology/Physiography
Wyoming Basin Province, RP 0.0 to RP 217.0 and RP 258.0 to RP 286.0		
Green River Basin	0.0 to 62.0	Unconsolidated alluvial and colluvial Quaternary deposits along drainages. Tertiary sedimentary bedrock comprised of shale, oil shale, mudtone, sandstone, trona, halite, and limestone. Land forms consist of gently rolling uplands; isolated, rugged badlands; shallow and incised drainages associated with intermittent streams; and well-defined floodplains associated with perennial streams. The majority of the proposed pipeline route would traverse slopes of less than 3 percent grade, although isolated slopes of 20 to 50 percent exist where the proposed pipeline route crosses escarpments, major streams, or the walls of incised drainages.
Rock Springs Uplift	62.0 to 107.0	Unconsolidated alluvial and colluvial Quaternary deposits along drainages. Tertiary and Cretaceous sedimentary bedrock comprised of shale, coal, limestone, siltstone, and sandstone. Physiography similar to Green River Basin above.
Wamsutter Arch	107.0 to 201.0	Unconsolidated alluvial and colluvial Quaternary deposits along drainages. Tertiary and Cretaceous sedimentary bedrock comprised of shale, coal, limestone, siltstone, chalk, and sandstone. Physiography similar to Green River Basin above.
Hanna-Carbon Basin	201.0 to 217.0	Unconsolidated alluvial and colluvial Quaternary deposits along drainages. Tertiary and Cretaceous sedimentary bedrock comprised of shale, carbonaceous shale, coal, limestone, siltstone, and sandstone. Physiography similar to Green River Basin above.
Laramie Basin	258.0 to 286.0	Unconsolidated alluvial and colluvial Quaternary deposits along drainages. Permian and Cretaceous sedimentary bedrock comprised of shale, limestone, mudstone, and sandstone. Physiography similar to Green River Basin above.

Table 3.3-1 Geologic Conditions Along the Proposed Overland Pass Pipeline Route

Physiographic Province/ Section	RP Range[1]	General Surface Geology/Physiography
Southern Rocky Mountain Province, RP 217.0 to RP 258.0 and RP 286.0 to RP 308.0		
Medicine Bow Mountains	217.0 to 258.0	Quaternary unconsolidated deposits comprised of alluvium and colluvium located along drainages and river beds; and gravel, pediment, and fan deposits located adjacent to areas of greater topographic relief. Sedimentary formations range in age from Cretaceous to Eocene and are comprised primarily of shale, mudstone, siltstone, sandstone, and limestone. The Medicine Bow Mountains, particularly from approximately RP 239.0 to RP 258.0, present the most rugged terrain crossed by the project. The overall relief along the proposed pipeline route through the Medicine Bow Mountains is moderate, although the pipeline would cross isolated slopes of greater than 30 percent.
Laramie Range	286.0 to 308.0	Proposed pipeline route is underlain by sedimentary (7.4 miles), igneous (11.5 miles), and metamorphic (3.1 miles) rock formations. Sedimentary rocks consist of Pennsylvanian to Permian sandstone, shale, and carbonates. Early Proterozoic metamorphic rocks consist primarily of schist with some quartzite and marble. The igneous bedrock consists of the Sherman Granite of Proterozoic age. The area of the Laramie Mountains crossed by the proposed pipeline route is characterized as rolling hills with less than 10 percent slopes, resulting in a notably less rugged landscape than the proposed pipeline route along the flanks of the Medicine Bow Mountains.
Great Plains Province, RP 308.0 to RP 749.4		
Colorado Piedmont	308.0 to 425.0	Unconsolidated deposits, primarily wind-blown sand and silt, underlie approximately 28 percent of the proposed pipeline route. Cretaceous and Tertiary sedimentary bedrock units consist of shale, sandstone, and volcaniclastic deposits. Physiography is characterized as isolated badlands, broad plains, and rolling hills separated by drainages where slopes can approach 15 percent.
High Plains	425.0 to 540.0	Unconsolidated deposits, primarily wind-blown sand and silt, underlie approximately 49 percent of the proposed pipeline route. Cretaceous and Tertiary sedimentary bedrock units consist of shale, sandstone, and volcaniclastic deposits. Physiography is characterized as isolated badlands, broad plains, and rolling hills separated by drainages where slopes can approach 15 percent.
Plains Border	540.0 to 749.4	Unconsolidated deposits, primarily wind-blown sand and silt, underlie approximately 61 percent of the proposed pipeline route. Cretaceous and Tertiary sedimentary bedrock units consist of shale, sandstone, limestone and chalk. Physiography is characterized as broad plains and rolling hills separated by drainages where slopes can approach 15 percent.

[1]Boundaries between physiographic provinces and sections are transitional.

Sources: NRG 2006; Howard and Williams 1972; Kansas Geological Survey 1991; Love and Christensen 1985; Trimble 1980; Tweto 1979.

Wyoming Basin Province. The western portion of the proposed pipeline route is located within the Wyoming Basin Province (**Table 3.3-1**). The province occupies southwestern and south-central Wyoming and part of northwestern Colorado and is comprised of broad, downwarped, sedimentary basins separated by basement-cored uplifts, some of which have little or no surface expression. These structures formed during the Laramide orogeny, which was a series of mountain-building events that affected much of western North America from Late Cretaceous (70 million years ago [mya]) to Early Tertiary time (40 mya). Most peaks within the province lie between 6,000 to 8,000 feet above mean sea level (amsl) and basin floors are at typically 3,000 to 5,000 feet amsl.

Nomenclature for individual physiographic areas within the Wyoming Basin Province varies, but from west to east the proposed pipeline route generally crosses the Green River Basin Rock Springs Uplift, Wamsutter Arch, Hanna-Carbon Basin, and Laramie Basin (**Table 3.3-1**). Land forms in these areas consist of gently rolling uplands; isolated, rugged badlands; shallow and incised drainages associated with intermittent streams; and well-defined floodplains associated with perennial streams. Based on a review of U.S. Geological Survey (USGS) topographic maps for the area, the majority of the proposed pipeline route through the Wyoming Basin Province would traverse slopes of less than 3 percent grade, although isolated slopes of 20 to 50 percent exist where the proposed pipeline route crosses escarpments, major streams, or the walls of incised drainages (Natural Resource Group [NRG] 2006).

In general, approximately 57.7 miles (24 percent) of the proposed pipeline route in the Wyoming Basin Province is underlain by unconsolidated Quaternary deposits (1.8 mya to present) (NRG 2006). These unconsolidated deposits are comprised of alluvium and colluvium located along drainages and river beds; and gravel, pediment, and fan deposits located adjacent to areas of greater topographic relief. The remainder of the proposed pipeline route in the Wyoming Basin Province, approximately 187.5 miles, is underlain by sedimentary rocks deposited in marine, marginal marine, terrestrial, and lacustrine (lake) environments. These sedimentary formations range in age from Permian (286 to 245 mya) to Eocene (54 to 38 mya) and are comprised primarily of shale, mudstone, siltstone, sandstone, and limestone.

Southern Rocky Mountains Province. The proposed pipeline route crosses portions of the Southern Rocky Mountains Province in Albany, Carbon, and Laramie counties, Wyoming (**Table 3.3-1**). Within the province the proposed pipeline route crosses approximately 5.1 miles of federally managed land.

The province extends from southeastern Wyoming through central Colorado and consists of linear, rugged, basement-cored mountain ranges separated by intermontane basins, with hogbacks and cuestas often located along the flanks of mountains. Most peaks within the province lie between 6,000 to 8,000 feet amsl, although some reach 14,000 feet amsl, and basin floors are typically at 3,000 to 5,000 feet amsl. Thus, the province exhibits from 3,000 to 11,000 feet of relief. Since the Miocene (5 to 23 mya), the Southern Rocky Mountains have undergone substantial vertical uplift of at least one mile, and deep erosion by streams and glaciers has carved the modern topography.

Within the Southern Rocky Mountains Province, the proposed pipeline route crosses the northern flank of the Medicine Bow Mountains and the Red Buttes area of the Laramie Mountains (**Table 3.3-1**). The Medicine Bow Mountains, particularly from approximately RP 239.0 to RP 258.0, present the most rugged terrain crossed by the Proposed Action. Peaks in the core of the Medicine Bow Mountains exceed 11,000 feet amsl. However, the proposed pipeline route would cross a maximum elevation of approximately 8,000 feet amsl near RP 239.2 along the north flank of Mount Arlington. The overall relief along the proposed pipeline route through the Medicine Bow Mountains is moderate, although the pipeline would cross isolated slopes of greater than 30 percent (**Table 3.4-2**).

The highest elevation along the entire proposed pipeline route occurs in the Laramie Mountains: approximately 8,360 feet amsl near RP 294.5. However, the area of the Laramie Mountains crossed by the proposed pipeline route is characterized as rolling hills with less than 10 percent slopes, resulting in a notably less rugged landscape than the proposed pipeline route along the flanks of the Medicine Bow Mountains (NRG 2006).

Unconsolidated Quaternary deposits underlie approximately 7.3 miles (24 percent) of the proposed pipeline route through the Medicine Bow Mountains (Love and Christensen 1985). These unconsolidated deposits are comprised of alluvium and colluvium located along drainages and river beds; and gravel, pediment, and fan deposits located adjacent to areas of greater topographic relief. The remainder of the proposed pipeline route in the Medicine Bow Mountains, approximately 33.7 miles, is underlain by similar sedimentary rocks as encountered in the Wyoming Basin Province. These sedimentary formations range in age from Cretaceous (146 to 65 mya) to Eocene (54 to 38 mya) and are comprised primarily of shale, mudstone, siltstone, sandstone, and limestone.

The proposed pipeline route in the Laramie Mountains is underlain by sedimentary, igneous, and metamorphic rock formations (Love and Christensen 1985). The igneous Sherman Granite underlies approximately 11.5 miles of the proposed pipeline route and is of Proterozoic age (2,500 to 544 mya). Early Proterozoic (2,500 to 1,600 mya) metasedimentary and metavolcanic rocks comprised primarily of schist with some quartzite and marble underlie approximately 3.1 miles of the proposed pipeline route. The remainder of the proposed pipeline route through the Laramie Mountains, approximately 7.4 miles, is underlain by sedimentary sandstone, shale, and carbonates dating from the Pennsylvanian to Permian (325 to 245 mya). Available geologic maps do not identify any significant unconsolidated deposits crossed by the proposed pipeline route in the Laramie Mountains, although shallow, localized, unconsolidated deposits likely exist along drainages and stream beds.

Great Plains Province. The remainder of the proposed pipeline route crosses the Great Plains province beginning in southeastern Wyoming to central Kansas. Physiographic sections within the Great Plains Province that are generally crossed by the proposed pipeline route from west to east are the Colorado Piedmont, High Plains, and the Plains Border (**Table 3.3-1**). The Great Plains Province is a remnant fluviatile plain that stretches from the Rocky Mountains on the west to the Central Lowlands Province on the east (Trimble 1980). The province formed as overloaded streams deposited unconsolidated silt, sand, and gravel ranging in thickness from nearly zero where the underlying bedrock is exposed in isolated hills, to more than 500 feet where the underlying bedrock surface was eroded prior to being covered. Elevations along the proposed pipeline route in the Great Plains Province gradually decrease from west to east, from approximately 7,400 feet amsl near the eastern flank of the Laramie Mountains to the lowest elevation along the entire proposed pipeline route, 1,565 feet amsl, at the crossing of the Little Arkansas River near RP 740.6 in Rice County, Kansas. Physiography along the proposed pipeline route is characterized as broad plains and rolling hills separated by drainages where slopes can approach 15 percent.

Quaternary (1.8 mya to today) unconsolidated deposits underlie approximately 217.8 miles (49 percent) of the proposed pipeline route in the Great Plains Province. These unconsolidated deposits are comprised of wind-blown deposits (208.0 miles) and alluvium and terrace deposits located along drainages and river beds (9.8 miles). The remainder of the proposed pipeline route in the Great Plains Province, approximately 223.7 miles, is underlain by sedimentary rocks which range in age from Early Cretaceous to Miocene (146 to 5 mya) (Tweto 1979; Kansas Geological Survey 1991). The predominant bedrock unit is the Ogallala Formation, which underlies approximately 92.4 miles (41 percent of the sedimentary bedrock formations) of the proposed pipeline route in the Great Plains Province. The Ogallala Formation is primarily composed of sandstone and conglomerate beds deposited in alluvial environments. An additional 53.9 miles (24 percent of the bedrock formations) of the proposed pipeline route is underlain by predominantly shale units deposited in shallow marine environments. The remainder of the sedimentary bedrock formations underlying the proposed pipeline route in the Great Plains Province consist of sandstone, siltstone, limestone, chalk, and volcaniclastic claystone, siltstone, and ash deposited in terrestrial, marginal marine, and shallow marine environments.

3.3.1.2 Mineral Resources

Wyoming

Oil and Natural Gas. The proposed pipeline route and its associated aboveground facilities in Wyoming are located in sedimentary basins with oil and gas production. The proposed pipeline route crosses oil and gas producing areas of the Moxa Arch, Rock Springs Uplift, Washakie Basin, Wamsutter Arch, Great Divide Basin,

Hanna Basin, Laramie Basin, and the Denver-Julesburg (D-J) Basin (DeBruin 2002). The location of oil and gas fields that are crossed by the proposed pipeline route are listed on **Table 3.3-2**. The proposed pipeline route crosses 12 oil and gas fields in Wyoming.

Table 3.3-2 Oil and Gas Fields Crossed by the Proposed Project

State/County	Approximate RP	Field Name	Status
Wyoming			
Lincoln	13.0-25.0	Wilson Ranch, Zeglers Wash, and Moxa	Active
Sweetwater	74.0-76.5	South Baxter Basin	Active
	98.0-99.0	Brady South	Active
	106.8 to 110.0	Patrick Draw	Active
	110.0-112.0	Monell Unit	Active
	115.0-118.0	Table Rock	Active
	143.0 to 153.0	Echo Springs	Active
Carbon	229.0-230.0	Elk Mountain	Active
	245.4 to 246.4	Dutton Creek	Active
Albany	248.5 to 249.5	Copper Cove	Active
	264.7 to 265.1	Little Laramie	Active
Laramie	315.0-316.0	Brush	Abandoned
Colorado			
Weld	333.0-3334.0	Longs Peak	Active
	346.0-346.5	Pawnee Pioneer	Active
	377.0-378.0	Active Pommel	Active
	399.0-400.0	Tepee	Abandoned
	410.0-411.0	Merino	Active
	415.0-415.5	Prewitt	Abandoned
Yuma	453.5-454.5	Whisper	Active
	460.0-463.0	Shout	Active
Kansas			
Cheyenne	514.0-515.0	Orlando, Orlando East	Abandoned
Sheridan	582.0	Sequin	Abandoned
	583.0-584.0	Koster	Active
	602.0-603.0	Tilton, Northeast	Active
Trego	615.0-616.0	Garner West	Active
	617.0-617.5	Garner South	Abandoned
	619.0-620.0	Joe K	Active
	639.0-640.0	Locker North	Active
	644.0	Kroeger South	Active
Ellis	647.0 to 648.0	Solburn/Springhill	Active
	653.5 to 656.0	Kraus/Antonino	Active
	658.0-659.0	Lookout Hollow	Abandoned
	659.0-660.0	Engel West	Active
	662.2 to 663.7	Linges	Active
	654.0	Wheatland	Active
Russell	678.0-678.5	Odom North	Abandoned

Table 3.3-2 Oil and Gas Fields Crossed by the Proposed Project

State/County	Approximate RP	Field Name	Status
Barton	682.0-683.0	Galatia North	Active
	683.5	Galatia	Active
	685.0-686.0	Herman Northeast	Abandoned
	688.0-689.0	Templing	Active
	688.5 to 696.5	Trapp	Active
	698.8 to 699.3	Braver South	Active
	700.6 to 701.0	Odin	Active
Barton/Ellsworth	704.0 to 711.0	Kraft, Prusa West	Active
Ellsworth	715.0 to 716.0	Heiken	Active
	718.0	Prosper	Active
Rice	720.5 to 721.5	Frederick	Active
	726.0-729.0	Lyons Gas Area	Active
	729.0-730.5	Geneseo/Edwards	Active
	730.5-731.0	Lyons Gas Area	Active
Rice/McPherson	743.0 to 745.0	Welch-Bornholdt	Active

Sources: DeBruin (2002); Kansas Geological Survey (2006a); Wray et al. (2002).

Coal. The proposed pipeline route also crosses surface and subsurface coal-bearing formations that are potentially mineable in the Green River, Hanna, and Rock Creek coal fields of Sweetwater, Carbon, and Albany counties (Averitt 1972). The operations of the Black Butte Coal Mine are 2,500 feet north of the proposed pipeline route at RP 96.0.

Trona. From approximate RP 21.0 to RP 54.0, the proposed pipeline route crosses one of the largest trona (natural sodium carbonate) deposits in the world, in western Sweetwater County, and the mineral is currently mined at five underground mines in the region (Wyoming Mining Association 2006). Underground workings associated with trona mining are present beneath the proposed pipeline route (NRG 2006). The proposed pipeline route avoids trona mine leases near RP 33.5 to RP 36.2 that will be mined in the foreseeable future (Section 2.3.3.3).

Sand and Gravel. Where the proposed pipeline route crosses drainages, the surface materials (alluvium, colluvium, and fan deposits) are potentially mineable. Sand and gravel operations within 1,500 feet of the Proposed Action in Wyoming are listed in **Table 3.3-3**. Eighteen sand and gravel operations are located within 1,500 feet of the proposed project in Wyoming (NRG 2006). Three of these operations, located at RP 27.9, RP 169.2, and RP 228.8 to RP 229.0, may be affected by construction due to their proximity to the proposed pipeline route.

Table 3.3-3 Mining Operations Within 1,500 Feet of the Proposed Project

State/County	Approximate RP	Offset and Direction	Operation/Notes
Wyoming			
Sweetwater	27.9	South-adjacent	Gravel pit [1]
	32.5-36.1	1,300-4,200 feet north	Underground trona mine
	99.0	500 feet south	Gravel pit [1]
	106.8	1,400 feet northwest	Gravel pit
	106.9	200 feet northwest	Gravel pit
	107.0	900 feet northwest	Gravel pit

Table 3.3-3 Mining Operations Within 1,500 Feet of the Proposed Project

State/County	Approximate RP	Offset and Direction	Operation/Notes
Carbon	142.2	200 feet north	Gravel pit
	169.2	50 feet south	Gravel pit
	181.4	700 feet north	Tailing [1]
	195.5	1,000 feet north	Gravel pit, North Platte River
	196.2	800 feet north	Gravel pit, North Platte River
	208.3	400 feet north	Gravel pit
	223.6 to 224.8	1,200 feet south	Carbon Basin Mine (surface coal mine)
	224.2 to 224.8	Crosses	Carbon Pass Coal Area
	228.8 to 229.0	Crosses	Gravel pit
	246.3	1,500 feet northeast	Gravel pit
Albany	256.6	900 feet southwest	Gravel pit
	266.2 to 266.5	1,100 feet northeast	Gravel pit
	279.9	100 feet northeast	Possible gravel pit
	298.2 to 298.6	1,000 feet south	Gravel pit
	300.0 to 301.0	Crosses	Granite quarry
Laramie	303.8	100 feet north	Gravel pit
	303.8	1,000 feet north	Gravel pit
Colorado			
Weld	379.3	800 feet north	Gravel pit
Kansas			
Rawlins	532.5	1,500 feet north	Quarry
	536.5	1,500 feet south	Possible quarry or gravel pit
Thomas	570.2	300 feet north	Possible gravel pit
	570.2	500 feet south	Possible gravel pit
Ellis	674.7	1,000 feet south	Gravel pit
Russell	677.1	1,300 feet north	Possible gravel pit

[1]Mineral material operations on federally managed lands.

Source: NRG (2006).

Other Minerals. One granite quarry is located within 1,500 of the proposed pipeline route at RP 300.0 to RP 301.0 (NRG 2006). Other areas of known or potential mineral resources include uranium in the Medicine Bow Mountains, and copper, gypsum, and carbonates along the flanks of the Laramie Range. None of these mineral resources are crossed by the proposed pipeline route. The proposed pipeline route does not cross any active mining claims in Wyoming (BLM 2006a).

Colorado

Oil and Natural Gas. The primary mineral resources in the vicinity of the proposed pipeline route in Colorado are oil and natural gas. Within Colorado, the proposed pipeline route is entirely located in the D-J Basin (Wray et al. 2002). The proposed pipeline route crosses eight fields, six of which are still in production (**Table 3.3-2**). Weld County produces more oil and gas than any other county in Colorado. The great majority of petroleum production in Weld County comes from the giant Wattenberg Field, but its northernmost-extent is approximately 20 miles to the south of the proposed pipeline route. In the general project area, oil and natural gas is produced from smaller, widely scattered fields throughout northeastern Colorado.

Coal. The proposed pipeline route crosses the Denver Coal Region between approximate RP 321.2 and RP 380.0 in Weld County. The coal is found primarily in the upper Cretaceous Laramie Formation (Kirkham and Ladwig 1980). However, based on information from the Colorado Geological Survey (CGS), review of USGS topographic maps and aerial photographs of the proposed pipeline route, there are no active surface or underground coal mines in the project area (Cappa et al. 2005).

Sand and Gravel. Construction sand and gravel is recovered from numerous surface pits throughout the project area in Colorado (Guilinger and Keller 2004). As indicated in **Table 3.3-3**, one gravel pit was identified approximately 800 feet north of the proposed pipeline route near RP 379.3 in Weld County (NRG 2006).

Other Minerals. Other mineral commodities are produced in Colorado, including marble, gypsum, limestone, dimension stone, uranium, and precious metals. However, according to the CGS, there are no significant mining operations for these minerals in the counties crossed by the proposed pipeline route (Guilinger and Keller 2004).

Kansas

Oil and Gas Fields. The proposed pipeline route in Kansas crosses approximately 60 miles (23 percent) of oil and gas fields, with the greatest concentration of fields in Ellis, Barton, and Rice counties (Kansas Geological Survey [KGS] 2006a). The proposed pipeline route does not cross existing oil and gas fields in Rawlins, Thomas, or Gove counties.

Coal. There are no mineable coal resources in the proposed pipeline route area (USGS 2006a).

Sand and Gravel. There are 366 active mineral recovery operations located in those Kansas counties crossed by the proposed pipeline route (KGS 1998). Of these operations, 257 (70 percent) are sand and gravel; 82 (22 percent) are limestone or dolomite; 19 (5 percent) are clay and/or shale; 6 (2 percent) are salt; and 2 (less than 1 percent) are sandstone. The nearest mining operation to the proposed pipeline route is an apparent gravel pit approximately 300 feet north of RP 570.2 in Thomas County (NRG 2006) (**Table 3.3-3**).

Other Minerals. Salt occurs in layers that, in aggregate, can be approximately 300 feet thick and are located 300 to 600 feet below the land surface throughout central Kansas (Swain and Buchanan 2002). Salt has been mined by underground dissolution mining in Barton, Ellsworth, Rice, and McPherson counties.

3.3.1.3 Geological Hazards

Seismic-Related Hazards

Primary and secondary seismic-related hazards potentially could impact the proposed pipeline. Primary seismic hazards consist of strong ground motions (earthquakes) and surface faulting, and secondary effects include soil liquefaction and related slope failures. As discussed in the following sections, the potential for prolonged, strong ground shaking and surface faulting is low along the proposed pipeline route and, therefore, the potential for secondary seismic-related impacts to develop also is low.

Earthquakes. Earthquakes are characterized by magnitude (a measure of the amount of energy released during the event) and intensity (a measure of the effects of the event at the land surface). Generally, the area crossed by the proposed pipeline route historically has experienced low-magnitude and low intensity earthquakes. From 1534 to 1986, most earthquakes in the proposed project vicinity were magnitude 4.0 or less (USGS 2006b). The strongest earthquake occurred in southern Larimer County, Colorado, approximately 45 miles south of RP 300.0 on November 7 and 8, 1882, with an estimated magnitude of 6.2 to 6.5. This earthquake resulted in category VI damage on the Modified Mercalli Index (MMI) in Laramie, Wyoming, which is characterized as “slight.”

Ground Motion. An earthquake generates waves of energy that cause the ground to shake. Surface structures are susceptible to ground motion, but buried pipelines also may be at risk of rupture or damage, but

to lesser degree depending on site-specific conditions (Pelmulder 1995). Ground motion hazard mapping indicates that along the proposed pipeline route there is a low potential for ground motion to cause serious damage from a maximum quake.

Surface Faults. Surface faults that have demonstrated significant historical seismicity or geologic displacement during the last 11,000 years (Holocene) are considered to be active (USGS 2006c). Faults that displace Quaternary deposits are considered potentially active. The proposed pipeline route does not cross any active or potentially active faults (USGS 2006d).

Soil Liquefaction. Secondary seismic effects often are more damaging than shaking or surface faulting. Soil liquefaction is a phenomenon which occurs when saturated, cohesionless soils are subjected to strong and prolonged shaking from seismic events. Liquefaction can lead to loss of load bearing strength and can result in lateral spreading, flow failures, and flotation of buried pipelines.

For soil liquefaction and the related effects to occur, a relatively shallow water table, rapid, strong ground motions, and susceptible soils all must be present. Unconsolidated materials and shallow water tables occur coincidentally where the proposed pipeline route crosses streams and waterbodies. As previously discussed in this section, the potential for strong ground shaking to occur along the proposed pipeline route is low, resulting in a low potential for soil liquefaction and related effects to develop. In Wyoming, where predicted ground motions are the highest along the entire proposed pipeline route (but there is still a low overall potential for ground motion), there are no liquefaction-prone areas within at least 25 miles of the project (Wyoming State Geological Survey [WSGS] 1986).

Landslides and Steep Slopes

Landslide refers to the downward and outward movement of slope-forming materials reacting under the force of gravity and usually consists of natural soil, rock, artificial fill, or a combination of those items. The term covers a range of events including mudflows, mudslides, rock flows, rockslides, debris flows, debris avalanches, debris slides, and earth flows. Landslides can be initiated by natural events or by human activity. Naturally occurring landslides are more likely to occur in areas where high average annual precipitation and steep slopes contribute to slope instability. The type of geologic formation exposed at the surface also influences landslide occurrence, as does the intensity and frequency of seismic activity.

No landslide areas were identified along the proposed pipeline route (NRG 2006; Radbruch-Hall et al. 1982; WSGS 2006). In west-central Kansas, there is an increased susceptibility to landslides where loess and unconsolidated materials are underlain by Cretaceous shale exposed in drainages river valleys (Radbruch-Hall et al. 1982). Cretaceous shale is exposed in various places between RP 674.0 and RP 696.0.

Pipeline construction on steep slopes could initiate localized landslides. Based on review of USGS topographic maps for the area, there are several areas of isolated slopes of more than 20 percent grade (**Table 3.3-4**). Due to steeper slopes, the risk of landslides is higher in these areas when compared to the remainder of the proposed pipeline route.

Table 3.3-4 Potential Geologic Hazards Within the Proposed Overland Pass Pipeline Project

State	Approximate RP	Potential Geologic Hazard
Wyoming	1.8, 29.6, 50.9, 51.2, 55.7, 62.2, 85.4, 86.7, 226.5, 229.2, 239.8, 251.7	Increased potential for construction-related landslides to occur on isolated slopes of greater than 20 percent (slope estimates based on USGS topographic maps). Construction-related landslides could impact workers and cause project delays.
	21.0 to 54.0	Elevated potential for broad subsidence to occur gradually over underground trona mine workings. Subsidence could potentially damage pipeline facilities by subjecting them to undue stress.

Table 3.3-4 Potential Geologic Hazards Within the Proposed Overland Pass Pipeline Project

State	Approximate RP	Potential Geologic Hazard
Wyoming (continued)	49.0 to 71.0	High susceptibility but low incidence of landslides in proximity to the Flaming Gorge Reservoir; no actual landslide deposits mapped in the area. Landslides could damage pipeline facilities.
	235.0 to 250.0	Moderate incidence of landslides in the area. Proposed pipeline route crosses near documented landslide deposits from RP 239.2 to RP 239.4.
	0.0 to 321.1	Stream bed scour may occur in conjunction with seasonal and flash flooding of perennial and intermittent stream crossings, potentially exposing the pipeline.
	0.0 to 38.0, 66.0 to 94.0, 140.0 to 230.0, 245.0 to 280.0, 310.0 to 321.1	Expansive soils are documented in the Green River Basin and may exist in other sedimentary basins in Wyoming. Expansive soils increase the potential for slope instability and reduce traction for heavy equipment if soils become wet.
Colorado	323.7	Increased potential for construction-related landslides to occur on isolated slopes of greater than 20 percent (slope estimates based on USGS topographic maps). Construction-related landslides could impact workers and cause project delays.
	321.1 to 492.2	Stream bed scour may occur in conjunction with seasonal and flash flooding of perennial and intermittent stream crossings, potentially exposing the pipeline.
	321.1 to 492.2	Expansive soils may exist in surficial deposits throughout the project area in Colorado. Expansive soils increase the potential for slope instability and reduce traction for heavy equipment if soils become wet. Swelling soil potential may be very high from RP 320.0 to RP 460.0.
Kansas	674.0 to 674.9, 679.6 to 684.0, 685.0 to 694.3, 695.0 to 696.0	Elevated potential for landslides and slumps to occur on steep slopes and bluffs where the Blue Hill Member of the Carlile Shale is exposed at the land surface.
	608.0 to 644.0	Underlain by outcrops or thinly buried Niobrara Formation, potential for solution and surface subsidence.
	494.2 to 749.4	Stream bed scour may occur in conjunction with seasonal and flash flooding of perennial and intermittent stream crossings, potentially exposing the pipeline.
	494.2 to 749.4	Expansive soils may exist in surficial deposits throughout the project area in Kansas. Expansive soils increase the potential for slope instability and reduce traction for heavy equipment if soils become wet.
	675.0 to 749.4	Potential subsidence hazards areas associated with mining or dissolution of salt.

Subsidence

Subsidence is the loss of surface elevation due to removal of subsurface support and is one of the most diverse forms of ground failure, ranging from small or local collapses to broad regional lowering of the earth's surface. Potential causes of subsidence along the proposed pipeline route include underground mining and dissolution of soluble formations (salt).

In Wyoming, a common form of subsidence occurs over abandoned underground coal mines. The proposed pipeline route does not cross abandoned underground coal mines or mined-out areas that have experienced subsidence (Case 1986). The proposed pipeline route does not cross areas susceptible to other causes of subsidence (Davies et al. 1984).

The proposed pipeline route avoids underground trona mine workings that are located between approximate RP 32.5 to RP 36.1 in Sweetwater County, Wyoming (**Table 3.3-3**). Subsidence has been documented over some underground trona mines. Subsidence over trona mines can be on the order of 6 feet and generally occurs gradually over a broad area, rather than as a sudden, localized collapse.

Similarly, subsidence in northeastern Colorado is commonly associated with underground mines. No areas along the proposed pipeline route in Colorado were identified to have the potential for subsidence resulting from underground mining activities (Turney and Murray-Williams 1983). Other types of subsidence in Colorado such as dissolution of soluble rocks (gypsum) and collapsible soil are not present along the proposed pipeline route (CGS 2001).

The proposed pipeline route crosses potential subsidence hazard areas in central Kansas (**Table 3.3-4**). One potential subsidence hazard involves the natural dissolution of salt beds that lie several hundred feet below the surface. An example of natural subsidence is Lake Inman in MacPherson County (Swain and Buchanan 2002). Lake Inman is in an area of natural salt dissolution that occurs from a line north of Conway, Kansas (just west of MacPherson) to Colwich (4 miles northwest of Wichita). This area is just a few miles east of the end of the proposed pipeline route and is thought to coincide with the eastern margin of the salt deposits that underlie the area (Williams and Lohman 1949).

Another cause of subsidence associated with salt beds in central Kansas involves salt mining and oil and gas production water disposal wells (Walters 1978). Surface collapse has occurred at salt mines in Reno and Ellsworth counties associated with removal of salt either by mining or solution. Another cause of salt solution results from oil field brine disposal wells where annular displacement of water migrates into salt layers and dissolves them. The dissolution can result in surface subsidence manifested as sinkholes or broad depressions (Swain and Buchanan 2002). An example of this type of subsidence generated by brine disposal has occurred at the Gorham Oil Field near Russell, Kansas, that has resulted in heavy damage to Interstate (I)-70. Other subsidence incidents related to oil wells have been documented in central Kansas, but the incidence is extremely rare given the thousands of wells and small number of associated subsidence incidents (Walters 1978). Subsidence features have not been identified along the proposed pipeline route in McPherson County (NRG 2006). The proposed pipeline route does not cross salt mining areas in Kansas although it passes approximately 2 miles south of the abandoned Little River Salt Mine in Section 18, T19S, R6W in Rice County Kansas. Some collapse features have been reported at the main shaft of the mine, but remedial work was conducted to convert the mine voids into underground liquefied petroleum gas storage (Walters 1978).

Another potential subsurface solution involves the Niobrara Formation which is largely composed of chalk. Small fissures may form in the Niobrara Formation and if the covering Ogallala or surficial materials are thin, these fissures may be manifested by depressions on the surface (Davies et al. 1984). The proposed pipeline route crosses areas of thinly covered or exposed Niobrara Formation in Trego County (RP 608.0 to RP 644.0).

Flooding

In general, seasonal flooding hazards exist where the proposed pipeline route would cross major streams and rivers, and flash flooding hazards exist where it would cross localized drainages. The proposed pipeline route would cross perennial and intermittent waterbodies, all of which are locations where seasonal or flash flooding could occur (**Appendix F**).

Expansive Soils

Expansive, or swelling, soils are geologic deposits that expand when wet and shrink when dry. Depending on the mineralogy and physical conditions, an expansive soil may swell to as much as 13 times its dry volume when wet (Gillott 1968). Site-specific information regarding expansive soils is not available for the entire length of the proposed pipeline route, but expansive soils are known to exist in portions of the Green River Basin of southwest Wyoming and the Great Plains Province (Colorado and Kansas) crossed by the proposed pipeline route. Areas crossed that have a high shrink-swell potential area shown in **Table 3.3-4**. An area of very high potential for shrink-swell soils is in northeastern Colorado (Olive et al. 1989).

3.3.1.4 Paleontological Resources

A paleontological study was conducted to review existing data and identify geological units and known fossil localities crossed by the proposed pipeline route (Uinta Paleontological Associates, Inc. 2006). The study examined geologic maps, publications, and paleontological site information obtained from the University of Colorado Museum at Boulder, Denver Museum of Nature and Science, University of Wyoming, Carnegie Museum in Pittsburgh, University of California Museum of Paleontology, as well as Colorado and Wyoming BLM state and district offices. In addition to literature review, field surveys were conducted to identify areas of relative paleontological importance crossed by the proposed pipeline route.

In Wyoming, the geologic study identified 33 formal geological formations ranging in age from Precambrian to Quaternary informal units along the proposed pipeline route (Uinta Paleontological Associates, Inc. 2006). In Colorado and Kansas, the study identified 12 formations and 4 Quaternary informal units along the proposed pipeline route. Many of the Mesozoic and Cenozoic units have vertebrate, invertebrate, and plant fossil localities sites in the vicinity of the proposed project. There is little information on paleontological resources for the proposed pipeline route in Colorado and Kansas because much of that portion of the route is covered with undetermined thicknesses of well-vegetated Quaternary deposits that are not known to be fossiliferous.

Evaluation of the paleontological sensitivity of all geological formations along the ROW on federal lands is mandated in the following statutes and guidance:

- The NEPA of 1969 (P.L. 91-190; 31 Stat. 852, 42 USC 4321-4327);
- The Federal Land Policy and Management Act of 1976 (FLPMA) of 1976 (P.L. 94-579; 90 Stat. 2743, USC 1701-1782); and
- BLM Paleontology Resources Management Manual and Handbook H-8270-1 (1998).

Similar guidelines also are outlined by Wyoming and Colorado state laws and regulations regarding paleontological resource protection: Wyoming Title 36-1-114 through 36-1-116 (as of 2003) and Colorado Revised Statute 1973, 24-80-401 through 409.

The BLM Paleontology Resources Management Manual establishes a classification system for ranking paleontological areas as to their potential for noteworthy occurrences of fossils (BLM 1998). The BLM classifies areas as:

- Condition 1 – Areas that are known to contain vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils. Consideration of paleontological resources would be necessary if the Field Office review of available information indicates that such fossils are present in the area.
- Condition 2 – Areas with exposures of geological units or settings that have high potential to contain vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils. The presence of geologic units from which fossils have been recovered elsewhere may require further assessment of these same units where they are exposed in the area of consideration.
- Condition 3 – Areas that are very unlikely to produce vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils based on their surficial geology, igneous or metamorphic rocks, extremely young alluvium, colluvium, or aeolian deposits or the presence of deep soils. However, if possible, it should be noted at what depth bedrock may be expected to determine if fossiliferous deposits may be uncovered during surface disturbing activities.

Either Condition 1 or Condition 2 may trigger the initiation of a formal analysis of existing data prior to authorizing land-use actions involving surface disturbance or transfer of title. Condition 3 suggests that further paleontological consideration is generally unnecessary.

Based on review of paleontological literature, geologic formations along the proposed pipeline route were classified accordingly (Uinta Paleontological Associates, Inc. 2006):

- Condition 1: 122.0 miles in Wyoming (54.0 miles on BLM and 1.6 miles on USFS); 73.3 miles in Colorado (17.5 miles on USFS); and 4.4 miles in Kansas;
- Condition 2: 142.1 miles in Wyoming (42.4 miles on BLM); 38.7 miles in Colorado (4.9 miles on USFS); and 94.0 miles in Kansas; and
- Condition 3: a total of 274.66 miles along the entire proposed pipeline route.

Field surveys conducted in the summer of 2006 provided the following findings:

- Within the survey corridor, 199 new occurrences of fossils were identified, many of which were grouped into 33 new formal localities;
- 22 localities with 171 occurrences were found in Wyoming, 9 localities with 19 occurrences in Colorado, and 2 localities with 9 occurrences in Kansas; and
- Within 1 mile of the corridor, 201 localities were identified in Wyoming, 3 in Colorado, and 7 in Kansas.

3.3.2 Southern Energy Corridor – Copper Ridge Bypass Alternative

The underlying geology along the Southern Energy Corridor – Copper Ridge Bypass Alternative would be the same as the Proposed Action. The Southern Energy Corridor – Copper Ridge Bypass Alternative would cross approximately 5.9 miles more of steep and side slopes compared to the Proposed Action (**Appendix E**).

Geological formations along the Southern Energy Corridor – Copper Ridge Bypass Alternative were classified as either Condition 1 or Condition 2 and are comparable to the Proposed Action through this same segment.

3.4 Soils

The State Soil Geographic (STATSGO) database was used to obtain information regarding soils that occur along the proposed pipeline route. STATSGO data contain physical and chemical properties, as well as interpretative groupings for approximately 18,000 soil series recognized in the U.S. These data apply to the whole soil (e.g., hydric or prime farmland soils, estimated crop yields, soil classification, slope class) as well as soil horizons (e.g., particle size, available water-holding capacity, permeability). These data can be used in conjunction with spatial data to quantitatively describe the soils in a particular area.

Soils data were grouped and evaluated according to characteristics that could affect construction or increase the potential for soil impacts. These sensitive soil characteristics include: highly erodible soils; prime farmland and hydric soils; compaction-prone soils; stony/rocky soils and shallow bedrock; droughty soils; depth of topsoil; and percent slope as defined below. Additional soil-related issues considered in the analysis include revegetation and soil contamination.

Highly Water and Wind Erodible Soils

Highly erodible soils along the proposed pipeline route were identified based on soil parameters that are directly related to water or wind soil erosion susceptibility. Highly erodible lands (HEL) include soils with severe to extreme erosion limitations for agricultural use as well as soils with slopes of 9 percent or greater that are susceptible to erosion. Soils susceptible to wind erosion include soils that have surface-soil properties that affect their resistance to soil blowing, including texture, organic matter content, and aggregate stability. Sandy-textured soils with poor aggregation are particularly susceptible to wind erosion. Because management and construction mitigation techniques used to minimize wind erosion hazards are different from those used to minimize water erosion, separate groupings for water and wind erosion were developed. Some overlap between these two interpretive groupings is expected.

Prime Farmland and Hydric Soils

Percentage and length of prime farmland and hydric soils along the proposed pipeline route were quantified using STATSGO data. Hydric soils may indicate the presence of wetlands or agricultural drain tiles.

Compaction-prone Soils

Compaction-prone soils along the proposed pipeline route were identified by soil series that have both: 1) a surface texture of sandy clay loam or finer and 2) a drainage class of somewhat poorly drained through very poorly drained.

Stony/Rocky Soils

Soils with significant quantities of stones in the surface were identified by soil series that have either: 1) a cobbley, stony, bouldery, gravelly, or shaly modifier to the textural class of the surface layer or 2) have a surface layer that contains greater than 5 percent (weight basis) stones larger than 3 inches.

Shallow Bedrock

Shallow-to-bedrock soils (shallow soils) were identified by soil series that have a bedrock contact listed above 60 inches in depth. The analysis also identified whether the near surface bedrock is hard and would require blasting to excavate or is soft and could be ripped and dug without blasting.

Droughty Soils

Droughty soils along the proposed pipeline route were identified by soil series that have: 1) a surface texture of sandy loam or coarser and 2) are moderately well to excessively drained.

Topsoil Depth

Topsoil depths along the proposed pipeline route were quantified by grouping the lower limit of the component soil-series A horizons into one of five groups: 0 to 6 inches, greater than 6 to 12 inches, greater than 12 to 18 inches, greater than 18 to 24 inches, and greater than 24 inches.

Slope Class

Because of the importance of slope to assess erosion hazards, a separate evaluation of slope of soils along the ROW was conducted. A complex query was used to reduce the large number of slope classes used by the NRCS to a more useable grouping. The analysis identified the average of the slope range provided for each soil series into one of five classes: 0 to 5 percent, greater than 5 to 8 percent, greater than 8 to 15 percent, greater than 15 to 30 percent, and greater than 30 percent slopes.

3.4.1 Proposed Action

Many of the soils crossed by the proposed pipeline route are considered susceptible to water (417.4 miles) and wind erosion (56.6 miles). Approximately 323.3 miles (approximately 43 percent) of the soils crossed by the proposed pipeline route are considered prime farmland or potentially prime farmland (**Table 3.4-1**). Most of the prime farmland is located in Colorado and Kansas with minimal prime farmland in Wyoming. Roughly 4 percent of prime farmland would be on federally managed lands.

Approximately 8.1 miles of the soils crossed by the proposed pipeline route are characterized as hydric soils. A total of 1.4 miles of the soils crossed by the proposed pipeline route are considered compaction prone; 77.4 miles of the soils crossed by the proposed pipeline route are considered to be stony/rocky soils; approximately 197.0 miles of the soils crossed by the proposed pipeline route are considered to have a bedrock contact listed above 60 inches in depth; and approximately 102.2 miles of the soils crossed by the proposed pipeline route are considered droughty.

Approximately 365 miles of soils (approximately 49 percent) crossed by the proposed pipeline route have between 6 and 12 inches of topsoil. Another 300 miles of soils crossed have between 0 and 6 inches of topsoil. Only approximately 85 miles of the proposed pipeline route would cross soils with more than 12 inches of topsoil. A majority of the proposed pipeline route (approximately 489 miles) crosses lands within the average slope class of 0 to 5 percent. An additional 242 miles of soils crossed fall within the average slope class of 5 to 30 percent. Only 19 miles of soils crossed exhibit an average slope of greater than 30 percent. **Table 3.4-2** lists topsoil depth and slope presented as classes based on the aggregate percentages of component soil series that are within a particular class.

The following text provides information on the Major Land Resource Areas (MLRAs) crossed and identifies sensitive soil locations along the Proposed Action and the Southern Energy Corridor – Copper Ridge Bypass Alternative by state. **Table 3.4-1** summarizes the soil characteristics by county crossed by the proposed pipeline route.

Wyoming

In Wyoming, the proposed pipeline route would cross three MLRAs recognized by the NRCS: The Central Desertic Basins, Mountains, and Plateaus (MLRA 34), the Wasatch and Uinta Mountains (MLRA 47), and the Southern Rocky Mountain Foothills (MLRA 49).

Central Desertic Basins, Mountains, and Plateaus (MLRA 34). Slightly more than half of the Central Desertic Basins, Mountains, and Plateaus MLRA in Wyoming are federally owned. The remainder is occupied by sheep and cattle ranches. Land along the few large streams that cross the area (approximately 2 to 5 percent of this MLRA) is irrigated. The physiography of the area is characterized by alluvial fans, piedmont plains, and pediments slope from the surrounding mountains that form broad intermountain basins. Elevations

Table 3.4-1 Mileage Summary by State of Soil Characteristics for the Proposed Overland Pass Pipeline Route[1]

State/County	Highly Erodible Water[2]		Highly Erodible Wind[3]		Prime Farmland[4]		Hydric[5]		Compaction Prone[6]		Stony – Rocky[7]		Shallow-to-Bedrock[8]		Droughty[9]	
	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other
Wyoming																
Lincoln	8.2	7.2	2.3	2.4	0.0	0.0	0.1	0.3	0.0	0.0	1.1	0.9	5.7	5.0	2.8	2.7
Sweetwater	43.1	63.1	5.6	7.8	0.0	0.0	0.8	0.7	0.0	0.0	6.2	8.9	35.1	51.7	11.1	16.8
Carbon	24.7	57.0	3.7	4.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4	11.8	9.6	25.5	14.4	25.2
Albany	1.9	36.8	0.0	0.6	0.0	0.0	0.0	3.3	0.0	0.8	0.8	15.3	1.4	21.0	0.2	9.0
Laramie	0.0	20.2	0.0	0.0	0.0	1.4	0.0	0.3	0.0	0.0	0.0	14.7	0.0	14.5	0.0	0.3
Wyoming Subtotal	**77.9**	**184.3**	**11.6**	**14.8**	**0.0**	**1.4**	**0.9**	**4.6**	**0.0**	**0.8**	**14.5**	**51.6**	**51.8**	**117.7**	**28.5**	**54.0**
Colorado																
Larimer	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weld	17.5	43.4	0.6	3.6	13.0	23.9	0.0	0.0	0.0	0.0	0.1	3.3	4.1	7.4	0.9	6.2
Morgan	0.0	5.4	0.0	2.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.5
Logan	0.0	5.8	0.0	2.9	0.0	7.3	0.0	0.5	0.0	0.1	0.0	0.4	0.0	0.1	0.0	2.5
Washington	0.0	10.9	0.0	5.2	0.0	22.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	1.1
Yuma	0.0	24.6	0.0	28.4	0.0	23.2	0.0	0.6	0.0	0.2	0.0	3.3	0.0	1.9	0.0	6.4
Colorado Subtotal	**17.5**	**90.2**	**0.6**	**28.4**	**13.0**	**83.1**	**0.0**	**1.1**	**0.0**	**0.3**	**0.1**	**7.0**	**4.1**	**10.7**	**0.9**	**17.7**
Kansas																
Cheyenne	0.0	14.0	0.0	0.7	0.0	26.0	0.0	0.6	0.0	0.0	0.0	0.3	0.0	0.5	0.0	0.5
Rawlins	0.0	5.2	0.0	0.1	0.0	14.2	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1
Thomas	0.0	2.7	0.0	0.0	0.0	21.6	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sheridan	0.0	7.5	0.0	0.3	0.0	27.4	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.3
Gove	0.0	0.6	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Trego	0.0	8.3	0.0	0.1	0.0	26.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	3.3	0.0	0.2
Ellis	0.0	4.7	0.0	0.0	0.0	23.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	3.7	0.0	0.0
Russell	0.0	1.3	0.0	0.0	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1.0	0.0	0.0
Barton	0.0	1.4	0.0	0.0	0.0	27.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0
Ellsworth	0.0	0.4	0.0	0.0	0.0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Rice	0.0	1.3	0.0	0.0	0.0	27.4	0.0	0.1	0.0	0.2	0.0	0.2	0.0	1.2	0.0	0.0

Table 3.4-1 Mileage Summary by State of Soil Characteristics for the Proposed Overland Pass Pipeline Route[1]

State/County	Highly Erodible Water[2]		Highly Erodible Wind[3]		Prime Farmland[4]		Hydric[5]		Compaction Prone[6]		Stony – Rocky[7]		Shallow-to-Bedrock[8]		Droughty[9]	
	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other
McPherson	0.0	0.1	0.0	0.0	0.0	5.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Kansas Subtotal	**0.0**	**47.5**	**0.0**	**1.2**	**0.0**	**211.3**	**0.0**	**1.5**	**0.0**	**0.3**	**0.0**	**4.2**	**0.0**	**12.7**	**0.0**	**1.1**
Project Total[10]	**95.4**	**322.0**	**12.2**	**44.4**	**13.0**	**310.3**	**0.9**	**7.2**	**0.0**	**1.4**	**14.6**	**62.8**	**55.9**	**141.1**	**29.4**	**72.8**

[1]Federal lands data based on BLM-provided land layers and USFS jurisdictional boundaries for the FGNRA and PNG.

[2]Includes land in capability subclasses 4E through 8E and soils with slopes greater than or equal to 9 percent.

[3]Includes soils in wind erodibility groups 1 and 2.

[4]Includes land listed by the NRCS as potential prime farmland if adequate protection from flooding and adequate drainage are provided.

[5]As designated by the NRCS.

[6]Includes soils that have clay loam or finer textures in somewhat poor, poor and very poor drainage classes.

[7]Includes soils that have either: 1) a cobbley, stony, bouldery, gravelly, or shaly modifier to the textural class, or 2) have greater than 5 percent (weight basis) of stones larger than 3 inches in the surface layer.

[8]Includes soils that have bedrock within 60 inches of the soil surface.

[9]Includes coarse-textured soils (sandy loams and coarser) that are moderately well to excessively drained.

[10]Slight discrepancies in state and project totals are due to rounding.

Table 3.4-2 Mileage Breakdown of Topsoil Depth and Average Slope Class Along the Proposed Overland Pass Pipeline Route

State/County	Topsoil Depth[1] (inches)										Slope Class[2] (percent)									
	0 – 6		>6 – 12		>12 – 18		>18 – 24		>24		0 – 6		>6 – 12		>12 – 18		>18 – 24		>24	
	Federal[3]	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other
Wyoming																				
Lincoln	7.7	8.0	2.2	3.2	0.6	0.5	0.0	0.0	0.0	0.0	7.3	8.9	0.0	0.0	2.2	2.0	0.7	0.6	0.3	0.3
Sweetwater	41.8	59.0	10.0	11.9	7.1	10.3	0.0	0.0	0.0	0.0	28.5	36.9	4.5	6.0	11.4	16.8	11.8	17.4	2.8	4.0
Carbon	20.7	44.6	8.6	17.6	0.0	0.0	0.0	0.0	0.0	0.0	13.2	22.1	5.4	10.5	5.4	14.5	4.9	13.4	0.3	1.6
Albany	1.7	36.5	0.4	7.5	0.0	5.3	0.0	1.5	0.0	0.0	0.6	25.3	0.1	3.3	0.2	8.4	0.6	7.2	0.5	6.5
Laramie	0.0	9.6	0.0	9.0	0.0	1.5	0.0	0.3	0.0	0.0	0.0	3.9	0.0	2.8	0.0	4.0	0.0	7.9	0.0	1.9
Wyoming Subtotal	**71.8**	**157.7**	**21.2**	**49.2**	**7.7**	**17.6**	**0.0**	**1.8**	**0.0**	**0.0**	**49.6**	**97.1**	**10.0**	**22.6**	**19.2**	**45.7**	**18.0**	**46.5**	**3.9**	**14.3**
Colorado																				
Larimer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weld	9.4	20.0	11.8	36.1	1.3	2.2	0.0	0.1	0.0	0.0	17.6	42.2	3.5	9.9	11.0	4.1	0.4	2.2	0.0	0.0
Morgan	0.0	2.6	0.0	4.4	0.0	0.4	0.0	0.0	0.0	0.0	0.0	6.1	0.0	0.7	0.0	0.0	0.0	0.6	0.0	0.0
Logan	0.0	5.3	0.0	4.1	0.0	0.5	0.0	0.0	0.0	0.0	0.0	8.8	0.0	0.3	0.0	0.0	0.0	0.8	0.0	0.0
Washington	0.0	11.7	0.0	17.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	21.5	0.0	3.2	0.0	0.2	0.0	4.2	0.0	0.0
Yuma	0.0	19.9	0.0	22.7	0.0	2.0	0.0	0.0	0.0	0.0	0.0	27.1	0.0	3.2	0.0	4.2	0.0	9.8	0.0	0.3
Colorado Subtotal	**9.4**	**59.5**	**11.8**	**84.3**	**1.3**	**5.5**	**0.0**	**0.1**	**0.0**	**0.0**	**17.6**	**105.7**	**3.5**	**17.3**	**1.0**	**8.5**	**0.4**	**17.6**	**0.0**	**0.3**
Kansas																				
Cheyenne	0.0	10.9	0.0	22.1	0.0	5.5	0.0	0.0	0.0	0.0	0.0	27.0	0.0	1.0	0.0	7.9	0.0	2.3	0.0	0.3
Rawlins	0.0	3.7	0.0	13.5	0.0	1.9	0.0	0.1	0.0	0.0	0.0	14.5	0.0	0.3	0.0	2.6	0.0	1.8	0.0	0.1
Thomas	0.0	2.6	0.0	20.8	0.0	1.2	0.0	0.0	0.0	0.0	0.0	21.8	0.0	0.1	0.0	2.1	0.0	0.4	0.0	0.1
Sheridan	0.0	4.3	0.0	27.2	0.0	3.2	0.0	0.3	0.0	0.0	0.0	27.9	0.0	0.1	0.0	4.5	0.0	2.5	0.0	0.1
Gove	0.0	0.3	0.0	0.6	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.3	0.0	0.2	0.0	0.0
Trego	0.0	1.3	0.0	28.1	0.0	4.7	0.0	1.7	0.0	0.0	0.0	28.4	0.0	1.8	0.0	4.7	0.0	0.8	0.0	0.0
Ellis	0.0	0.0	0.0	25.2	0.0	3.6	0.0	3.5	0.0	0.0	0.0	29.6	0.0	0.9	0.0	1.8	0.0	0.0	0.0	0.0
Russell	0.0	0.0	0.0	4.4	0.0	0.3	0.0	0.5	0.0	0.0	0.0	4.7	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
Barton	0.0	0.3	0.0	25.1	0.0	1.4	0.0	1.2	0.0	0.0	0.0	27.6	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Ellsworth	0.0	0.1	0.0	7.2	0.0	0.4	0.0	0.3	0.0	0.0	0.0	7.9	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Rice	0.0	0.8	0.0	23.6	0.0	2.4	0.0	1.5	0.0	0.0	0.0	27.7	0.0	0.1	0.0	0.4	0.0	0.0	0.0	0.0

Table 3.4-2 Mileage Breakdown of Topsoil Depth and Average Slope Class Along the Proposed Overland Pass Pipeline Route

State/County	Topsoil Depth[1] (inches)										Slope Class[2] (percent)									
	0 – 6		>6 – 12		>12 – 18		>18 – 24		>24		0 – 6		>6 – 12		>12 – 18		>18 – 24		>24	
	Federal[3]	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other
McPherson	0.0	0.4	0.0	4.8	0.0	0.1	0.0	0.1	0.0	0.0	0.0	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kansas Subtotal	**0.0**	**24.7**	**0.0**	**202.4**	**0.0**	**24.9**	**0.0**	**9.2**	**0.0**	**0.0**	**0.0**	**223.0**	**0.0**	**4.3**	**0.0**	**25.3**	**0.0**	**8.1**	**0.0**	**0.6**
Project Total[4]	**81.2**	**241.9**	**33.0**	**335.9**	**9.0**	**48.0**	**0.0**	**11.1**	**0.0**	**0.0**	**67.2**	**425.8**	**13.5**	**44.2**	**20.2**	**79.5**	**18.4**	**72.1**	**3.9**	**15.2**

[1]Topsoil includes A-horizons (layers 1, 11, and 12) listed in the STATSGO database layer table.

[2]Slopes are grouped by the averages of the high and low slope ranges provided in the STATSGO database for each Map Unit Identifier (MUID) component soil series. For example, Tresano series, 3 to 10 percent slopes, is 20 percent of MUID CO010. Its average slope is 6.5 percent. The representative acreage, calculated by multiplying percent composition by the total MUID acreage, is included in the >5 to 8 percent slope class.

[3]Federal lands data based on BLM-provided land layers and USFS jurisdictional boundaries for the FGNRA and PNG.

[4]Slight discrepancies in state and project totals are due to rounding.

throughout this MLRA range from 6,200 to 7,200 feet amsl. The dominant soils are Orthents. They are shallow to very deep and medium to fine textured and have a frigid temperature regime, an aridic moisture regime, and mixed or montmorillonitic mineralogy. Torriorthents (Patent and Garsid series) and Haplargids (Diamondville and Fraddle series) are on piedmont plains, alluvial fans, and pediments. Torrifluvents are on floodplains. Shallow Torriorthents (Blazon and Haterton series) are on rough, broken slopes. Some Torriorthents (Elkol series) and Torrifluvents (Laney series) have a high content of exchangeable sodium (USDA 1978).

Wasatch and Uinta Mountains (MLRA 47). Most of the Wasatch and Uinta Mountains MLRA are federally owned. Elevations throughout this MLRA range from 4,900 to 8,900 feet amsl but may reach as high as 13,451 feet on some peaks. Orthents, Fluvents, Aquolls, and Xerolls are common soils in the valleys, while Ochrepts, Xerolls, Borolls, Boralfs, and Xeralfs are on mountain slopes. These soils have a frigid or cryic soils temperature regime and mixed, montmorillonitic, or carbonatic mineralogy. They formed in mixed parent materials of sedimentary and igneous rocks. Deep, wet soils in the valley are Haplaquolls (Crooked Creek, Canburn, and Kovich series). Well Drained Ustifluvents (Neto, Shupert, and Winetti series), Ustorthents (Podo and Ruko series), Xerorthents (Redcan series), and Calcixerolls (Calita and Lundy series) are in valleys. Palexerolls (Borvant series) are on old alluvial fans and low mountain foot slopes; they have a limecemented hardpan. On mountain slopes are shallow to deep Haploxerolls (Aggasiz, Bradshaw, and Foxol series), Haploborolls (Bryean and Datino series), Argixerolls (Henefer, Smarts, and Wallsburg series), Argiborolls (Barfuss and LaPlatta series), and Palexerolls (Harkers, Goring, and Norcan series). In the high mountain areas are deep Paleborolls (Lucky Star, Elzinga, and Flygare series), Paleboralfs (Fitzgerald series), Cryoborolls (Bickmore, Daybell, and Dateman series), Cryoboralfs (Cliff, Duchesne, and Condie series), Cryochrepts (Scout, Lake Janee, and Marsell series), and Cryorthents (Mirrow Lake series).

Southern Rocky Mountain Foothills (MLRA 49). Approximately 80 percent of Southern Rocky Mountain Foothills MLRA is occupied by farms and ranches, the remaining area is federally owned. Major streams dissect the area and provide irrigation water for narrow belts of cropland in their valleys. Water in the remaining areas is scarce. The physiography is characterized by rugged hills and low mountains occurring in narrow bands along the eastern slopes of the Rocky Mountains; elevations range from approximately 5,600 to 7,900 feet amsl. The soils in this MLRA are described Ustolls, Borolls, and Boralfs. They are mostly deep and have an ustic moisture regime, a mesic or frigid temperature regime, and mixed mineralogy. Deep loamy Argiustolls (Bresser series), Argiborolls (Peyton series), and Eutroboralfs are dominant. They formed mainly in locally transported sediments on the more smoothly sloping sites. Shallow Haplustolls and Torriorthents are on steep and broken hill slopes.

Sensitive Soils. The majority of Wyoming soils crossed by the proposed pipeline route would be susceptible to water and wind erosion. In Wyoming, 1.4 miles of prime farmland would be crossed, all of which is on private land. There are 18.2 miles of soils on slopes greater than 30 percent, approximately 4 miles of which are on federal land. Droughty soils are found on approximately 82.5 miles, approximately one-third of these are on federal land.

Localized areas in Wyoming contain hydric or compaction prone soils. Stony/rocky soils and shallow bedrock commonly occur along the proposed pipeline route in Wyoming.

Colorado

The proposed pipeline route in Colorado would cross three MLRAs: the Southern Rocky Mountain Foothills (MLRA 49), the Central High Plains (MLRA 67), and the Central High Tableland (MLRA 72). MLRA 49 (Southern Rocky Mountain Foothills) is described previously in Wyoming soils section.

Central High Plains (MLRA 67). Most of the Central High Plains MLRA is made up of farms and ranches utilized for cattle and sheep grazing. Larger rivers and local wells provide water for irrigation across an extensive acreage. Irrigated areas are used for production of agricultural crops such as corn, alfalfa, sugar beets, and vegetables. A small portion of this MLRA is dry-farmed of wheat and other grains. The physiography of the area is characterized as undulating to rolling plains which are moderately dissected by

streams, with steep slopes bordering the valleys of larger streams. Elevations range from approximately 3,600 to 5,900 feet amsl, increasing east to west. The soils are Ustolls and Argids that are deep and medium textured to fine textured with mixed or montmorillonitic mineralogy. They have an aridic moisture regime that is borderline to ustic and a mesic temperature regime. The nearly level to gently sloping, fine Paleustolls (Weld and Platner series) and loamy Haplargids (Fort Collins and Vona series) on uplands formed in eolian and alluvial materials under a cover of grass. Torriorthents, Haplustolls, and Argiustolls are the major included soils.

Central High Tableland (MLRA 72). The majority of the Central High Tableland MLRA is used for farming and ranches with 60 percent or more in cropland used mainly for dry-farming of winter wheat and other small grains. Good-quality groundwater is used for irrigation in uplands where crops such as corn, grain sorghum, and sugar beets are grown extensively. The remainder of the area is made up of hilly and steep slopes bordering drainageways; these areas are primarily used for grazing of native grasses and shrubs. The physiography of the area is characterized as smooth loess-mantled tableland with gently rolling to nearly level slopes; slope grade increases along the borders of major valleys. Broad level floodplains and terraces are found along the Arkansas and Platte rivers and their larger tributaries. Elevations range from 2,600 to 3,900 feet amsl, increasing from east to west. The soils in this MLRA are mostly Ustolls (USDA 1978). They are well drained and medium to moderately fine textured. They have a mesic temperature regime, an ustic moisture regime, and mixed or montmorillonitic mineralogy. On loess-mantled uplands, well drained Argiustolls (Keith, Kuma, Rago, and Richfield series) are in nearly level and gently sloping areas, Haplustolls (Ulysses series) in gently sloping and moderately sloping areas, and Torriorthents (Colby series) in steeper areas. Torriorthents (Canyon series) and Ustorthents (Canlon series) are shallow over caliche and are on the steeper and more broken slopes. Torripsamments (Valent series), on hummocky and duned eolian sands, are associated with Argiustolls (Haxtun series) and Haplustolls (Anselmo series). Haplustolls (Bridgeport, McCook, and Duroc series) are on floodplains and terraces.

Sensitive Soils. The majority of Colorado soils crossed by the proposed pipeline route are susceptible to erosion by water and wind. Approximately 56 percent of the proposed pipeline route crosses prime farmland in Colorado. Most of the soils crossed in Colorado have thin topsoil horizons, so a decline in soil productivity is a concern with loss of topsoil horizons.

MLRA 67 and MLRA 72 have compaction prone soils that would be within the disturbance corridor. Localized areas of hydric and droughty would be crossed. Less than 9 percent of the proposed pipeline route in Colorado would cross stony/rocky soils or shallow bedrock.

Kansas

The proposed pipeline route in Kansas would cross three MLRAs: the Central High Tableland (MLRA 72), the Rolling Plains and Breaks (MLRA 73), and the Central Loess Plains (MLRA 75). MLRA 72 (Central High Tableland) is described in Colorado soils section.

Rolling Plains and Breaks (MLRA 73). Most of the Rolling Plains and Breaks MLRA is used for farming. Approximately 60 percent is used for dry-farming of winter wheat and grain sorghum. Narrow bands of bottom land and terraces along major rivers, and their tributaries, are irrigated for agricultural production; small grains, corn, hay, and alfalfa are the principal crops in these areas. In the north, irrigation water is obtained from deep wells which capture abundant supplies of groundwater. Groundwater is less available in the south where shale and limestone are near the surface. The remaining areas are covered in native grasses and primarily used for livestock grazing. The physiography of the area is characterized as heavily dissected plains with broad undulating to rolling ridge tops. Valleys are hilly to steep and are generally narrow, but the Republican River and its larger tributaries exhibit broad floodplains and terraces. Elevations range from 1,600 to 3,000 feet amsl, increasing from east to west. Soils in this MLRA are Ustolls (USDA 1978). They are deep, well drained, and medium to moderately fine textured. These soils have a mesic temperature regime, and ustic moisture regime, and mixed and montmorillonitic mineralogy. The nearly level to moderately sloping Argiustolls (Harney and Holdrege series) are on loess-mantled uplands. Haplustolls (Uly series) and Ustorthents (Coly series) are on adjacent steeper slopes. Gently sloping and moderately sloping Haplustolls (Wakeen series) and Pellusterts

(Bogue seires) are moderately deep over shale on the more strongly dissected uplands. Haplustolls (Hord, McCook, and Roxbury series) and Ustifluvents (Hobbs and Munjor series) are on floodplains and terraces.

Central Loess Plains (MLRA 75). The majority of the Central Loess Plains MLRA is used for farming. Seventy-five percent of the area is dedicated to agricultural production of winter wheat, grain sorghum, hay, corn, and other small grains. The remaining 25 percent of the area is rangeland and pastureland used for beef cattle grazing. In most areas, groundwater is readily available, but the quality varies based on the nature of the underlying soils. In areas where clay and shale are near the surface, groundwater is scarce. The physiography of the area is characterized as nearly level to gently rolling plains dissected by narrow gently sloped stream valleys. Elevation ranges from 1,600 to 2,000 feet amsl, increasing from east to west. Most of the soils in this MLRA are deep silty Ustolls (USDA 1978) that formed in loess. They have a mesic temperature regime, an ustic moisture regime, and mixed mineralogy. Argiustolls (Hastings, Geary, Holder, Holdrege, and Crete series in the north and Irwin, Ladysmith, and Geary series in the south) are dominant soils on uplands. Agiustolls (Hall series) are on stream terraces of major streams or rivers. Argiaquolls (Butler series), Argialbolls (Fillmore series), and Pellusterts (Goessel series) are associated soils in level areas and in depressions. Strongly sloping to steep Ustorthents (Coly series) formed in loess. Ustifluvents (Hobbs series) are on floodplains, and Haplustolls (Hord series) are on stream terraces. Shallow, strongly sloping to steep Haplustolls (Kipson series) formed in material weathered from shale.

Sensitive Soils. Approximately 18 percent of the soils crossed in Kansas are susceptible to water and/or wind erosion. Hydric soils, droughty soils, stony/rocky soils, and shallow bedrock occur in small localized areas along the proposed pipeline route. Approximately 1.5 miles of hydric soils would be crossed in Kansas. Areas of compaction prone soils would be crossed on land that is not federally managed. Approximately 4.2 miles of stony/rocky soils, 12.7 miles of shallow bedrock, and 1.1 miles of droughty soils would be crossed in Kansas.

3.4.2 Southern Energy Corridor – Copper Ridge Bypass Alternative

Characteristics of the soils associated with the Southern Energy Corridor – Copper Ridge Bypass Alternative route and the corresponding segment of the proposed pipeline route have been provided in **Tables 3.4-3** and **3.4-4**. The alternative route would cross fewer miles of prime farmland relative to the corresponding segment of the proposed pipeline route. However, the alternative route would cross more miles of soils susceptible to erosion caused by wind and water, hydric soils, stony-rocky soils, shallow depth to bedrock, and droughty soils. Soils with topsoil depths of 0 to 6 inches and greater than 6 inches to 12 inches would be comparable between the alternative and corresponding segment of the proposed pipeline route. However, the alternative route would traverse approximately 6.5 miles of soils with topsoil depths greater than 12 inches compared with the corresponding segment of the proposed pipeline route, which would not cross soils with topsoil depths of greater than 12 inches. In addition, the alternative route would traverse more miles of steeper slopes than the corresponding segment of the proposed pipeline route.

Sensitive Soils. The majority of soils crossed by the alternative route are on moderately to steeply sloping ground and would be susceptible to water and wind erosion. Localized areas along the alternative route contain hydric soils. Shallow bedrock, stony/rocky, and droughty soils commonly occur along the alternative route.

Table 3.4-3 Mileage Summary of Soil Characteristics for the Alternative and Corresponding Segment of the Proposed Pipeline Route

	Highly Erodible Water[1]	Highly Erodible Wind[2]	Prime Farmland[3]	Hydric[4]	Compaction Prone[5]	Stony-Rocky[6]	Shallow-to-Bedrock[7]	Droughty[8]
Proposed Action Segment	24.9	0.2	0.2	0.0	0.0	2.7	20.1	24.7
Southern Energy Corridor – Copper Ridge Bypass Alternative	30.8	1.5	0.0	0.2	0.0	3.1	24.6	30.6

[1]Includes land in capability subclasses 4E through 8E and soils with slopes greater than or equal to 9 percent.

[2]Includes soils in wind erodibility groups 1 and 2.

[3]Includes land listed by the NRCS as potential prime farmland if adequate protection from flooding and adequate drainage are provided.

[4]As designated by the NRCS.

[5]Includes soils that have clay loam or finer textures in somewhat poor, poor, and very poor drainage classes.

[6]Includes soils that have either: 1) a cobbley, stony, bouldery, gravelly, or shaly modifier to the textural class or 2) have >5 percent (weight basis) of stones larger than 3 inches in the surface layer.

[7]Includes soils that have bedrock within 60 inches of the soil surface.

[8]Includes coarse-textured soils (sandy loams and coarser) that are moderately well to excessively drained.

Table 3.4-4 Mileage Summary of Topsoil Depth and Average Slope Class for the Alternative and Corresponding Segment of the Proposed Pipeline Route

	Topsoil[1] (inches)					Slope[2] (percent)				
	0-6	>6-12	>12-18	>18-24	>24	0-5	>5-8	>8-15	>15-30	>30
Proposed Action Segment	17.8	7.0	0.0	0.0	0.0	22.7	0.0	2.0	0.00	0.0
Southern Energy Corridor – Copper Ridge Bypass Alternative	22.7	1.6	4.9	1.7	0.0	8.9	3.1	14.1	2.5	2.2

[1]Topsoil includes A horizons (layers 1, 11, and 12) listed in the STATSGO database layer.

[2]Slopes are grouped by the averages of the high and low slope ranges provided in the STATSGO database for each MUID component soil series.

3.5 Water Resources

3.5.1 Proposed Action

3.5.1.1 Surface Water

Surface water resources along the proposed pipeline route are partitioned into three watershed regions and 28 sub-basins (Seaber et al. 1994), as presented in **Table 3.5-1** and depicted in **Figure 3.5-1**.

Surface Water Quality

The CWA, Section 303(d), requires each state to review, establish, and revise water quality standards for all surface waters within the state. To comply with this requirement, each state crossed by the proposed pipeline route has developed its own beneficial use classification system to describe state-designated use(s). Regulatory programs for water quality standards include default narrative standards, non-degradation provisions, and associated minimum water quality requirements for the designated uses of listed surface waterbodies within the state.

The proposed pipeline route would cross 97 perennial waterbodies, 789 intermittent waterbodies, and 13 playas/ponds. Based on consultation with each state's USACE office, no waterbodies crossed by the proposed pipeline are designated as Section 10 navigable waters under the Rivers and Harbor Act, as defined by Title 33 CFR, Section 328. The Flaming Gorge Reservoir (Green River) is navigable from the headwaters of the reservoir (just south of the confluence of Bitter Creek and the Green River) to the Wyoming-Utah state line (NRG 2006).

A complete list of waterbody crossings, their state use classifications, and Section 303(d) impairment status where applicable is provided in **Appendix F**. Waterbody crossings of note have been summarized into sub-lists below for clarification. **Table 3.5-2** lists all major and sensitive waterbody crossings along the proposed pipeline route, which are defined as those with widths greater than 100 feet and streams classified by the state as high quality aquatic resources. **Table 3.5-3** provides a list of all impaired waterbody crossings, which include streams identified on the national Section 303(d) list as impaired waters for one or more chemical parameters. The complete list of waterbody crossings provided in **Appendix F**, also includes a number of lakes and small ponds, which may be greater than 100 feet wide. The majority of these crossings appear to be playas which are often dry for part of the year.

Wyoming. The State of Wyoming classifies surface waters into six uses and four classes. Surface water uses include agriculture, protection and propagation of fish and wildlife, industry, human consumption, recreation, and scenic value. **Appendix F** indicates surface water classifications in more detail. The four surface water classes include:

Class 1: Waters with the highest natural water quality and/or other qualities with extraordinary value to the people of Wyoming;

Class 2: Waters that are known to support fish or drinking water supplies;

Class 3: Waters that support aquatic life other than fish; and

Class 4: Waters that do not support aquatic life.

As indicated in **Table 3.5-2**, there are a total of seven major or sensitive crossings in Wyoming. Overland Pass proposes to cross all of these using the open cut method. The Hams Fork River, Blacks Fork River, Green River, and Bitter Creek are noted because they are considered sensitive fisheries. For further discussion on these sensitive fisheries, refer to Aquatic Resources in Section 3.7. The proposed Bitter Creek and Green River crossings are on federally managed lands. The Green River is listed as a Class 1 Surface Water by the State of Wyoming which identifies it as an Outstanding National Resource Water (ONRW).

Table 3.5-1 Watersheds Crossed by the Proposed Project

State / Regional Watershed / Sub-basin Cataloging Unit	Overall Area (Sq. Mi.)	General Characteristics	Stream Gage Location: High Flow / Low Flow, cubic feet per second (cfs)[1]	Begin RP	End RP
WYOMING					
Upper Colorado River Basin Watershed					
Blacks Fork	2,700	Mountain uplifts and mesas, valleys with rolling alluvial fans, floodplains, and terraces. Mountain watercourses have moderate gradient with cobble or gravel substrates. Streams originating in the center of the basin are more incised, with lower gradients and finer gravel substrates derived from shales. Small streams are ephemeral or weakly intermittent with sand or platy shale substrates.	Blacks Fork near Little America: 995 (June) / 71 (December)	0.0	47.9
Upper Green River – Slate Creek	1,480		See Green River below	47.9	53.8
Upper Green – Flaming Gorge Reservoir	2,460		Green River near Green River: 4,590 (June) / 744 (December)	53.8	62.0
Bitter Creek	2,200		Bitter Creek near Bitter Creek: 15 (April) / 0.87 (January)	62.0	119.1
Great Divide Closed Basin	3,870	Unglaciated basin (little or no external drainage); dispersed playas and sand dunes, floodplains and terraces, and rolling alluvial fans. Streams are ephemeral or weakly intermittent. Many streams are incised and flow onto playas. Substrate commonly is fine textured material or platy shale gravels. Playas are seasonal and have high level of soluble salts.	Separation Creek near Riner: 9.7 (May) / 0.0 (September)	119.1	173.6
Missouri River Basin Watershed					
Upper North Platte River	2,880	Unglaciated plains with hills, rolling alluvial fans, floodplains and terraces. On the northern edge of partially glaciated, low mountain slopes and outwash fans. Streams and rivers originating in the mountains have moderate gradient with cobble or gravel substrates.	North Platte River above Seminoe Reservoir near Sinclair: 4,280 (June) / 317 (January)	173.6	223.4
Medicine Bow River	1,430		Rock Creek at Arlington: 424 (June) / 11 (December)	223.4	243.6
Upper Laramie River	2,180	Unglaciated wide intermontane valley with floodplains, low terraces. Streams and rivers are moderate gradient, riffle/run. Substrate is generally cobble, glacial outwash material consisting of granite, limestone, and quartzite.	Laramie River at Laramie: 524 (June) / 35 (January)	243.6	291.8

Table 3.5-1 Watersheds Crossed by the Proposed Project

State / Regional Watershed / Sub-basin Cataloging Unit	Overall Area (Sq. Mi.)	General Characteristics	Stream Gage Location: High Flow / Low Flow, cubic feet per second (cfs)[1]	Begin RP	End RP
Cache La Poudre River	1,910	Partially glaciated low mountain slopes, hills, ridges, footslopes and outwash fans. Low to high gradient perennial, intermittent, and ephemeral streams. Bedrock and boulder substrates transitioning to coarse to fine gravel and cobble substrates.	No data in Wyoming near proposed ROW	291.8	295.0
Lone Tree Creek – Owl Creek	573	Irregular unglaciated plains of moderate relief. Intermittent streams, and a few large perennial streams that mostly originate in higher relief areas. Silty and sandy substrates. Small, open, depressional wetlands scattered throughout.	Lone Tree Creek near Granite Canyon: 7.1 (May) / 0.62 (December)	295.0	321.1
COLORADO					
Lone Tree Creek – Owl Creek	573	Irregular unglaciated plains of moderate relief. Intermittent streams, and a few large perennial streams which mostly originate in higher relief areas. Silty and sandy substrates. Small, open, depressional wetlands scattered throughout.	Lone Tree Creek at Carr: 0.99 (June) / 0.25 (August)	321.1	337.5
Crow Creek	1,410		Crow Creek near Barnesville: 0.0 (all months)	337.5	368.4
Pawnee Creek	728	Flat to rolling plains. Intermittent streams, with a few large perennial streams. Silty and sandy substrates. Small, open, depressional wetlands scattered throughout.	No data	368.4	386.3
Middle South Platte River – Sterling	2,900	Northwest of the South Platte River are flat to rolling plains, intermittent streams, with a few large perennial streams. Silty and sandy substrates. Small, open, depressional wetlands scattered throughout. Southeast of the South Platte River, the sandhill drainage network is not well established due to a lack of runoff and sand-choked drainages with disappearing subterranean streams.	South Platte River at Balzac: 1,460 (June) / 143 (November)	386.3	429.9
North Fork Republican River	3,290	West: flat to rolling plains, intermittent streams, with a few large perennial streams. Silty and sandy substrates. Small, open, depressional wetlands scattered throughout. East: sandhill drainages that are not well established due to a lack of runoff and sand-choked drainages with disappearing subterranean streams.	North Fork Republican River near Wray: 24 (April) / 19 (September)	429.9	480.6
Arikaree River	1,710	Irregular moderately sloping plains and flat or rolling plains, with intermittent streams, and a few large perennial streams. Silty and sandy substrates. Small, open, depressional wetlands scattered throughout.	Arikaree River above Spring Canyon near Idalia: 4.3 (April) / 0.0 (August)	480.6	492.3

Table 3.5-1 Watersheds Crossed by the Proposed Project

State / Regional Watershed / Sub-basin Cataloging Unit	Overall Area (Sq. Mi.)	General Characteristics	Stream Gage Location: High Flow / Low Flow, cubic feet per second (cfs)[1]	Begin RP	End RP
KANSAS					
Arikaree River	1,710	Irregular moderately sloping plains and flat or rolling plains, with intermittent streams, and a few large perennial streams. Silty and sandy substrates. Small, open, depressional wetlands scattered throughout.	Arikaree River above Spring Canyon near Idalia: 4.3 (April) / 0.0 (August)	492.3	496.0
South Fork Republican River	2,720		South Fork Republican River near Colorado – Kansas state line: 10 (June) / 1.1 (August)	196.0	523.8
Little Beaver Creek	604	Southwest: Flat to rolling plains. Few streams, mostly intermittent. Loess-mantled uplands with alluvial deposits. Sandstone and siltstone with thin loess mantle. Northeast: Sandy undulating plains with small scattered areas of active sand dunes. Few perennial streams.	No data	523.8	534.3
South Fork Beaver Creek	771		No data	534.3	541.6
Upper Sappa Creek	1,020		South Fork Sappa Creek near Achilles: 11 (June) / 0.18 (November)	541.6	560.5
Prairie Dog Creek	1,060	Rolling plains and dissected breaks with broad undulating to rolling ridge tops and hilly to steep valley sides. Tertiary sandstone and loess on uplands with alluvium on floodplains and stream terraces.	No data near proposed ROW	560.5	566.4
Upper North Fork Solomon River	1,350		No data near proposed ROW	566.4	574.7
Upper South Fork Solomon River	1,150		No data near proposed ROW	574.7	590.5
Upper Saline River	1,910		Saline River near Wakeeney: 45 (July) / 4.2 (December)	590.5	621.7
Big Creek	852		Big Creek near Ogallah: 80 (June) / 3.1 (December)	621.7	639.5
				640.2	641.0
				661.0	671.6
Middle Smoky Hill River	1,590	West: Dissected plains with broad undulating ridge tops and steep valley slopes. East: Undulating to hilly dissected plains. Broad belt of low hills formed by mature dissection of sedimentary rock layers, locally mantled with thin loess.	Smoky Hill River at Pfeifer: 188 (June) / 18 (January)	639.5	640.2
				641.0	661.0
				671.6	693.9
Little Arkansas	1,320	Plains and ridgetops locally mantled with loess. Dissected sedimentary rocks form valley slopes. Areas of sandy plains and dunes.	Little Arkansas River near Little River: 25 (June) / 1.5 (December)	733.9	748.9
				749.1	749.4
Lower Smoky Hill	1,980	Undulating to hilly dissected plain locally mantled with thin loess. Broad belt of low hills formed by mature dissection of sedimentary rock layers.	No representative data – proposed ROW on watershed divide.	748.9	749.1

Table 3.5-1 Watersheds Crossed by the Proposed Project

State / Regional Watershed / Sub-basin Cataloging Unit	Overall Area (Sq. Mi.)	General Characteristics	Stream Gage Location: High Flow / Low Flow, cubic feet per second (cfs)[1]	Begin RP	End RP
Arkansas Red-White River Basin Watershed					
Cow	938	Plains and ridgetops locally mantled with loess. Dissected sedimentary rocks form valley slopes. Areas of sandy plains and dunes.	Cow Creek near Claflin: 18 (May) / 1.7 (December)	693.9	733.9
Little Arkansas	1,320		Little Arkansas River near	744.2	748.9
			Little River: 25 (June) / 1.5 (December)	749.1	749.4

Sources: USEPA 2006a; USGS 1998; USGS National Water Information System 2007.

[1]Flow values are monthly averages in cubic feet per second for the highest average flow month and lowest average flow month.

Table 3.5-2 Summary of Major and Sensitive Waterbody Crossings Along the Proposed Project

State / County	RP	Waterbody Name	Proposed Crossing Method	Comment [1]
Wyoming				
Lincoln	0.9	Hams Fork River	Open Cut	Sensitive Fishery
Lincoln	18.9	Blacks Fork River	Open Cut	Major Waterbody, Sensitive Fishery
Sweetwater	41.3	Blacks Fork River	Open Cut	Major Waterbody, Sensitive Fishery
Sweetwater	59.3	Green River [2, 3]	Open Cut	Major Waterbody, Sensitive Fishery
Sweetwater	107.2	Bitter Creek [2]	Open Cut	Sensitive Fishery
Carbon	195.5	North Platte River	Open Cut	Major Waterbody
Carbon	228.1	Medicine Bow River	Open Cut	Major Waterbody
Colorado				
Logan	413.2	South Platte River	HDD	Major Waterbody
Yuma	491.7	Arikaree River	Open Cut	Major Waterbody
Kansas				
Cheyenne	510.4	South Fork Republican River	Open Cut	Major Waterbody

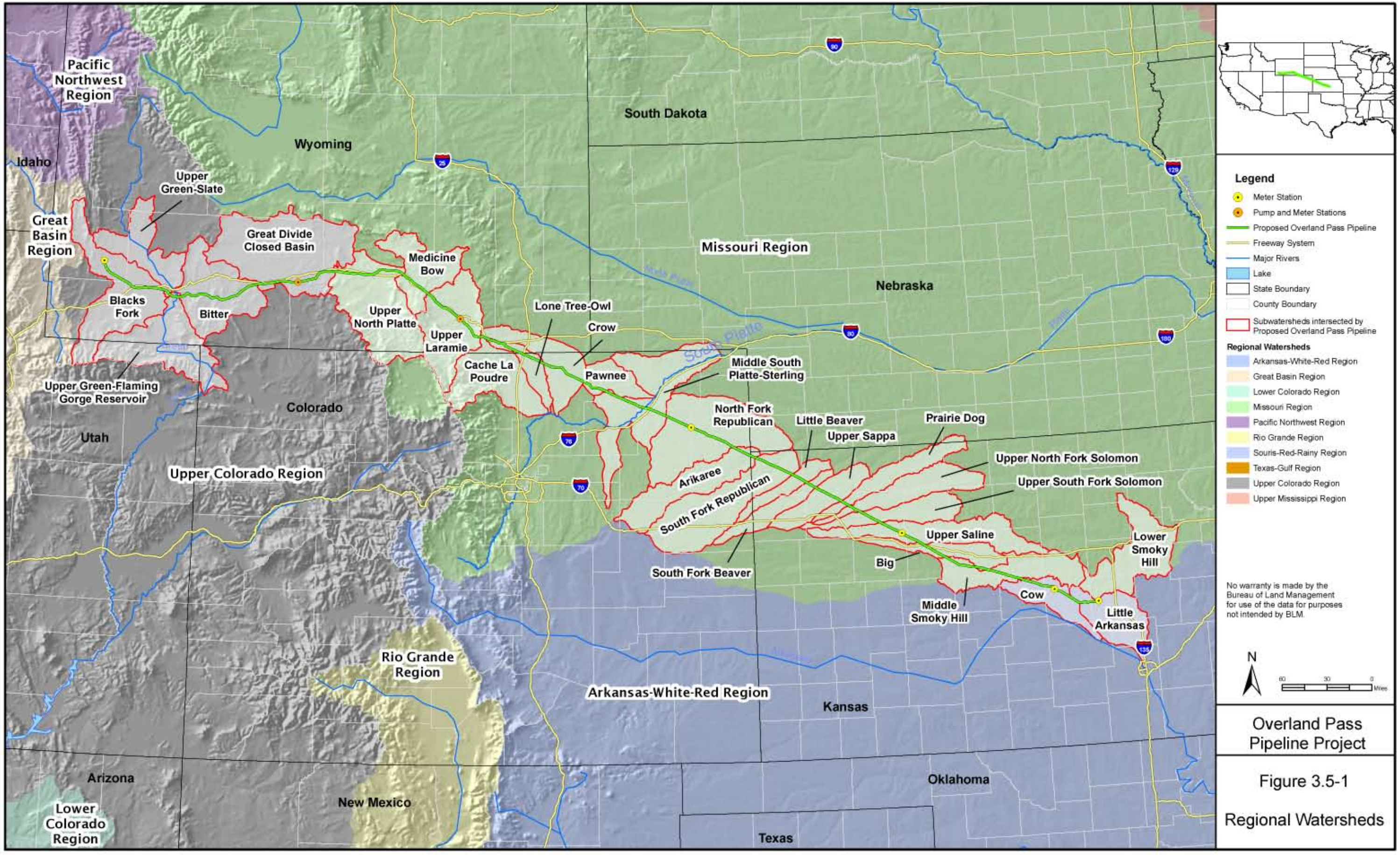
[1] Waterbody crossings greater than 100 feet are considered major. Playas/ponds were not included in this list. However, if water greater than 100 feet were present during construction then these would be classified as major waterbodies and treated accordingly.

[2] Crossing on federally managed land.

[3] Classified as an ONRW and Wyoming Class 1 Water.

Table 3.5-3 Summary of Impaired Waterbody Crossings Along the Proposed Project

State / County	RP	Waterbody Name	Intermittent or Perennial	303(d) Impairment
Wyoming				
Lincoln	18.9	Blacks Fork River	P	Fecal Coliform
Carbon	195.5	North Platte River	P	Selenium
Colorado				
Logan	413.2	South Platte River	P	Nitrates, *E. coli*
Kansas				
Rawlins	531.5	Little Beaver Creek	I	Dissolved Oxygen, Fluoride
Rawlins	538.6	Beaver Creek	P	Dissolved Oxygen, Fluoride
Trego	637.4	Big Creek	P	Dissolved Oxygen
Barton	684.3	Landon Creek	I	Selenium
Barton	691.7	Deception Creek	I	Turbidity, Chloride, Sulfate
Barton	699.5	Cow Creek	I	Chloride
Ellsworth	710.9	Calf Creek	I	Chloride
Ellsworth	715.3	Plum Creek	P	Chloride
Rice	720.4	Lost Creek	I	Chloride
Rice	730.0	Owl Creek (2 crossings)	I	Chloride, Zinc
Rice	730.1	Owl Creek	I	Chloride, Zinc
Rice	740.6	Little Arkansas River	P	Atrazine, Copper, Chloride
Rice	742.1	Salt Creek	I	Ammonia, Atrazine, Copper, Chloride, Nitrate, Nitrite
McPherson	745.7	Lone Tree Creek	I	Atrazine, Chloride, Copper



Overland Pass Pipeline Project

Figure 3.5-1

Regional Watersheds

As indicated in **Table 3.5-3**, two proposed waterbody crossings in Wyoming have been identified on the Section 303(d) list of impaired waters; the Blacks Fork River is listed for fecal coliform and the North Platte River for selenium.

As noted in **Appendix F**, there also are five playa/pond crossings in Wyoming. Frewen Lake and the playa at RP 190.6 in Carbon County are on federally managed land and are greater than 1,000 feet wide. The three remaining proposed playa/pond crossings are approximately 250 feet wide. All five proposed playa/pond crossings in Wyoming are classified as 3B by the state, which in Wyoming includes tributary waters and adjacent wetlands not known to support fish populations or drinking water supplies.

Colorado. When setting water quality standards, the State of Colorado first designates waterbodies by use (aquatic life, water supply, recreation, or agriculture), and then also adopts numeric or narrative quality standards to protect those classified uses. These beneficial uses are identified in **Appendix F**. The state classified uses for surface water are:

- Aquatic Life Cold, Class 1 or 2;
- Aquatic Life Warm, Class 1 or 2;
- Recreation Class 1 or 2;
- Domestic Water Supply;
- Agriculture; and
- Wetland.

The two major stream crossings proposed in Colorado are on the South Platte River and the Arikaree River (**Table 3.5-2**). There are no sensitive waterbody crossings proposed. Overland Pass proposes to cross the South Platte River using the HDD method, while the Arikaree River would be crossed using the open cut method.

Only one 303(d) listed impaired waterbody crossing is proposed to be crossed by the proposed pipeline route (**Table 3.5-3**). The South Platte River is Section 303(d) listed as impaired for nitrates and *E. coli*.

The project proposes to cross seven unnamed playas/ponds in Colorado (**Appendix F**). Four of the crossings are less than 250 feet wide, one is less than 100 feet wide, and one is of unknown width. The playa at RP 376.4 is on federally managed land.

Kansas. The State of Kansas classifies surface waters into four classes and six designated uses within each of these four classes. The four surface water classifications are defined structurally as stream segments, lakes, wetlands, and ponds. The six designated uses within each of these classifications include agriculture, aquatic life, domestic water supply, groundwater recharge, industrial, and recreation, as identified for the proposed waterbody crossings in **Appendix F**.

The South Fork Republican River is the only major stream crossing proposed in Kansas (**Table 3.5-2**). Overland proposes to cross this river using the open cut method.

Fifteen proposed crossings on 13 streams (Owl Creek is to be crossed 3 times) have been identified as Section 303(d) impaired waterbodies for various chemical parameters as specified in **Table 3.5-3**. All stream crossings in Kansas are proposed to be crossed using the open cut method.

Only one small playa at RP 527.7 is proposed to be crossed in Kansas. The proposed crossing is less than 100 feet wide (**Appendix F**).

Public Water Supplies

Waterbodies that serve as public water supply intakes are located within several miles downstream of proposed pipeline crossings and are identified in **Table 3.5-4**. Three downstream water supply intakes are located in Carbon County, Wyoming. There are no surface water intakes within 10 miles of the project in Colorado. Two surface water intakes, one in Ellis County and one in Russell County, are both owned by the City of Russell, Kansas.

Table 3.5-4 Surface Water Intakes Within 10 Miles Downstream of Proposed Crossings

State / County	RP	Distance (miles) / Direction from Construction	Hydrologic Connections	Downstream Feature
Wyoming				
Carbon	190.9	4.8 / North	North Platte River crossing	Intake for City of Rawlins
Carbon	195.5	0.9 / North	North Platte River crossing	Intake for WY DOT Ft. Steele Rest Area
Carbon	240.2	0.9 / Northeast	Rock Creek crossing	Water Intake for City of Rock River
Colorado				
There are no surface water intakes within 10 miles of proposed stream crossings in Colorado.				
Kansas				
Ellis	670.4	2.4 / Southwest	Tributary crossing to Smoky Hill River	Intakes for City of Russell
Russell	679.2	7.8 / Northeast	Smoky Hill River crossing to Big Creek	

Source: NRG 2006.

Sediment Quality

The USEPA has established a database of National Sediment Quality Survey sampling points to monitor sediment quality and identify areas that contain contaminated sediments. A Tier 1 site is one where sediment quality is such that associated adverse effects on aquatic life or human health are probable. A Tier 2 site is one where sediment quality is such that associated adverse effects on aquatic life or human health are possible (USEPA 2004). Given that sediment is transported as a natural result of surface flow dynamics, the possibility exists that sediment quality upstream or downstream of Tier 1 or Tier 2 sampling points may have adverse effects on aquatic life or human health. No Tier 1 or Tier 2 sampling points were found to be located within 10 stream- or river-miles of the proposed ROW (USEPA 2004a). Although the USEPA sediment survey is of limited coverage, it appears unlikely that contaminated sediments occur along the proposed ROW.

3.5.1.2 Groundwater

Regional Aquifers

Groundwater resources in the analysis area occur in three major regional aquifer systems. From west to east, these include (Miller and Appel 1997; Robson and Banta 1995; Whitehead 1996):

1. The Colorado Plateaus aquifer system;
2. The High Plains aquifer system; and
3. The Great Plains aquifer system (mapped as Lower Cretaceous aquifers and other rocks).

The primary regional aquifer systems along the pipeline route are described in **Table 3.5-5** and depicted in **Figure 3.5-2**. Within the project area, the Colorado Plateaus aquifer system is mainly composed of Tertiary- and Cretaceous-aged consolidated sedimentary rocks within the Wyoming Basins physiographic province (Thornbury 1965; Whitehead 1996). The depth to water and the quality of water in this region vary considerably. The Colorado Plateaus aquifer system is generally separated from the High Plains system by the Southern Rocky Mountains uplift, smaller basins and valleys, and exposures of Sherman Granite. Primary aquifer zones in the basins and valleys of the Southern Rocky Mountains consist of consolidated sedimentary rocks of Lower Tertiary and Upper Cretaceous age. The Sherman Granite extends from approximately project RP 291.5 to RP 307.5 and provides relatively little water to wells.

To the east, the High Plains aquifer system is composed of Tertiary-aged consolidated sedimentary rocks, of which the Ogallala Formation is a major waterbearing unit. Groundwater of good quality is extensively pumped from this system, primarily for irrigation use. The High Plains aquifer system is separated from the Great Plains aquifer system by thick confining units of shale, chalk, and limestones of Upper Cretaceous age that are exposed in north-central Kansas. These formations, labeled as “Other rocks” on **Figure 3.5-2**, generally provide little or no water to wells. The Great Plains aquifer system has limited extent along the proposed pipeline route. It largely occurs within the Plains Border physiographic section, which is a broadly defined area of dissected tablelands in central Kansas (Thornbury 1965). This system is also composed of consolidated sedimentary rocks, generally of Lower Cretaceous age. It occurs in scattered areas along the easternmost portion of the proposed ROW.

In addition to these regional systems of sedimentary bedrock aquifers, unconsolidated surficial deposits of Quaternary streamlain alluvium and eolian sands and silts also provide water to wells in the project area. Alluvial aquifers occur in relatively thin, narrow bands of gravels, sands, and silts along major rivers and streams. Eolian deposits occur in isolated irregular areas, and primarily occur near the South Platte River in northeastern Colorado.

Further details on groundwater resources within each state along the proposed ROW are provided below and in **Table 3.5-5**. The descriptions focus on major near-surface aquifers that would have the primary potential to be affected by the proposed project. In almost all of these water-bearing units, groundwater is primarily held in small fractures (secondary porosity), as opposed to pore spaces between sediment grains that result from deposition (primary porosity). Deeper aquifer zones occur throughout the regions, but are isolated from potential project impacts by thick or relatively impermeable overlying rocks.

Wyoming. Shallow alluvial aquifers are primarily associated with the larger streams and rivers across Wyoming. Examples of waterbodies associated with comparatively extensive alluvial aquifers include the Hams Fork River, Blacks Fork River, Green River, North Platte River, Medicine Bow River, Rock Creek, and the Laramie River. In most other locations along streams, the alluvial deposits are too narrow or are too elevated above the water table to act as significant sources of groundwater.

By far, mining is the overall primary use of groundwater in the counties along the Wyoming portion of the proposed ROW, particularly in Sweetwater County (USGS 2000). Additional uses include domestic and municipal supplies, other industrial supplies, and agricultural uses. Dominant uses vary between specific counties and locales. For example, public water supply in Albany County is the primary use of groundwater (USGS 2000).

Two aquifer protection areas exist in Wyoming along the proposed ROW; the Elk Mountain Sole Source Aquifer (near RP 224 to RP 234), and the Casper Aquifer protection zone (near RP 281). The dominant geologic formation along the proposed ROW through the Elk Mountain area is the Hanna Formation (Lowry et al. 1973). This consists of alternating beds of sandstone, conglomerate, shale, and coal of Paleocene/Eocene age (Bartos et al. 2006).

Table 3.5-5 Aquifer Zones near the Land Surface

State / Regional Aquifer System / Aquifer	Approximate RP Locations	Approximate Depth to Water, feet below ground surface	Range in Dissolved Solids Concentration milligrams per liter (mg/l)[1]	Rock Types	Other Characteristics	References[2]
WYOMING						
Colorado Plateaus						
Laney Member, Green River Formation	0 to 50	Varies widely; in places less than 200	1,000 to 3,500	Marlstone, fine-grained sandstone, siltstone; varying amounts of oil shale and limestone	Underlain by Wilkins Peak-Tipton Shale members, which outcrop from approximately RP 50 to 60	Naftz 1996; Whitehead 1996; USGS-National Water Information System (NWIS) 2006.
Bridger Formation	10 to 40	Generally less than 200	500 to 1,500	Mudstone	Confining unit; overlies the Laney Member in most of the area west of the Green River	Naftz 1996; Whitehead 1996; USGS NWIS 2006.
Wilkins Peak / Tipton Shale members	50 to 60	Varies; likely 500 or more	500 to 2,000	Shale and organic marlstone	Member parts of Green River Formation. Typically a confining unit providing little water to wells	Mason and Miller 2005; Whitehead 1996.
Wasatch Formation	60 to 155	Locally less than 200 along edges of Rock Springs uplift	200 to 3,700	Sandstone and shale	Outcrops around dome-like Rock Springs uplift, and in Great Divide Basin; stratigraphically overlies Fort Union aquifers	Mason and Miller 2005; Whitehead 1996.
Fort Union Formation	Primarily 155 to 165	Locally less than 200, generally 200 to 500	800 to 3,320	Sandstone, shale, and coal	Also outcrops around Rock Springs uplift	Mason and Miller 2005; Whitehead 1996.
Mesa Verde Aquifer (Lance Formation, Fox Hills Sandstone, Lewis Shale, and Mesa Verde Group)	60 to 125, 165 to 200	Locally less than 200 along edges of Rock Springs uplift, locally less than 100 near Rawlins	1,000 to 10,000	Sandstone and shale	Outcrops around dome-like Rock Springs uplift; confined in middle of uplift; stratigraphically underlies Fort Union formation. Also outcrops at Rawlins uplift to east	Mason and Miller 2005; Whitehead 1996; Bartos et al. 2006; Berry 1960.

Table 3.5-5 Aquifer Zones near the Land Surface

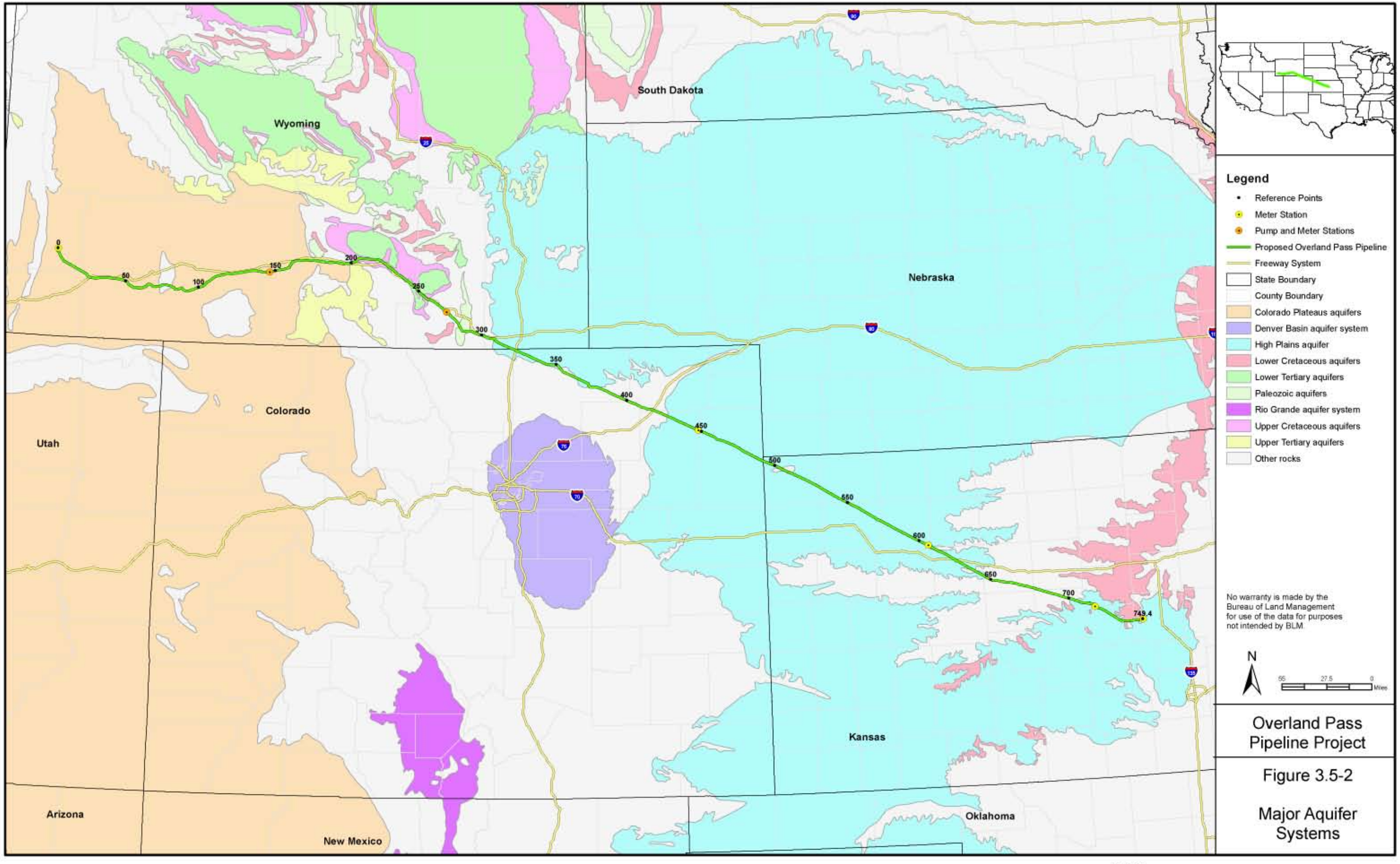
State / Regional Aquifer System / Aquifer	Approximate RP Locations	Approximate Depth to Water, feet below ground surface	Range in Dissolved Solids Concentration milligrams per liter (mg/l)[1]	Rock Types	Other Characteristics	References[2]
Upper Tertiary						
Browns Park/North Park/Arikaree formations	200 to 215	200 or more	100 to 750	Dominantly sandstones, with siltstones and conglomerates	Complex stratigraphy and different naming conventions between references	Lowry et al. 1973; Bartos et al. 2006.
Lower Tertiary / Upper Cretaceous						
Hanna and Ferris formations	215 to 250	Locally less than 50	200 to 4,000	Sandstones	Lower Tertiary intermingled with Upper Cretaceous	Lowry et al. 1973; Bartos et al. 2006.
Medicine Bow, Lewis Shale and Mesa Verde Aquifers	215 to 250	Locally less than 50	200 to 4,000	Sandstones and shales	Upper Cretaceous intermingled with Lower Tertiary	Lowry et al. 1973; Bartos et al. 2006.
Wind River Formation	250 to 260	50 to 100	1,000 to 2,000	Sandstones	Tertiary	Lowry et al. 1973.
Other Rocks						
Quaternary Valley Fills and Alluvium	260 to 275	10 to 20	Less than 1,000	Mixed gravels, sands, and silts	Recent unconsolidated deposits, Laramie Basin	Lowry et al. 1973.
Casper Formation	275 to 290	300 or more	500 or less	Sandstones and limestones	Water depth and quality vary according to lithology and location on uplift. Important water source	City of Laramie 2006.
Sherman Granite	290 to 307				Precambrian age; forms uplift. Supplies little groundwater to wells or springs	Love and Christiansen 1985.
High Plains						
White River and Ogallala formations	307 to 325	100 to 300	Less than 500	Conglomerate, sandstone, claystone	Miocene-aged formations, Ogallala underlain by the White River, including Brule and Chadron members	Love and Christiansen 1985; Lowry and Crist 1967.
COLORADO						
White River and Laramie formations	325 to 380	200 or more	200 to 400	Sandstone, claystone	Miocene-aged formations, White River includes Brule and Chadron members	Tweto 1979; Lowry and Crist 1967.

Table 3.5-5 Aquifer Zones near the Land Surface

State / Regional Aquifer System / Aquifer	Approximate RP Locations	Approximate Depth to Water, feet below ground surface	Range in Dissolved Solids Concentration milligrams per liter (mg/l)[1]	Rock Types	Other Characteristics	References[2]
Other Rocks						
Eolian sands and Quaternary Alluvium	380 to 430	0 to 200 or more	Less than 500	Unconsolidated sands, silts, and gravels	Platte River alluvium and nearby sandhills	Tweto 1979.
High Plains						
Ogallala Formation	430 to 490	Mostly 100 to 300, but 0 to 50 near CO/KS line	Less than 500	Conglomerate, sandstone, claystone	Irrigation pumping has modified the depth to water in many areas. Extensive aquifer	Robson and Banta 1995; McGuire 2005.
KANSAS						
High Plains						
Ogallala Formation	490 to 650	100 to 300	Less than 500	Conglomerate, sandstone, claystone	Irrigation pumping has modified the depth to water in many areas. Extensive aquifer	Robson and Banta 1995; McGuire 2005.
Other Rocks						
Pierre Shale, Niobrara Formation	650 to 700	500 or more	1,000 or more	Shales, marlstones	Generally of Cretaceous age, these rocks supply little water to wells or springs	Latta 1950.
Ogallala Formation	700 to 749	100 to 300	Less than 500	Conglomerate, sandstone, claystone	Irrigation pumping has modified the depth to water in many areas. Extensive aquifer	Robson and Banta 1995; McGuire 2005.
Dakota Formation	740 to 749	300 or more	100 to 800	Sandstones of Cretaceous age	Typically confined by overlying Carlile and Graneros shales, and/or Greenhorn limestone	Latta 1950.

[1]As reported for shallower portions of aquifers. Produced water from deeper zones may have much higher concentrations.

[2]References are reported in the respective EIS section.


Wyoming
South Dakota
Nebraska
Colorado
Utah
Kansas
Oklahoma
Arizona
New Mexico
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
749.4
Legend
Reference Points
Meter Station
Pump and Meter Stations
Proposed Overland Pass Pipeline
Freeway System
State Boundary
County Boundary
Colorado Plateaus aquifers
Denver Basin aquifer system
High Plains aquifer
Lower Cretaceous aquifers
Lower Tertiary aquifers
Paleozoic aquifers
Rio Grande aquifer system
Upper Cretaceous aquifers
Upper Tertiary aquifers
Other rocks
No warranty is made by the Bureau of Land Management for use of the data for purposes not intended by BLM.
N
55
27.5
0
Miles
Overland Pass Pipeline Project
Figure 3.5-2
Major Aquifer Systems

The Casper Aquifer near Laramie consists of sandstone-limestone bedrock that is recharged from the crest of the Laramie Range (east of town) to the eastern border of the City of Laramie itself. The groundwater flow direction generally follows down the mountain slope from east to west. The Casper Aquifer supplies approximately 50 percent of the water to the City of Laramie and 100 percent to many rural homeowners (City of Laramie 2006; Environmental Advisory Committee [EAC] 2006). The formation is exposed at the ground surface on the west flank of the Laramie Range, and locations of drinking water withdrawal are generally close to the recharge area.

The latter is protected through ordinances approved at both the municipal (City of Laramie, Wyoming) and county levels (Albany County, Wyoming). In addition, areas of shallow groundwater occur primarily in alluvial deposits along streams and rivers as identified previously. Aquifers that are rated highly sensitive to potential contamination generally occur in these areas (Hamerlinck and Arneson 1998; Hall 1998; Nixon et al. 1998). However, the proposed pipeline route would avoid these areas.

The proposed pipeline route would cross the Casper Formation outcrop from approximately RP 287 to RP 291. A short distance westward, the formation is overlain by Quaternary alluvial and colluvial deposits, and the Forelle Limestone or Satanka Shale. East of RP 291, the ROW crosses the underlying Sherman Granite of the Laramie Range (Love and Christiansen 1985).

Colorado. In the counties crossed by the proposed pipeline route, irrigated agriculture use makes up over 90 percent of all groundwater withdrawn along the proposed pipeline route in Colorado (USGS 2000). Domestic and industrial supplies represent other important, but much smaller, uses. The Platte River alluvium is a widely used source of groundwater, most of which interacts with returning irrigation surface flows. Water levels vary from the land surface to approximately 10 feet along the river. Similar shallow alluvial groundwater conditions exist along the Arikaree River and the North Fork of the Republican River.

Kansas. By far, the primary use of groundwater in Kansas along the proposed ROW is for irrigated agriculture. In the counties crossed by the proposed pipeline route, this use makes up over 90 percent of all groundwater withdrawn (USGS 2000). Domestic and industrial supplies represent other important, but much smaller, uses.

Springs

Based on map reviews, no springs were identified within 100 feet of the proposed pipeline route (NRG 2006). Subsequent field surveys did not identify any springs along the proposed ROW. However, USGS maps indicate that springs are in some locales crossed by the proposed pipeline route. Springs and/or seep features are scattered in the general locale of the ROW from RP 205 to RP 209 (east of Walcott, Wyoming), and from RP 282 to RP 286 (southeast of Laramie, Wyoming). The proposed alignment would be located several hundred feet away from mapped springs in these areas.

Water Supply Wells

Overland Pass conducted searches for public water supply wells and wellhead protection areas within 750 feet of the proposed project. Based on consultations with WDEQ, CDPHE, and KDHE, there are no public water wells within 750 feet of the proposed pipeline route in Wyoming, Colorado, and Kansas (Parker 2005; Karst and Colbert 2005; Ervin 2005).

Private water wells within 500 feet of the proposed ROW include 47 private wells in Wyoming, 51 private wells in Colorado, and 108 private wells in Kansas. Five of these are located on federally managed land. The distribution of these wells by county is provided in **Table 3.5-6**. It is currently not known if any of these wells are flowing wells.

Table 3.5-6 Private Water Supply Wells

State	County	Number of Private Water Wells Within 500 feet of the Construction ROW
Wyoming	Lincoln	1
	Sweetwater	5
	Carbon	16
	Albany	24
	Laramie	1
	Wyoming Subtotal	**47**
Colorado	Weld	19
	Logan	9
	Washington	6
	Yuma	20
	Colorado Subtotal	**51**
Kansas	Cheyenne	4
	Rawlins	4
	Thomas	6
	Sheridan	9
	Graham	1
	Trego	3
	Ellis	4
	Barton	3
	Ellsworth	48
	Rice	4
	McPherson	22
	Kansas Subtotal	**108**
PROJECT TOTAL		**206**

Source: Wyoming State Engineer's Office (2005); USGS well information; Colorado Division of Water Resources (no date); KGS (2006b).

Existing Groundwater Contamination

Based on reviews of the National Priorities List (NPL, or federal "Superfund") and the Comprehensive Environmental Response, Compensation, Liability Information System (CERCLIS), the proposed pipeline route does not cross any areas of known groundwater contamination. While it is possible that the proposed project may cross existing sites where groundwater quality has been compromised by other non-project related activities, these have not been identified in regulatory reviews and are not otherwise known (NRG 2006).

Potentially Sensitive Resources

No state groundwater supply management areas occur along the proposed pipeline route in Wyoming. In Colorado, managed groundwater resource areas consist of designated basins. Designated groundwater basins in Colorado include the Upper Crow Creek Basin in northern Weld County, and the Northern High Plains Basin in Washington and Yuma counties. Groundwater supply and resource allocation are managed through the State Engineer and local administrators in these basins.

In Kansas, managed groundwater resource areas consist of management districts. The proposed ROW would intersect the Northwest Kansas Groundwater Management District in Cheyenne, Rawlins, Thomas, and Sheridan counties. Similar to the basin management in Colorado, groundwater supplies and allocations in this

district are managed at the state and district levels. In both states, groundwater quality monitoring is conducted by these regional organizations as allowed by time and funding.

In Wyoming, the USEPA has designated the Elk Mountain aquifer as a sole source aquifer. The Elk Mountain aquifer, part of the Cloverly Aquifer, is located in the Pass Creek Basin of south central Wyoming. Typically Pass Creek Basin strata are folded and faulted inward into a series of north plunging, asymmetrical anticlines less than 1 mile in width. The aquifer is confined and averages approximately 90 feet thick. Since the sediments have been extensively folded and faulted, the water-producing zones vary from 2,380 to 2,780 feet below the ground surface (USEPA 1998). Overland Pass contacted Region VII of the USEPA to determine if the proposed pipeline route would cross the Elk Mountain aquifer (USEPA 2005). Based on the designated boundary map of the Elk Mountain aquifer, the sole source aquifer is located approximately 2,500 feet south of the proposed pipeline route at its nearest location at approximately RP 224 (**Figure 3.5-3**).

In addition to the Elk Mountain aquifer, the City of Laramie and the County of Albany have designated an aquifer protection overlay zone, known as the Casper Aquifer Protection Area, to safeguard wells and springs located west of Laramie, Wyoming (**Figure 3.5-4**). The Casper Aquifer is the saturated and permeable part of the Casper Formation. The Casper Formation is overlain by the Satanka Formation. The Satanka Formation consists of shale and gypsum and the bottom 50 feet are fractured and are probably in hydraulic communication with the Casper Formation. The aquifer protection overlay zone is effective within city limits and at all locations where the upper boundary of the Casper Formation is not covered by at least 75 feet of the overlying Satanka Formation. Generally, the Satanka Formation serves as a confining layer above the Casper aquifer. The Casper Aquifer is a sandstone-limestone rock formation that is over 700 feet thick. Carbonate formations are susceptible to dissolution and can thus develop extremely large, interconnected pore spaces. It is this enhanced porosity and permeability that makes these types of aquifers extremely vulnerable to contamination. The recharge area for the City of Laramie is from the Laramie Range crest to the eastern border. The Casper Aquifer is at a 4.5 percent down gradient to the west. Groundwater flow direction is from east to west (City of Laramie 2004; Litle 2006). Some of the prohibited activities within the Casper aquifer Protection Area include the operation of dry cleaners, hazardous waste facilities, and gasoline stations (City of Laramie 2004). The proposed pipeline route would be approximately 1 mile from the southwest edge of the Casper Aquifer Protection Area near RP 280, downgradient of the aquifer protection area.

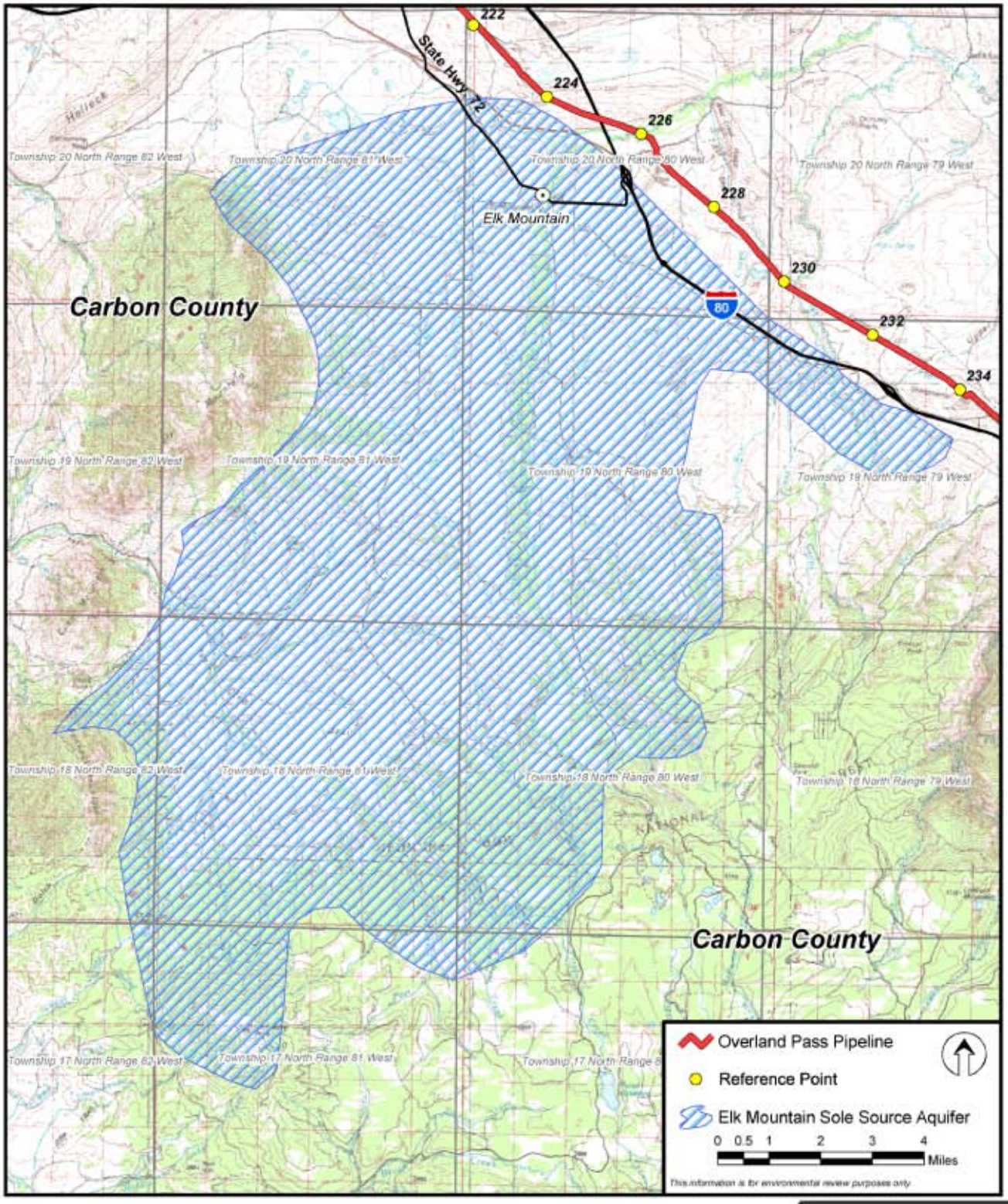
There are currently no designated sole source aquifers in Colorado or Kansas (USEPA 2004b).

3.5.1.3 Floodplains, Wetlands/Riparian Zones

From a geomorphic perspective, floodplains are relatively low, flat areas of land that surround rivers or streams and hold overflows during flood events. Floodplains are often associated with rivers and streams, where they consist of stream deposited sediments forming levels (or “terraces”) deposited at different times along the watercourse. Protection of floodplains and related resource values was established by EO 11988 (FR 1977a) and 11990 (FR 1977b).

From a policy perspective, the Federal Emergency Management Agency (FEMA) defines a floodplain as being any land area susceptible to being inundated by waters from any source (FEMA 2006). Local, state, and federal agencies have additional roles and responsibilities under EOs 11988 and 11990 and the FEMA floodplain program, particularly with respect to potential impacts on flooding from proposed projects. Major floodplains crossed by the proposed pipeline route are identified in **Table 3.5-7**.

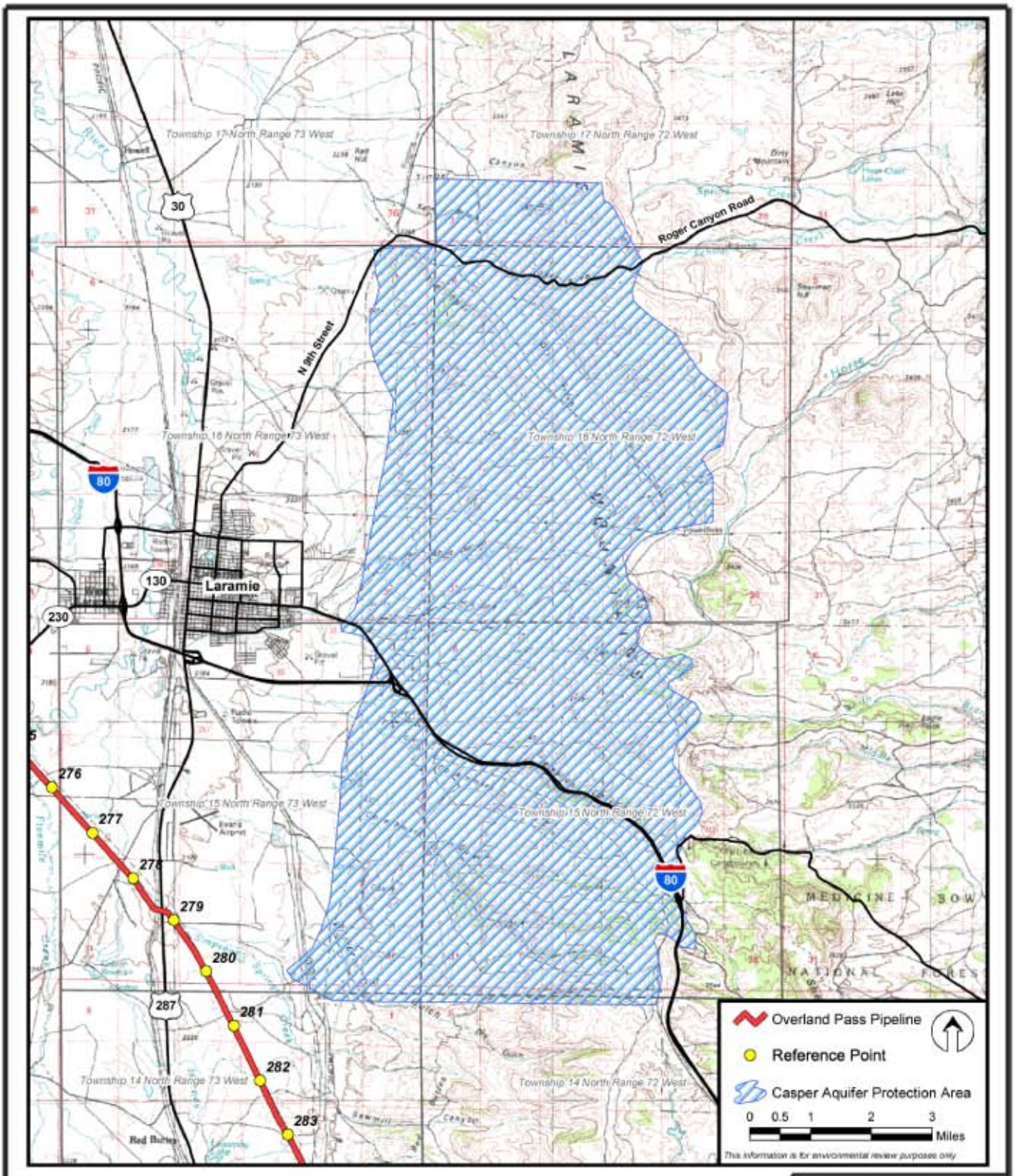
Riparian zones occur along floodplains associated with perennial, ephemeral, and intermittent rivers and creeks and typically support a combination of trees, shrubs, and herbaceous vegetation. Wetlands are commonly associated with riparian areas and landscape depressions that have adequate soil moisture throughout the growing season to support a prevalence of hydrophytic vegetation species. Wetlands are defined areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (USACE 1987). While wetlands and riparian zones make up a small



Overland Pass Pipeline Project

Figure 3.5-3

Elk Mountain Sole Source Aquifer



Overland Pass Pipeline Project

Figure 3.5-4

Casper Aquifer Protection Area

percentage of Wyoming's, Colorado's, and Kansas' land mass, covering less than 1 percent of the landscape, they are critical to many species in the state and serve as filters for runoff.

Table 3.5-7 Major Floodplains Crossed by the Project

State/RP	Waterbody Name	Proposed Crossing Method
Wyoming		
18.9 and 41.3	Blacks Fork River floodplain	Open Cut
59.3	Green River floodplain[1]	Open Cut
195.5	North Platte River floodplain	Open Cut
228.1	Medicine Bow River floodplain	Open Cut
Colorado		
413.2	South Platte River	HDD
491.7	Arikaree River	Open Cut
Kansas		
510.4	South Fork Republican River	Open Cut

[1]Waterbody crossing occurs within federally managed lands.

Based on field survey data, a total of 163 wetlands would be crossed by the proposed pipeline route. Of this total, eight are located all or partially on federally managed lands. The combined linear crossing distance of the 163 wetlands is approximately 6.5 miles, accounting for approximately 0.9 percent of the total proposed pipeline route. **Table 3.5-8** summarizes wetlands crossed by the proposed pipeline route.

Table 3.5-8 Summary of Wetland Types Crossed by the Overland Pass Pipeline

State	National Wetlands Inventory (NWI) Wetland Classification[1]	Length of Wetland Crossed (miles)
Wyoming		
	PEM	5.7
	PSS	0.3
	PFO	0.1
Wyoming Subtotal[2]		**6.1**
Colorado		
	PEM	0.2
	PSS	0.0
	PFO	0.0
Colorado Subtotal		**0.2**
Kansas		
	PEM	0.2
	PSS	<0.1
	PFO	0.0
Kansas Subtotal		**0.2**
Total		**6.5**

Source: Overland Pass Pipeline Project – 2006 Wetland Survey (WEST 2006d).

Slight discrepancies in total mileage are due to rounding.

[1]Cowardin Wetland Types:

PEM – Palustrine Emergent

PSS – Palustrine Scrub-Shrub

PFO – Palustrine Forested

[2]Includes <0.1 mile of wetlands (PEM and PSS) on federally owned land.

Palustrine systems include all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 percent (Cowardin 1979). Common species that occur in PSS and PEM habitats include narrowleaf cottonwood, plains cottonwood, aspen, green ash, various species of willow, thinleaf alder, water birch, wild rose, red-osier dogwood, beaked sedge, Nebraska sedge, Baltic rush, inland saltgrass, alkali sacaton, and temporarily store creeping bentgrass.

Riverine and lacustrine systems typically are considered open water habitats. Riverine systems include all wetlands and deepwater habitats contained within a channel, with the exception of wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens. In the case of braided stream channels, riverine systems are bound by the banks forming the outer limits of the depression within which the braiding occurs. As such, riverine habitat may include non-persistent emergent wetlands that are subject to periodic scouring. Lacustrine systems include wetlands and deepwater habitats situated in a topographic depression or a dammed river channel, lack trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30 percent aerial coverage, and total an area greater than 20 acres.

In addition to wetlands traversed by the proposed pipeline route, the PNG has identified multiple playas along the proposed pipeline route in Colorado. Playas are shallow, circular-shaped, depressional seasonal wetlands that are primarily filled by rainfall, although some playas found in cropland settings may also receive water from irrigation runoff. Compared to other wetlands, playas undergo frequent, unpredictable wet and dry cycles. The resulting wet-dry cycle of playas produces a highly diverse plant community. These plants produce a tremendous crop of nutritious seeds that are favored by waterfowl and other seed eating birds that migrate and winter in the region (Playa Lakes Joint Venture [PLJV] 2006).

3.5.2 Southern Energy Corridor – Copper Ridge Bypass Alternative

3.5.2.1 Surface Water

Between RP 62.3 and RP 87.1 in Sweetwater County, Wyoming, the Proposed Action would cross a total of 48 streams (46 intermittent, 2 perennial), while the Southern Energy Corridor – Copper Ridge Bypass Alternative would cross a total of 51 surface streams (47 intermittent, 4 perennial). No playas/ponds are crossed by either the Proposed Action through this section nor by the Southern Energy Corridor – Copper Ridge Bypass Alternative.

No major and sensitive waterbody crossings or Section 303(d) listed impaired waterbody crossings would be avoided or added by routing the pipeline along the Southern Energy Corridor – Copper Ridge Bypass Alternative. A complete list of waterbody crossings for the Southern Energy Corridor – Copper Ridge Bypass Alternative is provided in **Appendix F**, **Table F-2**.

There would be no difference in the public water supplies crossed by the Southern Energy Corridor – Copper Ridge Bypass Alternative.

3.5.2.2 Groundwater

Groundwater resources along this alternative would be the same as described for the Proposed Acton.

3.5.2.3 Floodplains, Wetlands/Riparian Zones

No additional floodplains would be crossed by the Southern Energy Corridor – Copper Ridge Bypass Alternative, thus floodplain resource concerns would be the same as those described for the Proposed Action. Between RP 62.3 and RP 87.1, the Proposed Action would cross 4 wetlands (2 PEM, 2 PSS), while the Southern Energy Corridor – Copper Ridge Bypass Alternative would cross one wetland (PEM) near State Highway 430.

3.6 Vegetation

3.6.1 Proposed Action

3.6.1.1 Vegetation Communities

The proposed pipeline route would cross five general vegetation types: grassland, agricultural land, shrubland, forest land, and wetlands. Vegetation types (**Figure 3.6-1**) were determined by Overland Pass through review of aerial photography, aerial flyover ground-truthing surveys, and review of high-resolution aerial photography (WEST 2006a). **Table 3.6-1** summarizes the miles of vegetation types crossed by the proposed pipeline route.

Table 3.6-1 Miles of Vegetation Crossed by the Proposed Pipeline Route

Vegetation Type	Miles of Vegetation Crossed[1]
Grassland	436.8
Agricultural Land	231.7
Shrubland	72.2
Forest Land	5.9
Wetlands	6.5
Total	**753.1**

[1]Does not include developed, commercial land, open water, or barren areas that do not display vegetation characteristics. Therefore, total miles are less than total length of the project.

The most common vegetation types crossed by the proposed pipeline route are grassland and agricultural land. Open water and waterbodies (including dry washes), commercial land, and areas with bare rock account for less than 1 percent of the disturbance along the proposed pipeline route and do not display vegetation characteristics; consequently, they are not discussed in this section of the EIS. **Table 3.6-2** provides a description of the vegetation types, sub-communities, and species commonly associated with these vegetation types along the proposed project route.

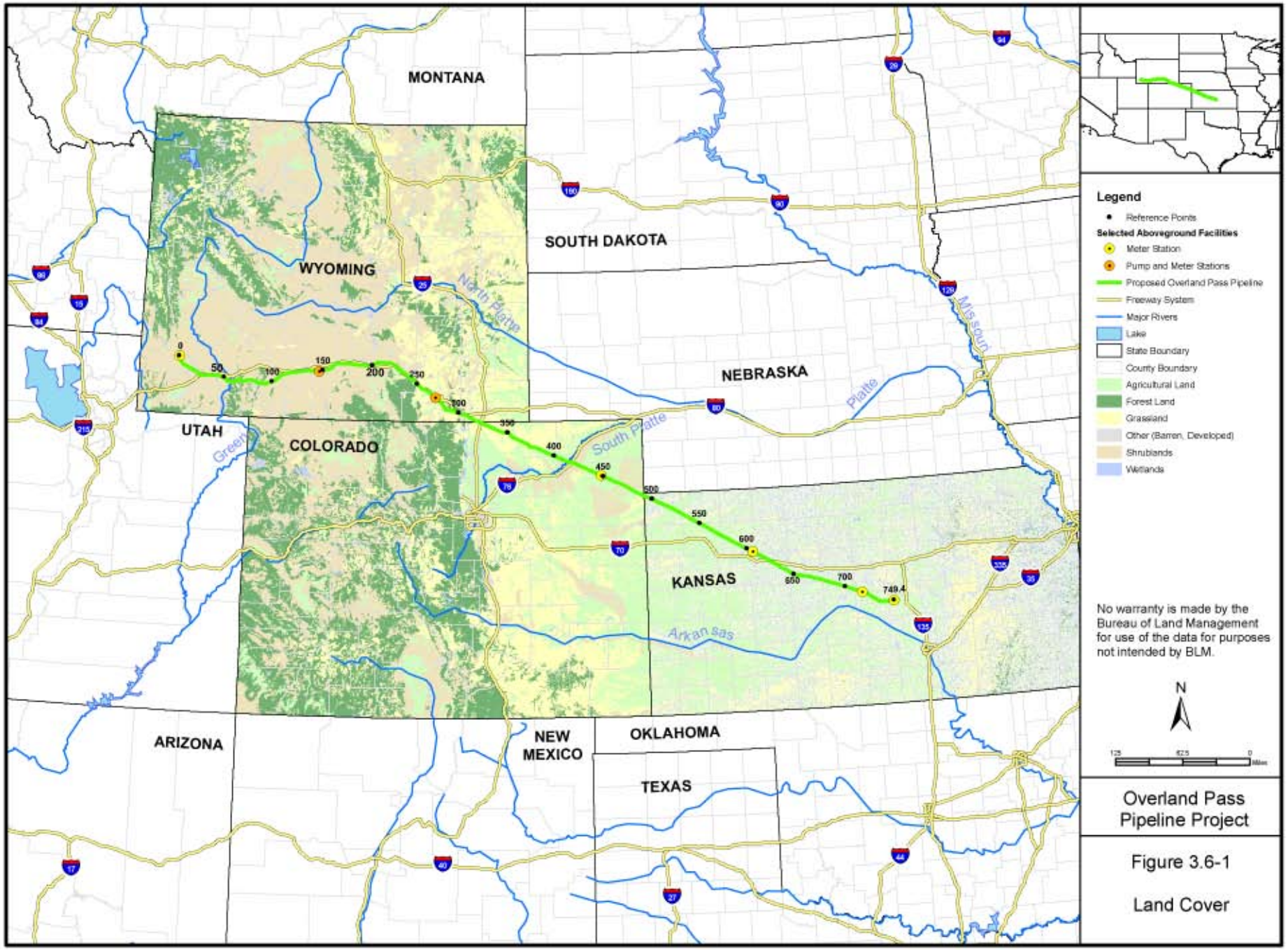
Grassland

Grassland occurs along approximately 436.8 miles (57 percent) of the proposed pipeline route, with sagebrush steppe being the dominant sub-community. Sagebrush steppe is a semi-closed steppe characterized by an overstory of sagebrush and understory of grasses, forbs, and smaller shrubs. Grass species comprise more than 50 percent of the species composition in this community; big sagebrush is the dominant shrub component throughout. The mixed-grass prairie sub-community occurs throughout most of eastern Wyoming and typically supports a high diversity of grasses, including short-, mid-, and tall-grass species. It is distinguished from the short-grass prairie sub-community by having a much higher floristic diversity and an absence of buffalo grass. The short-grass prairie is dominated by bunch grasses less than 20 inches tall. Buffalo grass is considered the indicator species of short-grass prairie.

Agricultural Land

Agricultural land occurs along approximately 231.7 miles (30 percent) of the proposed pipeline route. This community is primarily comprised of irrigated hay, small grain, corn, and alfalfa fields as well as pasture for livestock grazing.

Pasture and hayfields would typically regenerate quickly after cleanup and reseeding of the construction ROW, typically within 2 years. Overland Pass would reseed pasture and hayfields with seed mixes as requested by the landowner to restore the area to preconstruction conditions. Overland Pass would not reseed cultivated agricultural areas unless requested by the landowner.


MONTANA
WYOMING
SOUTH DAKOTA
NEBRASKA
UTAH
COLORADO
KANSAS
ARIZONA
NEW MEXICO
OKLAHOMA
TEXAS
North Platte
South Platte
Platte
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Selected Aboveground Facilities
Meter Station
Pump and Meter Stations
Proposed Overland Pass Pipeline
Freeway System
Major Rivers
Lake
State Boundary
County Boundary
Agricultural Land
Forest Land
Grassland
Other (Barren, Developed)
Shrublands
Wetlands
No warranty is made by the Bureau of Land Management for use of the data for purposes not intended by BLM.
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Overland Pass Pipeline Project
Figure 3.6-1
Land Cover

Table 3.6-2 Vegetation Types and Sub-Communities that Occur Along the Proposed Pipeline Route

Vegetation Type	Sub-Community	Common Species
Grassland	Sagebrush steppe Mixed-grass prairie Short-grass prairie Planted grassland	Indian ricegrass, needle and thread grass, western wheatgrass, bluebunch wheatgrass, Sandberg bluegrass, bottlebrush squirreltail, basin big sagebrush, Wyoming big sagebrush, blue grama, fringed sagewort, buffalograss, western wheatgrass, pricklypear cactus, yucca, prairie coneflower, scarlet globemallow, broom snakeweed, little bluestem, sideoats grama, big bluestem, switchgrass, and smooth brome.
Agricultural Land	Agriculture (hay/pasture land) Disturbed	Alfalfa, meadow barley, smooth brome, timothy, orchardgrass, Kentucky bluegrass, blue mustard, clasping pepperweed, perennial pepperweed, field pennycress, shepherd's-purse, common cocklebur, sowthistle, horseweed, Canada thistle, showy milkweed, common teasel, Russian thistle, and kochia.
Shrubland	Desert scrub Salt desert scrub Desert shrubland Greasewood Mountain Mahogany Fourwing saltbush Sand sagebrush	Gardner's saltbush (2 varieties), shadscale, rubber rabbitbrush, greasewood, basin big sagebrush, Wyoming big sagebrush, winterfat, Indian ricegrass, needle and thread grass, saltgrass, alkali sacaton, mountain mahogany, bluebunch wheatgrass, prairie junegrass, blue grama, fourwing saltbush, sand sagebrush, yucca, skunkbrush, sand bluestem, sand dropseed, prairie reedgrass, and sideoats grama.
Forest Land	Juniper woodland Aspen woodland Pine woodland Planted trees	Utah juniper, Rocky Mountain juniper, big sagebrush, mountain mahogany, rabbitbrush, broom snakeweed, Sandberg bluegrass, needlegrasses, Indian ricegrass, western wheatgrass, aspen, wild rose, gooseberry, ponderosa pine, limber pine, other native and non-native deciduous and coniferous trees.
Wetlands	PEM PSS PFO	Baltic rush, inland saltgrass, alkali sacaton, beaked sedge, Nebraska sedge, creeping bentgrass, willow species, thinleaf alder, water birch, wild rose, red-osier dogwood, narrowleaf cottonwood, plains cottonwood, aspen, and green ash.

Shrubland

Shrubland accounts for approximately 72.2 miles (10 percent) of vegetation cover that would be crossed by the proposed pipeline route. This community designation includes sagebrush, salt desert shrub/greasewood, and foothills shrub-scrub sub-communities. Sagebrush is the most widespread shrubland sub-community. This vegetation type is characterized by an overstory of big sagebrush and an understory of grasses, forbs, and smaller shrubs. Salt desert shrub/greasewood occurs as a mosaic within sagebrush communities, frequently on the fringes of playas, desert lakes, ponds, rivers, and streams. Foothills shrub-scrub communities consist of both mountain mahogany and scrub oak sub-communities. Mountain mahogany primarily occurs within northern mixed prairie and short-grass prairie habitats. This deciduous shrub forms dense thickets with sparse understory vegetation. It typically occurs on rocky or shallow soils and is often associated with a limestone, sandstone, or shale substrate. In oak scrub, Gambel oak is the dominant shrub, comprising more than a quarter of the total vegetation cover. This subcommunity does not occur on the eastern slope of the Rocky Mountains, but extends from Colorado into Wyoming on the western slope of the Rocky Mountains.

Forest Land

Forest lands occur along approximately 5.9 miles (less than 1 percent) of the proposed pipeline route. Forest land sub-communities include pinyon-juniper woodland, ponderosa pine woodland, and riparian woodland. Along the proposed pipeline route, the dominant community is pinyon-juniper woodland. Colorado pinyon pine and Utah juniper dominate the pinyon-juniper woodland plant community. Ponderosa pine woodland is commonly found on lower mountain foothills and slopes. Riparian woodlands occur along many perennial waterbodies and are characterized by cottonwood trees and a variety of riparian shrubs.

Riparian woodland communities crossed by the proposed pipeline route are associated with the North Platte River, Medicine Bow River (2), a tributary to Foote Creek, and Rock Creek (2) crossings.

Wetlands

Wetlands occur along 6.5 miles (less than 1 percent) of the proposed pipeline route. Wetlands crossed by the proposed pipeline route are discussed in Section 3.5.1.3.

3.6.1.2 Noxious Weeds and Invasive Plant Species

The prevention of the spread or introduction of noxious weeds and invasive plant species is a high priority to federal, state, and county agencies. Ground disturbance from construction may make vegetation communities more susceptible to infestations of noxious weeds or invasive plants. These species are most prevalent in areas of surface disturbance, such as agricultural areas, roadsides, existing utility ROWs, and wildlife concentration areas.

Legally, a noxious weed is any plant officially designated by a federal, state, or county government as injurious to public health, agriculture, recreation, wildlife, or property (Sheley et al. 1999). Under the Federal Plant Protection Act of 2000 (formerly the Noxious Weed Act of 1974 [7 USC SS 2801-2814]), a noxious weed is defined as "any plant or plant product that can directly or indirectly injure or cause damage to crops, livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the U.S., the public health, or the environment." Noxious weeds are opportunistic plant species that readily flourish in disturbed areas, thereby preventing native plant species from establishing successive communities. Wyoming, Colorado, and Kansas each maintain official state lists of weed species that are designated noxious species (Wyoming Weed and Pest Council 2006; State of Colorado 2006; Kansas Department of Agriculture [KDA] 2006). **Table 3.6-3** provides a summary of the noxious weed species regulated in Wyoming, Colorado, and Kansas.

Table 3.6-3 Noxious Weeds[1] that Potentially Occur Along the Proposed Pipeline Route

Common Name	Scientific Name	Wyoming	Colorado	Kansas
Absinth wormwood	*Artemisia absinthium*		X	
African rue	*Peganum harmala*		X	
Bull thistle	*Cirsium vulgare*			X
Bur ragweed	*Ambrosia grayii*			X
Camelthorn	*Alhagi pseudalhagi*		X	
Canada thistle	*Cirsium arvense*	X	X	X
Chinese clematis	*Clematis orientalis*		X	
Common burdock	*Arctium minus*	X		
Common crupina	*Crupina vulgaris*		X	
Common tansy	*Tanacetum vulgare*	X		
Cypress spurge	*Euphorbia cyparissias*		X	
Dalmation toadflax	*Linaria dalmatica*	X	X	
Diffuse knapweed	*Centaurea maculosa*	X	X	
Dyer's woad	*Isatis tinctoria*	X	X	
Field bindweed	*Convolvulus arvensis*	X		X
Giant salvinia	*Salvinia molesta*		X	

Table 3.6-3 Noxious Weeds[1] that Potentially Occur Along the Proposed Pipeline Route

Common Name	Scientific Name	Wyoming	Colorado	Kansas
Hoary cress (whitetop)	*Cardaria draba*	X		X
Houndstongue	*Cynoglossum officinale*	X		
Hydrilla	*Hydrilla verticillata*		X	
Johnsongrass	*Sorghum halapense*			X
Kudzu	*Peuraria lobata*			X
Leafy spurge	*Euphorbia esula* L.	X	X	X
Meadow knapweed	*Centaurea pratensis*		X	
Mediterranean sage	*Salvia aethiopos*		X	
Medusa head	*Taeniatherum caput-medusae*		X	
Musk thistle	*Carduus nutans*	X	X	X
Myrtle spurge	*Euphorbia myrsinites*		X	
Oxeye daisy	*Chrysanthemum leucanthemum*	X		
Perennial pepperweed	*Lepidium latifolium*	X	X	
Perennial sowthistle	*Sonchus arvensis*	X		
Pignut	*Hoffmannseggia densiflora*			X
Plumeless thistle	*Carduus acanthoides*	X	X	
Purple loosestrife	*Lythrum salicaria*	X	X	
Quackgrass	*Agropyron repens*	X		X
Rush skeletonweed	*Chondrilla juncea*		X	
Russian knapweed	*Centaurea repens* L.	X	X	X
Salt cedar	*Tamarix* spp.	X	X	
Scotch thistle	*Onopordum acanthium*	X	X	
Sericia lespedeza	*Lespedeza cuneata*		X	
Skeletonleaf bursage	*Franseria discolor*	X		
Spotted knapweed	*Centaurea maculosa*	X	X	
Squarerose knapweed	*Centaurea virgata*		X	
St. Johnswort	*Hypericum perforatum*	X		
Tansy ragwort	*Senecio jacobaea*		X	
Yellow star thistle	*Centaurea solstitialis* L.		X	
Yellow toadflax	*Linaria vulgaris*	X	X	

[1]Noxious weeds obtained from Wyoming's noxious weed list (Wyoming Weed and Pest Council 2006); Colorado's State A list, State B list (as identified through consultations with county weed coordinators) (State of Colorado 2006); and Kansas' noxious weed list (KDA 2006).

The more general term "invasive species" refers to a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Invasive plants not only include noxious weeds, but also other plants that are not native to this country. The BLM considers plants invasive if they have been introduced into an environment where they did not evolve. As a result, they usually have no natural enemies to limit their reproduction and spread (Westbrooks 1998).

Under EO 13112 (FR 1999) federal agencies shall not authorize, fund, or carry out actions likely to cause or promote the introduction or spread of invasive species in the U.S. or elsewhere unless it has been determined that the benefits of such actions outweigh the potential harm caused by invasive species and that all feasible and prudent measures to minimize the risk of harm would be taken in conjunction with the actions.

3.6.2 Southern Energy Corridor – Copper Ridge Bypass

There are no substantive differences between the affected vegetation communities that occur within the Southern Energy Corridor – Copper Ridge Bypass Alternative in comparison to the Proposed Action.

3.7 Wildlife, Aquatic Resources, and Special Status Species

3.7.1 Proposed Action

3.7.1.1 Wildlife

Wildlife habitats along the proposed pipeline route consists primarily of five major vegetative communities: grassland, shrubland, agricultural land, forest land, and wetlands. Each of these communities provides nesting, cover, and foraging habitat for a variety of wildlife. This section focuses on species of high economic and/or economic recreational importance and those that are considered sensitive to human disturbance. Baseline descriptions of both resident and migratory wildlife include species that have either been documented in the project area or those that may occur in the project region based on habitat associations. Common species associated with each of the vegetation communities that would be affected by the proposed project are listed in **Table 3.7-1**.

Table 3.7-1 Common Wildlife Species in the Project

Vegetative Community/ Habitat Type	Common Species
Grassland	Pronghorn antelope, coyote, swift fox, badger, white-tailed jackrabbit, thirteen-lined ground squirrel, spotted ground squirrel, black-tailed prairie dog, plains pocket gopher, plains pocket mouse, silky pocket mouse, plains harvest mouse, mourning dove, northern harrier, prairie falcon, ferruginous hawk, Swainson's hawk, common nighthawk, horned lark, rock wren, vesper sparrow, lark bunting, western meadowlark, loggerhead shrike, short-horned lizard, western skink, wandering garter snake, prairie rattlesnake, striped whipsnake, racer
Shrubland	Mule deer, elk, pronghorn antelope, coyote, Nuttall's cottontail, deer mouse, Wyoming ground squirrel, white-tailed prairie dog, sagebrush vole, northern harrier, American kestrel, Swainson's hawk, sage grouse, Say's phoebe, horned lark, black-billed magpie, sage thrasher, green-tailed towhee, vesper sparrow, Brewer's sparrow, sage sparrow, Great Basin spadefoot toad, sagebrush lizard, northern plateau lizard, short-horned lizard, western skink, striped whipsnake, racer
Agricultural Land	Mule deer, white-tailed deer, swift fox, black-tailed jackrabbit, raccoon, thirteen-lined ground squirrel, spotted ground squirrel, plains pocket gopher, plains harvest mouse, deer mouse, short-eared owl, ring-necked pheasant, common crow, horned lark, plains garter snake, common garter snake, prairie lizard, Great Plains rat snake, box turtle, horned lizard
Forest Land	Elk, mule deer, bobcat, porcupine, desert cottontail, desert woodrat, desert shrew, least chipmunk, pinion mouse, little brown bat, red-tailed hawk, American kestrel, great-horned owl, long-eared owl, mourning dove, common poorwill, black-chinned hummingbird, northern flicker, ash-throated flycatcher, gray flycatcher, Say's phoebe, pinyon jay, gray vireo, house finch, pine siskin, chipping sparrow, black-throated gray warbler, juniper titmouse, sagebrush lizard, northern plateau lizard, short-horned lizard, western skink, Great Basin gopher snake, striped whipsnake, racer, kingsnake, wandering garter snake
Wetlands	Beaver, muskrat, mink, red fox, desert cottontail, pocket gopher, Great Basin pocket mouse, western harvest mouse, meadow vole, western jumping mouse, rusty red fox squirrel, eastern woodrat, northern harrier, black-chinned hummingbird, violet-green swallow, black-billed magpie, robin, western tanager, yellow warbler, common yellowthroat, Brewer's blackbird, house finch, Savannah sparrow, chipping sparrow, Canada goose, wood duck, canvasback, gadwall, common goldeneye, Woodhouse's toad, boreal chorus frog, northern leopard frog, sagebrush lizard, western skink, striped whipsnake, racer, smooth green snake, wandering garter snake

Source: NRG 2006

Approximately 130 miles of new greenfield ROW of which 72 miles are forest and shrubland habitat would occur along the proposed pipeline route. These two habitat types require more than 5 years for restoration, and often decades. New greenfield ROW construction occurs in areas not co-located with existing pipeline, utility, or road ROW.

Game Species

The primary big game species that occur within the project area are elk, mule deer, and pronghorn antelope (pronghorn). Elk inhabit semi-open forests or forest edges adjacent to parks, meadows, and alpine tundra, as well as sagebrush steppe areas. Mule deer occur in the greatest densities in shrublands on rough, broken terrain, which provide abundant browse and cover. Pronghorn inhabit grasslands and semidesert shrublands on rolling topography that afford good visibility.

Other less prominent big game species that occur in the project area are white-tailed deer, black bear, and mountain lion. Occurrence of white-tailed deer would be limited to Kansas and Colorado and concentrated along riparian corridors. Black bear and mountain lion may travel infrequently through the project area, primarily in the forest vegetative community. This community represents a small component of the proposed project. Small game species that occur along the proposed pipeline route include upland game birds, waterfowl, furbearers, and small mammals.

Wyoming. Big game species, including mule deer, elk, and pronghorn are scattered in the vicinity of the proposed pipeline route in Wyoming. The proposed pipeline route would cross habitat ranges designated as crucial for maintenance of game populations. In Wyoming, designated big game ranges, including summer, yearlong, winter, and crucial winter ranges would be crossed (WDGF 2005a). Approximately 14.4 miles of crucial winter range for two game species that would be crossed by the proposed pipeline route. Approximately 8.5 miles of pronghorn, 4.2 miles of mule deer, and 1.4 miles of elk crucial winter habitat would be crossed by new greenfield ROW. Crucial winter habitat timing restrictions in Wyoming occur between November 15 and April 30. Crucial winter habitat with timing restrictions for mule deer, pronghorn, and elk are identified in **Table 3.7-2**.

Table 3.7-2 Big Game Crucial Winter Habitat with Timing Restrictions Affected by the Project[1]

State / Range Type	Locations (RP)	Approximate Total Length Crossed (miles)	
		Federal Lands	Non-Federal Lands
Wyoming			
Mule Deer Crucial Winter Habitat	88.8 to 91.1	6.9	23.8
	182.1 to 188.6		
	193.8 to 194.0		
	194.2 to 195.1		
	195.6 to 199.8		
	204.6 to 210.3		
	224.3 to 234.0		
	254.6 to 255.4		
Pronghorn Crucial Winter Habitat	14.6 to 21.2	16.3	46.2
	23.9 to 27.7		
	31.1 to 47.0		
	96.4 to 102.7		
	195.5 to 204.3		
	223.2 to 226.2		
	243.6 to 261.7		
Elk Crucial Winter Habitat	243.6 to 252.1	0.0	8.5
Colorado			
Pronghorn Crucial Winter Habitat	321.1 to 339.0	2.1	17.5
	358.5 to 360.2		

[1]Crucial big game ranges identified by WGFD and CDOW.

In Wyoming, sage grouse are considered the most sensitive small game species along the proposed pipeline route and are discussed further in Section 3.7.1.3 and in the Biological Report (BR)/Biological Evaluation (BE) associated with this project.

Colorado. In Colorado, big game species, including mule deer, white-tailed deer, elk, and pronghorn are scattered in the vicinity of the proposed pipeline route. The proposed pipeline route would cross habitat ranges designated as crucial for maintenance of big game populations. Crucial winter habitat timing restrictions for Colorado occur between December 1 and April 30. Approximately 20 miles of pronghorn crucial winter habitat, including approximately 1 mile of new greenfield ROW construction, would be crossed in Colorado (CDOW 2005) (**Table 3.7-2**).

Kansas. Big game species, including mule deer, white-tailed deer, and pronghorn are scattered across Kansas; however, there are no designated big game ranges in the state (KDWP 2005) and no crucial winter habitat would be crossed. In Kansas, the lesser prairie chicken is considered the most sensitive small game species along the proposed pipeline route. This species has limited potential for occurrence in the vicinity of the proposed pipeline route which is discussed further in the BA associated with this project.

Nongame Species

A diversity of nongame species (e.g., small mammals, raptors, passerines, amphibians, and reptiles) occupy a variety of trophic levels and habitat types along the proposed pipeline route. Nongame mammal species include a variety of small mammals such as shrews, bats, squirrels, prairie dogs, rabbits, woodrats, and mice. These small mammals provide a substantial prey base for predators including mammals (e.g., coyote, badger, skunk), raptors (e.g., eagles, buteos, accipiters, owls), and reptile species in the project area. Common reptiles along the proposed pipeline route include northern sagebrush lizard, eastern short-horned lizard, garter snake, and prairie rattlesnake. Common amphibians included plains spadefoot, boreal chorus frog, leopard frog, and tiger salamander (Baxter and Stone 1980; Hammerson 1999).

Migratory Birds

A neotropical migratory bird is a bird that breeds in Canada and the United States during summer and over winters in Mexico, Central America, South America or the Caribbean islands. According to a more strict definition used by some scientists, neotropical migratory birds are Western Hemisphere species in which the majority of individuals breeds north of the Tropic of Cancer and winters south of that same latitude (Smithsonian National Zoological Park 2007). Represenative migratory bird species with potential to occur along the proposed pipeline route, as provided by the USFWS, are listed by habitat association in **Table 3.7-1** and in the raptor section below.

A Memorandum of Understanding (MOU) among the USFS, BLM, and USFWS was drafted pursuant to EO 13186 in order to promote conservation of migrating birds and minimize the potential adverse effects of take to these birds. Specific measures to protect migratory bird species and their habitats have not been identified within the draft MOU document; but instead, provide guidance to agencies to promote best management practices for the conservation of migratory birds.

Raptors

Raptor species that could potentially occur as residents or migrants within the project region include eagles (bald eagle and golden eagle), buteos (e.g., red-tailed hawk, Swainson's hawk, ferruginous hawk), falcons (e.g., peregrine falcon, prairie falcon, American kestrel), accipiters (e.g., Cooper's hawk and sharp-shinned hawk), owls (e.g., great-horned owl, burrowing owl, long-eared owl, short-eared owl), northern harrier, and turkey vulture. Refer to **Table 3.7-1** for common raptor species along the proposed project route.

Wyoming. Raptor breeding habitat was identified in Wyoming for golden eagle, ferruginous hawk, peregrine falcon, red-tailed hawk, prairie falcon, northern harrier, Swainson's hawk, burrowing owl, and great horned owl in the vicinity of the proposed pipeline route (WGFD 2005a).

Colorado. In Colorado, raptor breeding habitat was identified for golden eagle, bald eagle, ferruginous hawk, red-tailed hawk, prairie falcon, northern harrier, Swainson's hawk, burrowing owl, and great horned owl in the vicinity of the proposed pipeline route (CDOW 2006; CNHP 2006).

Kansas. In Kansas, raptor breeding habitat was identified for golden eagle, ferruginous hawk, red-tailed hawk, Swainson's hawk, short-eared owl, and great horned owl in the vicinity of the proposed pipeline route (KDWP 2006; WEST 2006c).

Management Indicator Species

Management Indicator Species (MIS) are defined as a wildlife species whose population will indicate the health of the ecosystem in which it lives and, consequently, the effects of forest management activities to that ecosystem. MIS species are selected for this project by the USFS for areas in the vicinity of the proposed pipeline route in the PNG and FGNRA. The FGNRA occurs within the ANF and does not have a list of MIS species established specifically for the FGNRA. Some of the species identified for the entire forest are not analyzed in this document because their habitats do not occur within the vicinity of the proposed pipeline route. These species include white-tailed ptarmigan, northern goshawk, Lincoln sparrow, song sparrow, warbling vireo, and red napped sapsucker. MIS species that would occur along the proposed pipeline route are listed in **Table 3.7-3**. MIS species are discussed in detail in the BR associated with this project.

Table 3.7-3 Management Indicator Species for the Project

Habitat Type	MIS Species
Sagebrush	Sage grouse
Cliffs and rock outcrops	Golden eagle
Shortgrass prairie	Mountain plover
	Ferruginous hawk
Midgrass prairie	Ferruginous hawk
	Lark bunting
Prairie dog towns	Black-tailed prairie dog
	Western burrowing owl
Prairie woodlands	Mule deer
Various economic habitats	Mule deer
	Elk

3.7.1.2 Aquatic Resources

Aquatic resources are amphibian, fish, and invertebrate communities and their habitat, which includes wetlands, perennial streams, and pond/lake environments. The description of aquatic communities focuses on important fisheries, which include species with recreational value or threatened, endangered, or special status. No commercial fisheries occur in any waterbodies crossed by the proposed pipeline route. Special status aquatic species are discussed in Section 3.7.1.3. The study area for aquatic resources includes aquatic habitat (perennial streams, rivers, wetlands, and playas/ponds) crossed by the proposed pipeline route. Other waterbodies are included if they are located within approximately 0.25 mile downstream of the proposed pipeline crossings and support recreationally important game fish or special status fish species.

Invertebrate communities that occur in waterbodies crossed by the proposed pipeline route include a mixture of worms, immature and adult insect groups, snails, and numerous other groups. The composition and abundance of the invertebrate community can vary depending on the physical characteristics of the

waterbody, flow, substrate, presence of submersed vegetation, and other factors. Invertebrates serve important roles in the aquatic environment through their food web dynamics. They also represent important food sources for fish and are used as indicators of water quality conditions (Barbour et al. 1997). It is assumed that invertebrates are present in all perennial streams and playas/ponds located within the proposed pipeline corridors.

Waterbodies crossed by the proposed pipeline route also provide habitat for amphibians (salamanders, toads, and frogs) and aquatic reptiles (turtles). Many of the toad species such as plains spadefoot toad, Great Basin spadefoot toad, and salamanders occur in terrestrial habitats throughout most of the year, but move to aquatic habitats for breeding in the spring or early summer. The types of habitats that are used for breeding include perennial streams, reservoirs, ponds, wetlands, or seasonal flooded areas. Salamander and toad species overwinter in burrows and other moist areas in terrestrial habitat. Other toad species (e.g., boreal toad and Woodhouse's toad) and most frog species are associated with permanent wet areas including streams, ponds, and wetlands (Cerovski et al. 2004; Livo et al. 2000). Breeding typically occurs in the spring or early summer for frogs and aquatic reptile species. Most frog species overwinter in the bottom substrate of their occupied aquatic habitats. The following discussion for each state identifies amphibian and aquatic reptile species that could occur within the proposed pipeline route. The potential occurrence of special status amphibian species is discussed in Section 3.7.1.3.

Two MIS (Colorado River cutthroat trout and macroinvertabrates) were considered for analysis within the FGNRA. Colorado River cutthroat trout was eliminated from detailed analysis because this species does not occur in the Green River. Macroinvertebrates were included in the analysis for all waterbodies.

The following information describes fish species occurrence, fishery classifications, habitat quality, and characteristics of fishery management in each of the states traversed by the proposed pipeline route.

Wyoming

Fish. In total, the proposed pipeline route would cross 70 perennial streams in Wyoming, some of which are crossed multiple times. Of these perennial crossings, 21 streams are classified as supporting recreationally important fisheries (i.e., game fish) by WDEQ (2001) (**Table 3.7-4**). For clarification, the game fish species listed in **Table 3.7-4** are based on results of agency surveys conducted at the closest locations to the proposed stream crossings. Except for the Blacks Fork River, which only contains warmwater game fish species, these streams support coldwater game fish species. The game fish species include trout (brook, brown, rainbow, and cutthroat), kokanee salmon, walleye, smallmouth bass, and channel catfish. These streams support one to six game fish species, with the highest number occurring in the Green River. The North Platte River is considered a premium trout fishery by the WGFD. Other high quality trout waters (defined as representing statewide or regional importance) crossed by the proposed pipeline route include the Green River, Medicine Bow River, Tenmile Creek, Little Laramie River, and the Laramie River. Game fish are stocked in the Green River, North Platte River, Medicine Bow River, Wagonhound Creek, Foote Creek tributaries, Rock Creek, and the Laramie River. Other perennial streams crossed by the proposed pipeline route with nongame fisheries include Little Bitter Creek, Bitter Creek, Lone Tree Creek, and Sand Creek. In addition, five playas/ponds would be crossed by the proposed pipeline route. None are known to contain game fish species. General spawning periods for game fish species that occur in waters crossed by the proposed pipeline route are shown in **Table 3.7-5**.

Numerous streams have tested positive for whirling disease in Wyoming. Major rivers on the proposed pipeline route which have tested positive include the Green, North Platte, Medicine Bow, Little Laramie, and Laramie rivers (Money 2006). Whirling disease also has been detected in numerous small streams in eastern Wyoming.

Table 3.7-4 Game Fish Occurrence and Fishery Classifications for Waterbodies Crossed by the Project

Waterbody		Number of Crossings	Fishery Classification[1]	Brook Trout	Brown Trout	Cutthroat Trout (Snake River)	Kokanee Salmon	Walleye	Rainbow Trout	Smallmouth bass	Largemouth Bass	White Crappie	Black Crappie	Bluegill	Sunfish Species	Channel Catfish	Flathead Catfish	Black Bullhead	Yellow Bullhead	White bass	Freshwater drum
Wyoming																					
Hams Fork River	Lincoln	1	2AB		X																
Blacks Fork River	Lincoln	2	2AB																		
Green River **County**	Sweetwater	1	1		X	X	XS[2]		XS							X					
North Platte River	Carbon	1	2AB		X			X	XS						X	XS					
Medicine Bow River	Carbon	1	2AB		XS			X	XS												
Bear Creek	Carbon	1	2AB	X	X																
Wagonhound Creek	Carbon	1	2AB	XS	X																
Tributary to Upper Foote Creek	Carbon	4	2AB	XS																	
Foote Creek	Carbon	3	2AB	XS					X												
Rock Creek	Carbon	4	2AB	X					XS												
Onemile Creek	Carbon	2	2AB	X					X												
Threemile Creek	Carbon	2	2AB	X	X																
Dutton Creek	Carbon	3	2AB	X																	
Cooper Creek	Albany	3	2AB	X																	
Fourmile Creek	Albany	1	2AB	X																	
Sevenmile Creek	Albany	1	2AB	X																	
Little Laramie River	Albany	1	2AB		X																
Browns Creek	Albany	1	2AB	X	X																
Laramie River	Albany	1	2AB		X				XS												
Dale Creek	Albany	1	2AB	X																	
Lone Tree Creek	Albany	1	2AB	X																	
Colorado																					
South Platte River	Logan	1	WW2												X	X					
Chief Creek	Yuma	1	CW1		X						X			X	X				X		

Table 3.7-4 Game Fish Occurrence and Fishery Classifications for Waterbodies Crossed by the Project

Waterbody		Number of Crossings	Fishery Classification[1]	Brook Trout	Brown Trout	Cutthroat Trout (Snake River)	Kokanee Salmon	Walleye	Rainbow Trout	Smallmouth bass	Largemouth Bass	White Crappie	Black Crappie	Bluegill	Sunfish Species	Channel Catfish	Flathead Catfish	Black Bullhead	Yellow Bullhead	White bass	Freshwater drum
North Fork Republican River	Yuma		CW1		X				X						X				X		
Aikaree River	Yuma[4]	1	WW1												X						
Kansas	**County**																				
South Fork Republican River	Cheyenne		S											X	X	X	X	X			
Beaver Creek	Rawlins[1]	1	E							X	X				X						
Saline River	Graham	3	E								X				X	X	X	X	X		X
Plum Creek	Trego	1	E									X			X	X	X				
Big Creek	Trego	1	E								X	X			X	X	X	X			
Smokey Hill River	Ellis	1	E								X	X	X	X	X	X	X	X	X	X	X
Plum Creek	Rice	6	E								X	X			X	X					
Cow Creek	Rice	1	E								X	X			X	X					
Little Arkansas River	Rice	1	E								X	X			X	X	X X X				

[1]Fishery classifications:

Wyoming Class 1 (Outstanding Waters); Class 2 (Fisheries and Drinking Waters); AB = support game fish.

Colorado - CW (Coldwater) and WW (Warmwater) Class 1 or 2. Class 1 defined as waters currently capable of sustaining a wide variety of coldwater or warmwater biota including special status species, or could support species if water quality conditions were corrected. Class 2 defined as waters that are not capable of sustaining a wide variety of coldwater or warmwater biota including special status species due to physical, habitat, water flows or levels, or uncorrectable water quality conditions.

Kansas – S = special aquatic life use; E = expected aquatic life use.

[2]"S" denotes stocked species by WGFD.

Sources of fish occurrence: WGFD 2005b, 2006; Keith 2006; Snigg 2006; CDOW 2006; Swigle 2006a,b; Scoyoc 2006; KDWP 2006.

Table 3.7-5 Game Fish Spawning Periods and Habitat

Species or Group	Months[1]												Spawning Habitat[2]
	J	F	M	A	M	J	J	A	S	O	N	D	
Brook trout									■	■			Stream spawners that use gravel substrates and spring upwelling areas.
Brown trout									■	■			Stream spawners that use tributary streams with gravel substrates in riffle-run areas.
Cutthroat trout				■	■								Stream spawners that use tributary streams with gravel substrates in riffle areas.
Rainbow trout			■	■	■								Stream spawners that use gravel substrates at head of riffle or downstream portion of pool.
Kokanee salmon									■	■	■		Generally select gravel beds in tributary streams or shorelines in lakes/reservoirs.
Walleye				■	■								Spawn in lakes and streams in shallow water over rock substrates.
Bullheads (Black and Yellow)						■	■						Usually spawn in weedy or muddy shallow areas by building nests.
Channel catfish					■	■	■						Prefers areas with structure such as rock ledges, undercut banks, logs, or other structure where it builds nests.
Flathead Catfish					■	■							Nest builders with habitat similar to channel catfish.
Freshwater drum					■	■							Buoyant eggs drift in river currents during development.
Largemouth bass					■	■	■						Shallow areas over clean gravel and sand bottoms.
Smallmouth bass				■	■	■	■						Builds nests in shallow areas over boulder, cobble, or gravel substrates.
Crappies					■	■							Eggs deposited in depressions on bottom in cove or embayments.
Sunfishes					■	■	■	■					Nest builders in diverse substrates and shallow depths.
White bass				■	■	■							Egg masses deposited over sand bars, submerged vegetation, or other instream debris.

[1]Spawning periods are approximate and could occur in only a portion of a particular month.

[2]Sources: Baxter and Simon 1970; Eddy and Underhill 1974; Hickman and Raleigh 1982; Raleigh et al. 1984; Raleigh et al. 1986; and Raleigh 1982.

Amphibians and Turtles. Species that potentially occur in the proposed pipeline route include tiger salamander, plains spadefoot toad, Great Basin spadefoot toad, boreal toad, Woodhouse's toad, bullfrog, northern leopard frog, western spiny softshell, ornate box turtle, western painted turtle, and snapping turtle (Cerovski et al. 2004). All of these species potentially use flooded areas, wetlands, streams, and playas/ponds in the spring and early summer for breeding. Most of the frog and turtle species are associated with aquatic habitats throughout the year. Aquatic habitats in the portion of the state crossed by the proposed pipeline route usually support four or five amphibian species (Merrill et al. 1996). The highest number of species usually occurs in aquatic habitats near Laramie (up to seven species).

Colorado

Fish. The Colorado portion of the proposed pipeline route would cross 10 perennial streams in Colorado, of which four support game fish populations (South Platte River, Chief Creek, North Fork Republican River, and the Aikaree River). The North Fork Republican River and Chief Creek are classified as coldwater fisheries as

indicated by the presence of one or two trout species (**Table 3.7-4**). One or two warmwater species also occur in these two streams. The other perennial streams are considered warmwater fisheries with just one or two game species (green sunfish, black bullhead, or yellow bullhead). Five additional streams (Lone Tree Creek, South Pawnee Creek, North Sterling Creek, South Platte Ditch, and Sand Hill Creek) also are classified as warmwater nongame fisheries. Three of these streams (Chief Creek, North Fork Republican River, and Aikaree River) are considered Class 1 waters, defined as waters currently capable of sustaining a wide variety of coldwater or warmwater biota including special status species, or waters capable of supporting species if water quality conditions were corrected. Seven relatively small unnamed playas/ponds also would be crossed by the proposed pipeline route. Game fish species are not known to occur in these sites.

Whirling disease is widespread throughout Colorado drainages. Of the streams that would be crossed by the proposed pipeline route in Colorado, Chief Creek and the North Fork of the Republican River are the only waterbodies with no detection of whirling disease (Walker 2006).

Amphibians and Turtles. Aquatic habitats in the Colorado portion of the project study area could support tiger salamander, Great Plains toad, plains spadefoot, Woodhouse's toad, western chorus frog, bullfrog, plains leopard frog, northern leopard frog, and northern cricket frog (Livo et al. 2000). Turtle species could include the same species listed for Wyoming plus yellow mud turtle. The types of habitats and breeding periods are described in the Wyoming section.

Kansas

Fish. The proposed pipeline route would cross 17 perennial streams in Kansas, nine of which contain game fish species (**Table 3.7-4**). All of these streams are considered warmwater fisheries, with the number of game fish species ranging from 2 to 10 species. The most diverse game fish community occurs in Smokey Hill River and the Saline River, with 10 and 7 species, respectively. The major fish groups represented in these streams include sunfishes (bluegill, green sunfish, largemouth bass, and white crappie), catfishes (black bullhead, channel catfish, and flathead catfish), and drums (freshwater drum). One waterbody (South Fork Republican River) has been classified as "special aquatic life use water" by the KDHE, which is known to contain habitat or indigenous biota not commonly found in Kansas or representative populations of threatened and endangered species. Species associated with this stream are discussed in Section 3.7.1.3. The other streams are classified as "expected aquatic life use." One unnamed playa also would be crossed by the pipeline route, but it is not known to contain game fish species.

Disease or nuisance organism concerns in Kansas are limited to the presence of zebra mussels. Whirling disease is not known to occur in the state (Johnson 2006).

Amphibians and Turtles. In Kansas, wetlands, ditches, streams, and playas crossed by the proposed pipeline route also could contain amphibians and turtles. Potential amphibian species include Great Plains toad, Woodhouse's toad, northern cricket frog, spotted chorus frog, boreal chorus frog, Great Plains narrowmouth toad, plains leopard frog, bullfrog, and plains spadefoot (Taggert 2006). The same turtle species listed for Colorado plus northern painted turtle, eastern box turtle, slider, and smooth softshell.

3.7.1.3 Special Status Species

Special status species are those species for which state or federal agencies afford an additional level of protection by law, regulation, or policy. Included in this category are federally listed and federally proposed species that are protected under the ESA or are considered as candidates for such listing by the USFWS, and those species that are state-listed as threatened or endangered.

Also included in this category are species with designated categories that the BLM, USFS, Wyoming, Colorado, and Kansas have determined to be rare or vulnerable. The BLM and USFS designate these species as "sensitive." Colorado designates these species as "species of concern," Kansas as "species in need of conservation," and Wyoming as "critically imperiled" (NSS1) or "imperiled" (NSS2).

In accordance with Section 7 of the ESA, the BLM as the lead federal agency in consultation with the USFWS, would ensure that any action authorized, funded, or carried out by the applicant does not jeopardize the existence of a federally listed threatened or endangered species, or result in the adverse modification of the designated Critical Habitat of a federally listed species. In addition, as stated in Special Status Species Management Policy 6840 (Policy 6840) (Rel. 6-121), it is BLM policy "to conserve listed species and the ecosystems on which they depend, and to ensure that actions requiring authorization or approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list any special status species, either under the provisions of the ESA, or other provisions" identified in Policy 6840.

A total of 150 special status species were identified as potentially occurring within the project area (USFWS 2005; BLM 2002a, 2006a,b; WDGF 2005c,d; WYNDD 2005; KDWP 2005; CDOW 2006). These species, their associated habitats, and their potential for occurrence along the proposed pipeline route are summarized in **Appendix G**, **Table G-1**. Occurrence potential along the proposed pipeline route was evaluated for each species based on its habitat requirements and/or known distribution. Under this analysis 96 special status species were identified as occurring within the immediate vicinity of the proposed pipeline route. These species and their potential for occurrence along the proposed pipeline route are summarized in **Appendix G**, **Table G-2**. A detailed description of these species is located in the BA and in the BR/BE.

Wildlife

Wyoming. Within the Wyoming portion of the proposed pipeline route, six federally listed endangered, threatened, or candidate bird species and two mammal species have been retained for detailed analysis. An additional 24 special status birds, 12 mammals, and 5 reptiles have been retained for detailed analysis. These species are discussed in detail in the BA and in the BR/BE. Approximately 189 miles of sage grouse habitat would be crossed in Wyoming, 48.9 miles of which would be new greenfield ROW construction.

Colorado. Within Colorado, four federally listed endangered, threatened, or candidate bird species and two mammal species have been retained for detailed analysis. One additional bird species listed as threatened by the state of Colorado has been retained. Seventeen special status birds, 10 mammals, and 6 reptiles have been retained for detailed analysis. These species are discussed in detail in the BA and in the BR/BE.

Kansas. Within Kansas, four federally listed endangered, threatened, or candidate bird species and one mammal species have been retained for detailed analysis. Two bird and one mammal species listed as threatened or endangered by the state of Kansas have been retained. An additional 12 special status birds, 4 mammals, and 4 reptiles have been retained for detailed analysis. These species are discussed in detail in the BA and in the BR/BE.

Aquatic Resources

Wyoming. No federal-listed fish species occur at or within several miles downstream of waterbodies crossed by the proposed pipeline route in Wyoming. However, downstream portions of the Green River contain occupied and critical habitat for four federally listed fish species: Colorado pikeminnow, razorback sucker, humpback chub, and bonytail. The upper end of the critical habitat reach for all four species is the confluence between the Green and Yampa rivers. The distance from the proposed Green River pipeline crossing to the confluence with the Yampa River is approximately 75 miles. The Green River downstream of the Yampa River is known to support larvae, juvenile, and adult Colorado pikeminnow and razorback sucker. The occurrence of humpback chub and bonytail is limited to a few individuals in canyon areas (Desolation and Gray Canyons), which are located further downstream of the Yampa River confluence.

The Wyoming portion of the proposed pipeline route also crosses waterbodies that contain habitat for four fish species with Wyoming or BLM sensitive species status. Known or potential occurrence is listed below for each special status fish species. No USFS sensitive or MIS occur in the Green River portion of the Ashley National Forest.

- Flannelmouth sucker – Hams Fork River, Blacks Fork River, Green River, Bitter Creek;
- Bluehead sucker – Hams Fork River, Blacks Fork River, Green River;
- Leatherside chub – Green River; and
- Roundtail chub – Hams Fork Creek, Blacks Fork River, Green River, Bitter Creek.

Colorado. No federal-listed fish species occur at or within several miles downstream of waterbodies crossed by the proposed pipeline route in Colorado. However, downstream portions of the Platte River contain occupied and critical habitat for one federally listed fish species, the pallid sturgeon. This species has been collected in the Lower Platte River, defined as downstream of the mouth of the Elkhorn River. The upper end of occupied habitat for the pallid sturgeon is more than 350 miles downstream of the South Platte River crossing.

Three state-listed and two species of special concern fish species potentially occur in waterbodies crossed by the proposed pipeline route in Colorado, as listed below.

Colorado Listed Species

- Brassy minnow – South Platte, North Fork Republican, and Aikaree rivers;
- Suckermouth minnow – South Platte River, Aikaree River; and
- Plains minnow – South Platte and Republican rivers.

Colorado Species of Special Concern

- Orangethroat darter – Known occurrence in Chief Creek and North Fork Republican River; and
- Stonecat – Potential occurrence in North Fork Republican River.

Kansas. No federal or state-listed fish species occur at or within several miles downstream of waterbodies crossed by the proposed pipeline route in Kansas. One special status fish species, brassy minnow, potentially occurs in the headwaters of the Smokey Hill and Republican rivers, including the South Fork Republican River.

Amphibians and Turtles. Seven amphibians and one turtle species were identified as potentially occurring within the project study area. The amphibians included three toad species (Wyoming toad, Great Basin spadefoot toad, and Western boreal toad) and four frog species (spotted frog, northern leopard frog, northern cricket frog, and plains leopard frog). The special status turtle species is the yellow mud turtle. The special status of species retained for detailed analysis and potential occurrence by state are provided in **Table 3.7-7**. Toad species, such as Great Basin spadefoot, utilize aquatic habitats only during the breeding period and early-life development in the spring and early summer and during development of young. Other toad species are more closely associated with aquatic habitats throughout their life cycle, although adults also utilize terrestrial habitats. Toad species migrate to aquatic areas during breeding. The frog and turtle species utilize aquatic habitats throughout the year. The following discussion describes amphibian and turtle occurrence by state.

Wyoming. Within the Wyoming portion of the proposed pipeline route, five special status amphibians could utilize or occur in aquatic habitats. The relative occurrence potential and locations are listed below, based on information from Cerovski et al. (2004):

- Wyoming toad – Low potential occurrence in the Laramie River drainage;
- Great Basin spadefoot toad – High potential occurrence in sagebrush communities and aquatic habitats during breeding below 6,000 feet in the western and central portion of the proposed pipeline route;

- Spotted frog – Low occurrence in ponds or small streams in the western portion of the proposed pipeline route;
- Boreal toad – Moderate potential occurrence in wet areas at 11 segments (totaling approximately 5.3 miles) between RP 223.8 and RP 308.2 (elevations above approximately 7,500 feet); and
- Northern leopard frog – High potential occurrence in wetlands, ponds, and streams up to elevations of 9,000 feet.

Colorado. Four special status amphibians and one turtle species potentially occur within the Colorado portion of the proposed pipeline route. The relative occurrence potential and locations are listed below, based on information from Livo et al. (2000):

- Northern leopard frog – Low potential occurrence in wetlands, ponds, and streams in Weld, Yuma, Washington, and Morgan counties;
- Plains leopard frog – Low potential occurrence in wetlands, ponds, or streams in Yuma County;
- Northern cricket frog – Low potential occurrence in streams and impoundments in Yuma and Morgan counties; and
- Yellow mud turtle – Moderate potential occurrence wetlands and ponds in Yuma County.

Kansas. No special status amphibians or turtle species occur along the Kansas portion of the proposed pipeline route.

Plants

No unique, sensitive or protected vegetation communities were identified within the project area in Wyoming or Kansas. A complete description of special status plant species, including habitat associations and potential for occurrence along the proposed pipeline route may be found in **Appendix G**, **Tables G-1** and **G-2** and in the BA and in the BR/BE associated with this project.

3.7.2 Southern Energy Corridor – Copper Ridge Bypass Alternative

3.7.2.1 Wildlife

Habitat along the Southern Energy Corridor – Copper Ridge Bypass Alternative has a similar composition to habitat along the Proposed Action route. Big game, small game, and non-game species occurrence along the alternative route would be similar to the Proposed Action. This alternative does cross habitat with more significant vertical relief, therefore, cliff associated species may have greater potential to occur along this alternative. Species documented in the vicinity of the Southern Energy Corridor – Copper Ridge Bypass Alternative include white-tailed prairie dog, brewer's sparrow, sage sparrow, and sage thrasher. The proposed Southern Energy Corridor – Copper Ridge Bypass Alternative would not occur within lands administered by the USFS, therefore, MIS species are not considered under this alternative.

3.7.2.2 Aquatic Resources

Three perennial streams are crossed by the Southern Energy Corridor – Copper Ridge Bypass Alternative: Little Bitter Creek; unnamed tributary to Little Bitter Creek; and Cedar Creek (two crossings). No game fish species occur in any of these streams.

Perennial streams and wetlands crossed by the Southern Energy Corridor – Copper Ridge Bypass Alternative provide potential habitat for amphibians and turtles. Species that could be present include tiger salamander, plains spadefoot toad, Great Basin spadefoot toad, Woodhouse's toad, bullfrog, spiny softshell, ornate box turtle, western painted turtle, and snapping turtle (Cerovski et al. 2004).

3.7.2.3 Special Status Species

Perennial streams crossed by the Southern Energy Corridor – Copper Ridge Bypass Alternative do not contain special status fish species. Wildlife special status species occurrence is similar to the Proposed Action, including sage sparrow, sage thrasher, Brewer's sparrow, and northern leopard frog. White-tailed prairie dog may occur in the vicinity of this alternative. Two special status amphibians species, Great Basin spadefoot toad and spotted frog, could potentially occur in wetlands or stream segments crossed by the Southern Energy Corridor – Copper Ridge Bypass Alternative. Examples of special status species with sagebrush steppe and desert scrub association may include greater sage grouse, burrowing owl, mountain plover, ferruginous hawk, sage sparrow, sage thrasher, Brewer's sparrow, loggerhead shrike, Idaho pocket gopher, swift fox, pygmy rabbit, Great Basin spadefoot toad, and midget faded rattlesnake along this alternative. Special status plant species would be similar to those along the Proposed Action route.

3.8 Land Use, Recreation, and Aesthetics

3.8.1 Proposed Action

3.8.1.1 Land Ownership and Use

Land Ownership

Approximately 21 percent (160 miles) of the land crossed by the proposed pipeline route and aboveground facilities is managed or owned by public entities. Of the public land total, the majority is federally managed, while a smaller portion is managed or owned by the states or local municipalities. The federal lands are entirely managed by the BLM or the USFS. The remaining 79 percent (597 miles) of the proposed pipeline route would cross privately owned land. **Table 3.8-1** summarizes public land ownerships that would be crossed by the proposed pipeline route.

Table 3.8-1 Summary of Federal, State, and Locally Owned Land Crossed by the Proposed Pipeline Route

State/Ownership	Approximate Crossing Length (miles)	Percent of Total Length
WYOMING		
Federal	100.8	13
State/Local	25.3	3
Wyoming Subtotal	**126.1**	**17**
COLORADO		
Federal	22.4	3
State/Local	11.7	2
Colorado Subtotal	**34.1**	**4**
Project Total	**160.2**	**21**

Wyoming. Federal lands crossed in Wyoming are managed by the BLM and USFS. State lands that would be crossed in Wyoming are owned or managed by the State of Wyoming (including the Wyoming Highway Commission and the Wyoming Department of Corrections), the WGFD or the Wyoming Office of State Lands. Local government owners/managers consist of municipalities. Public land in Wyoming that would be crossed by the proposed pipeline route generally is managed for wildlife habitat, recreational uses, or leased to private tenants for livestock grazing. One federally managed recreation area would be crossed, the FGNRA, which is under the direction of the USFS.

Colorado. Federal lands crossed in Colorado are managed by the USFS. State lands in Colorado crossed by the proposed pipeline route are owned or managed by the CDOW or the Colorado State Land Board. A total of 34.1 publicly managed miles would be crossed in Colorado. Land owned by the State of Colorado that would be crossed by the proposed pipeline route is managed for wildlife habitat, recreational uses, or leased to private tenants for livestock grazing. A portion of the lands are special interest areas and are discussed in Section 3.7.3.

Kansas. No publicly owned lands are crossed by the proposed pipeline in Kansas.

Existing Land Use

Land types potentially affected by the project were assigned a land use classification based on the principal land characteristic in a given area. Aerial photography, USGS topographic maps, and field reconnaissance were used to identify six general land uses for the project area. These land uses are:

- Rangeland consisting of grasslands, pasture, livestock (e.g., sheep, cattle) grazing areas, and shrublands. Within the proposed pipeline route area, rangeland is typically used for livestock grazing. Grazing is permitted in specific allotments that are primarily managed by the BLM, although some rangeland also is owned or managed by the USFS, State of Wyoming, the State of Colorado, or private landowners. This is the predominant land use type that would be crossed by the proposed pipeline route (514.4 miles; 68 percent).
- Agricultural land consisting of irrigated hay meadows and farmlands where native vegetation is no longer evident, and crop production is apparent. Primary crops are grains and alfalfa, with some crop land dry-farmed and other areas under irrigation, including pivot irrigation (13.5 miles total). Agricultural land may have existing subsurface drainage systems (drain tiles) where hydric soils exist. The proposed pipeline route will affect approximately 72 acres (approximately 1 percent of total area) of hydric soils. Conservation Reserve Program (CRP) lands and disturbed areas containing non-desirable forb species adjacent to agricultural areas also are included in this land use classification. The proposed pipeline route would cross a total of 235.1 miles of agricultural land, or 31 percent of the total proposed pipeline route.
- Open land consists of bare rock, sand, clay, dry wash areas, and non-forested wetlands (2.9 miles; less than 1 percent).
- Forest land consists of mainly non-agricultural wooded uplands such as aspen woodlands, juniper woodlands, pine woodlands, and planted trees. Additionally, palustrine forested wetlands are grouped under this land use classification. The total forest land crossed by the proposed pipeline route is 9.2 miles, or approximately 1 percent of the total proposed pipeline route. None of the forest land is managed for timber production.
- Developed land includes both residential and commercial land. Residential land consists of existing developed residential areas that include single and multiple family dwellings in subdivisions as well as in rural areas. This category includes homes and landscaped areas associated with a residence. Commercial land consists of community features (cemeteries, schools, churches, hospitals) and industrial developments (utility stations, rock quarries, railroad crossings, road crossings). The total developed land crossed by the proposed pipeline route would be 2.8 miles (less than 1 percent).
- **Table 3.8-2** identifies the number of structures located within 50 feet of the construction work area for the proposed pipeline route by county and state. Approximately 83 percent of the pipeline would be co-located with existing pipeline, utility or road ROWs.
- Open water consists of waterbody crossings 100 feet or greater in width. The proposed pipeline route would cross 0.3 mile of open water.

Table 3.8-2 Structures Within 50 feet of the Construction Work Area for the Proposed Action

State	Number of Structures Within 50 feet of the Construction Work Area
Wyoming	
Lincoln	2
Sweetwater	2
Carbon	3
Albany	2
Wyoming Subtotal	***9***
Colorado	
Weld	2
Logan	3
Washington	3
Yuma	4
Colorado Subtotal	***12***

Table 3.8-2 Structures Within 50 feet of the Construction Work Area for the Proposed Action

State	Number of Structures Within 50 feet of the Construction Work Area
Kansas	
Cheyenne	2
Rawlins	1
Sheridan	4
Gove	1
Trego	2
Ellis	2
Barton	4
Rice	3
Kansas Subtotal	***19***
PROJECT TOTAL	**40**

Wyoming. Each specific land use type located in the project area in Wyoming is identified and discussed in detail below and shown on **Table 3.8-3**.

- Rangeland – In Wyoming, 96.9 miles of federally owned rangeland and 212.9 miles of privately held rangeland is crossed by the proposed pipeline route. More than 50 percent of this land is in Sweetwater County in the southcentral portion of Wyoming. Rangeland consists of grasslands, pasture, shrublands, and livestock grazing areas. The proposed pipeline route crosses several tracts of land that are owned and administered by the Board of Land Commissioners and BLM for grazing.
- Agricultural land – Wyoming agricultural land is characterized by irrigated hay meadows and farmlands where native vegetation is no longer evident and crop production is apparent. Major agricultural crops include spring wheat, barley, oats, dry beans, sugar beets, alfalfa hay, and corn (Wyoming Agricultural Statistics 2006). No pivot irrigated crop land is crossed by the proposed pipeline route in Wyoming. The majority of hydric soils crossed by the proposed pipeline route are in Wyoming (5.4 miles), with 3.3 miles in Albany County. Few, if any drain tiles are anticipated on the proposed pipeline route.
- Open land – Approximately 2.8 miles of open land crossed in Wyoming comprises all of the open land crossed by the proposed pipeline route. A little over 54 percent of the open land crossed by the proposed pipeline route is in Sweetwater County (1.5 miles). The remainder of open lands crossed occur in Lincoln County (0.8 mile), with small sections scattered throughout Carbon, Albany, and Laramie counties (less than 1 mile combined).
- Forest land – In Wyoming, forest land makes up a relatively small percentage of the state. This cover type primarily occurs at high elevations in the southeastern part of the state area and includes aspen, juniper, limber pine, lodgepole pine, and spruce-fir. Some scattered patches of ponderosa pine exist between Laramie and Cheyenne, and cottonwood riparian communities occur at the major river crossings. A total of 5.7 miles of forest land in Albany, Carbon, Sweetwater, and Laramie counties would be crossed by the proposed pipeline route.
- Developed land – In Wyoming, the proposed pipeline route crosses approximately 1 mile of developed land. No occupied residences within 50 feet of the ROW were identified along the proposed pipeline route. The developed land includes major road crossings, county road crossings, and railroad crossings. The majority of railroad lines crossed are owned by Union Pacific, though several other trains have rights to use these proposed pipeline routes. Generally, the pipeline corridor through Wyoming would run parallel to I-80.

Table 3.8-3 Summary of Land Use Types Crossed by the Proposed Pipeline Route (in miles)

State/County	Rangeland[1]		Agricultural[2]		Open[3]		Forest[4]		Developed[5]		Water[6]		Total[7]	
	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other
Wyoming														
Lincoln	10.1	10.7	0.0	0.4	0.4	0.4	0.0	0.0	0.0	0.1	0.0	<0.1	10.5	11.7
Sweetwater	55.5	78.3	0.0	0.0	1.1	0.4	2.1	2.4	0.2	0.1	<0.1	<0.1	58.9	81.3
Carbon	29.1	59.3	0.0	1.9	0.2	0.1	0.0	0.6	<0.1	0.3	0.0	0.1	29.3	62.1
Albany	2.1	45.3	0.0	4.7	0.0	0.2	0.0	0.4	0.0	0.3	0.0	<0.1	2.1	50.8
Laramie	0.0	19.4	0.0	0.6	0.0	0.1	0.0	0.3	0.0	<0.1	0.0	0.0	0.0	20.4
Subtotal[7]	**96.9**	**212.9**	**0.0**	**7.6**	**1.6**	**1.2**	**2.1**	**3.6**	**0.2**	**0.8**	**<0.1**	**0.2**	**100.8**	**226.4**
Colorado														
Larimer	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Weld	22.3	50.5	<0.1	7.7	0.0	0.0	0.0	<0.1	<0.1	0.2	0.0	0.0	22.4	58.4
Morgan	0.0	6.8	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4
Logan	0.0	6.5	0.0	2.8	0.0	<0.1	0.0	0.4	0.0	0.1	0.0	0.1	0.0	9.9
Washington	0.0	13.4	0.0	15.6	0.0	0.0	0.0	<0.1	0.0	0.1	0.0	0.0	0.0	29.1
Yuma	0.0	26.1	0.0	17.9	0.0	0.0	0.0	0.2	0.0	0.3	0.0	<0.1	0.0	44.6
Subtotal[7]	**22.3**	**103.2**	**<0.1**	**44.7**	**0.0**	**<0.1**	**0.0**	**0.6**	**<0.1**	**0.7**	**0.0**	**0.1**	**22.4**	**149.4**
Kansas														
Cheyenne	0.0	16.4	0.0	22.0	0.0	0.0	0.0	0.1	0.0	<0.1	0.0	0.0	0.0	38.5
Rawlins	0.0	5.6	0.0	13.5	0.0	0.0	0.0	<0.1	0.0	<0.1	0.0	0.0	0.0	19.2
Thomas	0.0	3.5	0.0	21.0	0.0	0.0	0.0	<0.1	0.0	<0.1	0.0	0.0	0.0	24.6
Sheridan	0.0	10.2	0.0	24.3	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	35.0
Gove	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.1
Trego	0.0	14.6	0.0	20.8	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	35.8
Ellis	0.0	13.1	0.0	19.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	<0.1	0.0	32.3
Russell	0.0	2.0	0.0	3.2	0.0	0.0	0.0	<0.1	0.0	0.0	0.0	0.0	0.0	5.2
Barton	0.0	5.6	0.0	22.1	0.0	0.0	0.0	0.3	0.0	<0.1	0.0	0.0	0.0	28.0
Ellsworth	0.0	1.0	0.0	6.2	0.0	0.0	0.0	0.7	0.0	<0.1	0.0	0.0	0.0	7.9

Table 3.8-3 Summary of Land Use Types Crossed by the Proposed Pipeline Route (in miles)

State/County	Rangeland[1]		Agricultural[2]		Open[3]		Forest[4]		Developed[5]		Water[6]		Total[7]	
	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other	Federal	Other
Rice	0.0	1.0	0.0	25.4	0.0	0.0	0.0	1.0	0.0	0.5	0.0	0.0	0.0	27.9
McPherson	0.0	0.1	0.0	5.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	5.4
Subtotal[7]	**0.0**	**74.1**	**0.0**	**182.8**	**0.0**	**0.0**	**0.0**	**2.9**	**0.0**	**1.1**	**0.0**	**0.0**	**0.0**	**260.9**
Project Total[9]	119.2	390.3	<0.1	235.1	1.6	1.3	2.1	7.1	0.3	2.6	<0.1	0.3	123.2	636.7

[1]Rangeland consists of grasslands, pasture, livestock grazing areas, and shrublands.

[2]Agricultural land consists of irrigated farmlands where crop production is apparent and disturbed areas containing non-desirable forb species adjacent to agricultural areas.

[3]Open land consists of bare rock, sand, clay, dry wash areas, and non-forested wetlands.

[4]Forest land consists mainly of non-agricultural wooded uplands.

[5]Developed land consists of existing residential developments and existing commercial development such as utility stations, rock quarries, railroad crossings, and road crossings.

[6]Open water consists of waterbody crossings 100 feet or greater in width.

[7]The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the exact sum of the addends in all cases.

- Two commercial structures in Lincoln County would be located within 25 feet of the proposed pipeline centerline and another structure would be located within 50 feet of the centerline. In Sweetwater County, the proposed pipeline route would pass within 50 feet of two commercial structures, and Albany and Carbon counties would have two and three commercial structures, respectively, within 50 feet of the proposed pipeline route (**Table 3.8-2**). The proposed pipeline route would be co-located with existing ROW for approximately 260 miles (78 percent of the total) through Wyoming.

Colorado. Each specific land use type located in the project area in Colorado is identified and discussed in detail below and shown on **Table 3.8-3**.

- Rangeland – In Colorado, the proposed pipeline route would cross approximately 125.5 miles of rangeland. The majority of this rangeland (72.8 miles) is located in Weld County, and of this, 22.3 miles are federally owned land. Several tracts of land are owned and administered by the BLM or owned by the Colorado State Land Board and administered by the CDOW for grazing, primarily for sheep and cattle.
- Agricultural land – In Colorado, agricultural land is characterized by irrigated hay meadows and farmlands where native vegetation is no longer evident and crop production is apparent. Major crops include grains and alfalfa. Approximately 44.8 miles of agricultural land would be crossed in Colorado by the proposed pipeline route. The greatest number of miles would occur in Yuma County (17.9 miles) and Washington County (15.6 miles). Of the total agricultural land crossed by the proposed pipeline route in Colorado, approximately 5.3 miles would cross pivot-irrigated crop land, all located in Yuma County. A total of 1.1 miles with hydric soils (with possible drain tiles) would be crossed in Colorado.
- Open land – No open land would be crossed by the proposed pipeline route through Colorado.
- Forest land – Of the approximately 172 miles of land crossed in Colorado, only 0.6 mile would be through forest land. These lands are not federally owned or managed.
- Developed land – In Colorado, the proposed pipeline route would cross less than 1 mile of developed land. No occupied residences have been located along the proposed pipeline route within 50 feet of the ROW in Colorado. Two commercial structures within 50 feet of the centerline were identified in Weld County, three structures were identified in both Logan and Washington counties, with another four structures identified within 50 feet in Yuma County (**Table 3.8-2**). Within Colorado, major roadways, county roads, and railroad lines would be crossed. Approximately 88 percent (152 miles) of the miles across Colorado would be co-located with other ROWs. Of these, 146 miles are co-located with Southern Star. Remaining miles are co-located with other utilities and CR 84.

Kansas. Each specific land use type located in the project area in Kansas is identified and discussed in detail below and shown on **Table 3.8-3**.

- Rangeland – No public grazing leases would be crossed in Kansas, however, 74.1 miles of privately held rangeland would be crossed by the proposed pipeline route. More than half of this land area is split between Cheyenne, Trego, Ellis, and Sheridan counties.
- Agricultural land – In Kansas, agricultural land is characterized by irrigated hay meadows and farmlands where native vegetation is no longer evident and crop production is apparent. Major crops include grains and alfalfa. A total of 182.8 miles of the 260.9 miles (70 percent) of pipeline in Kansas would cross agricultural land, including approximately 12 miles of pivot-irrigated crop land. In Cheyenne County, 2.9 miles of pivot-irrigated crop land would be crossed, while 1.8 miles would be crossed in Rawlins County, 4.7 miles would be crossed in Thomas County, and 2.6 miles would be crossed in Sheridan County. One and one-half miles with hydric soil (with possible drain tiles) would be located along the proposed pipeline route in Kansas.
- Open land – No open land would be crossed by the proposed pipeline route through Kansas.

- Forest land – The proposed pipeline route would cross through 2.9 miles of forested land in Kansas, spread across nearly all counties, with the highest number of miles (1.0 mile) occurring in Rice County.
- Developed land – The proposed pipeline route would cross a total of 1.1 miles of developed land in Kansas. No occupied residences would be within 50 feet of the proposed construction area. A total of 19 structures (ranging from farm buildings to sheds, to utility yards) were identified within 50 feet of the construction area in Cheyenne, Rawlins, Sheridan, Gove, Trego, Ellis, Barto, and Rice counties. Within Kansas, major roadways, county roads, and railroad lines would be crossed. A total of 212 of 261.4 miles (83 percent) of Overland Pass pipeline would be co-located with existing ROWs.

3.8.1.2 Congressional Designations and Special Management Areas

Conservation Reserve Program (CRP) Land

Established in 1985 by the Congress, the Farm Service Agency's (FSA) CRP is a voluntary program for agricultural landowners. Through CRP, participants can receive annual rental payments for 10 to 15 years and cost-share assistance to establish long-term, resource conserving covers on eligible farmland. Participating lands exhibit reduced soil erosion, improved water quality, and enhanced wildlife habitats. Nationally, CRP has 735,494 contracts and has restored grasses and trees on over 36 million acres (FSA 2006). Lands must meet the following criteria in order for lands to be eligible for the CRP:

- Cropland that has been planted or considered planted to an agricultural commodity 4 of the 6 years 1996 though 2001;
- Physically and legally capable of being planted in a normal manner to an agricultural commodity;
- Marginal pasture land;
- Have a weighted average Erosion Index of 8 or greater;
- Be expiring CRP; or
- Be located in a national or state CRP conservation priority area.

In consultation with local offices of the NRCS and FSA in Wyoming, Colorado, and Kansas, Overland Pass identified lands classified as CRP within a 1-mile radius of the proposed pipeline route (NRG 2006). No CRP land was identified in Wyoming. The NRCS and FSA identified approximately 3.5 miles and 8.3 miles of CRP lands crossed in Colorado and Kansas, respectively. **Table 3.8.4** identifies CRP lands crossed by the proposed pipeline route.

Table 3.8-4 Conservation Reserve Program Land Crossed by the Proposed Pipeline Route

State/ County	Miles
Colorado	
Morgan	1.4
Logan	0.7
Washington	0.2
Yuma	1.2
Colorado Subtotal	***3.5***
Kansas	
Cheyenne	2.4
Thomas	0.3
Sheridan	0.4
Trego	0.4
Sheridan	1.0

Table 3.8-4 Conservation Reserve Program Land Crossed by the Proposed Pipeline Route

State/ County	Miles
Ellis	1.2
Russell	1.0
Barton	0.5
Ellsworth	0.2
Rice	0.8
McPherson	0.1
Kansas Subtotal	***8.3***
Project Total	**11.8**

Recreational and Public Interest Areas

Generally, recreation and special interest areas include federal, state, or county parks and forests; conservation lands; wildlife habitat management areas; hunter management areas; natural landmarks; scenic byways; designated trails; recreational rivers; and campgrounds. Recreation and special interest areas were identified by reviewing USGS topographic maps; DeLorme Gazetteers for Wyoming, Colorado, and Kansas (DeLorme 2001, 2002, 2003); WGFD and CDOW interactive maps; BLM RMP maps of the proposed project area; landowner records; PNG management area maps; and field reconnaissance. Other historic or culturally significant areas crossed by the proposed pipeline route (e.g., Cherokee Trail, Lincoln Highway, Union Pacific Railroad) are discussed in Section 3.9.

No Wild and Scenic Rivers, Areas of Critical Environmental Concern (ACECs), Designated Wilderness, or Wilderness Study Areas would be crossed by the proposed action.

In addition to the federally managed lands, the proposed pipeline route traverses a total of four recreation and special interest areas. **Table 3.8-5** lists the location and land management agency responsible for each of these areas.

Table 3.8-5 Recreation and Special Interest Areas Affected by the Proposed Pipeline Route

State/County	RP	Name	Ownership
Wyoming			
Carbon	178.5	Continental Divide National Scenic Trail	USFS, BLM, National Park Service (NPS)
Albany	271.7	Snowy Range Scenic Drive	State of Wyoming
Colorado			
Weld	357.6	Pawnee Pioneer Trails Scenic Byway	State of Colorado
Kansas			
Trego	625.8	Smokey Valley Scenic Byway	State of Kansas

Wyoming. Approximately 1.8 miles of the proposed FGNRA, a federally managed recreation area, is crossed by the proposed pipeline route. The proposed pipeline route is proposed to cross the FGNRA at Cordwood and Davis Bottoms, near Green River, Wyoming.

The FGNRA is managed under the ANF LRMP. The ANF LRMP is intended to provide management direction for the many multiple uses of the national forest. Some of those multiple uses and resources include: outdoor recreation (i.e., four wheeling, kayaking/canoeing, and small game hunting), range, timber, watershed, fish and wildlife, minerals, wilderness, roadless areas, and cultural resources. During the winter, the area is mainly used for duck hunting and trapping. According to the ANF LRMP, the area crossed by the proposed pipeline route is allocated to the Northern Desert Management Area, Management Unit 5. The management unit

encompasses land on both sides of the Green River. This area is managed to provide and encourage dispersed and river floating recreation activities.

The proposed pipeline route crosses the Continental Divide National Scenic Trail (CDT) at RP 178.5 in Carbon County, Wyoming. In November 1978, the Congressional Oversight Committee of the National Trails System designated the CDT as a National Scenic Trail. The CDT is a 3,100-mile-long trail, traveling from Canada to Mexico, through five western states, including approximately 1,900 miles of existing trails and primitive, seldom-used roads. A Comprehensive Plan for the CDT was completed in 1985 to serve as a coordinating document providing broad-based policy, guidelines, and standards for establishing and managing the CDT over time and in such a manner as to ensure its continued utility as a high quality national recreation facility. The plan also provides a continuous record of issues, concerns, and public attitudes identified as a result of public involvement regarding the development and management of the CDT in the early 1980s. In 1995, the Continental Divide Trail Alliance (CDTA), a non-profit organization, was developed to be devoted to the completion, maintenance, and protection of the CDT. In 1998, the CDTA set a goal to complete the CDT over the next 10 years. Allowable uses of the CDTA include hiking, mountain biking, horseback riding, and limited motor vehicle use. The BLM portion of the trail is 95 percent primitive two-track roads, 4 percent is improved roads, and 1 percent requires cross-country travel. Cross-country segments are closed to motorized vehicles.

The proposed pipeline route also crosses the Snowy Range Scenic Drive at RP 271.7 in Albany County, Wyoming. The Snowy Range Scenic Drive, which travels through the Medicine Bow National Forest, is closed during the winter, and is used primarily by tourists during the summer. This road snakes through southeastern Wyoming and was designated as the second National Forest Scenic Byway in the U.S. The Snowy Range Scenic Byway is a 41-mile-long paved highway from Centennial over the rugged crest of to the North Platte River Valley. The Snowy Range Scenic crosses the Snowy Range, a rugged segment of the Rocky Mountains chain that reaches well above timberline into a glacier-carved landscape, over the second highest highway pass in Wyoming.

The proposed pipeline route crosses the Salt Wells Wild Horse Herd Management Area within the Rock Springs BLM District between approximate RP 64.1 and RP 110.5.

Colorado. The proposed pipeline route crosses approximately 22.4 miles of lands in the PNG in Weld County, Colorado that are under the jurisdiction of the USFS. These lands are managed under the 1997 Revision of the LRMP for the Arapaho and Roosevelt National Forests and PNG.

Recreation uses within the PNG include scenic driving (on open roads only), cross-country hiking, horseback riding, mountain biking, off-highway vehicle (OHV) use (OHVs are restricted to the Main OHV area; their use is prohibited on the rest of the PNG), as well as camping, picnicking, bird watching, and hunting at established recreational sites. No designated trails are crossed by the proposed pipeline route within the PNG.

One specific area of interest is the Pawnee Pioneer Trails Scenic Byway, which the proposed pipeline route crosses at RP 357.6 in Weld County. The Pawnee Pioneer Trails Byway travels through the PNG and is used mostly by traffic along Colorado State Routes 40 and 52 and tourists. Bird-watching is one of the most popular attractions on the Pawnee Pioneer Trails Scenic Byway.

Kansas. No federally managed or recreational areas are crossed in Kansas. The proposed pipeline route crosses the Smokey Valley Scenic Byway at RP 625.8 in Trego County, Kansas. The Smokey Valley Scenic Byway travels around the Cedar Bluff State Park (which the Project will not affect), and is used primarily by traffic on State Route 283 and by tourists. The byway offers tourists viewing of native wildflowers and grasses through the seasons.

3.8.1.3 Aesthetics (Visual and Noise)

Existing Visual Environment

Private lands crossed by the proposed pipeline route are not subject to federal or state visual management standards. Visual resources on private lands are a function of geology, climate, and historical processes and are influenced by topographic relief, vegetation, water, wildlife, land use, human uses, and development. The primary land use on private lands crossed by the proposed pipeline route is rangeland. The topography varies along the proposed pipeline route from rolling hills in Wyoming and eastern Colorado to flat agricultural fields in Kansas. The proposed pipeline route also crosses drainages and washes associated with intermittent streams throughout the proposed project area.

Public lands affected by the proposed pipeline route consist primarily of BLM-administered land. The BLM has an RMP for each resource area crossed by the proposed pipeline route and each RMP includes a visual resource management (VRM) standard. BLM land is managed to maintain the quality of scenic and visual resources. VRM classes are assigned to the various landscapes in each of the BLM's resource areas. The BLM VRM Classes Range from Class I to Class V, with Class I being the most restrictive and Class V being the least restrictive.

The USFS uses a Scenery Management System (SMS) to inventory, classify, and manage lands for visual resource values. Based on an inventory and evaluation of visual resources associated with national forest lands, SMS criteria are established to provide a measurable standard or objective form for management of visual resources. SMS criteria indicate the acceptable degree of landscape alteration and classify land in one of five categories: preservation, retention, partial retention, modification, or maximum modification.

BLM VRM and USFS SMS classifications for federally managed land crossed by the proposed pipeline route are provided in **Table 3.8-6**.

Table 3.8-6 BLM VRM and USFS SMS Classifications for Areas Crossed by the Proposed Pipeline Route[1]

Agency/Field Office/ Begin Reference Point	Reference Point		VRM/SMS Class
	Begin	End	
BLM			
Kemmerer Field Office	0.0	1.6	Class II
	1.6	23.6	Class IV
	23.6	42.8	Class III
Rock Springs Field Office	42.8	48.2	Class III
	48.2	50.3	Class IV
	50.3	55.4	Class III
	55.4	58.5	Class IV
	58.5	59.2	Class III
	59.2	60.4	Class II
	60.4	65.6	Class III
	65.6	105.2	Class IV
	105.2	110.4	Class V
Rawlins Field Office	110.4	110.8	Class IV
	110.8	155.5	Class IV
	155.5	161.0	Class III
	161.0	172.9	Class IV
	172.9	256.6	Class III
	256.6	256.8	Class IV
	256.8	317.9	Class III

Table 3.8-6 BLM VRM and USFS SMS Classifications for Areas Crossed by the Proposed Pipeline Route[1]

Agency/Field Office/ Begin Reference Point	Reference Point		VRM/SMS Class
	Begin	End	
USFS			
FGNRA	57.0	59.6	Retention
PNG[2]	336.7	338.9	Partial Retention
	339.1	340.1	Partial Retention
	341.0	342.6	Partial Retention
	343.4	344.2	Partial Retention
	344.2	344.4	Partial Retention
	344.4	344.6	Partial Retention
	344.6	346.9	Partial Retention
	346.9	348.9	Partial Retention
	351.3	351.8	Partial Retention
	352.4	352.6	Partial Retention
	353.0	353.8	Partial Retention
	355.0	356.0	Partial Retention
	371.5	374.5	Partial Retention
	375.5	376.0	Partial Retention
	376.0	376.5	Partial Retention
	380.0	381.4	Partial Retention
	381.4	383.9	Partial Retention
	385.4	386.9	Partial Retention
	386.9	387.1	Modification

[1]All reference points were identified utilizing digital VRM data provided by respective BLM field offices.

[2]The PNG uses SMS classification and management areas (USFS 1997).

The BLM-managed lands that will be crossed by the proposed pipeline route range between Class II and Class IV, with Class IV being the predominant VRM class affected. The objectives of these BLM VRM classes are:

Class II To retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV To provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

All but one of the USFS-managed lands crossed by the proposed pipeline route on the PNG are classified as partial retention areas. There is one area that has a SMS class of modification. The objectives of the PNG visual classifications are:

Partial Retention	Alterations to the natural landscape may be apparent, but they are visually subordinate to natural features. Management activities such as timber harvest and roading may occur, but must be designed so they blend into the natural landscape. Includes areas where changes in the basic elements (form, line, color, or texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.
Modification	Management activities may be visually dominant. They must be harmonious with features of the natural landscape, in their size, form, and linear characteristics. Recreation developments, timber harvest units, and roads are examples of elements that may be found in a landscape that meets this SMS. Alterations to the landscape may not be in glaring contrast to natural forms. Applies to areas where changes may subordinate the original composition and character; however, they should reflect what could be a natural occurrence within the characteristic landscape.

Existing Noise Environment

In 1974, the USEPA published a requisite evaluating the effects of environmental noise with respect to health and safety (USEPA 1974). The USEPA has determined that noise levels should not exceed a day-night (average sound) level (L_{dn}) of 55 decibels on the A-weighted scale (dBA), which is the level that protects the public from indoor and outdoor activity interference. This noise level has been useful for state and federal agencies to establish noise limitations for various noise sources. A 55 dBA L_{dn} noise level equates to a equivalent sound level (L_{eq}) of 48.6 dBA (i.e., a facility that does not exceed a continuous noise impact of 48.6 dBA will not exceed a 55 dBA L_{dn}).

Wyoming. The State of Wyoming and the counties of Carbon and Albany do not have any quantitative noise regulations. Two pump stations would be located in rural areas with few noise sources in the immediate vicinity. No Noise-Sensitive Areas (NSAs) are located within 1 mile of the proposed Echo Springs (RP 146.5) Pump Station in Carbon County and Laramie (RP 271.7) Pump Station in Albany County. Three meter stations also would be located in Wyoming.

Colorado. The State of Colorado has noise regulations (Title 25, Article 12) applicable to operations associated with the oil and gas industry. No pump stations would operate in Colorado, therefore, the State of Colorado noise regulations do not apply. Construction noise is not covered under Title 25, Article 12.

Kansas. No pump stations are currently proposed for Kansas, although a pump station at WaKeeney (RP 606.0) is likely in the foreseeable future. The WaKeeney Meter Station (RP 606.0) proposed for Sheridan County would be a new station. The State of Kansas and the county of Sheridan do not have any quantitative noise regulations. The location of the nearest NSA to the WaKeeney Meter Station is approximately 2,550 feet south/southwest (**Figure 3.8-1**).

3.8.2 Southern Energy Corridor – Copper Ridge Bypass Alternative

The Southern Energy Corridor – Copper Ridge Bypass Alternative would not differ substantially from the overall land use and aesthetics as described for the Proposed Action. Overall, the Southern Energy Corridor – Copper Ridge Bypass Alternative would add 4.8 miles to the total length of the pipeline. As a result, the amount of federal land crossed would increase from 10.9 miles to 18.5 miles. The alternative would cross the same number of paved roads, and one less dirt road. There are more buildings along the Southern Energy Corridor – Copper Ridge Bypass Alternative route within 500 feet of the ROW.


RP 605
RP 606
RP 607
NSA #1
2,550'
Legend
Reference Point (RP)
Noise Sensitive Area (NSA)
Aboveground Facilities
Proposed Overland Pass Pipeline
No warranty is made by the Bureau of Land Management for use of the data for purposes not intended by BLM.
Overland Pass Pipeline Project
Figure 3.8-1
Noise Sensitive Area Location Map

3.9 Cultural Resources

3.9.1 Proposed Action

3.9.1.1 Regulatory Framework

Federal historic preservation legislation provides a legal environment for documentation, evaluation, and protection of archaeological and historic sites that may be affected by federal undertakings, or by private undertakings operating under federal license or on federally managed lands. The NEPA of 1969 states that federal undertakings shall take into consideration impacts to the natural environment with respect to an array of disciplines, and that alternatives must be considered. The courts have made it clear that archaeological and historic sites (i.e., cultural resources) are regarded as part of the natural environment. The NHPA of 1966, as amended, established the ACHP and the NRHP (in its modern form). The NHPA mandates that federal agencies consider projects' effects on cultural resources that are enrolled on or eligible for the NRHP and Section 106 of the NHPA establishes a four-step review process by which cultural resources are given consideration during the conduct of federal undertakings.

Regulations in 36 CFR 800 (revised 2004) outline the process through which historic preservation legislation under the NHPA is administered. The National Programmatic Agreement (NPA) among the BLM, ACHP, and National Conference of State Historic Preservation Officers regarding the manner in which the BLM would meet its responsibilities under the NHPA is the National BLM authority for meeting requirements of the NHPA. Day-to-day operations are based on the protocols developed by the local BLM offices in each state. In Wyoming, the State Protocol (signed in March 2006) between the BLM and the Wyoming SHPO defines how the SHPO and BLM would interact and cooperate under the NHPA, and provides direction for implementing the NHPA. Additionally, BLM Manual 8140 provides direction for protecting cultural resources from natural or human-caused deterioration and for recovering significant cultural resource data to mitigate adverse effects of proposed undertakings in accordance with the state protocol.

Additional information on BLM procedures for protecting cultural resource sites is provided in **Appendix H**.

3.9.1.2 Qualifications for Listing Cultural Resources on the NRHP

The NRHP, maintained by the NPS on behalf of the Secretary of the Interior, is the nation's inventory of important cultural resources. The NPS has established three main standards that a resource must meet to qualify for listing on the NRHP: age, integrity, and significance. To meet the age criteria, a resource generally must be at least 50 years (NPS 1995). To meet the integrity criteria, a resource must "possess integrity of location, design, setting, materials, workmanship, feeling, and association" (36 CFR 60.4). Finally, a resource must be significant according to one or more of the following criteria:

- Be associated with events that have made a significant contribution to the broad patterns of U.S. history (Criterion A); or
- Be associated with the lives of persons significant in U.S. history (Criterion B); or
- Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C); or
- Have yielded, or may likely yield, information important in prehistory or history (Criterion D).

3.9.1.3 Cultural Resources Investigations

Numerous cultural resources investigations have been conducted along or within the vicinity of the proposed pipeline corridor. These include numerous Class I, Class II, and Class III investigations, as well as research designs and prehistoric, historic, and ethnographic contexts. Class I investigations are a review of reports containing the results of previously conducted inventories in the project area, as well as library and archival

sources for regional prehistory and history. Class II investigations are surveys of sample portions of an area to provide estimates of site distribution, density, and significance. Class III investigations are intensive field surveys of areas in which impacts are planned or are likely to occur. Cultural resources along the entire proposed pipeline corridor have been investigated at the Class I and Class III levels of intensity. The results of the cultural resources investigations are summarized below.

The proposed pipeline route crosses a variety of archaeology as it travels from western Wyoming to western Kansas. Habitation patterns, adaptive strategies, technical development, and cultural lifeways of prehistoric people to present-day populations vary greatly across the landscape. Archaeological investigations in the proposed project area indicate that people have inhabited the project area for at least 12,000 years, from Paleoindian occupation to the present. Prehistoric sites in the project area include lithic scatters, open camps, lithic procurement areas, and quarries; historic sites include, but are not limited to, expansion era trails, railroads, freight roads, homesteads, and staging stations. In addition, traditional cultural properties and other areas of tribal significance have been located within the proposed project area. Due to the size of the project area and expansive topography traversed by the proposed pipeline route, a cultural overview of prehistoric and historic development in the project area is not included in this EIS. However, the reader is referred to *Handbook of North American Indians, Volume 13, Plains*, (DeMallie 2001), for a comprehensive overview of prehistoric and historic development in the project area.

Wyoming

Between November 2005 and February 2006, a Class I files search of the proposed project area was conducted online at the Wyoming Cultural Records Office (WYCRO) and BLM field offices. The files search also included review of General Land Office (GLO) plats in order to identify potential historic site locations. The Class I files search examined a corridor extending 1 mile on each side of the proposed pipeline centerline. As a result of the files search, a total of 1,661 previously recorded sites and 140 features on the GLO plats of the project area were identified within the 2-mile-wide study corridor; 215 of the sites and 57 of the GLO features are located within 150 feet of the proposed pipeline centerline (Retter et al. 2006).

Of the 215 sites located within 150 feet of the proposed pipeline centerline, 50 are historic, 150 are prehistoric, 14 contain both historic and prehistoric components, and 1 is of unknown cultural affiliation. The prehistoric sites include lithic scatters, open camps, stone circles, and hearths; historic sites include several transportation routes (e.g., the Overland Trail, Union Pacific Railroad, Oregon Short Line Railroad, and Lincoln Highway), townsites, a bridge and homestead, and historic debris. The majority of multi-component sites include prehistoric artifact scatters and historic debris.

Review of the GLO maps revealed 57 features within 150 feet of the proposed pipeline centerline. These 57 features include roads, railroads, utility corridors, ditches, and structures.

Results of Field Investigations

From spring through fall 2006, cultural resources inventories were conducted along the Wyoming portion of the proposed project corridor (SWCA 2006a-f). The inventory included examination of the proposed pipeline corridor, alternate pipeline routes, additional TWAs, and access roads. Land crossed by the proposed pipeline mainly is privately owned; however, 2.2 miles of land administered by the USFS, 98.2 miles administered by the BLM, and 21.2 miles of state land also are crossed. As a result of the cultural resources inventory, 308 cultural resource sites and 144 isolated finds were identified. Of the 308 sites, 104 are historic, 181 are prehistoric, and 23 sites contain both prehistoric and historic components (**Appendix I**, **Table I-1**).

The majority of historic sites or site components are linear sites. These include multiple railroads (e.g., Union Pacific Railroad, Saratoga & Encampment Railroad, Oregon Short Line Railroad); ditches or canals (e.g., Robertson Ditch, Canon Ditch, Pioneer Canal); roads (e.g., Vernal-Green River Road, Rawlins to Baggs Stage Road, Bryan to Browns Park Wagon Road); trails (e.g., Blacks Fork Cutoff Trail, Overland Trail, Oregon Trail); and the Lincoln Highway.

Segments of the Union Pacific Railroad, Canon Ditch, Lincoln Highway, Overland Trail, and Rawlins to Baggs Stage Road are crossed multiple times by the proposed project corridor.

Union Pacific Railroad. The Union Pacific Railroad is the original Transcontinental Railroad connecting the eastern U.S. with the West during the late 19th and 20th centuries. The early development of coal mining, ranching, the trona industry, and the urban centers of southern Wyoming resulted from the presence of the Union Pacific railroad, which provided an efficient and relatively inexpensive mode of transportation.

Canon Ditch. The Canon Ditch, which is now a canal, was originally built in 1896 as a ditch for localized farm/ranch irrigation. The length of the canal was expanded in the early 1920s, and the width and depth were increased in 1944. The canal grew from an agricultural ditch to a large canal used to feed ranch rangelands.

Lincoln Highway. Originally proposed in 1913 by a group formed as the "Lincoln Highway Association," the Lincoln Highway was to be the first transcontinental highway in the U.S., connecting New York City to San Francisco. When choosing a route across southern Wyoming, the Association selected the Union Pacific Railroad corridor, a route that basically followed the Overland Trail corridor. Sections of various Lincoln Highway routes and reroutes dating from between 1913 and the 1940s parallel the current U.S. Highway 30/287 through much of Albany and Carbon counties. In 1926, the Wyoming portion of the Lincoln Highway was designated by the Federal Government as U.S. Highway 30, thus incorporating the road into the new transcontinental highway system. U.S. Highway 30, which includes most of the Lincoln Highway, remained the major east-west route across Wyoming until the completion of I-80 in the 1960s.

Overland Trail. Established and owned by the "Stagecoach King," Ben Holladay, the Overland Trail was a variation of the Oregon Trail. In 1862, Holladay and his Overland Stage Company were directed by the U.S. Post Office to move from the established route through Wyoming that followed the North Platte River to a different route following the South Platte. The new route had the advantage of being shorter, but it also was chosen in an effort to avoid Indian attacks that had been occurring on the Oregon Trail.

The route of the Overland Trail followed the southern bank of the South Platte River to Latham, near today's Greeley, Colorado, then went up along the Cache La Poudre River, crossed the Laramie Plains, traveled through Bridger's Pass, and rejoined the Oregon Trail at Fort Bridger. The western route out of Latham also was known as the Cherokee Trail.

While the Oregon Trail may have been more popular, the Overland Trail was not simply a detour. From 1862 to 1868, it was the only route upon which the federal government would permit travel and it served as the main highway to the west in those years. Holladay owned the Overland Stage Company until 1866 when, realizing the Transcontinental Railroad would end the need for stagecoach travel, he sold it to Wells Fargo.

Rawlins to Baggs Stage Road. Rawlins to Baggs Stage Road served as a major stage and travel route between Rawlins and Baggs during the latter half of the 19th century and early 20th century. The origins of the road are associated with two historical events: 1) the building of the first transcontinental railroad through southern Wyoming Territory in 1867-1868 and the founding of the Town of Rawlins, and 2) the creation of the White River Agency for the Ute Indians in northwestern Colorado in 1868. The road was originally used for freight, but passenger and mail service was added as more people settled in the region. Stage service ended on the Rawlins to Baggs Stage Road in 1909.

The majority of the 204 prehistoric sites or site components consist of open camps and lithic scatters. Based on the frequency of recorded campsites, it is assumed that prehistoric people came to the project area for food resource procurement. Non-human bone was observed in association with cultural remains at several sites, and ground stone at a few sites. None of the campsites located in the area had preserved habitation structures on the surface. In general, project area sites are associated with all prehistoric periods from the Late Paleoindian to the Protohistoric. However, sites with diagnostic projectile points or radiocarbon assays dated to the Late Prehistoric or Archaic periods.

Of the 144 isolated finds located during the inventory, 103 are prehistoric, 32 are historic, and 9 are multi-component. Most of the prehistoric isolated finds were one or a few flakes. Historic isolated finds were mainly cans, glass vessel fragments, or pieces of crockery.

Of the 308 sites located during the field survey, 123 are recommended or officially determined eligible for listing on the NRHP and 185 are recommended or officially determined not eligible for the NRHP. Sixty-two of the 123 recommended or officially determined NRHP-eligible sites are historic, 51 are prehistoric, and 10 contain both prehistoric and historic components. NRHP-eligible historic sites include, but are not limited to, trails, roads, railroads, and the Lincoln Highway. NRHP-eligible prehistoric are predominately lithic scatters and open camps. Management recommendations for the recommended or officially determined NRHP-eligible sites in Wyoming are provided in **Appendix I**, **Table I-1**.

Colorado

In November 2005, a Class I files search of the proposed project area was conducted through the Office of Archaeology and Historic Preservation (OAHP). On December 27, 2005, the files at the Pawnee National Grasslands/Arapaho-Roosevelt National Forest also were examined. Historic GLO plats were obtained from the BLM Colorado State Office in order to identify potential historic site locations. The Class I files search examined a corridor extending 0.5 mile on each side of the proposed pipeline centerline. As a result of the files search, 93 previously recorded cultural resource sites were identified within the 1-mile-wide study corridor; 37 of the sites are located within 150 feet of the proposed pipeline centerline (Horn and Wall 2006).

Of the 37 sites located within 150 feet of the proposed pipeline centerline, 18 are historic, 16 are prehistoric, 2 are multi-component sites containing both historic and prehistoric components, and 1 is of unknown cultural affiliation. The prehistoric sites include lithic scatters and camps; historic sites include a canal, highway, homestead, and trash scatter, farms, railroad grades, and transmission lines. The two multi-component sites include a prehistoric camp/historic homestead and prehistoric camp/historic trash scatter. The one site of unknown cultural affiliation consists of rock piles.

The GLO plats revealed 65 historic features, of which 8 had been previously recorded, resulting in a total of 57 potential historic sites in the 1-mile-wide study corridor. Of the 65 previously recorded and potential historic sites, 14 unnamed historic roads, the Eckley to Wray Road, two railroads (the Chicago, Burlington & Quincy Railroad and Colorado Central Railroad), three telegraph lines, and two ditches cross the proposed pipeline route. Four additional unnamed roads, four houses, and two homesteads are shown within 700 feet of the proposed pipeline centerline. Review of USGS 7.5-minute topographical maps revealed an additional 132 potential historic sites with no overlap in potential sites between the two data sources. Of the 132 potential historic sites identified from USGS 7.5-minute topographical maps, 17 appear to cross or be in close proximity to the proposed pipeline centerline. These include six windmills, five structure complexes, five canals or ditches, and the Union Pacific Railroad grade.

Results of the Field Investigations

From April through August 2006, cultural resources inventories were conducted along the Colorado portion of the proposed project corridor (Horn et al. 2006). The inventory included examination of the proposed pipeline corridor, alternate pipeline routes, additional TWAs, access roads, and above-ground facilities, including pipe yards and staging areas. Land crossed by the proposed pipeline mainly is privately owned; however, 22.4 miles of land administered by the USFS, PNG, and 10.6 miles of state land also are crossed. As a result of the cultural resources inventory, 66 cultural resource sites and 51 isolated finds were identified (**Appendix I**, **Table I-2**). Of the 66 sites, 42 are historic, 20 are prehistoric, and 4 sites contain both prehistoric and historic components. With the exception of one site, all of the sites recorded during the inventory were found along the proposed pipeline corridor.

Twenty of the 46 historic sites or site components are linear sites, including 8 segments of railroad grades; 7 segments of ditches or canals (e.g., South Platte Ditch, North Sterling Canal, Davis Brothers Ditch); 3 roads (Eckley to Wray Road and 2 unnamed roads); 1 highway (U.S. Highway 6); and 1 transmission line (Beaver

Creek to Sterling Transmission Line). The remaining 26 historic sites or site components include 1 camp circa 1931; 6 artifact scatters dating mainly from the 1910s to 1930s, with 1 dating from the 1930s to 1950s; and 19 homesteads or residential sites dating mainly from the 1910s to 1930s. Standing structures were present at three of the sites. One was a residence with collapsed outbuildings from the 1910s to 1970s, one was an active farm complex, and one was a relocated chicken coop from the 1920s.

Eighteen of the 24 prehistoric sites or site components were of unknown age or cultural affiliation. The six sites for which a temporal period could be ascertained extend from Early Archaic to Late Prehistoric. All of the prehistoric sites were lithic scatters, two of which were complex enough to be considered camps and five of which appeared to be the locus of lithic procurement and initial reduction activities.

Of the 51 isolated finds located during the inventory, 40 were prehistoric and 11 were historic. Most of the prehistoric isolated finds were one or a few flakes. Historic isolated finds were mainly cans, glass vessel fragments, or automobile parts.

Of the 66 sites located during the field survey, 27 sites and the prehistoric component of one multi-component site (SWL403) are recommended or officially determined eligible for listing on the NRHP and 38 sites and the historic component of a multi-component site (SWL403) are recommended or officially determined not eligible for the NRHP. The majority of recommended or officially determined NRHP-eligible sites are historic and include ditches, railroads, roads, and homesteads. All of the NRHP-eligible prehistoric sites are lithic scatters. Recommended management of the sites recommended and officially determined eligible for the NRHP in Colorado are provided in **Appendix I**, **Table I-2**.

In the fall of 2006, an additional Class III inventory of four reroutes, additional temporary work spaces, and a different configuration of a pipe yard were conducted (Horn 2006). The inventory resulted in the examination of 18.4 acres of private land and 29.4 acres of the PNG, for a total of 47.8 acres. Two new sites and one previously recorded site were recorded during the inventory **(Appendix I**, **Table I-2**). The two new sites are located on the PNG and consist of a prehistoric lithic scatter of unknown age and a historic homestead. The previously recorded site is a segment of a historic railroad grade.

Of the two newly recorded sites, the prehistoric lithic scatter is recommended as not eligible for the NRHP while the historic homestead is recommended as eligible. The previously recorded segment of the historic railroad grade was initially recorded during the original inventory conducted from April through August 2006 and was lengthened as a result of the additional inventory. The segment is considered to be a contributing element of the NRHP-eligible Burlington & Missouri River Railroad/Chicago, Burlington & Quincy Railroad/Burlington Northern Railroad grade.

An analysis of soils data and a geomorphological field reconnaissance of the entire proposed project area were conducted to assess the potential for soils in the project area to contain buried sites. Eolian, alluvial, colluvial, and lacustrine soil deposits of Late Pleistocene to Holocene age were identified and assessed. The analysis and reconnaissance resulted in recommendations for monitoring at 44 locations within the proposed project area that have the potential to contain archaeological sites in buried contexts. These areas are primarily in the vicinity of drainages where alluvial sedimentation has occurred and where aeolian deposition of late Pleistocene or more recent age has taken place.

Kansas

In January and February 2006, a Class I files search of the proposed project area was conducted through the Kansas State Historical Society (KSHS). The files search also included review of GLO plats in order to identify potential historic site locations. The Class I inventory examined a corridor extending 0.5 mile on each side of the proposed pipeline centerline. As a result of the files search, 45 previously recorded cultural resource sites were identified within or adjacent to the proposed pipeline ROW (Maymon and Bevitt 2006).

Of the 45 sites located within or adjacent to the proposed pipeline ROW, 3 are historic, 41 are prehistoric, and 1 is a multi-component site containing both historic and prehistoric components. The prehistoric sites include

lithic scatters, quarries, and camps; historic sites include trash scatters, habitation sites, and graffiti. The multi-component site includes a prehistoric camp and historic dugout depression.

The GLO plats indicate the potential presence of additional historic resources in the vicinity of the proposed pipeline corridor including a number of wagon roads or trails. County plat maps yielded additional information on Euro-American use of the region, generally in the form of individual homesteads and farms. A total of 340 homes were identified from early 20th Century documents within 0.5 mile of the proposed pipeline centerline, in addition to 5 townsites, 17 rural schools, 2 churches, and 4 cemeteries.

Results of the Field Investigations

From April through August 2006, cultural resources inventories were conducted along the Kansas portion of the project corridor (Maymon 2006). The inventory included examination of the proposed pipeline corridor, alternate pipeline routes, additional TWAs, access roads, and aboveground facilities, including proposed pump stations, pipe yards, and staging areas. All of the land crossed by the proposed pipeline is privately owned. As a result of the cultural resources inventory, 47 cultural resources and 26 isolated finds were identified (**Appendix I**, **Table I-3**). Of the 47 cultural resources, 10 are historic sites, 35 are prehistoric sites, and 2 are sites containing both prehistoric and historic components.

The 12 historic sites or site components include one machinery dump dating from 1900 to 1950, 1 trash dump dating from the 1930s to 1970s, one artifact scatter dating from the early to mid-20th Century, and nine homesteads or residential sites dating mainly from the mid 19th century to mid-20th Century. The six architectural properties date from 1900 to 1950 and include four farms, one sod house, and a two-story wood-frame house.

Twenty-five of the 37 prehistoric sites or site components are of unknown age or cultural affiliation. The 13 sites for which a temporal period could be ascertained extend from Paleoindian to Protohistoric. Most of the prehistoric sites or site components are lithic scatters; however, five camps, one village, two camps/lithic scatters, one lithic procurement area, two quarries/lithic procurement areas, three camps/lithic procurement areas, and one possible bison kill site also are included in the identified prehistoric sites or site components.

Of the 26 isolated finds located during the inventory, 12 were prehistoric and 14 were historic. Most of the prehistoric isolated finds were stone flakes or fragments. Historic isolated finds were mainly cans, glass vessel fragments, farm implements, automobiles, automobile parts, and metal, wood, or ceramic debris.

In fall 2006, archaeological evaluation of 18 of the sites located during the cultural resources inventory was conducted within the project corridor in Kansas (Goodwin & Associates 2006). The sites evaluated included: 14RW102, 14SD00107, 14SD00108/109, 14SD00102, 14SD00103, 14SD00104, 14SD00110, 14SD00428, 14SD00452, 14SD00101, 14GO00102, 14GO00301, 14TO00101, 14TO00306, 14TO00317, 14TO00314, 14TO00103, and 14TO00109 (**Appendix I**, **Table I-3**). The objective of the archaeological evaluation was to determine the significance of these 18 sites applying the NRHP Criteria for Evaluation (36 CFR 60.4 [a-d]). The evaluation also defined potential impacts to the resources and provided management recommendations for those sites evaluated as eligible for the NRHP. In addition to the evaluation of these sites, non-invasive geophysical survey was completed at site 14RC00313, which is already listed on the NRHP, in preparation for anticipated data recovery.

As a result of the site evaluations, five sites (14SD00108/109, 14SD00102, 14SD00103, 14SD00104, and 14TO00306) were determined to possess the qualities of significance as defined by the NRHP criteria for evaluation (**Appendix I**, **Table I-3**). Three of the sites are prehistoric lithic scatters, one is a prehistoric camp/workshop, and one is a prehistoric chipped stone quarry/workshop.

As a result of the field surveys and site evaluations, 6 sites are recommended or officially determined eligible for listing on the NRHP, 34 are recommended or officially determined not eligible for the NRHP, and 7 are unevaluated. Of the recommended or officially determined NRHP-eligible sites, five are prehistoric and one is a multi-component site consisting of a historic residence and prehistoric camp/lithic procurement area. The

NRHP-eligible prehistoric sites include lithic scatters and lithic procurement areas. Management recommendations for the recommended or officially determined NRHP-eligible sites in Kansas are provided in **Appendix I**, **Table I-3**.

An analysis of soils data, a review of USGS 7.5-minute topographic maps, and a geomorphological field reconnaissance of the entire proposed project area were conducted to assess the potential for soils in the project area to contain buried sites. The reconnaissance involved assessing geomorphic settings, with emphasis on identifying Holocene and late Pleistocene landform sediment assemblages, such as alluvial terraces and fans, colluvial aprons and playa basins. Seven localities in the proposed project area were identified as areas with potential for buried cultural deposits. Five of the seven localities were identified as areas that would require deep testing (i.e., backhoe trenching) if they cannot be avoided by a reroute.

3.9.2 Southern Energy Corridor – Copper Ridge Bypass Alternative

Since the proposed Southern Energy Corridor – Copper Ridge Bypass Alternative is considered an alternate corridor at this time, only a Class I files search was conducted. If the proposed Southern Energy Corridor – Copper Ridge Bypass Alternative was selected for construction, a Class III pedestrian survey would be conducted along the entire length of the proposed bypass corridor.

The Class I files search of the proposed Southern Energy Corridor – Copper Ridge Bypass Alternative was conducted online through the WYCRO. The files search also included review of GLO plats. The Class I files search examined a corridor extending 0.5 mile on either side of the proposed bypass centerline. As a result of the files search, a total of 53 previously recorded sites were identified within the 1-mile-wide study corridor (Wesson 2006). Thirty-seven of these are prehistoric sites, 11 are historic sites, 5 are multi-component sites containing both prehistoric and historic components, and 1 is a rock cairn of unknown cultural affiliation. The prehistoric sites consist of lithic scatters, open camps, habitation sites, and a food processing site. The 11 historic sites consist of roads/trails, debris scatters, a bridge, corral, telephone line, and cairn. In general, the multi-component sites contain prehistoric lithic scatters and historic debris scatters.

Of the 53 previously recorded sites within the 1-mile-wide study corridor, nine are located within approximately 100 feet of the proposed Southern Energy Corridor – Copper Ridge Bypass Alternative centerline. Three of the nine sites are prehistoric, five are historic, and one is a multi-component site. All of the prehistoric sites are lithic scatters. The five historic resources include two freight roads, a telephone line, bridge, and corral. The one multi-component site is described as a prehistoric/historic open camp. The NRHP eligibility of five of the sites is unknown, two are recommended as not eligible, one is eligible with SHPO concurrence, and one is an NRHP-eligible historic freight road; however, the segment that is within 100 feet of the proposed alternate centerline is unevaluated.

Compared to the proposed Southern Energy Corridor – Copper Ridge Bypass Alternative, a total of 16 previously recorded sites were identified within 0.5 mile of the segment of the proposed pipeline corridor that would be eliminated if the proposed bypass were chosen. Of the 16 sites, 13 are prehistoric sites, 2 are historic sites, and 1 is a multi-component site. The 13 prehistoric sites consist of 6 lithic scatters, 2 open campsites, 1 lithic scatter/open camp/quarry, 3 habitation sites, and a rock art site. The two historic sites are both freight roads and the one multi-component site consists of a prehistoric open camp and historic cabin.

During the Class III pedestrian survey, 5 sites were located within 100 feet of the proposed pipeline centerline that would be eliminated if the proposed bypass were chosen. Two of the sites were previously recorded. Of the five sites, one is a prehistoric lithic scatter/open camp/quarry, three are prehistoric lithic scatters, and one is a historic freight road. The historic freight road is not eligible for the NRHP with SHPO concurrence; the four prehistoric sites are recommended as not eligible for the NRHP.

In summary, 9 sites were identified within 100 feet of the proposed Southern Energy Corridor – Copper Ridge Bypass Alternative centerline as a result of the Class I files search and 5 sites were located within 100 feet of the segment of the proposed pipeline centerline that would be eliminated if the bypass were chosen as a result of the Class III pedestrian survey. All of the five sites located along the proposed pipeline route are

recommended as not eligible for the NRHP. Of the nine previously recorded sites identified along the proposed Southern Energy Corridor – Copper Ridge Bypass Alternative corridor, two are recommended as not eligible for the NRHP, five are unevaluated, one is eligible for the NRHP with SHPO concurrence, and one is an NRHP-eligible linear feature; however, the segment of the linear feature identified within 100 feet of the proposed alternative centerline is unevaluated.

3.10 Native American Consultation

3.10.1 Proposed Action

3.10.1.1 Regulatory Framework

Various federal statutes require consultation with Native American tribes concerning the identification of cultural values, religious beliefs, and traditional practices of Native American people that may be affected by federally approved actions. These federal statutes are interrelated regarding Native American consultation and include, but are not limited to, Section 106 NHPA of 1966, as amended; EO 13007 (FR 1996); AIRFA of 1978; and NAGPRA of 1990.

Section 106 of NHPA requires all federal agencies to take into account the effects of their actions on historic properties and provide the ACHP with an opportunity to comment on those actions and the manner in which federal agencies are taking historic properties into account in their decisions.

EO 13007 (FR 1996) requires federal agencies to accommodate access to and ceremonial use of Native American sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites. It also requires agencies to develop procedures for reasonable notification of proposed actions or land management policies that may restrict access to or ceremonial use of, or adversely affect, sacred sites.

AIRFA established federal policy of protecting and preserving the inherent right of individual Native Americans to believe, express, and exercise their traditional religions including, but not limited to, access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.

NAGPRA established a means for Native Americans, including Indian tribes, to request the return of human remains and other sensitive cultural items held by federal agencies or federally assisted museums or institutions. NAGPRA also contains provisions regarding the intentional excavation and removal of, inadvertent discovery of, and illegal trafficking in Native American human remains and sensitive cultural items.

Consultation includes the identification of places (i.e., physical locations) of traditional cultural importance to Native American tribes. Places that may be of traditional cultural importance to Native American people include, but are not limited to, locations associated with the traditional beliefs concerning tribal origins, cultural history, or the nature of the world; locations where religious practitioners go, either in the past or the present, to perform ceremonial activities based on traditional cultural rules or practice; ancestral habitation sites; trails; burial sites; and places from which plants, animals, minerals, and waters possessing healing powers or used for other subsistence purposes, may be taken. Additionally, some of these locations may be considered sacred to particular Native American individuals or tribes. The BLM must take into account the effects of the proposed project on these types of locations.

If a resource has been identified as having importance in traditional cultural practices and the continuing cultural identity of a community, it may be considered a TCP. The term “traditional cultural property” first came into use within the federal legal framework for historic preservation and cultural resource management in an attempt to categorize historic properties containing traditional cultural significance. National Register Bulletin 38: *Guidelines for Evaluating and Documenting Traditional Cultural Properties* (Parker and King 1989) defines a TCP as “one that is eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community’s history, and (b) are important in maintaining the continuing cultural identify of the community.” To qualify for nomination to the NRHP, a TCP must be more than 50 years old, must be a place with definable boundaries, must retain integrity, and meet certain criteria as outlined in National Register Bulletin 15 (NPS 1995).

3.10.1.2 Native American Consultation

In compliance with Section 106 of the NHPA, the BLM initiated government-to-government consultation by sending letters to 22 Native American tribes on March 1, 2006 (**Table 3.10-1**). The letters were sent to inform the various tribes of the proposed undertaking and solicit their concerns/comments regarding the possible presence of TCPs or places of cultural, traditional, or religious importance to the tribes in the proposed project area. In addition, on March 31, 2006, the BLM sent out offers for Cooperating Agency status to the tribes. Subsequently, the BLM conducted follow-up telephone calls and field visits to selected sites along the proposed pipeline route that were identified during the Class I overviews as places of cultural, traditional, or religious importance.

The BLM Rawlins Field Office invited tribal officials from the 22 Native American tribes to participate in an informational meeting on June 6, 2006, and field visits on June 6 and 7, 2006. Five of the 22 Native American tribes attended the meeting in Rawlins: Shoshone Business Council of the Eastern Shoshone Tribe, Fort Peck Tribes, Arapaho Business Council of the Northern Arapaho Tribe, Northern Cheyenne Tribe, and Northern Ute Indian Tribe. The purpose of the meeting was to discuss how tribal consultation for the proposed project should proceed with the BLM Rawlins Field Office. The meeting was followed by visits to selected archaeological sites that had been identified as sites of concern by the tribes during review of the Class I cultural resources inventory reports. During the site visits, several tribal representatives requested information on the plant communities along the proposed pipeline route and re-vegetation procedures following pipeline construction.

A second field visit to selected segments of the proposed pipeline corridor was conducted by the BLM Rawlins Field Office on July 25 through 28, 2006, and was attended by the Arapaho Business Council and Northern Cheyenne. The Fort Peck Assiniboine were scheduled to attend the July meeting; however, last minute conflicts prevented them from attending. During the field visit, Arapaho Business Council representatives requested tribal monitors during pipeline construction and requested to be notified of inadvertent discovery situations, including burials and funerary items. Northern Cheyenne representatives were concerned about sites with religious significance, recommended tribal monitors during all pipeline construction activities, and requested to be kept informed of any inadvertent discoveries located in the project area. The Northern Cheyenne also attended a third field visit near WaKeeney, Kansas, on August 24, 2006, to monitor several sites undergoing deep trench testing.

On September 27, 2006, the BLM Rawlins Field Office conducted a second tribal informational meeting. Five tribes (Crow Tribe, Fort Peck and Assiniboine Sioux Tribes, Northern Cheyenne Tribe, Shoshone Business Council [Eastern Shoshone Tribe], and Uintah Ouray Ute Tribe [Northern Ute Tribe]) attended the meeting. The Northern Arapaho Tribe had expressed interest in coming to the meeting, but was unable to attend due to last minute conflicts. The following issues were discussed during the meeting:

- NAGPRA responsibilities and state burial laws;
- The tribal consultation process;
- Cultural sites that were visited by the tribes;
- Suggested mitigation measures;
- Cultural resources data gathering and information sharing between the BLM and tribes;
- Drafting an agreement document on how data would be shared;
- Review of the Class III survey reports;
- Use of tribal monitors during project construction;
- Results from the deep trench testing in Kansas;
- Inadvertent discovery situations;
- Data recovery on private lands in Wyoming, Colorado, and Kansas;

- Additional survey of selected sites by tribal members; and
- Gathering comments from tribes not able to attend the meeting.

At the end of the meeting, the tribes expressed interest in a follow-up meeting to discuss in greater detail an agreement document and review of the Class III survey reports. At this time, no date has been set for a follow-up meeting.

Table 3.10-1 lists the Native American tribes that have been contacted and summarizes the concerns they have raised to date and the status of consultation.

3.10.2 Southern Energy Corridor – Copper Ridge Bypass Alternative

If the Southern Energy Corridor – Copper Ridge Bypass Alternative was selected for construction, the BLM would send a letter to the tribal groups to inform them of the revised pipeline route and solicit their concerns about places of cultural, traditional, or religious importance to the tribes that may be located along the proposed alternative. Consultation between the BLM and the identified tribal groups would follow the same protocol as the Proposed Action.

Table 3.10-1 Status of Native American Consultation

Name of Tribe	Date of Initial Contact	Follow up Contact	Summary of Issues Raised during Consultation
Apache Tribe of Oklahoma	March 30, 2006	April 6, 7, 11, 2006 May 9, 2006	Tribe stated they did not have any concerns with the proposed project.
Arapaho Business Council (Northern Arapaho Tribe)	March 30, 2006	April 3, 5, 2006 May 4, 24, 2006 June 19, 29, 30, 2006 July 5, 25-28, 2006 August 9, 14, 15, 2006 September 5, 6, 22, 2006	Have indicated concerns with the project and consultation is on-going as the project continues. Tribal representatives requested tribal monitors during construction and requested to be notified of inadvertent discoveries. Have asked for a plant survey of the project area and a copy of the reclamation plan with seed mixes included to ensure that vegetation is restored to pre-construction stands. Tribe requested additional surveys of project area to determine if additional areas included sacred sites.
Cherokee Nation	March 30, 2006	April 4,6,2006	Tribe stated they did not have any concerns with the proposed project.
Cheyenne and Arapaho Tribes of Oklahoma	March 30, 2006	April 5, 2006 May 22, 2006 need to address all follow up dates here	Tribe stated they had no concerns with the proposed project, but requested to be kept informed with project updates and project reports.
Cheyenne River Lakota Tribe	March 31, 2006	April 4, 2006 need to address all follow up dates here	Have continued to send updates for meetings and projects but have not received any response.
Comanche Tribe of Oklahoma	March 31, 2006	April 5, 2006 June 26, 2006 need to address all follow up dates here	The tribe did not have any concerns with the proposed project, but requested to be kept informed with project updates and project reports.
Crow Tribe	April 2, 2006	May 4, 8, 16, 2006 June 27, 2006 July 5, 2006 August 8, 2006 September 18, 27, 2006	Have indicated concerns with the project as known TCPs are located within the project area. Consultation with the tribe is ongoing through the project.
Crow Creek Lakota Tribe	April 2, 2006	April 7, 2006 May 3, 9, 16, 2006 need to address all follow up dates here	Tribe indicated they did not have any concerns with the project, but stated they would review project information before making a decision. Have continued to send updates for meetings and projects but have not received any response.
Fort Peck Assiniboine and Sioux Tribes	April 2, 2006	May 4, 22, 2006 June 6, 20, 2006 July 18, 19, 31, 2006 August 4, 21, 2006 September 8, 26, 27 2006	Tribe requested additional surveys of project area to determine if additional areas included sacred sites. Consultation is on-going as the project continues.
Jicarilla Apache Tribe	March 31, 2006	April 7, 11, 12, 2006	The tribe stated they did not have any concerns with the project and requested no further involvement.
Kaw Tribe of Oklahoma	March 30, 2006	March 31, 2006 April 5, 11, 12, 2006 May 4, 16, 26, 2006 June 30, 2006 August 2, 14, 17, 28, 2006	Have indicated concerns with the project and consultation is on-going as the project continues.
Kiowa Tribe	March 30,2006	April 4, 11, 2006	The Kiowa stated they did not have concerns with the project.

Table 3.10-1 Status of Native American Consultation

Name of Tribe	Date of Initial Contact	Follow up Contact	Summary of Issues Raised during Consultation
Northern Cheyenne Tribe	April 2, 2006	April 3, 12, 14, 2006 May 2, 16, 26, 2006 June 6, 26, 2006 July 5, 11, 25-28, 2006 August 8, 14, 15, 18, 30, 2006 September 5, 7, 27 2006	Tribal representatives were concerned with sites that had religious significance and recommended tribal monitors during construction, and to be kept informed of any inadvertent discoveries. Tribe requested additional surveys of project area to determine if additional areas included sacred sites.
Oglala Lakota Tribe	April 3, 2006	April 11, 18, 2006 May 17, 2006	The tribe requested to be kept informed of scheduled meetings, field visits to the project area, and project updates. Have continued to send updates for meetings and projects but have not received any response.
Osage Nation of Oklahoma	March 30, 2006	April 10, 13, 2006 August 2, 10, 2006	Tribe stated they have no concerns with the project. Would like to be notified of inadvertent discoveries and informed of the project through updates and reports.
Pawnee Nation of Oklahoma	March 30, 2006	March 31, 2006 April 7, 2006	Tribe stated that they did not have any concerns with the proposed project.
Rosebud Lakota Tribe	April 2, 2006	April 4, 2006 need to address all follow up dates here	Have continued to send updates for meetings and projects but have not received any response.
Shoshone Business Council (Eastern Shoshone Tribe)	March 31, 2006	April 12, 18, 2006 May 4, 2006 June 6, 7-8, 26, 29, 2006 July 17, 19-20, 2006 September 5, 8, 27 2006	Tribe requested reroutes around specific areas of the project area with known TCPs. Tribal representatives requested tribal monitors during construction and requested to be notified of inadvertent discoveries. Have asked for a plant survey of the project area and a copy of the reclamation plan with seed mixes included to ensure that vegetation is restored to pre-construction stands.
Shoshone-Bannock Tribes	March 30, 2006	April 18, 2006 need to address all follow up dates here	Have continued to send updates for meetings and projects but have not received any response.
Southern Ute Indian Tribe	April 2, 2006	June 7, 11, 14, 18, 2006	Tribe indicated that they had no concerns with the project, but would like to be informed of any inadvertent discoveries.
Uintah Ouray Ute Tribe (Northern Ute Tribe)	March 29, 2006	April 4, 18, 2006 May 24, 2006 June 6, 7-8, 2006 July 26, 2006 September 18, 27, 2006	Tribe requested reroutes around specific areas of the project area with known TCPs. Tribal representatives requested tribal monitors during construction and requested to be notified of inadvertent discoveries. Have asked for a plant survey of the project area and a copy of the reclamation plan with seed mixes included to ensure that vegetation is restored to pre-construction stands.
Wichita and Affiliated Tribes (Wichita Executive Committee)	March 30, 2006	March 31, 2006 April 6, 12, 2006 May 2, 23, 2006	Have indicated concerns with the project and consultation is on-going as the project continues.

Source: Seletstewa 2006, 2007.

3.11 Social and Economic Conditions

3.11.1 Proposed Action

The Proposed Action crosses 23 counties in Wyoming, Colorado, and Kansas. Counties crossed are listed by state in **Table 3.11-1**.

Table 3.11-1 States and Counties Crossed by the Proposed Pipeline Project

State	Number of Counties	Counties
Wyoming	5	Lincoln, Sweetwater, Carbon, Albany, and Laramie
Colorado	6	Larimer, Weld, Morgan, Logan, Washington, and Yuma
Kansas	12	Cheyenne, Rawlins, Thomas, Sheridan, Gove, Trego, Ellis, Russell, Barton, Ellsworth, Rice, and McPherson

A list of communities that may be affected by the proposed pipeline route and their respective year 2000 population statistics are shown in **Table 3.11-2**. This list identifies all communities within 0.5 and 2 miles of the project.

The proposed pipeline route crosses approximately 123.2 miles of federally owned land: 98.8 miles managed by the BLM and 24.4 miles managed by the USFS. BLM land affected by the project are in Lincoln, Sweetwater, Carbon, and Albany counties in Wyoming, and USFS managed lands are in Sweetwater County, Wyoming, and Weld County, Colorado. Federally owned lands represent approximately 16 percent of the total project.

3.11.1.1 Population, Employment, and Income

Table 3.11-3 summarizes the population, income trends, and unemployment rates in the counties crossed by the proposed pipeline route. The proposed pipeline route lies in predominantly rural and sparsely populated areas, with population densities generally ranging from approximately three to 35 people per square mile for the majority of the proposed pipeline route. The average population growth rate from 1990 to 2000 for all counties crossed by the project is 4.9 percent. This is substantially less than the growth rates observed in any of the three states affected by the project and well below the U.S. population growth rate for that timeframe of 13.1 percent. The 2004/2005 civilian unemployment rates for each affected county as provided by the applicable state's Department of Labor (NRG 2006) were relatively constant throughout the proposed project area, averaging approximately 3.6 percent and ranging from approximately 2.5 to 4.7 percent.

Wyoming

The greatest population densities in affected counties in Wyoming occur in Laramie County, Wyoming, with 30.4 people per square mile. These population densities are primarily attributed to the city of Cheyenne, Wyoming, which is approximately 10 miles from the proposed project area. The portion of Wyoming affected by the proposed project experienced an average population growth of 4.4 percent, with the greatest decline of 6.1 percent in Carbon County and the greatest increases of 15.4 and 11.6 percent in Lincoln and Laramie counties, respectively. The lowest 2000 median household income levels along the proposed pipeline route are found in Albany County, Wyoming.

Colorado

Where the proposed pipeline route crosses Larimer and Weld counties in northern Colorado, the population densities per square mile are 96.7 and 45.0, respectively. The majority of the population in Larimer County, Colorado, lives in and around the cities of Fort Collins and Loveland, which are 30 miles or more from the proposed project area. The majority of the population in Weld County, Colorado, is in and around the City of

Greeley or in the northern suburbs of Denver. These more densely populated areas in Weld County also are more than 30 miles from the proposed project. Of the three states crossed by the proposed project, Colorado experienced the greatest population growth. Populations in affected counties in Colorado all experienced growth, ranging from a low of 2.4 percent in Washington County to highs of 37.3 and 35.1 percent in Weld and Larimer counties, respectively. However, the largest cities likely to be making the largest contribution to these growth rates in each of these counties are more than 30 miles from the proposed project area.

Table 3.11-2 Affected Communities[1] Along the Proposed Project

State / Community[2]	County	Class[3]	Relative Proximity to Project (miles)	Population (2000)
WYOMING				
Arrowhead Springs	Sweetwater	CDP	0.5	68
Green River	Sweetwater	city	0.5	11,808
Opal	Lincoln	town	0.5	102
Rawlins	Carbon	city	0.5	8,538
Sweeney Ranch	Sweetwater	CDP	0.5	17
Table Rock	Sweetwater	CDP	0.5	82
The Buttes	Albany	CDP	0.5	31
Wamsutter	Sweetwater	town	0.5	261
Elk Mountain	Carbon	town	2	192
Granger	Sweetwater	town	2	146
James Town	Sweetwater	CDP	2	552
Laramie	Albany	city	2	27,204
Little America	Sweetwater	CDP	2	56
Sinclair	Carbon	town	2	423
COLORADO				
Raymer	Weld	town	0.5	91
Eckley	Yuma	town	2	278
Wray	Yuma	city	2	2,187
KANSAS				
Bird City	Cheyenne	city	0.5	482
Susank	Barton	city	0.5	57
WaKeeney	Trego	city	0.5	1,924
Windom	McPherson	city	0.5	137
Frederick	Rice	city	2	11
Little River	Rice	city	2	536
Menlo	Thomas	city	2	57

[1]Affected communities include those communities where new pipeline facilities or surface disturbing activities associated with pipeline refurbishment are proposed.

[2]Communities are listed in order by state as the proposed project crosses from west to east, proximity to proposed project centerline, and descending size based on year 2000 population.

[3]CDP classification represents census-designated place identified by the U.S. Census Bureau for statistical reporting.

Sources: Census 2000a; NRG 2006.

The lowest 2000 per capita income levels occur in Morgan and Yuma counties in Colorado. Larimer County, Colorado, which has the greatest population, population density, and one of the highest population growth rates for all affected counties in the proposed project area, also has the highest income level of both per capita income and median household income. The 2005 civilian labor force available in each affected county of Colorado varies proportionately with the size of the general populations for 2000. The greatest civilian workforce occurred in Larimer and Weld counties in Colorado. The unemployment rate in the affected counties ranged from a low of 3.3 (Yuma County) to 4.7 percent for Weld County.

Table 3.11-3 Socioeconomic Conditions in Affected Counties[1] Along the Proposed Project

State / County[2]	Population in 1990	Population in 2000	% Change in Population 1990-2000	Population Density (per square mile) 2000	Per Capita Personal Income ($ U.S.) 1999	Median Household Income ($ U.S.) 1999	Civilian Labor Force (persons) 2005	Unemployment Rate (%) 2004 / 2005
WYOMING	**453,427**	**493,782**	**8.9**	**5.1**	**19,134**	**37,892**	**254,508**	**4.0**
Lincoln	12,328	14,573	15.4	3.6	17,533	40,794	8,477	3.4
Sweetwater	38,816	37,613	-3.1	3.6	19,575	46,537	22,676	2.9
Carbon	16,655	15,639	-6.1	2.0	18,375	36,060	8,115	3.5
Albany	30,783	32,014	4.0	7.5	16,706	28,790	18,831	3.0
Laramie	73,125	81,607	11.6	30.4	19,634	39,607	42,633	3.8
COLORADO	**3,293,462**	**4,301,261**	**30.6**	**41.5**	**24,049**	**47,203**	**2,304,454**	**5.0**
Larimer	186,154	251,494	35.1	96.7	23,689	48,655	166,986	4.1
Weld	131,782	180,936	37.3	45.0	18,957	42,321	111,454	4.7
Morgan	21,947	27,171	23.8	21.0	15,492	34,568	14,010	4.5
Logan	17,570	20,504	16.7	11.1	16,721	32,724	10,288	4.2
Washington	4,811	4,926	2.4	2.0	17,788	32,431	2,730	3.8
Yuma	8,955	9,841	9.9	4.2	16,005	33,169	6,076	3.3
KANSAS	**2,477,805**	**2,688,418**	**8.5**	**32.9**	**20,506**	**40,624**	**1,374,698**	**5.1**
Cheyenne	3,243	3,165	-2.4	3.1	17,862	30,599	1,645	3.6
Rawlins	3,405	2,966	-12.9	2.8	17,161	32,105	1,425	3.6
Thomas	8,254	8,180	-0.9	7.6	19,028	37,034	4,287	3.1
Sheridan	3,044	2,813	-7.6	3.1	16,299	33,547	1,539	2.6
Gove	3,229	3,068	-5.0	2.9	17,852	33,510	1,524	3.0
Trego	3,696	3,319	-10.2	3.7	16,239	29,677	2,006	2.5
Ellis	25,999	27,507	5.8	30.5	18,259	32,339	17,386	3.2
Russell	7,832	7,370	-5.9	8.2	17,073	29,284	3,525	4.4
Barton	29,380	28,205	-4.0	31.3	16,695	32,176	15,284	3.7
Ellsworth	6,584	6,525	-0.9	9.0	16,569	35,772	3,232	4.0
Rice	10,612	10,761	1.4	14.8	16,064	35,671	5,451	4.7
McPherson	27,264	29,554	8.4	32.8	18,921	41,138	17,630	3.6

[1]Affected counties include those counties where new pipeline facilities or surface disturbing activities associated with pipeline refurbishment are proposed.

[2]States and counties are listed geographically from west to east as proposed project crosses the area.

Sources: Census 2000a; NRG 2006.

Kansas

The greatest population densities along the proposed pipeline route within Kansas are in McPherson County, Kansas, with 32.8 people per square mile. In general, populations in the 12 affected counties in Kansas have declined from 1990 to 2000, with an average decline of 2.8 percent. The greatest declines in population occurred in Rawlins and Trego counties, with growth rates dropping 12.9 and 10.9 percent in each, respectively. McPherson County saw the greatest increase in population for affected counties in Kansas with a growth rate of 8.4 percent. Trego and Russell counties in Kansas have the lowest 2000 median household income levels of the counties crossed by the proposed pipeline route. The 2005 civilian labor force available in each affected county varies proportionately with the size of the general populations for 2000. The smallest civilian workforce occurred in Rawlins, Gove, and Sheridan counties in Kansas. Trego and Sheridan counties in Kansas experienced the lowest unemployment rate of all counties crossed by the proposed pipeline route, while Rice County, Kansas, had the highest rate at 4.7 percent.

3.11.1.2 Infrastructure

Housing

Housing availability across the proposed pipeline route is a function of the housing stock, recent economic and population growth, the inventory of short-term lodging accommodations, such as RV parks and hotel and motel rooms, and demand for housing from other sources. **Table 3.11-4** summarizes the base housing stock in counties crossed by the project for 2000 and planned development for 2004. **Table 3.11-5** summarizes the available housing stock in counties crossed by the proposed project for 2000. The most pertinent component of local housing markets for purposes of the proposed project is the inventory of available short-term accommodations. Such accommodations include the number of available rental units, RV spaces, motel and hotel rooms, and mobile home spaces. In some instances, recreational cabins and seasonal housing for migratory workers also may be included.

Table 3.11-4 Total Housing for Counties along the Proposed Project

State / County[1]	Total Housing Units	Total Vacant Housing Units[2]	Total Rental Units	Building Permits (2004)
WYOMING				
Lincoln	6,831	1,565	1,261	212
Sweetwater	15,921	1,816	4,199	216
Carbon	8,307	2,178	2,136	60
Albany	15,215	1,946	6,793	410
Laramie	34,213	2,286	10,697	876
Wyoming Subtotal	*80,487*	*9,791*	*25,086*	*1,774*
COLORADO				
Larimer	105,392	8,228	32,739	3,252
Weld	66,194	2,947	20,660	4,414
Morgan	10,410	871	3,189	143
Logan	8,424	873	2,584	46
Washington	2,307	318	582	4
Yuma	4,295	495	1,197	2
Colorado Subtotal	*197,022*	*13,732*	*60,952*	*7,861*
KANSAS				
Cheyenne	1,636	276	335	0
Rawlins	1,565	296	336	2
Thomas	3,562	336	1,082	3
Sheridan	1,263	139	221	0
Gove	1,423	178	281	0
Trego	1,723	311	308	25

Table 3.11-4 Total Housing for Counties along the Proposed Project

State / County[1]	Total Housing Units	Total Vacant Housing Units[2]	Total Rental Units	Building Permits (2004)
Ellis	12,078	885	4,408	45
Russell	3,871	664	945	4
Barton	12,888	1,495	3,635	41
Ellsworth	3,228	747	586	19
Rice	4,609	559	1,046	8
McPherson	11,830	625	3,118	128
Kansas Subtotal	*59,676*	*6,511*	*16,302*	*275*
PROJECT TOTAL	**337,185**	**30,034**	**102,340**	**9,910**

[1]States and counties are listed geographically from west to east as proposed project crosses area.

[2]Includes units for rent, for sale, rented or sold but not occupied, available for seasonal, recreational, or migratory use, or other vacant status.

Sources: Census 2000b,c; NRG 2006.

Wyoming. Counties throughout Wyoming tend to have a high total housing supply. Within Wyoming, Laramie County had the highest number of total housing units (34,213) as well as the highest new development in 2004. High numbers of permanent and temporary housing units were available in Sweetwater and Laramie counties in 2000.

Colorado. Counties in more rural areas of eastern Colorado tended to have a low total housing supply and a low level of new development, while counties in northern Colorado tended to have the highest. Larimer and Weld counties in Colorado had the highest number of total housing units as well as the highest new development in 2004. Both permanent and temporary housing units were readily available in 2000 in the more urban communities, such as Larimer and Weld counties.

Kansas. Throughout Kansas, the counties crossed by the proposed pipeline route tended to have the lowest total housing supply and lowest level of new development of the three affected states. The lowest housing supply and growth occur in Sheridan, Gove, Rawlins, and Cheyenne counties in Kansas, and the highest supply and growth occur in Thomas County. Among the rural counties in the eastern portion of the proposed pipeline route the number of available housing stock units recorded in the 2000 Census was lowest in Sheridan, Cheyenne, Rawlins, Gove, and Trego counties in Kansas, all with less than 400 total available rental units. Ellis County had the largest number of available units in 2000.

Public Services and Facilities

Table 3.11-6 outlines selected public services and facilities serving the proposed project area. In general, the public services available are functions of the size and population of the county and the number of larger communities in the county. There are multiple law enforcement providers including the respective state patrols, county sheriffs, local police departments, and special law enforcement services, such as university police. In many instances, mutual aid/cooperative agreements among agencies allow members of one agency to provide support or backup to other agencies in emergency situations.

A network of fire departments and districts provides fire protection and suppression services across the region. Many of the fire districts across the region are staffed by volunteers and are housed in stations located in the larger communities.

For each county along the proposed pipeline route there is at least one acute care facility either within the county crossed or within approximately 50 miles of the proposed pipeline route in a neighboring county. These facilities provide emergency medical care and in several cases, also serve as the base for local emergency medical response and transport services.

Table 3.11-5 Available Housing Summary in Counties along the Proposed Project

State / County[1]	Housing Units for Sale	Rental Property			Special Use Vacancies		Temporary Housing Summary	
		Vacant Rental Units	Rental Vacancy Rate (%)	Median Monthly Rent ($)	Vacant for Seasonal, Recreational, or Occasional Use	Vacant for Migrant Workers	Total Apartment Units and Motel Rooms	Mobile Home / RV Spaces
WYOMING								
Lincoln	122	275	21.8	464	912	9	1,135	1,350
Sweetwater	282	681	16.2	428	243	12	2,388	3,911
Carbon	217	360	16.9	377	1,050	13	987	2,978
Albany	140	356	5.2	464	1,097	1	1,509	1,418
Laramie	328	820	7.7	473	238	1	3,032	2,787
Wyoming Subtotal	*1,089*	*2,492*	*13.6% (avg)*	*$441 (avg)*	*3,540*	*36*	*9,051*	*12,444*
COLORADO								
Larimer	795	1,334	4.1	678	4,870	11	NA	4,145
Weld	744	837	4.0	564	191	50	11,000	729
Morgan	103	174	5.5	482	333	1	1,013	NA
Logan	127	309	12.0	451	74	0	1,220	1,043
Washington	58	57	9.8	341	49	0	749	332
Yuma	75	88	7.4	375	60	6	438	412
Colorado Subtotal	*1,902*	*2,799*	*7.1% (avg)*	*$482 (avg)*	*5,577*	*71*	*14,420*	*6,661*
KANSAS								
Cheyenne	68	25	7.5	314	15	0	44	96
Rawlins	63	42	12.5	328	38	0	51	155
Thomas	52	83	7.7	373	18	1	635	560
Sheridan	28	22	10.0	286	25	0	37	81
Gove	38	30	10.7	330	22	2	135	142
Trego	32	41	13.3	326	106	0	201	130
Ellis	113	302	6.9	431	43	0	3,866	987
Russell	100	150	15.9	325	60	1	564	282
Barton	261	456	12.5	390	64	1	1,560	1,208
Ellsworth	66	81	13.8	336	302	1	182	459
Rice	80	98	9.4	340	84	1	275	646
McPherson	127	206	6.6	416	35	0	951	860
Kansas Subtotal	*1,028*	*1,536*	*10.6% (avg)*	*$350 (avg)*	*812*	*7*	*8,501*	*5,606*
PROJECT TOTAL	**4,019**	**6,827**	**10.1% (avg)**	**$404 (avg)**	**9,929**	**114**	**31,972**	**24,711**

[1]States and counties are listed geographically from west to east.

NA = Data not available.

Sources: Census 2000b,c; NRG 2006.

Table 3.11-6 Existing Public Services and Facilities Along the Proposed Overland Pass Pipeline Route

State / County[1]	Police/Sheriff Departments[2]		Fire Departments[3]		Medical Facilities[4]		
	Number of Depts.	Approximate Distance to Nearest (miles)	Number of Depts.	Approximate Distance to Nearest (miles)	Number of Hospitals	Name/Location	Approximate Distance to Nearest (miles)
WYOMING							
Lincoln	5	10	7	10	2	South Lincoln Medical Center (Kemmerer); Star Valley Medical Center (Afton)	10.0
Sweetwater	4	1	10	1	1	Memorial Hospital of Sweetwater County (Rock Springs)	6.6
Carbon	7	2	8	2	1	Memorial Hospital of Carbon County (Rawlins)	1.6
Albany	3	4	5	4	1	Ivinson Memorial Hospital (Laramie)	5.1
Laramie	4	4	10	11	2	United Medical Center West (Cheyenne); Cheyenne VA Medical Center (Cheyenne)	11.6
COLORADO							
Larimer	6	28	16	18	3	Poudre Valley Hospital (Fort Collins); McKee Medical Center (Loveland); Estes Park Medical Center (Estes Park)	29.1
Weld	16	24	19	8	1	North Colorado Medical Center (Greeley)	31.9
Morgan	3	17	4	11	2	East Morgan County Hospital (Brush); Colorado Plains Medical Center (Fort Morgan)	18.0
Logan	2	14	6	14	1	Sterling Regional Medical Center (Sterling)	12.7
Washington	1	15	3	10	0	N/A (see Morgan, Logan, or Yuma County)	N/A
Yuma	3	2	4	2	2	Wray Community District Hospital (Wray); Yuma District Hospital (Yuma)	2.1
KANSAS							
Cheyenne	2	5	2	1	1	Cheyenne County Hospital (Saint Francis)	6.3
Rawlins	2	16	4	5	1	Rawlins County Health Center (Atwood)	16.6
Thomas	2	9	4	2	1	Citizens Medical Center (Colby)	9.7
Sheridan	2	6	2	6	1	Sheridan County Health Complex (Hoxie)	5.9
Gove	2	22	3	15	1	Gove County Medical Center (Quinter)	22.7
Graham[5]	2	6	4	9	1	Graham County Hospital (Hill City)	6.1

Table 3.11-6 Existing Public Services and Facilities Along the Proposed Overland Pass Pipeline Route

State / County[1]	Police/Sheriff Departments[2]		Fire Departments[3]		Medical Facilities[4]		
	Number of Depts.	Approximate Distance to Nearest (miles)	Number of Depts.	Approximate Distance to Nearest (miles)	Number of Hospitals	Name/Location	Approximate Distance to Nearest (miles)
Trego	2	5	3	5	1	Trego County Lemke Memorial Hospital (WaKeeney)	1.8
Ellis	5	6	4	6	2	Hays Medical Center (Hays); NW Kansas Surgery Center (Hays)	6.4
Rush[5]	2	12	6	9	1	Rush County Memorial Hospital (La Crosse)	17.0
Russell	3	14	11	11	1	Russell Regional Hospital (Russell)	13.9
Barton	4	8	8	3	4	Clara Barton Hospital (Hoisington); Ellinwood District Hospital (Ellinwood); Central Kansas Medical Center (Great Bend); Surgical and Diagnostic Center of Great Bend (Great Bend)	8.1
Ellsworth	4	2	5	3	1	Ellsworth County Medical Center (Ellsworth)	16.0
Rice	5	3	8	2	1	Rice County Hospital District No. 1 (Lyons)	6.5
McPherson	8	11	11	9	3	Memorial Hospital Inc. (McPherson); Mercy Hospital Inc. (Moundridge); Lindsborg Community Hospital (Lindsborg)	8.5

[1]States and counties are listed geographically from west to east as proposed project crosses the area.

[2]Includes special law enforcement units for universities.

[3]Includes volunteer, district, city, and town fire departments, but does not include departments and services offered by the BLM or Department of Defense.

[4]Does not include mental health centers, drug/alcohol rehab, or eye surgery/laser facilities.

[5]Rush and Graham counties, Kansas, are not crossed by the proposed pipeline route, but have public services and facilities within close proximity and have therefore been included.

Source: NRG 2006.

3.11.1.3 Fiscal Relationships

Tax revenues constitute the primary source of income to the economies of the states, counties, and communities affected by pipeline construction. Taxes levied by various state, county, or local taxing jurisdictions may include property taxes paid on the purchase of land, payroll taxes on wages paid to temporary project employees, sales taxes on gross receipts from the sales of goods and services, and corporate income taxes. Sales tax revenues typically are generated by the temporary influx of workers who purchase local goods and services, the local purchase of construction materials, and leases/rentals on various office and/or storage spaces and construction equipment. Federal agencies also assess fees for use of public lands for activities such as pipeline and transmission line ROWs. These taxes and fees vary by region.

Employing a cost approach, states generally assess the value of pipelines to facilitate consistent valuation over all the counties crossed within the state. The resultant value is assigned to affected counties and taxing jurisdictions and property taxes are assessed accordingly. The effective property tax rates are then calculated using state property tax levies for pipelines, county property tax levies on pipelines, or a combination of the two. The impact a pipeline may have on the value of a tract of land depends on many factors including the size of the tract, values of adjacent properties, presence of other utilities, the current value of the land, and the current land use. Based on miles of pipeline through each state, Overland Pass anticipates that they would pay a total of approximately $10 million distributed proportionately to each state: approximately 15 percent to Wyoming, 10 percent to Colorado, and 75 percent to Kansas. Each state would then distribute these tax revenues to their respective counties accordingly.

3.11.1.4 Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires that impacts on minority or low-income populations be taken into account when preparing environmental and socioeconomic analyses of projects or programs that are proposed, funded, or licensed by federal agencies (FR 1994). The Environmental Justice Guidance under NEPA prepared by the CEQ (1997) is commonly used in implementing EO 12898 in preparing NEPA documents.

The purpose of the order is to avoid the disproportionate placement of any adverse environmental, economic, social, or health impacts from federal actions and policies on minority populations, low-income populations, and Indian tribes and to allow all portions of the population an opportunity to participate in the development of, compliance with, and enforcement of federal laws, regulations, and policies affecting human health of the environment regardless of race, color, national origin, or income. The provisions of the order apply to programs involving Native Americans and Hispanic communities. These requirements would be addressed by a) ensuring broad distribution of public information on the project through public scoping meetings and b) conducting government-to-government consultation with Native American groups either residing in or with historical ties to the project area. Details regarding public scoping meeting dates and locations can be found in Section 1.7. For an expanded discussion of Native American consultation, see Section 3.10.

Minority Populations

The CEQ defines the term “minority population” to include people who identify themselves during the Census as Black or African American, Asian or Pacific Islander, Native American or Alaskan Native, or Hispanic. Hispanic origin refers to ethnicity and language, not race, and may include people whose heritage is Puerto Rican, Cuban, Mexican, and Central or South American.

In accordance with the CEQ, minority populations should be identified where either a) the minority population in an affected area (e.g., a community) exceeds 50 percent; or b) the minority population percentage of the affected area is meaningfully greater (1.5 times) than the minority population percentage in the general population of the surrounding area (e.g., the county or other appropriate unit of geographical analysis). This is determined by multiplying the percentage of minorities in the surrounding area by 1.5. If the resulting figure exceeds the percentage of the minority population in the community, the community is not a minority population.

Tables 3.11-7 and **3.11-8** provide 2000 Bureau of the Census statistics on race, ethnicity, and income status in affected counties and communities. Affected counties are those counties crossed by the proposed project and affected communities are those in the proximity of the proposed pipeline route. Communities in the proximity of the proposed pipeline routes include those communities crossed by the proposed pipeline route (within 0.5 mile) as well as communities located within 2 miles of the proposed pipeline route. Based upon review of the available Census data for minority populations in all of the counties crossed and communities in the proximity of the proposed pipeline route, the various minority populations do not exceed 50 percent, however, there are minority populations occurring in portions of the counties crossed by the proposed pipeline route that are "meaningfully greater" than their corresponding minority populations in the general population. Therefore, for the purposes of identifying environmental justice concerns, minority populations, as defined in the CEQ, exist within the study area. For this EIS, general minority populations used for comparison were state populations.

Wyoming. In Wyoming, 3 counties and 7 of the affected communities have minority populations greater than 1.5 times the relevant minority population in their associated general populations. These include Carbon, Albany, and Laramie counties and the communities of Arrowhead Springs, Green River, Rawlins, Table Rock, and Wamsutter within 0.5 mile, and Laramie and Little America within 2 miles of the proposed project.

Colorado. Two affected counties and 1 affected community in Colorado have minority populations greater than 1.5 times their respective relevant minority populations. These include Weld and Morgan Counties and the community of Eckley, which is within 2 miles of the proposed project.

Kansas. There are no counties or communities in Kansas with minority populations greater than 1.5 times the relevant minority population in the associated general populations.

Low-Income Populations

According to the CEQ, low-income populations in an affected area should be identified using the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty. In identifying low-income populations, federal agencies may consider as a community either a group of individuals living in geographic proximity to one another or a set of individuals (such as migrant workers or Native Americans) where either type of group experiences common conditions of environmental exposure or effect. The poverty thresholds are revised annually to allow for changes in the cost of living as reflected in the Consumer Price Index. They are the same for all parts of the country (i.e., they are not adjusted for regional, state, or local variations in the cost of living). The poverty threshold for a family of three used for analysis was $13,290 in 2000. The median family income in the nation was $50,046 for a family of three and the percent of families below the poverty level was 9.2 percent.

Low income populations were identified along the proposed pipeline route by comparing the percent of the population below the poverty level in the affected counties and communities to the percent of the population below the poverty level in each respective state. If the percent in the affected county or community was greater than the percent in the state, the affected county or community was determined to be a low-income population. Low-income counties and communities are identified on **Tables 3.11-7** and **3.11-8**. The percent of the population below the poverty level in all three states is lower than the percent of the population below that of the national population.

Wyoming. In Wyoming, there are two counties (Carbon and Albany) and four communities (Rawlins, Wamsutter, Granger, and Laramie) that are identified as low-income populations. Roughly 10 percent of families in Carbon and Albany counties have incomes below the poverty level.

Colorado. In the more heavily populated state of Colorado, five of six affected counties and all three affected communities, Raymer, Eckley and Wray, are considered low-income populations. However, the national percentage of the population below the poverty level is greater than that of any of the affected counties in Colorado.

Table 3.11-7 Environmental Justice Statistics in Affected Counties[1]

State / County[2]	Total Population 2000	Racial/Ethnic Categories (% of total population, 2000)[3]							Median Family Income (1999)[5]	Families With Income Below the Poverty Level[6] (%) (1999)
		White	Black	Native American or Alaskan Native	Asian or Pacific Islander	Hispanic[4]	Other	Two or More Races		
WYOMING	**493,782**	**92.1**	**0.8**	**2.3**	**0.7**	**6.4**	**2.5**	**1.8**	**45,685**	**8.0**
Lincoln	14,573	97.1	0.1	0.6	0.3	2.2	0.7	1.2	44,919	6.4
Sweetwater	37,613	91.6	0.7	1.0	0.6	9.4	3.6	2.4	54,173	5.4
Carbon	15,639	90.1	0.7	1.3	0.8	13.8*	5.2	2.1	41,991	9.8*
Albany	32,014	91.3	1.1	1.0	1.8*	7.5	2.6	2.2	44,334	10.8*
Laramie	81,607	88.9	2.6*	0.8	1.1	10.9*	4.0	2.6	46,536	6.5
COLORADO	**4,301,261**	**82.8**	**3.8**	**1.0**	**2.3**	**17.1**	**7.2**	**2.8**	**55,883**	**6.2**
Larimer	251,494	91.4	0.7	0.7	1.7	6.3	3.4	2.2	58,866	4.3
Weld	180,936	81.7	0.6	0.9	0.9	27.0*	13.3	2.7	49,569	8.0*
Morgan	27,171	79.7	0.3	0.8	0.4	31.2*	16.4	2.5	39,102	8.5*
Logan	20,504	91.7	2.0	0.6	0.5	11.9	3.8	1.4	42,241	9.0*
Washington	4,926	96.4	0.0	0.6	0.1	6.3	2.0	0.9	37,287	8.6*
Yuma	9,841	94.2	0.1	0.3	0.1	12.9	4.1	1.2	39,814	8.8*
KANSAS	**2,688,418**	**86.1**	**5.7**	**0.9**	**1.7**	**7.0**	**3.4**	**2.1**	**49,624**	**6.7**
Cheyenne	3,165	97.9	0.1	0.1	0.3	2.6	1.0	0.5	34,816	7.4*
Rawlins	2,966	98.5	0.3	0.3	0.1	0.8	0.1	0.7	40,074	7.9*
Thomas	8,180	97.1	0.4	0.3	0.3	1.8	1.0	0.9	45,931	6.6
Sheridan	2,813	98.6	0.1	0.1	0.2	0.9	0.4	0.6	38,292	12.0*
Gove	3,068	97.9	0.1	0.2	0.1	1.2	0.7	1.0	40,438	8.0*
Trego	3,319	97.8	0.2	0.4	0.6	1.1	0.2	1.0	40,524	11.2*
Ellis	27,507	96.1	0.7	0.2	0.8	2.4	1.3	0.9	44,498	6.5
Russell	7,370	97.6	0.5	0.6	0.3	1.0	0.3	0.7	40,355	9.1*
Barton	28,205	93.0	1.1	0.5	0.2	8.3	3.5	1.6	39,929	9.9*
Ellsworth	6,525	93.7	3.6	0.5	0.2	3.6	0.9	1.2	44,360	4.0
Rice	10,761	94.7	1.2	0.6	0.3	5.6	1.8	1.4	40,960	8.5*
McPherson	29,554	96.5	0.8	0.3	0.4	1.9	0.8	1.2	48,243	4.2

[1] Affected areas are those counties where existing facilities exist, or counties where new pipeline facilities or surface disturbing activities associated with pipeline refurbishment are proposed.

[2] States and counties are listed geographically from west to east as proposed project crosses the area.

[3] Minority populations defined as black, Native American or Alaskan Native, Asian Pacific Islander, or Hispanic with percentages meaningfully greater than 1.5 times that of the minority population percentage in the general population of the surrounding area (i.e., the corresponding state) are identified with an asterisk (*).

[4] Persons of Hispanic origin may be of any race, and for census-gathering purposes, Hispanic is a self-identified category. In this table individuals may have reported themselves as only Hispanic or in combination with one or more of the other races listed. This may result in the sum of percentages for all ethnic categories to be greater than 100 percent for any one county.

[5] The median family income is defined here for a family of three. The poverty threshold is defined as the average threshold for a family of three and is not adjusted for regional, state, or local variations in the cost of living.

[6] The percent of families with income below the poverty threshold in 2000, as defined by the Census Bureau for federal statistical purposes, based on a family of three. Counties with a higher percent of the population below the poverty level than that occurring in the respective state are identified with an asterisk (*).

Source: Census 2000b; NRG 2006.

Table 3.11-8 Environmental Justice Statistics in Affected Communities[1]

State / Community[2]	Relative Proximity to Route (within x miles)	Racial/Ethnic Categories (% of total population)[3]							Median Family Income (1999)[5]	Families With Income Below the Poverty Level[6] (%) (1999)
		White	Black	Native American or Alaskan Native	Asian or Pacific Islander	Hispanic[4]	Other	Two or More Races		
WYOMING		**92.1**	**0.8**	**2.3**	**0.7**	**6.4**	**2.5**	**1.8**	**45,685**	**8.0**
Arrowhead Springs	0.5	92.6	0.0	0.0	5.9*	0.0	0.0	1.5	83,654	0.0
Green River	0.5	92.1	0.3	1.4	0.4	10.2*	4.2	1.6	59,100	3.1
Opal	0.5	99.0	0.0	0.0	0.0	5.9	0.0	1.0	52,083	0.0
Rawlins	0.5	85.9	0.8	1.5	0.9	21.0*	8.3	2.6	42,137	10.4*
Sweeney Ranch	0.5	100.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A	0.0
Table Rock	0.5	86.6	0.0	1.2	1.2*	11.0*	3.7	7.3	48,750	0.0
The Buttes	0.5	100.0	0.0	0.0	0.0	0.0	0.0	0.0	63,750	0.0
Wamsutter	0.5	93.9	0.0	0.8	0.0	13.0*	3.1	2.3	46,250	11.4*
Elk Mountain	2	95.8	0.0	1.0	0.0	5.2	2.1	1.0	46,042	0.0
Granger	2	82.2	0.0	0.0	0.0	2.1	8.2	9.6	52,083	10.5*
James Town	2	95.3	0.4	0.4	0.0	6.5	1.1	2.9	53,295	4.5
Laramie	2	90.8	1.2	0.9	2.0*	7.9	2.9	2.2	43,395	11.1*
Little America	2	71.4	0.0	0.0	0.0	44.6*	28.6	0.0	18,750	0.0
Sinclair	2	96.2	0.5	1.4	0.0	2.6	0.9	0.9	54,688	1.7
COLORADO		**82.8**	**3.8**	**1.0**	**2.3**	**17.1**	**7.2**	**2.8**	**55,883**	**6.2**
Raymer	0.5	98.9	0.0	0.0	0.0	7.7	1.1	0.0	36,875	14.8*
Eckley	2	85.3	0.4	1.8*	0.0	19.4	10.8	1.8	26,250	17.8*
Wray	2	94.4	0.1	0.3	0.1	10.0	3.5	1.6	38,942	11.3*
KANSAS		**86.1**	**5.7**	**0.9**	**1.7**	**7.0**	**3.4**	**2.1**	**49,624**	**6.7**
Bird City	0.5	99.2	0.0	0.2	0.0	2.9	0.2	0.4	32,589	15.0*
Susank	0.5	98.2	0.0	0.0	0.0	0.0	0.0	1.8	18,125	33.3*
WaKeeney	0.5	97.1	0.1	0.5	0.9	0.6	0.0	1.5	40,547	6.3
Windom	0.5	95.6	0.0	0.0	0.0	0.0	1.5	2.9	38,125	7.1*
Frederick	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	46,250	0.0
Little River	2	97.4	0.0	0.0	0.0	1.3	0.4	2.2	33,125	16.0*
Menlo	2	98.2	0.0	0.0	0.0	0.0	0.0	1.8	27,500	25.0*

[1]Affected areas are those communities where existing facilities exist, or communities where new pipeline facilities or surface disturbing activities associated with pipeline refurbishment are proposed.

[2]Communities are listed in order by state as the proposed project crosses from west to east, proximity to proposed project centerline, and descending size based on year 2000 population.

[3]Minority populations defined as black, Native American or Alaskan Native, Asian Pacific Islander, or Hispanic with percentages meaningfully greater than 1.5 times that of the minority population percentage in the general population of the surrounding area (i.e., the corresponding state) are identified with an asterisk (*).

[4]Persons of Hispanic origin may be of any race, and for census-gathering purposes, Hispanic is a self-identified category. In this table individuals may have reported themselves as only Hispanic or in combination with one or more of the other races listed. This may result in the sum of percentages for all ethnic categories to be greater than 100 percent for any one community.

[5]The median family income is defined here for a family of three. The poverty threshold is defined as the average threshold for a family of three and is not adjusted for regional, state, or local variations in the cost of living.

[6]The percent of families with income below the poverty threshold in 2000, as defined by the Census Bureau for federal statistical purposes, based on a family of three. Communities with a higher percent of the population below the poverty level than that occurring in the respective state are identified with an asterisk (*).

Source: Census 2000b.

Kansas. Nine of the 12 counties crossed by the proposed pipeline route and 5 of 7 communities along the proposed pipeline route in Kansas are identified as low income populations. The highest percentage poverty level across all three states was 33.3 percent in the community of Susank, Kansas.

3.11.2 Southern Energy Corridor – Copper Ridge Bypass Alternative

The socioeconomic analysis using the Southern Energy Corridor – Copper Ridge Bypass Alternative is no different from that of the Proposed Action except that the pipeline would be approximately 5.6 miles from the community of Arrowhead Springs, Wyoming. All counties and all other communities affected by the Proposed Action also would be affected by the Southern Energy Corridor – Copper Ridge Bypass Alternative.

3.12 Public Health and Safety

3.12.1 Proposed Action

3.12.1.1 Hazardous Materials and Wastes

Pre-existing soil contamination along the proposed pipeline route may exist. Review of the USEPA's CERCLIS Database (USEPA 2006b) and state Superfund Site Status Summaries indicates that the proposed pipeline route does not intercept any known areas of contamination.

Wyoming. One site listed in the CERCLIS Database, the Pole Mountain Former Target and Maneuver Area, is currently managed by the USFS as a recreational area in Wyoming. The area is located roughly 350 feet from the proposed centerline at approximate RP 294.6. This site is not listed on the NPL but could potentially contain unexploded munitions. No other Wyoming sites with previous contamination are crossed by the proposed pipeline route and the proposed project does not cross any municipal solid waste or hazardous waste landfills in Wyoming.

Colorado. No Superfund sites are intersected or within 5 miles of the proposed pipeline (USEPA 2006b).

Kansas. No Superfund sites are intersected or within 5 miles of the proposed pipeline route (USEPA 2006b).

3.12.1.2 Emergency Response Organizations

The existing public services and facilities in the project are shown on **Table 3.11-6**. In general, the public services available in the proposed project area are directly related to the numbers of cities and towns in each county and the population figures of the county.

The number of police and/or sheriff departments within each county that would be affected by the proposed project ranges from one department in Washington County, Colorado, to 16 departments in Weld County, Colorado. Weld County also has the highest number of fire departments with 19, whereas the counties in northwestern Kansas have only 2 to 4 fire departments each. Barton County, Kansas, has the most medical facilities available (4) within the project area, while Washington County, Colorado has no acute care hospital capable of providing emergency medical assistance.

3.12.2 Southern Energy Corridor – Copper Ridge Bypass Alternative

Public health and safety resources for this alternative are the same as the Proposed Action. No hazardous waste sites are located along the Southern Energy Corridor – Copper Ridge Bypass Alternative