4.0 ENVIRONMENTAL ANALYSIS

This section describes the affected environment as it currently exists and discusses the environmental consequences of the proposed project. The discussion is organized by the following major resource topics: geology; soils; water resources (including wetlands); vegetation; wildlife and aquatic resources; special status species; land use, recreation and special interest areas, and visual resources; socioeconomics (including transportation and traffic and environmental justice); cultural resources; air quality and noise; reliability and safety; and cumulative impacts.

In accordance with BLM Manual guidance (H-1790-1), the major resource sections address the following "critical elements of the human environment:" air quality; Areas of Critical Environmental Concern (ACECs); cultural resources; Native American religious concerns; prime or unique farmlands; floodplains; threatened and endangered species; hazardous or solid wastes; drinking and groundwater quality; wetlands and riparian zones; Wild and Scenic Rivers; Wilderness Areas; environmental justice; health and safety risks to children; and invasive, non-native species. These critical elements are based on requirements specified in statute, regulation, or executive order.

The environmental consequences of constructing and operating the Phoenix Expansion Project would vary in duration and significance. Four levels of impact duration were considered: temporary, short term, long term, and permanent. Temporary impact generally occurs during construction with the resource returning to preconstruction condition almost immediately afterward. Short-term impact could continue for up to 3 years following construction. Impact was considered long term if the resource would require more than 3 years to recover. A permanent impact could occur as a result of any activity that modifies a resource to the extent that it would not return to preconstruction conditions during the life of the project.

Transwestern, as part of its proposal, developed certain mitigation measures to reduce the impact of the project. In some cases, we determined that additional mitigation measures could further decrease the project's impacts. Our additional mitigation measures appear as bulleted, boldfaced paragraphs in the text of this section. The FERC staff will recommend to the Commission that these measures be included as specific conditions of the Certificate the Commission may issue to Transwestern for this project. The cooperating agencies will consider these additional mitigation measures as part of their permit decisions.

The conclusions in this EIS are based on the Agency Staffs' analysis of the environmental impact and the following assumptions:

- Transwestern would comply with all applicable laws and regulations;
- the proposed facilities would be constructed as described in section 2.0 of this EIS; and
- Transwestern would implement the mitigation measures included in its applications and supplemental submittals to the FERC and cooperating agencies.

4.1 GEOLOGY

4.1.1 Geologic Setting

4.1.1.1 New Mexico Facilities

The San Juan Lateral Loop facilities would be located entirely within the Colorado Plateau physiographic province, which is characterized by mesas, rolling hills, and eroded badlands (USGS, 1965). The proposed Loops A and B would cross Quaternary alluvial and wind-blown deposits, and bedrock units ranging in age from upper Cretaceous to lower Tertiary. Table 4.1.1-1 lists the major geologic units that would be crossed by the pipeline loops and that underlie the existing Bloomfield Compressor Station.

TABLE 4.1.1-1

Major Geologic Units Underlying the Phoenix Expansion Project Facilities in New Mexico

Facility	Mileposts	Unit	Description
San Juan Lateral Loop A	0.0 – 4.1	Tertiary Nacimiento Formation	Interbedded black, carbonaceous mudstone and white, coarse-grained sandstone
	4.1 – 8.3	Quaternary Alluvium	Gravel, sand, silt, and clay
	8.3 – 8.9	Tertiary Nacimiento Formation	Interbedded black, carbonaceous mudstone and white, coarse-grained sandstone
San Juan Lateral Loop B	71.9 – 75.7	Cretaceous Menefee Formation	Interbedded claystone, carbonaceous siltstone and shale, coal, and sandstone
	75.7 – 78.9	Cretaceous Point Lookout Sandstone	Very fine- to medium-grained, regressive coastal marine sandstone
	78.9 – 80.1	Cretaceous Menefee Formation	Interbedded claystone, carbonaceous siltstone and shale, coal, and sandstone
	80.1 – 80.7	Cretaceous Point Lookout Sandstone	Very fine- to medium-grained, regressive coastal marine sandstone
	80.7 – 81.1	Cretaceous Crevasse Canyon Formation	Coal-bearing sandstone
	81.1 – 81.9	Cretaceous Mulatto Tongue of Mancos Shale	Shale
	81.9 – 83.7	Cretaceous Crevasse Canyon Formation	Coal-bearing sandstone
	83.7 – 85.1	Cretaceous Gallup Sandstone	Marine and nonmarine sandstones that intertongue with the Mancos Shale
	85.1 – 87.8	Cretaceous Mancos Shale	Black or gray shale
Bloomfield Compressor Station	San Juan Lateral, north of 0.0	Tertiary Nacimiento Formation	Interbedded black, carbonaceous mudstone and white, coarse-grained sandstone

Sources: Bush, 2005; Scholle, 2003

The San Juan Lateral Loops would cross two major structural elements. Loop A would cross the San Juan Basin and Loop B would cross the Chaco Slope. The San Juan Basin is a Late Cretaceous to Early Tertiary depression that at its deepest contains just over 14,000 feet of Tertiary sedimentary rock (Stone et al., 1983). The Chaco Slope forms the southern edge of the San Juan Basin. The Zuni Uplift is a Precambrian to Early Mesozoic anticline abutting the southern edge of the San Juan Basin and Chaco Slope. The northwest portion of the Zuni Uplift is less than 5 miles east of the town of Gallup. Topography in the vicinity of Loops A and B consists of mesas with steep slopes and flat tops that slope gently to the north, badlands, and broad rolling hills. The area also contains several drainages that have cut deep canyons and arroyos into the surface. Elevations along the proposed routes for the pipeline loops

generally range from 5,500 to 7,260 feet above mean sea level (msl). The highest elevation is along Loop B, at about 7,260 feet above msl.

4.1.1.2 Arizona Facilities

The proposed pipeline facilities in Arizona would be located within the Colorado Plateau (described above) and the Basin and Range physiographic provinces (USGS, 1969). The Colorado Plateau and the Basin and Range physiographic provinces are generally coincident with geologic provinces of the same names. The northern portion of the Phoenix Lateral (between approximate MPs 0.0 and 16.0) would be located in the southern Grand Canyon section of the Colorado Plateau province, which is a relatively undissected plateau area containing many volcanic cones and peaks. The highest elevation along the Phoenix Lateral, at about 5,180 feet above msl, is located in the vicinity of MP 0.0. Between approximate MPs 16.0 and 101.0, the Phoenix Lateral would cross south through a deeply dissected mountainous region of the Transition Zone, which represents the transition from the Colorado Plateau province to the Basin and Range province. From approximate MP 101.0 to its termination point at MP 255.1, the Phoenix Lateral would traverse the Sonoran Desert section of the Basin and Range province. Mountain ranges in this section of the Basin and Range province comprise less than 25 percent of the area and are generally lower and narrower than those in other portions of the province. They typically rise abruptly from the surrounding desert and have rugged peaks (USGS, 1969). Ground surface elevations in this area generally range from 300 to 2,500 feet above msl with peaks at about 3,800 feet above msl. The lowest elevation along the Phoenix Lateral, at about 700 feet above msl, is located in the vicinity of MP 176.0.

The Phoenix Lateral would cross recent alluvial and wind-blown soil deposits and bedrock units ranging in age from Precambrian to Quaternary. Table 4.1.1-2 lists the major geologic units crossed by the Phoenix Lateral and customer laterals, and underlying the existing Seligman Compressor Station No. 1. All of the proposed aboveground facilities associated with the Phoenix Lateral (i.e., taps, meter stations, valves, pig launchers/receivers) are adjacent to the pipelines and are, therefore, not listed separately.

Construction and operation of the Phoenix Expansion Project would not materially alter the geologic conditions of the project area. Effects from construction could include disturbances to the natural topography along the right-of-way and at aboveground facility sites due to trenching and grading activities. Over most of the project area, alteration of topographic contours would consist of minimal grading of the construction right-of-way to provide a safe level work surface. Following construction, Transwestern would restore all areas as closely as practicable to their preconstruction contours.

4.1.2 Mineral Resources

New Mexico and Arizona contain many economically important geologic resources such as oil, natural gas, coal, sand and gravel, precious metals, and uranium (USGS, 1965).

TABLE 4.1.1-2

Major Geologic Units Underlying the Phoenix Expansion Project Facilities in Arizona

Facility	Mileposts	Unit	Description
Phoenix Lateral	0.0 – 3.2 4.3 – 4.5 5.6 – 6.0 6.6 – 16.3 17.1 – 17.6 18.0 – 18.2 26.3 – 27.2 79.0 – 80.3 83.5 – 83.9 90.2 – 90.6	Quaternary-Tertiary Volcanic Rocks (QTb)	Basaltic flows, agglomerate, tuff, and cinders. Includes units interfingering with Quaternary-Tertiary sedimentary deposits and some possibly older units whose debris is in Quaternary-Tertiary sedimentary deposits.
	3.2 – 4.3 4.5 – 5.6 6.0 – 6.6 16.3 – 17.1 18.2 – 20.6 30.7 – 44.8 47.0 – 47.2 48.0 – 49.0 76.1 – 76.9 97.9 – 98.2 99.4 – 112.3 112.4 – 114.0 114.5 – 171.9 174.2 – 188.0 188.4 – 191.4 191.7 – 238.4 238.6 – 255.1	Quaternary Sedimentary Deposits (Qs)	Mainly alluvial gravel, sand, and silt in flood plains, terraces, fans, and sediment cappings but locally includes dune sand, lake deposits, and landslide masses. Shown only in areas where they are of appreciable thickness or extent.
	17.6 – 18.0 22.9 – 24.3 25.6 – 25.8 29.2 – 29.6 30.4 – 30.7	Mississippian-Devonian Sedimentary Rocks (MDs)	Includes Mississippian Escabrosa Limestone and Devonian Martin Formation in much of southern and central Arizona; Mississippian Redwall Limestone and Devonian Temple Butte Limestone in northern Arizona, and locally Pennsylvanian limestone.
	20.6 – 21.7 22.5 – 22.9 24.3 – 25.6 25.8 – 26.0 28.6 – 29.2 44.8 – 47.0 47.2 – 48.0 49.0 – 53.5 67.2 – 67.4 67.9 – 69.2 71.3 – 71.4 74.6 – 76.1 76.9 – 79.0 92.1 – 95.3 96.0 – 96.6	Tertiary Sedimentary Deposits (Tps)	Includes fossiliferous alluvial, and lacustrine deposits of middle or early Pliocene age within valleys of the present drainage system and correlative conglomerate, sand, silt, and clay; unfossiliferous alluvial conglomerates that locally contain lava flows, tuffs, and breccias and interfinger with Tertiary volcanic rocks; and terrestrial deposits tentatively correlated with the Chuska Sandstone or Bidahochi Formation.
	21.7 – 22.5	Permian-Pennsylvanian Supai Formation (PPPs)	Sedimentary rocks.
	26.0 – 26.3 27.6 – 28.6	Tertiary Volcanic Rocks (Tvi)	Intermediate volcanic rocks, flows, tuffs, breccias, and agglomerates interfingering in part with Tertiary sedimentary rocks. Includes some plugs and dikes.

TABLE 4.1.1-2 (cont'd)

Major Geologic Units Underlying the Phoenix Expansion Project Facilities in Arizona

Facility	Mileposts	Unit	Description
Phoenix Lateral (cont'd)	27.2 – 27.6	Ordovician-Cambrian Sedimentary Rocks (OCs)	Includes Cambrian Abrigo Formation and Bolsa Quartzite in Pinal and Maricopa Counties; and Cambrian Tonto Group in northern and central Arizona.
	29.6 – 30.4	Precambrian Mazatzal Quartzite (pCm)	Locally includes Deadman Quartzite and Maverick Shale.
	53.5 – 54.2 54.4 – 65.3 95.3 – 96.0 97.3 – 97.9 98.2 – 99.4 238.4 – 238.6	Precambrian Metamorphosed Sedimentary and Volcanic Rocks (pCsc)	Includes Yavapai series in central Arizona, Pinal Schist in southeastern Arizona, and unnamed schistose units. Mainly phyllite, slate, mica schist, chlorite schist, and amphibolite derived from interbedded shale, sandstone, and rhyolitic to basaltic flows and tuffs but locally includes intrusive rhyolite, diorite, gabbro, and pyroxenite.
	54.2 – 54.4 71.4 – 74.6 80.3 – 83.5 83.9 – 86.9 188.0 – 188.4 191.4 – 191.7	Precambrian Intrusive Rocks (pCgr)	Granite, quartz monzonite, granodiorite, and quartz diorite. Locally includes areas of granitic rocks and other igneous rocks of post-Paleozoic age.
	65.3 – 67.2 67.4 – 67.9 69.2 – 71.3	Tertiary Volcanic Rocks (Tvm)	Mafic volcanic rocks, flows, tuffs, breccias, and agglomerates interfingering in part with Tertiary sedimentary rocks. Includes some plugs and dikes.
	86.9 – 90.2	Quaternary-Tertiary Sedimentary Deposits (QTs)	Includes Gila Conglomerate and other stream and lake deposits mainly in intermontane areas. Consists of loosely to firmly consolidated gravel, sand, and silt, local clay, gypsum, marl, limestone, diatomite, and some interlayered basalt flows and felsic tuff beds.
	90.6 – 92.1	Precambrian Intrusive Rocks (pCdi)	Diorite, diorite porphyry, and gabbro.
	96.6 – 97.3 112.3 – 112.4 114.0 – 114.5 171.9 – 174.2	Quaternary Volcanic Rocks (Qb)	Basaltic flows, agglomerate, tuffs, and cinders distinguished from older basalts by recognizable cinder cones, craters, and other geomorphic evidence of recent formation.
Southwest Gas Corporation (SWG) Sun Valley South Lateral	148.6	Quaternary Sedimentary Deposits (Qs)	Mainly alluvial gravel, sand, and silt in floodplains, terraces, fans, and sediment cappings but locally includes dune sand, lake deposits, and landslide masses. Shown only in areas where they are of appreciable thickness or extent.
Arizona Public Service Company (APS) Redhawk Lateral	164.9	Quaternary Sedimentary Deposits (Qs)	Mainly alluvial gravel, sand, and silt in floodplains, terraces, fans, and sediment cappings but locally includes dune sand, lake deposits, and landslide masses. Shown only in areas where they are of appreciable thickness or extent.
Entegra Gila River Lateral	180.2	Quaternary Sedimentary Deposits (Qs)	Mainly alluvial gravel, sand, and silt in floodplains, terraces, fans, and sediment cappings but locally includes dune sand, lake deposits, and landslide masses. Shown only in areas where they are of appreciable thickness or extent.
SWG Rainbow Valley Lateral	193.3	Quaternary Sedimentary Deposits (Qs)	Mainly alluvial gravel, sand, and silt in floodplains, terraces, fans, and sediment cappings but locally includes dune sand, lake deposits, and landslide masses. Shown only in areas where they are of appreciable thickness or extent.
Salt River Project Agricultural Improvement and Power District Desert Basin Lateral	239.1	Quaternary Sedimentary Deposits (Qs)	Mainly alluvial gravel, sand, and silt in floodplains, terraces, fans, and sediment cappings but locally includes dune sand, lake deposits, and landslide masses. Shown only in areas where they are of appreciable thickness or extent.

TABLE 4.1.1-2 (cont'd)

Major Geologic Units Underlying the Phoenix Expansion Project Facilities in Arizona

Facility	Mileposts	Unit	Description
APS Sundance Lateral	250.6	Quaternary Sedimentary Deposits (Qs)	Mainly alluvial gravel, sand, and silt in floodplains, terraces, fans, and sediment cappings but locally includes dune sand, lake deposits, and landslide masses. Shown only in areas where they are of appreciable thickness or extent.
El Paso Natural Gas Company Pinal County Lateral	255.1	Quaternary Sedimentary Deposits (Qs)	Mainly alluvial gravel, sand, and silt in floodplains, terraces, fans, and sediment cappings but locally includes dune sand, lake deposits, and landslide masses. Shown only in areas where they are of appreciable thickness or extent.
Seligman Compressor Station No. 1	Mainline 289.5	Cretaceous Mancos Shale	Black or gray shale.

Source: Hirschberg and Pitts, 2000; Bush, 2005

4.1.2.1 New Mexico Facilities

The San Juan Lateral Loop A would cross the Blanco Gas Field, a very large field that covers more than 1 million acres and has thousands of producing wells (Pritchard, 1972). Natural gas production is primarily from Cretaceous rocks of the Mesaverde Group, including the Cliff House Sandstone and the Menefee Formation. Twenty-seven oil and gas wells are within 1,000 feet of Loop A and 1 well is within 1,000 feet of Loop B (Cather, 2006). These oil and gas wells are listed in table 4.1.2-1 by county, owner, and nearest milepost. Table 4.1.2-1 also lists the approximate distance and direction from the pipeline centerline. This listing includes all the wells in the New Mexico oil and gas well database, which does not include information on the current status of the wells. Therefore, some of the wells may no longer be producing. According to the USGS Mineral Resource Data System (Frank, 1999), no active wells would be crossed by either of the loops. Furthermore, based on review of the USGS topographic survey maps and civil surveys conducted along the loops, there are no active oil or gas wells within 1,000 feet of the loops.

No coal mines were identified in the vicinity of Loop A. Based on Cather (2006), the probability of future coal production in this area is low. Loop B would cross two major near-surface coal producing formations. The northern section of the proposed route crosses over the Cleary Coal Member of the Menefree Formation, which is covered by approximately 200 feet of overburden and has an approximate capacity of 291 million tons of coal. The middle section of Loop B would cross the Gibson Coal Member of the Crevasse Canyon Formation, which has varying depths of overburden and an estimated 496 million tons of coal (Beaumont, 1998).

Two coal mines are located within 5 miles of Loop B. One is approximately 0.4 mile from MP 71.9 and the other is 4.8 miles from MP 74.4. Neither of these mines is close enough to be impacted by or have an impact on the project. Coal mining in this vicinity is typically surface mining, as the coal fields are usually very close to the surface. Coal outcrops are common (Allen, 1955; Hoffman, 2006). While there is a potential for future coal development in the vicinity of Loop B due to the near-surface availability of coal, the existing pipeline right-of-way already precludes future development of these resources in the immediate vicinity of the loop.

The nearest gold and silver producing district to the San Juan Lateral Loops is in northern Cibola County, located south of McKinley County. The United Nuclear Corporation uranium mine is located approximately 11.5 miles northwest of the termination point of Loop B (MP 87.6). This facility closed in 1982.

The construction and operation of the project near or over mineral resources could affect existing and future production of these resources as a result of restrictions on mining and mineral extraction activities in the immediate vicinity of the pipeline right-of-way and aboveground facilities. In general, potential effects on future mineral production may include loss of revenue and diminished mineral land values. Although Loops A and B pass through a gas and oil producing area, no active oil or gas wells would be located within 1,000 feet of the construction right-of-way. Because the depth of the oil and gas reserves is several hundred to several thousand feet or more below the ground surface and they can be reached by angled wells, these resources and future access to them would not be affected by construction and operation of the loops.

TABLE 4.1.2-1

Potential Oil and Gas Wells Within 1,000 Feet of the Phoenix Expansion Project Facilities in New Mexico

Facility, County/Owner	Nearest Milepost	Approximate Distance (feet) and Direction from the Pipeline Centerline
San Juan Lateral Loop A, San Juan County		
Pre-Ongard Well Operator	1.4	700 East
Allen Orion	1.5	500 East
Kendall & Associates	1.5	200 West
Pre-Ongard Well Operator	1.6	800 East
BP America Production Company	1.7	200 East
XTO Energy, Inc	1.8	800 West
XTO Energy, Inc	2.2	200 East
XTO Energy, Inc	2.2	100 East
Burlington Resources Oil & Gas Co.	2.8	100 West
Burlington Resources Oil & Gas Co.	2.9	100 East
Energen Resources Corporation	3.0	100 East
McElvain Oil and Gas Properties, Inc.	4.2	200 East
Energen Resources Corporation	4.7	100 West
Burlington Resources Oil & Gas Co.	5.0	900 East
Dugan Production Corp.	5.2	900 West
Burlington Resources Oil & Gas Co.	5.2	800 East
Pre-Ongard Well Operator	5.7	200 West
Dugan Production Corp.	5.7	200 East
Pre-Ongard Well Operator	6.0	100 East
ConocoPhillips Company	6.0	200 East
Dugan Production Corp.	6.0	500 East
Dugan Production Corp.	6.0	500 East
ConocoPhillips Company	7.1	900 East
Roddy Production Co, Inc.	7.2	900 East
Burlington Resources Oil & Gas Co.	7.9	500 East
Robert L. Bayless Producer LLC	8.1	900 East
Pre-Ongard Well Operator	8.3	600 East
San Juan Lateral Loop B, McKinley County		
Pre-Ongard Well Operator	85.2	400 East

Source: Cather, 2006

No actively mined or quarried areas were identified during field surveys or through examination of aerial photographs. In addition, because the majority of the routes of Loops A and B would be located adjacent to existing utility corridors that already preclude mining, they are not likely to affect future exploitation of mineral resources. Sufficient sources of construction-grade stone, sand, and gravel for construction and commercial purposes exist elsewhere (USGS, 2005a).

4.1.2.2 Arizona Facilities

According to available information, no oil and gas wells would be located within 1,000 feet of the Phoenix Lateral and customer laterals. The nearest known commercial well is located approximately 1.5 miles south of MP 123.1 (Arizona Geological Survey, 2005). The nearest known mine to the Phoenix Lateral and customer laterals is a gypsum mine located approximately 1.3 miles north of MP 255.1. Open pit sand and gravel mines are located within 2 to 4 miles of approximate MPs 50.0, 114.0, and 118.0 (USGS, 2005a; Allen, 1955; McLemore, 2001; McLemore and Chenowith, 1989).

In accordance with the General Mining Law of 1872, as amended, public lands managed by the FS and BLM are open to mineral acquisition by the location and maintenance of mining claims. Mineral deposits subject to acquisition in this manner include "locatable minerals" (e.g., gold, silver, lead, copper, zinc, nickel) and nonmetallic minerals (e.g., fluorspar, mica, certain limestones and gypsum, tantalum, heavy minerals in placer form, and gemstones) (BLM, undated). Any citizen of the United States may locate and hold a mining claim, provided that it is properly recorded and is maintained through payment of an annual maintenance fee. There are two types of mining claims: lode and placer. Lode claims cover classic veins or lodes having well-defined boundaries. Federal statute limits a lode claim to a maximum length of 1,500 feet along the vein or lode and a maximum width of 600 feet (300 feet on either side of the centerline of the lode). Placer claims cover all other deposits not subject to lode claims. Mill and tunnel sites may also be located to provide support facilities for lode and placer claims.

The BLM has 24,135 mining claims recorded in Arizona. However, many of these may be inactive due to abandonment, relinquishment to the federal government, or failure of the claimant to pay the annual maintenance fees. The BLM identified 122 active mining claims in the general vicinity of the Phoenix Lateral between approximate MPs 16.0 and 193.0 (BLM, 2006d). Fifty-five of these are in the vicinity of approximate MPs 184.0 to 186.0. Because these claims are recorded to the nearest quarter section, it is not possible to precisely determine the location of the claim in relation to the proposed pipeline right-of-way.

The construction and operation of the project near or over mineral resources could affect existing and future production of these resources as a result of restrictions on mining and mineral extraction activities in the immediate vicinity of the pipeline right-of-way and aboveground facilities. As discussed above, it is not possible to precisely pinpoint the location of mining claims in relation to the proposed route for the Phoenix Lateral and customer laterals. However, if a claimant decides to activate a mining claim and it is located within the permanent right-of-way, Transwestern would work with the FS or the BLM and the claimant to avoid impact on safe operation of the pipeline. The pipeline facilities would be clearly marked at line-of-sight intervals and at crossings of roads, railroads, and other key points. The markers would delineate the location of the pipeline and provide a telephone number and address where a company representative could be reached in the event of an emergency or before any excavation in the area of the pipeline by a third party. Transwestern also participates in the "One-Call" system that maintains contact information on the location of utilities, such as water, cable, natural gas, and sewer lines. Because the depth of the oil and gas reserves is several hundred to several thousand feet or more below the ground surface and they can be reached by angled wells, these resources and future access to them would not be affected by construction and operation of the Phoenix Lateral.

As with the San Juan Lateral Loops, no actively mined or quarried areas along the Phoenix Lateral or customer laterals were identified during field surveys or through examination of aerial photographs. In addition, because the majority of the proposed pipeline route would be located adjacent to existing utility corridors that already preclude mining, they are not likely to affect future exploitation of mineral resources. Sufficient sources of construction-grade stone, sand, and gravel for construction and commercial purposes exist elsewhere (USGS, 2005a).

4.1.3 Geologic Hazards

Geologic hazards are natural physical conditions that can, when present, result in damage to land and structures or injury to people. Such hazards typically include seismicity (e.g., earthquakes, faults) and liquefaction, landslides, flooding, subsidence, and blasting due to shallow bedrock. A comment was received during the scoping process expressing concern that rocks or swelling clays in the trench backfill could have an impact on the integrity of the pipeline. Large rocks would be screened out of the trench backfill material and swelling clays would not have an impact on the pipeline during operation.

4.1.3.1 Seismicity and Liquefaction

While the New Mexico portion of the project is not recognized as a seismically active region, two earthquake epicenters have been recorded in the vicinity of the San Juan Lateral Loop B (Stover and Coffman, 1993). The first epicenter, located about 5 miles east of the loop, was recorded in 1977 and had a Modified Mercalli Intensity (MMI) of VI. The second epicenter, located 6 to 7 miles east of the loop, was recorded in 1976 and was also a VI on the MMI scale. With an earthquake of MMI VI, movement would be felt, objects would fall from shelves, and plaster in walls might crack, but no structural damage would occur. There do not appear to be active faults associated with these epicenters (Howard, 1978) nor would Loops A or B cross any active faults (Haller et al., 2005). There were no recorded earthquakes of significance within 250 miles of the loops between 1990 and 2005 (USGS, 2005b) and there is a low potential for soil liquefaction in the area of the proposed loops (Algermissen et al., 1982).

The Richter Magnitude (RM) scale is a measure of earthquake energy interpreted from a seismogram based on the amplitude of the seismic waves. On this scale, Arizona typically experiences earthquakes in the 3 to 5 RM range (USGS, 2005b). An event with an RM equal to 3 may be felt by people near the epicenter; an event with an RM equal to 5 is felt by many people indoors near the epicenter but by few people outdoors near the epicenter. For comparison, an event having an RM of 7 or more is a major earthquake that can result in severe damage to structures.

Earthquake intensity is also measured in the Moment Magnitude (Mo) scale, which now supersedes the RM scale. Mo is the measure of total energy released by an earthquake and is the measurement and term generally preferred by scientists and seismologists to the RM scale because Mo is more precise. Mo is not based on instrumental recordings of an earthquake, but on the area of the fault that ruptured in the quake. Mo is calculated in part by multiplying the area of the fault's rupture surface by the distance the earth moves along the fault.

The largest event that affected the project area in Arizona was the 1887 Sonoran earthquake that was estimated to have an Mo of 7.25 (Pearthree, 1986). This event, which was a 7.4 on the RM scale, caused 51 deaths in Sonora (located in east Pinal County) and extensive property damage throughout southeastern Arizona (Fellows, 2000). In the past 20,000 years, southern Arizona has experienced five or six earthquakes of Mo 6.5 or greater, with an average recurrence of 3,000 to 4,000 years (Pearthree, 1986).

More than 20 earthquakes with RMs greater than 5 have occurred in or near Arizona since 1850, including the Sonoran earthquake described above (Fellows, 2000). There have been four measured earthquake events having epicenters within 35 miles of the proposed pipeline, with intensities ranging from RM 3 to 6. These events are summarized in table 4.1.3-1.

TABLE 4.1.3-1

Earthquake Epicenters Within 35 Miles of the Phoenix Expansion Project Facilities in Arizona

Date	Depth (miles)	Magnitude (RM) [a]	Distance from Phoenix Lateral (miles)	Nearest Milepost
April 19, 1973	11.8	4.5	25.4	73.0
February 4, 1976	7.5	5.1	9.1	40.0
February 9, 1976	6.2	3.3	10.9	42.0
February 23, 1976	6.2	3.5	5.2	39.0

[a] Approximate value.
RM = Richter Magnitude scale

Geologists have identified nearly 100 faults in Arizona that have probably generated earthquakes of RM 6 or greater during the Quaternary. Although the most active of these have ruptured every 5,000 to 10,000 years, recurrence intervals of 50,000 to 100,000 years are more typical (Fellows, 2000). Based on published geologic data, eight known faults or fault zones are located within a 40-mile radius of the Phoenix Lateral and customer laterals. These faults or fault zones, their locations relative to the Phoenix Expansion Project facilities in Arizona, and the estimated recurrence interval of movement are provided in table 4.1.3-2. As shown in table 4.1.3-2, no faults or fault zones would be crossed by the Phoenix Lateral or customer laterals, and the closest fault or fault zone to the project facilities would be 9 miles from the Phoenix Lateral.

TABLE 4.1.3-2

Faults and Fault Zones Within 40 Miles of the Phoenix Expansion Project Facilities in Arizona

Name	Fault Length (miles)	Timing of Most Recent Movement	Distance from Phoenix Lateral (miles)	Nearest Milepost	Recurrence Interval (Thousand Years)
Big Chino Fault (monocline)	28.6	Holocene and Post Glacial	5-20	21.0	25-50
Williamson Valley Gabions	10.6	Mid to Late Quaternary	16	38.0	Not Recorded
Prescott Valley Gabions	5.6	Mid to Late Quaternary	9	42.0	Not Recorded
Verde Fault Zone	5	Late Quaternary	21	54.0	Not Recorded
Carefree Fault Zone	6.8	Mid to Late Quaternary	17	100.0	Not Recorded
Horseshoe Fault Zone	5.6 and 7.5	Late Quaternary and Post Glacial	21	92.0	85-140
Cottonwood Basin Fault	3.1	Mid to Late Quaternary	25	68.0	Not Recorded
Sand Tank Fault	1.9	Late Quaternary	23	90.0	100

Source: Pearthree, 1998

Empirical reviews of historical earthquakes demonstrate that pipelines are not prone to failure due to earthquakes. A 1996 study of earthquake performance data for steel transmission lines and distribution supply lines operated by Southern California Gas Company over a 61-year period found that post-1945 arc-welded transmission pipelines in good repair have never experienced a break or leak during a southern California earthquake. These pipelines are the most resistant type of piping, vulnerable only to very large and abrupt ground displacement (e.g., severe landslides), and are generally highly resistant to

traveling ground wave effects and moderate amounts of permanent deformation (O'Rourke and Palmer, 1996).

The proposed facilities would be constructed to meet federal standards outlined in Title 49 CFR Part 192. These are the same regulations that govern the construction and operation of natural gas pipelines throughout the country, including areas with greater seismic hazards. Thus, the pipeline facilities would be able to withstand both the intensity and duration of transient ground motions resulting from seismic activity in the project area.

Liquefaction is a phenomenon in which saturated, non-cohesive soils temporarily lose their strength and behave as a liquid when subjected to intense and prolonged ground shaking. For soil liquefaction to occur, a relatively shallow water table; rapid, strong ground motions; and unconsolidated soils must all be present. Soil liquefaction can affect the integrity of a pipeline by causing lateral spreading, flow failures, loss of bearing strength, and flotation. Because of the low seismic risk and the limited amount of unconsolidated soils with high groundwater levels in the project area, liquefaction hazards associated with the Phoenix Expansion Project would be minimal.

4.1.3.2 Landslides

Based on Godt (1997) and Radbruch-Hall et al. (1976), the San Juan Lateral Loop A and the northern portion of the San Juan Lateral Loop B would be located in areas of low susceptibility and low incidence of landslides. The southernmost portion of Loop B, located in an area around the Zuni Uplift, has a high susceptibility and low incidence of landslides (Godt, 1997; Radbruch-Hall et al., 1976). Most landslides in this area are caused by the undercutting of resistant rock on the edges of mesas or prominent escarpments. Loop B would pass adjacent to a mesa at MP 85.0. Another type of landslide results from debris flows. Along the southernmost section of Loop B, small debris flows have been mapped in Gallegos Canyon (Guzetti and Brabb, 1987). Guzetti and Brabb (1987) have mapped an alluvial fan deposit that is more than 1 mile across in the vicinity of MP 87.0 of Loop B. The alluvial fan was deposited, in part, by debris flows.

Although the potential exists for landslides in the area of the southern portion of Loop B, field surveys did not find evidence of landslide activity along the proposed pipeline route. Furthermore, both loops would be installed adjacent or parallel to Transwestern's existing San Juan Lateral, which has been in place since the early 1990s. Historically, landslides have not been an issue along the existing San Juan Lateral.

According to *The Landslide Overview Map of the Conterminous United States* (Godt, 1997), the entire Phoenix Lateral and the customer laterals would be located in an area with low susceptibility to landslides. This map defines locations having low susceptibility to landslides as areas where natural or artificial cutting or filling or unusually high precipitation may generate landslides in less than 1.5 percent of the soil and rock.

Approximately eight steep slope face locations are present along the Phoenix Lateral between MPs 22.3 and 59.4 (e.g., areas in the vicinity of the Verde River at MP 23.8, and south of Prescott Valley and south of MP 54.0). These locations and the approximate slope grades are provided in table 4.1.3-3.

TABLE 4.1.3-3

Steep Slope Faces Between Mileposts 22.3 and 59.4 of the Phoenix Lateral

Approximate Milepost	Approximate Slope Grade (percent)
22.3	15 to 20
22.5	15 to 20
23.6	30 to 35
23.9	35 to 40
50.2	25 to 30
53.3	30 to 35
54.3	30 to 35
54.6	35 to 40

Note: Slope angles were measured parallel with the pipeline route.

These steep areas are localized and would require winching of construction equipment up or down the slope face. The percent of slope varies from location to location, but the angle of the slope and the soil and rock composition are not conducive to slope instability that would be susceptible to landslides. The closest known regular landslide occurrences to the Phoenix Lateral are located in the Sacaton Mountains, 1 to 3 miles north of MPs 238.0 to 246.0. A comment was received during the scoping process indicating that another potential landslide area exists east of Interstate 17, northeast of Black Canyon City in the vicinity of MP 87.5. The Phoenix Lateral would be west of Interstate 17 in this area.

The standards presented in Title 49 CFR 192 provide adequate protection from washouts, floods, unstable soils, or landslides that may occur in the project area. Pipeline installation techniques, especially padding and use of rock-free backfill, effectively insulate the pipeline from minor earth movements. In areas where the pipeline would be installed perpendicular to the slope, the overall energy to which a segment of pipe would be exposed during a major landslide event would be limited by the length of the slope. In areas where the pipeline would be installed parallel to the slope, the angle of the slope, as well as the composition of the soil and rock present, would likely limit the extent of landslide events. Therefore, it is expected that any major landslide events would, at worst, expose a short section of pipe along the slope face, requiring subsequent reburial.

If areas are identified where slope instability could occur during wet periods, one or more of the following drainage control measures specified in Transwestern's UECRM Plan (see Appendix F) would be implemented to reduce the potential for slope failure to occur:

- use of slope breakers and trench breakers;
- subsurface gravel or cobble drains; and
- diversion of water away from the right-of-way through the use of an energy-dissipating device at the end of the slope breaker and off the construction right-of-way.

4.1.3.3 Flooding

In the event of high quantities of rain or mountain precipitation, low lying areas of Arizona's Basin and Range region may become inundated with flooding. In general, flood concerns are along ephemeral washes that drain nearby mountain ranges, piedmonts, and basin floors as well as subsequent low-lying areas. In 1983, Hurricane Octave, coupled with a low pressure system, produced 100-year

storm quantities of 9.9 inches at the mouth of the Santa Cruz River. The resulting flood zone covered an area that includes MPs 228.0 to 235.0 on the Phoenix Lateral (Klawon et al., 1998).

Although flooding itself does not present a risk to buried pipelines, bank erosion and/or scour could expose pipe or result in unsupported sections of pipe. In some areas of the proposed pipeline route, numerous steep minor drainages are found in a rugged terrain where exposed or shallow bedrock or rock within the substrate is prevalent. Scouring would be less likely in these areas due to the presence of the shallow bedrock and rocky substrate. Therefore, the need for additional depth of cover greater than the standard 3 feet is not anticipated in these areas. In other areas of relatively low relief (e.g., the Sonoran Desert), the minor drainages crossed by the proposed pipeline route consist of washes with shallow banks. The shallow nature of the washes allows the flow to spread out during high flow events, which limits the potential for bed scour. For some minor drainages, Transwestern may extend the minimum required burial depth to 40 inches, based on engineering judgment. Where pipeline upheaval due to flood events is of concern, Transwestern would install external weighting (e.g., concrete coating or concrete weights) on the pipeline to prevent movement.

Typically, the pipeline would be buried at a minimum depth of 4 feet beneath major washes and named waterbodies. Transwestern would install external weighting to the pipeline to prevent upheaval during flood events for crossings of major washes and named waterbodies that have earthen beds (those with concrete beds are not of concern). Transwestern retained a geotechnical consultant who recommended site-specific scour analyses at two locations deemed susceptible to major scour events: the Gila River (MP 174.9) and Vekol Wash (MP 217.7). A local geotechnical engineering firm would perform a detailed evaluation of the subsurface strata and hydraulic study of the historical flow and depth of scour at these locations to determine a safe burial depth at each of these crossings. Transwestern would install the pipeline at the depth that would be required by the Arizona Department of Environmental Quality (ADEQ), which is the permitting agency for the crossings. Transwestern would file the proposed burial depth at the Gila River and Vekol Wash with the Secretary as part of its Implementation Plan that would be submitted before construction (see mitigation measure number 6 in section 5.3).

In addition to burying the pipeline deeper at scour-prone locations, Transwestern would implement best management practices (BMPs) during and after construction to maintain the water quality of any stream or wetland adjacent to the construction work area. Such BMPs would include the installation and maintenance of erosion controls (e.g., silt fence, hay bales, etc.) throughout construction and until revegetation is successful or the right-of-way is stabilized, thus reducing potential flood-related impacts. Monthly aerial pipeline inspections would be conducted to monitor the stability of the pipeline right-of-way. Any areas of inadequate cover resulting from a sequence of high rain events would be corrected.

4.1.3.4 Subsidence

Ground subsidence in the project area can be caused by the dissolution of rocks resulting in karst features, underground mining, and groundwater withdrawal. Karst terrain can include sinkholes (closed depressions), caves and caverns, and underground drainage systems.

The San Juan Lateral Loops would not cross any terrain that is susceptible to karst development (Davies et al., 1976) nor would they cross any known abandoned or active underground mines. No large population centers, which are typically associated with heavy groundwater usage, would be located in the vicinity of Loops A and B. This area of the project is also not known to have any fissure zones that may accompany land subsidence from groundwater withdrawal.

According to Haller et al. (2005), karst terrain may be crossed by the Phoenix Lateral between approximate MPs 17.0 and 26.0. This area is indicated as having the potential for karst fissures, tubes, and caves over 1,000 feet long with a vertical extent of 25 to 250 feet. However, field surveys did not find evidence of sinkholes or subterranean features along the proposed pipeline route that might cause the pipeline to be installed in an unsupported position.

The BLM (2005) and USGS topographic maps depict numerous mines, mine shafts, and prospects between the communities of Prescott Valley and Black Canyon City (approximate MPs 81.6 to 83.7). While no abandoned mines or mine shafts were encountered within the proposed construction work area during Transwestern's intensive civil surveys, it is possible that abandoned mines could be found during construction. If abandoned mines or prospects are encountered during construction, an investigation would be performed to determine the magnitude and extent of the potential impact on the pipeline. Depending on the status of the mine or prospect, Transwestern would implement one or more of the following actions: 1) measures would be taken to mitigate the risk of subsidence based on recommendations from a qualified professional and in accordance with local standards, where applicable; 2) the wall thickness and grade of pipe used in construction of the pipeline would be selected in accordance with Title 49 CFR, Part 192, *Minimum Federal Safety Standards for the Transportation of Natural and Other Gas by Pipeline*, such that it would be capable of safely bridging potential unsupported lengths that may develop over time; and/or 3) the pipeline would be rerouted to minimize the potential for impact.

The area surrounding Phoenix has seen a large increase in groundwater usage for agricultural purposes since the mid 20th century. The continual usage of the groundwater without adequate recharge has led to land subsidence of up to 11 feet in some areas over the course of 30 years, including areas within Maricopa and Pinal Counties. Table 4.1.3-4 lists zones within 1 mile of the Phoenix Expansion Project facilities in Arizona that have experienced significant groundwater losses that may lead to future ground subsidence.

TABLE 4.1.3-4

Zones of Large Groundwater Elevation Decrease Within 1 Mile of the Phoenix Expansion Project Facilities in Arizona

County	Beginning Milepost [a]	Ending Milepost [a]	Groundwater Elevation Decrease Within the Zone (feet)	Strata Type Above Aquifer
Maricopa [b]	122.4	178.6	0-100	Alluvial
Maricopa [c]	185.6	214.6	0-100	Alluvial
Pinal	222.7	235.7	300-500	Alluvial
Pinal [d]	244.0	255.0	100-300	Alluvial

[a] Phoenix Lateral mileposts.
[b] This zone would include the Southwest Gas Corporation (SWG) Sun Valley South Lateral and the Arizona Public Service Company (APS) Redhawk Lateral.
[c] This zone would include the SWG Rainbow Valley Lateral.
[d] This zone would include the APS Sundance Lateral.
Source: Schumann and Genualdi, 1986; Map 23

The edges of these zones of large groundwater elevation change are often accompanied by fissures in the land surface. Fissures due to land subsidence occur gradually and over large areas. Fissures can extend up to 10 feet wide and over 8 miles long, with the depth of the fissure extending hundreds of feet below the surface. In recent years the occurrence of fissures has greatly increased, with hundreds identified throughout various counties in Arizona. Most fissures, however, are found in the alluvial basins of southern Maricopa and western Pinal Counties. Table 4.1.3-5 lists the closest known

fissures and fissure zones. As shown in table 4.1.3-5, the Phoenix Lateral and customer laterals would not directly cross any known fissures or fissure zones.

TABLE 4.1.3-5

Known Fissures and Fissure Zones Near the Phoenix Expansion Project Facilities in Arizona

County	Location	Distance (miles) and Direction from Phoenix Lateral/Customer Lateral	Nearest Milepost [a]	Type
Pinal	West of Stanfield	3.1 South	223.0	Fissures
Pinal	Southwest Sacaton Mountain	4.0 North	233.0	Fissures
Pinal	8 Miles Outside Maricopa	2.0 North	234.0	Fissure Zone
Pinal	Black Butte	0.5 North/4.0 Northwest [b]	247.0/250.6	Fissures

[a] Phoenix Lateral mileposts.
[b] Arizona Public Service Company Sundance Lateral.
Source: Harris, 1995

Desiccation is another commonly encountered earth crack that occurs in geologic settings with primarily clay deposits. Desiccation cracks form polygonal blocks ranging from inches across (generally referred to as mudcracks) to hundreds of feet across (referred to as giant desiccation cracks). Giant desiccation cracks take years to decades to fully form in response to long-scale precipitation cycles (Harris, 2004) or a decrease in groundwater levels. Table 4.1.3-6 lists the closest known giant desiccation cracks. As shown in table 4.1.3-6, the Phoenix Lateral and customer laterals would not directly cross any known giant desiccation cracks.

TABLE 4.1.3-6

Known Giant Desiccation Cracks Near the Phoenix Expansion Project Facilities in Arizona

County	Location	Distance (miles) and Direction from Phoenix Lateral/Customer Lateral	Nearest Milepost [a]	Type
Maricopa	Southeast of Wintersburg	4.0 Northwest	160.0	Fissures
Maricopa	Southwest of Wintersburg	0.3 Northeast	161.0	Fissures
Maricopa	South of Wintersburg	1.0 East/0.7 Northeast [b]	164.5/164.9	Fissures

[a] Phoenix Lateral mileposts.
[b] Arizona Public Service Company Redhawk Lateral.
Source: Harris, 2004

In summary, no subsidence features have been identified along the proposed pipeline route. However, if evidence of such features were to be encountered during construction or operation of the project, an investigation would be performed to determine the magnitude and extent of the problem. Mitigation measures would be implemented based on recommendations from a qualified geotechnical professional and in accordance with local DOT standards, where applicable. Furthermore, the wall thickness and grade of pipe used in construction of the pipeline would be selected in accordance with Title 49 CFR 192, *Minimum Federal Safety Standards for the Transportation of Natural and Other Gas by Pipeline*, such that it would be capable of safely bridging potential unsupported lengths that may develop over time.

4.1.3.5 Shallow Bedrock and Blasting

Although shallow bedrock is not a geologic hazard in itself, blasting activities associated with the occurrence of shallow bedrock can create a potential hazard. The typical depth of the trench that would be necessary to install the pipeline is about 6 feet. When rock or rocky formations are encountered, tractor-mounted mechanical rippers or rock trenchers would be used to fracture the rock. In areas where mechanical equipment cannot break up or loosen the bedrock, blasting would be required before excavation. Based on information from U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) soil surveys, the potential to encounter shallow bedrock exists along approximately 105.8 miles that would be crossed by the project pipelines. Along the San Juan Lateral Loops, shallow bedrock may occur and blasting may be required at various locations between MPs 1.6 and 8.9 on Loop A and between MPs 73.2 and 87.6 on Loop B. Some of the blasting on Loop A would be on BLM-managed land; the majority of the blasting on Loop B would be on Navajo Nation land. Along the Phoenix Lateral, blasting may be required at specific locations within the segments between the following: MPs 0.0 and 30.3, MPs 31.6 and 31.8, MPs 38.1 and 38.4, MPs 42.7 and 43.8, MPs 47.9 and 50.3, MPs 53.4 and 74.8, MPs 77.2 and 115.9, and MPs 172.9 and 190.0. Blasting in these locations would occur on ASLD, BLM-managed, and private lands. No blasting is anticipated to be necessary along the customer laterals.

Transwestern has prepared a Blasting Procedure to minimize the effects of blasting and ensure safety during blasting operations (see Appendix N). The blasting contractor would also be required to develop detailed plans before conducting any blasting operations. Some of the main elements of the Blasting Procedure include:

- Controlled blasting would be required in the vicinity of powerlines, telephone lines, fiber optic lines, existing pipeline facilities, structures, water wells, springs, buildings, or other areas where it is necessary to preclude the possibility of damage due to fly-rock, air blast, or vibrations. No blasting would be permitted within 15 feet of an existing utility line or structure, except with special approval by Transwestern.

- Test shots for establishing the project-specific blasting procedures would occur before any blasting activities and particularly before approaching any structures that could be damaged by blasting in the rock type being excavated. All companies or entities that would or may be affected by blasting would be notified a minimum of 7 days before the test shots so representatives would have the opportunity to attend the test shots for verification of the test results and formulation of the blasting procedures.

- Every reasonable precaution would be taken to notify landowners or residents within 1,000 feet along the right-of-way, owners of adjacent facilities (pipelines, cables, powerlines, etc.), and contractor and company employees. Warning signs, with lettering a minimum of 4 inches in height on a contrasting background, would be erected and maintained at all approaches to the blast area. Flagpersons would be stationed on roadways passing within 1,000 feet of the blast area to stop traffic during blasting operations. All personnel not involved in the actual detonation would be required to stand back at least 1,000 feet, and workers involved in the actual detonation would be required to stand back 650 feet from the time the blast signal is given until the “all clear” has been sounded. Audible blasting signals such as an air horn or siren would be sounded before and after each blast.

- All landowners having structures or wells that are located within 150 feet of the blast site would be offered pre-blast tests. Owners having septic systems directly abutting the construction work area would also be offered pre-blast tests. Upon request by a

landowner who had a pre-blast inspection, a post-blast inspection would be performed. Landowners would be contacted by a company representative and a qualified independent contractor would make the inspection. If the damage is substantiated, Transwestern would negotiate a settlement with the landowner to have damages repaired or replaced.

- Where the pipeline route parallels or crosses an electrical transmission corridor, a potential hazard exists in that premature initiation of blasting could be triggered by stray current from the electrical field that may exist at these locations. To avoid premature detonation of any blast circuit due to static electricity, only non-electrical detonating systems would be used.

- During blasting, precautions would be taken to minimize damage to adjacent areas and structures. These precautions would include:

  - installing blasting mats (or backfilling with subsoil) in congested areas or near structures that could be damaged by fly-rock;

  - posting warning signals, flags, and barricades;

  - following procedures for safe storage, handling, loading, firing, and disposal of explosive materials; and

  - posting personnel at valves of adjacent pipelines for emergency response.

- In all cases, blasting standards used on the project would meet or exceed all applicable federal, state, and local requirements covering the use of explosives. Excessive vibration would be controlled by limiting the size of the charges and by using charge delays, which stagger each charge in a series of explosions.

Excess blast rock would be disposed of in accordance with the measures developed with landowners and land management agencies.

Implementation of the procedures described above would avoid or minimize the potential impacts associated with blasting that would be required for construction of the Phoenix Expansion Project.

4.1.3.6 Aboveground Facilities, Pipe Storage and Contractor Yards, and Access Roads

No geologic hazards have been identified at the existing Bloomfield Compressor Station or Seligman Compressor Station No. 1. The proposed aboveground facilities along the Phoenix Lateral and customer laterals would be installed either adjacent to the customer facilities or adjacent to the permanent right-of-way for the pipeline. No geologic hazards have been identified at these locations.

The pipe storage and contractor yards and access roads would be located in the same general vicinity of the pipelines and are, therefore, not expected to impact geologic resources. Further, it is unlikely that these facilities would be affected by geologic hazards.

4.1.4 Paleontological Resources

4.1.4.1 New Mexico Facilities

The San Juan Lateral Loops A and B would be installed adjacent to the existing San Juan Lateral where no paleontological resources were found during construction. As such, it is unlikely that significant paleontological resources would be encountered during construction of the loops.

4.1.4.2 Arizona Facilities

Transwestern conducted a literature search and examined museum collections to determine if any known paleontological resources were present along the Phoenix Lateral and customer laterals (Rowe, 2006). No large-scale systematic field survey assessments have been made of the distribution of fossils in any major part of Arizona and few existing publications reference fossils from the vicinity of the Phoenix Lateral and customer laterals area. Thayer (2003) lists six vertebrate localities, all of which fall in the northern half of the Phoenix Lateral. Three institutions hold paleontological collections from the vicinity of the Phoenix Lateral: the Museum of Northern Arizona, Mesa Southwest Museum, and the Grand Canyon National Park Museum. In addition to the literature search, Transwestern reviewed the geology in the project area in Arizona to determine the potential for fossils to occur along the Phoenix Lateral and customer laterals.

The BLM has developed a set of explicit, broadly applicable, and relatively objective criteria for assessment of paleontological significance. These criteria allow a ranking of geographic areas according to the probability of occurrence and the level of importance of fossils (BLM, 1969):

- Condition 1 (Significant): Areas that are known to contain vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils.

- Condition 2 (Potentially Significant): Areas with exposures of geological units or settings that have a high potential to contain vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils. The presence of geological units from which such fossils have been recovered elsewhere may require further assessment of these same units where they are exposed in the area of consideration.

- Condition 3 (Not Significant): 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, aeolian deposits, or the presence of deep soils. Anticipated depth of bedrock would aid in determining if fossiliferous deposits would be potentially uncovered during surface-disturbing activities.

Only one BLM Condition 1 (Significant) formation, the Kaibab Sandstone, was identified within the project area. This formation is exposed at the surface in a small area, approximately 7 miles northeast of Paulden, Arizona and makes up a portion of the canyon of the Verde River. This formation is within the Prescott National Forest. While there have not been any noted paleontological species recovered from the Kaibab Sandstone in the area of the Phoenix Lateral, recoveries have been made in the Four-Corners and Grand Canyon areas. This led to the classification of the Kaibab Sandstone as a Condition 1 area.

Ten geologic formations within the project area fall under the BLM Condition 2 (Potentially Significant) criteria. Of these, only five are exposed at the surface: the Hermit Formation, Redwall Formation, and Tepeats Sandstone found within the Verde River Valley; Tertiary sedimentary rocks

found within the Chino Valley and Salt River Basin; and Pleistocene sands found throughout the Salt River Valley and its tributaries. The formations within the Verde River Valley primarily consist of limestone and sandstone and have a good potential for the recovery of microfossils and larger marine fossils. Small fossils have been recovered from throughout these formations. The Tertiary sedimentary rocks within the Chino Valley and Salt River Basin have the potential for containing marine and coastal fossils because the area was a mud flat during the Tertiary with periods of inundation. The Pleistocene sands of the Salt River and tributaries have the potential for discovery of Pleistocene megafaunal fossils. Like discoveries have occurred (although rarely) throughout the Pleistocene sands of southern Arizona. The possible existence of vertebrate and invertebrate fossil localities in these units requires a tentative assignment of Condition 2.

Four formations fall under the BLM Condition 3 (Not Significant) criteria. These rocks, except for the recent deposits, constitute the base rocks for the project area and underlay nearly all of the project area.

In summary, with the exception of one area near the Verde River within the Prescott National Forest, the Phoenix Lateral is not located in an area with a high potential for paleontological resources. The FS staff at the Prescott National Forest has determined that paleontological resources surveys near the Verde River are not necessary (Clay, 2006).

In the event that significant paleontological resources are encountered during project construction, the following information would be recorded by the EI or other inspector in charge:

- the location of the specimen including project milepost/station number, township, range, and section;
- contact information for the federal or state land management agency, or landowner;
- provenance information including:
  - approximate depth from which the specimen was recovered,
  - context in which the specimen was recovered (*in situ*, in trench backfill, exposed on surface, etc.), and
  - the disposition of the specimen (returned with soil into the trench, turned over to the landowner, etc.);
- nature of the specimen (complete bone, bone fragment, tooth, armored plate, etc);
- number of specimens (single specimen, multiple specimens); and
- protection measures for specimen (returned to trench and documented, turned over to landowner, etc.).

If possible, a photograph of the specimen alongside a tape measure or other scale would be taken. Transwestern would report the discovery to the landowner or land management agency. If the BLM and the FS determine that additional measures to protect paleontological resources are necessary, Transwestern would be required to develop a Paleontological Resources Discovery and Mitigation Plan before construction. This plan would be included in the BLM/FS/BOR POD for the project, which is a

document required by the BLM before issuance of the ROD that would be part of the BLM's Right-of-Way Grant for the crossing of federal lands (see sections 1.2.2 and 2.3.1).

4.1.5 No Action Alternative

Under the No Action Alternative, the FERC would deny Transwestern's application for a Certificate, and the BLM would deny Transwestern's application to obtain a Right-of-Way Grant for the portion of the project on federal lands. The No Action Alternative means that the project would not go forward and the project-related facilities would not be installed. Accordingly, none of the potential environmental impacts on geologic resources identified for the construction and operation of the proposed project would occur.

4.2 SOILS

4.2.1 Existing Soil Resources

The majority of the soils crossed by the proposed project were analyzed using the State Soil Geographic (STATSGO) database developed by the NRCS for use in regional, multi-state, river basin, state, and multi-county resource planning. STATSGO spatial data are compiled by combining geologically and topographically related soil series found in county soil surveys into larger map units called Map Unit Identifiers (MUIDs). Of the 213 MUIDs that would be crossed by the project, the San Juan Lateral Loop A would cross 26, the San Juan Lateral Loop B would cross 16, and the Phoenix Lateral and customer laterals would cross 171. For about 67 miles of the Phoenix Lateral (approximate MPs 0.0 to 28.8, MPs 167.6 to 171.5, MPs 172.9 to 190.0, MPs 190.8 to 196.7, and MPs 201.6 to 212.8), STATSGO data are not available. Between MPs 9.7 and 27.8, where the route would cross the Prescott National Forest, soils data were obtained from the FS. For the remaining areas, soils data were derived by reviewing NRCS printed General Soil Maps for areas immediately adjacent to the project area, and conclusions were made regarding the MUIDs and soils associations that would likely be crossed.

4.2.1.1 Pipeline Facilities

The soils that would be crossed by the San Juan Lateral Loops in New Mexico primarily consist of deep mineral soils, the majority of which are well-drained to excessively well-drained soils. Along Loop A, the soils that would be crossed are moderately deep to very deep. The few poorly drained soils that would be crossed are typically associated with floodplains and river terraces. These soils generally occur in lengths of less than 0.2 mile and are present between MPs 0.5 and 2.1, MPs 2.5 and 3.7, MPs 5.3 and 6.0, and MPs 7.9 and 8.3. The soils crossed along Loop B range from very shallow to very deep. The shallow soils are typically associated with mesas, cuestas, hills, and ridges. No poorly drained soils were identified along Loop B. The Phoenix Lateral and customer laterals would cross soils characterized as very shallow to soils that are deep and well drained to excessively drained. The very shallow soils that would be crossed by the Phoenix Lateral are associated with hill and mountain slopes and certain alluvial formations.

Agricultural lands would be crossed by Loop A (at various locations between MPs 0.1 and 2.0), the Phoenix Lateral (at various locations between MPs 175.9 to 255.1), and the SRP Desert Basin Lateral (between MPs 0.2 and 0.5).

The soils along the San Juan Lateral Loops, the Phoenix Lateral, and the customer laterals were evaluated to identify prime farmland and major soil characteristics that could affect construction or increase the potential for construction-related soil impacts. The primary limiting characteristics include a high potential for erosion by water, a high potential for erosion by wind, shallow depth to bedrock, a potential for compaction, and poor revegetation potential. Each soil component was evaluated for these limitations, and then the percentage of each MUID with these limitations was summarized. The percentage, along with the length of pipeline route in each MUID, was used to estimate the acreage of soils with limitations that would be crossed by the pipeline facilities. Table 4.2.1-1 summarizes the acres of soil limitations that would be affected by the proposed pipeline facilities. The nature and prevalence of each major characteristic are discussed below.

TABLE 4.2.1-1

Soil Characteristics and Impacts Associated with the Phoenix Expansion Project Pipeline Facilities

Facility	Affected Acres [a]	High Water Erosion Potential (acres (percent)) [b]	High Wind Erosion Potential (acres (percent)) [b]	Potential for Shallow Bedrock (acres (percent)) [b]	Compaction Potential (acres (percent)) [b]	Poor Revegetation Potential (acres (percent)) [b]
San Juan Lateral Loops						
Loop A	154.3	75.4	69.0	53.7	7.6	33.5
		(49%)	(45%)	(35%)	(5%)	(22%)
Loop B	233.9	16.4	20.6	155.5	0.0	0.0
		(7%)	(9%)	(66%)	(0%)	(0%)
Phoenix Lateral	3,965.6	211.4	722.2	632.5	5.8	510.2
		(5%)	(18%)	(16%)	(<1%)	(13%)
Customer Laterals	13.7	0.0	7.6	0.0	0.0	0.0
		(0%)	(55%)	(0%)	(0%)	(0%)
Total Acres [c]	4,367.5	303.2	819.4	841.7	13.4	543.7
		(7%)	(19%)	(19%)	(<1%)	(12%)

[a] Affected acreage was calculated using a Geographic Information System-based footprint of permanent right-of-way, construction right-of-way, and temporary extra workspace. Aboveground facility sites and access roads are not included.

[b] For areas having multiple soil series within an individual map unit, the acreage of each soil limitation was calculated by multiplying the percent composition of the appropriate soil series by the total map unit area identified as having the potential soil limitation. It was assumed that the frequency of occurrence of each individual component soil series along the pipeline route within each Map Unit Identifier (MUID) is the same as its percent composition within the MUID.

[c] Not all soils affected by the proposed project have soil limitations. In addition, acres of soil limitations may overlap one another. Therefore, the acres of soil limitations do not equal the total acres of disturbance for the project.

Sources: STATSGO Database; Natural Resources Conservation Service and National Soil Survey Center, U.S. Department of Agriculture (USDA). USDA, 1976; USDA, 1986; USDA, 1991; USDA, 2003; USDA, 2004; and Moore, 2006

Erosion Potential from Water – Erosion is an ongoing, natural process that can be accelerated by human disturbance. Factors such as soil texture, structure, slope, vegetative cover, rainfall intensity, and wind intensity can influence the severity of erosion. Soils most susceptible to erosion by water are typified by bare or sparse vegetative cover, non-cohesive soil particles, and moderate to steep slopes. Soils typically more resistant to erosion include those that occupy low relief areas, are well vegetated, and have high infiltration capacity and internal permeability. Approximately 7 percent of all soils that would be affected by the project are highly susceptible to erosion by water.

Of the soils along Loop A, about 49 percent (75.4 acres) are susceptible to erosion from water and along Loop B about 7 percent (16.4 acres) of the soils are susceptible. Of the soils affected by the Phoenix Lateral, about 5 percent (211.4 acres) are susceptible to erosion from water. None of the soils along the customer laterals are susceptible to erosion from water.

Erosion Potential from Wind – Wind erosion processes are less affected by slope angles. Wind-induced erosion often occurs on dry, fine-textured soil where vegetative cover is sparse and strong winds are prevalent. About 19 percent of all soils that would be affected by the project are susceptible to wind erosion.

Forty-five percent (69.0 acres) of the soils that would be affected by the construction of Loop A are susceptible to wind erosion, while about 9 percent (20.6 acres) of the soils along Loop B are susceptible. About 18 percent (722.2 acres) of the soils along the Phoenix Lateral exhibit a high potential for erosion from wind and about 55 percent (7.6 acres) of soils along the customer laterals are susceptible.

Potential for Shallow Bedrock – Soils were evaluated to identify areas as containing shallow bedrock (hard bedrock within 5 feet of the soil surface). The presence of shallow bedrock could indicate the need for blasting. About 19 percent of all soils that would be affected by the project have the potential for shallow bedrock.

Shallow bedrock is most prevalent along the San Juan Lateral Loops with about 35 percent (53.7 acres) of the soils along Loop A and 66 percent (155.5 acres) of the soils along Loop B exhibiting the potential for bedrock at a depth of less than 5 feet. Only 16 percent (632.5 acres) of the soils along the Phoenix Lateral exhibit the potential for shallow bedrock. None of the soils along the customer laterals exhibit the potential for shallow bedrock.

Compaction Potential – Compaction is usually a problem associated with fine-textured and/or organic rich soils with high moisture content. The soils most prone to compaction are generally somewhat poorly drained to very poorly drained and often hydric. Compaction can reduce porosity, infiltration, and aeration of the soil, all of which are important to root health and plant growth. Compaction on sloping land can also significantly decrease the water infiltration potential and increase the potential for sheet and rill erosion along a construction right-of-way. Less than 1 percent of the soils that would be affected by the project are highly prone to compaction.

Five percent (7.6 acres) of the soils along Loop A have the potential for compaction while none of the soils along Loop B exhibit qualities that indicate a high compaction potential. Along the Phoenix Lateral, less than 1 percent (5.8 acres) of the soils exhibit a high potential for compaction and none of the soils along the customer laterals exhibit a high potential for compaction.

Poor Revegetation Potential – Soils with poor revegetation potential include soils that are droughty, prone to water and wind erosion, or have some other major limitation such as pH, salinity, or sodicity. These conditions affect the revegetation potential of a soil by limiting the choice of revegetation species to those that are adapted to these conditions. Extra efforts and time are necessary to restore these areas to preconstruction conditions. Soils with poor revegetation potential are identified in the STATSGO database as having a poor to very poor potential to support wildlife habitat and rangeland. Of the soils that would be affected by the project, about 12 percent would be considered as exhibiting poor revegetation potential.

Twenty-two percent (33.5 acres) of the soils along Loop A have poor revegetation potential and 13 percent (510.2 acres) of the soils along the Phoenix Lateral exhibit poor revegetation potential. No soils with poor revegetation potential were identified along Loop B or the customer laterals.

Prime Farmland – The NRCS (2003) defines prime farmland as "land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops." This designation includes cultivated land, pasture, woodland, or other lands that are either used for food or fiber crops, or are available for these uses. Urbanized land, built-up land, and open water cannot be designated as prime farmland. Prime farmland typically contains few or no rocks, has an adequate and dependable water supply, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent, prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating).

Additionally, the NRCS recognizes unique farmland and farmland of statewide importance. Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops (e.g., citrus, tree nuts, olives, cranberries, fruits, and vegetables). It has the special combination of soil quality, location, growing season, and moisture supply needed to economically

produce sustained high quality or high yields of specific crops when treated and managed according to acceptable farming methods. Farmland of statewide importance is similar to prime farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for production of irrigated crops at some time during the 4 years before the mapping date. The NRCS also designates soils as farmland of local importance, which include localized areas where there is a need for certain additional farmlands even though the lands are not identified as having national or statewide importance. These lands may be identified as farmland of local importance by a local agency or other concerned agencies or by local ordinance. Table 4.2.1-2 lists areas of prime farmland, unique farmland, and farmlands of statewide and local importance by facility and quantifies the acres that would be affected by the project. A total of 1,055.9 acres of prime farmland, unique farmland, and farmlands of statewide and local importance would be temporarily affected by the pipeline facilities associated with the Phoenix Expansion Project.

4.2.1.2 Aboveground Facilities

Modifications at the Bloomfield Compressor Station, (including the relocation of an existing pig launcher from the existing San Juan Lateral) and the Seligman Compressor Station No. 1 would be completed within the existing fencelines and would not require additional land.

Construction and operation of the Ash Fork Facility would affect about 2.5 acres of land. The soils associated with this facility consist of shallow well-drained soils with the potential for shallow bedrock. No soils designated as farmland were identified at this site.

The installation of the four proposed taps would affect about 0.5 acre of soils within the permanent pipeline right-of-way. These sites would be fenced and graveled; however, no designated farmlands would be affected.

About 12.9 acres would be required for construction and operation of the 11 proposed meter stations. The SWG Sun Valley North and the SWG Sun Valley South Meter Station sites would affect about 0.5 acre each of deep soils that are well drained to excessively well drained. Neither site exhibits soil limitations or contains designated farmlands. The APS Redhawk Meter Station site would affect about 1.1 acres of deep well-drained soils designated as unique farmland, a portion of which have a high potential for wind erosion. The 0.5 acre of soils that would be affected by construction and operation of the Entegra Gila River Meter Station is characterized as shallow to very shallow well-drained soils with rocky outcrops present and the potential for shallow bedrock. No soils designated as farmland are present. The SWG Rainbow Valley, SRP Desert Basin, and APS Sundance Meter Station sites would collectively affect about 3.6 acres of deep well-drained soils with a high potential for wind erosion. The SRP Desert Basin Meter Station site would affect 0.5 acre of soils designated as prime farmland if irrigated and protected from flooding and the APS Sundance Meter Station site would affect 0.5 acre of soils designated as unique farmland. The EPNG Pinal County and EPNG East Valley Lateral Meter Station sites together would affect a total of 4.0 acres of deep well-drained soils. No soil limitations are associated with these sites; however, the soils at these sites are designated as prime farmland if irrigated and protected from flooding. The SWG New Florence Meter Station site would affect 1.3 acres of soils that range from very shallow to deep while the 1.4 acres of soils affected at the SWG Germann Meter Station site would be deep soils. Soils at both of these sites are described as well drained with no soil limitations identified. The SWG Germann Meter Station site would affect 1.4 acres of soils designated as prime farmland if irrigated and protected from flooding.

TABLE 4.2.1-2

Prime Farmland, Unique Farmland, and Farmlands of Statewide and Local Importance Affected by the Phoenix Expansion Project

Facility	Class of Farmland	Acres [a]
San Juan Lateral Loops		
Loop A	Farmland of statewide importance	35.6
Loop B	Farmland of local importance	4.7
Phoenix Lateral	Prime farmland, if irrigated	468.9
	Prime farmland, if irrigated and either protected from flooding or not frequently flooded during the growing season	261.3
	Unique farmland	272.5
Customer Laterals	Prime farmland, if irrigated	9.6
	Unique farmland	3.3
Pipeline Facilities Subtotal		1,055.9
Aboveground Facilities		
Arizona Public Service Company (APS) Redhawk Meter Station	Unique farmland	1.1
Salt River Project Agricultural Improvement and Power District Desert Basin Meter Station	Prime farmland, if irrigated and either protected from flooding or not frequently flooded during the growing season	0.5
APS Sundance Meter Station	Unique farmland	0.5
El Paso Natural Gas Company (EPNG) Pinal County Meter Station and EPNG East Valley Lateral Meter Station	Prime farmland, if irrigated and either protected from flooding or not frequently flooded during the growing season	4.0
Southwest Gas Corporation Germann Meter Station	Prime farmland, if irrigated and either protected from flooding or not frequently flooded during the growing season	1.4
Pig Launcher/Receiver Sites	Unique farmland	0.9
Valve Sites	Prime farmland, if irrigated	1.1
	Prime farmland, if irrigated and either protected from flooding or not frequently flooded during the growing season	0.1
	Unique farmland	0.5
Aboveground Facilities Subtotal		10.1
Pipe Storage and Contractor Yards		
Randolph Yard and Siding	Prime farmland, if irrigated	36.1
	Unique farmland	41.1
Webb Pipe Storage/Contractor Yard	Prime farmland, if irrigated	8.7
	Prime farmland, if irrigated and either protected from flooding or not frequently flooded during the growing season	23.1
Pipe Storage and Contractor Yards Subtotal		109.0
Project Total		1,175.0

[a] Acreage was calculated using a Geographic Information System based on the actual footprint of the construction right-of-way and temporary extra workspaces. Access roads were not included. For areas having multiple soil series within an individual map unit, the acreage of prime farmland was calculated by multiplying the percent composition of the appropriate soil series by the total map unit area identified as having the potential for prime farmland.

Source: STATSGO Database; Natural Resources Conservation Service and National Soil Survey Center, U.S. Department of Agriculture (USDA), 1976; USDA, 1977; USDA, 1986; USDA, 1991; USDA, 2003; USDA, 2004

The majority of the proposed pig launcher/receiver facilities would be collocated with other aboveground facilities and would not affect any additional land; however, the pig launcher at MP 164.9 associated with the APS Redhawk Lateral would affect an additional 0.9 acre of unique farmland.

Construction and operation of the 27 valves and 4 remote blowdown valves would affect about 2.9 acres outside the permanent right-of-way. The majority of the valves and remote blowdown valves would avoid soils designated as farmland; however, about 1.7 acres of soils designated as farmland would

be permanently converted to an industrial use. Valves-123, -133, -232, and -239 and Remote Blowdown Valve-133 would convert 1.1 acres of soils designated as prime farmland if irrigated; Valve-221 would convert 0.1 acre of soils designated as prime farmland if irrigated and protected from flooding; and Valves-165, -245, and -250 would convert 0.5 acre of soils designated as unique farmland. These sites would be fenced and graveled and unavailable for agricultural use.

4.2.1.3 Pipe Storage and Contractor Yards

Soils at three of the eight proposed pipe storage and contractor yards have been previously disturbed for industrial/commercial activities and two of these yards are paved (see section 2.2.3). Of the five yards not previously disturbed (the Ash Fork Pipe Storage Yard, Drake Pipe Storage Yard, Landfill Pipe Storage/Contractor Yard, Webb Pipe Storage/Contractor Yard, and Randolph Yard and Siding), the soils at the Ash Fork Pipe Storage Yard have the potential for shallow bedrock, and the soils at the Drake Pipe Storage Yard exhibit a high potential for wind erosion. The Landfill Pipe Storage/Contractor Yard does not exhibit soil limitations. The soils at the Webb Pipe Storage/Contractor Yard exhibit a high potential for wind erosion. Of the 31.8 acres at this site, about 8.7 acres are farmland designated as prime if irrigated and about 23.1 acres are farmland designated as prime if irrigated and either protected from flooding or not frequently flooded during the growing season. The Randolph Yard and Siding contains soils that exhibit a high potential for wind erosion, shallow bedrock, and poor revegetation potential. Of the 77.2 acres at this site, 36.1 acres are farmland designated as prime if irrigated and either protected from flooding or not frequently flooded during the growing season and about 41.1 acres are designated as unique farmland.

4.2.1.4 Access Roads

Construction of the 11 new permanent access roads would primarily affect soils within the permanent right-of-way of the Phoenix Lateral. These soils would exhibit the same characteristics and limitations as described for the soils crossed by the Phoenix Lateral pipeline facilities (see section 4.2.1.1).

4.2.2 General Impact and Mitigation

Pipeline construction activities such as clearing, grading, trench excavation, backfilling, and the movement of construction equipment along the right-of-way may affect soil resources. Clearing removes protective vegetative cover and exposes the soil to the effects of wind, rain, and runoff, which increases the potential for soil erosion and sedimentation of sensitive areas. Grading, spoil storage, and equipment traffic can compact soil, reducing porosity and percolation rates and increasing runoff potential. Construction activities can also affect soil fertility and facilitate the dispersal and establishment of weeds.

Erosion is a continuing, natural process that can be accelerated by human activities. Clearing, grading, and the movement of equipment on the right-of-way can accelerate the erosion process and, without adequate protection, result in discharges of sediment to wetlands and waterbodies and lower soil fertility. Factors that influence the rate of erosion include soil texture and structure, the length and percent of slope, vegetative cover, and rainfall and wind intensity. The most erosion-prone soils are generally bare or sparsely vegetated, non-cohesive, fine textured, and situated on moderate to steep slopes. Soils more resistant to erosion include those that are well vegetated, well structured with high percolation rates, and located on flat to nearly level terrain.

Construction equipment operating and traveling on the construction right-of-way, especially during wet periods and on poorly drained soils, can compact the soil. Soil compaction can also result from the storage of heavy spoil piles on certain types of soil for extended periods of time. Soil

compaction destroys soil structure, reduces pore space and the moisture holding capacity of the soil, and increases runoff potential. If unmitigated, compaction results in soils with a reduced revegetation potential and an increased erosion hazard. The degree of compaction depends on the moisture content and texture of the soil. Wet soils with fine clay textures are the most susceptible to compaction. A small percent of the soils along Loop A and the Phoenix Lateral (5 percent and less than 1 percent, respectively) are prone to compaction.

Construction activities such as grading, trenching, and backfilling can also cause mixing of soil horizons. Mixing of topsoil with subsoil, particularly in agricultural lands, dilutes the superior chemical and physical properties of the topsoil and lowers soil fertility and the ability of disturbed areas to revegetate successfully. Trenching of stony or shallow-depth-to-bedrock soils can bring stones or rock fragments to the surface. Soils with bedrock present at depths of 5 feet or less may require blasting, which also often results in excess rock being brought to the soil surface. Excess rocks on or near the soil surface could interfere with agricultural practices and hinder restoration of the right-of-way. Shallow soils are prevalent along the San Juan Lateral Loops, are less common along the Phoenix Lateral, and are not present along the customer laterals.

Construction can also facilitate the establishment of noxious weeds where none or few existed. The clearing of existing perennial vegetation provides an opportunity for weed species to invade the right-of-way, and the movement of equipment along the right-of-way could transport weed seed and plant parts from one location to another (see section 4.4.4). The seriousness of these effects would depend on the prevalence of weeds in the area of the pipeline route, the type of weed and its method of reproduction and dispersal, and the weed's effect on current or future land use.

As discussed in section 4.7.6, no areas of contaminated soils are expected to be crossed by the project; however, all of the soils crossed by the project would be susceptible to contamination from spills or leaks of fuels, lubricants, and coolants from construction equipment. Although these impacts would typically be minor because of the low frequency and volumes of these occurrences, the introduction of these contaminants to soils can adversely affect productivity.

The impact of construction on soils can be effectively minimized through the use of erosion control, revegetation, and weed control plans. Transwestern's UECRM Plan has been developed to minimize impacts on soils associated with the project (see Appendix F). Transwestern would also implement its Restoration Plan[1] that includes project-specific measures developed in consultation with the BLM and the FS to address the special issues associated with construction and restoration in an arid environment and its Noxious Weed Management Plan that includes project-specific measures to control the spread of noxious weed species attributable to the project (see section 4.4.4 and Appendix R). In addition, Transwestern's UECRM, Restoration, and Noxious Weed Management Plans would be appendices of the BLM/FS/BOR POD for the project, which would also include additional site-specific stipulations that are determined by the BLM, the FS, and the BOR to be necessary on federal lands under their jurisdiction. Some of the mitigation measures contained in these plans that Transwestern would implement to reduce construction-related impacts on soils include:

- adjusting the width of the construction right-of-way to avoid the clearing of certain types of native vegetation (see section 4.4.2 for additional details);

[1] This plan is too voluminous to include in this EIS but can be viewed on the FERC Internet website at http://www.ferc.gov. Using the "eLibrary" link, select "General Search" from the eLibrary menu and enter the docket number excluding the last three digits in the "Docket Number" field (i.e., CP06-459). Be sure to select an appropriate date range. It is also available for public inspection at the FERC's Public Reference Room in Washington, DC (call (202) 502-8317 for instructions).

- preserving the native seed bank by segregating topsoil over the full width of the construction right-of-way to a depth of 3 inches in non-agricultural areas where requested by the landowner/land management agency and redistributing material over the right-of-way during cleanup;

- restricting grading to minimize soil disturbance;

- shredding, crushing, or cutting vegetation where possible to minimize soil disturbance and leave root crowns to aid in revegetation;

- preserving, and redistributing cut and shredded vegetation over the right-of-way (cut vegetation would be redistributed as vertical mulch and shredded vegetation would be redistributed as a standard mulch layer over the restored topsoil);

- seeding selected disturbed areas based on the site-specific recommendations included in the Restoration Plan;

- imprinting areas with a sheepsfoot or similar device to provide indentations to catch water and seed and anchor native plant material that has been respread over the right-of-way, thereby aiding in natural revegetation and erosion control;

- segregating and redistributing topsoil to its actual depth up to 12 inches in agricultural areas and in specified native areas;

- testing for and alleviating compacted soils in agricultural and residential areas, and ripping soils in selected areas of native desert habitats (rangeland) to a depth of 12 to 24 inches depending on the site-specific recommendations included in the Restoration Plan; and

- implementing procedures to prevent or minimize the spread of noxious weeds and other undesirable species.

Transwestern's UECRM Plan modifies or omits several measures of the FERC Plan because portions of the FERC Plan are not applicable due to the arid climate in the areas that would be affected by the project. For example, Transwestern does not propose to seed all disturbed areas but instead would limit seeding to site-specific locations identified in its Restoration Plan where it has determined in consultation with the BLM and the FS that seeding would be effective.

We have reviewed Transwestern's UECRM Plan and generally agree with the level of mitigation proposed and the appropriateness of the differences between Transwestern's UECRM Plan and the FERC Plan. We have also reviewed Transwestern's Restoration Plan dated July 2007. The BLM and the FS have indicated that they are satisfied with the measures included in this plan; however, because these agencies and other applicable agencies may identify additional restoration concerns before construction, **the FERC staff recommends that:**

- **Transwestern shall coordinate with the BLM, the FS, and other applicable agencies to finalize its Restoration Plan to address any additional restoration concerns identified by these agencies. The final Restoration Plan shall be filed with the Secretary <u>before construction</u>.**

In addition, it is possible that the BLM and the FS could include further site-specific stipulations in the BLM/FS/BOR POD for the project after the Restoration Plan is finalized. Other agencies (e.g., FWS, AGFD, New Mexico Department of Game and Fish (NMDGF)) may include additional construction or mitigation measures when issuing permits and agreements for the proposed project as well.

Although revegetation of the disturbed areas in native desert habitats would be slow due to the arid environment, with the implementation of Transwestern's UECRM Plan and the final Restoration Plan as recommended above, the project would not result in significantly increased erosion rates, a reduction of soil productivity by compaction, or soil mixing to a level that would prevent successful rehabilitation and eventual re-establishment of vegetative cover to the recommended or preconstruction composition and density. Further, with the implementation of the mitigation measures in Transwestern's UECRM Plan that pertain to agricultural areas, the project would not result in a significant reduction in agricultural productivity for longer than 3 years as a result of soil mixing, structural damage, or compaction. Transwestern's vegetation and crop monitoring programs are discussed in detail in section 4.4.2.

Additional measures to mitigate construction-related impacts on soils are included in Transwestern's Dust Control Plan, which is described in section 4.10 and provided in Appendix M. Fugitive dust disturbed by construction is a visible indication of soil loss through wind erosion. The Dust Control Plan outlines measures that would be implemented to control fugitive dust during construction.

Transwestern's SRP Procedures specifies cleanup procedures to minimize the potential for soil contamination from spills or leaks of fuels, lubricants, and coolants used during construction (see Appendix H). Implementation of Transwestern's SRP Procedures would effectively reduce the potential impact on soils from spills of the hazardous materials used during construction and would not significantly increase the exposure of human or ecological receptors to potentially hazardous levels of chemicals.

As discussed in section 2.5, Transwestern would employ full-time EIs to ensure compliance with its UECRM Plan, Restoration Plan, Noxious Weed Management Plan, SRP Procedures, Dust Control Plan, BLM/FS/BOR POD, and other project-specific plans and specifications during construction and restoration. At least one EI would be assigned to each construction spread. The EI would have the authority to stop work and order corrective actions for activities that violate the environmental conditions of the FERC Certificate and other authorizations. In addition, third-party Compliance Monitors representing the FERC, the BLM, and the FS would be present on each construction spread to monitor compliance with project mitigation measures and requirements.

4.2.3 Site-specific Impact and Mitigation

As listed in table 4.2.1-1, about 35 percent of the soils crossed by Loop A, 66 percent of the soils crossed by Loop B, and 16 percent of the soils crossed by the Phoenix Lateral may exhibit shallow depth to bedrock. Transwestern indicates that blasting may be required in some of these areas (see section 4.1.3.5). Specific construction procedures would be used to minimize impact on soils. Excess rock would be removed from the upper 12 inches of soil to the extent practicable in cropland, hayfields, pastures, residential areas, and other areas at the landowner's request. Excess rock would not be windrowed along the right-of-way unless written approval was obtained from landowner(s) or the land management agency. All blasting would be done according to Transwestern's Blasting Procedure (see section 4.1.3.5 and Appendix N), which includes detailed requirements for the use, storage, transportation, and handling of explosives.

Other soil limitations that would be encountered during construction of the project include 303.2 acres of soils with high water erosion potential. The majority of these soils would occur along the Phoenix Lateral (211.4 acres); about 91.8 acres would be affected along the San Juan Lateral Loops. In addition, a total of 819.4 acres of soils would be highly susceptible to wind erosion, consisting of 89.6 acres along the San Juan Lateral Loops, 722.2 acres along the Phoenix Lateral, and 7.6 acres along the customer laterals. As discussed in section 4.2.2, implementation of the mitigation measures outlined in Transwestern's UECRM Plan, Restoration Plan, Dust Control Plan, BLM/FS/BOR POD, and other project-specific plans would satisfactorily minimize and mitigate construction-related effects on these soils.

A comment was received during the scoping process expressing concern about the impact of the project on biological soil crusts. Biological soil crusts, also known as cryptogamic, cryptobiotic, microbiotic, or microphytic soil crusts, occur on undisturbed soils in arid and semi-arid regions. They are the result of complex communities of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria that form crusts that protect the soils from erosion. The crusts function as a living mulch that aids in moisture retention and nitrogen fixation and hinders annual weed growth. Biological soil crusts would be expected to be found along the pipeline right-of-way on undisturbed, fine-textured soils within native desert habitats. Biological soil crusts are sensitive to soil disturbance and slow to recover.

While biological soil crusts are well adapted to severe growing conditions, they are poorly adapted to compressional disturbances. Studies indicate that domestic livestock grazing, recreational activities (e.g., hiking, biking, and off-road driving), and military activities take a heavy toll on the integrity of the crusts. Burial also affects soil crusts. Soil crusts tolerate shallow burial; however, deeper burial will kill crusts (USGS, 2006). Soil crusts along the pipeline route would by affected by burial from soil-disturbing activities such as grading and trenching and by compressional disturbances from equipment, vehicular, and pedestrian traffic. The project would result in a long-term impact on these soil crusts on the pipeline right-of-way. However, recovery of the biological crusts would be enhanced by Transwestern's implementation of seedbank preservation because soil crusts are able to withstand shallow burial by extending sheaths to the surface and continuing photosynthesis. Seedbank preservation would also reduce the potential for soil crusts to be affected by compressional disturbances by segregating the material before construction and would provide a source of inoculum when the material is respread during restoration.

Another comment was received during the scoping process regarding the potential for impacts on the pipeline associated with the freeze-thaw characteristics of the soils and corrosive environments along the proposed pipeline route. Based on soils data available from the NRCS, frost susceptible soils would be encountered along the Phoenix Lateral; however, in order for frost heave to occur, the soil must experience freezing temperatures and have a supply of water. Soils encountered along the Phoenix Lateral are generally well drained and shallow groundwater conditions are not prevalent. Furthermore, the frost line in the vicinity of the Phoenix Lateral ranges from 6 to 16 inches, depending on ground surface elevation. The pipeline would be buried to a depth of approximately 3 feet below the soil surface, well below the frost line. Therefore, the freeze-thaw cycles would have no effect on the pipeline.

Soils designated as farmlands would be crossed by both of the San Juan Lateral Loops, the Phoenix Lateral, and the customer laterals. Along Loop A, soils designated as farmland of statewide importance would be crossed between MPs 0.0 and 1.6 and MPs 1.9 and 2.2. Along Loop B, soils designated as farmland of local importance would be crossed, the majority of which occur between MPs 77.1 and 78.6. The Phoenix Lateral would cross soils designated as prime and unique farmland with significant concentrations found between MPs 45.1 and 47.1, MPs 129.0 and 136.9, and MPs 197.7 and 245.5. The customer laterals would cross about 0.8 mile of soils designated as prime farmland and about 0.4 mile of unique farmland. Of the 1,175.0 acres of designated farmlands affected by the project,

1,055.9 would be affected by the pipeline facilities. These impacts would be temporary and no permanent impacts on prime or unique farmland or farmland of statewide or local importance would occur in association with the pipeline facilities.

Soils would, however, be permanently affected at aboveground facility sites where the land use would be permanently converted from farmland to an industrial use. About 10.1 acres of soils designated as farmland are present at the proposed aboveground facility sites where the areas would be fenced and graveled and converted to an industrial use. Construction and operation of 6 of the 11 proposed meter stations would affect soils designated as prime farmland if irrigated and protected from flooding (5.9 acres) and unique farmland (1.6 acres). This small amount would not represent a significant loss of this resource. The pig launcher that would affect 0.9 acre of unique farmland would be collocated with other aboveground facilities, which would reduce impacts on various resources (e.g., wildlife habitat and visual resources). In addition, this site is previously disturbed with no vegetation present. Construction and operation of six valve sites and one remote blowdown valve site would permanently affect 1.2 acres of prime farmland (if irrigated and/or protected from flooding) and 0.5 acre of unique farmland. Impact on the designated farmland associated with the contractor and pipe storage yards (109.0 acres) would be temporary.

The Arizona NRCS has requested that alternative sites be considered to avoid the permanent conversion of soils classified as prime farmland. As discussed in section 3.7, the locations of the proposed aboveground facility sites were primarily determined by the location of agreed-upon customer delivery points and DOT safety regulations and the sites would be either adjacent to the permanent right-of-way or adjacent to or within existing customer facilities. Therefore, no alternative sites were considered.

About 23.1 miles of irrigated cropland would be crossed by the project, all of which occurs along the Phoenix Lateral between MPs 175.9 and 255.1 in Maricopa and Pinal Counties, Arizona. Before construction in agricultural areas, Transwestern would contact the landowner/operator to locate existing drainage structures and irrigation facilities and identify plans for future locations of irrigation systems. During construction, Transwestern would segregate up to 12 inches of topsoil before installation of the pipeline and reapply topsoil over the surface of the right-of-way during restoration as outlined in its UECRM Plan (see Appendix F). Natural flow in crop irrigation systems would be maintained by providing breaks in topsoil and subsoil stockpiles, as necessary. Any rutting or compaction would be repaired before restoration of disturbed areas. In addition, Transwestern would implement a post-construction crop monitoring program to maintain the level of production of the affected soils. The program would evaluate crop productivity and success for a period of at least 2 years following construction. Transwestern would prepare activity reports during this period documenting any problems identified by Transwestern or the landowner and describing corrective actions taken to remedy these problems. These reports would be submitted to the FERC on a quarterly basis, as stipulated in Transwestern's UECRM Plan. The FERC, BLM, and FS staffs would also monitor the right-of-way after construction. If after 2 years it is determined that cropland crossed by the pipeline has not been restored successfully, Transwestern would implement additional restoration measures.

About 328.1 acres of soils would be permanently affected by the construction or modification and use of access roads associated with the project. Transwestern would construct and maintain access roads on Forest System lands in accordance with its Forest Service Access Management Plan (see Appendix O). In these areas, roads would be constructed to meet an all-weather standard using native surfacing materials, and would be graded to shed water by crowning and out-sloping the roads. Drainage ditches would be installed where there is a potential for larger volumes of runoff. In accordance with its Forest Service Access Management Plan, Transwestern would develop and implement a post-construction schedule of maintenance for access roads on Forest System lands. In section 4.7.4.1, we have

recommended that Transwestern revise its Forest Service Access Management Plan to incorporate additional information and develop and file a similar access management plan for BLM-managed lands.

4.2.4 No Action Alternative

Under the No Action Alternative, the FERC would deny Transwestern's application for a Certificate and the BLM would deny Transwestern's application for a Right-of-Way Grant for the portion of the project on federal lands. The No Action Alternative means that the project would not go forward and the project-related facilities would not be installed. Accordingly, none of the potential environmental impacts on soil resources identified for the construction and operation of the proposed project would occur.

4.3 WATER RESOURCES

4.3.1 Groundwater Resources

4.3.1.1 Existing Groundwater Resources

New Mexico Facilities

The San Juan Lateral Loops A and B and the existing Bloomfield Compressor Station are within the San Juan surface water basin and the San Juan groundwater basin as defined by the New Mexico Office of the State Engineer (NMOSE) (NMOSE, 2005). The southern end of Loop B also extends into the Gallup groundwater basin and the Lower Colorado River surface water basin.

Loops A and B and the existing Bloomfield Compressor Station would be underlain by the Colorado Plateau aquifers. Regionally, the Colorado Plateau aquifers cover an area of approximately 110,000 square miles in western Colorado, northwestern New Mexico, northeastern Arizona, and eastern Utah. The many water-yielding units of the Colorado Plateau aquifers have been grouped into four principal aquifers. From youngest (shallowest) to oldest (deepest) these aquifers are the Uinta-Animas aquifer, Mesaverde aquifer, Dakota-Glen Canyon aquifer system, and Coconino-De Chelly aquifer. All four aquifers are present in the San Juan Basin. The Uinta-Animas aquifer is the topmost aquifer underlying Loop A and the Mesaverde aquifer is the topmost aquifer underlying Loop B (Robson and Banta, 1995).

Uinta-Animas Aquifer – In the San Juan Basin, the Uinta-Animas aquifer consists of the San Jose Formation, the underlying Animas Formation and its lateral equivalent the Nacimiento Formation, and the Ojo Alamo Sandstone. The San Jose Formation is the uppermost significant bedrock formation and primarily consists of permeable, coarse, arkosic sandstone interlayered with mudstone. The Animas and Nacimiento Formations and the Ojo Alamo Sandstone primarily consist of permeable conglomerate and medium to very coarse sandstone interlayered with relatively impermeable shale and mudstone (Robson and Banta, 1995).

Water recharges the Uinta-Animas aquifer in the higher elevation areas that nearly encircle the San Juan Basin. The San Juan River valley forms the principal area of groundwater discharge. The maximum thickness of the aquifer is approximately 3,500 feet (Robson and Banta, 1995).

The Uinta-Animas aquifer in the San Juan Basin contains fresh to moderately saline water. Dissolved solids concentrations generally increase along the groundwater flow path from less than 1,000 milligrams per liter (mg/L) near recharge areas to about 4,000 mg/L near the discharge area along the San Juan River valley (Robson and Banta, 1995).

Mesaverde Aquifer – In the San Juan Basin, the Mesaverde aquifer consists of sandstone, coal, siltstone, and shale of the Mesaverde Group. The formations of the Mesaverde Group intertongue extensively with the Mancos Shale and, to a lesser extent, with the Lewis Shale. The Point Lookout Sandstone is the most areally extensive of the Mesaverde Group formations in the basin.

The top of the Mesaverde aquifer is about 2,500 to 5,000 feet above msl. The aquifer has a maximum thickness of about 4,500 feet in the southern part of the San Juan Basin. Recharge occurs mainly in the area of the Zuni Uplift, Chuska Mountains, and in northern Sandoval County, New Mexico. Groundwater discharges from the Mesaverde aquifer directly to streams, springs, and seeps by upward movement through confining layers and into overlying aquifers, or by withdrawal from wells. The

natural discharge areas generally are along streams and rivers, such as the San Juan River and the Chaco River and its tributaries in the San Juan Basin (Robson and Banta, 1995).

Little groundwater quality information is available for the Mesaverde aquifer. The sparse data indicate that the dissolved solids concentrations range from about 1,000 to 4,000 mg/L in parts of the San Juan Basin (Robson and Banta, 1995). Except for the Bloomfield area (MPs 0.0 to 1.5), the San Juan Basin is sparsely populated, and water use is mostly for domestic and agricultural purposes.

USGS monitoring well data for San Juan and McKinley Counties indicate that for wells advanced in bedrock (several sandstone formations), groundwater levels typically range from 64 to over 500 feet below the land surface (USGS, 2003). For wells advanced in alluvium, groundwater generally occurs from about 8 to at least 25 feet below the ground surface. Except for the one perennial waterbody that would be crossed by Loop A (the San Juan River), most of the route for the loops is expected to occur in areas where groundwater is at least 50 feet below the ground surface. In areas of alluvium, groundwater would tend to be closer to the surface.

Arizona Facilities

The Phoenix Lateral, customer laterals, and associated aboveground facilities are underlain by the Basin and Range aquifers. The Basin and Range aquifers extend across about 200,000 square miles of the southwestern United States and underlie most of Nevada and parts of eastern California, southern Oregon and Idaho, western Utah, southern Arizona, and southwestern New Mexico. The aquifers include the western part of the Southwest alluvial basins aquifer system in Arizona (Robson and Banta, 1995).

The Basin and Range aquifers generally consist of unconsolidated gravel, sand, silt, and clay, or partly consolidated sedimentary or volcanic materials. These materials have filled deep fault-block valleys formed by large vertical displacement across faults. Mountain ranges, which generally consist of impermeable rocks, separate adjacent valleys. When mountains encircle a valley, the aquifer in the valley is isolated, and groundwater is contained within the valley. However, most valleys are interconnected and groundwater moves from valley to valley through the interconnected network of aquifers. The Basin and Range aquifers are the principal sources of groundwater in southern Arizona. The groundwater in some basins is extensively utilized and large water-level declines have occurred. In other basins, the population is less dense and very small volumes of groundwater are utilized, so water levels are stable (Robson and Banta, 1995).

The water levels and the direction of groundwater movement in a basin are determined by the geometry of the bedrock surrounding the basin and by the location and quantity of recharge and discharge within the basin. Although groundwater flows through the basin-fill aquifers from areas of recharge to areas of discharge, the complex and partly interconnected network of aquifers in the basins causes groundwater to flow in many different directions, and the hydrology of each basin is unique. Water generally moves from recharge areas along the margins of the basins either toward discharge areas in the central parts of the valley, or toward discharge areas at the downgradient end of the valley (Robson and Banta, 1995).

Groundwater in the basin-fill aquifers is generally of suitable quality for most uses (i.e., most of the groundwater has dissolved solids concentrations of less than 1,000 mg/L). However, the dissolved solids concentrations of groundwater in parts of some basins in Arizona can be as high as 10,000 mg/L (Robson and Banta, 1995).

Most groundwater in Arizona is withdrawn for irrigating commercial crops. However, an increasing proportion of groundwater is being withdrawn for urban use. Some of the largest rates of

groundwater withdrawal in Arizona are near the rapidly expanding metropolitan areas of Phoenix and Tucson. Irrigation is still the principal water use in these areas, although due to the population increases, groundwater is increasingly becoming the principal source of the water supply (Robson and Banta, 1995).

Within the Basin and Range aquifers, the Phoenix Lateral crosses six groundwater basins, three of which have been designated Active Management Areas (AMAs), as defined by the ADWR (ADWR, 2006). The ADWR designated the AMAs in response to severe overdraft of groundwater. The primary goal of two of the AMAs crossed by the Phoenix Lateral (the Prescott and Phoenix AMAs) is to achieve "safe-yield" by 2025. Safe-yield is accomplished when no more groundwater is being withdrawn than is being replaced on an annual basis. The primary goal of the third AMA crossed by the Phoenix Lateral (the Pinal AMA) is to preserve the economy, which is primarily agricultural, for as long as feasible while considering the need to preserve groundwater for future non-irrigation uses. Each AMA carries out its programs in a manner consistent with its goals. The six groundwater basins are described below from north to south.

Verde River Groundwater Basin – The northernmost groundwater basin crossed by the Phoenix Lateral is the Verde River groundwater basin between approximate MPs 0.0 and 27.0. The Verde River groundwater basin covers about 5,450 square miles of north-central Arizona and is divided into the Big Chino, Verde Valley, and Verde Canyon sub-basins. It is completely contained within the Verde River surface water watershed. Elevations range from over 12,000 feet above msl in the San Francisco Mountains to about 1,600 feet above msl in the south. The Mogollon Rim escarpment forms a topographic relief of up to 2,000 feet and trends northwest across the basin. The Phoenix Lateral would cross the Big Chino sub-basin within the Verde River groundwater basin.

The principal aquifer of the Big Chino sub-basin consists of widespread basin-fill sediments interbedded with basalt flows, alluvial sands, and gravels in the major washes (Wallace and Laney, 1976, as referenced in ADWR, 2006). These deposits contain unconsolidated to moderately consolidated silts, sands, gravel, and interbedded volcanics and clays, and they are bounded by low-permeability crystalline and consolidated rocks. Groundwater occurs under both water-table (unconfined) and artesian (confined) conditions. Typically, confined conditions occur where buried lava flows are interbedded with clays and volcanic ash. Groundwater levels in wells range from above the land surface (due to confined conditions) to more than 200 feet below ground surface (bgs). Recharge to the Big Chino sub-basin is from runoff along the mountain fronts and the major washes. Discharges from the sub-basin include groundwater pumpage and surface water outflow (ADWR, 2006). Water quality is generally good, although several wells in the Verde Valley have been reported to have high levels of nitrate (ADEQ, 1990).

Prescott AMA – The next groundwater basin to the south is the Prescott AMA. The Phoenix Lateral would cross the Prescott AMA for about 28 miles between approximate MPs 27.0 and 55.0. The Prescott AMA encompasses 485 square miles in central Yavapai County. Elevations range from about 4,400 feet above msl in the valleys to about 7,800 feet above msl in the Bradshaw Mountains. The Prescott AMA boundary is defined by the Bradshaw Mountains to the south, Granite Mountain and Sullivan Buttes to the west, and by the Black Hills to the northeast. The Prescott AMA consists of two sub-basins, the Little Chino and the Upper Agua Fria, which are bisected by a surface drainage divide. The Little Chino sub-basin is part of the Verde River surface water watershed and the Upper Agua Fria sub-basin is part of the Middle Gila surface water watershed. The Phoenix Lateral would cross both sub-basins. The Little Chino sub-basin encompasses the western and northern portions of the Prescott AMA, while the Upper Agua Fria sub-basin spans the southeast portion of the Prescott AMA. Two aquifers occur in both sub-basins: the upper alluvial unit and the lower volcanic unit aquifers. The depth-to-water in the upper alluvial unit aquifer ranges from land surface elevation near Del Rio Springs and the Agua Fria River near Dewey-Humboldt, to over 560 feet bgs near Prescott Valley's Santa Fe well field (Nelson, 2002).

In general, water quality throughout the Prescott AMA is excellent. The water in the Prescott AMA can be characterized as moderately hard to very hard with mostly low total dissolved solids (TDS) concentrations (i.e., less than 500 mg/L) (ADEQ, 2005). Radon levels that exceed standards have been detected in granitic formations around Prescott and may force domestic well owners to start receiving water from large providers (ADWR, 2006). Some wells have been found to exceed the arsenic drinking water standard of 10 micrograms per liter (μg/L) (ADEQ, 2005).

Agua Fria Groundwater Basin – The Agua Fria groundwater basin is located south of the Prescott AMA and would be crossed for 41 miles between approximate MPs 55.0 and 96.0. The Agua Fria groundwater basin occupies about 1,200 square miles in central Arizona. The basin is bounded on the north by Hickey Mountain, on the west by the Bradshaw and Buckhorn Mountains, on the south by Lake Pleasant, and on the east by the Black Hills and New River Mountains. It is part of the Middle Gila surface water watershed. Land-surface elevations in the Agua Fria basin vary from 1,570 feet above msl at Lake Pleasant to 7,800 feet above msl in the Bradshaw Mountains.

Rock units in the Agua Fria basin can be divided into four broad groups based on general geologic character and their ability to yield water. The units, from youngest to oldest, are: basin-fill sands and gravels, volcanic rocks, conglomerates, and igneous and metamorphic rocks. Groundwater occurs in all four rock units in the Agua Fria basin. The main water-bearing units are the basin-fill sands and the conglomerates. The volcanics and crystalline rocks yield only small amounts of water. Because the basin-fill unit is thin, it does not contain large quantities of groundwater in storage. The volcanic rocks provide small amounts of water to low-yield stock wells in the northeastern sections of the basin. Conglomerates occur widely throughout the basin and contain the largest volume of groundwater. Faulting formed the present-day drainage basins and separated the unit into several smaller, discrete groundwater basins that are separated by impermeable crystalline rocks. As a result, there is little direct subsurface hydrologic connection between the sedimentary units in the smaller groundwater basins (Wilson, 1988, as referenced in ADWR, 2006). The water-bearing ability of the igneous and metamorphic rocks depends on their degree of fracturing. Most wells have low yields; however, near Black Canyon City wells drilled into the Precambrian schist can produce up to 20 gallons per minute (gpm) (Littin, 1981, as referenced in ADWR, 2006). Water quality in the basin is generally good. Near Black Canyon City, arsenic has been detected in the groundwater and is associated with the volcanic formations in the area (ADEQ, 1990).

Phoenix AMA – The fourth groundwater basin is the Phoenix AMA. This AMA would be crossed twice for a total of 106 miles between approximate MPs 96.0 and 174.0 and MPs 186.0 and 214.0. Three customer laterals, the SWG Sun Valley South Lateral, the APS Redhawk Lateral and the SWG Rainbow Valley Lateral, would also cross the Phoenix AMA. The Phoenix AMA covers 5,646 square miles and consists of seven groundwater sub-basins. All of the AMA is part of the Middle Gila surface water watershed. Elevations range from less than 800 feet above msl at Gillespie Dam to over 6,000 feet above msl in the Superstition Mountains in the eastern portion of the Phoenix AMA. The sub-basins in the Phoenix AMA include: Lake Pleasant sub-basin, East and West Salt River Valley sub-basins, Carefree sub-basin, Fountain Hills sub-basin, Hassayampa sub-basin, and Rainbow Valley sub-basin. The Phoenix Lateral would traverse the Lake Pleasant, West Salt River Valley, Hassayampa, and Rainbow Valley sub-basins. The groundwater in these sub-basins is found primarily in basin-fill sediments. Three distinct water-bearing units make up most of the sub-basins. These units are an upper alluvial unit, a middle fine-grained unit, and a lower conglomerate unit. Most groundwater is pumped from the middle fine-grained unit, although conditions vary. Bedrock, consisting of various metamorphic and igneous rocks, underlies the basin-fill sediments (Maricopa County, 2001).

Most samples collected in the Phoenix AMA indicate the water can be characterized as very hard (i.e., TDS concentrations greater than 2,000 mg/L) and slightly saline, especially in the southern part of

the AMA. Some wells have been found to exceed the arsenic drinking water standard of 10 µg/l. High concentrations of nitrate (greater than 10 mg/L) have also been observed throughout the AMA. One pesticide, dibromochloropropane, was detected at levels higher than its Aquifer Water Quality Standard in 1994 in the Avondale area. Other pesticides have been detected in some wells but no pesticide standards were exceeded, usually because no standard has been established for the pesticide detected (ADEQ, 2005).

Gila Bend Groundwater Basin – The Phoenix Lateral would cross the northernmost part of the Gila Bend groundwater basin for 12.0 miles between approximate MPs 174.0 and 186.0. One customer lateral, the Entegra Gila River Lateral, would also cross the Gila Bend basin. The basin is located in southwestern Arizona and encompasses 1,280 square miles. It is part of the Middle Gila surface water watershed. The basin contains a wide, gently sloping alluvial plain surrounded by low, fault-block mountains. Elevations in the basin's alluvial plain range from about 700 feet to 1,400 feet above msl. The main water-bearing unit in the Gila Bend basin is the alluvial valley-fill material, which is divided into a younger and an older alluvial unit. In the mountains, thin alluvial deposits provide water to low-yield stock and domestic wells. In the alluvium, the depth to water is usually shallowest near the Gila River and deepest near the mountain fronts. In 1979, depth to water varied from about 15 feet bgs in the Gila River's floodplain near Gillespie Dam to more than 600 feet bgs in the southern part of the basin in Township 6 South, Range 3 West (Sebenik, 1981, as referenced in ADWR, 2006). Well yields from the alluvial aquifer vary widely. Sand and gravel beds in the alluvium provide the highest well yields, and fine-grained layers have lower well yields. Measured yields from wells in the alluvial aquifer range from several hundred gpm to over 2,000 gpm (Sebenik, 1981, as referenced in ADWR, 2006).

The quality of groundwater in the Gila Bend basin is very poor throughout most of the basin. Fluoride and TDS concentrations in numerous wells sampled in the basin exceed the maximum contaminant levels established by the EPA. Groundwater from all wells sampled in the basin exceeded the recommended secondary maximum contaminant level for TDS of 500 mg/L. TDS concentrations estimated from specific conductance values ranged from 900 mg/L to about 5,000 mg/L in 1979 (Sebenik, 1981). The highest concentrations are in the northeastern part of the basin between Gillespie Dam and Cotton Center. TDS values from this area ranged from 1,200 mg/L to 4,290 mg/L (Sebenik, 1981). The BOR (1976) reported a perched-water zone of poor quality northwest of Gila Bend. This perched zone of high sodium and chloride concentrations probably is influenced by percolation of irrigation water and the presence of evaporite deposits found in the western part of the basin. Fluoride concentrations in the basin range from 0.5 to 6.2 mg/L, with the highest concentrations found in water from deeper wells in the western end of the basin (Sebenik, 1981). The maximum contaminant level for fluoride is 4.0 mg/L.

Pinal AMA – The southernmost 41.1 miles of the Phoenix Lateral would cross the Pinal AMA between approximate MPs 214.0 and 255.1. Three customer laterals, the SRP Desert Basin Lateral, the APS Sundance Lateral, and the EPNG Pinal County Lateral would also cross the Pinal AMA. The Pinal AMA encompasses about 4,000 square miles in central Arizona. It is part of the Santa Cruz/Rio Magdalena/Rio Sonoita surface water watershed. The topography consists of gently sloping alluvial basins separated by north to northwest trending fault-block mountains. Land surface elevations range from 1,000 to 4,000 feet above msl. The Pinal AMA consists of five sub-basins with unique groundwater underflow, storage, and surface water characteristics: the Maricopa-Stanfield, Eloy, Vekol Valley, Santa Rosa Valley, and Aguirre Valley. The boundaries that separate the Maricopa-Stanfield and Eloy sub-basins signify the presence of groundwater divides that define the extent of groundwater underflow. The migration of groundwater underflow between these sub-basins is limited or non-existent.

The Phoenix Lateral and customer laterals in this area would cross the Maricopa-Stanfield and Eloy sub-basins. The Maricopa-Stanfield sub-basin has experienced a decline in groundwater levels due to 40 years of intensive agricultural pumping. However, over the last 25 years, the depth to groundwater in this basin has begun to stabilize. The depth to groundwater in the Maricopa-Stanfield sub-basin

currently ranges from 100 to 600 feet bgs. The water table is rising in this basin in response to reductions in groundwater withdrawals and increases in recharge due to flood events, and the level in the Maricopa Stanfield sub-basin has risen as much as 100 feet in some areas since 1989. The Eloy sub-basin is similar to the Maricopa-Stanfield sub-basin, in that historically this basin had experienced a decline in groundwater levels due to 40 years of intensive agricultural pumping. However, over the last 25 years, the depth to groundwater has begun to stabilize and the level in the Eloy sub-basin has risen 50 to 100 feet since 1989 due to reductions in groundwater withdrawals and increases in recharge due to flood events. The depth to groundwater in the Eloy sub-basin ranges from less than 100 feet bgs in the northern areas to about 300 to 400 feet bgs in the south-central area. A perched water table in the Casa Grande area results in groundwater at depths of 10 to 100 feet bgs (Pinal County, 2001).

Information on groundwater quality for the Pinal AMA is based on water samples collected from the Casa Grande area, in the Eloy sub-basin. The water in the Casa Grande area can be characterized as very hard (i.e., TDS greater than 2,000 mg/L) and slightly saline. Arsenic concentrations exceeding the present arsenic drinking water standard of 10 µg/L have been detected; most samples exceed 50 µg/L of arsenic. Fluoride concentrations are also elevated in this area. High concentrations of nitrate (greater than 10 mg/L) were also found throughout the Casa Grande Area and farther south (ADEQ, 2005).

4.3.1.2 Sole Source Aquifers and Wellhead Protection Areas

The EPA defines a sole or principal source aquifer as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas can have no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend upon the aquifer for drinking water. All designated sole or principal source aquifers are referred to as "sole-source aquifers."

No EPA-designated sole-source aquifers occur within New Mexico (EPA, 2003a). The Phoenix Lateral and customer laterals would be located north of the Upper Santa Cruz and Avra Basin sole-source aquifer in Arizona and would not cross it. Therefore, no sole-source aquifers would be affected by the project. However, Arizona has designated all aquifers in the state to be drinking water aquifers, thus all aquifers, in their entirety are protected by drinking water standards (ADEQ, 1997).

The New Mexico Source Water Assessment and Protection Program incorporates both wellhead protection areas and surface water protection areas and is administered by the Drinking Water Bureau of the New Mexico Environment Department (NMED). Loop A would be within the source water protection areas of several public drinking water systems in the Farmington area that use surface water from the San Juan and Animas Rivers. No wellhead protection areas would be crossed by Loop A. No source water protection areas would be crossed by the portions of Loop B that are within the jurisdiction of the NMED (Padilla, 2006).

Like New Mexico's Source Water Assessment and Protection Program, the Arizona Source Water Assessment Program incorporates both wellhead protection areas and surface water protection areas. Arizona's Source Water Assessment Program is administered by the ADEQ. The Phoenix Lateral would cross a group of six overlapping source water protection areas between MPs 88.0 and 90.0 (ADEQ, 2006).

4.3.1.3 Water Supply Wells and Springs

A review was conducted of the Geographic Information Systems (GIS) data from the NMOSE and the ADWR to determine if any public water supply wells would be located within 150 feet of the construction work area for the project. In addition, private wells were documented during Transwestern's civil field surveys as identified by landowners or visual observation.

Based on these sources, no public water supply wells were identified in New Mexico. In the Prescott AMA, the Prescott Valley North (Lonesome Valley) well field is located in Township 15 North, Range 1 West, Section 27, about 3 miles west of approximate MP 41.0 of the Phoenix Lateral. According to the Town of Prescott Valley, one well structure is located about 1.5 miles north of Highway 89 with a second about 1 mile north of the first. Neither the well field nor the well structures would be affected by the Phoenix Lateral or customer laterals. The town owns another public water supply well, Fairground Well #1, which is located 71 feet west of the construction work area at MP 43.8 of the proposed Phoenix Lateral route. No wellhead protection area has been established for this well.

Forty private wells have been documented within 150 feet of the construction work area, including 1 well for Loop A in New Mexico and 39 wells for the Phoenix Lateral in Arizona. These wells are listed in table 4.3.1-1 by location, distance and direction from the pipeline centerline and construction work area, and groundwater basin. No wells have been documented within 150 feet of the construction work area for Loop B or the customer laterals. No springs have been identified within 150 feet of the construction work area for the project.

Existing water supply wells would be used as a source of water for hydrostatic testing of the pipelines after construction (see section 4.3.3.1).

4.3.1.4 General Impact and Mitigation

Although pipeline construction activities are not likely to affect groundwater resources, any potential impacts would be avoided or minimized by the use of both standard and specialized construction techniques, including those measures contained in Transwestern's UECRM Plan and Restoration Plan. Shallow aquifers could sustain minor, indirect impacts from changes in overland water flow and recharge caused by clearing and grading of the proposed right-of-way. In addition, near-surface soil compaction caused by heavy construction vehicles could reduce the soil's ability to absorb water in these isolated areas. These minor, indirect impacts would be temporary and would not significantly affect groundwater resources. Upon completion of construction, Transwestern would mitigate compacted soils, restore the ground surface as closely as practicable to original contours, and revegetate the right-of-way to ensure restoration of preconstruction overland flow and recharge patterns. Furthermore, the area of soil compaction would be small compared to the total recharge area. Additional discussion of soil compaction and mitigation is presented in section 4.2.2.

Direct impacts on groundwater resources are unlikely given the groundwater depths are substantially below the trenching depth of between 6 and 7 feet. In addition, as discussed in greater detail in section 4.7.6, no hazardous waste sites or other potential sources of groundwater contamination were identified within 0.25 mile of the proposed project. Given the depth of groundwater and the absence of nearby contaminant sources, groundwater contamination is unlikely to be encountered during project construction.

Unconfined aquifers and shallow groundwater areas could be vulnerable to contamination caused by inadvertent surface spills of hazardous materials used during construction. Accidental spills and leaks of hazardous materials associated with equipment trailers; the refueling or maintenance of vehicles; and the storage of fuel, oil, and other fluids pose the greatest risk to groundwater resources. If not cleaned up, contaminated soils could continue to leach and add pollutants to groundwater long after a spill has occurred. Impacts associated with spills or leaks of hazardous liquids would be avoided or minimized by restricting the location of refueling and storage facilities and by requiring clean up in the event of a spill or leak.

TABLE 4.3.1-1

Wells Within 150 Feet of the Construction Work Area for the Phoenix Expansion Project

Facility/Milepost	Distance (feet) and Direction from Pipeline Centerline	Distance (feet) from Construction Work Area [a]	Groundwater Basin
Loop A			
0.6	112 West	37	San Juan
Loop B		- None -	
Phoenix Lateral			
31.0	124 West	30	Prescott Active Management Area (AMA)
31.0	118 West	23	Prescott AMA
31.2	78 West	within	Prescott AMA
31.8	37 West	within	Prescott AMA
40.9	47 West	within	Prescott AMA
41.1	75 East	35	Prescott AMA
41.3	136 East	99	Prescott AMA
41.6	82 East	41	Prescott AMA
44.2	137 West	43	Prescott AMA
52.2	102 East	62	Prescott AMA
53.0	10 East	within	Prescott AMA
54.1	16 West	within	Prescott AMA
56.1	80 West	46	Agua Fria
56.1	208 West	46	Agua Fria
56.3	101 East	within	Agua Fria
56.3	117 West	77	Agua Fria
59.5	96 West	within	Agua Fria
59.7	140 West	46	Agua Fria
59.8	189 East	149	Agua Fria
59.9	195 East	145	Agua Fria
60.0	146 West	51	Agua Fria
77.5	168 East	143	Agua Fria
88.5	20 East	within	Agua Fria
88.9	211 West	136	Agua Fria
88.9	174 West	99	Agua Fria
151.1	60 Left	45	Phoenix AMA
200.1	12 South	within	Phoenix AMA
201.6	16 South	within	Phoenix AMA
215.4	123 South	within	Pinal AMA
217.4	91 South	41	Pinal AMA
218.0	24 South	within	Pinal AMA
219.7	97 South	15	Pinal AMA
222.5	165 South	140	Pinal AMA
235.6	68 South	within	Pinal AMA
245.4	6 North	within	Pinal AMA
249.3	12 North	within	Pinal AMA
251.2	186 South	111	Pinal AMA
253.0	255 South	130	Pinal AMA
254.7	26 North	1	Pinal AMA
Customer Laterals		- None -	

[a] Wells within the construction work area would be marked and fenced.

Implementation of the measures in Transwestern's SPR Procedures would minimize the potential for groundwater impacts associated with an inadvertent spill of hazardous materials or petroleum (see Appendix H). The SPR Procedures identifies preventive measures to reduce the likelihood of a spill such as secondary containment for petroleum products, daily equipment inspection for leaks, and restrictions on the transport of potentially hazardous materials to the construction work area. The SPR Procedures also specifies measures to contain and clean up a spill should one occur. Documented and undocumented wells encountered during construction that are adjacent to, or within the construction right-or-way, would be fenced with yellow/orange safety fence and marked by iron stakes to prevent physical damage to the wells.

No hazardous materials would be stored and no refueling would occur within 200 feet of any private water well or 400 feet of any public water supply well. The Agency Staffs have reviewed Transwestern's SPR Procedures and find that they adequately address the storage and transfer of hazardous materials and petroleum products, and the response to be taken in the event of a spill. Therefore, the potential for the project to contaminate local aquifers or water supply wells would be minimal.

Where blasting is necessary, it would be done in accordance with Transwestern's Blasting Procedure (see section 4.1.3.5 and Appendix N). If blasting is required near water supply wells, blasting loads would be reduced as much as possible. In addition, Transwestern would offer to conduct pre- and post-construction testing of all existing private water supply wells within 150 feet of the construction work area. Testing parameters would include fecal coliform, pH, conductivity, hardness, nitrate, and sulfate, as agreed to between Transwestern and the well owner. Results of the testing would be made available to the landowner. If blasting or construction activities temporarily impair the quality or yield of a water supply well, Transwestern would either provide a temporary source of water (e.g., bottled) to residents or compensate the landowner. If the water is used for farming or livestock operations, temporary water would be trucked from a municipal water source until the water supply well is repaired or replaced. In the unlikely event that water quality or yield is permanently impaired as a result of blasting or other construction activities based on post-construction testing, Transwestern would arrange for the water supply well to be repaired or replaced.

The pipe storage and contractor yards and access roads proposed as part of the project are located in the same general project vicinity. The measures Transwestern would implement to minimize impacts on groundwater as a result of the project (e.g., adherence to the UECRM Plan, Restoration Plan, and SPR Procedures) would apply to these facilities as well. Therefore, use of the pipe storage and contractor yards and access roads is not expected to impact groundwater resources.

4.3.2 Surface Water Resources

4.3.2.1 Existing Surface Water Resources

Pipeline Facilities

The Phoenix Expansion Project would cross two river basins and two watersheds in New Mexico and three watersheds in Arizona. Within these basins/watersheds, the pipeline route crosses a total of 8 perennial waterbodies and approximately 805 intermittent and ephemeral waterbodies. Perennial waterbodies flow at all seasons of the year, intermittent waterbodies flow only at certain times of the year, and ephemeral waterbodies flow only in direct response to precipitation. These waterbodies were identified using Transwestern's aerial photo-based alignment sheets, USGS topographic maps, and field surveys conducted in 2003 and 2006. Table L-1 in Appendix L lists the waterbodies that would be

crossed by name, location, crossing width, depth at the crossing location, and flow type. In addition, several canals that provide water for general use and irrigation would be crossed.

The Clean Water Act (CWA), section 305(b), requires states to review, establish, and revise water quality standards for all surface waters within the state. To comply with this requirement, each state has developed a classification system to describe the highest designated use(s) and associated water quality requirements of identified surface waters within the state. In addition, section 303(d) of the CWA requires states to develop a list of waterbodies where applicable surface water quality uses and standards are not attained and to list, by surface water segment, the pollutants or surface water characteristics that are not meeting surface water quality standards. The resulting section 303(d) List of Impaired Waters is used to establish priorities for water quality improvement measures, including development of total maximum daily load (TMDL). A TMDL is a planning document that establishes specific water quality goals and reduction estimates for pollutants currently exceeding surface water quality standards. Waterbodies remain on the section 303(d) List of Impaired Waters until the required TMDL are completed or new data show that the water quality uses and/or standards are being met.

The watersheds and the water quality of surface waters within these watersheds are described below. Source water protection areas crossed by the proposed project are discussed in section 4.3.1.2.

San Juan Lateral Loops – Loop A would cross the San Juan River Basin and the San Juan River watershed. Loop B would cross the San Juan and Lower Colorado River Basins and the San Juan River and Puerco River watersheds. Within these basins/watersheds, the loops would cross 97 waterbodies. Six of these waterbodies are perennial and 91 are ephemeral or intermittent. All of the perennial waterbodies would be crossed by Loop A. These include the San Juan River at MP 1.5 and tributaries to the San Juan River at MPs 1.0, 1.2 (two crossings), 1.3, and 1.7. In addition, two intermittent waterbodies that are tributaries to the San Juan River would be crossed by Loop A. These crossings would be at MP 5.2 (Kutz Canyon) and at MP 7.9. Loop A would cross two canals, the Hammonds Canal at MP 2.2 and the Navajo Main Canal No. 1 at MP 8.6. All of the waterbodies that would be crossed by Loop B are ephemeral.

The New Mexico surface water use classification system is based on many characteristics of the surface waters (NMED, 2006). Designated uses for ephemeral waterbodies that are not included in a classified water of the state are livestock watering, wildlife habitat, limited aquatic life, and secondary contact. Designated uses for intermittent waterbodies that are not included in a classified water of the state are livestock watering, wildlife habitat, aquatic life, and secondary contact. The designated uses for the San Juan River at the crossing location include municipal and industrial water supply, irrigation, livestock watering, wildlife habitat, secondary contact, marginal coldwater aquatic life, and warmwater aquatic life (NMED, 2006).

The New Mexico section 303(d) list of impaired surface waters for 2004 lists the San Juan River as impaired from the confluence of the Animas River to Canyon Largo (New Mexico Water Quality Control Commission (NMWQCC), 2006). This reach meets section 305(b) designated uses for industrial and municipal water supply, irrigation, livestock watering, warmwater fishery, and wildlife habitat; however, the river does not support marginal coldwater fishery or secondary contact designated uses. The probable causes of impairment are fecal coliform, mercury in fish tissue, and sedimentation/siltation (NMWQCC, 2006). The probable sources of the impairment are crop production, drought-related impacts, flow alterations from water diversions, loss of riparian habitat, municipal point source discharges, on-site treatment systems (septic systems and similar decentralized systems), petroleum/natural gas activities, and rangeland grazing (NMWQCC, 2006).

No potable water supply protection areas have been identified along Loops A and B and no public water supply intakes are within 3 miles downstream of the San Juan River crossing.

Phoenix Lateral and Customer Laterals – The Phoenix Lateral would cross three watersheds (Verde, Middle Gila, and Santa Cruz-Rio Magdelana-Rio Sonoyta) in Arizona. The Verde watershed would be crossed from MPs 0.0 to 43.3, the Middle Gila watershed would be crossed from MPs 43.3 to 212.8, and the Santa Cruz-Rio Magdelana-Rio Sonoyta watershed would be crossed from MPs 212.8 to 255.1. Within these basins/watersheds, approximately 716 waterbodies would be crossed by the Phoenix Lateral. No waterbodies would be crossed by the customer laterals. Two of the waterbodies are perennial: the Verde River (MP 23.8) and the Enterprise Canal (MP 174.6). The Verde River is listed on the Nationwide Rivers Inventory (NRI) as potentially eligible for designation as a National Wild and Scenic River (see section 4.3.2.3). Of the remaining 714 waterbodies, 704 are ephemeral and 10 are unknown but assumed to be ephemeral.

Irrigation canals that would be crossed by the Phoenix Lateral include the CAP/Waddell Canal (MP 109.9), the Beardsley Canal (MPs 116.4 and 123.5), the Gila Bend Canal (MP 175.9), and a large number of irrigation canals between MPs 214.0 and 255.1.

Arizona has included designated uses in 18 Arizona Administrative Code 11, Article 1, for each surface water or segment. Designated uses include aquatic and wildlife warmwater, aquatic and wildlife ephemeral, aquatic and wildlife effluent dependent water, full-body contact, partial-body contact, domestic water source, fish consumption, agricultural irrigation, and agricultural livestock watering.

The Gila River (Gillespie Dam to Rainbow Wash) is the only surface water that would be crossed by the Phoenix Lateral that is listed on Arizona's section 303(d) List of Impaired waters for not meeting at least one designated use (ADEQ, 2006). This segment of the Gila River is on the section 303(d) List for DDT metabolites, toxaphene, and chlordane in fish tissue.

In addition to the 303(d) List, Arizona maintains a Planning List. Surface waters with any designated uses assessed as "inconclusive" or "not attaining" are placed on the Planning List for further monitoring. The Verde River is on Arizona's Planning List.

No potable water supply protection areas have been identified along the Phoenix Lateral or customer laterals and no public water supply intakes are within 3 miles downstream of any of the waterbody crossings.

Aboveground Facilities and Pipe Storage and Contractor Yards

No waterbodies are present at any of the aboveground facility sites or proposed pipe storage and contractor yards.

Access Roads

Sixty-three waterbodies would be crossed by access roads associated with the project. All of these waterbodies are ephemeral waterbodies. Four of these waterbodies would be crossed in New Mexico (three by roads associated with Loop A and one by a road associated with Loop B). The remaining 59 waterbodies would be crossed by access roads associated with the Phoenix Lateral in Arizona. No waterbodies would be crossed by access roads associated with the customer laterals. Table L-2 in Appendix L lists the waterbodies that would be crossed by access roads by name, location, crossing width, and depth at the crossing location.

4.3.2.2 General Impact and Mitigation

Pipeline construction could affect surface waters in several ways. Clearing and grading of streambanks, in-stream trenching, trench dewatering, and backfilling could affect waterbodies through modification of existing aquatic habitat, an increased rate of in-stream sediment loading, increased turbidity levels, reduced dissolved oxygen concentrations, stream warming, and the introduction of chemical discharges from fuels/lubricants. The crossing of irrigation canals could disrupt the normal stage/discharge of the irrigation channel, which could damage crops and/or reduce yields. However, such impacts are unlikely given the short duration of canal crossings and small area of impact at each crossing.

The removal of floodplain vegetation could reduce the ability of the floodplain to moderate flood events and filter pollutants and suspended sediment, resulting in increased loading to the downstream areas of the watershed. Flash flooding could result in the transport of large loads of sediments.

The greatest potential impacts of pipeline construction on surface waters would result from an increase in the sediment loading to the surface waters and an increase in internal sediment loading due to channel/floodplain instability as a result of a change in erosion/deposition patterns. The level of impact of the proposed project on surface waters would depend on precipitation events, sediment loads, stream area/velocity, channel integrity, and bed material.

The highest levels of sediment would be generated by use of the wet open-cut method. The amount of sediment would depend on the characteristics at the crossing location including depth and width of the stream, which affects mixing of the sediment plume in the water column; current velocity and local turbulence at and downstream of the crossing location; concentrations of suspended sediment initially at the crossing location and at some distance downstream; particle diameter; specific weight; and settling velocity of the excavated and backfilled materials (Ritter, 1984; Reid et al., 2004). The highest peak of turbidity usually occurs during trench excavation and backfilling. These peaks decline rapidly when the streambed disturbance ceases (Reid and Anderson, undated).

Clearing and grading of the waterbody banks would disturb the riparian vegetation and soils, exposing the site(s) to erosion/deposition. Heavy equipment used during construction could compact upland and riparian soils, which could greatly reduce infiltration and cause greater runoff to waterbodies.

Refueling of vehicles and storage of fuel, oil, or other hazardous materials near surface waters and spills from equipment working in waterbodies could also create a potential for contamination in waterbodies. Water quality and aquatic habitat of the downstream waterbodies could be degraded if a spill were to occur.

Several federal and state agencies regulate construction activities within waterbodies, including the COE, the EPA, the Navajo Nation, the NMED, and the ADEQ. Transwestern would construct all waterbody crossings in accordance with the requirements of these permitting agencies. The general procedures that Transwestern would implement to avoid or minimize potential impacts on surface waters are discussed below. In New Mexico and Arizona, section 401 Water Quality Certification will be required from the NMED and the ADEQ, respectively. On Navajo Nation lands, section 401 Water Quality Certification will be required from the EPA, Region IX. In addition, Transwestern's section 404 permit application to the COE will be submitted to the Navajo Nation Environmental Protection Agency for review and comment.

Waterbody Construction and Mitigation Procedures

The majority of the waterbodies that would be crossed by the project are intermittent or ephemeral waterbodies that are expected to be dry at the time of construction. These waterbodies do not typically support fisheries or provide critical aquatic habitat or migratory passage for aquatic organisms. Transwestern proposes to cross intermittent and ephemeral waterbodies that are dry at the time of construction using the dry open-cut method. The dry open-cut method involves standard upland cross-country construction techniques as described in section 2.3.1. At certain steep-banked intermittent and ephemeral waterbodies that are dry at the time of the crossing, soil from grading of the banks may be used to stabilize culverts used for an equipment bridge. These waterbodies are listed in the WWCM Procedures (see Appendix G). Impacts on dry intermittent and ephemeral waterbodies would be primarily limited to the temporary alteration of beds and banks and possibly increased sediment load during initial storm events following construction.

Intermittent and ephemeral waterbodies that are flowing at the time of construction would be crossed using the wet open-cut method. This method is described in section 2.3.2 and depicted on figure 2.3.2-1. For some of the remaining waterbody crossings, Transwestern has stated that the crossing would be constructed using the methods described in its WWCM Procedures but has not provided the specific crossing method. The irrigation canals would be crossed using a conventional bore, unless otherwise approved by the landowner or operator, reducing the likelihood of channel disturbance. The bore method is described in section 2.3.2. Major and sensitive waterbodies and the crossing method that would be used are discussed in section 4.3.2.3.

During construction across waterbodies, Transwestern would implement the mitigation measures described in its UECRM Plan and WWCM Procedures (see section 2.3 and Appendices F and G, respectively), its Restoration Plan,[2] and its SPR Procedures (see Appendix H). Transwestern would follow BMPs for in-stream work as well as BMPs for upland work adjacent to waterbodies. All construction within floodplains would be temporary, lasting only a few months during clearing, grading, trenching, pipe stringing, welding, lowering in, backfilling, and restoration operations. All trench spoil would be returned to the trench, and all disturbed areas would be restored to preconstruction contours. Because the project would not add permanent fill in floodplains, potential flood flows would not be displaced and long-term impacts are not anticipated.

Some of the relevant mitigation measures pertaining to waterbody crossings that are specified in Transwestern's proposed plans include:

- limiting the size of extra workspaces to the minimum needed to construct the waterbody crossing;
- locating extra workspaces at least 50 feet back from waterbody boundaries unless a reduced setback is requested on a site-specific basis and a variance is issued by the FERC;
- limiting clearing of vegetation between extra work areas and the edge of the waterbody to preserve riparian vegetation;

[2] This plan is too voluminous to include in this EIS but can be viewed on the FERC Internet website at http://www.ferc.gov. Using the "eLibrary" link, select "General Search" from the eLibrary menu and enter the docket number excluding the last three digits in the "Docket Number" field (i.e., CP06-459). Be sure to select an appropriate date range. It is also available for public inspection at the FERC's Public Reference Room in Washington, DC (call (202) 502-8317 for instructions).

- requiring temporary erosion and sediment control measures to be installed across the entire width of the construction right-of-way after clearing and before ground disturbance to prevent the flow of spoil or heavily silt-laden water into any waterbody;

- maintaining adequate flow rates throughout construction to protect aquatic life and prevent the interruption of existing downstream uses;

- restricting spoil placement near surface waters to the construction right-of-way at least 10 feet from the water's edge or in additional extra workspaces placed at least 50 feet from the water's edge;

- limiting the use of equipment operating in the waterbody to that needed to construct the crossing;

- requiring construction to be completed across minor waterbodies (i.e., less than or equal to 10 feet wide) within 24 hours and across intermediate waterbodies (i.e., greater than 10 feet wide but less than or equal to 100 feet wide) within 48 hours (not including blasting and other rock breaking measures) to mitigate the duration and degree of sedimentation and turbidity;

- developing site-specific construction procedures for each major waterbody (i.e., greater than 100 feet wide at the crossing location);

- requiring construction to be completed during the low-flow and non-spawning time windows specified in the WWCM Procedures or required by applicable permits to minimize impacts on sensitive aquatic resources;

- requiring maintenance of temporary erosion and sediment control measures throughout construction until streambanks and adjacent upland areas are stabilized;

- inspecting equipment daily for leaks;

- prohibiting use of leaking equipment and storage of fuel, lubricants, and hazardous materials within 100 feet of waterbodies;

- requiring bank stabilization and re-establishment of bed and bank contours after construction; and

- installing a permanent slope breaker across the construction right-of-way at the base of slopes greater than 5 percent that are less than 50 feet from the waterbody, or as needed to prevent sediment transport into the waterbody.

Where applicable, these measures (e.g., fuel and hazardous materials storage buffers, equipment inspection procedures) would apply to intermittent and ephemeral waterbody crossings.

To minimize the potential for construction across intermittent and ephemeral waterbodies to occur during runoff events, Transwestern's construction contractor and EIs would monitor upcoming weather forecasts to determine if significant rainfall is anticipated at times when construction across these waterbodies is planned. To the extent practicable, Transwestern would avoid installing the pipeline across intermittent and ephemeral waterbodies during periods of anticipated rainfall. In the event that rainfall is not expected to be significant (e.g., less than 0.5 inch) and Transwestern determines that

construction should proceed, environmental crews would be notified of the location of planned crossings and would be available to respond quickly if additional erosion control devices are needed.

If perceptible flow conditions develop during construction of the crossing, Transwestern's EIs and environmental crews would be notified immediately to determine the extent of the flow and to install additional erosion control devices as necessary. If flows are significant, and siltation is likely to occur downstream, work may be stopped until flows have ceased or have decreased to the point where potential erosion can be contained within the construction work area.

Impacts on waterbodies from access roads associated with the project would depend on the condition of the access road at the time of construction, the width and depth of the crossing (see table L-2 in Appendix L), the timing of construction (e.g., anticipated potential for rainfall events), and the anticipated use of the road (e.g., use for heavy construction equipment or for access to the right-of-way by pickup trucks). Transwestern's EIs would review each access road crossing at the time of construction and, in consultation with the construction contractor, would determine the appropriate measures to minimize the impact of the crossing. Mats or equipment bridges may be used to span some waterbodies that would be crossed by project access roads. Because all of the waterbodies that would be crossed by project access roads are ephemeral waterbodies, few modifications would be required. In accordance with the UECRM Plan, each waterbody crossed by project access roads would be inspected within 24 hours to determine if the road should be temporarily closed until the water recedes or additional crossing measures (e.g., mats, erosion control devices) are needed.

The project is not expected to affect any waterbodies known to have contaminated sediments. It would be possible, however, that unanticipated pre-existing contaminated sediments could be encountered during construction. Transwestern would minimize potential impacts from downstream sedimentation that could occur by implementing measures as described in its WWCM Procedures and the SPR Procedures. Transwestern would minimize erosion by stabilizing and installing temporary sediment barriers within 24 hours of completing in-stream construction activities and returning all waterbody banks to preconstruction contours or to a stable angle of repose as approved by the EI.

4.3.2.3 Major and Sensitive Waterbodies

Waterbodies may be considered sensitive to pipeline construction for a number of reasons, including, but not limited to: the width of the crossing; waters that do not meet the water quality standards associated with the water's designated beneficial uses; surface waters that have been designated for intensified water quality management and improvement; waterbodies that contain threatened or endangered species or critical habitat; waterbodies that are crossed less than 3 miles upstream of potable water intake structures; outstanding or exceptional quality waterbodies; waters of particular ecological and recreational importance; waterbodies located in sensitive and protected watershed areas; waterbodies and intermittent drainages that have steep banks, potentially unstable soils, high volume flows, and actively eroding banks; surface waters that have important riparian areas; and rivers on or designated to be added to the NRI or a state river inventory.

Major waterbodies in New Mexico that would be crossed by Loop A include the perennial San Juan River (200 feet wide at the crossing location; MP 1.5), a perennial tributary to the San Juan River (186 feet wide at the crossing location; MP 1.7), and an intermittent tributary to the San Juan River (Kutz Canyon) that is 200 feet wide at the crossing location (MP 5.2). In addition to being a major waterbody, the San Juan River is considered sensitive because it supports three federally and/or state-listed endangered species, the Colorado pikeminnow, the razorback sucker, and the roundtail chub (see sections 4.6.3.5, 4.6.3.6, and 4.6.4.4, respectively). Loop B would cross one major waterbody in New Mexico, an ephemeral tributary to the Puerco River that is 150 feet wide at MP 87.1.

Major waterbodies in Arizona that would be crossed by the Phoenix Lateral include the ephemeral Hell Canyon Tank (101 feet wide at the crossing location; MP 9.5) and an ephemeral tributary to Centennial Wash (130 feet wide at the crossing location; MP 166.7).

Transwestern proposes to cross the San Juan River using the HDD method. This method is described in section 2.3.2 and depicted on figure 2.3.2-2. As discussed in section 2.3.2, the HDD method is a specialized crossing method that has the potential to avoid impacts on waterbodies but requires suitable geology, topography, and space to accommodate the bending radius of the pipe. This technique involves drilling a pilot hole under the waterbody and banks, then enlarging that hole through successive reamings until the hole is large enough to accommodate the pipe. A benefit of the HDD method is it avoids disturbance to the bed and banks of the river, including impacts on riparian vegetation adjacent to the river. Throughout the process of drilling and enlarging the hole, a slurry made of naturally occurring non-toxic materials, such as bentonite clay and water, would be circulated through the drilling tools to lubricate the drill bit, remove drill cuttings, and hold the hole open. This slurry is referred to as drilling mud. Pipe sections long enough to span the entire crossing would be staged and welded along the construction work area on the opposite side of the river and then pulled through the drilled hole.

Transwestern estimates that an HDD of the San Juan River would take 4 to 5 weeks. The length of the drill would be approximately 1,800 feet and the drill would be 50 feet below the riverbed at its deepest point. Unlike a conventional open-cut crossing, the HDD method would not alter or remove streambed or streambank habitat, cause in-stream sedimentation, or interfere with fish movement. The primary impact that could occur as a result of an HDD is an inadvertent release of drilling mud (frac-out) directly or indirectly into the river. Drilling mud may leak through previously unidentified fractures in the material underlying the river bed, in the area of the mud pits or tanks, or along the path of the drill due to unfavorable ground conditions. Although drilling mud consists of naturally occurring nontoxic materials, such as bentonite clay and water, in larger quantities the release of drilling mud into a waterbody could affect fisheries or other aquatic organisms by settling in and temporarily inundating the habitats used by these species. The probability of an inadvertent release is greatest when the drill bit is working near the surface (i.e., near the entry and exit points). Because the staging areas for the HDD would be set back from the banks of the river, the potential for an inadvertent release to occur in the water would be minimized.

There are certain subsurface material characteristics that may prevent successful HDD installations. These include large grain content (i.e., gravel, cobbles, and boulders) and excessive rock strength and hardness. Where soils consist principally of coarse-grained material, they cannot be readily fluidized by the drilling mud, nor are they stable enough to be cut and removed in a drilling mud stream as is the case with a crossing in competent rock. Where a boulder or cobble occurs in the drill path, it can present an obstruction to the bit, reamer, or pipeline or coarse material may migrate to low spots along the drill path forming impenetrable blocks. Exceptionally strong and hard rock can also hamper all phases of an HDD. Excessive rock hardness can lead to slow penetration rates due to frequent stoppages to replace worn bits and reamers, tool failures downhole resulting from premature wear, and drill pipe failures due to excessive torque. In the early 1990s, Transwestern experienced a failed HDD crossing upstream of the proposed crossing location during installation of the existing San Juan Lateral. The pipeline was eventually installed using the wet open-cut method.

In September of 2006, Transwestern conducted a geotechnical investigation at the San Juan River crossing location to determine whether the HDD method would be feasible. Eight borings were drilled and the samples retrieved were analyzed. The results indicate that the soils at the crossing location are cohesionless soils comprising poorly graded gravel and cobbles. These conditions are not conducive to a successful HDD installation. However, in response to comments received from the COE, Transwestern proposes to attempt an HDD crossing of the San Juan River.

Transwestern has prepared an HDD Plan (see Appendix I) that describes how the HDD operation would be conducted and monitored to minimize the potential for inadvertent drilling mud releases as well as corrective actions and procedures for clean up of drilling mud releases and for sealing the hole if the HDD cannot be completed. In accordance with the HDD Plan, if a frac-out occurs in the water, the HDD operation would be stopped immediately. Transwestern would contact the FERC, the FWS, the COE, the NMDGF, the New Mexico Oil Conservation Division, and the Surface Water Bureau of the NMED to describe the location and nature of the release and the corrective actions being taken. The criteria for determining whether the HDD could be successfully completed or whether it would be abandoned are also outlined in Transwestern's HDD Plan. In addition, the HDD Plan describes the documentation that Transwestern would maintain to describe the events leading up to the HDD failure should a failure occur and specifies that the same agencies that would be notified of an in-water frac-out would be provided with that documentation.

If the HDD is not successful, Transwestern proposes to cross the river using a modified wet open-cut method. The wet open-cut crossing plan would involve installing an aqua dam on the south half of the river (Stage I) in a horseshoe pattern to allow adequate space to enclose the excavated material and create a dry workspace. Fish trapped within the enclosure would be transferred back to the river and the enclosure within the aqua dam would be dewatered. After dewatering, probing or test holes would be used to determine if blasting is required, and drilling and blasting would be completed if blasting is necessary. The trench would be excavated and all trench spoil would be stored within the aqua dam enclosure. A steel casing pipe would be installed in the trench at the design grade, and the trench and enclosed area would be backfilled. The aqua dam would be removed and reinstalled on the north half of the river (Stage II) in a similar manner to Stage I, and construction activities would proceed in the same order. Before backfill of the trench to the north shoreline is completed, the pipeline would be pulled through the casing pipe. Excavation of the pipeline trench landward from the shorelines would proceed simultaneously with excavation of the river. All trench dewatering for the land segment of the pipeline near the river would be through silt fence, silt curtains, and/or hay or straw bales to minimize sedimentation into the river. Following the pull installation of the pipeline through the casing, the crossing pipe would be welded to the land segment pipeline, the banks and shoreline restored to as close to original contours as possible, and post-construction erosion control devices would be installed. A wet open-cut crossing of the San Juan River would take about 7 days to complete.

The primary impact of a wet open-cut crossing would be a temporary increase in in-stream turbidity during construction, mainly due to the excavation and backfill activities. The turbidity level would decline rapidly when the streambed disturbance ceases. An open-cut crossing would also disturb the riparian vegetation adjacent to the river.

In accordance with its WWCM Procedures, Transwestern has submitted site-specific HDD and wet open-cut crossing plans for the San Juan River to the FERC staff. The site-specific HDD crossing plan depicts a 70-foot-wide construction right-of-way between the HDD entry and exit locations that would be used for installation of the HDD contractor's guidance controls that are necessary to control the location of the drill head throughout the HDD process. These guidance controls would consist of two cables that are installed aboveground on both sides of the drill path. Transwestern has stated that the ideal width between the two cables would be the design depth of the HDD to ensure accurate triangulation calculations used in steering the drill head. The depth of the HDD of the San Juan River would be approximately 70 feet at the high bank of the river; therefore, the optimal spacing for the two cables for the guidance system would be a minimum width of 70 feet. Transwestern has stated that some hand clearing would be necessary to install the tracking system; however, it would not clear the entire 70-foot-wide construction right-of-way shown on the site-specific plan and would minimize the impacts of clearing when installing the surface tracking coils along the HDD path. However, within the notes section of the site-specific crossing plan it states that the contractor shall <u>attempt to</u> minimize clearing

along the HDD path when installing the surface tracking coil cable and this note is 1 of 20 notes to the contractor. Based on our experience, this note has the potential to be overlooked before clearing activities begin. To ensure that impacts on vegetation on the banks of the San Juan River would be minimized, the **FERC staff recommends that:**

- **Transwestern shall revise its site-specific HDD crossing plan for the San Juan River to include a prominent note that only minimal hand clearing to install the aboveground HDD guidance system shall be conducted between the HDD entry and exit locations. Transwestern shall file the revised HDD Plan with the Secretary for the review and written approval of the Director of OEP <u>before construction of the San Juan Lateral Loop A</u>.**

We have reviewed the site-specific wet open-cut crossing plan for the San Juan River and determined that the extra workspace depicted on the crossing plan is acceptable and needed to support the crossing activities. Due to the presence of the federally listed endangered Colorado pikeminnow and razorback sucker in the river and the uncertainty over whether the river can be successfully crossed using the HDD method, the FERC staff initiated formal consultation with the FWS regarding the impact of the project on these species (see sections 4.6.3.5 and 4.6.3.6). As discussed above, the San Juan River also supports the state-listed endangered roundtail chub (see section 4.6.4.4). In its comments on the draft EIS, the NMDGF requested that it be notified 7 days in advance of the start of in-stream construction activities at the San Juan River.

Because of the potential for adverse impacts on listed species should the HDD fail and a wet open-cut crossing be necessary, t**he FERC staff recommends that:**

- **Transwestern shall not begin a wet open-cut crossing of the San Juan River <u>until</u> it: files documentation of the events leading up to the HDD failure with the Secretary; files documentation that it has provided at least 7 days advance notification of the start of in-stream activities at the San Juan River to the NMDGF; and receives written notification from the Director of OEP that a wet open-cut crossing may begin.**

In accordance with its WWCM Procedures, Transwestern would file site-specific crossing plans for all other major waterbodies with the FERC for the review and written approval of the Director of OEP before construction. These plans would be developed in consultation with the appropriate federal and state agencies and would depict extra work areas, spoil storage areas, and sediment control structures.

The Phoenix Lateral would cross the Verde River at MP 23.8 within the Prescott National Forest. This portion of the Verde River is considered sensitive because it was listed on the NRI in 1993. The NRI is a register of river segments that potentially qualify as national wild, scenic, or recreational river areas. The NRI is maintained by the National Park Service in partial fulfillment of section 5(d) of the National Wild and Scenic Rivers Act (16 USC 1271-1287). This section requires that "In all planning for the use and development of water and related land resources, consideration shall be given by all federal agencies involved to potential national wild, scenic, and recreational river areas." The Outstandingly Remarkable Values for the proposed crossing area include scenery, fish, wildlife, and cultural. The Verde River is also considered sensitive because of the special status fish species and critical habitat it is known to support (see section 4.6). One of these species, the spikedace, is federally listed as threatened. The portion of the Verde River that would be crossed by the project was designated as critical habitat for the spikedace on March 21, 2007. As discussed in section 4.6.3.7, the FERC staff initiated formal consultation with the FWS to address the potential effects of the project on the spikedace.

Transwestern has filed a site-specific crossing plan for the Verde River that indicates it would install the crossing using a variation of the flume method. The flume method is described in section 2.3.2 and depicted on figure 2.3.2-3. As described in section 2.3.2, the flume method is a dry-crossing technique that uses dams and one or more flume pipes to isolate streamflow from the construction work area, thereby avoiding in-stream activities. Sediment control structures would be installed and maintained throughout construction, including downgradient of the work area and between the spoil storage area and the water's edge. Hard or soft trench plugs would be maintained in the trench until just prior to installation of the pipe crossing section. The pipe would be installed with a minimum depth of cover of 4 feet. Because the steep angle of the north bank of the river would make it infeasible to successfully thread the pipe under the flume(s) without excessive additional excavation, Transwestern proposes to use a dam and pump technique to convey streamflow around the work area during the actual pipe installation. The dam and pump technique is similar to the flume method except that the streamflow would be pumped around the work area instead of being conveyed through the flume(s). This would allow the flume pipe(s) to be lifted out of the way while the pipeline is installed and still maintain downstream flow and a relatively dry work site. Sufficient pumps, including on-site backup pumps, would be used to maintain downstream flow, the pump intakes would be screened to prevent entrainment or impingement of fish, the pumps would be monitored, and streambed scour would be prevented at the pump discharge location. The entire pipe installation would take 2 hours or less after which the flume(s) would be reinstalled. This dry crossing method would significantly reduce the amount of sediment released into the water column during construction, and thus reduce the overall impact on the waterbody. Use of this method would reduce exposure of the river to erosion and sedimentation, and would provide the best conditions for excavating the trench, installing and backfilling the pipe, and restoring the riverbed contour and banks.

The Verde River is considered an intermediate waterbody because it is approximately 20 feet wide at the crossing location. In accordance with the WWCM Procedures, in-stream construction activities (not including blasting and other rock breaking measures) would be completed within 48 hours, unless site-specific conditions make completion within 48 hours infeasible. To protect fishery resources in the river, Transwestern would attempt to complete construction across the river before the end of January as requested by the Prescott National Forest depending on the receipt of the necessary permits. Transwestern's proposed restoration measures at the Verde River are summarized in section 4.4.3 and presented in detail in its Restoration Plan.

Waterbodies that are susceptible to bank erosion or scour that could expose pipe or result in unsupported sections of pipe are also considered sensitive. For the majority of the route, Transwestern does not anticipate the need for additional depth of cover greater than the standard 3 feet. In major washes and named waterbodies, however, Transwestern would typically bury the pipeline at a minimum depth of 4 feet. In addition to burying the pipeline deeper at scour-prone locations, Transwestern would implement BMPs during and after construction to maintain the water quality of any stream or wetland adjacent to the construction work area. Transwestern would also install external weighting to the pipeline to prevent upheaval during flood events for crossings of major washes and named waterbodies that have earthen beds. Two waterbodies, the Gila River (MP 174.9) and Vekol Wash (MP 217.7) have been identified as being susceptible to major scour events. As discussed in section 4.1.3.3, a local geotechnical engineering firm would perform a detailed evaluation of the subsurface strata and hydraulic study of the historical flow and depth of scour at these locations to determine a safe burial depth at each of these crossings. Transwestern would install the pipeline at the depth that would be required by the ADEQ, which is the permitting agency for the crossings. Transwestern would file the proposed burial depth at the Gila River and Vekol Wash with the Secretary as part of its Implementation Plan that would be submitted before construction (see mitigation measure number 6 in section 5.3).

4.3.3 Groundwater and Surface Water Uses During Construction

4.3.3.1 Hydrostatic Test Water

Pipeline integrity would be verified through hydrostatic testing, which is conducted by filling the pipeline with water, pressurizing it, and then checking for pressure loss resulting from leakage. Transwestern would use both groundwater and surface water resources for hydrostatic testing.

In New Mexico, Transwestern would obtain hydrostatic test water for Loop A from the San Juan River and anticipates using existing local water supply wells to provide hydrostatic test water for Loop B. Approximately 16 miles of Loop B would be on Navajo Nation lands. Transwestern is working with the Navajo Nation Environmental Protection Agency to develop a hydrostatic test water discharge plan that would include details of the required volumes and exact discharge locations for the water. Up to 6.7 million gallons of water would be required for hydrostatic testing of Loops A and B.

In Arizona, Transwestern expects to obtain hydrostatic test water from two or more existing wells in Yavapai County, from surface water withdrawn from the CAP/Waddell Canal or other nearby canals, and from effluent from the Casa Grande Wastewater Treatment Facility. Water from the wells would be withdrawn and discharged in accordance with the requirements of the ADWR. Water from the CAP canals and the treatment plant would not be regulated by the ADWR and can be discharged into any watershed.

Transwestern has stated that it is not aware of any chemicals in the wastewater treatment facility effluent. Between 57 to 66.5 million gallons of water would be required for hydrostatic testing of the Phoenix Lateral and customer laterals.

The estimated hydrostatic water requirements, sources, and discharge locations are listed in table 4.3.3-1. Transwestern has stated that it is likely that water used to test one test section would be pumped to another test section; therefore, the total water requirements would be less than the estimated volumes.

TABLE 4.3.3-1

Proposed Hydrostatic Test Water Source/Discharge Locations

State/Facility/Mileposts (MPs)	Volume	Source	Discharge
New Mexico			
Loop A MPs 0.0 to 8.9	2.5 million gallons/ 7.7 acre-feet	San Juan River	Within the San Juan Basin
Loop B MPs 71.9 to 87.6	4.2 million gallons/ 13 acre-feet	Wells	Within the San Juan Basin
Arizona			
Phoenix Lateral and Customer Laterals			
MPs 0.0 to 27.0	4.9 million gallons/ 15-acre feet	Private wells	Within the Verde River Basin
MPs 27.0 to 95.2	9.8 million gallons/ 30 acre-feet	Private wells in the Prescott Active Management Area (AMA)	Within the Agua Fria River Basin
MPs 95.2 to 165.0	32.6 to 42 million gallons/ 100 to 130 acre-feet	Central Arizona Project/ Waddell Canal (MP 109.9)	Within the Agua Fria or Gila Bend Basin, or the Phoenix AMA
MPs 165.0 to 255.1	9.8 million gallons/ 30 acre-feet	Effluent from the Casa Grande Wastewater Treatment Facility	Within the Phoenix AMA, the Gila Bend Basin, or the Pinal AMA

The withdrawal of large volumes of water from surface water sources could temporarily affect the recreational and biological uses of the resource if the diversions constitute a large percentage of the source's total flow or volume. Hydrostatic test water withdrawals could also result in the temporary loss of habitat, changes in water temperature and dissolved oxygen levels, and entrainment or impingement of fish or other aquatic organisms. The withdrawal of large volumes of water from private or public water supply wells could exceed the delivery capacity of the system or well.

Transwestern would minimize the potential for these effects by adhering to the hydrostatic testing measures included in its WWCM Procedures (see Appendix G). These measures include screening intake hoses and regulating the withdrawal of hydrostatic test water at a rate that would not adversely affect aquatic resources or downstream flows. In accordance with its WWCM Procedures, Transwestern would obtain approval from the appropriate federal and state agencies to use the San Juan River as a water source because it supports three federally and/or state-listed endangered species, the Colorado pikeminnow, the razorback sucker, and the roundtail chub (see sections 4.6.3.5, 4.6.3.6, and 4.6.4.4, respectively). The rate of water withdrawal from private or municipal sources would be limited so as not to exceed the delivery capacity of the system or well. Transwestern would be testing only new pipe and no chemicals would be added to the test water.

The potential impacts resulting from the discharge of hydrostatic test water include soil erosion and stream scour and subsequent degradation of water quality. Hydrostatic test water discharges would be conducted in accordance with the requirements of the applicable New Mexico, Navajo Nation, and Arizona NPDES permits. Generally, discharge locations would be in upland areas adjacent to the pipeline right-of-way and may include discharge into ephemeral washes where appropriate and where allowed under the terms of the permits. The sites would be selected to avoid steep slopes or any other land type or feature that might be easily eroded. Transwestern does not anticipate that hydrostatic test water would be discharged on top of slopes. If discharge is necessary on top of a slope, additional erosion control devices would be installed along the slope as necessary to prevent scour and erosion. No hydrostatic test water would be discharged onto known cultural resources sites.

The discharge rate would be regulated, and water would be discharged through an energy dissipation device and sediment barriers, as necessary, to prevent erosion or excessive flow. The energy dissipation device would consist of a large diameter pipe diffuser located at the terminus of the discharge pipe that would be located within the confines of a silt fence/hay bale erosion control structure.

A detailed hydrostatic test plan would be included as an appendix of the BLM/FS/BOR POD.

4.3.3.2 Dust Control Water

Water would also be needed to control fugitive dust during construction. Transwestern has prepared a Dust Control Plan (see Appendix M) that identifies activities with the potential to generate dust during construction and specifies mitigation measures for dust abatement. These specific measures are discussed in section 4.10.1.3. Transwestern's dust control measures would also be included in the access management plans that would be appendices of the BLM/FS/BOR POD. The access management plans are discussed in section 4.7.4.1.

The water for dust control would be obtained from municipal water systems at a variety of locations along the pipeline route and would be of potable quality. Alternatively, water would be acquired from canals along the Phoenix Lateral. This water would be suitable for agriculture and, if treated, for potable use. The impacts on water resources due to water withdrawals for dust control would be the same as those discussed in section 4.3.3.1 for hydrostatic test water withdrawals. The rate of water

withdrawal for dust control would be limited so as not to exceed the delivery capacity of the system or affect downstream uses.

Because Transwestern did not provide estimates of the quantities of water that would be required for dust control or specify the water sources or measures to protect aquatic resources during dust control water withdrawals, **the FERC staff recommends that:**

- **Transwestern shall prepare a revised Dust Control Plan that specifies the following:**

  a. the sources of water that would be used for dust control;

  b. the anticipated quantities of water that would be required; and

  c. measures to prevent fish and fish egg entrainment during dust control water withdrawals.

  The revised Dust Control Plan shall be filed with the Secretary for the review and written approval of the Director of OEP <u>before construction</u>.

4.3.3.3 Fire Prevention and Suppression Water

It is anticipated that the same sources of water proposed to be used for dust control would be used for fire prevention and suppression. The total volume of water likely to be used during construction would be negligible and would not exceed the delivery capacity of the system or affect downstream uses.

4.3.4 Wetlands

4.3.4.1 Existing Wetland Resources

Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of wetland vegetation adapted for life in saturated soil conditions (COE, 1987). Wetlands can be a source of substantial biodiversity and serve a variety of functions that include providing wildlife habitat, recreational opportunities, flood control, and naturally improving water quality.

Wetlands in the project area are regulated at the federal and state levels. On the federal level, the COE has authority under section 404 of the CWA to review and issue permits for activities that would result in the discharge of dredged or fill material into waters of the United States, including wetlands. Section 401 of the CWA requires that proposed dredge and fill activities under section 404 be reviewed and certified by the designated state agency so that the proposed project would meet state water quality standards. The designated state agencies in New Mexico and Arizona are the NMED and the ADEQ, respectively. On Navajo Nation lands, section 401 Water Quality Certification would be required from the EPA, Region IX.

For the Phoenix Expansion Project, wetlands were delineated using the methodology described in the COE Wetlands Delineation Manual (COE Manual), Technical Report Y-87-1. The delineations were conducted during January, February, and August of 2006 at all locations along the route where survey permission was granted. Based on these delineations, four COE jurisdictional wetlands would be crossed by the proposed project. No isolated, non-COE jurisdictional wetlands and no agricultural wetlands would be crossed by the project. The location, wetland identifier, FWS National Wetlands Inventory

(NWI) classification, crossing length, and approximate acreage of each wetland that would be affected by construction and operation of the project are listed in table 4.3.4-1.

TABLE 4.3.4-1

Wetlands Crossed by the Phoenix Expansion Project [a]

Facility/ Milepost	County, State	Wetland Identifier	National Wetlands Inventory (NWI) Classification [b]	Crossing Length (feet)	Temporary Construction Impact (acres) [c]	Permanent Impact (acres)
San Juan Lateral Loops			- None -			
Phoenix Lateral						
23.8	Yavapai, AZ	Wetland 1a	PEM	12.2	<0.1	0.0
23.8	Yavapai, AZ	Wetland 1b	PEM	12.2	<0.1	0.0
88.8	Yavapai, AZ	Wetland 7	PEM	160.2	0.3	0.0
88.8	Yavapai, AZ	Wetland 8	PEM	12.3	<0.0	0.0
Customer Laterals			- None -			
Project Total				196.9	0.4	0.0

[a] Survey information for the portion of the proposed route in Casa Grande between MPs 239.2 and 244.7 is not yet available.

[b] NWI Wetland Classification (Cowardin et al., 1979): PEM = Palustrine emergent.

[c] Acres calculated using a 120-foot-wide construction right-of-way through Wetlands 1a and 1b and a 75-foot-wide right-of-way through Wetlands 7 and 8.

Based on Transwestern's field surveys, the proposed pipeline facilities would cross four palustrine emergent wetlands along the Phoenix Lateral in Yavapai County, Arizona for a total distance of approximately 196.9 feet. The four palustrine emergent wetlands that would be crossed are associated with waterbodies. Wetlands 1a and 1b consist of two linear wetlands adjacent to the Verde River at MP 23.8 that are vegetated with cattails, sedges, rushes, horsetail, and tamarisk. These wetlands are bordered by forested riparian vegetation that provides a cottonwood overstory. Wetlands 7 and 8 are adjacent to the Agua Fria River at MP 88.8 and are dominated by tamarisk, willow, sedges, mulefat, and cattails.

No wetlands would be crossed by the San Juan Lateral Loops or the customer laterals, and no wetlands are present at any of the aboveground facility sites, at the proposed pipe storage and contractor yards, or along the proposed access roads.

4.3.4.2 General Impact and Mitigation

As discussed above, construction impacts on wetlands would occur only along the Phoenix Lateral. Construction of the Phoenix Lateral would affect a total of 0.4 acre of emergent wetlands (see table 4.3.4-1).

The primary impact of pipeline construction and right-of-way maintenance activities on wetlands would be the temporary alteration of wetland vegetation. These effects would be greatest during and immediately following construction. Generally, the wetland vegetation community would eventually transition back into a community with functionality similar to that of the wetland before construction. In these emergent wetlands, the herbaceous vegetation would regenerate quickly (typically within 1 to 3 years).

Following revegetation, there would be no permanent impact on emergent wetland vegetation in the maintained right-of-way because these areas naturally consist of and would remain as open and herbaceous communities. Herbaceous wetland vegetation in the pipeline right-of-way is not generally

mowed or otherwise maintained, although Transwestern's WWCM Procedures allows annual maintenance of a 10-foot-wide strip centered over the pipeline to facilitate corrosion/leak surveys.

Other types of impacts associated with construction of the pipeline facilities could include temporary changes in wetland hydrology and water quality. During construction, failure to segregate topsoil over the trenchline in non-saturated wetlands could result in the mixing of the topsoil with the subsoil. This disturbance could result in altered biological activities and chemical conditions in wetland soils and could affect the re-establishment and natural recruitment of native wetland vegetation after restoration. In addition, inadvertent compaction and rutting of soils during construction could result from the movement of heavy machinery and the transport of pipe sections. The resulting alteration of the natural hydrologic patterns of the wetlands could inhibit seed germination or increase the potential for siltation. The discharge of stormwater, trench water, or hydrostatic test water could result in silt-laden water entering a wetland and cause the release of chemical and nutrient pollutants from sediments. Construction clearing activities and disturbance of wetland vegetation could also temporarily affect the wetland's capacity to buffer flood flows and/or control erosion. The procedures that Transwestern would implement to avoid or minimize these impacts are discussed below.

In general, wetland impacts would be minimized by avoidance and mitigation of impacts in accordance with federal, state, and local regulations. Transwestern would avoid impacts on wetlands by routing its pipelines to avoid crossing wetlands to the extent possible. Transwestern would mitigate construction-related impacts by implementing its WWCM Procedures, and by complying with the COE's section 404 conditions and the section 401 permit conditions required by the ADEQ. The COE would determine whether the Phoenix Expansion Project would qualify for an Authorization under its Nationwide Permit program or an individual section 404 permit. A Nationwide Authorization is a general permit authorization issued by the COE for certain activities having minimal impacts. Projects that qualify for a Nationwide Authorization are not required to demonstrate compliance with the section 404(b)(1) guidelines that restrict discharges of dredged or fill material where a less environmentally damaging alternative exists. Should the COE determine that an individual section 404 permit is necessary, as part of its section 404 permit application Transwestern would be expected to demonstrate that it has taken appropriate and practicable steps to minimize wetland impacts in compliance with the section 404(b)(1) guidelines that restrict discharges of dredged or fill material where a less environmentally damaging alternative exists. When unavoidable wetland impacts are proposed, the COE and the ADEQ would require that all practicable actions be taken to mitigate those impacts. This is consistent with the CEQ's *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (Title 40 CFR Part 1508.20), which defines mitigation to include the following criteria:

- avoiding the impact altogether by not taking a certain action or parts of an action;
- minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
- compensating for the impact by replacing or providing substitute resources or environments.

Transwestern would implement the wetland construction and restoration measures contained in its WWCM Procedures (see Appendix G). Transwestern's WWCM Procedures includes mitigation measures specifically designed to avoid, minimize, and mitigate impacts on wetlands. Some of the measures pertaining to wetland crossings specified in Transwestern's WWCM Procedures include:

- prohibiting storage of hazardous materials, chemicals, fuels, and lubricating oils within a wetland or within 100 feet of a wetland boundary;
- requiring that native vegetation on the right-of-way within wetlands be cut at ground level, leaving existing root systems in place to promote regrowth;
- requiring segregation of the uppermost 1 foot of wetland topsoil from the underlying subsoil in areas disturbed by trenching;
- limiting the operation of construction equipment within wetlands to that equipment essential for clearing, excavation, pipe installation, backfilling, and restoration activities;
- requiring all nonessential equipment to traverse around wetlands using upland access roads where wetland soils are prone to rutting and/or cannot be appropriately stabilized; and
- minimizing duration of construction-related disturbance within wetlands.

In its WWCM Procedures, Transwestern is proposing a 120-foot-wide right-of-way in wetlands 1a and 1b at the Verde River because the wetlands at the river are located at the bottom of 6-foot-high river banks that consist of loose sandy soil saturated by groundwater. The soil texture and the saturated condition would likely require a wider than normal trench at this location. In addition, blasting may be required to complete the river crossing, which could further destabilize the river bank. The Agency Staffs agree that due to the existing site conditions, a 120-foot-wide construction right-of-way at the Verde River would be acceptable.

In its review of the project to determine whether to issue a section 401 permit, the ADEQ may impose permit conditions requiring mitigation measures in addition to those described above. Transwestern's adherence to its WWCM Procedures and compliance with the COE's section 404 and the ADEQ's section 401 permit conditions would adequately protect wetland resources affected by the Phoenix Lateral. Wetland compensation would not likely be required for the Phoenix Expansion Project because there would be no loss of wetlands associated with the project.

4.3.5 No Action Alternative

Under the No Action Alternative, the FERC would deny Transwestern's application for a Certificate and the BLM would deny Transwestern's application to obtain a Right-of-Way Grant for the portion of the project on federal lands. The No Action Alternative means that the project would not go forward and the project-related facilities would not be installed. Accordingly, none of the potential environmental impacts on groundwater, surface water, and wetland resources identified for the construction and operation of the proposed project would occur.

4.4 VEGETATION

4.4.1 Existing Vegetation Resources

The Phoenix Expansion Project would be within the Colorado Plateau Semi-desert Province in New Mexico and Arizona as well as within a portion of the American Semidesert and Desert Province in Arizona (Bailey, 1994). Vegetation communities found in the project vicinity are representative of these ecoregions. The characterization of vegetation communities presented in this EIS is based on the published literature for New Mexico (Dick-Peddie, 1993) and information provided in the Arizona Gap Analysis Program (Bennett et al., 2004); however, certain vegetation communities were combined to accommodate the format of this EIS.

The nine distinct upland vegetation communities that occur within the project area are discussed below. Table 4.4.1-1 lists these upland communities; provides general descriptions, including common vegetative species typical of each community; and identifies the pipeline facility where each community occurs. Wetland vegetation communities that would be affected by the project are discussed in section 4.3.4.

Pipeline Facilities

The San Juan Lateral Loops would cross four native vegetation communities as well as agricultural and developed/disturbed lands that have been significantly altered by human settlement.

The primary vegetation community that would be crossed by Loop A is desert grassland, comprising about 50 percent of the vegetation communities crossed. The next most prevalent vegetation community that would be crossed is desert scrub, comprising about 26 percent of the vegetation communities crossed by Loop A. The remaining upland vegetation communities along Loop A, the developed/disturbed, riparian, and agricultural communities would account for 11, 7, and 5 percent, respectively, of the vegetation communities crossed. Along Loop B, desert scrub would be the primary vegetation type crossed, comprising about 58 percent of the vegetation communities crossed. Desert grassland (36 percent) and juniper woodland/grassland (6 percent) account for the remaining vegetation communities that would be crossed by Loop B.

The Phoenix Lateral would cross seven distinct vegetation types, of which the desert shrub community would comprise 54 percent of the vegetation communities crossed. Scrub-shrub grassland would be the next most prevalent community, accounting for 12 percent of the vegetation communities crossed. Other upland vegetation communities that would be crossed by the Phoenix Lateral are the agricultural, chaparral, and juniper woodland/grassland communities, which would account for 9, 8, and 8 percent, respectively, of the vegetation communities crossed. The developed/disturbed community would also account for about 8 percent, while the riparian community would account for about 2 percent of the vegetation communities crossed.

The customer laterals would cross the desert shrub (56 percent), agricultural (32 percent), and developed/disturbed (12 percent) vegetation communities.

TABLE 4.4.1-1

Vegetation Communities Affected by the Phoenix Expansion Project

Vegetation Community	General Description	Common Species	Location of Occurrence (Facility)
Desert Grassland	Consists of grasslands and areas dominated by forbs and is often a transition between desert and grassland areas.	Alkali sacaton, galleta, sandhill muhly, ring muhly, three-awn, blue grama, snakeweed, spiny golden aster, globe mallow, buckwheat	San Juan Lateral Loops A and B
Desert Shrub	Open spaced low diversity stands of microphyll shrubs. Variants include areas along drainages with greater species diversity and higher concentrations of tree/cacti species, and areas dominated by salt bush.	Creosote bush, bursage, mesquite, barrel cactus, cholla, catclaw acacia, palo verde, ironwood, desert willow, saguaro, prickly pear, brittlebush, ocotillo, hopbush, red brome, three-awn, fluffgrass, sand dropseed, woolly plantain, globemallow, peppergrass, four-wing salt bush, alkali sacaton salt grass	Phoenix Lateral, Customer Laterals
Developed/ Disturbed	Previously disturbed areas where vegetation is sparse or absent. May include improved landscaped areas.	Greenmolly, Russian thistle, pigweed, musk thistle, knapweed, mustard, white sweet clover, dandelion, various ornamental species	San Juan Lateral Loop A, Phoenix Lateral, Customer Laterals
Riparian	Typically associated with perennial streams and rivers, intermittent drainages, and floodplains where moisture is present. Species present depend on moisture and elevation.	Arizona walnut, cottonwood, tamarisk, desert willow, ironwood, mesquite, palo verde, Russian olive, velvet ash, seep willow, greasewood, Junegrass, sand dropseed, Russian knapweed, bee weed	San Juan Lateral Loop A, Phoenix Lateral
	Deciduous swamp/desert riparian along the Phoenix Lateral characterized by thick mesquite woodlands (bosques).	Deciduous swamp/desert riparian: mesquite burro bush, catclaw acacia, desert willow, ironwood, blue and yellow palo verde, saguaro	Phoenix Lateral
Juniper Woodland/ Grassland	Dominated by one-seed juniper, typically occurs on rocky slopes. Occurs as a lower density savannah community in New Mexico, and higher density woodlands and woodland/grasslands in Arizona. May occur in association with pinyon pine in Arizona.	Utah juniper, big sagebrush, Bigelow sagebrush, three-awn, blue grama, ring muhly, red brome, woolly plantain, side-oats grama, galleta cliff rose barberry, pincushion cactus, plains prickly pear cactus, beargrass, narrowleaf yucca, banana yucca, Whipple cholla, scrub live oak, buckwheat, portulaca, stink grass	San Juan Lateral Loop B, Phoenix Lateral
Desert Scrub	Cold desert vegetation with 30 percent shrub cover and sparse understory of grasses and forbs.	Sagebrush, shadscale, greasewood, four-wing saltbush, sacaton sp, galleta, grama sp.	San Juan Lateral Loops A and B
Scrub-Shrub Grassland	Scattered shrubs with a variety of grasses, forbs, and cactus species. Portions of this community are the result of juniper clearing and colonization by invader species. Other areas are dominated by grasses and forbs with lower densities of scrub-shrub species.	One-seed juniper, broom snakeweed, rabbitbrush, mustard, thistle, annual sunflower, cheatgrass, buckwheat, mentzelia, blue grama, three-awn, side-oats grama, western wheatgrass, bottlebrush squirreltail, Indian ricegrass, sand dropseed, prickly pear cactus narrow-leaf yucca, pincushion cactus, beargrass, banana yucca, Whipple cholla, four-wing saltbush	Phoenix Lateral
Agricultural	Consists of commercial agricultural crops typically dependent on irrigation.	Wheat, alfalfa, barley, broccoli, cabbage cauliflower, carrots, citrus cotton, hay, lemons, lettuce, melons, onions, potatoes	San Juan Lateral Loop A, Phoenix Lateral, Customer Laterals
Chaparral	Manzanita and mixed evergreen sclerophyll communities occurring within the Prescott National Forest.	Shrub live oak, manzanita, sumac, skunkbush, mountain mahogany, Gambel oak, cliff rose, wait-a-minute bush, juniper trees, agave, pincushion cactus, prickly pear cactus, beargrass, narrowleaf yucca, banana yucca, cholla, hedgehog cactus	Phoenix Lateral

Aboveground Facilities

The modifications proposed at the Bloomfield Compressor Station and Seligman Compressor Station No. 1 would take place within the fenceline at each facility and not affect vegetation communities. Construction of the Ash Fork Facility would affect the juniper woodland/grassland community.

The construction of the UNS Tap, Chino Valley and UNS Tap, Prescott Valley Airport would affect the scrub-shrub grassland community; the UNS Tap, Prescott South would affect the chaparral community; and the EPNG Gila Bend Tap would affect the desert shrub community.

Of the 11 proposed meter stations associated with the Phoenix Lateral and the East Valley Lateral, six sites (the SWG Sun Valley North, SWG Sun Valley South, Entegra Gila River, SWG Rainbow Valley, SRP Desert Basin, and SWG New Florence Meter Stations) would affect the desert shrub community. Two sites (the APS Redhawk and APS Sundance Meter Stations) would affect the developed/disturbed community. The three remaining sites (the EPNG Pinal County, EPNG East Valley Lateral, and SWG Germann Meter Stations) would affect the agricultural community.

The pig launcher facility associated with the APS Redhawk Lateral at MP 164.9, which is the one launcher or receiver facility that is not collocated with other aboveground facility sites, would affect the desert shrub community.

Of the 27 proposed valves, 25 would be constructed along the Phoenix Lateral affecting vegetation resources. Four valve sites (Valves -17, -35, -42, and -49) would affect the scrub-shrub grassland community; 3 valve sites (Valves -56, -62, and -69) would affect the chaparral community; 14 valve sites (Valves -82, -87, -95, -104, -115, -123, -133, -147, -152, -180, -193, -213, -239, and -245) would affect the desert shrub community; 1 valve site (Valve-165) would affect the developed/disturbed community; and 3 valve sites (Valves -221, -232, and -250) would affect the agricultural community. Valves -0 and -255 would be installed within other aboveground facility sites (the Ash Fork facility site and the EPNG East Valley Lateral Meter Station, respectively) and thus would not affect any additional land.

Pipe Storage and Contractor Yards

Transwestern identified eight pipe storage and contractor yards to be used during construction. Three of these yards would affect developed/disturbed lands, two would affect the desert shrub vegetation community, one would affect the juniper woodland/grassland vegetation community, one would affect the scrub-shrub grassland vegetation community, and one would affect the agricultural community (see table 2.2.3-1).

Access Roads

The existing access roads that would be used during construction of Loop A (18 roads), Loop B (18 roads), and the Phoenix Lateral (138 roads) would require some improvements that could affect vegetation resources. Because the exact location of the road improvements is unknown at this time, the affected vegetation communities could not be identified. As discussed in the following section, to account for impacts associated with access roads, Transwestern calculated the entire length and width of the roads and identified the vegetation type as developed/disturbed. Eleven new roads would be constructed to provide permanent access to facilities associated with the Phoenix Lateral. These roads would affect the chaparral, desert shrub, and developed/disturbed vegetation communities.

4.4.2 General Impact and Mitigation

Pipeline Facilities

The primary impact of the pipeline facilities on vegetation would be the cutting, clearing, and/or removal of existing vegetation within the construction work area. The degree of impact would depend on the type and amount of vegetation affected, the rate at which the vegetation would regenerate after construction, and the frequency of vegetation maintenance conducted during operation. Existing vegetation would be disturbed everywhere along the construction right-of-way. In general, the swath of vegetation that would be disturbed during construction would be 100 feet wide for the length of the San Juan Lateral Loops. For the Phoenix Lateral, vegetation would generally be cleared from a 120-foot-wide corridor between MPs 0.0 and 95.2 and a 100-foot-wide corridor between MPs 95.2 and 255.1. A 75-foot-wide swath of vegetation would be cleared for each of the customer laterals.

Secondary effects associated with disturbances to vegetation could include increased soil erosion (see section 4.2), increased potential for the introduction and establishment of invasive weedy species (see section 4.4.4), and a local reduction in available wildlife habitat (see section 4.5.1). Other potential effects on vegetation could include the contamination of soils from spills or leaks of fuels, lubricants, and coolants from construction equipment that would restrict the ability of vegetation to become re-established.

Transwestern's proposed construction right-of-way and temporary extra workspaces would disturb a total of about 4,367.4 acres of vegetation. Table 4.4.2-1 lists the amount of each vegetation community that would be affected by construction and operation of the pipeline facilities. The most common vegetation community that would be affected is desert shrub (1,926.3 acres), which accounts for about 44 percent of the vegetation that would be cleared or affected by construction. The next most common vegetation communities that would be disturbed are scrub-shrub grassland (553.5 acres) and juniper woodland/grassland (426.3 acres), which together account for about 22 percent of the vegetation communities that would be disturbed. The chaparral (358.0 acres), agricultural (346.5 acres), and developed/disturbed (343.0 acres) communities together would account for about 24 percent, while the desert scrub (165.4 acres) and desert grassland (163.0 acres) communities would together account for about 8 percent of the vegetation that would be cleared for construction. The least common vegetation community affected during construction of the project would be the riparian community (80.0 acres), which would account for 2 percent of the vegetation that would be affected by construction.

To reduce impacts on vegetation within the construction and permanent rights-of-way and to improve revegetation potential, Transwestern would overlap its construction right-of-way by 25 feet onto its own previously disturbed right-of-way along the San Juan Lateral Loops and between 15 and 100 feet over other previously disturbed rights-of-way adjacent to the Phoenix Lateral. This overlap would occur over 60 percent of the proposed pipeline facilities.

TABLE 4.4.2-1

Acres of Vegetation Communities Affected by the Phoenix Expansion Project

	Desert Shrub		Scrub-Shrub Grassland		Juniper Woodland/ Grassland		Chaparral		Agricultural		Developed/ Disturbed		Desert Scrub		Desert Grassland		Riparian [a]		Total	
Facility	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.
San Juan Lateral Loop A																				
Pipeline Facilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	12.8	0.0	24.7	0.0	56.0	0.0	8.3	2.5	107.8	2.5
Extra Workspace	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	12.2	0.0	12.6	0.0	17.7	0.0	3.2	0.0	46.5	0.0
Aboveground Facilities	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
Pipe Storage and Contractor Yards	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.3	0.0
Access Roads	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.7	0.0
Subtotal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	0.0	103.0	0.0	37.3	0.0	73.7	0.0	11.5	2.5	232.3	2.5
San Juan Lateral Loop B																				
Pipeline Facilities	0.0	0.0	0.0	0.0	10.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	112.1	0.0	67.1	0.0	0.0	0.0	189.8	0.0
Extra Workspace	0.0	0.0	0.0	0.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	0.0	22.2	0.0	0.0	0.0	44.1	0.0
Aboveground Facilities	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
Pipe Storage and Contractor Yards	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
Access Roads	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.2	0.0
Subtotal	0.0	0.0	0.0	0.0	16.5	0.0	0.0	0.0	0.0	0.0	74.2	0.0	128.1	0.0	89.3	0.0	0.0	0.0	308.1	0.0
Phoenix Lateral																				
Pipeline Facilities	1,724.3	1.4	451.8	0.2	299.2	0.0	311.7	0.2	274.6	0.1	258.0	0.6	0.0	0.0	0.0	0.0	54.8	16.4	3,374.4	18.9
Extra Workspace	196.1	0.0	101.7	0.0	110.6	0.0	46.3	0.0	60.8	0.0	62.0	0.0	0.0	0.0	0.0	0.0	13.7	0.0	591.2	0.0
Aboveground Facilities	7.3	7.3	0.5	0.5	2.5	2.5	0.0	0.0	4.2	4.2	1.6	1.6	0.0	0.0	0.0	0.0	0.0	0.0	16.1	16.1
Pipe Storage and Contractor Yards	149.6	0.0	37.2	0.0	14.9	0.0	0.0	0.0	31.8	0.0	40.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	273.8	0.0
Access Roads	2.3	2.3	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	989.7	325.5	0.0	0.0	0.0	0.0	0.0	0.0	992.3	328.1
Subtotal	2,079.6	11.0	591.2	0.7	427.2	2.5	358.3	0.5	371.4	4.3	1,351.6	327.7	0.0	0.0	0.0	0.0	68.5	16.4	5,247.8	363.1

TABLE 4.4.2-1 (cont'd)

Acres of Vegetation Communities Affected by the Phoenix Expansion Project

	Desert Shrub		Scrub-Shrub Grassland		Juniper Woodland/ Grassland		Chaparral		Agricultural		Developed/ Disturbed		Desert Scrub		Desert Grassland		Riparian [a]		Total	
Facility	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.
Customer Laterals																				
Pipeline Facilities	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.3	0.0
Extra Workspace	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0
Aboveground Facilities	0.9	0.9	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	0.9	0.9
Pipe Storage and Contractor Yards	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
Access Roads	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
Subtotal	6.8	0.9	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.6	0.9
East Valley Lateral																				
Aboveground Facilities	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	2.7
Project Total																				
Pipeline Facilities [b]	1,729.4	1.4	451.8	0.2	309.8	0.0	311.7	0.2	283.3	0.1	274.3	0.6	136.8	0.0	123.1	0.0	63.1	18.9	3,683.2	21.4
Extra Workspace	196.9	0.0	101.7	0.0	116.5	0.0	46.3	0.0	63.2	0.0	68.7	0.0	28.6	0.0	39.9	0.0	16.9	0.0	684.2	0.0
Aboveground Facilities	9.5	9.5	0.5	0.5	2.5	2.5	0.0	0.0	5.6	5.6	1.6	1.6	0.0	0.0	0.0	0.0	0.0	0.0	19.7	19.7
Pipe Storage and Contractor Yards	149.6	0.0	37.2	0.0	14.9	0.0	0.0	0.0	31.8	0.0	91.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	325.1	0.0
Access Roads	2.3	2.3	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	1,090.6	325.5	0.0	0.0	0.0	0.0	0.0	0.0	1,093.2	328.1
Project Total [c]	2,087.7	13.3	591.2	0.7	443.7	2.5	358.3	0.5	383.9	5.7	1,532.4	327.7	165.4	0.0	163.0	0.0	80.0	18.9	5,805.2	396.2

[a] Includes 3.0 acres of riparian vegetation affected during construction that would be avoided if the horizontal directional drill crossing of the San Juan River is successful (see section 4.3.2.3).

[b] Includes the acres of vegetation within the permanent right-of-way that would be permanently maintained (e.g., valve sites and riparian areas).

[c] Excludes wetland acres and borrow/disposal areas.

Note: The totals shown in this table may not equal the sum of addends due to rounding.

To further reduce impacts on vegetation within the construction and permanent rights-of-way and improve revegetation potential, Transwestern would implement its UECRM Plan (see Appendix F) and Restoration Plan.[3] Specifically, Transwestern would implement the following measures:

- Segregate up to 1 foot of topsoil in agricultural and residential areas and other site-specific areas identified in the Restoration Plan. This topsoil would be stripped from either the full work area or from the trench and subsoil storage area. Segregate the top 3 inches of topsoil over the full width of the construction right-of-way in native desert habitats where requested by the landowner/land management agency. These measures would preserve the superior chemical and biological qualities of the topsoil and, in non-agricultural habitats, would preserve the native seed bank contained in the top layer of soil. In addition, where biological soil crusts are present, segregating the top 3 inches of soil would preserve the propagules necessary to allow re-establishment of these soil crusts.

- Avoid clearing existing vegetation by adjusting the clearing boundaries to avoid selected individual specimens of native desert vegetation (approximately 50 ironwoods and 50 saguaros have been identified for potential preservation) and, where possible, avoid tree removal at riparian crossings. Locate storage, lay down, and spoil disposal areas at sites with little or no vegetative cover or in areas of non-native vegetation. Avoidance of native desert vegetation and riparian trees that would be slow to recover would reduce long-term impacts on vegetation communities.

- Feather the edge of the right-of-way in visually sensitive areas. Feathering involves the selective removal/preservation of vegetation to visually obscure the edge of the construction right-of-way.

- Crush, shred, or cut vegetation within the construction right-of-way in areas where grading is not required, which would result in less soil disturbance. The remaining root crowns would aid in soil stabilization, help retain organic matter in the soil, aid in moisture retention, and have the potential to resprout following construction.

- Preserve native vegetation removed during clearing operations. Shredded vegetation would be windrowed along the right-of-way during construction and then redistributed over the disturbed areas as part of restoration activities. The shredded vegetation would be used as a standard mulch that would aid in water retention and infiltration and add organic matter to the topsoil as it decomposes. The larger cut vegetation would be stockpiled in extra workspaces and returned to the right-of-way during restoration activities (lopped and scattered). Reuse of the cut vegetation would be considered vertical mulch and would aid in seedling recruitment by trapping seeds, providing shade, and improving water infiltration. This cut vegetation would also protect young plants from grazing animals and add to the organic matter in the topsoil layer as it decomposes. The aboveground parts of prickly pear and cholla cacti specifically would be preserved, spread on the restored right-of-way, and slightly buried to enhance revegetation of these native desert species.

[3] This plan is too voluminous to include in this EIS but can be viewed on the FERC Internet website at http://www.ferc.gov. Using the "eLibrary" link, select "General Search" from the eLibrary menu and enter the docket number excluding the last three digits in the "Docket Number" field (i.e., CP06-459). Be sure to select an appropriate date range. It is also available for public inspection at the FERC's Public Reference Room in Washington, DC (call (202) 502-8317 for instructions).

- Recontour disturbed areas as needed. The contours would be reshaped after backfilling the trench and replacing the topsoil to restore preconstruction contours and natural drainage patterns. This treatment would reduce erosion and the loss of topsoil, which would improve revegetation potential.

- Test for and alleviate compacted soils in agricultural and residential areas. Soil ripping to a depth of 12 to 24 inches would be implemented in native habitats at the site-specific locations identified in the Restoration Plan. Compaction alleviation would result in increased water infiltration and drainage and provide soil conditions favorable for revegetation.

- Scarify the soil surface using a harrow or other device where ripping is not recommended because of shallow soil depths to increase water infiltration and promote seed germination.

- Apply seed at selected locations to promote revegetation. Depending upon site-specific conditions identified in the Restoration Plan, seeding operations would include the planting of annual cover crops (using sterile seed) or the planting of annual and perennial species native to the area.

- Chain drag areas of soil disturbance following seeding. Chain dragging helps to increase soil-to-seed contact to improve seed germination rates.

- Imprint areas of soil disturbance using a "sheep's-foot" roller or other methods. Imprinting would provide micro-catchment areas for seed retention and would improve water infiltration.

- Mulch restored areas with shredded vegetation, native rock, or other mulch material (e.g., straw) to reduce erosion and increase water infiltration.

- Maintain water flow in crop irrigation systems, unless shutoff is coordinated with affected parties.

- Implement procedures to prevent or minimize the spread of noxious weeds or other undesirable species to reduce competition with native species. Existing infestations would be mechanically removed during clearing operations and burned if sufficiently dry. Alternatively, existing infestations would be treated with an herbicide in accordance with the appropriate land management agency's requirements (see section 4.4.4). Monitoring for the presence of noxious weeds would occur for a period of 5 years following construction.

- Monitor the revegetation of the right-of-way in agricultural areas the year following construction and again during the second growing season. Crop monitoring would be conducted to determine if additional restoration is required. In non-agricultural lands, revegetation monitoring would begin the year following the completion of construction and continue for a total of 5 years (see below for further details regarding revegetation monitoring in non-agricultural lands).

After cleanup and reseeding of the right-of-way, the agricultural community would typically regenerate quickly and impacts on this vegetation community would be short term. Cultivated areas are regularly disturbed, generally receive ample water through irrigation if necessary, and would quickly re-

establish on the right-of-way following replanting by the landowners. Similarly the developed/disturbed community would be restored to its previous condition, which would include restoring original contours, hardscape, and landscaped areas.

The removal of desert vegetation would have a long-term impact. The arid environment characteristic of these habitats is not conducive to plant growth and would slow the regeneration of vegetation following construction. Natural regeneration of these areas would take several years and in some cases could take over 50 years.

Construction of the pipeline facilities would result in long-term impacts on about 3,592.5 acres of native desert vegetation (i.e., desert shrub, scrub-shrub grassland, juniper woodland/grassland, chaparral, desert scrub, and desert grassland). Transwestern's plan to avoid areas of desert vegetation by overlapping its construction right-of-way onto previously disturbed rights-of-way and adjust the limits of clearing to avoid certain patches of undisturbed sensitive vegetation (e.g., large specimen ironwood trees and saguaro cacti) would reduce the amount of native desert vegetation that would be cleared. Further, adjusting the clearing limits and leaving patches of existing vegetation extending into the construction right-of-way would help aid in revegetation of the right-of-way by providing a living seed source and some shade to immediately adjacent areas. Preserving the cleared vegetation and the top 3 inches of topsoil for later redistribution over the restored right-of-way would promote recovery of native areas by preserving the native seedbank, and any macro- and microbiota that may be present within the soil crusts or topsoils where present, as well as organic matter, which is extremely slow to develop in arid habitats.

Following construction, Transwestern would monitor restoration of the areas disturbed by construction both qualitatively and quantitatively. Qualitative monitoring would be achieved by establishing photographic points from which to photographically document selected areas of the restored right-of-way annually for a period of 5 years following construction. On federal lands, Transwestern would be required to monitor for a longer period if determined necessary by the applicable land management agency. At the same time, visual observations would be documented on standardized forms. Quantitative monitoring would be achieved by developing test plots in areas disturbed by construction and control plots in adjacent undisturbed areas then recording and comparing plant densities and species diversity of the test and control plots. Quantitative monitoring would be conducted after the third summer growing season following the completion of construction and again after the fifth summer growing season following construction. The qualitative and quantitative monitoring data would be analyzed to assess whether restoration is progressing at an adequate rate. The data and analysis would be provided to the applicable land management agency and if, in consultation with the land management agency, it is determined that restoration is not progressing adequately, remedial measures such as additional seedbed preparation and seeding, actions to control human impacts, soil stabilization, or other measures would be implemented. Restoration would be considered successful if the species richness (diversity) of native, perennial vegetation in the test plots is equal to or exceeds 60 percent of the species richness in the adjacent control plots.

Maintenance of Transwestern's proposed permanent right-of-way as allowed by its UECRM Plan would result in minor permanent impacts on native desert vegetation communities (i.e., desert shrub, scrub-shrub grassland, juniper woodland/grassland, chaparral, and desert scrub) where trees and shrubs make up a significant component of the community. Because of the typically slow growth rate and sparse nature of vegetation within the project area, Transwestern does not propose to conduct routine vegetation maintenance along its proposed pipeline facilities. Vegetation maintenance of the permanent right-of-way in upland areas would be very infrequent and limited to the removal of individual plants such as juniper trees after they reach a mature size.

In compliance with the State of Arizona's Native Plant Protection Program, Transwestern has conducted surveys to identify areas of native vegetation within the proposed construction right-of-way that would be suitable for transplanting (e.g., cacti, agave, ocotillo, desert trees, among others) and would allow third-party plant salvage of the suitable specimens. The Native Plant Protection Program protects cacti, ocotillo, ironwood, palo verde, and mesquite as well as many smaller plants on both privately and publicly owned lands including lands owned by state and local political entities. Plants cannot be removed from any lands in Arizona without permission from the landowner and obtaining a permit from the Arizona Department of Agriculture. Transwestern is coordinating with the Arizona Department of Agriculture and the Central Arizona Cactus and Succulent Society to facilitate the society's salvage of plants, especially in the areas where cactus communities are dominant and many salvageable plants are present. Other private societies in Arizona as well as commercial nurseries could also be involved in the salvage activities. The salvaged plants would be used in other off-site areas.

During the scoping process, the FS requested that Transwestern consider active revegetation (e.g., seeding and planting) and right-of-way edge softening to reduce visual impacts in Hell Canyon (MP 17.8) and at the Verde River crossing (MP 23.8) along the Phoenix Lateral. Transwestern's most recent draft of its Restoration Plan dated July 2007 includes many site-specific restoration treatments developed using best available science, including measures to conduct active revegetation at the Hell Canyon and Verde River crossings. For further discussion of the revegetation treatments that would be implemented at riparian locations, see section 4.4.3. Other measures that would be implemented at site-specific locations include the colorization of soils and rocks on cut slopes, the preservation of native vegetation, and boulder replacement where boulder fields are crossed.

Some of the measures in the Restoration Plan were developed as a result of a visual resources study Transwestern conducted of potential construction-related impacts on BLM-managed lands as well as within the Kaibab and Prescott National Forests. Transwestern's Draft Visual Resource Study Technical Report dated June 2007 is discussed in detail in section 4.7.7 and included in Appendix T.

The BLM and the FS have indicated that Transwestern's Restoration Plan dated July 2007 satisfies their restoration concerns. However, these and other agencies may continue to identify restoration concerns before construction, including concerns associated with visual resources impacts. Therefore, we have recommended in section 4.2.2 that Transwestern coordinate with the BLM, the FS, and other applicable agencies to finalize its Restoration Plan to address any additional restoration concerns identified by these agencies and file the final Restoration Plan before construction.

All of the vegetation communities affected by the project would be susceptible to secondary impacts related to soil contamination by materials used during construction activities. While these impacts would typically be minor because of the low frequency and volumes of these occurrences, the introduction of contaminants to soils could adversely affect the potential for revegetation. Transwestern's SPR Procedures specifies preventive measures and containment and cleanup procedures to minimize the potential for soil contamination from spills or leaks of fuels, lubricants, and coolants (see Appendix H). Adherence to the SPR Procedures would reduce the potential for a spill or leak to contaminate the soil to the extent of eradicating existing vegetation, inhibiting revegetation, or migrating to other areas and affecting soil and water ecology via erosion and sedimentation.

Aboveground Facilities

Construction of the Ash Fork Facility would permanently affect about 2.5 acres of the juniper woodland/grassland community. Construction of the 11 proposed meter stations would permanently affect about 12.9 acres of vegetation resources including 5.9 acres of the desert shrub community, 5.4 acres of the agricultural community, and 1.6 acres of the developed/disturbed community.

The four proposed taps would be fenced, graveled, and maintained free of vegetation. While this would result in permanent impacts on vegetation resources, these impacts would affect less than 0.1 acre within the permanent right-of-way for each tap with the exception of the UNS Tap, Chino Valley that would affect about 0.5 acre of scrub-shrub grassland.

The majority of the pig launcher/receiver facilities would be collocated with other aboveground facilities and not affect additional vegetation resources. The one exception is the pig launcher associated with the APS Redhawk Lateral that would permanently affect an additional 0.9 acre of the desert shrub community.

Of the 27 proposed valve sites along the Phoenix Lateral, 22 would be located entirely within the permanent right-of-way, 3 would extend outside the permanent right-of-way, and 2 would be located within aboveground facility sites. The 22 valves within the permanent right-of-way would be maintained in the same manner as the taps and result in less than 0.1 acre each of permanent impact on vegetation resources. The three valves (Valves -95, -239, and -250) that would extend outside the permanent right-of-way would result in permanent impacts on 0.7 acre of the desert shrub community and 0.2 acre of the agricultural community. Impacts associated with the two valves within aboveground facility sites (Valves -0 and -255) are included as part of the impacts of the Ash Fork Facility and the East Valley Lateral Meter Station, respectively. In addition, the four proposed remote blowdown valves would be located outside the permanent right-of-way resulting in permanent impact on 2.0 acres of the desert shrub community.

Pipe Storage and Contractor Yards

The temporary use of eight pipe storage and contractor yards would result in temporary impacts on 149.6 acres of the desert shrub community, 91.6 acres of developed/disturbed land, 37.2 acres of the scrub-shrub grassland community, 31.8 acres of agricultural land, and 14.9 acres of the juniper woodland/grassland community. No permanent impacts on vegetation would result from the use of these sites.

Access Roads

The construction, modification, and improvement to access roads used during construction would have both temporary and permanent impacts on vegetation resources. The estimated impacts on vegetation communities associated with access roads are listed in table 4.4.2-1. The areas where modifications and improvements would be required to existing roads have not yet been determined. However, to account for these impacts, Transwestern calculated the entire length and width of the roads and identified the vegetation type as the developed/disturbed community. While it is certain that other vegetation types would be affected by road improvements, it is likely that the magnitude of these impacts would be much smaller than this preliminary estimate.

The 11 permanent access roads required to access facilities associated with the Phoenix Lateral would result in permanent impacts on vegetation communities (see table 4.4.2-1). The construction of new access roads (typically extensions to existing access roads) would affect the developed/disturbed (1.6 acres), desert shrub (0.7 acre), and chaparral (0.3 acre) communities. About 325.5 acres would be permanently affected by the use of and improvements to existing access roads including 323.9 acres of the developed/disturbed and 1.6 acres of desert shrub vegetation communities.

4.4.3 Vegetation Communities of Special Concern or Value

No designated vegetation communities of special concern or value were identified along the proposed pipeline route or at aboveground facility sites; however, the riparian community would be affected along the San Juan Lateral Loop A and the Phoenix Lateral.

Riparian vegetation communities are important in that they provide high quality wildlife habitat that supports greater species diversity than the more xeric vegetative communities in the project area (see section 4.5). Riparian vegetation is typically associated with perennial and intermittent waterbodies, and wetlands. The plant species within these communities vary depending on type and elevation (see table 4.4.1-1). Along Loop A in New Mexico, the riparian community primarily occurs within floodplains associated with the San Juan River crossing (MP 1.5) and at the Kutz Canyon crossing (MP 5.2). As discussed in section 4.3.2.3, Transwestern proposes to cross the San Juan River using the HDD method, which would largely avoid impacts on riparian vegetation adjacent to the river. If the HDD were to fail and a wet open-cut crossing is necessary, about 3.0 acres of riparian vegetation would be affected. At the Kutz Canyon crossing, more than 3.0 acres of riparian vegetation would be affected. Along the Phoenix Lateral in Arizona, the majority of riparian communities are associated with various intermittent waterbody crossings where typically less than 1 acre of vegetation would be affected. Larger areas of riparian vegetation (greater than 2.0 acres) would be affected at the following waterbody crossings: the Verde River (MP 23.8), Moore Gulch (MP 93.0), and the Hassayampa River (MP 155.1). About 1.7 miles of riparian vegetation that would be crossed by the Phoenix Lateral were specifically identified as Sonoran deciduous swamp/desert riparian at locations including the Tributary to Government Spring Wash (MPs 75.1 to 75.9), the Tributary to Bumblebee Wash (MPs 78.4 to 79.0), and the Gila River (MP 174.8). This vegetation community also occurs at other locations along the Phoenix Lateral in conjunction with more typical riparian vegetation communities consisting of species such as cottonwood, willow, and velvet ash.

Similar to the native desert communities, impacts on riparian vegetation would be considered long term because of the time required to restore riparian vegetation to its preconstruction condition. A total of 77.0 acres of riparian communities would be affected by construction of the project including 8.5 acres associated with Loop A (assuming the HDD at the San Juan River is successful) and 68.5 acres associated with the Phoenix Lateral). Impacts associated with construction and operation would be greatest on riparian forest vegetation due to the change in structure and environment caused by the removal of the large, mature tree canopy over the width of the right-of-way. Permanent impacts on riparian vegetation would be greatest over the maintained portion of the right-of-way totaling 18.9 acres. A 10-foot-wide area centered over the pipeline would be maintained treeless on an annual basis, which would result in the conversion of the riparian forest community in this area to an herbaceous community. In addition, any trees greater than 15 feet in height and within 15 feet of the pipeline would be removed every 3 years. This would result in a conversion of forested vegetation to a shrub or herbaceous dominated vegetation community over a 30-foot-wide corridor.

To reduce impacts on riparian vegetation within the construction and permanent rights-of-way, Transwestern would implement the measures included in its WWCM Procedures (see sections 2.3 and 4.3.2.2 and Appendix G). The WWCM Procedures require restrictions on vegetation maintenance within 25 feet of a waterbody. In these areas, Transwestern would limit vegetation maintenance as described above. Transwestern would revegetate disturbed riparian areas with conservation grasses and legumes or native plant species, preferably woody plant species. Additionally, riparian areas identified as xeroriparian (Sonoran deciduous swamp/desert riparian vegetation), which occur along the Phoenix Lateral, would be allowed to re-establish to a mature state within the construction and permanent rights-of-way.

In its Restoration Plan dated July 2007, Transwestern prescribed treatments for riparian areas that include a general requirement that large riparian trees be avoided where possible. The Restoration Plan also includes the following site-specific treatments: on Loop A, cottonwood trees would be preserved at Citizens Wash near MP 0.5; along the Phoenix Lateral, willows would be planted and temporary fencing would be installed at Little Hell Canyon Reservoir near MP 9.5; cottonwood trees, willows, and deer grass as well as a site-specific seed mix would be planted at the Verde River and cat claw acacia, globe mallow, yucca, cliff-rose, mesquite, Apache plum, and wait-a-minute bush would be planted on the adjacent river terrace between MPs 23.7 and 23.8. The construction right-of-way would be narrowed to the extent possible at Government Springs Wash (MPs 75.0 to 75.6), Bumble Bee Creek (MPs 78.0 to 78.2), and at an unnamed riparian wash near Little Squaw Creek (MPs 92.9 to 93.0).

As previously noted, the BLM and the FS have indicated that Transwestern's Restoration Plan dated July 2007 satisfies their revegetation concerns. However, in its comments on the draft EIS, the NMDGF recommended that seepwillows be replaced at the Kutz Canyon crossing. The FS requested that any cottonwood cleared in Little Hell Canyon be preserved and provided for the use of the Hopi Tribe**.** Because there is the potential that these or other agencies would identify additional revegetation concerns before construction, we have recommended in section 4.2.2 that Transwestern coordinate with the BLM, the FS, and other applicable agencies to finalize its Restoration Plan to address any additional concerns identified by these agencies and file the final Restoration Plan before construction.

4.4.4 Noxious Weeds and Other Invasive Plants

Noxious weeds and other invasive plants are non-native, undesirable native, or introduced species that are able to exclude and outcompete desirable native species, and thereby decrease overall species diversity. Noxious weeds often invade and persist in areas after disturbance (e.g., after construction of a pipeline) and can hinder restoration. Other aggressive plant species, both native and introduced, may also outcompete desirable native and other beneficial species. Noxious weeds are addressed by Executive Order 13112 (February 1999), which directs federal agencies to prevent the introduction of invasive species; provide for their control; and minimize the economic, ecological, and human health impacts that invasive species cause. The order further specifies that a federal agency shall not authorize, fund, or carry out actions likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless it has determined that the benefits of such actions outweigh the potential harm caused by invasive species and that all feasible and prudent measures to minimize risk of harm would be taken in conjunction with the actions.

The removal of existing vegetation and the disturbance of soils during construction could create conditions for the invasion and establishment of exotic-nuisance species. Construction equipment traveling from invasive weed-infested areas into weed-free areas could also facilitate the dispersal of invasive weed seed and propagules and result in the establishment of noxious weeds in weed-free areas. The spread of exotic or noxious weeds has been identified as one of the most harmful threats to the biodiversity of the Sonoran Desert area (Marshall et al., 2000). The potential severity of the noxious weed impacts depends upon the species, the prevalence in the area before construction, and the intensity of the construction-induced dispersal.

Transwestern conducted surveys to identify federal- and state-listed noxious weeds along the proposed pipeline route. Table 4.4.4-1 lists the species and density of weed species identified by facility.

TABLE 4.4.4-1

Noxious/Invasive Weed Species Identified During Surveys Along the Phoenix Expansion Project Pipeline Route

Facility/Common Name	Scientific Name	Density [a]
San Juan Lateral Loops		
Annual sunflower	*Helianthus annuus*	NA
Black mustard	*Brassica nigra*	Low-medium
Bull thistle	*Cirsium vulgare*	NA
Common mullein	*Verbascum thapsus*	NA
Common purslane	*Portulaca oleracea*	Low
Fox tail	*Setaria/Hordeum spp.*	Low-medium
Goosefoot	*Chenopodium spp.*	NA
Horehound	*Marrubium vulgare*	High
London rocket	*Sisymbrium irio*	Medium-high
Musk thistle	*Carduus nutans*	Low-medium
Mustards	*Brassica/Descurainia/Sysimbrium spp.*	Low
Prickly Russian thistle	*Salsola tragus*	NA
Puncture vine	*Tribulus terrestris*	NA
Red brome	*Bromus rubens*	NA
Russian olive	*Elaeagnus angustifolia*	High
Nightshade	*Solanum elaeagnifolium*	Low
Salt cedar/tamarisk	*Tamarix sp.*	Medium
Siberian elm	*Ulmus pumila*	Low
Thistle/knapweed	*Carduus/Cirsium/Acroptilon/Centaurea spp.*	Low-medium
Triangle-leaf bursage	*Ambrosia spp.*	Low
Phoenix Lateral and Customer Laterals		
Black mustard	*Brassica nigra*	High
Buffelgrass	*Pennisetum ciliare*	NA
Common mullein	*Verbascum thapsus*	NA
Common purslane	*Portulaca oleracea*	NA
Feather fingergrass	*Chloris virgata*	NA
Filaree	*Erodium spp.*	Low to high
Fox tail	*Setaria/Hordeum spp.*	High
Goosefoot	*Chenopodium spp.*	NA
Halogeton	*Halogeton glomeratus*	NA
Horehound	*Marrubium vulgare*	High
London rocket	*Sisymbrium irio*	Medium-high
Mediterranean grass	*Schismus arabicus*	High
Mustards	*Brassica/Descurainia spp.*	Low to high
Nightshade	*Solanum elaeagnifolium*	Low
Puncture vine	*Tribulus terrestris*	NA

TABLE 4.4.4-1 (cont'd)

Noxious/Invasive Weed Species Identified During Surveys Along the Phoenix Expansion Project Pipeline Route

Facility/Common Name	Scientific Name	Density [a]
Red brome	*Bromus rubens*	Low to high
Russian thistle	*Salsola kali*	Low to high
Salt cedar/tamarisk	*Tamarix spp.*	Low to high
Spurge	*Euphorbia spp.*	NA
Thistle/knapweed	*Cirsium/Centaurea spp.*	Low-medium
Triangle-leaf bursage	*Ambrosia spp.*	Low

[a] Weed densities in each weed patch documented along the survey corridor were classified as low (<10 plants), medium (10 to 100 plants), high (>100 plants), and NA (density not estimated).

Transwestern's Restoration Plan identifies certain areas where noxious and/or invasive weeds identified by the BLM and the FS are present and identifies the control measures that would be implemented at site-specific locations. For example, tamarisk (*Tamarix sp.*), also referred to as salt cedar, is a common and highly invasive weed found in high concentrations in many of the riparian areas that would be crossed by the project. Tamarisk is likely to be found in New Mexico at the Kutz Canyon and San Juan River crossings; and in Arizona at the Gila, Hassayampa, Verde, and Agua Fria Rivers; along Big Bug and Bumble Bee Creeks; and at Galena Gulch. In general, tamarisk plants would be cut and the resultant debris would be burned.

In addition to the weed control measures included in its Restoration Plan, Transwestern has developed a Noxious Weed Management Plan to prevent the spread of noxious weed infestations within the project area. The specific weeds addressed in this plan are listed on noxious weed lists maintained by the New Mexico and Arizona State Departments of Agriculture. Some of the control measures outlined in the plan that Transwestern would implement include washing equipment with water under high pressure (power washing) before working on the project to remove weed seed sources and propagules (i.e., soil, vegetation, seeds, roots, and rhizomes) to prevent the introduction of weed species from sources outside the project area. The power washing would be conducted at locations where the wash water would be directed into a wastewater sewer system. Before clearing operations, areas of noxious weeds identified during noxious weed surveys or subsequent field observations would be flagged in the field. Soils and vegetation removed from these areas and other non-native vegetation communities would be stored and respread in the areas from which they were removed and would not be transported into areas of native vegetation. Equipment used for clearing operations or topsoil/seedbank restoration in areas of noxious weed infestations would be cleaned using compressed air before leaving such areas. Following construction, the right-of-way would be monitored for the presence of noxious weeds for 5 years. On federal lands, Transwestern would be required to monitor for a longer period if determined necessary by the applicable land management agency. The primary treatment method for weed infestations identified during the post-construction monitoring period would be herbicide application. Any post-construction weed control treatment methods conducted would be coordinated in consultation with the landowner or land management agency. Transwestern's Noxious Weed Management Plan is in Appendix R and would also be an appendix of the BLM/FS/BOR POD.

Although Transwestern's Noxious Weed Management Plan appears to address the majority of the weed control issues identified by the BLM and the FS, other issues may be identified by these and other applicable agencies before construction. For example, the FS commented that on Forest System lands, it would monitor the compressed air equipment cleaning and if the procedure does not adequately clean the equipment the FS may require power washing. Therefore, **the FERC staff recommends that:**

- **Transwestern shall coordinate with the BLM, the FS, and other applicable agencies to finalize its Noxious Weed Management Plan to address any additional issues or concerns identified by these agencies. The final Noxious Weed Management Plan shall be filed with the Secretary <u>before construction</u>.**

4.4.5 No Action Alternative

Under the No Action Alternative, the FERC would deny Transwestern's application for a Certificate and the BLM would deny Transwestern's application for a Right-of-Way Grant for the portion of the project on federal lands. The No Action Alternative means that the project would not go forward and the project-related facilities would not be installed. Accordingly, none of the potential environmental impacts on vegetation resources identified for the construction and operation of the proposed project would occur.

4.5 WILDLIFE AND AQUATIC RESOURCES

4.5.1 Wildlife

4.5.1.1 Existing Wildlife Resources

New Mexico and Arizona have a rich biological diversity of wildlife and wildlife habitats. Specifically, New Mexico ranks fourth and Arizona ranks third in the United States in overall species diversity with over 4,500 native species occurring within each state (Stein, 2002).

Pipeline Facilities

As described in section 4.4, the proposed pipeline facilities would cross nine distinct upland vegetation communities. Each of these communities provides nesting, cover, and foraging habitat for a variety of wildlife. Other resources including open water and wetland habitats also provide these same functions for wildlife species. Impacts on these resources are described and quantified in sections 4.3.2 and 4.3.4, respectively. Table 4.5.1-1 identifies some of the wildlife species that are common to these habitats. The majority of bird species within the project area would be considered migratory birds and are discussed in section 4.5.1.3.

The most prevalent habitat that would be affected during construction is desert shrub, which comprises about 36 percent of the wildlife habitat affected by the entire project.[4] Many wildlife species also depend on riparian and wetland areas for their sources of water, cover, and forage. Riparian areas account for about 1 percent and wetlands account for less than 1 percent of the habitat that would be affected by the project. The developed/disturbed community, which provides the least favorable wildlife habitat, is the next most prevalent community comprising about 26 percent of the habitat affected. Other habitats that would be affected are scrub-shrub grassland (10 percent), juniper woodland/grassland (8 percent), agricultural (7 percent), chaparral (6 percent), desert scrub (3 percent), and desert grassland (3 percent). Open water habitats would comprise less than 1 percent of the affected habitats.

Aboveground Facilities

Wildlife use of the areas of the proposed aboveground facility sites is similar to adjacent habitats. The modifications proposed at the existing Bloomfield Compressor Station and Seligman Compressor Station No. 1 would take place within the fenceline and not affect wildlife habitat. Juniper woodland/grassland habitat would be affected by construction of the Ash Fork Facility.

Construction of the 11 proposed meter stations would affect desert shrub, developed/disturbed, and agricultural habitats. The four taps proposed along the Phoenix Lateral would affect desert shrub, scrub-shrub grassland, and chaparral habitats. The pig launcher facility associated with the APS Redhawk Lateral at MP 164.9 that is not collocated with other aboveground facility sites would affect desert shrub habitat.

[4] The entire project includes the pipeline construction right-of-way, extra workspaces, aboveground facilities, pipe storage and contractor yards, and access roads.

TABLE 4.5.1-1

Wildlife Species Common in the Phoenix Expansion Project Area [a]

Type	Species
Mammals	White-tailed deer, elk, mule deer, pronghorn, coyote, collared peccary (Javelina), gray fox, kit fox, red fox, muskrat, ringtail, raccoon, badger, spotted skunk, striped skunk, bobcat, white-nosed coati, hooded skunk, western hog-nosed skunk, black-tailed jackrabbit, desert cottontail, eastern cottontail, Nuttall's cottontail, North American porcupine, American beaver, Gunnison's prairie dog, Arizona gray squirrel, Harris's antelope squirrel, rock squirrel, round-tailed ground squirrel, spotted ground squirrel, white-tailed antelope squirrel, red squirrel, cliff chipmunk, Colorado chipmunk, least chipmunk, Arizona woodrat, banner-tailed kangaroo rat, desert kangaroo rat, desert woodrat, house rat, Ord's kangaroo rat, bushy-tailed woodrat, Mexican woodrat, Norway rat, Stephen's woodrat, white-throated woodrat, Botta's pocket gopher, cinereus shrew, desert shrew, dwarf shrew, montane shrew, Merriam's shrew, Arizona pocket mouse, Bailey's pocket mouse, brush mouse, cactus mouse, canyon mouse, deer mouse, desert pocket mouse, house mouse, little pocket mouse, Merriam's mouse, northern grasshopper mouse, northern rock mouse, pinyon mouse, plains pocket mouse, rock pocket mouse, silky pocket mouse, western harvest mouse, white-footed mouse, long-tailed vole, meadow vole, Mogollon vole, Allen's big-eared bat, big brown bat, big free-tailed bat, Brazilian free-tailed bat, pocketed free-tailed bat, California leaf-nosed bat, cave myotis, greater mastiff bat, lesser long-nosed bat, Townsend's big-eared bat, hoary bat, California myotis, fringed myotis, little brown myotis, long-legged myotis, pallid bat, spotted bat, silver-haired bat, Yuma myotis, western long-eared myotis, western pipistrelle, western red bat, western small-footed myotis, western yellow bat
Amphibians	Bullfrog, chorus frog, canyon treefrog, lowland leopard frog, mountain treefrog, Mexican spadefoot toad, plains spadefoot toad, red-spotted toad, Woodhouse's toad, couch's spadefoot toad, Arizona toad, Great Plains toad, Sonoran desert toad, tiger salamander
Reptiles	Gila monster, Arizona night lizard, Clark's spiny lizard, common lesser earless lizard, common sagebrush lizard, desert horned lizard, desert iguana, desert spiny lizard, eastern collared lizard, elegant earless lizard, Great Basin collared lizard, long-nosed leopard lizard, long-tailed brush lizard, greater earless lizard, greater short-horned lizard, Madrean alligator lizard, ornate tree lizard, plateau lizard, prairie lizard, regal horned lizard, side-blotched lizard, Sonoran collared lizard, tree lizard, western banded gecko, zebra-tailed lizard, Gilbert's skink, Great Plains skink, common chuckwalla, desert grassland whiptail, Gila spotted whiptail, little striped whiptail, plateau striped whiptail, tiger whiptail, Arizona coral snake, black-necked garter snake, blacktail rattlesnake, coachwhip, common kingsnake, eastern racer, glossy snake, gophersnake, ground snake, Mexican garter snake, milk snake, Mojave rattlesnake, nightsnake, prairie rattlesnake, ring-necked snake, rosy boa, saddle leaf-nosed snake, Smith's black-headed snake, sidewinder, Sonora mountain kingsnake, Sonoran whipsnake, speckled rattlesnake, spotted leaf-nosed snake, striped whipsnake, terrestrial garter snake, tiger rattlesnake, Tucson shovel-nosed snake, variable sand snake, western blind snake, western diamondback rattlesnake, western hog-nosed snake, western lyresnake, western patch-nosed snake, western rattlesnake, painted turtle, Sonora mud turtle, spiny softshell, Sonoran desert tortoise
Fish	Black bullhead, bluehead sucker, brown trout, channel catfish, common carp, desert sucker, flannelmouth sucker, fathead minnow, flathead catfish, green sunfish, smallmouth bass, largemouth bass, longfin dace, mosquitofish, mottled sculpin, rainbow trout, red shiner, roundtail chub, Sonora sucker, speckled dace, striped bass, walleye, yellow bullhead, white sucker

[a] Excludes bird species. Bird species are addressed in section 4.5.1.3.

Sources: Adams, 2003; Degenhardt et al., 1996; Kays, 2002; Painter, E. W. and J. N. Stuart, 2004; Stebbins, 1966

Of the 27 proposed valves associated with the Phoenix Lateral, 25 would affect wildlife habitats including scrub-shrub grassland, chaparral, desert shrub, developed/disturbed, and agricultural habitats. Valve-0 would be installed within the Ash Fork Facility site and Valve-255 would be installed within the EPNG East Valley Lateral Meter Station, neither of which would affect additional land.

Pipe Storage and Contractor Yards

Use of the eight pipe storage and contractor yards would affect desert shrub, developed/disturbed, scrub-shrub grassland, juniper woodland/grassland, and agricultural habitats.

Access Roads

Construction of the project would require the use of 174 existing access roads that would require some improvements that could affect vegetation habitats; however, because the exact location of the road improvements is unknown at this time, it is unclear what the impact would be on wildlife habitats. The construction of 11 new permanent access roads would affect developed/disturbed, desert shrub, and chaparral habitats.

4.5.1.2 General Impact and Mitigation

Pipeline Facilities

The impact of the project on wildlife species and their habitats would vary depending on the requirements of each species and the existing habitat present in the areas crossed by the pipeline facilities. Direct impacts of construction on wildlife would include the displacement of wildlife on the right-of-way and could result in the direct mortality of some individuals. Wildlife, such as birds and larger mammals, would leave the vicinity of the right-of-way as construction activities approach. Depending on the season, construction could also disrupt bird courting or nesting and breeding of other wildlife on and adjacent to the right-of-way. Many of these animals may relocate into similar habitats nearby; however, a lack of adequate territorial space could force some animals into suboptimal habitats. This could increase inter- and intra-specific competition and lower reproductive success and survival. The influx and increased density of animals in some undisturbed areas caused by these dislocations could also reduce the reproductive success of animals that are not displaced by construction. Additionally, some smaller, less mobile wildlife, such as small mammals and burrowing species (e.g., burrowing owl, shrew, rats, mice) and reptiles, could be crushed by construction equipment or trapped in trenches. Bird nests located within the construction work area could be destroyed by clearing activities. The loss of these species could result in a decrease in the food stock available for predators of these species. These effects, however, would cease after construction, and wildlife would return to the newly disturbed areas and adjacent, undisturbed habitats after right-of-way restoration is completed.

During construction, Transwestern would reduce the loss of individual animals by implementing its Trenching and Wildlife Guidelines that were developed based on recommendations from the AGFD and the NMDGF (see Appendix K). In accordance with these guidelines, Transwestern would minimize the amount of trench left open; backfill the trench as soon as feasible after the pipe has been lowered in; and, where feasible, leave earthen trench plugs to allow wildlife to cross the open trench. Wildlife escape ramps would be installed in the trench at least every 300 feet and at the end of each section of open trench, and open trenches would be monitored for entrapped wildlife at least daily and before the pipe is lowered in and backfilling occurs. The trench monitors would assist in the removal of wildlife from the trench, document the numbers and locations of individual species identified, and provide this information to the appropriate land management agencies.

The cutting, clearing, and/or removal of existing vegetation would also affect wildlife by reducing the amount of available habitat. The degree of impact would depend on the type of habitat affected and the rate at which vegetation regenerates after construction. The impact on developed/disturbed habitats (1,532.4 acres) would be minor because they provide minimal habitat value and would be restored to near original condition following construction. The impact on agricultural habitats (383.9 acres) would be relatively minor because these areas receive regular disturbance (e.g., crop planting, harvesting) and would be replanted either immediately following, or during the next growing season following construction. Riparian habitats (77.0 acres assuming a successful HDD crossing of the San Juan River (see section 4.3.2.3)) would also recover relatively quickly due to the more prevalent moisture regimes in these areas; however, it could take up to 30 years to reproduce the mature

vegetation that would provide structural diversity similar to preconstruction conditions. Additionally, about 18.9 acres of riparian vegetation would be permanently converted to a more herbaceous/scrub type habitat by maintenance activities conducted over the permanent right-of-way. In response to BLM concerns regarding the effect of vegetation maintenance on habitat loss, Transwestern stated that it would not conduct routine maintenance over its permanent right-of-way in riparian areas identified as xeroriparian (Sonoran deciduous swamp/desert riparian vegetation) that occur along the Phoenix Lateral (see section 4.4.3). Allowing this community to re-establish within the construction and permanent rights-of-way would reduce permanent impacts on riparian vegetation.

Native desert upland habitats could take between 10 and more than 100 years to become re-established depending on the vegetation type. The FS estimates that grasslands would take between 5 and 10 years, while chaparral habitats would take between 30 and 50 years, and juniper-dominated habitats could take more than 100 years to regenerate to late seral stage habitats. Larger specimens within the desert shrub, desert scrub, and scrub-shrub grassland communities could take more than 50 years to regenerate. About 3,809.3 acres of native desert habitats would be affected by the project including: desert shrub (2,087.7 acres), scrub-shrub grassland (591.2 acres), juniper woodland/grassland (443.7 acres), chaparral (358.3 acres), desert scrub (165.4 acres), and desert grassland (163.0 acres). The impacts on these areas would be much greater because these native desert habitats would take the longest amount of time to regenerate. However, in general, the effects on native desert habitats are not expected to have a significant impact on wildlife populations because the amounts of the habitats that would be affected are relatively minor compared to the amounts present in the surrounding areas. In addition, the majority of the construction right-of-way through desert habitats (60 percent) would overlap existing previously disturbed rights-of-way by 15 to 100 feet, which would reduce the amount of habitat loss. Furthermore, Transwestern's implementation of its UECRM Plan (see Appendix F) and Restoration Plan[5] would improve the potential for successful revegetation of the right-of-way in the long term. As discussed in section 4.4.2, Transwestern would not conduct routine maintenance along its permanent right-of-way, which over time, would allow vegetation to regenerate similar to preconstruction conditions. Although the loss of native desert habitat would be long term, the loss would amount to less than 0.01 percent of the regionally available habitat.

Construction of the Phoenix Expansion Project would result in cleared rights-of-way of 75 feet wide along the customer laterals, 100 feet wide along the San Juan Lateral Loops and the Phoenix Lateral between MPs 95.2 and 255.1, and 120 feet wide along the Phoenix Lateral between MPs 0.0 and 95.2. These cleared rights-of-way could contribute to habitat fragmentation and affect the movement of wildlife species. However, this impact would be minimized because Transwestern would reduce the amount of clearing necessary for construction by overlapping its construction right-of-way onto previously disturbed, adjacent rights-of-way. Because 86 percent of the proposed pipeline facilities would be located adjacent to or overlap existing rights-of-way, the project would not result in a new cleared utility corridor for the majority of the facilities but in an incremental increase of existing cleared rights-of-way.

Following construction and restoration, Transwestern would monitor the revegetation of the right-of-way for a period of 5 years following construction. On federal lands, Transwestern would be required to monitor for a longer period if determined necessary by the applicable land management agency. If restoration is not progressing adequately, remedial measures such as additional seedbed preparation and seeding, actions to control human impacts, soil stabilization, or other measures would be implemented. Restoration would be considered successful if the species richness (diversity) of native, perennial vegetation in areas disturbed by construction is equal to or exceeds 60 percent of the species richness in

[5] This plan is too voluminous to include in this EIS but can be viewed on the FERC Internet website at http://www.ferc.gov. Using the "eLibrary" link, select "General Search" from the eLibrary menu and enter the docket number excluding the last three digits in the "Docket Number" field (i.e., CP06-459). Be sure to select an appropriate date range. It is also available for public inspection at the FERC's Public Reference Room in Washington, DC (call (202) 502-8317 for instructions).

adjacent undisturbed locations. For additional details regarding revegetation monitoring, see section 4.4.2.

The clearing of juniper woodland/grassland habitats would result in beneficial impacts on wildlife habitats. In Arizona, where pronghorn habitat coincides with juniper woodland/grassland habitat, the AGFD indicated that pronghorn herds would benefit from a reduction in the amount of juniper and an increase in grasslands.

Open water and wetland habitats are limited within the project area. These areas are important habitats for a number of resident wildlife species**.** Transwestern would minimize impacts on open water and wetland habitats by implementing the measures contained in its WWCM Procedures. Where the pipeline would parallel the Beardsley Canal (between MPs 116.4 and 123.0), the AGFD expressed concern that the open trench and trench spoil pile would block access to the canal for wildlife species that are dependent on the canal as a water source. Transwestern has stated that it would consult with the AGFD to develop measures to maintain access to the canal or provide alternate sources of water every 0.25 mile during construction within this stretch of right-of-way. Transwestern is proposing to cross the San Juan River using the HDD crossing method. A successful HDD crossing would reduce impacts on open water habitat and disturb 3.0 fewer acres of adjacent riparian habitat.

Fires inadvertently started by construction activities (e.g., welding), equipment, or personnel could also affect wildlife in the project area by igniting vegetation along the right-of-way. This habitat loss could cause crowding in adjacent habitats reducing productivity and increasing stress-induced mortality. Fire would likely have temporary impacts on developed/disturbed and agricultural communities and longer-term impacts on native desert communities. Transwestern developed a Fire Prevention and Suppression Plan to minimize the potential for wildfires (see Appendix J). Some of the measures contained in the plan include: requiring the contractor to train all personnel on fire prevention measures; restricting smoking and parking to cleared areas; requiring all combustion engines to be equipped with a spark arrestor; and requiring vehicles and equipment to maintain a supply of fire suppression equipment (e.g., shovels and fire extinguishers). A Fire Guard would coordinate with designated personnel on each construction spread to implement the Fire Prevention and Suppression Plan, On a daily basis, the Fire Guard would inspect work locations and crew activities to ensure compliance with the plan. Transwestern would restrict activities on federal lands during conditions of high fire danger in coordination with the BLM, the FS, and the Tribal or BIA Fire Management Officer.

Aboveground Facilities, Pipe Storage and Contractor Yards, and Access Roads

The impact of the aboveground facilities on vegetation communities (see section 4.4.2) would result in minimal impact on wildlife because only 19.7 acres of habitat would be permanently affected. No permanent impacts on wildlife would result from the use of the pipe storage and contractor yards. The construction of new permanent access roads would affect about 1.6 acres of developed/disturbed, 0.7 acre of desert shrub, and 0.3 acre of chaparral habitats. This loss of habitat would be negligible given the amount of available habitat in the project area.

4.5.1.3 Migratory Birds

Executive Order 13186 (January 2001) directs federal agencies to consider the effects of agency actions and plans on migratory birds, with emphasis on species of concern. A variety of migratory bird species, including both songbirds and raptors, utilize the vegetation communities identified within the project area. Migratory birds are species that nest in the United States and Canada during the summer, and then migrate south to the tropical regions of Mexico, Central and South America, and the Caribbean for the non-breeding season. The Phoenix Expansion Project would be within the Sonoran/Mohave and

Southern Rockies Colorado Plateau bird conservation regions as identified by the U.S. North American Bird Conservation Initiative (NABCI) Committee.[6] General impacts on migratory birds are discussed below; specific impacts on many of these species are discussed in section 4.6. Two hundred and sixty-nine migratory bird species could occur within the project area in New Mexico, of which 149 species potentially breed within the project area (Natural Heritage New Mexico, 2006; FWS, 2005). In Arizona, 257 migratory bird species could occur within the project area, of which 126 species potentially breed within the area (AGFD, 2006a; Corman and Wise-Gervais, 2005; FWS, 2005).

The Phoenix Expansion Project would result in short- and long-term losses of habitat available to migratory birds. Short-term losses of habitat available for use by migratory birds would include 383.9 acres of agricultural habitat, 1,532.4 acres of developed/disturbed habitats, and less than 1 acre of emergent wetland habitat. Construction of the project would also disturb a total of 3,809.3 acres of native desert habitat, which would result in long-term losses of habitat available for use by migratory birds because these habitats would require many years to recover following construction. This loss of habitat would be minimized by Transwestern's proposal to overlap its construction right-of-way over previously disturbed rights-of-way, which would reduce new long-term habitat loss. Additionally, Transwestern would adjust its clearing limits to preserve sensitive vegetation such as large ironwood trees or saguaro cacti, which would be beneficial to migratory birds by maintaining some structural diversity within the project area. The measures contained in Transwestern's UECRM Plan, Restoration Plan, and Noxious Weed Management Plan would promote revegetation of disturbed areas by restoring original contours, segregating topsoil or the top 3 inches of soil, alleviating compaction or scarifying the seedbed, seeding selected areas, chain dragging and imprinting disturbed areas, respreading cut vegetation over the restored areas, controlling erosion, controlling the spread of noxious weed species, monitoring restoration of the right-of-way, and implementing remedial treatments if necessary (see sections 4.4.2 and 4.4.4). Although the loss of native desert habitat that would be utilized by migratory birds would be long term, this loss would amount to less than 0.01 percent of the regionally available desert habitat.

Long-term losses of habitat would also affect about 77.0 acres of riparian habitat that provides important habitats for migratory birds. Transwestern would avoid impacts on about 3.0 acres of riparian habitat by conducting an HDD crossing of the San Juan River. Implementation of its WWCM Procedures, which includes revegetation requirements and limits on right-of-way maintenance activities, would further reduce impacts on riparian vegetation. Riparian areas would be actively revegetated with conservation grasses and legumes or native plant species, preferably woody species. Vegetation maintenance within 25 feet of a waterbody would be restricted to a 30-foot-wide corridor centered over the pipeline. Within this corridor, trees greater than 15 feet in height could be removed every 3 years and annual vegetation maintenance would be restricted to a 10-foot-wide corridor centered over the pipeline.

As noted above, Transwestern would not conduct routine maintenance over its permanent right-of-way in riparian areas identified as xeroriparian (Sonoran deciduous swamp/desert riparian vegetation) that occur along the Phoenix Lateral. In addition, Transwestern would conduct site-specific treatments to reduce short- and long-term impacts on riparian habitat including avoiding large riparian trees; reducing the right-of-way width; and planting cottonwoods, willows, and other species, including native grasses. Following a review of Transwestern's most recent draft of its Restoration Plan dated July 2007, the BLM and the FS indicated that they are satisfied with the measures contained in the plan. However, to address the potential for additional revegetation issues to be identified by these and other applicable agencies, we have recommended in section 4.2.2 that Transwestern coordinate with the BLM, the FS, and other applicable agencies and address any remaining issues in a final Restoration Plan to be filed before

[6] The NABCI Committee is a coalition of government agencies, private organizations, and bird initiatives in the United States working to advance integrated bird conservation (NABCI, 2006).

construction. Section 4.4.3 includes a more detailed discussion of the site-specific measures included in the Restoration Plan.

Some wintering migratory birds concentrate in foraging areas that are ephemeral and widely dispersed. For example, in Arizona, a large concentration of shorebirds including long-billed curlews, greater yellowlegs, and sandpipers was documented in a flood-irrigated agricultural field near MP 227.0 of the Phoenix Lateral during biological surveys in January 2006. Such an aggregation would be displaced by construction activities and these birds may have fewer foraging alternatives than other species that also use flooded agricultural fields (e.g., sparrows, blackbirds). However, shorebird concentrations are a rarity along the Phoenix Lateral corridor (only one was documented during biological surveys) and the potential impacts on such species would be limited to the period of active construction.

Transwestern has stated that it would attempt to schedule the majority of construction activities in native habitats outside of the breeding season for migratory birds. However, due to the overall duration of the construction schedule, avoidance of the breeding season would not be possible.

The AGFD recommended that Transwestern conduct surveys to determine when bird species may be utilizing the project area and develop a plan to avoid disturbance during the breeding season. Transwestern has filed a preliminary Migratory Bird Plan that includes potential measures to minimize impacts on migratory birds (see Appendix S). Some of the measures proposed include: the destruction of nests during the dormant (i.e., non-breeding) season; the preclearing of suitable nesting vegetation from the right-of-way; and the installation of temporary barriers to make existing nests unusable during the construction period. Certain mitigation measures included in the plan pertain specifically to large migratory birds (e.g., raptors and ravens) and some pertain to all migratory birds; however, it is not clear exactly why the distinction is made and in certain cases it is not clear to which group the specific measures apply. Because Transwestern is currently working with the FWS to finalize the mitigation measures contained in its Migratory Bird Plan, **the FERC staff recommends that:**

- **Transwestern shall continue to consult with the FWS and finalize its plan to protect migratory bird species during construction, including: specific details of the measures that would be implemented to protect nesting migratory birds; clarification as to which measures apply only to large migratory birds and which measures apply to all migratory birds; and a discussion of the basis for those distinctions. The plan and documentation of consultation with the FWS regarding the plan shall be filed with the Secretary <u>before construction</u>.**

With the implementation of Transwestern's proposed measures and our recommendation, the project would not substantially reduce the abundance of species under the protection of the Migratory Bird Treaty Act.

4.5.1.4 Sensitive or Managed Wildlife Habitats and Species

No sensitive or managed wildlife habitats or species were identified. The project would affect several management indicator species (MIS) that occur where the Phoenix Lateral would cross the Kaibab and Prescott National Forests. These species are discussed in section 4.6.7.

4.5.2 Aquatic Resources

4.5.2.1 Existing Aquatic Resources

Fishery resources in the waterbodies that would be crossed by the proposed project would be limited to the eight proposed crossings of perennial waterbodies, the San Juan River and five tributaries to the San Juan River (MPs 1.0 to 1.7) along Loop A in New Mexico, and the Verde River (MP 23.8) and the Enterprise Canal (MP 174.6) along the Phoenix Lateral in Arizona.

Pipeline Facilities

In New Mexico, the San Juan River (MP 1.5) and the five unnamed tributaries to the river (MPs 1.0 to 1.7) are designated for both marginal coldwater aquatic life and warmwater aquatic life at the proposed crossing locations (NMED, 2006). Native species that are likely to occur at the proposed crossing location of the San Juan River include bluehead sucker, flannelmouth sucker, and mottled sculpin. Introduced fish species that could occur at the proposed crossing include white sucker and several sucker hybrids, red shiner, common carp, green sunfish, smallmouth bass, largemouth bass, striped bass, walleye, rainbow trout, brown trout, black bullhead, yellow bullhead, and channel catfish. These native and introduced species could also be present in the perennial tributaries to the San Juan River, primarily near their confluences with the river; however, these tributaries do not contain habitat likely to support populations of these species, especially at the proposed crossing locations. The San Juan River supports three federally and/or state-listed endangered species, the Colorado pikeminnow, the razorback sucker, and the roundtail chub (see sections 4.6.3.5, 4.6.3.6, and 4.6.4.4, respectively).

In Arizona, the Verde River (MP 23.8) does not support a commercial or sport fishery in the vicinity of the proposed crossing. Native fish species that could occur at Transwestern's proposed crossing of the Verde River include desert sucker, longfin dace, headwater chub, Sonora sucker, speckled dace, and spikedace. These species are considered special status species and are discussed in section 4.6. In addition, the Verde River supports designated critical habitat for the spikedace (see section 4.6.3.7). Several introduced species also could occur, including yellow bullhead, carp, red shiner, flathead catfish, mosquitofish, green sunfish, and smallmouth bass. The presence of introduced species contributes significantly to the reduction in populations of native species, both through competition and especially by direct predation.

The Enterprise Canal (MP 174.6) does not have specific water quality designations. Canals in Arizona typically support domestic water use, irrigation, and livestock watering, which are designations that are not indicative of supporting sustainable populations of aquatic resources.

Other river crossings along the Phoenix Lateral that are intermittent or ephemeral at the proposed crossing locations include the Tributaries to the Agua Fria River (MPs 44.6 to 47.6), the Agua Fria River (MPs 88.2 and 110.9), the Hassayampa River (MP 155.1), the Gila River (MPs 174.8 and 174.9), and the Tributary to the Gila River (MP 175.3). The Agua Fria River is dry much of the year. Transwestern proposes to cross intermittent and ephemeral waterbodies that are dry at the time of construction using the dry open-cut method, which involves standard upland cross-country construction techniques as described in section 2.3.1. All intermittent and ephemeral streams with perceptible flow at the time of crossing would be crossed using the wet open-cut method (see section 2.3.2).

No waterbodies would be crossed by the customer laterals.

Aboveground Facilities and Pipe Storage and Contactor Yards

No waterbodies are present at any of the aboveground facility sites or proposed pipe storage and contractor yards.

Access Roads

The 63 waterbodies that would be crossed by access roads associated with the project (4 in New Mexico and 59 in Arizona) are ephemeral waterbodies. These waterbodies are listed in table L-2 in Appendix L.

4.5.2.2 General Impact and Mitigation

Construction of the pipeline and the use of access roads across waterbodies would increase the sedimentation and turbidity of the water, the potential for streambank erosion, and the potential for fuel and chemical spills. These effects could impact aquatic resources. Construction-related impacts on aquatic resources could also result from in-stream blasting, hydrostatic testing, and water withdrawals for dust control. The degree of impact would depend on the proposed crossing method, the existing conditions at each crossing location, the mitigation measures employed, and the timing of construction.

Sedimentation and Turbidity

Sedimentation can adversely affect fish eggs and juvenile fish survival, benthic community diversity and health, and spawning habitat. The San Juan River would be crossed using the HDD method. Use of the HDD method would avoid impacts on the waterbody and prevent changes in sedimentation or turbidity. If the HDD is not successful, Transwestern proposes to cross the river using a modified wet open-cut method as described in section 4.3.2.3. The majority of the remaining waterbodies that are flowing at the time of construction would be crossed using the wet open-cut crossing method. Because this method involves trench excavation, pipeline installation, and backfilling in a waterbody without controlling or diverting streamflow, it has a higher potential for sedimentation and turbidity than the other crossing methods. However, the wet open-cut method is also the quickest crossing method. Because the effects of increased sedimentation and turbidity are generally limited to the period of in-stream work, the duration of these effects would be relatively short.

In Arizona, the Verde River would be crossed using a variation of the flume method as described in section 4.3.2.3. Use of this dry crossing method would minimize potential impacts on aquatic resources. To protect fishery resources in the river, Transwestern would attempt to complete construction across the river before the end of January as requested by the Prescott National Forest depending on the receipt of the necessary permits.

Transwestern would cross the Enterprise Canal by boring below the waterbody and thus avoid impacts on aquatic resources that may be present in the canal.

Streambank Erosion

Waterbodies crossed by the proposed project facilities that would be susceptible to streambank erosion are primarily limited to perennial rivers. Crossing the San Juan River using the HDD method would avoid disturbance of the streambank vegetation. Retaining the existing bank composition at this waterbody would prevent the need for bank armoring following construction. Clearing of vegetation at the other perennial waterbodies that would be crossed including the unnamed tributaries to the San Juan River and the Verde River could temporarily increase susceptibility of streambanks to erosion. However,

adherence to Transwestern's UECRM Plan and WWCM Procedures (see section 2.3 and Appendices F and G, respectively), and its Restoration Plan would facilitate revegetation of the banks following construction such that no long-term impacts would be expected. Additionally, clearing of banks of intermittent and ephemeral waterbodies would not be expected to increase the susceptibility of those features to streambank erosion due to the limited flow in each waterbody.

Fuel and Chemical Spills

A chemical or fuel spill in or near a waterbody could release contaminants, which could affect fish directly or indirectly through changes in food sources or by contaminating the water resources. Transwestern would adhere to the measures detailed in its SPR Procedures (Appendix H) to prevent a large spill from occurring near surface waters. Hazardous materials storage and vehicle or equipment refueling would be restricted within 100 feet of surface waters. Should a spill occur, the implementation of the measures in the SPR Procedures, such as maintaining adequate emergency response equipment, would decrease the response time for control and clean up of the spill and minimize exposure of aquatic resources to hazardous materials released into a waterbody. Although some individual fish or invertebrates could be harmed by a spill of hazardous materials into a waterbody, these impacts would not change the numbers of a local population or cause a substantial deterioration of existing fish habitat.

Hydrostatic Testing and Dust Control Water Withdrawals

Potential impacts associated with hydrostatic testing and dust control water withdrawals include entrainment of fish, reduced downstream flows, impaired downstream uses associated with water withdrawals, erosion, scouring, and a release of chemical additives associated with hydrostatic test water discharges. Transwestern proposes to obtain hydrostatic test water for Loop A from the San Juan River; for Loop B from private wells; and for the Phoenix Lateral and customer laterals from private wells, the CAP/Waddell Canal or other nearby canals, and effluent from the Casa Grande Wastewater Treatment Facility. These same sources of water are expected to be used for dust control. The estimated hydrostatic water requirements, sources, and discharge locations are listed in table 4.3.3-1. Transwestern has stated that it is likely that water used to test one test section would be pumped to another test section; therefore, the total water requirements would be less than the estimated volumes.

Transwestern would screen intake piping to prevent fish and fish egg entrainment during hydrostatic test water withdrawal. In accordance with its WWCM Procedures, Transwestern would obtain approval from the appropriate federal and state agencies to use the San Juan River as a water source because it supports three federally and/or state-listed endangered species, the Colorado pikeminnow, the razorback sucker, and the roundtail chub (see sections 4.6.3.5, 4.6.3.6, and 4.6.4.4, respectively).

Water withdrawals from existing wells, canals, and the wastewater treatment facility would not affect current flow levels in waterbodies containing fishery resources, and fish and fish egg entrainment would be minimized during water withdrawals by screening. Approvals obtained from appropriate agencies for water withdrawals from the San Juan River are expected to include specific measures, as necessary, to avoid or minimize impacts on fishery resources in that waterbody. In section 4.3.2.3, we have recommended that Transwestern prepare and file a revised Dust Control Plan that specifies the sources of water that would be used for dust control, the anticipated quantities of water that would be required, and measures to prevent fish and fish egg entrainment during dust control water withdrawals. As such, water withdrawals for the proposed project are not expected to affect the movement, range, or spawning of resident fish.

The potential impacts resulting from the discharge of hydrostatic test water include soil erosion and stream scour and subsequent degradation of water quality. After hydrostatic testing, the water would be discharged through energy dissipation devices and sediment barriers to prevent erosion. No chemicals would be added to the test water. Hydrostatic test water would not be discharged directly into waterbodies or wetlands. Dust control water would be sprayed directly on the ground surface. Therefore, changes in water quality would not be expected from hydrostatic testing or dust control activities.

Blasting

Transwestern anticipates that some in-stream blasting may be necessary. If in-stream blasting is required, aquatic organisms close to the blast may be injured or killed. Transwestern would use techniques such as non-injurious scare charges, microsecond delays, and other typical procedures to minimize the blast pressures and cause mobile species to move out of the blast area before detonation. It is expected that the preparation of the rock for blasting (i.e., drilling shot holes) would cause enough disturbance to displace most aquatic organisms from the immediate vicinity of the blast. Immediately following blasting, Transwestern would remove shot rock that impedes streamflow. Transwestern has also prepared a Blasting Procedure to minimize the effects of blasting and ensure safety during blasting operations (see Appendix N). As a result, impacts on aquatic resources associated with blasting would be minimal.

Timing of Construction

The degree of impact associated with in-stream activities can be affected by the season of construction. Construction during periods of sensitive fish activities (i.e., spawning and migration) can have a greater impact on fish than construction during other periods. The majority of the waterbodies that would be crossed by the project are intermittent or ephemeral waterbodies that do not typically support fisheries or provide critical aquatic habitat or migratory passage for aquatic organisms. Transwestern's proposed crossing methods, our recommended mitigation measures, and any additional conservation measures potentially imposed by the FWS (see section 4.6) would minimize impacts on fish spawning and migration in the remaining waterbodies.

4.5.2.3 Site-specific Impact and Mitigation

Transwestern proposes to cross the San Juan River using the HDD method. Although the HDD method avoids in-stream impacts because it eliminates the need for in-stream excavation, it does not completely eliminate the possibility of impacts on aquatic resources due to the possibility of a frac-out into the waterbody. Drilling mud primarily consists of water mixed with bentonite, which is a naturally occurring clay material. A frac-out could occur if the drilling head hits a subterranean fracture in the substrate. When the drilling mud reaches the fracture, it can follow the fracture up or otherwise be forced to the surface or into the water if drilling is occurring under a waterbody. If drilling mud is released into the water, the settling bentonite could cover fish or amphibian eggs and cut off their oxygen supply. Bentonite has not been shown to adversely affect gills or feeding of fish or invertebrates.

Transwestern's HDD Plan (see Appendix I) describes how the HDD operation would be conducted and monitored to minimize the potential for inadvertent drilling mud releases as well as corrective actions and procedures for clean up of drilling mud releases and for sealing the hole if the HDD cannot be completed. In accordance with the HDD Plan, if a frac-out occurs in the water, the HDD operation would be stopped immediately. Transwestern would contact the FERC, the FWS, the COE, the NMDGF, the New Mexico Oil Conservation Division, and the Surface Water Bureau of the NMED to describe the location and nature of the release and the corrective actions being taken. These agencies would determine whether additional measures need to be implemented. If it is determined that the release

cannot be remedied without causing additional environmental impact, in accordance with its HDD Plan, Transwestern may abandon the HDD effort and complete the crossing using the wet open-cut method. The specific criteria for determining whether the HDD could be successfully completed or whether it would be abandoned are also outlined in Transwestern's HDD Plan.

As discussed in section 4.3.2.3, due to the presence of the federally listed Colorado pikeminnow and razorback sucker and the uncertainty over whether the San Juan River can be successfully crossed using the HDD method, the FERC staff initiated formal consultation with the FWS regarding the impact of the project on these species should a wet open-cut crossing be necessary. The San Juan River also supports the state-listed roundtail chub. In its comments on the draft EIS, the NMDGF requested that it be notified 7 days in advance of the start of in-stream construction activities at the San Juan River. We have recommended in section 4.3.2.3 that Transwestern not begin a wet open-cut crossing of the San Juan River until Transwestern files with the Secretary documentation of the events leading up to the HDD failure and documentation that it has provided at least 7 days advance notification of the start of in-stream activities at the San Juan River to the NMDGF and receives written notification from the Director of OEP that a wet open-cut crossing may begin.

Aboveground Facilities and Pipe Storage and Contractor Yards

No waterbodies are present at any of the aboveground facility sites or proposed pipe storage and contractor yards. Therefore, no impacts on aquatic resources would occur during construction or operation.

Access Roads

The 63 waterbodies that would be crossed by access roads associated with the project are ephemeral waterbodies that are not expected to support fisheries or provide critical aquatic habitat or migratory passage for aquatic organisms. Therefore, no impacts on aquatic resources would occur as a result of use of these roads.

4.5.3 No Action Alternative

Under the No Action Alternative, the FERC would deny Transwestern's application for a Certificate and the BLM would deny Transwestern's application for a Right-of-Way Grant for the portion of the project on federal lands. The No Action Alternative means that the proposed project would not go forward and the project-related facilities would not be installed. Accordingly, none of the potential environmental impacts on wildlife and aquatic resources identified for the construction and operation of the proposed project would occur.

4.6 SPECIAL STATUS SPECIES

4.6.1 Regulatory Requirements and Species Identification

Federal agencies are required by section 7 of the ESA (Title 19 USC Part 1536(c)), as amended (1978, 1979, and 1982), to ensure that any actions authorized, funded, or carried out by the agency do not jeopardize the continued existence of a federally listed endangered or threatened species, or result in the destruction or adverse modification of designated critical habitat of a federally listed species. The action agency (e.g., the FERC) is required to consult with the FWS and/or the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) to determine whether federally listed endangered or threatened species or designated critical habitat are found in the vicinity of the proposed project, and to determine the proposed action's potential effects on those species or critical habitats. For actions involving major construction activities with the potential to affect listed species or designated critical habitat, the federal agency must submit a Biological Assessment (BA) to the FWS and/or the NMFS and, if it is determined that the action may adversely affect a listed species, the federal agency must submit a request for formal consultation to comply with section 7 of the ESA. In response, the FWS and/or the NMFS would issue a Biological Opinion (BO) as to whether or not the federal action would likely jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of designated critical habitat.

In compliance with section 7 of the ESA, on May 4, 2007 the FERC submitted a BA to the FWS. The draft EIS was also provided to the FWS and was incorporated by reference within the BA. In a letter dated June 7, 2007, the FWS indicated that it had received or had access to all of the information necessary for the FERC to initiate formal consultation and that formal section 7 consultation for the proposed Phoenix Expansion Project was initiated on May 9, 2007 (see section 4.6.6). The FWS has not yet issued the BO. No species under the NMFS' jurisdiction would be affected by the proposed project.

Additionally, the State of New Mexico's Endangered Species Act requires state agencies to protect state-listed endangered or threatened species. In addition to species listed as endangered or threatened under the ESA and New Mexico laws, agencies and organizations such as the FWS, the NMDGF, the BLM, the Navajo Nation Department of Fish and Wildlife (NNDFW), and the FS (Kaibab and Prescott National Forests) maintain lists of special concern or sensitive species that are also appropriate to consider in this NEPA analysis. Arizona does not have an endangered species law for plants or animals; however, the AGFD has a ranking system for species of special concern. These species were also included in this analysis.

For purposes of this environmental analysis, special status plants and animals include the following:

- species officially listed by the federal government or New Mexico as endangered, threatened, or rare;
- species that are proposed for federal listing as threatened or endangered or considered candidates for listing; and
- species noted as sensitive or of special concern by the FWS, the BLM, the FS, the NNDFW, the NMDGF, and the AGFD.

Transwestern and the FERC consulted with the FWS, the FS, the NNDFW, the BLM, the NMDGF, and the AGFD and used data from the natural heritage programs in New Mexico and Arizona to prepare a list of threatened, endangered, and special status species that potentially occur in the vicinity of

the proposed project. Transwestern and the FERC also met with representatives of the FS to present an overview of the project and solicit issues of concern.

A total of 102 special status species were initially identified as potentially occurring within the proposed project area (see table 4.6.1-1). Following focused habitat evaluations and species-specific surveys in 2006, 54 of the 102 species were eliminated from consideration due to lack of habitat or absence during field surveys (see table 4.6.1-1). The remaining 48 species are discussed below.

4.6.2 General Impact and Mitigation

In general, the impacts of the proposed project on special status species would be the same as described for vegetation, wildlife, and aquatic resources (see sections 4.4.2, 4.5.2.1, and 4.5.2.2, respectively). However, the magnitude and duration of these impacts could be greater for special status species because their distribution and relative abundance usually are more limited. Construction could remove special status plants living within the construction right-of-way and could disturb, displace, or harm special status animals on and adjacent to construction work areas. Construction could also affect special status plants and wildlife by temporarily and permanently altering the habitat along the pipeline right-of-way and at aboveground facility sites.

4.6.3 Federally Listed Threatened and Endangered Species

Based on consultations with the FWS' New Mexico and Arizona Ecological Services Field Offices as well as the NMDGF, the AGFD, and a search of the New Mexico and Arizona natural heritage program databases, 15 federally listed threatened and endangered species protected under the ESA were identified as potentially occurring in the proposed project area in New Mexico and Arizona. The list includes three mammals, four birds, six fish, and two plants (see table 4.6.1-1). Two bird species, the bald eagle and the cactus ferruginous pygmy owl, have been delisted and one bird species, the yellow-billed cuckoo, is a candidate for federal listing. The bald eagle remains a state-listed species in New Mexico and is discussed in section 4.6.4. The cactus ferruginous pygmy owl is discussed in section 4.6.5. No impacts are anticipated on the yellow-billed cuckoo; therefore, this species is not discussed in this final EIS. Eight federally listed species would not be affected due to lack of habitat in the project area or the unlikelihood of occurrence and have been eliminated from further consideration. These species include the black-footed ferret, Mexican gray wolf, Mexican spotted owl, desert pupfish, Gila chub, Gila topminnow, Arizona agave, and the Mesa Verde cactus. Discussions of the remaining seven federally listed species are presented below.

4.6.3.1 Lesser Long-nosed Bat

The lesser long-nosed bat is a federally listed endangered species that occurs from desert grasslands and shrubland to oak transitional areas. Only two old specimen records exist for this species north of Picacho Peak, which is about 50 miles south of the proposed project, and none exist for it north of Phoenix (Linwood, 2006). The lesser long-nosed bat roosts in caves, mine tunnels, and occasionally in old buildings, and forages in areas of saguaro, ocotillo, palo verde, prickly pear, and organ pipe cactus, and later in summer, among agaves. It is found at lower elevations below about 3,500 feet from April to at least July and ranges up to approximately 5,500 feet from about July to late September or October (Cockrum, 1989). Exclusion of food sources or habitat and disturbance are thought to have caused reductions in the number of maternity colonies and declines in the size of remaining maternity colonies in Arizona and Sonora, Mexico, leading to this bat's endangered status (AGFD, 2006a).

TABLE 4.6.1-1

Special Status Species Initially Identified as Potentially Occurring in the Vicinity of the Phoenix Expansion Project

Species	Status [a]			Eliminated from Further Consideration	Facility/General Milepost Range Where Species May Occur
	Federal	State	Other		
Mammals					
Arizona pocket mouse *(Perognathus amplus)*			NN-G4		San Juan Lateral Loop B
Banner-tailed kangaroo rat *(Dipodomys spectabilis)*			NN-G4		Mileposts (MPs) 71.9 to 75.5 of the San Juan Lateral Loop B
Black-footed ferret (*Mustela nigripes)*	F-E	NM-E	NN-G2	No suitable habitat in project area; proposed Seligman Compressor Station is approximately 25 miles from reintroduction area for species – no effect	
California leaf-nosed bat (*Macrotus californicus*)		AZ-SC	FWS-SC BLM-S		Phoenix Lateral
Cave myotis (*Myotis velifer*)			FWS-SC BLM-S		Phoenix Lateral
Chisel-toothed kangaroo rat *(Dipodomys microps)*			NN-G4	No suitable habitat in project area – no effect	
Fringed myotis (*Myotis thysanodes*)			FWS-SC BLM-S		Phoenix Lateral
Kit fox *(Vulpes macrotis)*			NN-G4		San Juan Lateral Loops A and B
Lesser long-nosed bat *(Leptonycteris curasoae yerbabuenae)*	F-E				Phoenix Lateral
Mexican gray wolf *(Canis lupus baileyi)*	F-E			Unlikely to occur in project area; project would not affect Blue Range Wolf Recovery Area – no effect	
Pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*) [=P*lecotus townsendii pallescens*]		NM-SC	FWS-SC NN-G4		San Juan Lateral Loops A and B, Phoenix Lateral
Pronghorn *(Antilocarpa americana)*			NN-G3		San Juan Lateral Loop B
Spotted bat *(Euderma maculatum)*		NM-T	NN-SS	No suitable habitat in project area – no effect	
Western yellow bat (*Lasiurus xanthinus*)		AZ-SC		No suitable habitat in project area – no effect	
Birds					
Peregrine falcon (*Falco peregrinus anatum*)		NM-T	FWS-SC NN-G4		San Juan Lateral Loop B
Bald eagle *(Haliaeetus leucocephalus)*	F-D	NM-T AZ-SC			MP 1.5 of the San Juan Lateral Loop A, MPs 2.5 to 136 and 174.8 of the Phoenix Lateral
Belted kingfisher (*Ceryle alcyon*)		AZ-SC			MP 23.8 of the Phoenix Lateral
Broad-billed hummingbird (*Cyananthus latirostris*)		NM-T			San Juan Lateral Loops A and B

TABLE 4.6.1-1 (cont'd)

Special Status Species Initially Identified as Potentially Occurring in the Vicinity of the Phoenix Expansion Project

Species	Status [a]			Eliminated from Further Consideration	Facility/General Milepost Range Where Species May Occur
	Federal	State	Other		
Cactus ferruginous pygmy owl (*Glaucidium brasilianum cactorum*)	F-D				Phoenix Lateral
Common blackhawk (*Buteo anthracinus*)			FWS-S		MPs 23.8, 44.8, 155.1, and 174.8 of the Phoenix Lateral
Ferruginous hawk *(Buteo regalis)*			NN-G3		San Juan Lateral Loop B
Golden eagle *(Aquila chrysaetos)*			NN-G3		San Juan Lateral Loop B
Gray vireo *(Vireo vicinior)*		NM-T	NN-SS	No suitable habitat in project area – no effect	
Great egret (*Ardea alba*)		AZ-SC			MPs 162 to 177 of the Phoenix Lateral
Least bittern (*Lxobrychus exilis*)		AZ-SC			Phoenix Lateral
Least tern (*Sterna antillarum athalassos*)	F-E	NM-E			MP 1.5 of the San Juan Lateral Loop A
Loggerhead shrike *(Lanius ludovicianus)*		NM-SS			San Juan Lateral Loop B
Mexican spotted owl (*Strix occidentalis lucida*)	F-E			No suitable habitat in project area; no critical habitat would be crossed by the proposed project – no effect	
Mountain plover (*Charadrius montanus*)		NM-SS	FWS-SC NN-G4	Not identified during field surveys; negligible long-term or permanent effects on habitat in project area – no effect	
Northern goshawk (*Accipiter gentilis*)			FS-S		MPs 0.0 to 1.5, 5.0 to 5.5, and 9.5 of the Phoenix Lateral
Southwestern willow flycatcher (*Empidonax trailii extimus)*	F-E	NM-E AZ-SC	NN-G2 FS-S		MP 1.5 of the San Juan Lateral Loop A
Western burrowing owl *(Athene cunicularia hypugaea)*		NM-SS	FWS-SC NN-G4		MPs 140 to 255.1 of the Phoenix Lateral
Yellow-billed cuckoo *(Coccyzus americanus)*	F-C	NM-SS	FWS-SC NN-G3	Not identified during field surveys; negligible long-term or permanent effects on marginal habitat in the project area – no effect	
Yuma clapper rail (*Rallus longirostris yumanensis*)	F-E	AZ-SC			MP 174.8 of the Phoenix Lateral and nearby wetlands
Zone-tailed hawk (*Buteo albonotatus*)			BLM-S	No suitable habitat in project area – no effect	
Invertebrates					
MacNeil sooty winged skipper (*Hesperopsis gracielae*)			BLM-S FS-S	No suitable habitat in project area – no effect	
Maricopa tiger beetle (*Cicindela oregona maricopa*)			FWS-SC BLM-S FS-S		Phoenix Lateral

TABLE 4.6.1-1 (cont'd)

Special Status Species Initially Identified as Potentially Occurring in the Vicinity of the Phoenix Expansion Project

Species	Status [a]			Eliminated from Further Consideration	Facility/General Milepost Range Where Species May Occur
	Federal	State	Other		
New Mexico silverspot butterfly *(Speyeria okomis nitocris)*			FWS-SC NN-G3	Not identified during field surveys – no effect	
San Juan checkerspot butterfly *(Euphydryas anicia chuskae)*			FWS-SC	Not identified during field surveys – no effect	
San Juan tiger beetle *(Cicindela lengi jordai)*			FWS-SC		San Juan Lateral Loops A and B
Verde Rim springsnail (*Pyrgulopsis glandulosa*)			FS-S		MP 23.8 of the Phoenix Lateral
Amphibians and Reptiles					
Arizona night lizard (*Xantusia vigilis arizonae*)			FS-S	Not identified during field surveys – no effect	
Arizona toad (*Bufo microscaphus*)			FWS-SC FS-S		MPs 0 to 100 of the Phoenix Lateral
Common chuckwalla (*Sauromalus obesus*)			BLM-S	Not identified during field surveys – no effect	
Lowland leopard frog (*Rana yavapaiensis*)			FWS-SC FS-S		Phoenix Lateral
Mexican garter snake (*Thamnophis eques megalops*)			FS-S		MPs 23.8 and 44.8 of the Phoenix Lateral
Milk snake (*Lampropeltis triangulum)*			NN-G3	Not identified during field surveys – no effect	
Narrow-headed garter snake (*Thamnophis rufipunctatus*)			FS-S		MP 23.8 of the Phoenix Lateral
Sonoran desert tortoise (*Gopherus agassizii*)		AZ-SC	FWS-SC BLM-S		MPs 84.5 to 86.0, and south of MP 66 of the Phoenix Lateral
Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*)			BLM-S		MPs 201 to 209 of the Phoenix Lateral
Fish					
Colorado pikeminnow *(Ptychocheilus lucius)*	F-E	NM-E	NN-G2		MP 1.5 of the San Juan Lateral Loop A
Desert pupfish *(Cyprinodon macularis)*	F-E			Unlikely to occur in project area – no effect	
Desert sucker (*Catastomus clarki*)			FWS-SC BLM-S		MPs 23.8 and 44.8 of the Phoenix Lateral
Flannelmouth sucker (*Catostomus latipinnis*)			BLM-S	Unlikely to occur in project area – no effect	
Gila chub *(Gila intermedia)*	F-E			Unlikely to occur in project area – no effect	
Gila topminnow (*Poeciliopsis occidentalis occidentalis*)	F-E	AZ-SC		Unlikely to occur in project area – no effect	
Headwater chub (*Gila nigra*)			FWS-SC		MP 23.8 of the Phoenix Lateral
Longfin dace (*Agosia chrysogaster*)			FWS-SC BLM-S		MPs 23.8 and 44.8 of the Phoenix Lateral
Razorback sucker *(Xyrauchen texanus)*	F-E	NM-SS AZ-SC	NN-G2		MP 1.5 of the San Juan Lateral Loop A
Roundtail chub *(Gila robusta)*		NM-E	NN-G2 FWS-SC BLM-S		MP 1.5 of the San Juan Lateral Loop A

TABLE 4.6.1-1 (cont'd)

Special Status Species Initially Identified as Potentially Occurring in the Vicinity of the Phoenix Expansion Project

Species	Status [a]			Eliminated from Further Consideration	Facility/General Milepost Range Where Species May Occur
	Federal	State	Other		
Sonora sucker (*Catostomus insignis*)			FWS-SC BLM-S		MPs 23.8 and 44.8 of the Phoenix Lateral
Speckled dace (*Rhinichthys osculus*)			FWS-SC BLM-S		MPs 23.8 and 44.8 of the Phoenix Lateral
Spikedace (*Meda fulgida*)	F-T	AZ-SC	FS-S		MPs 23.8 and 44.8 of the Phoenix Lateral
Plants					
Acoma fleabane (*Erigeron acomanus)*			NN-G3	Not identified during field surveys	
Arizona agave (*Agave arizonica*)	F-E			Unlikely to occur in project area – no effect	
Arizona phlox (*Phlox amabilis*)			FS-S	Not identified during field surveys	
Arizona Sonoran rosewood (*Vauquelinia californica sonorensis*)			BLM-S	No suitable habitat in project area – no effect	
Aztec (Beautiful) gilia (*Aliciella formosa)*		NM-E	FWS-SS	Not identified during field surveys	
Bigelow onion (*Allium bigelovi*i)		AZ-SR			MPs 45 to 140 and 193 to 197 of the Phoenix Lateral
Bitsi fleabane (*Erigeron bistiensis)*			FWS-SC	Not identified during field surveys	
Brack's fishhook cactus (*Sclerocactus cloveriae brackii)*		NM-E	FWS-SC NN-G4	Not identified during field surveys	
Broad-leafed lupine (*Lupinus latifolius leucanthus*)			FS-S	No suitable habitat in project area – no effect	
California flannelbush (*Fremontodendron californica*)			BLM-S		MPs 57 to 63 of the Phoenix Lateral
Chaco milkvetch (*Astragalus micromerius)*		NM-SC	NN-SS	Not identified during field surveys	
Eastwood alum root (*Heuchera eastwoodiae*)			FS-S	No suitable habitat in project area – no effect	
Fickeisen plains cactus (*Pediocactus peeblesianus* var.)			FWS-SC NN-G3	Not identified during field surveys	
Flagstaff beardtongue (*Penstemon nudiflorus*)			FS-S	No suitable habitat in project area – no effect	
Flagstaff pennyroyal (*Hedeoma diffusum*)			FS-S	No suitable habitat in project area – no effect	
Giant sedge (*Carex spissa ultra*)			BLM-S	No suitable habitat in project area – no effect	
Heatherleaf wild buckwheat (*Eriogonum ericifolium ericifolium*)			FS-S	No suitable habitat in project area – no effect	
Hohokam agave (*Agave murpheyi*)			FWS-SC BLM-S FS-S	Not identified during field surveys	
Hualapai milkwort (*Polygala rusbyi*)			FS-S		MPs 0, 22, 49 to 52, 65 to 85, and 117 to 118 of the Phoenix Lateral

TABLE 4.6.1-1 (cont'd)

Special Status Species Initially Identified as Potentially Occurring in the Vicinity of the Phoenix Expansion Project

Species	Status [a]			Eliminated from Further Consideration	Facility/General Milepost Range Where Species May Occur
	Federal	State	Other		
Kofa Mountain barberry (*Berberis harrisoniana*)			BLM-S	No suitable habitat in project area – no effect	
Mancos saltbush (*Proatriplex pleiantha)*		NM-SC		Not identified during field surveys	
Mazatzal triteleia (*Triteleia lemmoniae*)		AZ-SR		No suitable habitat in project area – no effect	
Mesa Verde cactus (*Sclerocactus mesae-verdae)*	F-T	NM-E	NN-G2	No suitable habitat in project area – no effect	
Missouri milkvetch (*Astragalus missouriensis var. accumbens*)		NM-SC	FWS-SC	Not identified during field surveys	
Mt. Dellenbaugh sandwort (*Arenaria aberrans*)			FS-S	Not identified during field surveys	
Narrow-mouth penstemon (*Penstemon breviculus)*		NM-SC		Not identified during field surveys	
Naturita milkvetch (*Astragalus naturitensis)*		NM-SC	FWS-SC NN-G4		MPs 83.2 to 85.5 of the San Juan Lateral Loop B
Navajo bladderpod (*Lesquerella navajoensis)*		NM-SC		Unlikely to occur in project area – no effect	
Parish's alkali grass (*Puccinellia parishii)*		NM-E	FWS-SC	Not identified during field surveys	
Ripley wild buckwheat (*Eriogonum ripleyi*)			FS-S	No suitable habitat in project area – no effect	
Rock fleabane (*Erigeron saxatilis*)			FS-S	No suitable habitat in project area – no effect	
San Juan milkweed *(Asclepias sanjuanensis)*		NM-SC	NN-G4	Not identified during field surveys	
Sivinski's fleabane (*Erigeron siviniskii)*			NN-G4	Not identified during field surveys	
Strawtop cholla (*Opuntia echinocarpa*)		AZ-SR			MPs 77 to 255 of the Phoenix Lateral
Tonto Basin agave (*Agave delamateri*)			FS-S	No suitable habitat in project area – no effect	
Tourney agave (*Agave toumeyana*)		AZ-SR		Not identified during field surveys	
Tumamoc globeberry (*Tumamoca macdougalii*)			BLM-S	Not identified during field surveys	
Tusayan rabbitbush (*Chrysothamnus molestus*)			FS-S	Not identified during field surveys	
Verde valley sage (*Salvia dorii mearnsii*)		AZ-SR	FWS-SC FS-S	Not identified during field surveys	

TABLE 4.6.1-1 (cont'd)

Special Status Species Initially Identified as Potentially Occurring in the Vicinity of the Phoenix Expansion Project

Species	Status [a]			Eliminated from Further Consideration	Facility/General Milepost Range Where Species May Occur
	Federal	State	Other		

[a] Status:

F-E	= Federally listed as endangered
F-T	= Federally listed as threatened
F-C	= Candidate for federal listing as endangered or threatened
F-D	= Removed from federal list
NM-E	= New Mexico state-listed as endangered
NM-T	= New Mexico state-listed as threatened
NM-SS	= New Mexico state-listed as sensitive species
NM-SC	= New Mexico state-listed as species of concern
BLM-S	= Bureau of Land Management listed as sensitive
FS-S	= U.S. Forest Service listed as sensitive
FWS-SC	= U.S. Fish and Wildlife Service listed as species of concern
AZ-SC	= Arizona state-listed as species of concern
AZ-SR	= Salvage restricted, collection only with permit
NN-G	= Navajo Nation Groups
G2	= Species or subspecies in danger of being eliminated
G3	= Species or subspecies likely to become endangered within the foreseeable future
G4	= Species or subspecies for which the Navajo Nation does not have sufficient information to list in G2 or G3, but has reason to consider them

Lesser long-nosed bats may forage along the southern portions of the Phoenix Lateral right-of-way near MP 108 and between MPs 195 and 255.1. Between MPs 195 and 217, however, the predominant land use is agriculture. Therefore, although that area is considered within the potential range of the lesser long-nosed bat, based on field surveys, only 37 percent of the area in the milepost range could actually provide suitable foraging habitat for the species. Transwestern estimates that approximately 727 acres of foraging habitat would be disturbed as a result of the clearing of the right-of-way. Vegetation clearing and construction activities would displace lesser long-nosed bats into adjacent habitats. If suitable habitat in the vicinity of the project were to be limited, the influx and increased density of bats in adjacent habitats could increase inter- and intra-specific competition and also reduce the reproductive success of animals that are not displaced by construction. Impacts on foraging would remain until the right-of-way is restored and provides suitable foraging habitat for the lesser long-nosed bat. However, because adequate foraging habitat is located adjacent to the proposed project facilities, impacts on foraging would not be expected to adversely affect the species. Roosting habitats observed during field surveys in June and July 2007 included buildings and several mine adits. However, because no buildings are slated for removal along the Phoenix Lateral and identified adits were outside the proposed construction right-of-way, it is unlikely that any roosting habitat would be affected by the proposed project. Therefore, the proposed project may affect, but is not likely to adversely affect the lesser long-nosed bat.

4.6.3.2 Least Tern

The least tern is a federally listed and New Mexico state-listed endangered species that once occupied much of the intermountain west (NMDGF, 2006a). A summer resident, this species has been documented at the Bitter Lakes National Wildlife Refuge and along the Pecos River near Roswell, New Mexico, approximately 300 miles southeast of the project area in New Mexico. The bird is a colonial ground-nesting bird. Nest sites are generally located along river shores, alkali flats, and sand bars where waters are consistently shallow and clear. Sudden fluctuations in water levels have altered potential nesting areas and the encroachment of salt cedar and Russian olive along the San Juan River have further reduced potential habitat for this species. Areas of potential foraging habitat could occur within major waterbodies along the proposed project corridor, although these areas are not likely used by the species except during migration. Impacts on these in-stream habitats would be limited only to the period of construction because the waterbodies would be returned to preconstruction condition after the crossing is complete.

Alterations to habitat potentially used by the species would be temporary, returning to preconstruction condition during the season following construction. Also, the least tern was not observed during surveys conducted in May 2006 and is not likely to occur in the project area. Further, because construction is expected to occur during the winter when this species would not likely be present in the project area and impacts on habitat would be temporary, the proposed project may affect, but is not likely to adversely affect the least tern.

4.6.3.3 Southwestern Willow Flycatcher

The southwestern willow flycatcher is federally listed as endangered. It is also a New Mexico state-listed endangered species, a species of concern in Arizona, a Navajo Nation G2 species, and a FS-sensitive species. This species breeds in riparian habitats along rivers, streams, or other wetlands where dense growths of willows or other shrubs and medium-sized trees are present. Similar habitats are used during migration. All willow flycatcher subspecies winter in Mexico, Central America, and possibly northern South America, but specific wintering grounds and migration routes for the southwestern subspecies are unknown. Southwestern willow flycatchers are late migrants and typically arrive on their

breeding grounds in the southwestern United States in mid-May where they remain until late August (Sogge et al., 1997).

Some plant species typically considered to be important components of suitable habitat for the southwestern willow flycatcher were identified along the Phoenix Lateral right-of-way during field surveys. However, none of the locations where these species are present provide the stature and density of vegetation required for suitable nesting or essential foraging habitat. Although the Phoenix Lateral would cross riparian vegetation at the Gila River and the Hassayampa River that includes elements of suitable southwestern willow flycatcher habitat, these communities are not considered dense enough to provide suitable nesting habitat and provide only marginal foraging habitat. These communities, therefore, are not expected to be used by the species.

In accordance with the FWS' recommendations, Transwestern conducted surveys for southwestern willow flycatchers following FWS protocols during May through July 2006 in suitable habitat near the San Juan River crossing. No individuals or nests were observed during the three survey periods. The habitat near the crossing location appears to be of marginal quality with an absence of mid-story canopy structure throughout the right-of-way corridor. Nonetheless, successful completion of the proposed HDD crossing of the San Juan River would avoid impacts on existing riparian vegetation. If the HDD is unsuccessful and in-stream disturbance is required, approximately 3 acres of riparian vegetation would be cleared.

Since the protocol surveys were conducted, Transwestern has relocated the proposed San Juan River crossing location approximately 1,500 feet west of the surveyed location to a location that would accommodate both an HDD and a wet open-cut crossing of the river. Habitat conditions at this crossing location are similar to the original crossing location.

The FWS noted that critical habitat for the southwestern willow flycatcher is not present at the proposed crossing location, but the species could occur in the area during construction because the San Juan River is used as a migration and dispersal corridor from nearby nesting sites. Based on this concern, the FWS recommended that Transwestern prohibit construction activities in the area between April 15 and August 31, and that if suitable or potential habitat for the southwestern willow flycatcher develops, surveys should be conducted in the area before construction according to the survey protocol.

In accordance with the FWS' recommendation, Transwestern proposes to complete the crossing of the San Juan River and through the adjacent suitable flycatcher habitat between January and March, when flycatchers are unlikely to be present in the project area. Transwestern would consult with the FWS if the crossing is delayed past April 15 to determine the need for surveys and to develop an appropriate construction plan and timing window to avoid potential impacts on the southwestern willow flycatcher.

Because construction of the proposed project, specifically the crossing of the San Juan River where potential habitat for the southwestern willow flycatcher has been identified, would occur in accordance with the FWS' recommendations and outside of the period when individual flycatchers may be present in the area, the proposed project may affect, but is not likely to adversely affect the southwestern willow flycatcher.

4.6.3.4 Yuma Clapper Rail

The Yuma clapper rail is a federally listed endangered species and a species of concern in Arizona. The Yuma clapper rail occupies areas of heavily overgrown, relatively narrow, wet sloughs and backwaters and emergent vegetation along ponds, reservoirs, canals, ditches, and sections of slow-moving rivers. The species' range in Arizona includes the Bill Williams River drainage, the lower Gila River

from near Phoenix to the Colorado River, the lower Salt and Verde Rivers, and the Picacho Reservoir. The species is found at elevations between 75 and 1,700 feet. The primary threat to this species is habitat loss.

The FWS reported that the proposed location of the Phoenix Lateral crossing of the Gila River is within the range of the Yuma clapper rail. Transwestern's field surveys in this area revealed that suitable habitat for this species is lacking in the area. Additionally, Transwestern noted that other areas along the proposed project corridor provide only limited habitat for clapper rails. As such, no nesting habitat and only limited foraging habitat is present along the proposed project. No impacts on the species are expected from the project and only temporary impacts on marginal foraging habitat may occur. Therefore, the proposed project may affect, but is not likely to adversely affect the Yuma clapper rail.

4.6.3.5 Colorado Pikeminnow

The Colorado pikeminnow is a federally listed endangered species. It is also a New Mexico state-listed endangered species and a Navajo Nation G2 species. Adult pikeminnows utilize a variety of habitats in turbid and strongly flowing large rivers, although juveniles are commonly found in shallow backwater areas (Sublette et al., 1990). Once abundant, this species is currently found in small populations near the Green River in Utah; the Yampa, Colorado, Gunnison, and Little Snake Rivers in Colorado; and the upper San Juan River in New Mexico. In New Mexico, the Colorado pikeminnow once occurred in both the Gila and San Juan Rivers but is now found only in the San Juan River, primarily between Shiprock and the Four Corners area, about 40 miles upstream of the San Juan Lateral Loop A crossing location (Probst, 1999). Extensive habitat modifications, inter-specific competition, and predation by non-native species have lead to the decline of this species. This species is restocked yearly in the San Juan River near Shiprock and has been somewhat successfully reproducing in the wild (Ryden, 2006).

Critical habitat for the Colorado pikeminnow has been designated in the San Juan River downstream of Farmington, New Mexico, about 13.5 miles downstream of the proposed crossing (NMDGF, 2006a). Given the distance between the proposed crossing location and designated critical habitat, the proposed project is not expected to result in the destruction or adverse modification of critical habitat for this species.

There is a small reproducing population of this species downstream of the proposed crossing location and individuals may occasionally be found in the general project area on a transitory basis. However, reports of the species occurring in the Bloomfield area, near the crossing location, are rare.

Currently, Transwestern is proposing to cross the San Juan River using the HDD method (see sections 2.3.2 and 4.3.2.3). If the HDD can be successfully completed, there would be no effect on the Colorado pikeminnow. While there is a potential for inadvertent releases of non-toxic drilling mud into the river, typically these "frac-outs" occur near the HDD entry and exit points. The entry and exit points for the proposed crossing of the San Juan River would be located greater than 500 feet from the banks of the river. Thus, the potential for drilling mud releases to reach the river would be minimized. Additionally, Transwestern has developed an HDD Plan that describes measures to contain and clean up frac-outs (see section 4.3.2.3 and Appendix I). As discussed in section 4.3.2.3, if a frac-out occurs in the water, the HDD operation would be stopped immediately. Transwestern would contact the FERC, the FWS, the COE, the NMDGF, the New Mexico Oil Conservation Division, and the Surface Water Bureau of the NMED to describe the location and nature of the release and the corrective actions being taken.

If the HDD fails, Transwestern would use a modified wet open-cut method to complete the crossing (see section 4.3.2.3). Transwestern would isolate portions of the river and manually remove fish

from those areas ahead of in-stream activities. Although the proposed project would be constructed during the winter when dispersing pikeminnows are not expected to be present at the crossing location, if present at the time of the crossing, direct handling of the fish would be considered an adverse impact on the species. Additionally, sedimentation associated with construction activities could affect the pikeminnow, if present in the area, by reducing foraging and mobility.

In summary, if Transwestern completes the crossing of the San Juan River using the HDD method, the proposed project would have no effect on the Colorado pikeminnow. However, because the likelihood of a successful HDD crossing is uncertain, and given that the proposed alternative wet open-cut crossing method would require handling of individual pikeminnows, if present in the area during construction, the proposed project may affect, and is likely to adversely affect the Colorado pikeminnow. Given the potential for adverse impacts on the species, the FERC staff initiated formal consultation with the FWS with the submittal of the BA. In section 4.3.2.3, we have recommended that Transwestern not begin a wet open-cut crossing of the San Juan River until it files documentation of the events leading up to the HDD failure with the Secretary and receives written notification from the Director of OEP that a wet open-cut crossing may begin. Transwestern would be required to obtain the applicable permits for handling of Colorado pikeminnows, as necessary.

4.6.3.6 Razorback Sucker

The razorback sucker is a federally listed endangered species, and is also considered a special status species in New Mexico, a species of concern in Arizona, and a Navajo Nation G2 species. This species primarily occupies large rivers with strong currents and deep backwater pools, although it is occasionally found in reservoirs (Sublette et al., 1990). The species, once found throughout the Colorado River Basin, is now restricted to the upper Green River in Utah, the lower Yampa River in Colorado, and occasionally in the Colorado River near Grand Junction, Colorado. Razorback suckers have been reintroduced into the San Juan River in New Mexico. The reintroductions have occurred approximately 30 miles downstream of the proposed crossing location. Predation from non-native species, altered flow hydrology, and cold tailwater releases from reservoirs have all contributed to the decline of this species.

The FWS noted that the proposed crossing location of the San Juan River is “well above” areas designated as critical habitat for the razorback sucker in that waterbody. Accordingly, the proposed project is not expected to result in the destruction or adverse modification of critical habitat for this species.

Despite the reintroductions of razorback sucker that have been occurring downstream of the proposed crossing location of the San Juan River, the FWS acknowledges that it is unlikely that the species could occur in the project area. Nonetheless, the FWS has requested that potential impacts on the species be evaluated.

As discussed above, Transwestern is proposing to cross the San Juan River using the HDD method. Successful completion of the crossing using the HDD method and implementation of Transwestern’s HDD Plan as discussed above and in section 4.3.2.3 would avoid impacts on the razorback sucker and its habitat. However, if the HDD fails, Transwestern would use a modified wet open-cut method to complete the crossing. In-stream activity could cause behavioral shifts in habitat use in the unlikely event that the species is present during construction. If the species is present at the crossing location during construction, the proposed crossing method could require that individual fish be moved from the immediate construction area, thus requiring handling of the fish. Handling of protected species is considered an adverse effect. Accordingly, although highly remote, the potential need to handle individual razorback suckers if in-stream activity is required at the San Juan River necessitates a determination that the project may affect, and is likely to adversely affect the razorback sucker. Similar

to the Colorado pikeminnow, the FERC staff initiated formal consultation with the FWS to address the potential effects on the razorback sucker with the submittal of the BA. As discussed above, in section 4.3.2.3, we have recommended that Transwestern not begin a wet open-cut crossing of the San Juan River until it files documentation of the events leading up to the HDD failure with the Secretary and receives written notification from the Director of OEP that a wet open-cut crossing may begin. Transwestern would be required to obtain the applicable permits for handling of razorback suckers, as necessary.

4.6.3.7 Spikedace

The spikedace is a federally listed threatened species that occupies midwater habitats of runs, pools, and swirling eddies (Rinne and Minckley, 1991) in Aravaipa Creek (Grahm and Pinal Counties), Eagle Creek (Greenlee County), and 35 miles of the Verde River in Yavapai County, Arizona. It is also a species of concern in Arizona and a FS-sensitive species. It is found in streams at elevations ranging from 1,620 to 4,500 feet. The population has been adversely affected by drought, lack of flooding, and predation from introduced species, especially the red shiner (AGFD, 2006a).

The Phoenix Lateral would cross the Verde River at MP 23.8 in Yavapai County, Arizona. Spikedace have been found in the Verde River system as recently as 1999 (72 FR 13355-13422). However, the FS reported that spikedace have not been found in the vicinity of the proposed pipeline crossing since 1996. As such, spikedace are not expected to be present in the area of the proposed pipeline crossing. Nonetheless, the FWS has indicated that because of the confirmed presence near the crossing location in 1996, the species could be present in the proposed project area. Transwestern proposes to cross the Verde River using a variation of the flume method (see sections 2.3.2 and 4.3.2.3). If present, in-stream disturbance could preclude individuals from using the portion of the river for foraging. Such behavioral impacts are unlikely due to the low likelihood of the species occurring in the vicinity of the project area. Further, although remote, the potential exists for handling of individual spikedace to remove them from the construction work area. Because such impacts would be considered harassment under the terms of the ESA, the FWS has indicated that the project could result in adverse impacts on the species. The FERC staff initiated formal consultation with the FWS to address the potential effects on the spikedace with the submittal of the BA. Transwestern would be required to obtain the applicable permits for handling of spikedace, as necessary.

The portion of the Verde River that would be crossed by the pipeline route was designated as critical habitat for the spikedace on March 21, 2007 (72 FR 13355-13422). The Verde River designated critical habitat unit (Complex 1) includes 43 miles of the Verde River extending from the Prescott and Coconino National Forest boundary with private lands upstream to Sullivan Dam. In addition, designated Verde River critical habitat includes a lateral component that consists of 300 feet on either side of the stream channel measured from the stream edge at bank full discharge (Title 50 CFR Part 17). The designation of Primary Constituent Elements (PCEs) helps to focus conservation efforts and impact minimization measures on those critical elements of the habitat that are essential to the conservation of the species. The five PCEs associated with the designated critical habitat for the spikedace and the potential impacts and minimization measures proposed by Transwestern are described below.

- <u>Permanent, flowing water with no or minimal pollutant levels.</u> The Verde River is not known to have contaminated sediments. It would be possible, however, that unanticipated pre-existing contaminated sediments could be encountered during construction. The proposed crossing method (variation of the flume method) is a dry crossing method that would significantly reduce the amount of sediment released into the water column during construction. In addition, Transwestern would minimize potential impacts from downstream contamination by implementing the measures in its WWCM

Procedures and the SPR Procedures. Therefore, construction of the proposed project would not result in an adverse modification of this PCE.

- Sand, gravel, and cobble substrates with low or moderate amounts of fine sediment and substrate embeddedness. During construction, Transwestern would minimize potential impacts from downstream sedimentation that could occur by implementing the measures in its WWCM Procedures and the SPR Procedures. As discussed in section 4.3.2.3, Transwestern has filed a site-specific crossing plan for the Verde River that indicates it would install the crossing using a variation of the flume method. This method would significantly reduce the amount of sediment released into the water column during construction. To protect fishery resources in the river, Transwestern would attempt to complete construction across the river before the end of January as requested by the Prescott National Forest depending on the receipt of the necessary permits. With the implementation of the site-specific crossing plan, impacts on downstream sediments would be temporary and would not be expected to result in a long-term or permanent alteration of this PCE.

- Streams that have low gradients of less than approximately 1.0 percent; water temperatures in the approximate range of 35 to 86 °F (with additional natural daily and seasonal variation); pool, riffle, run, and backwater components; and abundant aquatic insect food base consisting of mayflies, true flies, caddisflies, stoneflies, and dragonflies. Construction of the proposed project would not alter the gradient of the Verde River at the proposed crossing location, nor would it result in the permanent alteration of the water temperature of the river. Transwestern would return all waterbody banks to preconstruction contours or to a stable angle of repose following construction activities within the waterbody. Construction of the pipeline across the Verde River would result in a temporary adverse effect on prey species by directly removing or burying aquatic insects. However, it is anticipated that recolonization by aquatic insects would occur rapidly upon restoration of water flow to the proposed crossing location. Therefore, the project would not result in a long-term or permanent alteration of this PCE.

- Habitat devoid of non-native aquatic species or habitat in which non-native aquatic species are at levels that allow persistence of spikedace. As discussed in section 4.4.4, Transwestern has filed a Noxious Weed Management Plan that includes a description of noxious weed control measures that would be implemented during and after construction. With the implementation of the Noxious Weed Management Plan, construction and operation of the proposed project would not be expected to result in the introduction of non-native aquatic species to the Verde River.

- Areas within perennial, interrupted stream courses that are periodically dewatered but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted. Transwestern's proposed crossing method would convey the streamflow through one or more flume pipes, thus maintaining downstream flow. In accordance with the WWCM Procedures, in-stream construction activities (not including blasting and other rock breaking measures) would be completed within 48 hours, unless site-specific conditions make completion within 48 hours infeasible. Therefore, construction of the proposed project would not result in an adverse modification of this PCE.

Clearing of vegetation at the Verde River crossing could temporarily increase susceptibility of streambanks to erosion. Transwestern's proposed restoration measures at the Verde River are

summarized in section 4.4.3 and presented in detail in its Restoration Plan. Adherence to Transwestern's UECRM Plan and WWCM Procedures (see section 2.3 and Appendices F and G, respectively), and the site-specific measures in its Restoration Plan would facilitate revegetation of the banks following construction such that no long-term impacts would be expected.

Based on the above, the proposed project is not likely to result in the destruction or adverse modification of critical habitat for the spikedace. Nonetheless, the FWS expressed concern about the extent of impacts on the Verde River, although temporary, and concluded that these temporary impacts would result in an adverse modification of spikedace critical habitat. Thus, in order to allow the FWS to include the project's potential impacts on spikedace critical habitat in the BO issued for the project, the FERC staff requested that the FWS consider impacts on the Verde River to result in an adverse modification of spikedace critical habitat.

4.6.4 State-listed Threatened and Endangered Species

Based on consultations with the NMDGF and a search of the natural heritage database, 14 state-listed threatened and endangered species were identified as potentially occurring within the proposed project area. Five of these species are also federally listed (black-footed ferret, least tern, southwestern willow flycatcher, Colorado pikeminnow, and Mesa Verde cactus) and are discussed in section 4.6.3. Five species lack habitat in the project area or were not located during field surveys and have been eliminated from further consideration: the spotted bat, gray vireo, Aztec gilia, Brack's fishhook cactus, and Parish's alkali grass. The remaining four species are discussed below.

4.6.4.1 Bald Eagle

The bald eagle is a New Mexico state-listed threatened species and a species of special concern in Arizona that inhabits coastal areas, estuaries, inland waters, and some arid areas of the western interior and southwestern part of the United States. A small resident population exists in central Arizona, while wintering populations occur in both central and northern Arizona and New Mexico. Territories and nesting localities have been documented along the Verde and Gila Rivers. Although bald eagles and nest sites were not located during surveys in May 2006, potential winter roosting habitat may occur along the San Juan River. Bald eagles have been observed at elevations ranging from 460 to 7,390 feet. Populations have declined as a result of habitat loss, prey loss, and reproductive impairment from pesticides and heavy metals (AGFD, 2006a).

There are no known active bald eagle nests within 3 miles of the proposed project (AGFD, 2006b). One historic bald eagle nest occurs near the Verde River crossing; however, the nest has not been used by bald eagles since the mid-1980s (Martinez, 2006). Wintering bald eagles are known to occur within the proposed project area during October through March. Bald eagles roost during the winter along the Verde River, but do not have established roost sites (Martinez, 2006). Individual roosting eagles may be disturbed during construction at and near the Verde River; however, no known communal winter roost areas occur in the proposed project area. Also, Transwestern reported that only marginally suitable roost or perch trees for eagles occur near the proposed crossing location of the Gila River. Temporary disturbance of individual roosting eagles would not be expected to affect survival of the individual or have population-level effects on bald eagles.

Transwestern identified a single potential nest or roost tree at approximate MP 1.3 along the San Juan Lateral Loop A. This tree is a large cottonwood approximately 50 feet north of the proposed project's crossing of U.S. Highway 64. Based on the proximity of the tree to the road and the lack of waterbodies nearby, it is unlikely that the tree would be used by eagles for nesting or roosting. No other

likely nesting or roosting sites were identified along the San Juan Lateral Loops A or B, including at the proposed crossing location of the San Juan River.

Seven observations of bald eagles were made between MPs 2.5 and 136.0 of the Phoenix Lateral during field surveys in 2006 and, therefore, bald eagles may forage in numerous areas along this segment of the Phoenix Lateral. Construction of the proposed project could temporarily reduce available foraging area. The removal of foraging habitat would have a negligible impact on the bald eagle because of the abundance of adjacent foraging habitat. Further, bald eagles depend on fish in rivers and lakes/reservoirs for a major portion of their diet and the proposed project would not affect lakes or reservoirs.

Although suitable bald eagle nesting habitat has not been identified along the proposed route, Transwestern conducted aerial and follow-up ground surveys for raptors between May and July 2007 and those surveys did not identify bald eagles or eagle nests; therefore, construction activities are not expected to have adverse impacts on this species. Nevertheless, Transwestern would conduct environmental training for all field construction personnel regarding threatened and endangered species and has indicated that any bald eagle nesting activity noted during construction would be immediately reported to the FWS. With implementation of Transwestern's proposed measures and because nesting and communal roost sites would not be affected by the proposed project, and because abundant suitable habitat near the proposed project would be available for foraging during construction, the proposed project is unlikely to have adverse impacts on the bald eagle.

4.6.4.2 Peregrine Falcon

The peregrine falcon is a state-listed threatened species in New Mexico, a FWS species of concern, and a Navajo Nation G4 species. In New Mexico, it nests on steep cliffs in montane areas with breeding territories centering on cliffs that are in wooded/forested habitats, with large "gulfs" of air nearby in which these predators can forage. Although potential nesting habitat and several peregrine falcons were identified during the fall 2003 surveys of the San Juan Lateral in the vicinity of Crossover Canyon along the San Juan Lateral Loop B, no birds or nest sites were observed during the May 2006 or May or July 2007 surveys. This raptor species could, however, occupy previously unrecorded nests in the general vicinity of the project in 2008. Construction during periods when nests are being used could result in nest failure or other adverse impacts on the nest or nestlings. The NMDGF (Jankowitz, 2007) has recommended that if construction would occur in New Mexico during the nesting season in 2008, additional surveys extending 1 mile from the construction work area should be conducted for the peregrine falcon during the nesting season in areas of suitable nesting habitat. These surveys should be conducted before 2008 construction begins. Therefore, **the FERC staff recommends that:**

- **If construction of the San Juan Lateral Loops has the potential to occur during the peregrine falcon nesting season, Transwestern shall conduct surveys for active peregrine falcon nests during the nesting season <u>before beginning construction of the San Juan Lateral Loops</u>. These surveys shall extend 1 mile from either side of the construction work area where suitable peregrine falcon nesting habitat is identified. If active peregrine falcon nests are found within the survey corridor, Transwestern shall consult with the NMDGF and the Navajo Nation to develop conservation measures to prevent adverse impacts on the nests. The results of the surveys and the conservation measures developed shall be filed with the Secretary <u>before initiating construction within a 1-mile radius of any active peregrine falcon nest</u>.**

Through proper implementation of our recommendation, it is unlikely that the proposed project would adversely affect the peregrine falcon.

4.6.4.3 Broad-billed Hummingbird

The broad-billed hummingbird is a state-listed threatened species in New Mexico. The hummingbird occupies a wide array of habitats, but is usually found in the riparian habitats that are rare along the proposed project route. The broad-billed hummingbird's natural range in New Mexico is limited to the southwest corner, nearly 300 miles from the proposed project. As such, although it is possible that transient individuals of this species could occur within the proposed project area, due to the lack of ideal habitat and the high mobility of this species, it is unlikely that the proposed project would adversely affect the species.

4.6.4.4 Roundtail Chub

The roundtail chub is a state-listed endangered species in New Mexico, a FWS species of concern, a BLM-sensitive species, and a Navajo Nation G2 species. Historically, this species was known to occur in the San Juan, Zuni, Gila, and San Francisco River drainages (Probst, 1999). The roundtail chub is limited to the San Juan and Gila drainages in New Mexico where populations have been steadily declining (NMDGF, 2006b). The species typically inhabits the pools and rapids of moderate to large rivers, but has also been found in large reservoirs (Sublette et al., 1990). Preferring cobbled or graveled substrates, adult roundtail chubs are usually found in deep pools and the young are more often confined to the more shallow sites. Cut banks, overhead logs, and other sheltering features also appear to be important to this species (NMDGF, 2006a). Predation from non-native fish species, as well as loss of suitable pool habitats, is the primary reason for the decline of the roundtail chub throughout its range.

Currently, Transwestern is proposing to cross the San Juan River using the HDD method (see sections 2.3.2 and 4.3.2.3). If the HDD can be successfully completed, there would be no effect on the roundtail chub. While there is a potential for inadvertent releases of non-toxic drilling mud into the river, typically these "frac-outs" occur near the HDD entry and exit points. The entry and exit points for the proposed crossing of the San Juan River would be located greater than 500 feet from the banks of the river. Thus, the potential for drilling mud releases to reach the river would be minimized. Additionally, Transwestern has developed an HDD Plan that describes measures to contain and clean up frac-outs (see section 4.3.2.3 and Appendix I). As discussed in section 4.3.2.3, if a frac-out occurs in the water, the HDD operation would be stopped immediately. Transwestern would contact the FERC, the FWS, the COE, the NMDGF, the New Mexico Oil Conservation Division, and the Surface Water Bureau of the NMED to describe the location and nature of the release and the corrective actions being taken.

If the HDD fails, Transwestern would use a modified wet open-cut method to complete the crossing (see section 4.3.2.3). Transwestern would isolate portions of the river and manually remove fish from those areas ahead of in-stream activities. Sedimentation associated with construction activities could affect the roundtail chub, if present in the area, by reducing foraging and mobility. In its comments on the draft EIS, the NMDGF requested that it be notified 7 days in advance of the start of in-stream activities so it can assist in fish salvage efforts. Section 4.3.2.3 has been revised to include the recommendation that Transwestern shall not begin a wet open-cut crossing of the San Juan River until it files documentation with the Secretary that it has provided at least 7 days advance notification of the start of in-stream activities at the San Juan River to the NMDGF and receives written notification from the Director of OEP that a wet open-cut crossing may begin.

In summary, if Transwestern completes the crossing of the San Juan River using the HDD method, the proposed project would have no effect on the roundtail chub. However, because the likelihood of a successful HDD crossing is uncertain, and given that the proposed alternative wet open-cut crossing method would require handling of individual chub, if present in the area during construction, the proposed project may have adverse impacts on individual roundtail chub. However, implementation of

Transwestern's proposed relocation of trapped fish from the construction area would minimize those impacts such that the proposed project would avoid adverse population-level impacts on the roundtail chub.

4.6.5 Other Special Status Species

Based on consultations with the FWS, the BLM, the FS, the NNDFW, the NMDGF, and the AGFD, 78 special status species (i.e., those not federally or state-listed or proposed listed endangered or threatened) were identified as potentially occurring within the proposed project area. Sixteen of these 78 species lack suitable habitat in the project area and would not be affected, and 25 additional species were not found during field surveys or are unlikely to occur in the project area. These 41 species have been eliminated from further consideration. The proposed project has the potential to affect the remaining 37 species. These species are discussed below.

The Arizona pocket mouse is a Navajo Nation G4 species that occurs in desert scrub communities with sparse, shrub and woody cover (NMDGF, 2006a). This small mouse may be found throughout portions of the San Juan Lateral Loop B. Although it is possible that transient individuals of this species could occur within the proposed project area, due to lack of ideal habitat and high mobility, it is unlikely that the proposed project would adversely affect the species.

The banner-tailed kangaroo rat is a Navajo Nation G4 species that occurs in desert grasslands and grassy scrublands. This species constructs distinctive burrows under large and conspicuous mounds. Mounds typically have many entrances and an elaborate system of underground tunnels and chambers. Banner-tailed kangaroo rats and burrows were identified during surveys between MPs 71.9 and 75.5 conducted in the fall of 2006. Some burrows may be disturbed during construction resulting in injury or death of individual kangaroo rats. However, the project is not expected to have population-level impacts on the banner-tailed kangaroo rat.

The California leaf-nosed bat is a FWS species of concern, a BLM-sensitive species, and an Arizona species of concern that occurs in Sonoran desert scrub communities (AGFD, 2006a). Within Arizona, this bat is found primarily south of the Mogollon Rim and has been reported in extreme southeastern and extreme northwestern Mohave County in the summer, approximately 75 miles from the proposed project. This species occurs in Arizona at elevations below 4,000 feet with most occurring below 2,500 feet. Population declines have been caused by roost abandonment and reduced numbers resulting from disturbances by both recreationalists and scientists at several well known and accessible roost sites (AGFD, 2006a). The California leaf-nosed bat roosts in caves and mines and may forage along the proposed project right-of-way in Sonoran desert scrub vegetation. This vegetation community occurs along 139 miles of the Phoenix Lateral. However, no individuals were seen and the only potential roosting areas documented during field surveys in June and July 2007 were outside the proposed construction right-of-way. Nonetheless, impacts on this species could include disturbance and displacement from the right-of-way during construction and loss of foraging habitat until the right-of-way is restored and provides suitable foraging habitat. Because the species is unlikely to occur along the project route and impacts on foraging habitat would be minor and temporary, the proposed project is not likely to have adverse population-level impacts on the California leaf-nosed bat.

The cave myotis is a FWS species of concern and a BLM-sensitive species that occurs in desert scrub communities with creosote bush, brittlebush, palo verde, and cacti (Fitch et al., 1981). Within Arizona, the cave myotis is found 50 to 75 miles from the proposed project, south of the Mogollon Plateau from Lake Mohave, Burro Creek, Montezuma Well, the San Carlos Apache Reservation, and the Chiricahua Mountains south to Mexico. It ranges between 300 and 5,000 feet in elevation (AGFD, 2006a) and roosts in caves, tunnels, mines, under bridges, and in buildings within a few miles of water

(Fitch et al., 1981). Cave myotis populations have declined mainly because of habitat loss caused by excessive development. The cave myotis may forage in the creosote bush shrublands and may roost in the bridges and buildings along the Phoenix Lateral. However, no individuals were seen and the only potential roosting areas documented during field surveys in June and July 2007 were outside the proposed construction right-of-way. Nonetheless, impacts on this species could include disturbance and displacement from the right-of-way during construction and loss of foraging habitat until the right-of-way is restored to provide suitable foraging habitat. No tunnels, caves, old mines, or buildings would be disturbed during construction of the proposed project. Because the species is unlikely to occur along the project route and impacts on foraging habitat would be minor and temporary, the proposed project is not likely to have adverse population-level impacts on the cave myotis.

The fringed myotis is a FWS species of concern and a BLM-sensitive species that occurs in deserts, grasslands, oak-pinyon woodlands, and other open coniferous forests between 4,000 and 8,400 feet in elevation (AGFD, 2006a). This species roosts in caves, mines, large snags, under exfoliating bark, and in buildings (O'Farrell and Studier, 1973). Populations of fringed myotis appear to be stable in Arizona, but the species is rare in other areas. Human disturbance from recreational caving, mine exploration, and vandalism is the species' greatest threat (AGFD, 2006a). The fringed myotis may forage along the Phoenix Lateral and may roost in large snags and trees in the general project area. However, no individuals were seen and the only potential roosting areas documented during field surveys in June and July 2007 were outside the proposed construction right-of-way. Nonetheless, impacts on this species could include disturbance and displacement from the right-of-way during construction and loss of foraging habitat until the right-of-way is restored to provide suitable foraging habitat for the species. Because the species is unlikely to occur along the project route and impacts on foraging habitat would be minor and temporary, the proposed project is not likely to have adverse population-level impacts on the fringed myotis.

The kit fox is a Navajo Nation G4 species. This species is primarily a nocturnal carnivore whose diet consists of rodents and other small mammals, as well as insects, passerine birds, lizards, amphibians, and fish. These small foxes live in the open desert or grasslands where they often have dens and hunt mesa country along the borders of valleys, sparsely vegetated habitats on sloping plains, hilltops, and other well-drained areas (NMDGF, 2006a). While the species may occasionally hunt along portions of the San Juan Lateral Loops A and B, no suitable breeding habitat was observed along the proposed construction right-of-way during field surveys. Nonetheless, foraging and transient individuals could be temporarily displaced during construction of the proposed project. However, because abundant suitable foraging habitat is available adjacent to and in the larger general vicinity of the proposed project, the project is not expected to cause population-level impacts on the kit fox.

The pale Townsend's big-eared bat is a FWS species of concern, a Navajo Nation G4 species, and a New Mexico state-sensitive species that occurs from desert scrub up to woodlands and coniferous forests (AGFD, 2006a). The species is widespread in Arizona and has been found in Maricopa, Pinal, and Yavapai Counties. It is found at elevations ranging from 550 to 7,520 feet but most records are from above 3,000 feet. Summer day roosts include caves and mines; night roosts are often in buildings. In winter, the bats hibernate in caves, lava tubes, and mines, mostly in uplands and mountains. Pale Townsend's big-eared bat populations have declined because of human disturbance and vandalism at maternity and hibernating sites, loss of roosting caused by mine closures, and loss of foraging habitats caused by deforestation (AGFD, 2006a). The species may forage anywhere along the Phoenix Lateral; however, no individuals were observed during field surveys in June and July 2007 and the only potential roosting habitats documented during surveys were outside the proposed construction right-of-way. No buildings would be removed for installation of the pipeline and no other potential roosting areas would be disturbed. Nonetheless, impacts on this species could include disturbance and displacement from the right-of-way during construction and loss of foraging habitat until the right-of-way is restored. Because

the species is unlikely to occur along the project area and impacts on foraging habitat would be minor and temporary, the proposed project is not likely to have adverse population-level impacts on the pale Townsend's big-eared bat.

The pronghorn is a Navajo Nation G3 species. There is no suitable pronghorn habitat along the San Juan Lateral Loop A and pronghorn are not known to occur in the portion of San Juan County crossed by the proposed project (NMDGF, 2006a). There is some marginally suitable pronghorn habitat along the San Juan Lateral Loop B, but it is limited and of low quality, principally because both vegetation and the terrain limit visibility. Thus, although individuals present in the project area could be temporarily disturbed during construction, the project would not be likely to have adverse population-level impacts on the pronghorn in New Mexico. The pronghorn is not a listed species in Arizona; however, it is an MIS in the Kaibab and Prescott National Forests (see section 4.6.7).

The belted kingfisher is an Arizona species of concern that occurs along perennial rivers, creeks, ponds, lakes, and marshes containing abundant aquatic prey (Corman and Wise-Gervais, 2005). In Arizona, kingfishers occur in high elevation mountain riparian areas containing scattered pines, firs, alder, willow, cottonwood, and other deciduous trees. The species may also occur along canals, urban ponds, stock tanks, fish hatcheries, irrigation ditches, and wastewater effluent channels. Belted kingfishers may be found at elevations ranging from 1,840 to 8,400 feet. The belted kingfisher breeds along the upper Verde River, Salt River, Gila River, and Black River, and along the smaller streams of the Mogollon Rim and White Mountains (AGFD, 2006a). This species' breeding season extends from early April to mid-July. Populations of belted kingfisher have declined because of human disturbance during nesting (AGFD, 2006a). Belted kingfishers were observed at the Verde River crossing during field surveys and may forage and nest adjacent to the proposed crossing. Construction activities could destroy nests and kill young birds. Implementation of the measures in Transwestern's Migratory Bird Plan (e.g., destruction of nests during the non-breeding season, preclearing of nesting vegetation from the right-of-way, and the installation of temporary barriers to make existing nests unusable) (see section 4.5.1.3 and Appendix S) would reduce direct impacts on nesting birds. Additionally, the temporary loss of perches and foraging habitat would not be expected to result in population-level impacts on the species.

The cactus ferruginous pygmy owl was previously listed by the FWS as an endangered species but was recently delisted (71 FR 19452), with the delisting taking effect on May 15, 2006. Little is known about the owl's diet, but it forages in microphyllous woodlands and desert washes with mature blue palo verde, mesquite, and ironwood (Monson, 1998) in elevations of 1,300 to 4,000 feet (AGFD, 2006a). Today, the species is almost exclusively found in southern Arizona, occupying Sonoran desert uplands, and nearly all recently discovered nests have been in woodpecker cavities in saguaro cactus (AGFD, 2006a). Likely threats to the owl are degradation and loss of habitat and urban development in saguaro-ironwood forests (near Tucson). The Phoenix Lateral would cross lands that support habitat elements for the species in the form of saguaro cacti, ironwood, mesquite, and palo verde trees. The BLM and FWS identified areas in the project vicinity that appear to have the proper configuration of vegetation elements to provide habitat for the owl, and recommended the establishment of three calling stations on Little Squaw Creek (approximate MP 92.9) and three on Moore Gulch between New River and Black Canyon City (approximate MP 93.5) to determine if the species is present. The agencies also recommended a single calling station be established at a dense mesquite inclusion at MP 202.5. Both agencies agreed that these stations should be surveyed for the species for 1 year (the year construction is expected to occur at the calling station sites). Transwestern conducted these surveys throughout 2007 following the agency-recommended protocols. No cactus ferruginous pygmy owls were identified during surveys; therefore, the proposed project is not expected to impact this species.

The common blackhawk is a FWS-sensitive species that occurs in lowland forests, swamps, and mangroves in both moist and arid habitats, but generally near water along rivers and streams. This

species forages on tidal flats or in open woodlands and prefers to nest in tall gallery forest trees, generally cottonwoods, supported by flowing water. The common blackhawk may occur in the project area near the Verde, Agua Fria, Hassayampa, and Gila Rivers. Potential impacts on this species during construction include disturbance/displacement and loss of foraging habitat. However, because these impacts would be minor and temporary, it is unlikely that the project would cause population-level effects on this species.

The ferruginous hawk is a Navajo Nation G3 species. This raptor nests in tall trees and cliffs in open arid areas with shrubs and grass, as well as pinyon juniper woodlands (NMDGF, 2006b). The ferruginous hawk feeds primarily on small mammals, including prairie dogs, ground squirrels, and jackrabbits, and less regularly on birds, snakes, lizards, and large insects. Although rare in New Mexico, the ferruginous hawk could potentially nest or winter along some of the sandstone cliff faces near Crossover Canyon (approximate MP 81) along the San Juan Lateral Loop B. No nests or adult pairs were observed during the May 2006 survey, but adult ferruginous hawks were observed near Crossover Canyon during the 2003 surveys. Transwestern conducted aerial and follow-up ground surveys for raptors between May and July 2007. No ferruginous hawks or hawk nests were identified during those surveys. Therefore, the proposed project is not expected to have adverse impacts on the ferruginous hawk.

The golden eagle is a Navajo Nation G3 species. While these birds inhabit mountainous or hilly terrain throughout the state, they were previously observed along the San Juan Lateral during surveys conducted in the area in 2003. Golden eagles are found nesting on cliffs or in trees near open habitats and are known to use mixed shrub, pinyon-juniper, and juniper habitats on the Zuni Reservation in southern McKinley County, New Mexico (NMDGF, 2006b). Potential foraging habitat is found at the south end of the San Juan Lateral Loop B near Thoreau (and the Thoreau Pipe Storage Yard). The golden eagle will often abandon habitat that is subject to intensive human activity and move to more remote areas. No golden eagles or nest sites were observed during the May 2006 survey. Transwestern conducted aerial and follow-up ground surveys for raptors between May and July 2007. No golden eagles or eagle nests were identified during those surveys. Therefore, the proposed project is not expected to impact golden eagles.

The great egret, an Arizona species of concern, occurs in lowland riparian areas with cottonwood, willow, mesquite, and tamarisk, as well as marshes, ponds, lake shores, and slower sections of rivers (Corman and Wise-Gervais, 2005). Egrets also inhabit agricultural areas, feeding in irrigated croplands, stock ponds, canals, sump ponds, and at wastewater treatment facilities. The species is threatened by grazing, channelization, some recreational activities, pesticides, draining of marshlands, loss of riparian forest, and clearcutting (AGFD, 2006a). Great egrets were observed three times during field surveys, all between MPs 162 and 177, but the species may also occur in riparian zones across much of the proposed project corridor. Away from the Colorado River, the great egret is known to nest only at the Painted Rock and Picacho Reservoirs. The absence of larger bodies of water and suitable large tree nest sites precludes this bird nesting along the Phoenix Lateral right-of-way. As such, great egrets are very unlikely to nest anywhere along the proposed project. Impacts from the proposed project would likely be limited to the temporary disturbance and displacement of foraging individuals and would not likely result in population-level effects on the great egret.

The least bittern is an Arizona species of concern that occurs in freshwater and brackish marshes with tall, dense growths of aquatic or semi-aquatic vegetation (e.g., cattails, sedges, rushes, and arrow-weed) interspersed with clumps of woody vegetation and open water (Corman and Wise-Gervais, 2005). Bitterns are the smallest member of the heron family and are found in the southwestern part of Arizona, mainly in the lower Colorado River Valley (Todd, 1987). Bittern nests are typically built among dense, tall stands of emergent or woody vegetation and the nesting season in Arizona is generally April or early

May. Populations of least bitterns are threatened by destruction of wetland habitat (AGFD, 2006a). In the proposed project area in Arizona, least bitterns may occur in wetlands along the major rivers, ponds, and lake edges, and possibly along irrigation canals and runoff ditches in agricultural areas. No individuals were observed during field surveys, and because of the lack of suitable habitat along the Phoenix Lateral right-of-way, impacts from the proposed project would likely be limited to temporary disturbance and displacement of foraging individuals. These impacts would not likely result in population-level effects on the least bittern.

The loggerhead shrike is a New Mexico-sensitive species. This sharp-billed passerine utilizes a variety of habitats including desert scrub and open grasslands, although it prefers to nest in trees of medium to tall height. Loggerhead shrikes occur in San Juan and McKinley Counties (NMDGF, 2006b). Although individuals of this species were not seen during the May 2006 survey, a number of these birds were observed during the 2003 surveys along the San Juan Lateral. This species may forage within the immediate proposed right-of-way. Although construction would result in the temporary removal of vegetation from the right-of-way that may serve as foraging perches, loggerhead shrikes could continue to forage in the cleared right-of-way and use perches in the adjacent, uncleared areas. Therefore, although construction activities may disrupt foraging by individual loggerhead shrikes, the project would be unlikely to have an adverse population-level impact on this species.

The northern goshawk is a FS-sensitive species that inhabits large tracts of mature old growth forests comprising tall pine, fir, and/or spruce (Corman and Wise-Gervais, 2005). It also occurs in deciduous forests with aspen, birch, and willow. Within Arizona, it breeds in high, forested mountains and plateaus (usually above 6,000 feet) but has been identified at elevations ranging from 4,750 to 9,120 feet (AGFD, 2006a). Nest building begins in March and eggs typically are laid by late April. Timber harvest and ensuing habitat degradation is the main threat to state breeding populations (AGFD, 2006a). The Kaibab National Forest has identified three areas where the northern goshawk may occur along the right-of-way: the Johnson Creek Canyon area between MPs 0.0 and 1.5, south of Meath Wash between MPs 5.0 and 5.5, and Hell Canyon at MP 9.5. No other northern goshawk habitat occurs along the route in Arizona. Disturbance to nests could cause abandonment, thereby leading to lower productivity of the species in the area. The three areas on the Kaibab National Forest with the potential to contain nests were surveyed using the FS protocol in May of 2007. No active nests were identified during these surveys; therefore, no impacts on this species are anticipated.

The western burrowing owl is a FWS species of concern, a New Mexico-sensitive species, and a Navajo Nation G4 species. It uses burrows dug by other animals for nest sites, and can be found in open shrubland and woodland, as well as agricultural land and open well-drained grasslands. Nest site loss from human efforts to control ground squirrels and prairie dogs by poisoning have had negative effects on populations, as have habitat alteration, fragmentation, and loss of edge habitat (AGFD, 2006a). No burrowing owls or burrowing owl colonies were observed along the proposed route in New Mexico. Potential western burrowing owl habitat occurs along the proposed route in Arizona beginning at the Verde River crossing and is likely to occur in the desert scrub and chaparral habitat types. Numerous observations of burrowing owls, primarily between MPs 140.0 and 255.1 of the Phoenix Lateral, were made during field surveys in January and February 2006 and again during surveys in 2007. Potential impacts on burrowing owls could include direct mortality due to burrow collapse caused by equipment traffic and surface disturbance or collisions with vehicles. Construction, especially during the nesting season, could destroy nests and kill individual owls. Construction activities would occur outside the nesting season (May through September) and construction disturbance before the nesting season may inhibit nesting near the construction work areas, thus reducing impacts on nesting birds. However, some burrows could be destroyed by construction, and foraging habitat would be removed from within the construction work areas until revegetation is successful. Transwestern would consult with the AGFD to develop appropriate conservation measures to avoid or minimize impacts on this species. It is expected

that the development of these measures in consultation with the AGFD would preclude adverse population-level impacts on burrowing owls.

The Maricopa tiger beetle is a FWS species of concern, a BLM-sensitive species, and a FS-sensitive species. This species occurs on sandy, gravelly, or clayey streambanks, near seeps, and along reservoir banks. Maricopa tiger beetles are known to occur along the Verde, Agua Fria, and Hassayampa Rivers. This species could occur along those waterbodies or in other sandy areas near streambanks throughout the project area, although no individuals were noted during field surveys along the project corridor. Disturbed areas would be available for occupancy by Maricopa tiger beetles again following construction. Additionally, individual beetles may be affected during construction activities along the proposed project route. However, it is unlikely that the proposed project would have other than a negligible effect on the Maricopa tiger beetle and no population-level impacts would be anticipated.

The San Juan tiger beetle is a FWS species of concern. The beetle is known to occur along the San Juan Lateral Loops A and B and is found in sandy, open areas (NMDGF, 2006b). It was not observed during surveys conducted in May 2006. Localized construction disturbances may result in some mortality to this species, because vegetation removal could impact individuals. However, it is unlikely that the proposed project would have other than a negligible effect on the San Juan tiger beetle and no population-level impacts would be anticipated.

The Verde Rim springsnail is a FS-sensitive species that occurs in springs, streams, and rivers with perennial water. It is found in the Nelson Place Spring complex, consisting of two springs that form the headwaters of Sycamore Creek in Yavapai County, central Arizona at an elevation of 5,250 feet. Its highly restricted geographic distribution is a threat to this species as is water development and groundwater depletion (AGFD, 2006a). The Verde Rim springsnail may occur in the proposed project area along the Verde River. Individuals could be killed during construction and habitat could be lost in the vicinity of the Verde River crossing. However, due to the limited width of disturbance that would occur within waterbodies and the temporary nature of the disturbance, population-level impacts on this species would not be expected.

The Arizona toad is a FWS species of concern and a FS-sensitive species that inhabits rocky streams and canyons in the pine-oak belt and in lower deserts. It is also known to occur along the Verde, Agua Fria, and Hassayampa Rivers. No Arizona toads were identified during field surveys along the proposed route, but suitable habitat was identified along the northern 100 miles of the Phoenix Lateral. It is unlikely that the species occurs along the route, but if present, individuals could be affected by construction activities. Habitat disturbance could also temporarily preclude occupancy by nearby individuals. Following construction, areas of suitable habitat would again be available for the species. Due to the limited width of disturbance that would occur along the route and the temporary nature of the disturbance, population-level impacts on this species would not be expected.

The lowland leopard frog is a FWS species of concern and a FS-sensitive species that occurs in aquatic systems ranging from desert grasslands to pinyon-juniper woodlands (Platz and Frost, 1984). This species is found in both natural and man-made aquatic systems, including rivers, permanent streams, permanent pools in intermittent streams, beaver ponds, cienegas, springs, earthen cattle tanks, livestock drinkers, canals, irrigation sloughs, wells, mine adits, abandoned swimming pools, and ornamental backyard ponds (Platz and Frost, 1984; Scott and Jennings, 1985; Sredl and Saylor, 1998). It is known to occur along the Verde, Agua Fria, Hassayampa, and Gila Rivers in central Arizona at elevations ranging from 244 to 1,678 feet. Populations have been threatened by the introduction of bullfrogs, crayfish, and predatory fish, and local die-offs can be caused by habitat fragmentation and water manipulation (AGFD, 2006a). The lowland leopard frog is likely to occur along the Phoenix Lateral, although none were observed during field surveys. The AGFD has requested that surveys for the lowland leopard frog be

conducted according to the established protocol at any permanent/semi-permanent water crossing north of Lake Pleasant (approximate MP 105.0) between April and September. Transwestern has agreed to complete the requested surveys and would provide the survey report to the AGFD. If present during construction, individual frogs may be killed; however, such mortality is likely to be negligible because of a lack of suitable habitat along the proposed right-of-way. Nonetheless, Transwestern would conduct monitoring for the species in areas of suitable habitat during construction to further avoid impacts on the lowland leopard frog. As such, impacts on the lowland leopard frog, if present during construction, are unlikely to result in population-level effects.

The Mexican garter snake is a FS-sensitive species that occurs in densely vegetated habitat surrounding cienegas, cienega-streams, and stock tanks and in or near water along streams in valley floors and generally open areas (Rosen and Schwalbe, 1988). The lowering of water tables, urbanization, and habitat destruction are all threats to the Mexican garter snake. The introduction of bullfrogs and predatory fish also pose a threat. The Mexican garter snake's range encompasses southeastern Arizona, southwestern New Mexico, and western and southern areas of Mexico (Stebbins, 1985). It can be found at elevations ranging from 3,000 to 5,000 feet (AGFD, 2006a). In Arizona, this species occurs in the Santa Cruz Valley south of the Gila River (Rosen and Schwalbe, 1988). In the proposed project area in Arizona, the species could occur along the Verde River and possibly the Agua Fria River, although no Mexican garter snakes were observed during field surveys. During construction, if the species is present, some individuals could be killed and some suitable habitat could be temporarily unavailable. The AGFD has requested that surveys for the Mexican garter snake be conducted according to the established protocol at the Verde River to assist the AGFD in continued tracking and monitoring efforts for this species. Transwestern has agreed to complete the requested surveys at the Verde River before construction and would provide the survey report to the AGFD. Although mortality of individuals may occur if the species is present in the construction work area, due to the relatively narrow area of effect from the proposed project, population-level impacts on the species are not anticipated. Nonetheless, Transwestern would conduct monitoring for the species in areas of suitable habitat during construction to further avoid impacts on the Mexican garter snake.

The narrow-headed garter snake is a FS-sensitive species found in pinyon-juniper and pine-oak woodlands and ponderosa pine forests. It can also be found along permanently flowing streams that are sometimes sheltered by broadleaf deciduous trees (Rosen and Schwalbe, 1988). Lowered water tables, habitat modification, grazing along streambeds, increased recreational use in riparian areas, and habitat fragmentation all pose a threat to the narrow-headed garter snake. The species' range includes the mountains of central and eastern Arizona and west-central New Mexico, and it can be found at elevations ranging from 2,300 to 7,972 feet (AGFD, 2006a). The AGFD (2006a) reported that the species can occur in the Mogollon Rim and the White Mountains, Oak Creek Canyon, and the East Verde River in Arizona. The species has the potential to occur along the project corridor near the Verde River. If present during construction, some individuals could be killed. Additionally, suitable habitat could be temporarily unavailable following construction of the crossing. However, due to the limited width of disturbance that would occur at the crossing location of the Verde River and the temporary nature of the disturbance, population-level impacts on this species would not be expected.

The Sonoran desert tortoise is a FWS species of concern, a BLM-sensitive species, and an Arizona species of concern that occurs on rocky slopes and bajadas in desert scrub vegetation. Caliche caves in incised and cut banks of washes are used by the species for shelter sites, especially in the Lower Colorado River Valley. This tortoise is found at elevations ranging from 510 feet in Mojave desert scrub to semi-desert grassland and chaparral at about 5,300 feet. The Sonoran desert tortoise's range extends from northern Sinaloa, Mexico to southern Nevada and southwestern Utah and from south-central California east to southeastern Arizona (FWS, 1990). The Sonoran desert tortoise is widely distributed in central and southwestern Arizona and its burrows were observed in the Black Canyon City area during

field reconnaissance along the proposed project corridor. During field surveys, suitable habitat was identified along much of the Phoenix Lateral right-of-way south of MP 66.0. However, habitat used by this species only occurs in portions of this area where there are boulders or caliche caves.

According to the BLM, the Phoenix Lateral right-of-way would traverse 3.7 linear miles of Category II desert tortoise habitat (habitat that may be essential to maintenance of viable populations) between MPs 91.4 and 94.0 and MPs 96.7 and 97.8, and 1.5 linear miles of Category III habitat (habitat not essential to maintenance of viable populations) between MPs 84.5 and 86.0 on BLM-managed lands (Hughes, 2006). As discussed above, desert tortoises are not uniformly distributed across these areas, and their burrows may be tied to geologic formations or inclusions. Areas between burrow sites are important for facilitating tortoise movement and foraging and for maintaining habitat integrity. The BLM has a no net loss objective for the Sonoran desert tortoise and requires compensation according to the guidelines in the *Compensation for the Desert Tortoise* (Desert Tortoise Management Oversight Group, 1991). Transwestern would compensate for any desert tortoise habitat lost.

To reduce direct mortality of tortoises, Transwestern would follow AGFD guidelines (1997) for the relocation of any Sonoran desert tortoises found during construction. These guidelines specify that the tortoises be moved less than 48 hours before disturbance so that they do not return to the area, at times when the air ambient temperature is less than 105 degrees Fahrenheit, and to locations up to 0.25 mile from the place they were encountered. The AGFD also requested that Transwestern follow the BLM's recommendations regarding tortoise fencing and that the number of tortoises encountered and where they were encountered be reported back to the AGFD. Transwestern has agreed to implement the requested measures, including preconstruction surveys in areas of suitable habitat, and would move tortoises into adjacent areas outside of the construction work area. Transwestern would continue to cooperate with the AGFD and the BLM on management of the Sonoran desert tortoise during construction. Implementation of the agency-requested measures is expected to avoid population-level impacts on the Sonoran desert tortoise.

The Tucson shovel-nosed snake is a BLM-sensitive species that occurs in arid deserts with sandy washes, dunes, and rocky hillsides scattered with mesquite-creosote bush vegetation. This species is found at elevations ranging from 0 to 4,700 feet. This species' habitat is threatened by agriculture and urban development. Road building has destroyed and fragmented habitat and increased traffic, leading to greater snake mortality. Off-highway vehicles (OHVs) also have disturbed habitat (AGFD, 2006a). Suitable habitat was identified between MPs 201 and 209 of the Phoenix Lateral. During construction, field personnel would alert the EI of any shovel-nosed snakes identified in or around the trench. The EI, or someone under his/her direction who would be assigned snake identification responsibility, would be trained by a qualified herpetologist and provided with appropriate documentation for the identification of reptiles and amphibians in the proposed project area. Transwestern would adhere to the measures in its Trenching and Wildlife Guidelines (see Appendix K) that were developed partially based on recommendations by the AGFD. As requested by the AGFD, any shovel-nosed snakes trapped in the pipeline trench, or otherwise encountered, would be held and turned over to the AGFD for ongoing studies. As such, the project would not be expected to adversely affect the Tucson shovel-nosed snake at the population-level.

The desert sucker is a FWS species of concern and a BLM-sensitive species that occurs in rapids and flowing pools of streams and rivers, primarily over bottoms of gravel/rubble with sandy silt in the interstices. Spawning takes place in the riffles. Changes in flow regimes and the construction of reservoirs have decreased the amount of available habitat and non-native fish have led to an increase in competition and hybridization. The desert sucker occurs throughout the entire Gila River Basin (Minckley, 1973) at elevations ranging from 480 to 8,840 feet (AGFD, 2006a). It likely occurs at the Verde River crossing and the Agua Fria River crossing (when the Agua Fria, an intermittent waterbody, is

flowing). Because Transwestern proposes to cross the Verde River using a variation of the flume method (see sections 2.3.2 and 4.3.2.3) and the Agua Fria River would likely be dry at the time of the crossing, impacts on the desert sucker would likely be negligible both at the crossings and at associated tributaries or downstream of the crossing locations.

The headwater chub is a FWS species of concern. The species inhabits the upper to middle reaches of moderately sized streams. The headwater chub occurs in the tributaries of the Verde River, most of the Tonto Creek drainage, much of the San Carlos River drainage, and parts of the upper Gila River in New Mexico. However, it is not likely to occur at the Verde River crossing location and is not known to occur at the Gila River crossing location. The Verde River would be crossed using a variation of the flume method and the Gila River is intermittent at the crossing location. Transwestern would work to minimize impacts such as sedimentation and loss of habitat. As such, the proposed project would be unlikely to cause population-level effects on the headwater chub.

The longfin dace is a FWS species of concern and a BLM-sensitive species that may be found in a wide range of aquatic habitats from hot low desert streams to clear cool brooks in higher elevations. The small to medium streams it inhabits tend to have either sandy or gravelly bottoms and usually have water depths less than 8 inches. The native range of the longfin dace includes the Gila and Bill Williams River drainages in Arizona and the Magdalena and Sonoita River drainages in Mexico. In Arizona, this species may also be found in the Virgin River Basin. Threats to this species include human activities that alter the quality or flow of water including flood control, groundwater pumping, and irrigation practices. Non-native fish also pose a large threat (AGFD, 2006a). The longfin dace likely occurs at the Verde River crossing and the Agua Fria River crossing (when the Agua Fria, an intermittent river, is flowing). Because Transwestern proposes to cross the Verde River using a variation of the flume method and the Agua Fria River would likely be dry at the time of crossing, impacts on the longfin dace would likely be negligible both at the crossings and at associated tributaries or downstream of the crossing locations.

The Sonora sucker is a FWS species of concern and a BLM-sensitive species that is found in a variety of habitats from warmwater rivers to trout streams. Spawning takes place in small streams or riffles of larger streams. The total range of this species encompasses the Colorado River drainage in New Mexico, Arizona, and northern Sonora, Mexico. It lives at elevations ranging from 1,210 to 8,730 feet (AGFD, 2006a). In Arizona, the Sonora sucker can be found in the Gila and Bill Williams River drainages (Sublette et al., 1990). Watershed erosion has eliminated pool habitats because of excessive sand deposition; other habitat damage has been caused by changes in flow regimes and the construction of reservoirs (AGFD, 2006a). The Sonora sucker likely occurs at the Verde River crossing and the Agua Fria River crossing (when the Agua Fria, an intermittent river, is flowing). Because Transwestern proposes to cross the Verde River using a variation of the flume method and the Agua Fria River would likely be dry at the time of crossing, impacts on the Sonora sucker would likely be negligible both at the crossings and at associated tributaries or downstream of the crossing locations.

The speckled dace is a FWS species of concern and a BLM-sensitive species. This bottom dweller can be found in rocky riffles, runs, and pools of headwaters (Page and Burr, 1991). Its range includes all of the major western drainages from the Columbia and Colorado Rivers south to Sonora, Mexico. In Arizona, the speckled dace can be found in the Colorado, Bill Williams, and Gila River drainages, at elevations ranging from 6,562 to 9,843 feet. Land use practices that damage natural aquatic habitats and non-native predatory fish have had a negative impact on this small minnow-sized fish (AGFD, 2006a). The speckled dace likely occurs at the Verde River crossing and the Agua Fria River crossing (when the Agua Fria, an intermittent river, is flowing). Because Transwestern proposes to cross the Verde River using a variation of the flume method and the Agua Fria River would likely be dry at the time of crossing, impacts on the speckled dace would likely be negligible both at the crossings and at associated tributaries or downstream of the crossing locations.

The Bigelow's onion is an Arizona salvage-restricted species and is known to occur in Coconino, Gila, Greenlee, Maricopa, and Yavapai Counties. It is an herbaceous perennial that usually grows from a solitary bulb, flowering from April to May (Flora of North America, 1993+). This species occurs on dry, rocky soils in grassland, chaparral, and desert scrub communities between elevations of 1,500 and 5,574 feet (AGFD, 2006a). In the proposed project area, potential habitat for the Bigelow's onion was observed in numerous locations between MPs 45 and 140 and MPs 193 and 197 of the Phoenix Lateral, generally between Prescott Valley and the Hassayampa River, and near MP 195 in Rainbow Valley. The proposed project may impact individuals of Bigelow's onion, but is not likely to result in population-level effects.

The California flannelbush is a BLM-sensitive species that occurs in Yavapai County in the Black Hills, Peeples Valley, and Bradshaw, New River, and Weaver Mountains, and in Pinal County in the Superstition Mountains. This species typically flowers in May, but may flower from April to June (McDougall, 1973). It occurs on well-drained rocky hillsides and ridges in chaparral and oak/pine woodlands. In Arizona, the California flannelbush is usually found on dry, north slopes in canyons (McDougall, 1973) at elevations ranging from 3,500 to 6,500 feet (AGFD, 2006a). The main threats to this species include browsing by livestock and large game animals (AGFD, 2006a). The California flannelbush may occur along the project area between MPs 57 and 63 of the Phoenix Lateral in manzanita and mixed evergreen sclerophyll vegetation. The proposed project may impact individuals of the California flannelbush, but is not likely to result in population-level effects.

The Hualapai milkwort is a FS-sensitive species that occurs in Yavapai County in desert grassland and juniper woodland on sandy flats, limestone, rock, gravel, and silt at elevations of 3,150 to 5,000 feet (AGFD, 2006a). Suitable habitat occurs in the vicinity of MPs 0, 22, 49 to 52, 65 to 85, and 117 to 118 of the Phoenix Lateral in juniper grassland, mixed grass-scrub, manzanita and mixed evergreen sclerophyll, and palo verde-mixed cacti series vegetation. The proposed project may impact individuals of the Hualapai milkwort, but is not likely to result in a trend toward federal listing or loss of viability.

The Naturita milkvetch is a federal and state species of concern and a Navajo Nation G4 species occurring on sandstone ledges and rimrock along canyons in pinyon-juniper woodland in elevations of 5,400 to 6,200 feet. This species was identified near the northern terminus of the San Juan Lateral Loop A during surveys conducted in 2003; however, the species was not relocated during surveys for the expansion conducted in 2006. Surveys conducted in 2006 documented this species in low density on slopes of hillsides between MPs 83.2 and 85.5 along the San Juan Lateral Loop B. Individual plants located within the construction right-of-way would likely be removed during construction. However, given the low density of plants found during surveys, population-level impacts on the Naturita milkvetch are not likely to result from the project.

The strawtop cholla is an Arizona salvage-restricted species that occurs in Maricopa County (Benson, 1982). Cholla flowers bloom during April and May. Preferred habitat for this species includes sandy or gravelly soil on benches, slopes, mesas, flats, and washes in desert communities, usually at elevations below 4,500 feet. The strawtop cholla was observed in the proposed project area between MPs 164 and 169 of the Phoenix Lateral in saltbush vegetation, and potential habitat is present in various locations between MPs 77 and 255. Due to the availability of habitat elsewhere, the proposed project may impact individuals of the strawtop cholla, but is not likely to result in population-level effects on this species.

4.6.6 Summary of Determinations of Effect for Listed Species

Based on informal consultation with the FWS, 15 federally listed species were identified as potentially occurring in the general vicinity of (within the counties crossed by) the proposed project.

After further consultations with the FWS, the BLM, the FS, the NMDGF, the AGFD, and completion of field surveys, a determination of effect for each of these species was developed. In the draft EIS, three of the 15 species (the Colorado pikeminnow, the razorback sucker, and the spikedace) were identified as likely to be adversely affected by the proposed project.

In compliance with section 7 of the ESA, on May 4, 2007, the FERC staff submitted a BA to the FWS with a request for concurrence with these determinations of effect and to initiate formal consultation. The draft EIS was also provided to the FWS and was incorporated by reference within the BA. After follow-up discussions with the FWS, the FERC also determined that the project is likely to adversely affect critical habitat for the spikedace and documented that revised determination of effect in e-mail correspondence to the FWS dated May 29, 2007. In a letter dated June 7, 2007, the FWS indicated that it concurred with the FERC's determinations of effect and had received or had access to all of the information necessary to initiate formal consultation. The FWS' June 7, 2007 letter also stated that formal section 7 consultation for the proposed Phoenix Expansion Project was initiated on May 9, 2007. The FWS has not yet issued a BO as to whether the proposed project would likely jeopardize the continued existence of the Colorado pikeminnow, the razorback sucker, and the spikedace or result in the destruction or adverse modification of designated critical habitat for the spikedace.

As required, consultation has occurred with the NMDGF to determine the proposed project's effect on New Mexico-listed species. As described above, it is expected that the Phoenix Expansion Project would avoid adverse impacts on individuals or populations of New Mexico-protected species.

To ensure that potential impacts on special status species would be avoided or mitigated, as well as to comply with the ESA, **the FERC staff recommends that:**

- **Transwestern shall not begin construction activities <u>until</u>:**

  a. Transwestern completes any outstanding species-specific surveys and the FERC receives comments from the FWS regarding the preconstruction survey reports;

  b. the FERC completes formal consultation with the FWS; and

  c. Transwestern receives written notification from the Director of OEP that construction and/or implementation of conservation measures may begin.

4.6.7 Management Indicator Species

Seven MIS have the potential to occur along portions of the Phoenix Lateral right-of-way that cross the Kaibab and Prescott National Forests. MIS are those species selected to represent all wildlife species as indicators of forest health. MIS are used as planning and analysis tools to: 1) set goals, objectives, and minimum management requirements; 2) focus analysis of effects of plan alternatives; and 3) monitor the effects of plan implementation at the project level. The seven MIS that may occur include the pronghorn, mule deer, elk, juniper titmouse, spotted towhee, Lucy's warbler, and yellow-breasted chat. These species are discussed below.

Pronghorn inhabit low to high elevation grasslands in southeastern and central Arizona, and use the existing right-of-way as a migration corridor between Ash Fork and Prescott Valley (Coconino and Yavapai Counties). Population levels in both the Kaibab and the Prescott National Forests appear to be stable. Pronghorn would likely benefit from construction of the proposed project because junipers would be removed from the construction work areas and grass would be encouraged during reclamation.

Mule deer are not limited to any one type of terrain or habitat, occurring in sparse low deserts to high, forested mountains. They generally prefer more rugged country. The recent drought has had a negative impact on mule deer populations, and the population trend is downward in the Prescott National Forest. On the Kaibab National Forest, pinyon-juniper habitat is believed to have increased, and the overall trends in mule deer habitat on the Kaibab National Forest since 1987 appear to be relatively stable. The relatively small amount of disturbed habitat associated with the proposed project would have negligible impacts on the mule deer population and would not accelerate the downward trend in the population.

The population trend for elk in the Kaibab National Forest has been positive to the extent that there is continued debate as to whether management should try to decrease overall populations. All of the approximately 9 miles (130.9 acres) of pipeline right-of-way in the Kaibab National Forest occurs in habitats that could be used by elk. The result of pipeline construction would be to revert much of the affected right-of-way to an early-seral stage, resulting in more grassland, and fewer junipers and other trees. This would increase food sources (grass) for elk, but would reduce cover. However, because of the small acreage that would be affected, the proposed project would not affect the upward trend in elk populations.

The juniper titmouse is an obligate secondary cavity nester that is highly restricted to semi-arid pinyon-juniper woodlands. The juniper titmouse is a year-round resident in Arizona, exhibiting little seasonal movement to other habitats within its range. Given the stable population trend of juniper titmouse in the Kaibab and Prescott National Forests, it is unlikely that disturbance to late seral pinyon-juniper habitat associated with the proposed project would change that trend.

The spotted towhee typically occurs in open woodlands, on chaparral-covered slopes, and in brushy canyons. This bird species nests in thick brush and forages in dense leaf litter and debris below low-growing woody shrubs. Spotted towhee populations show a stable trend in the Prescott National Forest. Spotted towhees seem to be abundant in and around the Prescott National Forest and their populations are robust. The proposed project right-of-way would disturb only 0.8 mile (11.3 acres) of chaparral habitat in the Prescott National Forest. Therefore, it is unlikely that the stable trend of the spotted towhee would be changed by the proposed project.

The Lucy's warbler is a bird species found in riparian habitats of low-elevation mesquite bosques, cottonwood-willow woodlands, and densely vegetated xero-riparian washes. Riparian habitat in the Kaibab National Forest is spatially and temporally limited. While it may support individual pairs or family groups of riparian-dependent species, insufficient habitat exists to support viable populations. None of the open-water riparian areas support the necessary habitat features required by the Lucy's warbler. Therefore, the proposed project is unlikely to adversely affect the Lucy's warbler in the Kaibab National Forest. Population data for the Lucy's warbler in the Prescott National Forest are insufficient to determine local trends. Riparian crossings that would be disturbed by the proposed project right-of-way in the Prescott National Forest represent a small proportion of the riparian habitat available to the Lucy's warbler in the Prescott National Forest. As a result, although the proposed project may displace the Lucy's warbler in the vicinity of these crossings, it is unlikely to change the stable trend of the species in the Kaibab National Forest, or to adversely affect populations in the Prescott National Forest.

The yellow-breasted chat is an MIS for late-seral, low elevation riparian areas in the Kaibab National Forest. This bird species is largely insectivorous and nests at heights of 3 to 4 feet in dense thickets or tangles of vegetation. Appropriate habitat for the yellow-breasted chat in the Kaibab National Forest is limited and the species either does not occur or occurs in insufficient numbers to allow an evaluation of local trends. Nevertheless, the Kaibab National Forest designates its potential population of the yellow-breasted chat as stable because the fragmentary habitat that does occur for this species has

benefited from improvements in range management. Suitable habitat for the yellow-breasted chat does not exist in the Kaibab National Forest portion of the project right-of-way. Therefore, the project would not affect the yellow-breasted chat in the Kaibab National Forest.

4.6.8 No Action Alternative

Under the No Action Alternative, the FERC would deny Transwestern's application for a Certificate and the BLM would deny Transwestern's application for a Right-of-Way Grant for the portion of the project on federal lands. The No Action Alternative means that the proposed project would not go forward and the project-related facilities would not be installed. Accordingly, none of the potential environmental impacts on special status species identified for the construction and operation of the proposed project would occur.

4.7 LAND USE, RECREATION AND SPECIAL INTEREST AREAS, AND VISUAL RESOURCES

4.7.1 Land Use

Pipeline Facilities

The Phoenix Expansion Project would involve the construction of 283.9 miles of new 36- and 42-inch-diameter pipeline in San Juan and McKinley Counties, New Mexico and Yavapai, Coconino, Maricopa, and Pinal Counties, Arizona. Of this total, 8.9 miles and 15.7 miles are 36-inch-diameter loop pipelines (Loop A and Loop B, respectively, collectively referred to as the San Juan Lateral Loops). The remaining 259.3 miles of pipeline are referred to as the Phoenix Lateral, which would consist of 163.6 miles of 36-inch-diameter pipe and 95.7 miles of 42-inch-diameter pipe. The project would also involve the construction of approximately 1.4 miles of 6- to 24-inch-diameter pipeline in seven customer laterals that would connect the Phoenix Lateral to the proposed meter stations that are not located immediately adjacent to the Phoenix Lateral right-of-way.

Approximately 22.4 miles (91 percent) of the San Juan Lateral Loops would be constructed within or adjacent to existing rights-of-way and 2.2 miles (9 percent) would be constructed on newly created right-of-way. Of the 22.4 miles, 100 percent would be constructed within Transwestern's and other existing rights-of-way and would overlap these rights-of-way by 25 feet (see Appendix C).

Approximately 222.8 miles (86 percent) of the Phoenix Lateral would be constructed within or adjacent to existing rights-of-way and 36.5 miles (14 percent) would be constructed on newly created right-of-way. Of the 222.8 miles, about 68.2 miles (31 percent) would overlap existing rights-of-way by 15 feet, about 1.9 miles (1 percent) would overlap by 50 feet, and about 85.7 miles (38 percent) would overlap by 100 feet. The remaining 67.0 miles would be located adjacent to an existing easement but would require additional permanent right-of-way for operation. The customer laterals extending from the Phoenix Lateral and not immediately adjacent to the right-of-way would be constructed on newly created right-of-way.

Land use impacts associated with the project would include the disturbance of existing land uses within the construction right-of-way during construction and retention of an expanded or new permanent right-of-way for operation of the pipelines. Transwestern proposes to generally use a 100-foot-wide construction right-of-way along the San Juan Lateral Loops. Following construction, a 10- to 40-foot-wide permanent right-of-way would be maintained in most locations, with the exception of areas where the pipeline loop would diverge from the existing right-of-way. At these locations, Transwestern would maintain a 50-foot-wide permanent right-of-way. In addition to the construction right-of-way, various temporary extra workspaces and access roads would be used for construction (see Appendix E).

Along the Phoenix Lateral, Transwestern proposes to generally use a 120-foot-wide construction right-of-way for the 42-inch-diameter portion (MPs 0.0 to 95.2) and a 100-foot-wide construction right-of-way for the 36-inch-diameter portion (MPs 95.2 to 255.1). Following construction, Transwestern would maintain a 50-foot-wide permanent right-of-way. The customer laterals would be constructed within a 75-foot-wide right-of-way and, following construction, maintained within a 50-foot-wide permanent right-of-way. In addition to the construction right-of-way, various temporary extra workspaces and access roads would be used for construction (see Appendix E).

Because the new pipeline would be partially installed within existing rights-of-way at certain locations (see Appendix C), construction and permanent impacts associated with the project at these locations would be reduced. Construction of Transwestern's proposed loops and laterals would affect a

total of about 5,460.6 acres of land, including 3,683.2 acres for the pipeline rights-of-way, 684.2 acres for temporary extra workspace, and 1,093.2 acres for access roads. Of the 3,683.2 acres affected by the pipeline rights-of-way, about 60 percent of the total length would be within Transwestern's or other existing rights-of-way by 15 to 100 feet. Table 4.7.1-1 summarizes the acres of each land use that would be affected by construction and operation of the loops and laterals. As shown in table 4.7.1-1, rangeland would be the primary land use affected by construction of the pipelines, totaling about 3,698.7 acres (68 percent). The remaining land uses that would be affected consist of 1,378.3 acres (25 percent) of developed land, 346.5 acres (6 percent) of agricultural land, and 37.2 acres (1 percent) of residential land.

Of the 5,460.6 acres of land affected by construction of the pipeline facilities, about 1,731.0 acres would be retained as new permanent right-of-way. The land retained as permanent right-of-way would be allowed to revert to former use; however, certain activities such as the construction of aboveground structures, including houses, house additions, garages, patios, pools, or other objects not easily removable, or the planting and cultivating of trees or orchards, would be prohibited within the permanent right-of-way. An additional 328.1 acres of land would be affected by permanent modified or newly created access roads along the right-of-way. The remaining 3,401.5 acres used for temporary construction right-of-way and temporary extra workspace would be allowed to revert to prior uses following construction with no restrictions.

Impacts on range, agricultural, developed, and residential lands are discussed below. Surface waters and wetlands are discussed in sections 4.3.2 and 4.3.4, respectively. Impacts on transportation uses are discussed in section 4.8.4.

Rangeland – The majority of the San Juan Lateral Loops, Phoenix Lateral, and customer laterals would cross rangeland. Construction of the pipelines would affect approximately 3,698.7 acres of rangeland (includes temporary extra workspace and access roads). Rangeland associated with the project generally consists of open lands comprising grasslands and desert scrub-shrub.

Construction on rangeland would be conducted as described in section 2.3.1. The effects of construction on rangeland are expected to be minor and short term. Preconstruction herbaceous and shrub communities are anticipated to reestablish within one or two growing seasons after construction. Transwestern would implement the measures described in its UECRM Plan and Restoration Plan before, during, and after construction to facilitate reclamation and revegetation of land disturbed by construction. In accordance with its UECRM Plan, Transwestern would work with willing landowners, grazing permittees, and land management agencies to develop grazing deferment plans. Measures in these plans could include fences, installation of gates, and proper management of livestock to minimize grazing disturbance of revegetation efforts.

Some rangeland animals and wildlife animals could be trapped in the open pipeline trench and be exposed to additional injury or mortality from predation or other causes. Transwestern would minimize the impacts of the open trench on wildlife by implementing the Trenching and Wildlife Guidelines (see Appendix K). These guidelines are based on recommendations from the wildlife agencies in New Mexico and Arizona and include reducing the length of open trench at any one time, providing ramps to allow animals to escape trenches, and frequent inspection of trenches and rescue of trapped animals. This would reduce mortality from entrapment in the pipeline trench. Additionally, Transwestern would cut and brace existing fences along the right-of-way and would install temporary gates to control livestock and limit public access.

TABLE 4.7.1-1

Acres of Land Affected by Construction and Operation of the Phoenix Expansion Project [a]

State/Facility	Rangeland [b]		Agricultural [c]		Developed [d]		Residential [e]		Subtotals	
	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.
New Mexico										
Bloomfield Compressor Station [f]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
San Juan Lateral Loop A										
Pipeline Right-of-Way	89.0	44.5	6.0	3.0	10.8	5.4	2.0	1.0	107.8	53.9
Temporary Extra Workspace	33.7	0.0	0.9	0.0	11.9	0.0	0.0	0.0	46.5	0.0
Aboveground Facilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Access Roads	0.0	0.0	0.0	0.0	26.7	0.0	0.0	0.0	26.7	0.0
Offsite Areas [g]	0.0	0.0	0.0	0.0	51.3	0.0	0.0	0.0	51.3	0.0
San Juan Lateral Loop A Subtotal	122.7	44.5	6.9	3.0	100.7	5.4	2.0	1.0	232.3	53.9
San Juan Lateral Loop B										
Pipeline Right-of-Way	189.8	94.9	0.0	0.0	0.0	0.0	0.0	0.0	189.8	94.9
Temporary Extra Workspace	44.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.1	0.0
Aboveground Facilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Access Roads	0.0	0.0	0.0	0.0	74.2	0.0	0.0	0.0	74.2	0.0
Offsite Areas [g]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
San Juan Lateral Loop B Subtotal	233.9	94.9	0.0	0.0	74.2	0.0	0.0	0.0	308.1	94.9
Arizona										
Seligman Compressor Station No. 1 [g]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phoenix Lateral										
Pipeline Right-of-Way	2,860.6	1,324.4	274.6	137.6	210.5	99.1	28.7	13.7	3,374.4	1,574.8
Temporary Extra Workspace	473.1	0.0	60.8	0.0	50.8	0.0	6.5	0.0	591.2	0.0
Aboveground Facilities										
Ash Fork Facility	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5
Valves and Pig Launchers/Receivers [h]	3.4	3.4	0.0	0.0	0.0	0.0	0.0	0.0	3.4	3.4
Southwest Gas Corporation (SWG) Sun Valley North Meter Station	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5

TABLE 4.7.1-1 (cont'd)

Acres of Land Affected by Construction and Operation of the Phoenix Expansion Project [a]

State/Facility	Rangeland [b]		Agricultural [c]		Developed [d]		Residential [e]		Subtotals	
	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.
SWG Sun Valley South Meter Station	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
Arizona Public Service (APS) Redhawk Meter Station	0.0	0.0	0.0	0.0	1.1	1.1	0.0	0.0	1.1	1.1
Entegra Gila River Meter Station	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
SWG Rainbow Valley Meter Station	2.6	2.6	0.0	0.0	0.0	0.0	0.0	0.0	2.6	2.6
Salt River Project Agricultural Improvement and Power District Desert Basin Meter Station	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
APS Sundance Meter Station	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.5	0.5
El Paso Natural Gas Company (EPNG) Pinal County Meter Station	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.5	0.5
EPNG East Valley Lateral Meter Station	0.0	0.0	3.5	3.5	0.0	0.0	0.0	0.0	3.5	3.5
Aboveground Subtotal	10.5	10.5	4.0	4.0	1.6	1.6	0.0	0.0	16.1	16.1
Access Roads	2.6	2.6	0.0	0.0	989.7	325.5	0.0	0.0	992.3	328.1
Offsite Areas [i]	233.4	0.0	0.0	0.0	227.1	0.0	0.0	0.0	460.5	0.0
Phoenix Lateral Subtotal	3,580.2	1,337.5	339.4	141.6	1,479.7	426.2	35.2	13.7	5,434.5	1,919.0
Customer Laterals										
Pipeline Right-of-Way [j]	5.0	3.3	2.7	1.8	3.6	2.3	0.0	0.0	11.3	7.4
Temporary Extra Workspace	0.8	0.0	1.5	0.0	0.1	0.0	0.0	0.0	2.4	0.0
Aboveground Facilities	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9
Access Roads	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Offsite Areas [i]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Customer Laterals Subtotal	6.7	4.2	4.2	1.8	3.7	2.3	0.0	0.0	14.6	8.3
East Valley Lateral [k]										
Pipeline Right-of-Way	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temporary Extra Workspace	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aboveground Facilities										
SWG New Florence Meter Station	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.3

TABLE 4.7.1-1 (cont'd)

Acres of Land Affected by Construction and Operation of the Phoenix Expansion Project [a]

State/Facility	Rangeland [b]		Agricultural [c]		Developed [d]		Residential [e]		Subtotals	
	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.
SWG Germann Meter Station	0.0	0.0	1.4	1.4	0.0	0.0	0.0	0.0	1.4	1.4
Aboveground Subtotal	1.3	1.3	1.4	1.4	0.0	0.0	0.0	0.0	2.7	2.7
Access Roads	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Offsite Areas [i]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
East Valley Lateral Subtotal	1.3	1.3	1.4	1.4	0.0	0.0	0.0	0.0	2.7	2.7
Project Subtotals										
Pipeline Right-of-Way	3,144.4	1,467.1	283.3	142.4	224.9	106.8	30.7	14.7	3,683.2	1,731.0
Temporary Extra Workspace	551.7	0.0	63.2	0.0	62.8	0.0	6.5	0.0	684.2	0.0
Aboveground Facilities	12.7	12.7	5.4	5.4	1.6	1.6	0.0	0.0	19.7	19.7
Access Roads	2.6	2.6	0.0	0.0	1,090.6	325.5	0.0	0.0	1,093.2	328.1
Offsite Areas	233.4	0.0	0.0	0.0	278.4	0.0	0.0	0.0	511.8	0.0
Project Total	3,944.8	1,482.4	351.9	147.8	1,658.3	433.9	37.2	14.7	5,992.2	2,078.8

Const. = Temporary construction work area or right-of-way. Oper. = Permanent facility or right-of-way.

[a] Does not take into account the approximately 6.0 acres of land that would be avoided if the horizontal directional drill crossing of the San Juan River is successful (see section 4.3.2.3).

[b] Rangeland consists of plains, grasslands, and sagebrush scrubland primarily used for grazing activities.

[c] Agricultural land consists of irrigated land used for agriculture and cropland.

[d] Developed land consists of power or utility stations, manufacturing or industrial plants, mines, commercial facilities, and roads.

[e] Residential land consists of landscaped areas associated with residences.

[f] Activities proposed at the Bloomfield Compressor Station and Seligman Compressor Station No. 1 would occur within the existing facility fenceline and would not require additional land outside of that previously disturbed. See table 4.7.1-2.

[g] Offsite areas consisting of pipe storage and contractor yards and borrow/disposal areas would be commonly used for Loops A and B and, therefore, have only been accounted for once in land use impacts (with the San Juan Lateral Loop A).

[h] Includes only those land use impacts associated with valves and pig launchers or receivers that would affect land outside of already proposed aboveground facilities or the construction or operational right-of-way. See table 4.7.1-2.

[i] Offsite areas consisting of pipe storage and contractor yards and borrow/disposal areas would be commonly used for the Phoenix Lateral and customer laterals and, therefore, have only been accounted for once in land use impacts (with the Phoenix Lateral).

[j] Includes the area affected by construction and operation of lateral pipelines to connect the meter station to the Phoenix Lateral.

[k] The East Valley Lateral is an existing 36.7-mile-long, 24-inch-diameter lateral that was constructed in 2004 and would connect to the Phoenix Lateral at MP 255.1. Transwestern would acquire an undivided interest in this facility as part of the Phoenix Expansion Project.

Note: The totals shown in this table may not equal the sum of addends due to rounding.

Long-term impact associated with pipeline operation includes the land easement encumbrance for the right-of-way and its restrictions on future land uses. These restrictions prohibit certain types of uses from occurring within the permanent right-of-way that could affect the maintenance and safe operation of the pipeline, such as the construction of any permanent aboveground structures (e.g., houses, commercial buildings) or excavation activities. However, operation of the pipelines would not affect other types of land uses, such as rangeland or other activities that do not directly disturb the pipelines.

Transwestern has identified two range allotments within the Kaibab National Forest that would be affected by the Phoenix Lateral. The Irishman Dam cattle allotment is located between MPs 0.0 and 5.5 and the Hat sheep allotment is located between MPs 5.5 and 9.5. In order to maintain the grazing permit, the permittee must have a base property (private land) of at least 40 acres. As long as the permittee is leasing and not selling part of their base property, this lease would have no effect on the ability to maintain the grazing permit. If the grazing permittee sold part of their base property, a reduction below the minimum 40 acres may affect their ability to maintain the grazing permit. Operation of the pipeline at the Hat sheep allotment would not affect the range allotment status because the pipeline right-of-way would not reduce the amount of land available for grazing. However, the site for the Ash Fork Facility, which is located in the Irishman Dam cattle allotment, would reduce the amount of land available for grazing. Transwestern is negotiating a long-term lease with the permittee of this allotment for the Ash Fork Facility, thus avoiding the loss of the cattle allotment.

Agricultural Land – About 0.5 mile of agricultural land would be crossed by Loop A, no agricultural land would be crossed by Loop B, about 22.7 miles of agricultural land in Maricopa and Pinal Counties would be crossed by the Phoenix Lateral, and about 0.3 mile of agricultural land would be crossed by the customer laterals. Along the Phoenix Lateral, a nursery would be crossed between MPs 181.8 and 182.3 and an orange orchard would be crossed between MPs 214.1 and 214.4. Construction of the pipelines including temporary extra workspace and access roads would affect approximately 346.5 acres of agricultural land, including 6.9 acres within the nursery and 4.2 acres within the orchard. Nearly all crossings of agricultural lands would be in locations where the Phoenix Lateral would be installed adjacent to the EPNG right-of-way.

Short-term impacts on agricultural areas could include the loss of standing crops within the construction work area and disruption of farming operations for the growing season during the year of construction. Installation of the proposed pipelines would generally take row crops out of production for one growing season; pasture and hayfields could take several years to return to previous production levels. Transwestern would address compensation for crop damage or loss associated with construction with each individual landowner. Transwestern would bury the pipelines at a depth that would be sufficient to allow for current and anticipated agricultural activities. Additionally, Transwestern would minimize impacts on agricultural land by segregating and conserving topsoil in all actively cultivated and rotated cropland and improved pasture (see section 4.2.2).

Transwestern would consult with each landowner to identify existing and possible future drainage structures and irrigation facilities, current and anticipated types of equipment used, tillage depths, typical crops, etc. Transwestern would maintain natural flow in crop irrigation systems by providing breaks in topsoil (if segregated) and subsoil stockpiles, installing temporary gates in existing fences, and implementing the appropriate requirements of Transwestern's UECRM Plan during construction and restoration, including alleviating any rutting or soil compaction resulting from construction activities. Where cathodic protection equipment is installed in agricultural areas, it would be placed on or as close as practical to an existing fence or, alternatively, adjacent to an existing road right-of-way. If no fence or road right-of-way is available, Transwestern would work with individual landowners on the placement of these facilities.

Following construction, Transwestern would implement the restoration practices outlined in its UECRM Plan. Operation of the permanent pipeline right-of-way would occur on 142.4 acres of agricultural land. However, agricultural uses would continue as before construction, with the exception of the orchard where approximately 1.5 acres of orchard trees would be permanently removed for operation of the pipeline.

Developed Land – Loop A would cross developed land for the first approximate 2.4 miles (with the exception of about 0.6 mile at the San Juan River crossing), no developed land would be crossed by Loop B, and approximately 16.0 miles of developed land would be crossed by the Phoenix Lateral. A total of about 1,378.3 acres of developed land would be affected by the pipeline facilities, temporary extra workspace, and access roads. Developed land associated with the project generally consists of power or utility stations, manufacturing or industrial plants, mines, commercial facilities, and roads. The majority (1,090.6 acres) of the project's impact on developed land would be associated with modifications to existing roads or creation of roads necessary for access.

Developed land uses could be temporarily impacted during pipeline construction by increased dust from exposed soils, construction noise, and traffic congestion.

Air quality impacts on developed land would be temporary. Air quality may be affected by the proposed project as a result of an increase in vehicular traffic and equipment use during construction. The effects of increased vehicle traffic and construction equipment would be short term and would consist of a temporary increase in fugitive dust and mobile source emissions. Fugitive dust is dependent on soil type, weather conditions, and the extent of ground disturbance. Transwestern would minimize dust impacts by implementing the control measures outlined in its Dust Control Plan (see section 4.10.1.3 and Appendix M). A discussion of the impacts of mobile source emissions is presented in section 4.10.1.3.

The project would create intermittent, temporary increases in noise levels at any given location within the project area as construction activities proceed. Most of the noise currently generated in any given area along the proposed project route is due to human activity such as vehicle traffic and industrial processes (e.g., mining). Increases in noise levels would likely occur during construction from increased vehicle traffic on local roads and the operation of construction equipment on the right-of-way. Increases in noise levels would be short term and occur mostly during daylight hours. Noise impacts are discussed further in section 4.10.2.

The movement of construction personnel, construction equipment, and materials to the construction right-of-way may slightly impact the transportation system in the project area. Traffic congestion on local roads could result when bulk equipment and materials are moved from roads to and from the construction right-of-way. Once construction equipment and materials reach the construction right-of-way, construction traffic would remain on the right-of-way except to cross roads, which would temporarily interrupt traffic flow. Appropriate traffic control measures, such as flag persons and signs, would be used to ensure safety of local traffic. Many of the workers would leave their personal vehicles at the contractor yard and share rides to the construction right-of-way. Because the construction right-of-way is a linear corridor, disruption to traffic on local roads would normally be limited to several days to a week at any location as the various phases of construction progress along the pipeline route.

Transwestern would obtain the appropriate state or county highway/road permits for any roads to be bored and open cut. Most major paved roads and railroads would be crossed by boring under the rail or road, resulting in no traffic disruptions and no damage to the rail or road surface. Lightly traveled, other paved, and unimproved rural dirt roads would be crossed by open cutting, which usually would take about 1 day to complete. Provisions would be made for a detour around the construction site or a bridge across the trench during pipeline installation.

Most developed land uses would be able to continue following construction. However, some activities, such as the building of new commercial or residential structures would be prohibited on the permanent right-of-way. During easement negotiations, landowners would have the opportunity to request that their development plans be considered during pipeline construction. Impacts on planned developments crossed by or within 0.25 mile of the pipeline route are discussed in additional detail in section 4.7.3.2.

Residential Land – Residential land affected by the pipeline facilities would occur on Loop A and the Phoenix Lateral. Construction, including temporary extra workspaces, would affect approximately 37.2 acres of residential land.

Similar to developed lands, residential land could be temporarily impacted during pipeline construction by increased dust from exposed soils, construction noise, and traffic congestion. Transwestern would mitigate these impacts as discussed above. Further, Transwestern would construct through or near residential areas in a manner to ensure that all construction activities minimize adverse impacts on residences and that cleanup is prompt and thorough. Access to homes would be maintained, except for the brief periods essential for laying the new pipeline.

The location of existing residences and structures within 50 feet of the construction work area, and the impacts on and mitigation proposed for these residences and structures, are discussed in additional detail in section 4.7.3.1.

Aboveground Facilities

As part of the project, Transwestern would modify 2 existing compressor stations (Bloomfield Compressor Station and Seligman Compressor Station No. 1), and construct 1 filter-separator/odorant facility (Ash Fork Facility), 4 taps, 11 meter stations, 6 pig launchers, 3 pig receivers, and 31 valves (including remote blowdown valves). Additionally, Transwestern would remove the pig launcher facility from MP 8.9 of the existing San Juan Lateral and relocate it to the Bloomfield Compressor Station as part of the installation of Loop A. Also, Transwestern would remove the pig receiver facility at MP 71.9 and the pig launcher facility at MP 87.6 of the existing San Juan Lateral as part of the installation of Loop B. A total of about 19.7 acres of land would be disturbed by construction and operation of these aboveground facilities. Table 4.7.1-2 summarizes the land requirements and land use for the aboveground facilities associated with the Phoenix Expansion Project.

Construction activities at the two compressor stations would occur within the existing buildings or on previously disturbed, graded, or graveled areas within the existing fenceline of the facilities. No additional land would be required or disturbed during the modifications at these stations.

The modifications at the Bloomfield Compressor Station would include the addition of a discharge header, station side, and bypass valves necessary to accommodate Loop A, as well as the relocation of the pig launcher for Loop A from MP 8.9 to within the compressor station yard. The modifications at the existing Seligman Compressor Station No. 1 would include the addition of one pressure control valve and one pressure monitor valve in the bypass line of each station bypass valve. Because these modifications would occur within the existing, developed, previously disturbed fencelines of these facilities, no new land use impacts would occur.

TABLE 4.7.1-2

Aboveground Facilities Associated with the Phoenix Expansion Project

Facility	Milepost (MP)	County, State	Land Use	Land Affected During Construction (acres)	Land Affected During Operation (acres)
Compressor Stations					
Bloomfield [a]	San Juan Lateral MP 0.0	San Juan, New Mexico	Developed	0.0	0.0
Seligman No. 1 [b]	Mainline MP 289.5	Mohave, Arizona	Developed	0.0	0.0
Compressor Station Subtotal				0.0	0.0
Ash Fork Facility	Mainline MP 235.7/ Phoenix Lateral MP 0.0	Yavapai, Arizona	Rangeland	2.5	2.5
Meter Stations					
Southwest Gas Corporation (SWG) Sun Valley North Meter Station	Phoenix Lateral MP 137.7	Maricopa, Arizona	Rangeland	0.5	0.5
SWG Sun Valley South Meter Station	Phoenix Lateral MP 148.6	Maricopa, Arizona	Rangeland	0.5	0.5
Arizona Public Service Company (APS) Redhawk Meter Station	APS Redhawk Lateral MP 0.4 (Off Phoenix Lateral MP 164.9)	Maricopa, Arizona	Developed	1.1	1.1
Entegra Gila River Meter Station	Phoenix Lateral MP 180.2	Maricopa, Arizona	Rangeland	0.5	0.5
SWG Rainbow Valley Meter Station	Phoenix Lateral MP 193.3	Maricopa, Arizona	Rangeland	2.6	2.6
Salt River Project Agricultural Improvement and Power District (SRP) Desert Basin Meter Station	SRP Desert Basin Lateral MP 0.8 (Off Phoenix Lateral MP 239.1)	Pinal, Arizona	Rangeland	0.5	0.5
APS Sundance Meter Station	Phoenix Lateral MP 250.6	Pinal, Arizona	Developed	0.5	0.5
El Paso Natural Gas Company (EPNG) Pinal County Meter Station	Phoenix Lateral MP 255.1	Pinal, Arizona	Agricultural	0.5	0.5
EPNG East Valley Lateral Meter Station	Phoenix Lateral MP 255.1	Pinal, Arizona	Agricultural	3.5	3.5
SWG New Florence Meter Station	East Valley Lateral MP 10.5	Pinal, Arizona	Rangeland	1.3	1.3
SWG Germann Meter Station	East Valley Lateral MP 29.3	Pinal, Arizona	Agricultural	1.4	1.4
Meter Station Subtotal				12.9	12.9
Pig Launchers/Receivers [c]					
Launcher (for 42-inch pipeline and within Ash Fork Facility)	Phoenix Lateral MP 0.0	Yavapai, Arizona	Rangeland	0.0	0.0
Receiver (for 42-inch pipeline)	Phoenix Lateral MP 95.2	Yavapai, Arizona	Rangeland	0.0	0.0
Launcher (for 36-inch pipeline)	Phoenix Lateral MP 95.2	Yavapai, Arizona	Rangeland	0.0	0.0
Launcher (for APS Redhawk Meter Station)	Phoenix Lateral MP 164.9	Maricopa, Arizona	Rangeland	0.9	0.9
Launcher and Receiver (for Entegra Gila River Meter Station)	Phoenix Lateral MP 180.2	Maricopa, Arizona	Rangeland	0.0	0.0
Launcher (for SRP Desert Basin Lateral)	Phoenix Lateral MP 239.1	Pinal, Arizona	Rangeland	0.0	0.0

TABLE 4.7.1-2 (cont'd)

Aboveground Facilities Associated with the Phoenix Expansion Project

Facility	Milepost	County, State	Land Use	Land Affected During Construction (acres)	Land Affected During Operation (acres)
Launcher (for APS Sundance Lateral)	Phoenix Lateral MP 250.6	Pinal, Arizona	Developed	0.0	0.0
Receiver (for 36-inch pipeline and within EPNG Pinal County Meter Station)	Phoenix Lateral MP 255.1	Pinal, Arizona	Agricultural	0.0	0.0
Pig Launchers/Receivers Subtotal				0.9	0.9
Valves, Taps, and Blowdown Valves [c]					
Valve-0	Phoenix Lateral MP 0.0	Yavapai, Arizona	Rangeland	0.0	0.0
Valve-17	Phoenix Lateral MP 17.3	Yavapai, Arizona	Rangeland	0.0	0.0
Unisource Energy, Inc. (UNS) Tap, Chino Valley	Phoenix Lateral MP 32.5	Yavapai, Arizona	Rangeland	0.5	0.5
Valve-35	Phoenix Lateral MP 34.8	Yavapai, Arizona	Rangeland	0.0	0.0
Valve-42	Phoenix Lateral MP 41.8	Yavapai, Arizona	Rangeland	0.0	0.0
UNS Tap, Prescott Valley Airport	Phoenix Lateral MP 43.3	Yavapai, Arizona	Rangeland	0.0	0.0
Valve-49	Phoenix Lateral MP 48.7	Yavapai, Arizona	Rangeland	0.0	0.0
UNS Tap, Prescott South	Phoenix Lateral MP 50.2	Yavapai, Arizona	Rangeland	0.0	0.0
Valve-56	Phoenix Lateral MP 55.5	Yavapai, Arizona	Rangeland	0.0	0.0
Valve-62	Phoenix Lateral MP 62.4	Yavapai, Arizona	Rangeland	0.0	0.0
Valve-69	Phoenix Lateral MP 69.3	Yavapai, Arizona	Rangeland	0.0	0.0
Valve-82	Phoenix Lateral MP 81.8	Yavapai, Arizona	Rangeland	0.0	0.0
Valve-87	Phoenix Lateral MP 87.4	Yavapai, Arizona	Rangeland	0.0	0.0
Valve-95	Phoenix Lateral MP 95.2	Yavapai, Arizona	Rangeland	0.5	0.5
Valve-104	Phoenix Lateral MP 104.3	Maricopa, Arizona	Rangeland	0.0	0.0
Valve-115	Phoenix Lateral MP 114.6	Maricopa, Arizona	Rangeland	0.0	0.0
Blowdown Valve-115	Phoenix Lateral MP 114.6	Maricopa, Arizona	Rangeland	0.5	0.5
Valve-123	Phoenix Lateral MP 123.3	Maricopa, Arizona	Rangeland	0.0	0.0
Valve-133	Phoenix Lateral MP 133.0	Maricopa, Arizona	Rangeland	0.0	0.0
Blowdown Valve-133	Phoenix Lateral MP 133.0	Maricopa, Arizona	Rangeland	0.5	0.5
Valve-147	Phoenix Lateral MP 147.1	Maricopa, Arizona	Rangeland	0.0	0.0
Blowdown Valve-147	Phoenix Lateral MP 147.1	Maricopa, Arizona	Rangeland	0.5	0.5
Valve-152	Phoenix Lateral MP 151.8	Maricopa, Arizona	Rangeland	0.0	0.0

TABLE 4.7.1-2 (cont'd)

Aboveground Facilities Associated with the Phoenix Expansion Project

Facility	Milepost	County, State	Land Use	Land Affected During Construction (acres)	Land Affected During Operation (acres)
Blowdown Valve-152	Phoenix Lateral MP 151.8	Maricopa, Arizona	Rangeland	0.5	0.5
Valve-165	Phoenix Lateral MP 164.9	Maricopa, Arizona	Rangeland	0.0	0.0
Valve-180	Phoenix Lateral MP 180.2	Maricopa, Arizona	Rangeland	0.0	0.0
EPNG Gila Bend Tap	Phoenix Lateral MP 180.2	Maricopa, Arizona	Rangeland	0.0	0.0
Valve-193	Phoenix Lateral MP 193.3	Maricopa, Arizona	Rangeland	0.0	0.0
Valve-213	Phoenix Lateral MP 213.4	Pinal, Arizona	Rangeland	0.0	0.0
Valve-221	Phoenix Lateral MP 221.4	Pinal, Arizona	Agricultural	0.0	0.0
Valve-232	Phoenix Lateral MP 231.6	Pinal, Arizona	Agricultural	0.0	0.0
Valve-239	Phoenix Lateral MP 239.3	Pinal, Arizona	Rangeland	0.2	0.2
Valve-245	Phoenix Lateral MP 244.7	Pinal, Arizona	Rangeland	0.0	0.0
Valve-250	Phoenix Lateral MP 250.5	Pinal, Arizona	Rangeland	0.2	0.2
Valve-255	Phoenix Lateral MP 255.1	Pinal, Arizona	Developed	0.0	0.0
Valves, Taps, and Blowdown Valves Subtotal				3.4	3.4
Project Total				19.7	19.7

[a] Piping modifications at the existing Bloomfield Compressor Station would affect previously disturbed land within the existing station fenceline.

[b] Installation of the valves at the existing Seligman Compressor Station No. 1 would affect previously disturbed land within the existing station fenceline.

[c] The pig launcher/receiver facilities, valves, remote blowdown valves, and taps would be constructed and installed within the permanent pipeline right-of-way or within the existing or proposed aboveground facility sites unless otherwise noted. Land beyond that otherwise permanently affected by the pipeline facilities would not be required for operation of these facilities unless otherwise noted.

The Ash Fork Facility would be constructed at the intersection of the Transwestern mainline system (MP 235.7) and the beginning of the Phoenix Lateral (MP 0.0) on rangeland used for pasture. Construction of the Ash Fork Facility would include installation of a side valve on Transwestern's existing 30-inch-diameter mainline and on the 30-inch-diameter loop, two filter-separators to remove pipeline liquids that may be present, pipeline odorant injection facilities and odorant storage tank, telecommunications equipment, and a pig launcher for the proposed 42-inch-diameter Phoenix Lateral. The Ash Fork Facility would affect 2.5 acres of rangeland during construction, which would be fenced and permanently maintained for operation of the facility.

Transwestern would construct 11 meter stations along the Phoenix Lateral at locations either adjacent to the customer facilities or adjacent to the permanent right-of-way. The meter stations would include interconnecting metering and pressure/flow regulation facilities, and interconnecting pipe, receivers for the customer laterals, and filter-separators as needed for each specific interconnect. As listed in table 4.7.1-2, the meter stations would range in size from 0.5 acre to 3.5 acres, affecting a total of 5.9 acres of rangeland, 1.6 acres of developed land, and 5.4 acres of agricultural land.

Six pig launchers and three pig receivers would be constructed as part of the Phoenix Expansion Project. One of the pig launchers (MP 0.0) would be installed within the Ash Fork Facility. Three pig launchers (MPs 95.2, 239.1, and 250.6) would be installed at the beginning of the 36-inch-diameter pipeline segment along the Phoenix Lateral, the SRP Desert Basin Lateral, and the APS Sundance Lateral, respectively. One pig launcher would be installed along a customer lateral (Phoenix Lateral MP 164.9) for the APS Redhawk Meter Station, a pig launcher and receiver would be installed at MP 180.2 for the Entegra Gila River Meter Station, and one pig receiver would be installed at MP 255.1 within the EPNG East Valley Lateral Meter Station site (MP 255.1). The other pig receiver (MP 95.2) would be installed at the end of the 42-inch-diameter pipeline segment along the Phoenix Lateral. With the exception of the pig launcher at the APS Redhawk Meter Station, which would affect 0.9 acre, all of the pig launchers and receivers would be constructed and operated within the permanent pipeline right-of-way or within the existing or proposed aboveground facility sites and would not require any additional land during construction and operation. However, each facility would result in the permanent conversion of land within the pipeline right-of-way to an industrial use (i.e., graveled and fenced).

A total of 27 valves and 4 remote blowdown valves would be constructed as part of the project. With the exception of three valves (Valves 95, 239, and 250) and the four remote blowdown valves, all of the valves would be constructed and operated within the permanent pipeline right-of-way or within the existing or proposed aboveground facility sites and would not require any additional land during construction and operation. Each site would be graveled, as necessary, and fenced, and would result in the permanent conversion of land within the pipeline right-of-way to an industrial use.

Pipe Storage and Contractor Yards and Borrow/Disposal Areas

To support construction activities, Transwestern proposes to use eight pipe storage and contractor yards on a temporary basis. One of these yards would support activities associated with construction of the San Juan Lateral Loops. The remaining seven yards would support activities associated with construction of the Phoenix Lateral and customer laterals. The sizes, locations, land use, and land ownership of the proposed yards are listed in table 2.2.3-1; the yards are depicted on the figures in Appendix B. These yards would temporarily affect about 325.1 acres of land. About 91.6 acres of developed land would be affected; the remaining acreage that would be affected is rangeland (see table 2.2.3-1).

In addition, Transwestern has identified nine areas to borrow rock from and/or dispose of surplus rock that cannot be re-used during pipeline installation or restoration of the construction work areas in the

northern segment of the Phoenix Lateral (approximate MPs 0.0 to 61.1). The sizes, locations, land use, and land ownership of these proposed sites are listed in table 2.2.3-1; the sites are depicted on the figures in Appendix B. These borrow/disposal areas would temporarily affect about 186.8 acres of previously disturbed, developed land (see table 2.2.3-1).

Access Roads

Transwestern proposes to use several existing roads for temporary right-of-way access during construction. These access roads are primarily paved or dirt roads that would be graded or otherwise improved as needed to move equipment and materials to the construction right-of-way. Transwestern would construct 11 permanent access roads to provide operational access to 7 valve sites and 4 meter station sites along the Phoenix Lateral. The new access roads required for access to aboveground facilities would affect about 2.6 acres of rangeland. Additionally, five existing roads along the Phoenix Lateral would be permanently modified to provide access to valves, the pig launcher and receiver site at MP 95.2, and a meter station site. The modifications to these roads required for access to aboveground facilities would affect about 21.8 acres of developed land. The locations, conditions, lengths, and acres of the proposed access roads are listed in table E-2 in Appendix E.

During the scoping process, the Kaibab and Prescott National Forests and the BLM expressed concern about the creation of new roads, improvements to existing roads, and the potential for improved access introducing an increase in public OHV use as a result of the newly cleared construction right-of-way and improved access roads. To address these concerns, Transwestern developed the Forest Service Access Management Plan (see Appendix O). The plan specifies how roads would be improved and maintained during and after construction. In accordance with its Forest Service Access Management Plan, Transwestern would develop and implement a post-construction schedule of maintenance for access roads on Forest System lands. In section 4.7.4.1, we have recommended that Transwestern revise its Forest Service Access Management Plan to incorporate additional information and develop and file a similar access management plan for BLM-managed lands.

During construction, Transwestern would maintain access across designated recreational trails, except during actual installation of the pipeline. However, where the Phoenix Lateral would be installed adjacent to the EPNG pipeline easement and the existing EPNG access road would be used (between MPs 0.0 and 107.8 and MPs 169.2 and 255.1), recreational use would not be allowed during construction. Transwestern is working with the National Forests and the BLM to develop measures to discourage this type of use where possible and to control OHV use of the construction right-of-way and improved access roads (see section 4.7.4.1).

The Kaibab National Forest also expressed concerns about the access road at MP 1.3, which is Forest Road 114, and the need to provide adequate cover over the pipeline to handle commercial fuel wood-hauling trucks. Based on the pipe that would be installed at this location, the 3 feet of spoil that would cover the installed pipeline, safe external loads of 20,000 pounds per axle, and the existing geological conditions, Transwestern estimated that a gross weight of approximately 100,000 pounds could be accommodated at the crossing. This is anticipated to be adequate to accommodate commercial fuel wood loads.

4.7.2 Land Ownership and Easement Requirements

Table 4.7.2-1 summarizes land ownership along the proposed pipeline facilities. Approximately 112.6 miles (39 percent) of the land affected by construction and operation of the Phoenix Expansion Project would be privately owned. The remaining 172.7 miles (61 percent) would be located on tribal

land or public land managed by a variety of federal, state, and local agencies. Recreation and special interest areas within these public lands are discussed in section 4.7.4.

TABLE 4.7.2-1

Summary of Land Ownership Along the Phoenix Expansion Project

Facility	Private (miles)	Federal (miles)				Tribal (miles)	State (miles)	County/ Municipal (miles)	Total (miles)
		BLM	FS (Kaibab)	FS (Prescott)	BOR				
San Juan Lateral Loop A	3.2	5.7	0.0	0.0	0.0	<0.1	0.0	0.0	8.9
San Juan Lateral Loop B	1.4	0.0	0.0	0.0	0.0	14.3	0.0	0.0	15.7
Phoenix Lateral	106.7	58.9	9.0	20.4	0.8	0.0	56.6	6.9	259.3
Customer Laterals	1.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.4
Project Total	112.6	64.7	9.0	20.4	0.8	14.3	56.6	6.9	285.3

At some locations, Transwestern's proposed San Juan Lateral Loops would overlap its existing pipeline easement by 25 feet. This easement gives it the right to maintain the right-of-way as necessary for pipeline operation, including the removal of larger vegetation and trees, as needed regardless of whether the area is part of a San Juan Lateral Loop associated with the Phoenix Expansion Project. Because about 2 percent of Loop A and about 100 percent of Loop B would be located partially (25 feet) within Transwestern's existing easement, Transwestern would only need to acquire new easements in the areas where the loops deviate from the existing right-of-way and where Transwestern requests additional operational right-of-way to bring the easement up to 100 feet. Transwestern would also need to acquire temporary easements or property to construct the Phoenix Lateral and customer laterals as well as the proposed aboveground facilities. The easement would convey both temporary (for construction) and permanent rights-of-way to Transwestern and would give Transwestern the right to construct, operate, and maintain the pipeline. Transwestern would negotiate a one-time payment for each easement. An easement agreement between a company and a landowner typically specifies compensation for losses resulting from construction, including losses of non-renewable and other resources, damages to property during construction, and restrictions on existing uses that would not be permitted on the permanent right-of-way after construction.

If an easement cannot be negotiated with a landowner and the project has been certificated by the FERC, Transwestern may use the right of eminent domain granted to it under section 7(h) of the NGA and the procedures set forth under the Federal Rules of Civic Procedure (Rule 71A) to obtain the right-of-way and temporary extra workspace areas. Transwestern would still be required to compensate the landowner for the right-of-way and damages incurred during construction. However, the level of compensation would be determined by a court according to state or federal law. In either case, Transwestern would compensate landowners for use of the land. Factors such as the negotiation process, length of time to negotiate easements, specifics regarding the condemnation process, and costs associated with litigation and/or condemnation payments cannot be accurately predicted because this process varies depending on the level of federal or state involvement, different processes by state, and the amount of backlog in the court system. Eminent domain does not apply to lands under federal or tribal ownership but does apply to lands under state and local ownership.

The modifications at the two existing compressor stations would occur on private lands owned by Transwestern. Transwestern would need to lease the property proposed for the Ash Fork Facility. The majority of the pig launchers and receivers, taps, and valve sites would be located within Transwestern's proposed permanent right-of-way easement. These sites would be acquired as part of Transwestern's negotiations with the landowners for the permanent right-of-way easement. One pig launcher, three valves, and the four remote blowdown valves would require additional land. Transwestern would negotiate with the landowners for the easements for the sites for these facilities. Transwestern would obtain temporary easements from the landowners of the pipe storage and contractor yards and borrow/disposal sites for use of these facilities during construction.

4.7.3 Existing Residences and Planned Developments

4.7.3.1 Existing Residences

Applicants are encouraged to utilize existing rights-of-way to the greatest extent possible, thereby avoiding the creation of new rights-of-way on previously undisturbed areas and thus reducing overall environmental impacts associated with energy infrastructure projects. The proposed project would involve the construction of approximately 285.3 miles of new pipeline, of which approximately 86 percent would be constructed within or adjacent to existing rights-of-way. However, since the establishment of these existing rights-of-way, residential development has occurred adjacent to, and in some cases within, the existing rights-of-way. Based on civil surveys conducted in 2006 and 2007, Transwestern has identified 55 existing residences (including mobile homes) that would be located within 50 feet of the proposed construction work area (i.e., construction right-of-way and temporary extra workspaces) (see table 4.7.3-1). Of the 55 residences, 3 are located along the San Juan Lateral Loop A, 1 is located along the San Juan Lateral Loop B, and 51 are located along the Phoenix Lateral. An additional 54 structures (e.g., buildings, sheds) are located within 50 feet of the proposed construction work area along the San Juan Lateral Loops A and B and the Phoenix Lateral. No residences or structures would be located within 50 feet of the construction work area along the customer laterals. Due to the rapid rate of development in some areas along the proposed route, Transwestern has committed to providing the FERC with quarterly updates of residences and structures within 50 feet of the construction work area.

In residential areas, the two most significant impacts associated with pipeline construction and operation are disturbance during construction and encumbrance of property for future uses caused by the easement. This encumbrance would not allow the construction of permanent structures within the permanent right-of-way. The residences within 50 feet of the construction work area would be most likely to experience the effects of construction and operation of the project. In general, as the distance to the construction work area increases, the impacts on residences decrease.

Construction impacts on residential areas could include increased traffic, noise, and dust generated by vehicles and equipment, personnel, and trenching of roads or driveways; ground disturbance of lawns; removal of trees, landscaped shrubs, or other vegetative screening between residences and/or adjacent rights-of-way; potential damage to existing septic systems or wells; and removal of aboveground structures, such as fences, sheds, or trailers, from within the right-of-way.

Where there are residences or business establishments that are greater than 25 feet but less than 50 feet from the edge of the construction right-of-way, Transwestern would: 1) install safety fence at the edge of the construction right-of-way for a distance of 100 feet on either side of the residence/business; 2) attempt to maintain a minimum distance of 25 feet between any residence/business and the edge of the construction work area for a distance of 100 feet on either side of the residence/business; and 3) attempt to leave plantings and landscaping intact within the construction work area unless the landscaping interferes with pipeline construction or presents unsafe working conditions.

TABLE 4.7.3-1

Residences and Structures within 50 feet of the Construction Work Area Associated with the Phoenix Expansion Project

State/Facility/ Milepost	Number	Distance (feet) from Proposed Centerline to Nearest Corner of Residence/Structure	Distance (feet) from Construction Work Area to Nearest Corner of Residence/Structure	Direction from Centerline/Type [a]
New Mexico				
San Juan Lateral Loop A				
0.4	1	55	28	West – Barn
0.5	1	26	1	East – Barn
0.5	1	62	10	East – Stable
0.5	1	72	20	East – Barn
0.6	1	31.3	6.3	East – House
0.6	1	65	10	East – Garage
0.9	1	23	Within	North – House [b]
0.9	1	94	19	South – Barn
1.0	1	59	34	South – House
1.4	1	82	7	West – Tank
1.4	1	96	21	West – Tank
1.4	1	111	36	West – Meter Building
San Juan Lateral Loop B				
76.5	1	84	9	East – Foundation (no residence)
76.5	1	95	20	East – Abandoned House
Arizona				
Phoenix Lateral				
18.5	1	67	13	West – Pad (tin)
31.6	1	77.5	25	West – House
31.6	1	124	29	West – House
31.6	1	15	Within	West – Pump House
31.8	1	135	40	West – House
40.9	1	120	25	West – Office Trailer
50.1	1	90	10	East – House
50.4	1	83	43	East – House
50.4	1	90	50	East – House
50.6	1	78	38	East – House
50.6	1	80	40	East – Shed
50.6	1	62	22	East – Shed
50.6	1	52	12	East – House
50.6	1	52	12	East – Shed
50.7	1	60	20	East – House
50.7	1	86	46	East – House
50.7	1	75	35	East – Shed
50.7	1	63	23	East – House

TABLE 4.7.3-1 (cont'd)

Residences and Structures within 50 feet of the Construction Work Area Associated with the Phoenix Expansion Project

State/Facility/ Milepost	Number	Distance (feet) from Proposed Centerline to Nearest Corner of Residence/Structure	Distance (feet) from Construction Work Area to Nearest Corner of Residence/Structure	Direction from Centerline/Type [a]
50.7	1	68	28	East – Shed
52.1	1	113	22 / 33	West – Mobile Home
52.1	1	14	Within	West – House
52.4	1	63	27	West – House
52.4	1	36	4	West – Gas Propane Tank
52.5	1	46.5	Within	West – House
52.6	1	87.6	25	West – House
52.6	1	38	Within	West – Building
52.6	1	On Centerline	Within	N/A – Abandoned Building
52.6	1	On Centerline	Within	N/A – Building
52.6	1	62	25	West – Building
52.7	1	83	43	East – House
52.9	1	32	25	West – Building
52.9	1	27	7	West – Building
52.9	1	24.7	10	West – Mobile Home
53.0	1	4	Within	East – Building
53.0	1	31	10	West – House
53.0	1	111	41	West – House
53.0	1	106	36	West – Building
53.0	1	115	45	West – Building
53.1	1	54.4	20 / 30	West – House
53.1	1	3.1	Within	East – Storage Building [b]
53.3	1	29	30 / 15 / 25	West – House
53.3	1	75	25	West – House
58.4	1	136	41	East – House
58.4	1	128	33	East – Shed
58.7	1	88	48	West – Shed
58.8	1	148	25	East – House
58.8	1	129	25	East – House
58.8	1	90	50	West – Shed
59.0	1	192	47	West – Shed
59.9	1	87	25	West – House
59.9	1	120	45	West – Building
59.9	1	127	25	West – Building
79.6	1	87	7	West – Shed
87.9	1	52	41	South – House
87.9	1	155	20	North – House

TABLE 4.7.3-1 (cont'd)

Residences and Structures within 50 feet of the Construction Work Area Associated with the Phoenix Expansion Project

State/Facility/ Milepost	Number	Distance (feet) from Proposed Centerline to Nearest Corner of Residence/Structure	Distance (feet) from Construction Work Area to Nearest Corner of Residence/Structure	Direction from Centerline/Type [a]
87.9	1	160	26	North – Shed
87.9	1	69	42	South – House
88.0	1	52	10	Southeast – House
88.1	1	86	Within	West – Garage
88.2	1	53	10	West – House
88.3	1	25	10	West – House
88.3	1	11	6	West – House
88.4	1	145	40	West – Mobile Home
88.6	1	10	Within	West – Abandoned House [b]
89.0	1	129	24	West – Shed
89.0	1	82	Within	West – Shed
89.0	1	106	Within	West – Shed
89.0	1	87	Within	West – Storage container
89.0	1	127	42	West – House
120.6	1	34	19	South – Shed
120.6	1	2	Within	South – Shed
120.7	1	2	Within	South – Shed
150.7	1	31	16	Southeast – Unoccupied House
150.9	1	38	23	Southeast – House
156.3	1	64	49	Southeast – Mobile home
157.6	1	59	44	Southeast – House
157.8	1	6	Within	Southeast – House
157.8	1	4	Within	Northwest – Shed
217.4	1	80	30	South – House
217.7	1	33	8	South – House
217.7	1	4	Within	South – Shed
217.7	1	27	2	South – Shed
218.0	1	39	3	South – House
220.9	1	120	45	South – House
246.8	1	80	55	South – House
246.9	1	14	Within	South – Shed
246.9	1	70	2 / 45	South – House
247.0	1	63	38	South – House
247.0	1	48	23	South – Shed
247.0	1	11	Within	South – Shed
247.0	1	On Centerline	Within	NA – Shed
247.0	1	56	31	South – House
247.0	1	11	Within	North – Shed

TABLE 4.7.3-1 (cont'd)

Residences and Structures within 50 feet of the Construction Work Area Associated with the Phoenix Expansion Project

State/Facility/ Milepost	Number	Distance (feet) from Proposed Centerline to Nearest Corner of Residence/Structure	Distance (feet) from Construction Work Area to Nearest Corner of Residence/Structure	Direction from Centerline/Type [a]
247.1	1	26	1	South – House
247.1	1	On Centerline	Within	NA – Shed
Customer Laterals		- None -		

[a] Transwestern would implement mitigation measures at this location that would include installation of a safety fence at the edge of the construction work area for a distance of 100 feet on either side of the residence/business and maintaining mature trees and landscaping intact within the construction work area, where possible.

[b] Because the structure (e.g., shed) would be located within the permanent right-of-way or the residence is abandoned, Transwestern would work with the landowner on plans for relocation/removal of this feature.

In addition to the general measures identified above, Transwestern would follow site-specific residential and structural implementation plans to minimize disruption and to maintain access to the residences, businesses, and structures within 50 feet of the construction work area associated with the pipelines. To date, Transwestern has provided site-specific plans for some of the residences, businesses, and structures currently identified within 50 feet of the construction work area. The plans show the proposed centerline of the pipeline, the limits of the construction work area, each residence or associated structure located within 50 feet of the construction work area, the existing pipelines, and existing fences. Some plans also show the location of safety fencing that would be installed during construction. The plans do not, however, specifically show the trees and other landscaping that would need to be removed during construction. Because the plans that have been filed to date are not complete, and additional residences and structures within 50 feet of the construction work area are expected to be identified before construction, **the FERC staff recommends that:**

- **Transwestern shall prepare an updated table listing all residences, businesses, and structures within 50 feet of the construction work area and site-specific residential and structural implementation plans for these residences, businesses, and structures. The site-specific residential and structural implementation plans shall show the area that would be disturbed during construction and the safety measures that would be implemented, such as construction fencing, access provisions, and use of steel plates. The plans shall also show landscaping that would be removed during construction activities within 50 feet of residences, businesses, and structures. The updated table and site-specific residential and structural implementation plans shall be filed with the Secretary for the review and written approval of the Director of OEP <u>before construction</u>.**

During construction, Transwestern would implement a Landowner Complaint Resolution Procedure to address problems that may arise. Details of the procedure are as follows:

- Transwestern would respond to any complaints or concerns within 24 hours of receiving a call from an affected party. The field construction office would be the first contact for the affected landowners. Telephone numbers for the appropriate field construction office would be provided in the Landowner Complaint Resolution Procedure mailer that would be sent to landowners before the initiation of construction. The Office Manager at the field construction office would take calls from affected landowners and would direct them to an appropriate person, such as the Chief Inspector, Lead EI, or Right-of-Way Agent, to resolve any issues.

- Once a complaint has been received, a site visit would be scheduled with the affected landowner to assess the problem and provide an appropriate response. Transwestern would also maintain a voice mail system at the field office for any calls received after business hours.

- If an affected landowner has contacted the field construction office and feels that an appropriate response has not been provided, the landowner would be encouraged to contact the Transwestern offices in Phoenix, Arizona, via a 24-hour toll-free project telephone number at 1-(888)-998-1764. Transwestern would respond to all calls received at this number within 24 hours.

- If an affected landowner has contacted Transwestern at the above locations and still feels that an appropriate response has not been provided, the landowner would be encouraged

to contact the FERC directly via the Commission's toll-free Enforcement Hotline at 1-(888)-889-8030.

- Transwestern would maintain a written record of all incoming and outgoing calls regarding landowner complaints. A copy of this record would be maintained by the Office Manager in each field construction office. Each complaint received would be documented on a Landowner Complaint Resolution Form. Copies of this form would be distributed to the Chief Inspector, the Lead EI, and the Right-of-Way Agent.

All information regarding landowner complaints would be summarized in the applicable biweekly status report and submitted to the Commission throughout the construction phase (see mitigation measure number 7 in section 5.3).

Operation of the proposed project would impact residential landowners by prohibiting the construction of structures within the permanent right-of-way. The impact of this encumbrance would be subject to negotiation and resolution between the landowners and Transwestern as described in section 4.7.2. Comments were received during the scoping period expressing concern regarding the safety of operating a high-pressure natural gas pipeline in proximity to residences. The pipeline and aboveground facilities associated with the project would be designed, operated, and maintained in accordance with DOT standards (see section 4.11). In general, these standards ensure public safety by specifying pipeline materials, corrosion protection, monitoring, and scheduled maintenance procedures. As discussed in section 4.11.1, the regulations become more stringent as the human population density in the vicinity of a pipeline increases. The pipeline safety data presented in section 4.11.2 indicate that, while the operation of the nation's 300,000-mile-long pipeline system is not risk free, the risk is relatively low when compared to other human activities. Therefore, by designing and operating the proposed project in accordance with the applicable standards, the project would not result in a significant increased public safety risk.

4.7.3.2 Planned Developments

One of the primary concerns expressed by local governments, landowners, developers, and builders is the potential for the project to adversely impact developments that are in various stages of planning, approval, and construction along or near the pipeline route.

Approved and proposed developments that would be located within 0.25 mile of the project are listed in table 4.7.3-2. The FERC staff defined "Approved" developments as those projects that have obtained at least tentative plat approval from the local planning authorities whereas "proposed" developments are in an earlier stage of planning and have not filed for tentative plat approval. In Arizona, the Phoenix Expansion Project would be located within 0.25 mile of 52 approved or proposed developments located in Yavapai County (2 developments), Maricopa County (18 developments), and Pinal County (32 developments). Of these, the proposed project would either cross or abut 7 developments that are under construction, 16 approved developments, and 16 proposed developments. Upon construction, the 52 approved or proposed developments would contain thousands of residential lots in addition to commercial property, municipal facilities, schools, and other amenities such as parks and greenspace. However, at this time, the proposed construction work area is within 50 feet of two existing residences within these developments.

TABLE 4.7.3-2

Approved and Proposed Developments Within 0.25 Mile of the Phoenix Expansion Project

Facility/Development Name [a]	Milepost Range	Current Status [b]	Type of Development	Relation of Proposed Project to Development	Collocation Status of Proposed Project	Lots Impacted (Temporary/Permanent) [c]
San Juan Lateral Loops A and B			- None -			
Phoenix Lateral						
Unnamed	37.0 – 37.5	Proposed	Residential	Abut	New ROW	0/0
Bensch Ranch	66.2 – 66.9	Approved (under construction)	Residential	Within	West side of EPNG	25/25
Vistancia	114.5 – 115.5	Proposed	Residential and commercial	Within	Within APS	0/0
Coldwater Ranch	116.5 – 117.3	Approved (begin construction within next 30 days)	Residential	Within	Within APS	0/0
Mesquite Mountain Ranch	130.0 – 131.0	Approved	Residential	Within	Within SRP	0/0
Surprise Foothills	132.0 – 132.5	Approved	Residential	Abut	Within SRP	0/0
Sun City Festival	134.5 – 136.9	Approved (under construction)	Residential and commercial	Within	Within SRP	0/0
Sun Valley	137.8 – 140.5	Approved	Residential	Within	Within SRP	0/0
Valley Village III (Sun Valley Village)	140.5 – 145.5	Approved	Residential	Within	Within SRP	0/0
Elianto	147.5 – 148.5	Proposed	Residential	Within	Within SRP	0/0
Sun Valley South	147.7 – 148.0	Proposed	Residential	400 feet west	Within SRP	0/0
Tartesso	150.0 – 151.9	Approved (under construction)	Residential and commercial	Within	Within SRP	0/0
Desert Creek	153.3 – 155.2	Proposed	Residential	Within	Within SRP and new ROW	0/0
Verma II	158.8 – 159.1	Proposed	Residential	Within	Within SRP	0/0
Maricopa Freeway Center Unit 1	159.1 – 159.4	Proposed	Residential	Within	Within SRP	0/0
Sonoma	159.4 – 159.7	Approved	Residential	Within	Within SRP	0/0
Nuclear Vision LLC	162.9 – 163.6	Proposed	Residential	Within	Within SRP	0/0
Enterprise Ranch	174.3 – 174.8	Proposed	Residential	Within	New ROW	0/0
Arizona Highway 85, LLC	181.8 – 182.3	Proposed	Unknown	Within	North side of EPNG	0/0
Montage	200.0 – 209.0	Proposed	Residential	Within	North side of EPNG	0/0
Hidden Valley Estates	214.0 – 214.6	Approved (under construction)	Residential	Within	North side of EPNG	0/39
Hidden Valley	215.4 – 217.1	Approved (under construction)	Residential	Within	South side of EPNG	0/121
Red River	218.0 – 220.0	Approved	Residential	500 feet north	South side of EPNG	0/0

TABLE 4.7.3-2 (cont'd)

Approved and Proposed Developments Within 0.25 Mile of the Phoenix Expansion Project

Facility/Development Name [a]	Milepost Range	Current Status [b]	Type of Development	Relation of Proposed Project to Development	Collocation Status of Proposed Project	Lots Impacted (Temporary/Permanent) [c]
Maricopa Opus	218.5 – 219.5	Approved	Residential	Within	South side of EPNG	0/0
Terrazo	220.3 – 221.0	Approved	Residential	Within	South side of EPNG	0/11
Siena	220.9 – 221.1	Approved	Residential and commercial	Within	North and south side of EPNG	0/0
Midway	221.3 – 224.5	Proposed	Residential and commercial	Within	North and south side of EPNG	0/0
Stanfield Estates	228.5 – 229.0	Proposed	Residential	Abut	South side of EPNG	0/0
Solana Ranch North	230.5 – 231.5	Approved	Residential	Within	South side of EPNG	1/47
Legends	233.0 – 235.5	Approved	Residential	Within	South side of EPNG	0/46
Maratea	235.8 – 236.5	Proposed	Residential	Within	South side of EPNG	24/16
Vista Canyons	238.0 – 238.5	Approved	Residential and commercial	Within	South side of EPNG	0/35
Mesquite Trails	240.1 – 240.6	Proposed	Residential	550 feet south	South side of Santa Cruz Wash	0/0
Santa Cruz Village	240.6 – 241.0	Approved	Residential	650 feet south	North side of Santa Cruz Wash	0/0
Elaine Farms	241.0 – 241.4	Approved	Residential	400 feet north	South side of EPNG	0/0
Rodeo Estates M.H.P.	241.3 – 241.3	Proposed	Residential	175 feet south	North side of Santa Cruz Wash	0/0
Rodeo Ranch Estates	241.3 – 241.4	Approved	Residential	175 feet south	North side of Santa Cruz Wash	0/0
Rancho Val Vista Estates	241.6 – 241.8	Approved	Residential	175 feet south	North side of Santa Cruz Wash	0/0
Santa Cruz Crossing	241.8 – 242.3	Approved	Residential	100 feet south	North side of Santa Cruz Wash	0/0
The Muirlands	242.3 – 242.5	Approved	Residential	200 feet north	North side of Santa Cruz Wash	0/0
Griffiths Parcel	242.4 – 242.7	Approved	Residential	100 feet south	North side of Santa Cruz Wash	0/0
Bella Vista Estates	242.5 – 242.7	Approved	Residential	100 feet north	South side of Santa Cruz Wash	0/0
Mission Por Del Rio	242.7 – 243.2	Proposed	Residential	Within	North and south side of Santa Cruz Wash	0/0
Mission Valley	243.2 – 243.7	Approved (under construction)	Residential	Abut	North side of Santa Cruz Wash	0/0

TABLE 4.7.3-2 (cont'd)

Approved and Proposed Developments Within 0.25 Mile of the Phoenix Expansion Project

Facility/Development Name [a]	Milepost Range	Current Status [b]	Type of Development	Relation of Proposed Project to Development	Collocation Status of Proposed Project	Lots Impacted (Temporary/Permanent) [c]
Mission Park	243.2 – 243.9	Approved	Residential	100 feet south and within	North side of Santa Cruz Wash	0/6
Rodeo Parcel	243.7 – 243.9	Proposed	Residential	100 feet west and abut	West side of Henness Road	0/0
Southern Trails	244.5 – 245.5	Proposed	Residential	500 feet north	South side of EPNG	0/0
Encanto Hacienda	245.7 – 246.2	Approved	Residential	Within	South side of EPNG	0/4
Vista Del Monte	247.8 – 249.3	Approved	Residential	Within	South side EPNG	0/0
Laco 80/Vista del Rey Estates	249.2 – 249.7	Approved	Residential	Abut	South side of EPNG	14/14
Verona	251.7 – 253.0	Approved	Residential	Within	South side of EPNG	77/35
Brighton Village	253.3 – 254.8	Proposed	Residential	Within	South side of EPNG	0/0

[a] Based on Transwestern's table 10-1 filed on April 5, 2007 and other information contained in comments on the draft Environmental Impact Statement.

[b] "Approved" means that at least a tentative plat has received approval from the local planning authority. "Proposed" means that the project is in an earlier stage of planning and has not filed for tentative plat approval.

[c] "Temporary" means that the lot would be affected by construction activities. "Permanent" means that the proposed pipeline and/or permanent right-of-way would cross the lot. The number of lots impacted may be shown as "0" or "unknown" because the development is in the conceptual phase, no plat was available, or the developer and Transwestern have negotiated an agreement.

ROW = Right-of-way.

EPNG = El Paso Natural Gas Company.

APS = Arizona Public Service Company.

SRP = Salt River Project Agricultural Improvement and Power District.

The primary impact that a pipeline project could have on an approved or proposed development would be to place permanent right-of-way on lots, which could affect the constructability or value of the lots. Depending on the number and location of affected lots, the developer could choose to redesign the affected portion of the development. Depending on the stage of the development, this redesign could require additional review and approval by local permitting officials, which could delay the development. Alternatively, the developer could sell the affected lots to the pipeline company or negotiate agreeable easement terms on the affected lots. A pipeline project could also affect the design of future infrastructure, such as streets or utility crossings, which could increase development costs. Some local planning agencies have also expressed concern that the loss of too many lots due to the project could affect the character of the development.

Information filed by Transwestern indicates that the proposed project would place permanent right-of-way on approximately 399 approved or proposed lots (see table 4.7.3-2). The effect of this encumbrance would be the subject of negotiation between the developer or landowner and Transwestern (see section 4.7.2). Based on information filed by Transwestern, successful easement negotiations have been or are nearly completed with 8 of the 39 approved or proposed developments that the Phoenix Expansion Project would cross or abut, and negotiations are continuing with most of the other affected developers. Transwestern has committed to working with developers and local governments to reduce the impact of the proposed project on approved and proposed developments. For example, Transwestern would incorporate planned future street and utility crossings into the final project design at its expense. Furthermore, in response to comments, the FERC staff evaluated route alternatives and route variations in an effort to avoid or reduce impacts on approved and proposed developments (see sections 3.4.2.5, 3.4.2.6, and 3.5.2.5) and has recommended that Transwestern adopt variations that would significantly reduce the direct impact of the project on 6 specific developments by avoiding the placement of permanent right-of-way on 77 lots within the 6 developments.

The proposed project could also impact approved and proposed developments if the construction schedules for the pipeline project and development projects coincide. The construction-related impacts and mitigation measures that would be implemented to reduce the effects of construction on existing developments are discussed in section 4.7.3.1. Developers also expressed concern regarding the potential safety hazard that the proposed project would pose to the future residents of the approved and proposed developments. A detailed discussion of pipeline safety is included in section 4.11 and a discussion of pipeline safety as it relates to existing residences is included in section 4.7.3.1.

In compiling the information presented in table 4.7.3-2, Transwestern consulted with county officials, landowners, and developers, and reviewed land title records and available plans. In addition, the FERC staff, Transwestern, local government officials, developers, and other stakeholders attended technical conferences in Casa Grande and Buckeye, Arizona, on December 13 and 14, 2006, respectively, to discuss project impacts on area developments. We also encouraged local planning authorities, developers, and other stakeholders to file comments or supplemental information pertaining to approved and proposed developments within 0.25 mile of the proposed project facilities with the Secretary during the draft EIS comment period.

Comments were received indicating that information Transwestern filed regarding approved and proposed developments was incomplete or inaccurate. Transwestern has stated that it expended considerable resources to establish a title of record of affected landowners consistent with regulatory requirements. According to Transwestern, some of the apparent discrepancies may be due to the rapid pace of development in some areas and the process by which property is assembled for potential development. For example, a developer may have an option to purchase a property subject to obtaining entitlements and successfully marketing the property. In such a case, the developer would not be the owner of record and, therefore, the development project may not have been identified by Transwestern.

Specific information received regarding planned developments was incorporated into our analysis in this final EIS. Responses to all comments received on the draft EIS regarding planned developments are in Volume II.

To keep us informed of changes in development activity near the project, Transwestern has committed to providing the FERC with quarterly updates of residences and other structures within 50 feet of the construction work area. In section 4.7.3.1, we have recommended that Transwestern prepare and file site-specific residential and structural implementation plans for all residences, businesses, and structures within 50 feet of the project construction work area before construction.

4.7.4 Federal Management Areas

4.7.4.1 Bureau of Land Management

As discussed in section 1.5.1, the proposed project would cross BLM-managed land under the jurisdiction of the BLM Farmington District (Farmington Field Office) in New Mexico and the BLM Phoenix District (Hassayampa and Lower Sonoran Field Offices) in Arizona. Within the BLM's Farmington District, Loop A would cross 5.7 miles of BLM-managed land within the Farmington Planning Area. Within the BLM's Phoenix District, the Phoenix Lateral would cross the Bradshaw-Harquahala Planning Area under the jurisdiction of the Hassayampa Field Office between MP 0.0 in Yavapai County and approximate MP 153.8, where the Phoenix Lateral would cross Interstate 10 in Maricopa County. The Phoenix Lateral would cross the Phoenix South Planning Area under the jurisdiction of the Lower Sonoran Field Office between approximate MPs 153.8 in Maricopa County and 255.1 in Pinal County.

The BLM uses ROS designations to aid in the management and planning of BLM-managed lands. The ROS classification system describes different outdoor recreation settings across lands managed by various federal agencies, including the BLM and the FS. Seven standard classes are used: Primitive, Semi-Primitive Non-motorized, Semi-Primitive Motorized, Roaded Natural, Roaded Modified, Rural, and Urban. These classes are described below.

Primitive: A classification of the ROS characterized by an essentially unmodified environment, where trails may be present but structures are rare, and where there is isolation from the sights and sounds of man; these areas are limited to non-motorized and non-mechanized uses.

Semi-Primitive Non-motorized: A classification of the ROS characterized by moderate opportunity for solitude in a predominantly unmodified natural environment; these areas are limited to non-motorized uses.

Semi-Primitive Motorized: A classification of the ROS characterized by a moderate opportunity for solitude in a predominantly unmodified natural environment; motorized and non-motorized recreational opportunities exist.

Roaded Natural: A classification of the ROS characterized by a predominantly natural environment with evidence of moderate permanent alternate resources and resource utilization. Evidence of the sights and sounds of man is moderate, but in harmony with the general environment. Opportunities exist for both social interaction and moderate isolation from the sights and sounds of man.

Roaded Modified: A classification of the ROS characterized by a natural environment with much evidence of the works of humans. Such evidence usually dominates the natural environment.

Rural: A classification of the ROS characterizing areas in which the sights and sounds of man are prevalent and the landscape has been considerably altered by the works of man.

Urban: A classification of the ROS in which the natural setting is dominated by man-made structures and the sights and sounds of man predominate.

Loop A would not cross any ACECs, Wilderness Areas, or designated recreational areas or trails on BLM-managed land and Loop B would not cross any BLM-managed land. However, Loop A would be located in an area designated as Roaded Natural and the Phoenix Lateral would be located in Roaded Natural, Rural, and Semi-Primitive Motorized areas. The project's consistency with these designations is discussed further in section 1.5.1.

The Phoenix Lateral would not cross any ACECs or Wilderness Areas. OHV recreational use is popular on BLM-managed lands crossed by the Phoenix Lateral, both in the Black Canyon Corridor in the Bradshaw-Harquahala Planning Area, and along the northern boundary of the Sonoran Desert National Monument in the Phoenix South Planning Area.

During construction, OHV use would be disrupted along areas of Transwestern's open pipeline trench. For the safety of construction workers and OHV operators, Transwestern would close OHV trails crossed by an open pipeline trench near the location of the crossing. Because of the number of OHV trails in the area, the temporary trail closings resulting from construction of the Phoenix Lateral are not expected to significantly affect the OHV operators' recreational experience.

During operation of the pipeline, Transwestern has stated that it would prefer to restrict OHV use along the pipeline centerline. However, it would consider allowing portions of the permanent right-of-way to be used as OHV trails, provided that the BLM's management of these trails does not inhibit Transwestern's ability to access or maintain the pipeline. It is unlikely that OHV users could be kept entirely off of the new right-of-way. Along the boundary of the Sonoran Desert National Monument (MPs 124.0 to 205.0), the Phoenix Lateral right-of-way would widen the area within the utility corridor already used extensively by OHV users. Although the improved road conditions that result from construction of the pipeline could increase OHV use of the area, the right-of-way in this area is not expected to open areas to OHV use that were not already accessible.

As discussed in section 4.7.1, Transwestern developed the Forest Service Access Management Plan (see Appendix O) to address concerns raised by the Kaibab and Prescott National Forests about the creation of new roads, improvements to existing roads, and the potential for improved access introducing an increase in public OHV use as a result of the newly cleared construction right-of-way and improved access roads. The plan specifies how roads on Forest System lands would be improved and maintained during and after construction. In accordance with its Forest Service Access Management Plan, Transwestern would develop and implement a post-construction schedule of maintenance for access roads on Forest System lands. The plan does not, however, include stipulations for restricting vehicle access during construction, which may be required by the FS.

The BLM has also expressed concerns regarding road and increased OHV use as a result of construction and improved access roads. However, an access management plan for BLM-managed lands has not yet been developed. In the draft EIS, we recommended that Transwestern consult with the BLM and prepare an access management plan that conforms to agency standards, including maps that show how roads on BLM-managed lands would be improved and maintained during and after construction and the transportation crossings and any necessary deterrents to prevent increased OHV use. The recommendation also required Transwestern to develop and implement a post-construction schedule of maintenance for access roads on BLM-managed lands. In addition, we recommended that Transwestern

update its Forest Service Access Management Plan to include maps similar to those to be included in the BLM access management plan and stipulations for restricting vehicle access during construction if determined necessary by the FS. Transwestern was required to file the BLM access management plan and updated Forest Service Access Management Plan with the Secretary during the draft EIS comment period for analysis in the final EIS.

In its comments on the draft EIS, Transwestern stated that it met with the BLM on June 6, 2007 and the BLM indicated that it required additional time to coordinate completion of the access management plan because it is in the process of preparing a travel management plan for the Bradshaw-Harquahala RMP, at which time the BLM agreed to provide examples to Transwestern of other BLM access management plans that could be used to prepare the access management plan for the Phoenix Expansion Project.

Although the BLM does not anticipate any permanent closures of OHV trails or other permanent roads, limited temporary road closures would be required during construction for public safety purposes. The BLM asked that it be notified in advance of the road closures and Transwestern agreed to include these closures as part of the access management plan. With regard to permanent OHV deterrents, Transwestern offered to provide options, based on data provided by the BLM, for access management where existing OHV trails cross the proposed pipeline route. These locations would be indicated on the project maps. Also, the BLM requested that the plan identify roads by legal descriptions noting every road that Transwestern intends to use and the work to be done to upgrade roads to the appropriate standards. Other requirements of the access management plan were discussed during the June 6, 2007 meeting.

In its comments on the draft EIS, the EPA expressed concern about the generation of fugitive dust emissions associated with OHV use of the right-of-way and requested that the access management plans for BLM-managed and Forest System lands include the frequency of monitoring, the methodology for reassessing the implemented measures in the future, and enforcement measures. Transwestern has committed to preparing a consistent access management plan for BLM-managed and Forest System lands once it receives further direction from the BLM. Additionally, Transwestern would prepare supporting maps depicting key elements of the access management plan including OHV deterrent locations, road closures (temporary and permanent), new project access, road improvements, and road reclamation, if necessary. Because this information is needed before construction and to address the concerns of the EPA regarding the generation of fugitive dust emissions associated with OHV use of the right-of-way, **the FERC staff recommends that:**

- **Transwestern shall coordinate with the BLM and the FS to develop access management plans that conform to agency standards. Specifically:**

  a. The BLM access management plan shall include supporting maps depicting key elements of the access management plan including OHV deterrent locations, road closures (temporary and permanent), new project access, road improvements, and road reclamation, if necessary. The plan shall also include a commitment to develop and implement a post-construction schedule of maintenance for access roads on BLM-managed lands.

  b. The Forest Service Access Management Plan shall be updated to include maps similar to those to be included in the BLM access management plan and stipulations for restricting vehicle access during construction if determined necessary by the FS.

c. Both plans shall include information regarding the frequency of monitoring that would be conducted, the methodology for reassessing the implemented measures in the future, and enforcement measures.

The plans shall be filed with the Secretary <u>before construction across BLM-managed or Forest System lands</u>.

In the Black Canyon Corridor, the right-of-way would create a new north-south corridor in an area predominated by east-west trails, which would increase the connectivity of the trails in the area. The Black Canyon Trail (existing and proposed) is discussed in section 4.7.5.

Visual classifications and resources on BLM-managed land that would be affected by the project are discussed in section 4.7.7.

4.7.4.2 Kaibab National Forest

An approximately 9-mile-long portion of the Phoenix Lateral would be located within the Kaibab National Forest. The Kaibab Forest Plan regulates recreational use and opportunity using the ROS-SMS Guidebook (FS, 2004a). Similar to BLM-managed lands, the Kaibab National Forest uses ROS designations to aid in the management and planning of Forest System lands. The majority of the pipeline route through the Kaibab National Forest would be located in an area designated as Roaded Modified, with the exception of a Roaded Natural area at Little Hell Canyon Reservoir (MP 9.5). The Phoenix Lateral would not cross any designated trails in the Kaibab National Forest. The project's consistency with these designations is discussed further in section 1.5.1.

Within the Kaibab National Forest, the Phoenix Lateral would cross Little Hell Canyon Reservoir at MP 9.5 near the Prescott National Forest boundary (MP 9.8). This is a dispersed fisheries site and the FS' only managed recreation site in the Ash Fork area. This area is designated as Roaded Natural based on the ROS designations, which is a classification system that describes different outdoor recreation settings across lands managed by various federal agencies, including the BLM and the FS. Roaded Natural is characterized by a "predominantly natural environment with evidence of moderate permanent alternate resources and resource utilization. Evidence of the sights and sounds of man is moderate, but in harmony with the general environment. Opportunities exist for both social interaction and moderate isolation from sights and sounds of man."

The ROS-SMS Guidebook states that special uses management is restricted in Roaded Natural areas. The guidelines for special uses management in the Roaded Natural ROS class state "Attempt to avoid clearing of new major utility corridors within sensitive travel corridor foregrounds" and also suggest that new utilities be constructed underground.

The entire pipeline crossing of the Kaibab National Forest would be adjacent to the existing EPNG pipeline right-of-way, would not require clearing of a new utility corridor for construction, and would be installed underground. Following construction, however, maintenance of the permanent pipeline right-of-way would require periodic clearing adjacent to Little Hell Canyon Reservoir, resulting in a pipeline corridor that is visible to fishermen at this site**.** The Little Hell Canyon Reservoir crossing is located in a high (Level 2) visual SIO area. Visual resources are discussed in section 4.7.7.

Access management and OHV control during and after construction are discussed in sections 4.7.1 and 4.7.4.1.

4.7.4.3 Prescott National Forest

The Phoenix Lateral would cross about 20.4 miles of land within the Prescott National Forest. The Prescott National Forest is managed for multiple uses, including logging, grazing, and a wide variety of recreational uses including hiking and camping. The FS manages this forest under the Prescott Forest Plan (FS, 1986).

Similar to BLM-managed lands, the Prescott National Forest uses ROS designations to aid in the management and planning of Forest System lands. The Phoenix Lateral would be located entirely within the Roaded Natural ROS class and would not cross any designated recreational trails. The project's consistency with these designations is discussed further in section 1.5.1.

Within the Prescott National Forest, the Phoenix Lateral would cross Hell Canyon at MP 17.8, which is primarily known for its visual resources (see section 4.7.7). The Phoenix Lateral would also cross the Verde River at MP 23.8 within the Prescott National Forest. Reaches of the Verde River were designated as Scenic in the Arizona Wilderness Act of 1984 under the Wild and Scenic River Act (Public Law 90-542). The location at which the pipeline would cross the Verde River is not within an area inventoried as Wild or Scenic in the FS' Verde Wild and Scenic River Comprehensive Management Plan (FS, 2004b). However, the Verde River at the pipeline's crossing location has been identified by the FS as eligible for Recreational status under the Wild and Scenic Rivers Act (FS, 1993). Because of its eligibility status, the FS is obligated to manage eligible rivers at the recommended, rather than inventoried, classification. The FS requires projects within eligible river corridors to show that a project is consistent with the following:

- The free-flowing character of the identified river is not modified by the construction or development of stream impoundments, diversions, or other water resource projects.
- Outstandingly remarkable values of the identified river area are protected.
- For legislatively mandated study rivers, management and development of the identified river and its corridor is not modified to the degree that eligibility is compromised or the classification changed to a less restrictive class (such as from wild to scenic or scenic to recreational).

The operation and maintenance of the proposed pipeline would not involve the construction of any permanent stream impoundments, diversions, or water resource projects and would not modify the free-flowing character of the river. The outstandingly remarkable values identified for the Verde River are for Fish/Wildlife and Cultural/Historic. Construction and operation of the proposed pipeline is not expected to have a significant effect upon the endangered, threatened, or sensitive species (see section 4.6) that are the basis for the outstandingly remarkable value for Fish/Wildlife. Transwestern is working with the FS to identify and avoid impacts on cultural resources, and thus would avoid affecting the Cultural/Historic outstandingly remarkable value at the Verde River crossing.

At the Verde River crossing, the Phoenix Lateral would be collocated with the existing EPNG pipeline. In addition to the EPNG pipeline, facilities already existing within the eligible Verde River segment include 20 miles of railroad, 4 power transmission lines, 3 water diversions, 1 storage yard, and 2 special use pastures (FS, 1993). Based on a review of the site-specific crossing plan for the Verde River (see section 4.3.2.3) and the restoration measures that would be implemented at the river (see sections 4.4.3 and 4.7.7 and the Restoration Plan), we believe that the installation and operation of the pipeline would not modify the river corridor to the degree that eligibility for Recreational status would be compromised.

The Arizona Wilderness Coalition, an association of groups and individuals concerned with preserving and restoring wilderness in Arizona, has prepared a Wild and Scenic River Proposal for the Verde River (Arizona Wilderness Coalition, 2005). The proposal briefly describes the key components of the Verde River that make it suitable for designation as Wild or Scenic and includes a recommendation to designate the reach crossed by the proposed Phoenix Lateral and the existing EPNG pipeline as Wild. The Arizona Wilderness Coalition does not intend the proposal to be a comprehensive suitability study (Arizona Wilderness Coalition, 2005), but intends to provide new information that has not been considered before to augment the FS' Wild and Scenic River study and to provide suggestions to the FS for when it reevaluates the eligibility status of the Verde River. The Arizona Wilderness Coalition expects the FS to reconsider the Verde River segment when it next revises its Forest Plan (Arizona Wilderness Coalition, 2005).

Visual resources on the Prescott National Forest are discussed in further detail in section 4.7.7. Access management and OHV control during and after construction are discussed in sections 4.7.1 and 4.7.4.1.

4.7.5 Other Recreation and Special Interest Areas

The proposed pipeline facilities would not cross any national or state-designated Wild and Scenic Rivers, natural landmarks, national parks, or state parks. Further, none of the counties affected by the project fall under the Coastal Zone Management Act. The project would, however, cross or be located adjacent to several recreation and/or special interest areas in addition to the BLM-managed and Forest System lands discussed in section 4.7.4. Table 4.7.5-1 lists the crossing locations and land ownership for each of these areas. A more detailed discussion of each area is provided below. In addition to these areas, several gravel pits and a stone quarry are located within proximity to the proposed pipeline facilities. These areas are discussed in section 4.1.2.

TABLE 4.7.5-1

Recreation and Special Interest Areas Crossed by or Located Adjacent to the Phoenix Expansion Project

Facility	Milepost Location	Name of Area	Land Ownership
San Juan Lateral Loop A		- None -	
San Juan Lateral Loop B		- None -	
Phoenix Lateral	68.0 - 75.0	Proposed Black Canyon Trail	Bureau of Land Management
	88.8	Proposed Black Canyon Heritage Park	Private
	102.5	Black Canyon Trail	Arizona State Land Department
	126.0 - 127.5	Landfill Property	Waste Management Arizona Landfills, Inc. (WMA)
	181.8 - 182.3	Nursery	Private
	206.1 - 206.2	Landfill Property	WMA
	214.1 - 214.4	Orchard	Private
	239.8 - 240.2	Golf Course	Private and City of Casa Grande
	242.6 - 242.8	Nature Reserve	City of Casa Grande (dedicated)
Customer Laterals		- None -	

One of the primary concerns when crossing recreation and special interest areas is the impact of construction on the purpose for which the area was established (e.g., the recreational activities, public access, and resources the area aims to protect). Construction would alter visual aesthetics by removing existing vegetation and disturbing soils. Construction would also generate dust and noise, which could be a nuisance to recreational users. Construction could also interfere with or diminish the quality of the recreational experience by affecting wildlife movements or disturbing trails. In the case of nurseries,

vineyards, and tree orchards, construction would take the area affected out of production for one or more growing seasons. In general, impacts on recreation and special interest areas would be temporary and would be limited to the period of active construction, which typically would last only several days to several weeks in any one area. Impacts on nurseries, vineyards, and tree nurseries would last longer depending on the type of products/species grown.

Overall, Transwestern would minimize construction-related impacts on these areas by:

- installing the pipeline facilities partially within and adjacent to existing rights-of-way;
- timing construction to avoid peak usage periods, when practical; and
- ensuring effective post-construction reclamation of the right-of-way to preconstruction conditions.

Black Canyon Trail (Existing and Proposed)

The Phoenix Lateral would cross the existing Black Canyon Trail at MP 102.5, which is located on land administered by the ASLD. The Black Canyon Trail is a hiking and equestrian trail that follows a route that has been used since the 1800s for the movement of livestock and people and was known as the Black Canyon Livestock Driveway. The Black Canyon Livestock Driveway was established as the "Black Canyon Trails Area" by the Secretary of the Interior on January 3, 1969.

At its crossing location, the Phoenix Lateral would be collocated with the EPNG pipeline. During construction, the trail would be disrupted during the stringing, welding, and laying of the pipe, which could last from 2 to 4 weeks. Transwestern has stated that it would reroute users of the existing trail around the active construction work area. No impacts on the trail or its users are expected during operation of the pipeline.

An approximately 60-mile-long extension of the Black Canyon Trail has been proposed that would extend from a northern terminus in the Prescott National Forest near the Interstate 17 and Dugas Road interchange (about 9 miles east of MP 63.0 of the Phoenix Lateral) and a southern terminus off the Lake Pleasant/Carefree Highway (Highway 74) near the Ben Avery Shooting Range in New River (about 5 miles east of MP 109.0). The BLM has entered into a cooperative recreation management agreement with Maricopa and Yavapai Counties for the development and management of the proposed segments of the trail.

The proposed new segments of the Black Canyon Trail would be intended for use by equestrians, bicyclists, hikers, and other non-motorized users. The Black Canyon Trail remains undeveloped north of the Little Pan Loop trail segment in Yavapai and Maricopa Counties and would be mainly aligned on two-track jeep trails as described in the Black Canyon Trail Master Plan. Since development of the Black Canyon Trail Master Plan, however, OHV use has increased dramatically and the BLM is currently working with the Black Canyon Trail Coalition to realign the route away from two-track trails to separate motorized and non-motorized trails to further the enjoyment of trail users. The BLM is currently drafting an amendment to the Black Canyon Trail Master Plan that may change the proposed alignment of the trail. Based on the currently proposed alignment of the trail, the Phoenix Lateral would cross the trail at three locations between MPs 68.0 and 75.0.

Construction of the Black Canyon Trail was originally planned to begin between March and May 2007 (Black Canyon Trail Coalition, 2007). According to the BLM, no work has begun and the assessment process is still underway. Therefore, it is unlikely that trail construction would overlap the

construction schedule for the Phoenix Lateral. If, however, the construction schedules do overlap and the Phoenix Lateral route crosses the final alignment of the trail, Transwestern would coordinate with the BLM and the Black Canyon Trail Coalition to attempt to avoid delays in the construction of either project that could be caused by simultaneous construction. Alternatively, if trail construction is occurring at a point where pipeline construction is occurring, post-construction restoration of the pipeline work areas may include construction of the trail across the work area.

After the Black Canyon Trail is completed, the BLM plans to evaluate the trail for inclusion into the National Recreation Trail System in order to provide for the ever-increasing outdoor recreation needs of an expanding urban population and to promote the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources of the Black Canyon corridor. The Black Canyon Trail would intersect numerous roads and OHV trails in these areas. The addition of the Phoenix Lateral right-of-way is not expected to significantly change the character of the environment along the trail or impact the recreational experience of future users of the trail. Further, construction and operation of the Phoenix Lateral is not expected to affect the trail's potential eligibility for inclusion into the National Recreation Trail System.

Black Canyon Heritage Park (Proposed)

The Phoenix Lateral would cross the proposed Black Canyon Heritage Park at MP 88.8. Based on conversations with the Friends of the Agua Fria National Monument, one of the main groups involved with development of this area, the proposed 27-acre park would be located along the Agua Fria River in Black Canyon City, between the Old Black Canyon Highway (also known as Old Highway 17) and Interstate 17 (Jones, 2007). As of July 2007, the property had been officially transferred from the previous private landowner to the Black Canyon City Community Association, which would develop the land into the proposed park. The proposed park would have nature trails and public information on cultural resources. One of the main goals identified for the proposed park is to restore the riparian habitat along the river and the riverbed to provide habitat for native Arizona fish species. The restoration work would occur primarily along the east side of the river, near Old Highway 17, and some restoration work is necessary along the west side of the river.

According to the Friends of the Agua Fria National Monument, grants to conduct the riparian and riverbed restoration work have been applied for but not yet received and restoration work would likely not begin until the fall of 2007. However, draining of a pond on the property has started and the group has consulted with a landscape architect (Jones, 2007).

Because of the uncertainty in timing of the proposed park's development, Transwestern has not identified any specific measures at this location to avoid or reduce project impacts. Therefore, it is difficult to predict if restoration work and park development would overlap the construction schedule for the Phoenix Lateral. At a minimum, Transwestern would adhere to the measures outlined in its UECRM Plan for upland areas and its WWCM Procedures for construction across wetlands and waterbodies to reduce construction impacts. If the construction schedules do overlap, Transwestern would coordinate with the landowner to attempt to avoid delays in the construction of either project that could be caused by simultaneous construction. Alternatively, if restoration work or park development is occurring at a point where pipeline construction is occurring, post-construction restoration of the pipeline work areas may include additional riparian and riverbed restoration.

Landfill Properties

The Phoenix Lateral would cross through two properties with active landfills between MPs 126.0 and 127.5 and MPs 206.1 and 206.2. The first property (MPs 126.0 to 127.5) is owned by WMA.

Transwestern proposes to install the pipeline at this location within an existing powerline easement between two existing powerlines and adjacent to the EPNG pipeline in an existing multiple pipeline corridor. During the scoping process and in comments on the draft EIS, WMA expressed concerns regarding the safety and operation of the pipeline through its landfill and requested that Transwestern route the pipeline along the southern edge of the landfill rather than bisecting the landfill as currently proposed. In section 3.5.2.4, the FERC staff analyzed the route variation, referred to as the Waste Management Arizona Variation, and recommended that Transwestern adopt the variation unless it provides documentation of WMA's concurrence with the proposed route through the landfill.

The second property (MPs 206.1 to 206.2) is also owned by WMA. The pipeline would be installed at this location along the extreme southern edge of the property and adjacent to existing pipelines and would not affect operation of the landfill.

Nurseries and Orchards

Along the Phoenix Lateral, a nursery would be crossed between MPs 181.8 and 182.3 and an orange orchard would be crossed between MPs 214.1 and 214.4. Construction at these locations would affect 5.7 acres within the nursery and 4.2 acres within the orchard. Nearly all crossings of agricultural lands would be at locations where the Phoenix Lateral would be installed adjacent to the EPNG right-of-way. Impacts on these areas could include the loss of standing crops within the construction work area and disruption of operations during the growing season affected by construction and longer depending on the products/species grown. Transwestern would address compensation for crop damage or losses associated with construction with each individual landowner. Overall, Transwestern would minimize impacts on agricultural land by segregating and conserving topsoil in all actively cultivated cropland (see section 4.2.3). Transwestern would also repair damage to irrigation systems or drain tiles caused by construction activities. Transwestern would allow agricultural activities to resume following construction provided that they do not interfere with operation of the pipeline. Transwestern would monitor crops for at least 2 years to determine if additional restoration is necessary.

Golf Course

The Phoenix Lateral would cross the City of Casa Grande, Dave White Park Golf Course between MPs 239.8 and 240.2 in part of the City of Casa Grande's future "Greenbelt-Utility Corridor." Transwestern has proposed measures to reduce impacts on the golf course, including the reimbursement of lost revenue due to the project if necessary, and would continue to consult with the operator to minimize disruption during construction. Alternatives that would avoid this golf course are discussed in section 3.4.2.6.

Nature Reserve

The Phoenix Lateral would cross a 40-acre parcel of land between MPs 242.6 and 242.8 that has been dedicated to the City of Casa Grande as a nature reserve. The alignment through the City of Casa Grande is along the North Santa Cruz Wash, referred to as "The Wash." The City of Casa Grande did not voice concern regarding potential project-related impacts on the nature reserve. However, other comments were received expressing concern that the project would impact vegetation and wildlife in the parcel. Transwestern only recently obtained landowner approval to conduct surveys for threatened and endangered species, wetlands, and cultural resources along The Wash alignment, including in the nature reserve. Before construction, Transwestern would file the results of these surveys with the FERC and obtain approval from the FWS, the COE, and other appropriate agencies and implement mitigation if threatened or endangered species, wetlands, or cultural resources that could be impacted by the project are identified in the nature reserve or elsewhere along The Wash. Vegetation and wildlife impacts resulting

from the project are discussed further in sections 4.4.2 and 4.5.1.2, respectively. Alternatives that would avoid this nature reserve are discussed in section 3.4.2.6.

4.7.6 Hazardous Waste Sites

State and federal databases were reviewed to identify any known hazardous waste sites that may be affected by the Phoenix Expansion Project or that could potentially affect the project. These databases included the National Priority List (NPL), Resource Conservation Recovery Act (RCRA) facilities, Comprehensive Environmental Response Liability Act sites, Toxic Substances Control Act sites, Toxic Release Inventory, landfills, brownfields, and hazardous waste site listings available through the EPA's Envirofact Data Warehouse and Enviromapper utilities. The Comprehensive Environmental Response, Compensation, and Liability Information System database, the RCRA Online database, the Arizona Unified Repository for Informational Tracking of the Environment database, and the New Mexico Electronic Integrated Database for Environmental Assurance were also reviewed.

A United Nuclear Corporation (UNC) former uranium ore processing mill and tailings disposal area is located approximately 1 mile west of the termination point of Loop B at MP 84.0. This facility was closed in 1982 and placed on the NPL in 1983 due to offsite contaminated groundwater (EPA, 2003a). Loop B would cross property owned by UNC at about MP 83.6 and again at about MP 84.7. However, the pipeline would not be installed in any areas of known contamination at the UNC facility. No other known hazardous waste sites were identified within 0.25 mile of the San Juan Lateral Loops, the Phoenix Lateral, or customer laterals. Furthermore, no known hazardous waste sites were identified within 0.25 mile of aboveground facilities, pipe storage and contractor yards, or borrow/disposal sites.

If contaminated soils are unexpectedly encountered during construction, Transwestern has stated that it would manage all excavated, contaminated materials in accordance with applicable federal, state, and local regulations. All pipe, including the joints, would be coated with an inert, corrosion-resistant, fusion-bonded epoxy coating and thus, contaminated soils would generally not pose a hazard to the integrity of the pipeline. Any contaminated soils encountered that would not pose a hazard to the integrity of the pipeline would be replaced *in situ*, unless the contamination of the soil is the result of an inadvertent spill from construction activities, in which case these soils would be managed as outlined in the SPR Procedures (see Appendix H). Transwestern would inform the contractor of any health or safety concerns it may be aware of within the construction right-of-way. The contractor would then be required to inform/train construction personnel appropriately.

Polychlorinated Biphenyls

Polychlorinated biphenyls (PCBs) are a blend of chemical compounds that were used in a variety of industrial applications until their commercial manufacture was banned by the EPA in 1979. Before then, PCBs were introduced into many natural gas transmission lines in the United States through the use of PCB-containing lubricants at compressor station sites and in other operation and maintenance activities. Since 1981, the EPA has worked with pipeline operators, including Transwestern, to identify and remove PCBs from the nation's natural gas transmission systems. Transwestern assumes that its entire mainline system west of a point east of the existing San Juan Lateral (but not the San Juan Lateral itself) has the potential to contain regulated levels of PCBs.

The Seligman Compressor Station No. 1 in Mohave County, Arizona is located within the segment of Transwestern's existing system that has the potential to contain regulated levels of PCBs. However, the only modifications that would be performed at the compressor station would be the installation of pressure control valves. This activity would not contribute to the level of PCBs that may be present in the existing system.

The Phoenix Lateral would connect to Transwestern's existing system at the Ash Fork Facility. The site of the Ash Fork Facility is located within the segment of Transwestern's system that has the potential to contain regulated levels of PCBs. Transwestern would install a filter separator at the Ash Fork Facility to remove potentially PCB-containing pipeline liquids from the Phoenix Lateral. These pipeline liquids would be re-injected into Transwestern's mainline and loop for removal and disposal at the Seligman Compressor Station No. 1.

Transwestern has stated that it would comply with all applicable environmental laws and regulations in connection with the storage and disposal of regulated PCB-containing pipeline liquids, and that the removal of any piping or equipment required for the tie-in to the existing system that has been in contact with natural gas would be done in accordance with the PCB rules and regulations contained within Title 40 CFR Part 761, as revised (June 29, 1998, Volume 63, No. 124).

The removal of pipeline liquids at the Ash Fork Facility coupled with Transwestern's commitment to comply with applicable PCB regulations would result in the appropriate control and management of potentially regulated PCB-containing pipeline liquids.

4.7.7 Visual Resources

Pipeline Facilities

Visual resources along the pipeline route are a function of geology, climate, and historical processes and include topographic relief, vegetation, water, wildlife, land use, and human uses and development. The vegetation along the pipeline facilities consists largely of open lands consisting of grasslands and desert scrub and cropland on flat to rolling terrain. Much of the area has been developed or visual resources have been previously affected by other activities such as existing utility rights-of-way, residential development, and farming. Throughout the project planning process, Transwestern, the FERC, and the affected land management agencies have worked together to develop measures to minimize the visual impacts of the proposed project.

Transwestern proposes to generally use a 100- to 120-foot-wide construction right-of-way for the San Juan Lateral Loops and Phoenix Lateral, and a 75-foot-wide construction right-of-way for the customer laterals. Some areas would be widened for additional temporary extra workspaces required for construction at waterbody, road, and utility crossings as well as in areas of steep side slopes or other difficult terrain. Visual impacts associated with the construction right-of-way and temporary extra workspaces would include the removal of existing vegetation and the exposure of bare soils, as well as earthwork and grading scars associated with heavy equipment tracks, trenching, blasting (if required), rock formation alteration or removal, and machinery and tool storage. Other visual effects could result from the removal of large individual trees that have intrinsic aesthetic value; the removal or alteration of vegetation that may currently provide a visual barrier; or landform changes that introduce contrasts in visual scale, spatial characteristics, form, line, color, or texture.

Visual impacts would be greatest where the pipeline route parallels or crosses roads and the pipeline right-of-way may be seen by passing motorists and on residents in areas where vegetation used for visual screening of existing utility rights-of-way or for ornamental value would be removed. The duration of visual impacts would depend on the type of vegetation that is cleared or altered. The impact of vegetation clearing would be shortest in areas consisting of grasslands and in agricultural crop and pasture lands, where the re-establishment of vegetation following construction would be relatively fast (generally less than 5 years).

The impact on forest land and the desert shrub community, which would take many years to regenerate mature trees and plants, would be greater. The greatest potential visual impact would result from the removal of large specimen trees, which would take longer than other vegetation types to regenerate and would be prevented from re-establishing on the permanent right-of-way. The project would impact relatively few trees. Where not precluded by safety or other environmental concerns, Transwestern would evaluate locations along the right-of-way where the right-of-way could be shifted or narrowed to avoid removing larger trees such as the Utah juniper (greater than 15 feet in height) observed north of Crossover Canyon (MP 80.5) on Loop B. Transwestern would conduct grading activities in a manner that minimizes erosion and conforms to the natural terrain.

Approximately 91 percent of the San Juan Lateral Loops and 86 percent of the Phoenix Lateral would be located within or adjacent to existing rights-of-way; the customer laterals would be located on new right-of-way. Construction within or adjacent to existing rights-of-way typically reduces impacts on visual resources because it minimizes vegetation clearing for the construction work area and permanent right-of-way and also minimizes new fragmentation of vegetation. For approximately 60 percent of the pipeline route, the construction right-of-way would overlap existing rights-of-way by 15 to 100 feet, thus reducing the amount of new clearing that would be required. Vegetation clearing would result in both short and long-term impacts on visual resources depending on the type of vegetation that is removed.

To minimize visual impacts, Transwestern would reduce the clearing of existing vegetation by adjusting the clearing boundaries to avoid selected individual specimens of native desert vegetation, feather the edge of the right-of-way in visually sensitive areas to obscure the edge of the construction right-of-way, and preserve native vegetation removed during clearing operations for redistribution over the disturbed areas as part of restoration activities. These and other measures Transwestern would implement to reduce impacts on vegetation and improve revegetation potential are described in detail in section 4.4.2 and included in Transwestern's Restoration Plan.[7]

The areas where new right-of-way would be created are located in non-forested areas, which minimize the potential for impacts on visual resources. After construction, all disturbed areas would be restored and returned to preconstruction conditions in compliance with federal, state, and local permits; landowner agreements; and Transwestern's easement requirements.

Private lands that would be crossed by the proposed pipeline route are not subject to federal or state visual management standards. However, Transwestern conducted a detailed visual resources study along the pipeline right-of-way to inventory and assess the level of visual modification in the landscape that could result from the construction, operation, and maintenance of the proposed project. On private lands, the visual study was restricted to sensitive viewers adjacent to aboveground facilities and sensitive viewers on private lands that have middleground views (up to 5 miles) of federal lands on which the proposed project would be constructed. The study assessed visual impacts along travel routes (e.g., scenic highways, interstates, state routes), recreational areas (e.g., trails), and nearby residences. The results of the study are documented in a Draft Visual Resource Study Technical Report dated June 2007 that is included in Appendix T.

Impacts on scenic quality were assessed using scenic quality inventory data and landscape contrast ratings (Classes A, B, and C).

- Class A – landscapes with distinctive or outstanding diversity or interest

[7] This plan is too voluminous to include in this EIS but can be viewed on the FERC Internet website at http://www.ferc.gov. Using the "eLibrary" link, select "General Search" from the eLibrary menu and enter the docket number excluding the last three digits in the "Docket Number" field (i.e., CP06-459). Be sure to select an appropriate date range. It is also available for public inspection at the FERC's Public Reference Room in Washington, DC (call (202) 502-8317 for instructions).

- Class B – landscapes with common or average diversity or interest
- Class C – landscapes with minimal diversity or interest

More detailed descriptions of the scenic quality classes listed above as they relate to the BLM and the FS can be found in the Draft Visual Resource Study Technical Report (see Appendix T).

Impacts were anticipated to be high where strong contrast is visible from high sensitivity viewpoints that are within 1 mile of the proposed project. Visual impacts would decrease for sensitive viewers as distance from the proposed project increases, reducing dominance of the project. In general, initial impacts on sensitive viewers in New Mexico and Arizona are anticipated to range from low/moderate to low, because the proposed project would parallel an existing pipeline for the majority of the project route. Also, implementation of Transwestern's Restoration Plan would facilitate revegetation and, therefore, project-related impacts would be further minimized.

Public lands that would be affected by the proposed pipeline comprise mostly lands managed by the BLM and the FS. Visual objectives for these federal lands are typically dictated by a resource management plan or equivalent. The visual resource classifications and objectives for BLM-managed and Forest System lands are discussed below.

Bureau of Land Management

The BLM uses a Visual Resource Management (VRM) system that inventories visual resources into four classifications (Class I, II, III, or IV) as described below.

VRM Class I Objective: The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes, but it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

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

VRM Class III Objective: The objective of this class is 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.

VRM Class IV Objective: The objective of this class is to provide for management activities that require major modifications 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 the viewer's attention. Every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Transwestern's Draft Visual Resource Study Technical Report described above for private lands and included in Appendix T assessed the potential impact of the project on BLM-managed and Forest System lands. The impact methodology was based on the BLM's VRM classification system as well as the FS' SIO classification system. Based on these systems, a methodology was developed that addressed the potential visual impacts of the proposed project on landscape scenic quality, sensitive viewers, and

compliance with agency management objectives. The results of this methodology provided the foundation for impact characterization and subsequent recommendations for restoration that can be equally applied to all lands, regardless of jurisdiction.

Loop A, the Phoenix Lateral, and the customer laterals would cross BLM-managed lands. Transwestern's discussions with the BLM have resulted in applying the VRM classes inventoried in the Agua Fria National Monument and Bradshaw-Harquahala Draft RMP and Draft EIS to the proposed project. Based on the visual resources study, the pipeline route would be located within a BLM-designated utility corridor (Class III) and Class III and IV inventoried lands. In New Mexico, these classes were inventoried as follows: Class III (MPs 4.9 to 7.4 and MPs 8.4 to 8.9) and Class IV (MPs 0.0 to 4.9 and MPs 7.4 to 8.4). In Arizona, the RMPs do not have established VRM objectives and, therefore, in the absence of adopted VRM classes, all lands without visual resource objectives default to Class III. The proposed route would not cross any Class I or II designated lands.

In general, the majority of the proposed route would be adjacent to existing pipelines or transmission lines within BLM-designated utility corridors. These segments of the Phoenix Lateral are expected to be in compliance with VRM Class III and Class IV objectives. Additionally, as discussed in Transwestern's Draft Visual Resource Study Technical Report, impacts on scenic quality were assessed using scenic quality inventory data and landscape contrast ratings (Classes A, B, and C). In general, the project in a Class A landscape would result in a strong or high contrast, whereas the project in a Class C landscape would result in a weak or low to low/moderate contrast.

In New Mexico, the proposed route would cross a Class B landscape (Great Basin badlands) that has been highly modified by OHV trails and an existing pipeline. Based on these modifications, impacts on scenic quality are anticipated to range from low to moderate (for the steepest slopes). In Class C landscapes (Great Basin foothills), where the topography is subtle and vegetation clearing would be minimal, initial impacts are anticipated to be low. As with most of the project area in New Mexico, the landscape has been modified by roads and one or more pipelines possessing similar visual characteristics. Transwestern's implementation of its Restoration Plan would promote vegetation restoration, which primarily consists of grasses and low shrubs. Residual impacts are, therefore, expected to diminish over time in both Class B and Class C landscapes, resulting in low impacts.

In Arizona, inventories of lands managed under the Phoenix RMP recorded only Class B and Class C landscapes. Initial impacts on Class B landscapes (primarily in the Black Canyon corridor), are anticipated to range from low to moderate where vegetation clearing and soil disturbance would result in an increase in both line and color contrasts, respectively. Some areas of moderate to high/moderate impacts would occur where the proposed project deviates from the existing pipeline and other similar modifications (primitive roads). Initial impacts on Class C landscapes are expected to be low when the proposed pipeline would parallel the existing pipeline. Limited areas of low/moderate impacts would occur in Class C landscapes where the proposed pipeline deviates from the existing pipeline and other modifications. Other areas of Class C landscapes are located on BLM lands managed by the Lower Sonoran Field Office, under the Lower Gila South RMP, where initial impacts are anticipated to be low. Project contrast is anticipated to be minimal because the proposed route follows a BLM-designated utility corridor consisting of an existing pipeline and, for some segments of the project, a transmission line with similar visual features. As with New Mexico, Transwestern's implementation of its Restoration Plan would promote vegetation restoration and, therefore, impacts are expected to diminish over time, resulting in low impacts.

Visual issues associated with the Phoenix Expansion Project were identified by federal agencies, including the BLM. The BLM is mandated by law to manage its scenic resources so that visual quality is protected for present and future generations (Federal Land Policy and Management Act, 1976). Proposed

activities that require modification of the landscape must make a reasonable attempt to minimize visual impacts. Visual issues were identified through both agency input and public comments on the proposed project. Areas of concern identified include recreation destinations, scenic vistas, and special management areas that are well known to the public and/or land management agencies.

The BLM identified one major visual area of concern along the pipeline route, Sunset Point. Sunset Point is a popular scenic rest area and overlook along Interstate 17 and is located approximately 7 miles north of Black Canyon City. The Sunset Point Rest Area and associated viewshed are designated VRM Class III. Sunset Point has a view of moderate to steep mountainous terrain occupied by both upland Sonoran vegetation (palo verde-mixed cacti) and grasslands studded with prickly pear. The pipeline in this section would be located adjacent to Bumble Bee Road and noticeable from the Sunset Point Rest Area for a portion of the area of effect. The BLM has expressed concern for this overlook based on its high use and scenic vistas.

In response to the BLM's concerns, Transwestern developed mitigation measures and detailed restoration plans for Sunset Point that were approved by the BLM and then incorporated into the Restoration Plan dated July 2007. As discussed in section 4.2.2, the BLM has indicated that it is satisfied with the measures included in this plan. However, the BLM noted that it may provide further comments on the detailed restoration plans specific to lands under its management. We have recommended in section 4.2.2 that Transwestern coordinate with the BLM and other applicable agencies to finalize its Restoration Plan to address any additional restoration concerns identified by these agencies and file the final Restoration Plan before construction.

Kaibab National Forest

Visual resources in the Kaibab National Forest are managed using the SMS detailed in the ROS-SMS Guidebook, which is consistent with the FS' current guidance on scenery management, the SMS Handbook (FS, 1995). The SMS is used to inventory, analyze, and manage the aesthetic values of National Forest lands. It is used to create and maintain landscapes having high scenic diversity, harmony, and unity for the benefit of society in general. SIOs are used to evaluate deviations from, or alterations to, the landscape character that is valued for its aesthetic appeal. These SIO levels are described below.

Level 1, Very High: Landscapes where the valued landscape character is intact with only minute, if any, deviations. The existing landscape character and sense of place is expressed at the highest possible level.

Level 2, High: Landscapes where the valued landscape character appears intact. Deviations may be present, but must repeat the form, line, color, texture, and pattern common to the landscape character, so completely and at such a scale that they are not noticeable.

Level 3, Moderate: Landscapes where the valued landscape character appears slightly altered. Noticeable deviations must remain visually subordinate to the landscape character being viewed.

Level 4, Low: Landscapes where the valued landscape character appears moderately altered. Deviations begin to dominate the valued landscape character being viewed, but they have similar valued attributes to the outside of the landscape being viewed, such as size, shape, edge effect and pattern of natural openings, vegetative type changes, or architectural styles.

Level 5, Very Low: Landscapes where the valued landscape character appears heavily altered. Deviations may strongly dominate the valued landscape character.

As previously discussed, the Phoenix Lateral is the only pipeline segment that would cross the Kaibab National Forest. The Phoenix Lateral would be entirely located within SIO Level 4, with the exception of an area at Little Hell Canyon Reservoir (MP 9.5), which is in SIO Level 2. Based on the ROS-SMS Guidebook, the guidelines on special use management for SIO Level 4 state "Where possible, use this SIO for expansion of existing transmission line or transmission line right-of-way expansion or construction of new transmission lines." Therefore, the Phoenix Lateral would be consistent with the scenery management direction for SIO Level 4.

Based on Transwestern's consultations with the Kaibab National Forest, it is acknowledged that there is no reasonable way to locate the pipeline outside of the SIO Level 2 area (Little Hell Canyon Reservoir). While special uses management is also considered consistent with SIO Level 2, mitigation may be required in these areas.

As discussed above, Transwestern's Draft Visual Resource Study Technical Report (see Appendix T) addressed the impact of the project on Forest System lands. Impacts on scenic quality were assessed using scenic quality inventory data and landscape contrast ratings (Classes A, B, and C). More detailed descriptions of the scenic quality classes listed above as they relate to the FS can be found in the Draft Visual Resource Study Technical Report (see Appendix T). The Kaibab National Forest scenic attractiveness (scenic quality) rating for the majority of the land affected by the project is Class C. The primary landscape type of this class is conifer plains. Areas rated as Class B primarily include juniper rolling hills and foothills. The presence of woody vegetation in Class B landscape types adds greatly to visual interest, because changes in terrain are often subtle. In Class C landscapes, where conifer grassland plains are common, initial impacts are anticipated to be low because vegetation is sparse and changes in soil color are anticipated to be weak. Residual impacts are expected to diminish over time as the restored vegetation has a chance to mature, reducing contrast in both Class B and Class C landscapes to low. Residual impacts on Class B and Class C landscapes are anticipated to be low/moderate to low, because the restored vegetation would mature and reduce the contrast associated with the edge of the project right-of-way.

Areas designated as Class A scenery include canyon or riparian areas such as the Little Hell Canyon Reservoir, which is a reservoir unique to the region. Little Hell Canyon Reservoir is an important recreation area for local residents in the small towns of Ash Fork and Chino Valley. Little Hell Canyon Reservoir is designated as a high SIO. The landscape character is defined by rolling hills blanketed by junipers with riparian vegetation occurring along the banks of the reservoir. An existing pipeline is located immediately adjacent to the proposed pipeline. Initial impacts on Little Hell Canyon Reservoir are anticipated to be high/moderate to moderate where mature dense vegetation and steep slopes occur. Moderate residual impacts are expected for Little Hell Canyon Restoration (Class A landscape), after restoration of vegetation in portions of the right-of-way. This area was identified by the Kaibab National Forest as a major visual area of concern.

In response to the Kaibab National Forest's concerns, Transwestern developed mitigation measures and a detailed restoration plan for Little Hell Canyon Reservoir, including a detailed planting design. The restoration plan and planting design were approved by the FS and then incorporated into the Restoration Plan dated July 2007. As discussed in section 4.2.2, the FS has indicated that it is satisfied with the measures included in this plan. However, the FS noted that it may provide further comments on the detailed restoration plans specific to lands under its management. We have recommended in section 4.2.2 that Transwestern coordinate with the FS and other applicable agencies to finalize its Restoration Plan to address any additional restoration concerns identified by these agencies and file the final Restoration Plan before construction.

Prescott National Forest

The Prescott Forest Plan has adopted VQOs for its visual management system. The five VQOs classes are described below.

Preservation: This VQO allows ecological changes only. Management activities, except for low visual-impact recreation facilities, are prohibited.

Retention: This VQO provides for management activities that are not visually evident. Activities may only repeat form, line, color, and texture that are frequently found in the characteristic landscape; changes in their qualities should not be evident.

Partial Retention: Management activities remain visually subordinate to the characteristic landscape. Activities may repeat form, line, color, or texture common to the characteristic landscape but changes in their qualities remain visually subordinate. Activities may also introduce form, line, color, or texture that are found infrequently or not at all in the characteristic landscape, but should remain subordinate.

Modification: Management activities may visually dominate the original characteristic landscape, but most borrow from naturally established form, line, color, or texture so as to remain compatible with the natural surroundings.

Maximum Modification: Management activities may dominate the characteristic landscape. However, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character type.

Although the Prescott Forest Plan still refers to the VQOs, they have since been replaced by the SIO described in the SMS Handbook (by revised Forest Service Manual Chapter 2380, effective as of May 2, 2003). The SMS Handbook provides the following conversions between VQO classes and SMS classes:

VQO Class	SMS SIO Level
Preservation	Very High, Level 1
Retention	High, Level 2
Partial Retention	Moderate, Level 3
Modification	Low, Level 4
Maximum Modification	Very Low, Level 5

As previously discussed, the Phoenix Lateral is the only pipeline segment that would cross the Prescott National Forest. For its entire length through the Prescott National Forest, the Phoenix Lateral would be adjacent to an existing pipeline right-of-way where disturbance from the proposed pipeline would be similar to that of the existing pipeline. The majority of the Phoenix Lateral would be located in areas of Modification or Partial Retention with small portions of the proposed route entering areas of Retention at Hell Canyon (MP 17.8) and the Verde River (MP 23.8). Based on discussions with Prescott National Forest staff, and as discussed in Transwestern's Draft Visual Resource Study Technical Report (see Appendix T), the pipeline would cross 1.5 miles of VQO Retention, including Hell Canyon and the Verde River, 11 miles of Partial Retention, and 8.5 miles of Modification designation. Areas of Partial Retention are generally associated with views from Highway 89 at the Prescott National Forest's northern border to Hell Canyon (approximate MPs 10.0 to 17.5). Areas of Partial Retention and Modification

designations are between Hell Canyon and the Verde River (about MPs 18 to 23). The remainder of the route in the northern portion of the Prescott National Forest has a VQO designation of Modification between about MPs 24 and 30. The project would cross the southern Prescott National Forest in areas of Modification and Partial Retention between MPs 60 and 61, respectively.

The Prescott National Forest variety class (scenic quality) rating for the majority of the land affected by the project is Class C. These landscape types include chaparral foothills and conifer plains. Initial impacts on Class C landscapes, where the topography is subtle, would be low. Areas rated as Class B primarily include juniper rolling hills and foothills. The presence of woody vegetation in Class B landscape types greatly adds to the visual interest, because changes in terrain are often subtle. Moderate to low/moderate initial impacts are anticipated in Class B landscapes (rolling conifer woodlands), with a few isolated areas of high/moderate impacts, based on the clearing of vegetation in areas of dense junipers. Residual impacts for both Class B and C landscapes are anticipated to be low in most cases, except on some of the steepest wooded slopes of the Class B landscapes.

Areas designated as Class A scenery include canyon or riparian areas such as the Verde River and Hell Canyon, and are rich in plant diversity and rock outcrops. Initial impacts at these locations are expected to be moderate to high/moderate, depending on the slope and the amount of vegetation clearing. Moderate residual impacts are anticipated for Hell Canyon and the Verde River (Class A landscapes) following the implementation of Transwestern's Restoration Plan and revegetation of the right-of-way.

These two areas were identified by the Prescott National Forest as major visual areas of concern. As previously discussed, Hell Canyon has a VQO of Retention. The landscape has steep topography that is within a conifer woodland vegetative community. The proposed pipeline would be located adjacent to an existing pipeline. The Prescott National Forest has requested visual mitigation including feathering and replanting, if applicable. The Verde River is a proposed recreation access point that will eventually consist of a parking lot and trailhead providing access to the Verde River. The upper river has been selected as a candidate for recreational river designation and, therefore, has a current VQO designation of Retention. The landscape is characterized by steep topography and conifer woodland and broadleaf riparian vegetation. The proposed pipeline would be located adjacent to an existing pipeline. Prescott National Forest has requested supplemental plantings of broadleaf vegetation along the Verde River for visual mitigation.

In response to the Prescott National Forest's requests, Transwestern developed mitigation measures and detailed restoration plans for Hell Canyon and the Verde River. These plans were approved by the FS and then incorporated into the Restoration Plan dated July 2007. As discussed in section 4.2.2, the FS has indicated that it is satisfied with the measures included in this plan. However, the FS noted that it may provide further comments on the detailed restoration plans specific to lands under its management. We have recommended in section 4.2.2 that Transwestern coordinate with the FS and other applicable agencies to finalize its Restoration Plan to address any additional restoration concerns identified by these agencies and file the final Restoration Plan before construction.

Aboveground Facilities

Modifications at the existing Bloomfield Compressor Station and Seligman No. 1 Compressor Station would not result in additional permanent impacts on visual resources. All of the modifications would occur within the fencelines of the existing facilities.

Construction and operation of the Ask Fork Facility would occur at the intersection of the Transwestern mainline (approximate MP 235.7) and the beginning of the Phoenix Lateral (MP 0.0). The facility would be located in a rural setting surrounded by pastures. Interstate 89 is located about 0.8 mile

west and the town of Ash Fork is located over 1 mile northwest. The Ash Fork Facility would affect 2.5 acres of land during construction, which would be fenced and permanently maintained for operation of the facility. The Ash Fork Facility would have a permanent impact on visual resources.

Transwestern would construct 11 meter stations along the Phoenix Lateral at locations either adjacent to the customer facilities or adjacent to the permanent right-of-way. The meter stations would range in size from 0.5 acre to 2.6 acres, and be surrounded by primarily rangeland, agricultural land, and developed land. The meter stations would have a permanent impact on visual resources.

The valves, taps, and pig launchers and receivers that would be collocated with existing aboveground facilities would only slightly expand the footprint of the existing facilities and would not result in additional permanent impacts on visual resources. The remaining valves, taps, and pig launchers and receivers outside of existing or proposed facilities would have a permanent impact on visual resources.

Transwestern would paint all aboveground facilities to blend with the surrounding landscape, thus reducing the visual impacts. Construction of these facilities would not result in a substantial adverse effect on a scenic area or vista, substantially damage scenic resources, or substantially degrade the existing visual character or quality of the area or its surroundings. Also, based on Transwestern's Draft Visual Resource Study Technical Report (see Appendix T), impacts are anticipated to be low where the proposed facilities would be screened from sensitive viewers by vegetation or constructed adjacent to similar facilities or large industrial features (e.g., power plants).

Access Roads

Transwestern proposes to use several existing roads for temporary right-of-way access during construction. These access roads would be graded or otherwise improved as needed to move equipment and materials to the construction right-of-way. Additionally, along the Phoenix Lateral, Transwestern would construct 11 permanent access roads and permanently modify 5 roads to provide operational access to aboveground facility sites. These roads are located in relatively remote areas and would affect rangeland or previously disturbed developed land. Therefore, these activities would not result in significant impacts on visual resources.

Pipe Storage and Contractor Yards and Borrow/Disposal Areas

With the possible exception of minor grading activities and surfacing, soils at the pipe storage and contractor yards and borrow/disposal areas would not be disturbed. Transwestern would limit all rock disposal to previously disturbed areas within each rock disposal site. The rocks would be spread out within the site so they do not extend higher than the disposal area rim and covered with soil from within the previously disturbed area of the site. As a result, there would be no permanent impacts on visual resources associated with the use of the pipe storage and contractor yards and borrow/disposal areas.

4.7.8 No Action Alternative

Under the No Action Alternative, the FERC would deny Transwestern's application for a Certificate and the BLM would deny Transwestern's application for a Right-of-Way Grant for the portion of the project on federal lands. The No Action Alternative means that the project would not go forward and the project-related facilities would not be installed. Accordingly, none of the potential environmental impacts on land use, recreation, or visual resources identified for the construction and operation of the proposed project would occur.

4.8 SOCIOECONOMIC RESOURCES

Socioeconomic effects that may result from construction and operation of the proposed Phoenix Expansion Project include those related to construction and the number of local and non-local construction workers who would work on the project, their income and local expenditures, and their impact on population, temporary housing, public services, and traffic during the construction period. Other potential effects related to construction include local construction expenditures by Transwestern. Potential economic benefits associated with operation of the project include increased property tax revenue, increased job opportunities and income, and ongoing local expenditures by Transwestern. A discussion of the effects of the proposed project on the local[8] population, employment, economy, housing, public services, transportation, property values, tax revenues, and environmental justice is provided below.

4.8.1 Population, Economy, and Employment

4.8.1.1 Population

The proposed project in New Mexico would include facilities in San Juan and McKinley Counties. In Arizona, the proposed project would include facilities in Coconino, Yavapai, Maricopa, and Pinal Counties. Table 4.8.1-1 describes the population characteristics of the counties in the project area as well as those of the States of New Mexico and Arizona.

TABLE 4.8.1-1

Population Characteristics in the Vicinity of the Phoenix Expansion Project [a]

State/County	Land Area (square miles)	Population	Population Density (persons per square mile)
New Mexico	121,356	1,819,046	15.0
San Juan	5,514	113,801	20.6
McKinley	5,449	74,798	13.7
Arizona	113,635	5,130,632	45.2
Coconino	18,617	116,320	6.2
Yavapai	8,123	167,517	20.6
Maricopa	9,203	3,072,149	333.8
Pinal	5,370	179,727	33.5

[a] Persons per square mile, based on population and area size.
Source: U.S. Census Bureau, 2000

McKinley County, New Mexico is the most sparsely populated county in the New Mexico project area, while Coconino County, Arizona has the lowest population density in the Arizona project area with 6.2 persons per square mile in 2000. Maricopa County, Arizona had the highest population in 2000 (3,072,149), as well as the highest population density (333.8 persons per square mile) of the project area in 2000.

Population impacts of the proposed project would be associated with the influx of non-local personnel for construction (temporary) and operation (permanent) of the proposed facilities. Transwestern anticipates that construction of the San Juan Lateral Loops would take approximately 3 months and would require a workforce of 325 for each loop, including construction, administrative, and

[8] "Local" refers to the counties directly affected by the project facilities and does not include areas where activities are proposed within existing facilities (i.e., the Bloomfield Compressor Station and the Seligman Compressor Station No 1).

support personnel. For the compressor stations, Transwestern anticipates that the piping modifications would take 3 months, which would be concurrent with construction of the San Juan Lateral Loops, and would require a workforce of 30. For the Phoenix Lateral, customer laterals, and meter stations, Transwestern anticipates that construction would take approximately 12 to 13 months and would require a workforce of 1,540, including construction, administrative, and support personnel. In total, Transwestern anticipates that the workforce for the project would be 2,220 workers.

It is estimated that up to 40 percent of the workforce for pipeline construction would be local hires and up to 60 percent of the workforce would be non-local hires. Therefore, the temporary non-local workforce would be approximately 1,332 workers, 408 for the New Mexico facilities and 924 for the Arizona facilities. Because the pipeline facilities would be spread over six counties in two states, any associated population increases would also likely be spread across the project area, which would reduce the impact in any particular community. Transwestern would hire three to four permanent employees for operation and maintenance of the proposed pipeline facilities. Even if all of these positions were filled by non-local persons, they would not have a significant impact on the population.

4.8.1.2 Employment and Economy

All of the counties in the project area, with the exception of Maricopa County, Arizona had per capita incomes that were lower than the states' per capita income of $17,261 (New Mexico) and $20,275 (Arizona) in 1999 (see table 4.8.1-2). In 1999, the per capita income for the counties in which the project would be located ranged from $9,872 in McKinley County, New Mexico to $22,251 in Maricopa County, Arizona. Maricopa County, Arizona had the greatest civilian labor force at 1,488,720, making up nearly 63 percent of the state's total, while McKinley County, New Mexico had the smallest at 26,400. Unemployment rates in two of the counties (Yavapai and Maricopa, Arizona) were less than the states' averages of 4.4 percent (New Mexico) and 3.4 (Arizona), while the remaining counties had unemployment rates higher than the states' average. Generally, the major industry in the project area is management, professional, and related occupations. However, industry in San Juan County, New Mexico and Pinal County, Arizona relies heavily on sales and office occupations.

TABLE 4.8.1-2

Employment Conditions in the Vicinity of the Phoenix Expansion Project

State/County	Per Capita Income 1999	Civilian Labor Force 2000	Unemployment Rate (percent)[a] 2000	Top Employment Industry 2000
New Mexico	$17,261	815,800	4.4	
San Juan	$14,282	48,900	5.5	Sales and office, and management, professional, and related occupations
McKinley	$9,872	26,400	9.2	Management, professional, and related occupations
Arizona	$20,275	2,347,740	3.4	
Coconino	$17,139	57,760	4.8	Management, professional, and related occupations
Yavapai	$19,727	71,090	2.7	Management, professional, and related occupations
Maricopa	$22,251	1,488,720	3.0	Management, professional, and related occupations
Pinal	$16,025	65,980	3.9	Sales and office occupations

[a] Percentage based on civilian labor force, not total population.
Source: U.S. Census Bureau, 2000

Based on the projected workforce, Transwestern anticipates that an average of approximately 227 workers per month would be required during construction of the project facilities in New Mexico and 128 workers per month would be required during construction of the project facilities in Arizona.

Construction of the project facilities would require approximately 2,220 workers. Transwestern would attempt to hire local workers when possible. The actual number of local workers hired would depend on the type of contractors awarded the construction contracts (i.e., local or out-of-state, union versus non-union) and the availability of local workers possessing the necessary skills. It is estimated that about 40 percent of the construction workforce would be local hires from within about 50 to 100 miles of the project area. Non-local hires for construction of the pipeline facilities are expected to include pipeline construction specialists, supervisory personnel, and inspectors.

Assuming the 40 percent local hire rate and based on the anticipated workforce size, construction of the pipeline facilities would result in about 272 temporary jobs in the New Mexico project area and 616 temporary jobs in the Arizona project area. Given the existing labor forces in each of the counties affected by the project, these additional jobs could have a positive yet relatively insignificant impact during the construction period. In summary, although temporary, the impacts of project construction on employment would be beneficial as the local hires would most likely come from the unemployed workforce.

Transwestern anticipates that the operation and maintenance of the Phoenix Lateral would require between three to four full-time positions. One or two of the operations and maintenance workforce could be local hires depending on the availability of personnel with the required training and skills. While this is not a large number of new jobs when viewed from a state perspective, it would be a long-term beneficial impact that the project would have on local and regional employment in Arizona. This small number of positions would have a minimal impact on employment.

As shown in table 4.8.1-3, Transwestern anticipates that construction payroll costs associated with the proposed project would be approximately $69.4 million. This breaks out to be about $8.2 million for the project in New Mexico and about $61.2 million for the project in Arizona. Operational payroll costs would be approximately $0.25 million per year and limited to Arizona. In addition, Transwestern would purchase many construction materials for the project locally and anticipates that expenditures for these materials would be approximately $729,400, of which about $18,420 would be spent in New Mexico and about $710,980 would be spent in Arizona. The majority of the expenditures would occur in Maricopa and Yavapai Counties, Arizona ($348,380 and $248,850, respectively).

TABLE 4.8.1-3

Estimated Construction Costs Associated with the Phoenix Expansion Project (in U.S. dollars)

	New Mexico		Arizona				
Expenditure	San Juan County	McKinley County	Yavapai County	Coconino County	Maricopa County	Pinal County	Total
Construction Costs:							
Total Construction Payroll	3,397,000	4,767,000	21,428,000	238,000	30,071,000	9,524,000	69,425,000
Cost of Materials Purchased Locally	9,950	8,470	248,850	2,840	348,380	110,910	729,400
Contractor Consumables Supplies (not purchased locally)	1,009,847	1,417,159	6,374,441	72,851	8,924,218	2,852,107	20,650,623
Total	4,416,797	6,192,629	28,051,291	313,691	39,343,598	12,487,017	90,805,023

Construction-related payroll and material expenditures would temporarily benefit the local economies. In addition to the direct benefits, some portion of the construction payroll would be spent locally for the purchase of housing, food, gasoline, entertainment, and luxury items. Indirect sales, jobs,

and salaries could also be created in new or existing businesses and organizations that would supply goods and services to the project and the project's employees.

Sales tax revenues associated with the construction and operation of the proposed facilities are discussed in section 4.8.6.

4.8.2 Housing

Housing statistics for the States of New Mexico and Arizona and the six counties in which the project would be located are provided in tables 4.8.2-1 and 4.8.2-2. Table 4.8.2-1 presents an overview of the total housing units, including occupied and unoccupied units, and the rental vacancy rates. Table 4.8.2-2 lists the temporary housing availability in the project area, including hotel/motel rooms and campgrounds/recreational vehicle parks by major city.

TABLE 4.8.2-1

General Housing Conditions in the Vicinity of the Phoenix Expansion Project

State/County	Total Housing Units	Total Occupied Units	Total Unoccupied Units [a]	Rental Vacancy Rate (percent)
New Mexico	780,579	677,971	102,608	13.2
San Juan	43,221	37,711	5,510	12.8
McKinley	26,718	21,476	5,242	19.6
Arizona	2,189,189	1,901,327	287,862	13.2
Coconino	53,443	40,448	12,995	24.3
Yavapai	81,730	70,171	11,559	14.1
Maricopa	1,250,231	1,132,866	117,345	9.4
Pinal	81,154	61,364	19,790	24.4

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

Source: U.S. Census Bureau, 2000

TABLE 4.8.2-2

Temporary Housing Availability in Cities in the Vicinity of the Phoenix Expansion Project

Facility	County, State	City	Distance to Facility (miles)	Number of Hotels/Motels [a]	Number of Campground/ RV Parks [a]
San Juan Lateral Loops	San Juan, New Mexico	Bloomfield	15	1	0
	San Juan, New Mexico	Farmington	25	20	0
	McKinley, New Mexico	Gallup	20	33	1
Phoenix Lateral and Customer Laterals	Coconino, Arizona	Ash Fork	0	2	3
	Coconino, Arizona	Prescott	10	27	7
	Coconino, Arizona	Prescott Valley	5	3	0
	Pinal, Arizona	Casa Grande	2	5	3
	Maricopa, Arizona	Phoenix Area (includes Glendale, Scottsdale, Mesa, and Tempe)	10 to 50	270	33

[a] Each motel, hotel, and campground would consist of multiple accommodations per facility.

Sources: U.S. Census Bureau, Accommodation and Foodservices, 2002; http://www.local.google.com.

There were about 1,536,497 total housing units in the project area in 2000, of which 69,939 were located in New Mexico and 1,466,558 were located in Arizona (see table 4.8.2-1). McKinley County, New Mexico had the smallest number of housing units (26,718) and Pinal County, Arizona had the highest rental vacancy rate (24.4 percent) in the project area. Maricopa County, Arizona had the largest number of housing units (1,250,231), the greatest total number of unoccupied housing units (117,345), and the smallest vacancy rate (9.4) in 2000. Unoccupied units in the other counties ranged from 5,242 in McKinley County, New Mexico to 19,790 in Pinal County, Arizona.

As discussed above, about 60 percent of the construction workforce for the project facilities is expected to consist of non-local workers who would relocate to the project area temporarily. Using the 2000 census data for the United States, New Mexico, and Arizona, which indicate that a typical household consists of 2.6 people, an additional 1,060 people may move into the project area in New Mexico and an additional 2,402 people may move into the project area in Arizona if workers were to bring their families. These workers or families would likely seek unoccupied rental units or units for sale. The potential influx of temporary workers and their families could have a significant impact on the rental vacancy rates and available housing units in smaller communities such as in San Juan and McKinley Counties, New Mexico. However, the project would be distributed geographically throughout the region and consist of a relatively short pipeline construction period. It is anticipated that most workers would likely prefer temporary quarters such as hotels/motels, apartment units, and campgrounds. The construction workforce would, however, not be allowed to camp on federal lands unless special permission is granted on a case-by-case basis. Previous pipeline project experience indicates that about 30 percent of non-local construction workers would provide their own housing (e.g., trailers, campers). Vacant units in Arizona would likely be found in the greater Phoenix area, Prescott and Prescott Valley, Sun City, and Casa Grande, as well as more limited vacant units in local cities and towns such as Ash Fork, Chino Valley, Dewey-Humboldt, Mayer, and Black Canyon City. There appears to be a sufficient supply of housing for construction employees as well as any families temporarily relocating to the project area even assuming maximum population influx scenarios (e.g., workforce bringing families).

As previously discussed, Transwestern anticipates hiring up to three to four permanent full-time employees for operation and maintenance of the Phoenix Lateral. About one-half of these permanent employees could be non-local. This impact would be insignificant due to the small number of persons and no long-term impacts on housing are anticipated.

4.8.3 Public Services

The majority of the project area is sparsely populated and relies on nearby population centers for public services and infrastructure. However, the entire project area is covered by emergency "911" service, and the cities of Phoenix, Prescott, Prescott Valley, Sun City, and Casa Grande have historically had a wide array of public services and infrastructure to support the project.

San Juan County, New Mexico has four public school districts with 56 public schools, while McKinley County has two public school districts with 43 public schools. The closest school to the project in New Mexico is the Mesa Alta High School in Bloomfield, which is located about 3 miles north of MP 6 of Loop A. In Arizona, Coconino County has 23 public school districts with 61 public schools, Yavapai County has 56 public school districts with 100 public schools, Maricopa County has 254 public school districts with 1,000 public schools, and Pinal County has 27 public school districts with 86 public schools. There are over 10 schools within 5 miles of the Phoenix Lateral and customer laterals in Arizona, the closest of which is a school in Mobile, Maricopa County about 0.2 mile south of MP 207.5.

Medical facilities in San Juan County, New Mexico include six clinics and health centers and two hospitals including one in Farmington. Medical facilities in McKinley County, New Mexico include two

hospitals including one in Gallup. In addition, Loop B would traverse Navajo Nation land. The Navajo Nation Department of Emergency Medical Services (NNEMS) is one of eight departments within the Navajo Nation Division of Public Safety. As a public safety service, the EMS works with all police, fire, and rescue departments and is affiliated with the University of New Mexico EMS Academy and the New Mexico EMS Bureau (NNEMS, 2006). EMS field offices for the Navajo Nation are located in both New Mexico and Arizona, but are based in Window Rock, Arizona.

Medical facilities along the Arizona portion of the project vary. Coconino County has four hospitals: Flagstaff Medical Center, Grand Canyon Hospital, Tuba City Hospital, and Williams Hospital. There are four hospitals in Yavapai County, including the Yavapai Regional Medical Center (YRMC), YRMC West in Prescott, YRMC East in Prescott Valley, and the Verde Valley Medical Center in Cottonwood. There are at least 35 hospitals in Maricopa County, many of which are located in Phoenix and Mesa. Pinal County has seven hospitals, the largest of which include the Casa Grande Regional Medical Center in Casa Grande and the Central Arizona Medical Center in Florence.

In New Mexico, the San Juan County Sheriff's office cooperates with the police departments in the surrounding cities of Aztec, Bloomfield, and Farmington, in addition to state police and Navajo police. The Sheriff's office employs 90 certified deputies throughout three locations; the Aztec Main Office; the Lees Acres Substation; and the Kirtland Substation. The San Juan County Fire Department has a Fire Chief and Fire Marshal as well as 330 volunteers in 13 volunteer fire districts (San Juan County Fire Department, 2006) that operate out of 21 stations across the county. The McKinley County Sheriff's office is located in Gallup and employs 32 certified officers. The McKinley County Fire and Rescue Office serves as a liaison between the State Fire Marshal and the county's 20 volunteer fire departments. The McKinley County fire stations are operated with 350 volunteer firefighters, of which about 275 are also trained as First Responders (McKinley County Fire and Rescue, 2006).

The Navajo Nation provides its own fire and rescue services from six stations in New Mexico: Window Rock, Fort Defiance, Chinle, Tuba City, Leupp, and Indian Wells. Each fire station has between 10 and 15 volunteer firefighters and 1 to 2 paid firefighters. Where Navajo communities are not serviced by these stations, they are protected by community fire departments discussed above or the BIA (Navajo Nation Fire Department, 2006).

In Arizona, the Coconino County Sheriff's Office has 1 office, 3 substations, and 5 single-man satellite offices, and employs approximately 65 officers (Drayton, 2006). There are 18 fire departments in Coconino County working from 29 fire stations, with approximately 443 career and volunteer firefighters (Coconino County Fire Department, 2006). The Yavapai County Sheriff's Office is divided into three sections or "areas of command." There is one main office and substations in each of the three areas of command for a total of approximately nine locations (Chaney, 2006). There are 17 fire districts in Yavapai County as well as a number of additional local fire departments, many of which are volunteer fire departments (Yavapai County Fire Departments, 2006). The Maricopa County Sheriff's Office has 740 sworn officers operating out of the main office as well as 7 substations across the county (Walker, 2006). Maricopa County is home to 40 fire departments and numerous fire districts. In Pinal County, there are approximately 100 sworn officers employed throughout 8 substation locations in addition to the main office in Florence, Arizona (Rodriguez, 2006). Pinal County has 17 fire departments across the county (Pinal County Fire Departments, 2006).

Construction and operation of the proposed project is expected to have a negligible impact on public services. As previously discussed, some employees would move their families into the area during construction and enroll their children into area schools. Based on an average scenario, as many as 244 additional children may be attending local schools in New Mexico and 552 additional children may be attending local schools in Arizona. However, this increase would be temporary and short term, lasting

only the duration of construction, or one school year. Short-term impacts on public services could also include the need for localized police assistance to control traffic flow during construction activities. Also, unanticipated accidents or emergencies could occur as a result of construction-related injuries. The local communities would have adequate infrastructure and community services to meet such needs. Further, under Title 49 CFR Part 192.615, Transwestern would be required to establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency.

The project impacts on Navajo Nation public services such as emergency medical services, fire and rescue, are not expected to directly impact these resources for the Native American population. All construction activities on Navajo Nation land would be associated with expansion of an existing pipeline right-of-way. Existing Navajo Nation Fire and Rescue stations in New Mexico, as supplemented by state and county resources as needed, are adequate to meet the project's construction requirements.

It is anticipated that long-term, project-related impacts on police, fire, medical, and other public services would be minimal, and the local communities have historically had adequate infrastructure and community services to meet the needs of the proposed project. Further, it is not anticipated that the project would result in additional government expenditures for public services such as road maintenance, public safety, or public utilities.

4.8.4 Transportation and Traffic

The Phoenix Expansion Project area is readily accessible by interstate highways, U.S. highways, state highways, secondary state highways, county roads, and private roads. The proposed project would cross two interstate highways; several state and U.S. highways and railroads; and numerous small, unimproved roads. The primary transportation routes in the vicinity of the San Juan Lateral Loop A in New Mexico are State Highways 64 and 44 (crossed at MPs 1.3 and 4.5, respectively) and Navajo Highway 9 (not crossed) near the San Juan Lateral Loop B. Major transportation routes in the vicinity of the Phoenix Lateral and customer laterals include Interstates 10 (crossed at MP 244.2), 40 (not crossed), and 17 (crossed at MPs 89.8, 92.6, and 93.5); and Highways 85 (crossed at MP 182.3), 89 (crossed at MP 41.7), 101 (not crossed), and 238 (crossed at MPs 207.9 and 235.5). Eight railroads would be crossed, all of which are located along the Phoenix Lateral.

Construction across roads, highways, and railroads would result in short-term impacts on public transportation while construction activities pass through the project area. Paved roads and railroads would generally be crossed by boring beneath the crossing. Boring typically requires temporary extra workspace on both sides of the crossing for excavating bore pits to the depth of the pipeline. There would be little or no disruption of traffic at road or railroad crossings that are bored. Most smaller, unpaved roads and driveways would be open cut where permitted by local authorities or landowners. The open-cut method would require temporary closure of the road to traffic and the establishment of detours. If no reasonable detour is feasible, at least one lane of the road being crossed would be kept open to traffic, except for brief periods when it is essential to close the road to install the pipeline. Most open-cut crossings would be completed and the road resurfaced in 1 or 2 days.

The movement of construction equipment, materials, and workers would result in a short-term impact on the transportation network. Impacts on local traffic levels are not expected to be significant because construction would move sequentially along the pipeline route and only one or two crews would need to be in a particular area at a particular time. Additionally, the relatively rural location of the project and the fact that the pipeline work day typically starts before and ends after the average work day would minimize traffic-related impacts.

Transwestern would be required to adhere to road weight restrictions as required by the DOT and its operating administrations, as well as any local (county) road weight restrictions. Following construction, roads used for access would be regraded and restored to original condition unless the landowner or land management agency requests otherwise.

On Forest System lands, Transwestern would implement its Forest Service Access Management Plan (see Appendix O). This plan identifies the measures that Transwestern and its construction contractors would implement to provide safe, minimal impact, and stable surface access to the project facilities. The plan outlines the access standards that would be conducted during construction, including livestock management and signage, and restoration of access roads following construction. In accordance with its Forest Service Access Management Plan, Transwestern would develop and implement a post-construction schedule of maintenance for access roads on Forest System lands. The plan does not, however, include stipulations for restricting vehicle access during construction, which may be required by the FS. In section 4.7.4.1, we have recommended that Transwestern revise its Forest Service Access Management Plan to incorporate additional information and develop and file a similar access management plan for BLM-managed lands.

Access for transporting equipment, materials, and personnel to the major aboveground facility sites would be provided by existing public roads and access roads. Construction and operations worker parking and equipment storage would be provided within the aboveground facility sites.

No significant impacts would be expected during operation of the project because there would be only minimal traffic associated with operation and maintenance of the proposed facilities.

4.8.5 Property Values

Comments were received regarding the impacts of the proposed project on property values. Transwestern currently maintains easements to operate its San Juan Lateral. Installation of Loops A and B adjacent to the existing pipeline should not change or affect the value of a property. Further, because portions of the area required to construct Loops A and B would overlap its existing easement by 25 feet, Transwestern would reduce the amount of new permanent easements or property that would need to be acquired to operate these facilities. Transwestern would, however, need to acquire temporary easements or property to construct areas where the San Juan Lateral Loops would not overlap or be adjacent to its existing easement, the proposed Phoenix Lateral, and aboveground facilities. Transwestern would also need to acquire the easements for the customer laterals.

The effect that a pipeline easement may have on property value is a damage-related issue that would be negotiated between the landowner and Transwestern during the easement acquisition process. The easement acquisition process is designed to provide fair compensation to the landowner for the right to use the property for pipeline construction and operation. Appraisal methods used to value land are based on objective characteristics of the property and any improvements. The impact a pipeline may have on the value of a tract of land depends on many factors, including the size of the tract, the values of adjacent properties, the presence of other utilities, the current value of the land, and the current land use. Subjective valuation is generally not considered in appraisals. This is not to say that the pipeline would not affect resale values. A potential purchaser of property may make a decision to purchase land based on his or her planned use, such as agricultural, future subdivision, or second home on the property in question. If the presence of a pipeline renders the planned use unfeasible, it is possible that a potential purchaser would decide not to purchase the property. However, each potential purchaser has different criteria and differing capabilities to purchase land.

The Interstate Natural Gas Association of America (INGAA) conducted a national case study to determine if the presence of a pipeline on a piece of property affected the property value or sale price of the property. The *INGAA Foundation Natural Gas Pipeline Impact Study* (2001) found that there was not a significant impact on the sale price of properties along natural gas pipelines. The study further concluded that neither the size of the pipeline (diameter) nor the product carried by a pipeline has a significant impact on sale price.

Property taxes for a piece of property are generally based on the actual use of the land. Construction of the pipeline would not change the general use of the land, but would preclude construction of aboveground structures on the permanent right-of-way. If a landowner believes that the presence of a pipeline easement reduces the value of his or her land, resulting in an overpayment of property taxes, he or she may appeal the issue of the assessment and subsequent property taxation to the local property tax agency. This is the proper forum for this issue to be addressed.

4.8.6 Tax Revenues

Construction and operation of the project would have a beneficial impact on local tax revenues (see table 4.8.6-1).

TABLE 4.8.6-1

Estimated Tax Revenues Associated with the Phoenix Expansion Project (in U.S. dollars)

	New Mexico		Arizona				
Expenditure	San Juan County	McKinley County	Yavapai County	Coconino County	Maricopa County	Pinal County	Total
Construction Taxes:							
Contractor Taxes and Insurance	1,468,869	2,061,322	9,271,914	105,965	12,980,680	4,148,519	30,037,269
Sales Tax on Locally Purchased Materials (see table 4.8.1-3)	597	508	161,750	1,849	226,450	72,094	463,248
New Mexico Gross Receipts Tax	1,262,266	2,001,516	--	--	--	--	3,263,782
Navajo Nation Taxes	16,543	386,752	--	--	--	--	403,295
New Mexico Taxes Revenues from temporary housing (rentals, hotels, motels)	129,641	137,660	--	--	--	--	267,301
Arizona Transaction Privilege Tax	--	--	4,209,805	218,909	3,439,784	1,059,324	8,927,822
Arizona Taxes Revenues from temporary housing (rentals, hotels, motels)	--	--	997,053	63,642	806,128	254,567	2,121,390
Total	2,877,916	4,587,758	14,640,522	390,365	17,453.042	5,534,504	45,484,107
Operation Taxes:							
Ad Valorem and Property Taxes	206,964	493,989	4,847,964	30,517	7,536,954	4,847,964	16,825,438

In New Mexico, the gross receipts tax is a tax applied to the entire dollar amount expended for project facilities in the state and includes engineering, survey, and materials (e.g., pipe, valves fittings). The gross receipts tax rate is 6.0625 percent for San Juan County and 6.4375 percent for McKinley County. Transwestern estimates that the revenue from this tax would be $1.3 million for San Juan County and $2.0 million for McKinley County. The sales tax rate in New Mexico is 6 percent, which

would generate a total of approximately $1,105 for San Juan and McKinley Counties for locally purchased materials. Transwestern estimates that taxes paid to the Navajo Nation would total approximately $0.4 million. The average state income tax rate that would be paid by resident (local) workers is 5 percent. Non-local workers would be subject to local income taxes.

In Arizona, the Arizona Transaction Privilege tax applies to the total contractor contract, which includes a percentage of labor and a much smaller percentage on consumables. Transwestern estimates that the Transaction Privilege tax in Arizona would generate the following revenues for the counties affected by the project:

- Yavapai County - $4.2 million;
- Coconino County - $0.2 million;
- Maricopa County - $3.4 million; and
- Pinal County - $1.1 million.

The amount of revenue expected from sales taxes on construction materials purchased locally in Arizona (8.1 percent of $710,980; see table 4.8.1-3) would be about $57,590. The average state income tax rate that would be paid by resident (local) workers is 4.72 percent. Non-local workers would be subject to local income taxes.

Transwestern estimates that during operation of the project, approximately $16.2 million would be paid in property taxes on the pipeline and associated aboveground facilities, resulting in long-term benefits to the local and regional economy. These property taxes would be paid for the life of the project.

4.8.7 Environmental Justice

Tables 4.8.7-1 and 4.8.7-2 below have been prepared to allow assessment of whether disproportionately high and adverse human health or environmental impacts would occur on minority and low-income populations as a result of authorizing the project.

TABLE 4.8.7-1

Racial/Ethnic Statistics for the Phoenix Expansion Project Area

State/County	White (%)	Black (%)	Native American & Alaska Native (%)	Asian (%)	Native Hawaiian & Other Pacific Islander (%)	Persons Reporting Some Other Race (%)	Persons Reporting Two or More Races (%)	Persons of Hispanic or Latino Origin (%) [a]
New Mexico	66.8	1.9	9.5	1.1	0.1	17.0	3.6	42.1
San Juan	52.8	0.4	36.9	0.3	0.0	6.8	2.8	15.0
McKinley	16.4	0.4	74.7	0.5	0.0	5.5	2.5	12.4
Arizona	75.5	3.1	5.0	1.8	0.1	11.6	2.9	25.3
Coconino	63.1	1.0	28.5	0.8	0.1	4.1	2.4	10.9
Yavapai	91.9	0.4	1.6	0.5	0.1	3.6	1.9	9.8
Maricopa	77.4	3.7	1.8	2.2	0.1	11.9	2.9	24.8
Pinal	70.4	2.8	7.8	0.6	0.1	15.7	2.7	29.9

[a] People who identify themselves as Hispanic or Latino may be of any race. Thus, also are included in other race categories.

Source: U.S. Census Bureau, 2000

TABLE 4.8.7-2

Economic Statistics for the Phoenix Expansion Project Area

State/County	Median Household Income (2003) ($ U.S.)	Persons Below Poverty (2003) (percent)	Households Receiving Public Assistance (2000) (percent)
New Mexico	$35,091	17.7	328,933
San Juan	$35,943	18.4	24,196
McKinley	$26,464	30.6	26,664
Arizona	$41,963	13.9	698,669
Yavapai	$35,260	12.0	19,552
Coconino	$38,980	15.6	20,609
Pinal	$37,858	14.6	27,816
Maricopa	$46,322	12.8	355,668

Source: U.S. Census Bureau, 2000

Only two of the seven counties affected by the project have lower percentages of minority populations than the state averages: Yavapai and Maricopa Counties, Arizona. Both counties in New Mexico and two out of the four counties in Arizona have a higher percentage of persons who identify themselves as American Indian or Alaskan Native. One county, Pinal County, Arizona, has a higher percentage (29.9) of persons who identify themselves of Hispanic or Latino origin than the state average (25.3). One county in New Mexico (San Juan) and one county in Arizona (Maricopa) have higher median household incomes than the state averages. Additionally, all of the counties in New Mexico and two of the four counties in Arizona have higher poverty rates than the state averages. With the exception of McKinley County, New Mexico, most of the counties affected by the project are within a relatively close range of each state's average income.

Although percent minorities and poverty rates are well above the state average in some of these areas, the pipeline once buried would have minimal impact on the environment and surrounding population of these areas. In addition, the pipeline facilities would bring economic benefits to the area where they are located via added tax revenues and jobs associated with construction and operation of the pipeline. Therefore, implementation of the Phoenix Expansion Project would not result in any disproportionately high or adverse environmental and human health impacts on minority and low-income populations.

A number of opportunities for community input into the NEPA process have been provided. The mailing list for the project was initiated when the FERC granted Transwestern's request to initiate the Pre-Filing Process on November 22, 2005. As part of the Pre-Filing Process, Transwestern mailed notification letters to landowners, government and agency officials, and the general public, without any distinction based on minority or income status, informing them about the project and inviting them to attend open houses in January and May 2006. Additionally, on February 6, 2006, the Commission issued an NOI. The NOI described the EIS process and listed the date and location of four public scoping meetings to be held in the project area in February and March 2006. The draft EIS was issued in April 2007 and the public was given 45 days to review and comment on the document in the form of written comments and at five meetings held in the project area in June 2007. Section 1.3 further describes the public notification and participation process. Section 4.9.3 and Appendix P describe the Native American consultation conducted to date for the proposed project. In accordance with a recent Final Federal Rule, published in May 2005 for Title 49 CFR Part 192, Transwestern would be required to include, in its public awareness plans, measures to prepare and distribute a comprehensive program that includes activities to advise affected municipalities, school districts, businesses, and residents of pipeline facility locations.

In summary, information about the Phoenix Expansion Project has been readily available to the public and no disproportionately high and adverse human health or environmental effects on minority and/or low-income communities have been identified. Furthermore, project construction would provide some short-term job opportunities. The only long-term socioeconomic effect of the project is likely to be beneficial, based on the increase in tax revenues that would accrue to the counties affected by the project (see section 4.8.6).

4.8.8 No Action Alternative

Under the No Action Alternative, the FERC would deny Transwestern's application for a Certificate and the BLM would deny Transwestern's application for a Right-of-Way Grant for the portion of the project on federal lands. The No Action Alternative means that the project would not go forward and the project-related facilities would not be installed. Accordingly, none of the potential environmental impacts on socioeconomic resources and transportation identified for the construction and operation of the proposed project would occur.

4.9 CULTURAL RESOURCES

Section 106 of the NHPA, as amended, requires that federal agencies take into account the effects of their undertakings (including the issuance of permits or Certificates) on properties listed on, or eligible for listing on, the National Register of Historic Places (NRHP) and to provide the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the undertaking. Transwestern, as a non-federal party, is assisting the FERC in meeting its obligations under section 106 and the implementing regulations in Title 36 CFR Part 800.

4.9.1 Results of Cultural Resources Survey

Transwestern completed cultural resources investigations of most areas affected by its proposed project in 2003 and 2006. The investigations included literature reviews and site file searches and a pedestrian survey by qualified archaeologists of areas where ground disturbance associated with the proposed project could occur. These surveys identified a total of 221 sites.

Along the San Juan Lateral Loops in New Mexico, Transwestern surveyed a 200- to 210-foot-wide corridor on BLM-managed land, and a 150-foot-wide corridor on New Mexico State Trust, BIA (allotted), private, and Navajo Nation lands. Along the Phoenix Lateral and customer laterals in Arizona, Transwestern surveyed a 250-foot-wide corridor, with the exception of one area between MPs 125.0 and 137.0 of the Phoenix Lateral where a 360-foot-wide corridor was surveyed. The survey corridor included areas where extra workspace would be needed during construction. In addition, the project surveys included access roads, which consisted of a 200-foot-wide corridor in the Kaibab National Forest and a 100-foot-wide corridor in all other locations. Surveys have also been completed at the 11 meter station sites, other associated aboveground facility sites (e.g., taps, pig launchers and receivers, valves), pipe storage and contractor yards, and borrow/disposal areas.

San Juan Lateral Loops

Between August and November 2003, Transwestern completed a pedestrian survey along 100 percent of the right-of-way, temporary extra workspaces, and access roads in the New Mexico area of potential effect (APE) for the San Juan 2005 Expansion Project (FERC Docket No. CP04-104-000). The results of the 2003 surveys are discussed in a report entitled *A Cultural Resource Survey for the Proposed Transwestern Pipeline San Juan Expansion Project, in the Navajo Nation, and San Juan, McKinley, Socorro, and Torrance Counties, New Mexico* (Howell et al., 2004), which was included as part of Transwestern's FERC application. In June 2004, Transwestern provided this cultural resources survey report for review and comment to the New Mexico SHPO, the BLM, and the Navajo Nation. Transwestern received concurrence with the report's recommendations from the New Mexico SHPO on November 23, 2004. The Navajo Nation indicated that the results from the 2003 survey for the San Juan 2005 Expansion Project will be used for its review of the pipeline corridor for the Phoenix Expansion Project.

The APE defined for the Phoenix Expansion Project is within the majority of the area surveyed in 2003 as part of the previous project. In May and June 2006, Transwestern conducted additional cultural resources surveys for changes to the previously surveyed pipeline route, new access roads, and the right-of-way on BLM-managed land. The results of the 2003 surveys relevant to the current project along with the 2006 surveys are discussed in a report entitled *A Cultural Resource Survey for the Proposed Transwestern Pipeline Phoenix Expansion Project, in the Navajo Nation, and San Juan and McKinley Counties, New Mexico* (Howell, 2006a), which was included as part of Transwestern's FERC application. This report was submitted to the New Mexico SHPO and the Navajo Nation. Subsequent to this report, Transwestern prepared a separate report for the BLM that summarized the new survey that was completed

on BLM-managed land entitled *A Class III Cultural Resource Survey of BLM Lands on Loop A of the Proposed Phoenix Expansion Project, San Juan County, New Mexico* (Howell, 2006b). This report was provided to the BLM, and the BLM commented on the report on January 10, 2007. Based on the BLM's comments, Transwestern revised this report and filed the revised version with the FERC. In late 2006, Transwestern completed additional surveys and provided the results of these surveys in a report entitled *A Cultural Resource Survey of 13 Extra Workspaces, One Mile of Allotted Land and a Re-Route for the Transwestern Pipeline Phoenix Expansion Project in McKinley and San Juan Counties, New Mexico* (Dawson et al., 2007). Transwestern filed this report with the FERC and provided it to the New Mexico SHPO and the Navajo Nation for review and comment.

The 2003 and 2006 surveys of the San Juan Lateral Loops identified 29 cultural resources. These include 19 prehistoric sites, 6 historic sites, and 4 sites with both prehistoric and historic components. Of these, 21 sites are recommended as eligible for listing on the NRHP, 7 sites require testing to determine their eligibility, and 1 site has been determined to be not eligible for listing on the NRHP. In general, Transwestern has indicated that the 28 sites that are recommended as eligible for listing or are unevaluated can possibly be avoided by construction activities. If avoidance is not feasible, testing and/or archival research should be conducted to determine the potential project impacts and the extent of subsurface deposits. No additional work is recommended for sites that are recommended as not eligible.

Additional testing and completion of outstanding cultural resources surveys began in spring 2007 and are ongoing. Transwestern has stated that reports documenting the results of the testing and surveys would be filed when they are complete.

Phoenix Lateral and Customer Laterals

Between January and April 2006, Transwestern completed a pedestrian survey of 100 percent of the right-of-way, and nearly all temporary extra workspaces and access roads in the Arizona APE for the Phoenix Expansion Project. The results of the surveys are discussed in a report entitled *A Cultural Resource Survey for the Proposed Transwestern Pipeline Phoenix Expansion Project in Yavapai, Coconino, Maricopa, and Pinal Counties, Arizona* (Howell et al., 2006). The survey report provides the results of literature reviews, site file searches, and the cultural resources inventory in Arizona.

Transwestern provided its draft Arizona cultural resources survey report for review and comment to the Arizona SHPO, the BLM, the FS (Kaibab and Prescott National Forests), and the ASLD in April 2006. Comments on the draft Arizona survey report were received from the Arizona SHPO, the BLM, and the FS in May and June 2006. In September 2006, Transwestern submitted a revised Arizona cultural resources survey report that incorporated the Arizona SHPO's, the BLM's and the FS' comments to the same agencies that received the draft report. All of these agencies provided comments between October and December 2006. In April 2007, Transwestern submitted a second revised report to the Arizona SHPO, the BLM, the FS (Kaibab and Prescott National Forests), the ASLD, and Native American tribes. The Arizona SHPO, the ASLD, the BLM, the Prescott National Forest, and the Navajo Nation provided comments on the revised report. Transwestern also prepared an addendum report documenting survey of extra workspaces entitled *Addendum 1 to the Cultural Resource Survey for the Proposed Transwestern Pipeline Phoenix Expansion Project in Yavapai, Coconino, Maricopa, and Pinal Counties, Arizona* (Howell and Minjares, 2007). Transwestern provided this report to the Arizona SHPO, the BLM, the FS (Kaibab and Prescott National Forests), the ASLD, and Native American tribes. To date, no comments have been received on the addendum report.

Surveys of the Phoenix Lateral and customer laterals identified 192 cultural resources. These include 89 prehistoric sites, 31 historic sites, 47 irrigation ditches, 5 multicomponent (prehistoric and historic) sites, 5 railroads, 5 roads, 3 mines/mine features, 1 highway, 1 powerline, 1 levee, 1 historic

habitation, 1 recent habitation, 1 trail, and 1 possible structure. Of these, 54 sites are recommended as eligible for listing on the NRHP, 6 sites require testing to determine their eligibility, 130 sites are recommended as not eligible for listing on the NRHP, and 2 sites are outside the construction work area. Transwestern has indicated that the sites that are recommended as eligible for listing or are unevaluated can possibly be avoided by construction activities. If avoidance is not feasible, testing and/or archival research should be conducted to determine the potential project impacts and the extent of subsurface deposits. No additional work is recommended for 127 of the sites that are recommended as not eligible for listing on the NRHP, as well as the 2 sites that are outside the construction work area. At the request of the Prescott National Forest heritage personnel, Transwestern has recommended additional archival research at one site (a historic road) that is recommended not eligible for listing on the NRHP. Additional archival research at one other site that is recommended not eligible for listing on the NRHP (a powerline) is recommended to better understand the site in relation to rural electrification of the area. The remaining site that is recommended not eligible for listing on the NRHP includes a possible pet burial. Transwestern recommends monitoring at this site during ground-disturbing activities.

Several areas along the Phoenix Lateral and customer laterals that would be required for construction have not yet been surveyed. The majority of these areas include temporary extra workspaces. Also, several sites that are recommended as eligible for listing on the NRHP or are unevaluated require testing if avoidance is not feasible. Additional testing and completion of outstanding cultural resources surveys began in spring 2007 and are ongoing. Transwestern has stated that reports documenting the results of the testing and surveys would be filed when they are complete. In addition, as discussed in section 3.5.2.4, cultural resources surveys for the Waste Management Arizona Variation have not been completed.

Aboveground Facilities

The Bloomfield Compressor Station and Seligman Compressor Station No. 1 are existing facilities that have been previously disturbed. The proposed pipeline modifications would occur within the existing fencelines and would not result in any additional ground disturbance. Therefore, no impacts on cultural resources are expected to occur.

The 11 proposed meter station sites, and sites for the taps, pig launchers, pig receivers, valves, and remote blowdown valves were surveyed during 2003 and 2006 as part of the pipeline surveys discussed above.

Access Roads, Pipe Storage and Contractor Yards, and Borrow/Disposal Areas

Transwestern has identified 160 access roads that would require modifications during construction. Thirty-six of these are located in New Mexico and 124 are located in Arizona. Transwestern conducted cultural resources surveys of all of these access roads in 2003 and 2006. Cultural resources sites that were recorded along access roads are included in the site totals discussed above and the results of these surveys are included in the previously discussed New Mexico and Arizona reports. As with cultural resources identified within the construction corridor, Transwestern would attempt to avoid sites that are recommended as eligible for listing on the NRHP or remain unevaluated. If avoidance is not feasible, testing and/or archival research should be conducted to determine the potential project impacts and the extent of subsurface deposits.

Transwestern conducted surveys of the majority of the proposed pipe storage and contractor yards and borrow/disposal areas in 2003 and 2006. The results of these surveys are included in the previously discussed New Mexico and Arizona reports. Two cultural resources were identified during these surveys. One site is recommended as eligible for listing on the NRHP and one site requires further testing to

determine its eligibility status. As with cultural resources identified within the construction corridor, Transwestern would attempt to avoid sites that are recommended as eligible or remain unevaluated. If avoidance is not feasible, testing and/or archival research should be conducted to determine the potential project impacts and the extent of subsurface deposits.

The Ash Fork Pipe Storage Yard at MP 0.0 and a portion of the Drake Pipe Storage Yard near MP 16.5 has not been surveyed for cultural resources. The report of those surveys has not yet been filed.

4.9.2 Unanticipated Discovery Plans

Transwestern provided its Unanticipated Discovery Plans to be used in the event that cultural resources or human remains are discovered during construction. Transwestern's Unanticipated Discovery Plans include contact information for its cultural resources consultant and specify who would be responsible for contacting the FERC in the event of a discovery. The plans provide for the protection in place of any unanticipated discoveries until appropriate evaluation and consultation have occurred. In New Mexico, Transwestern's consultant would also contact the Navajo Nation Tribal Historic Preservation Officer (THPO) of the Navajo Nation Historic Preservation Department (NNHPD), the BLM, and/or the New Mexico SHPO via telephone and follow-up with written confirmation. In Arizona, the FERC would be responsible for subsequently contacting the Arizona SHPO and any other agency having jurisdiction over the land (e.g., BLM, FS, BOR) via telephone and following up with written confirmation. In the event that the discovery is determined to be of NRHP significance, a treatment plan (such as avoidance, monitoring, and/or scientific data recovery) would be developed and implemented in consultation with the appropriate parties. In addition, a treatment plan would be created for the unanticipated discovery of Native American human remains and funerary objects. Specific provisions for treatment and disposition of Native American human remains and funerary objects would be determined on a case-by-case basis in consultation with the appropriate SHPO, the landowner or land management agency, the FERC, the culturally affiliated tribe(s), and lineal descendants. Transwestern's Unanticipated Discovery Plans are included as attachments to the Programmatic Agreement (PA), which has been provided to the consulting parties for their signatures in order that it be executed pursuant to Title 36 CFR Part 800.6(b)(iv) (see section 4.9.4).

4.9.3 Native American Consultation

In order to comply with existing federal legislation, and as required by the various agencies involved, Transwestern's cultural resources investigations included Native American consultation. The consultation included: 1) compliance with the requirements of the non-Navajo Nation parties and the New Mexico and Arizona SHPOs (involving contact with Native American tribes); and 2) compliance with the Navajo Nation-specific requirements for consultation (requiring ethnographic interviews on Navajo Nation lands).

As part of the Commission's Pre-Filing Process approved on November 22, 2005, Transwestern sent letters between January and August 2006 that introduced its project to and requested information from 36 Native American tribes and Native American organizations. Table P-1 in Appendix P lists the Native American tribes, with the exception of the Navajo Nation, which is a cooperating agency for this project, that have been contacted regarding the proposed project and summarizes concerns they have raised. These Native American tribes were identified by Transwestern and its cultural resources consultant as having traditional territories that would be crossed by the project or had been identified by the New Mexico or Arizona SHPOs, the BIA, or another knowledgeable party as having a potential cultural resources concern in the project area.

As of November 2006, 13 tribes have requested copies of the cultural resources survey reports: Ak-Chin Indian Community Council, Comanche Indian Tribe, Fort McDowell Yavapai Indian Community, Gila River Indian Community, Hopi Tribe, Hualapai Tribe, Pueblo of Acoma, Pueblo of Laguna, Pueblo of Zuni, Salt River Pima-Maricopa Indian Community, Shivwits Band of the Paiute, Tohono O'odham Nation, and Yavapai-Prescott Indian Tribe. Transwestern provided the requested report copies in July and September 2006 and February 2007. Transwestern also sent draft copies of its ethnographic report to the Hualapai Tribe and Yavapai-Prescott Indian Tribe on September 14, 2006 (see section 4.9.3.1). In addition, the tribes relayed the following:

- the Ak-Chin Indian Community Council and Tohono O'odham Nation claimed descent from prehistoric residents of the Phoenix area;
- the Gila River Indian Community requested information on all sites south of Township 13 North;
- the Hopi Tribe claimed cultural affiliation to prehistoric cultural groups in both New Mexico and Arizona and is interested in any archaeological information;
- the Hualapai Tribe is concerned about resources in the project area, which it also claims as traditional territory;
- the Shivwits Band of the Paiute indicated that its forebearers could have gone as far south as Phoenix, but only sporadically; and
- the Yavapai-Prescott Indian Tribe is concerned about resources in the Prescott area, which it claims as traditional territory.

To date, eight tribes have expressed no specific concerns regarding the project: Chemehuevi Tribal Council, Havasupai Tribal Council and Community, Kiowa Tribe of Oklahoma, Ohkay Owingeh, Pueblo of Isleta, Tohono O'odham Nation (although still requested report copies), Tonto Apache Tribe, and Yavapai-Apache Nation. Five tribes have requested to be kept informed of the project and findings during cultural resources surveys: Comanche Indian Tribe, Fort McDowell Yavapai Indian Community, Pueblo of Acoma, Pueblo of Laguna, and Shivwits Band of the Paiute.

Transwestern and the FERC have been in regular communication with the NNHPD throughout the project. On February 23, 2006, the FERC and Transwestern met with representatives of the Navajo Nation to discuss the project and the tribe's issues and concerns. On April 24, 2006, Transwestern conducted a drive-through of the portions of the project on Navajo Nation lands with a representative of the NNHPD. On May 31, 2006, Transwestern visited certain areas of the proposed route with representatives from the Navajo Nation Traditional Cultural Properties Program to determine if certain geographic features in the project area were Traditional Cultural Properties (TCPs).

The Commission's NOI dated February 6, 2006 was sent to 175 individuals from 22 Native American tribes and the Navajo Nation. The NOI described the proposed project and the environmental review process, listed the potential environmental effects, and requested tribal comments on issues and concerns that should be addressed in the EIS. The FERC staff also sent consultation letters on June 9, 2006 to 11 tribes. The mailing list for the consultation letter was developed in consultation with the BIA. These consultations were conducted in accordance with section 101(d)(6)(B) of the NHPA regarding consultation with Native American tribes. The letter identified the FERC as the lead federal agency, as well as the cooperating federal agencies for the project, and invited the tribes to attend a meeting on June 28, 2006. The purpose of the meeting was two-fold: 1) to consult with applicable Native American tribes

regarding tribal issues and concerns relative to the proposed project area; and 2) to obtain the tribes' comments regarding the Phoenix Expansion Project and its potential effects on religious or cultural properties that the tribes may consider significant, in accordance with Title 36 CFR Part 800.2(c)(2). As a follow-up to these letters, FERC representatives contacted via telephone additional representatives from the 11 tribes that were invited to the June 28, 2006 meeting (see Appendix P).

The June 28, 2006 meeting was attended by six representatives from four tribes (Yavapai-Prescott Indian Tribe, Gila River Indian Community, Salt River Pima-Maricopa Indian Community, and Hualapai Tribe), as well as representatives from the BIA, the Inter Tribal Council of Arizona, the BLM, and Transwestern. The meeting included discussions of the cultural resources survey procedures, results, and eligibility recommendations for possible listing of cultural resources sites on the NRHP; the PA process and the tribes' role in that process; and environmental monitoring during project construction. Several tribes requested copies of the draft and final cultural resources survey reports when available. Tribal representatives voiced their concerns regarding potential project impacts on TCPs. Concerns were also expressed regarding potential impacts on biological resources near Hell Canyon, threatened and endangered species at the Verde River crossing, and vegetation. Subsequent to the June 28, 2006 meeting, Transwestern and FERC representatives followed up with the tribes that had not yet commented on the project (see Appendix P). The concerns raised by Native American tribes were addressed in the draft EIS.

The draft EIS was sent to 129 individuals from 36 Native American tribes and the Navajo Nation, including all of the tribes discussed above and listed in Appendix P. One Native American tribe, the Hopi Tribe, submitted comments on the draft EIS. The Hopi Tribe's comments are available for viewing on the FERC's Internet website (http://www.ferc.gov)[9] and included in Volume II of this final EIS with the Agency Staffs' response to each comment.

On June 12, 2007, the FERC held a public meeting to receive comments on the draft EIS in Crownpoint, New Mexico on the Navajo Nation reservation. A transcript was prepared from the meeting that is available for viewing on the FERC's Internet website and included in Volume II of this final EIS with the Agency Staffs' response to each comment. The final EIS was sent to the same tribes as the draft EIS.

Transwestern is continuing to work with the Native American tribes and has stated that it intends to continue consultations and negotiations throughout the environmental review and construction phase of the project. The Agency Staffs believe that Transwestern's continued cooperation with these tribes, in addition to our recommendations and continuing consultations, would address tribal issues associated with the proposed project.

4.9.3.1 Ethnographic Studies and Traditional Cultural Properties

Portions of the San Juan Lateral Loops are located on Navajo Nation land. In order to comply with *The Navajo Nation Policy to Protect Traditional Cultural Properties*, Transwestern completed ethnographic work as part of the San Juan 2005 Expansion Project. The Navajo Nation Chapter Houses adjacent to, or crossed by, the proposed project right-of-way were initially contacted by Transwestern representatives during August and September 2003. Subsequently, Transwestern's cultural resources consultant (ethnologists) revisited the Chapter Houses during September and October 2003. The purpose of these meetings was to identify any culturally sensitive locations (such as burial or ceremonial sites) along the proposed right-of-way, as well as to identify the families who hold leases and/or live along the

[9] Using the "eLibrary" link, select "General Search" from the eLibrary menu and enter the docket number excluding the last three digits in the "Docket Number" field (i.e., CP06-459). Be sure to select an appropriate date range.

right-of-way. Transwestern held additional meetings at the Chapter Houses between November 6 and 21, 2003 to discuss identified cultural resources concerns. Subsequent to these Chapter House visits, and between September 17 and February 20, 2004, Transwestern's ethnologists conducted ethnographic interviews with relevant family members to identify sensitive sites along the proposed route.

As a result of these consultations, meetings, and interviews, 12 Sensitive Cultural Manifestation sites were identified. These sites are also referred to as TCPs. These include nine burial sites (two of which are also ceremonial sites), one ceremonial site, and two resource gathering areas. The locations of the burial sites were visited by Transwestern's ethnologists along with the next of kin. Transwestern subsequently completed the required Navajo Nation *Identification of Gravesites, Human Remains, and Funerary Items and Statement of Wishes* forms, which were signed by the next of kin. Transwestern then filed these forms with the Navajo Nation. Thus, it is believed that construction of the Phoenix Expansion Project in New Mexico would conform to *The Navajo Nation Policy for the Protection of Jishchaa': Gravesites, Human Remains, and Funerary Items* and the wishes of the next of kin, which would result in avoidance of the sites.

Transwestern has also agreed to design the project facilities such that impacts on the ceremonial sites would be limited to the extent possible. Additionally, Transwestern has stated that it would conform to the legal requirements of the Navajo Nation, as specifically outlined in *The Navajo Nation Policy to Protect Traditional Cultural Properties*.

Transwestern continues to conduct ethnographic work and contacts with the Lands Officials for the Chapter Houses for inspection of any new right-of-way, temporary extra workspaces, and access roads identified, and would conduct follow-up meetings with identified families and next of kin as necessary. The results of this ethnographic work are summarized in a confidential ethnographic report on file with the NNHPD. Due to its sensitive nature, and in conformance with Navajo Nation law and regulation, this report is available only upon request to and approval by the NNHPD.

Transwestern also completed an ethnographic review and consultation report for the remaining Native American tribes that might have an interest in the project area. The report includes a description of the traditional and current Native American tribes that occupy the area, summarizes the consultations that have occurred to date between Transwestern and the tribes, and provides recommendations for future project consultations. Based on interest from the tribes, Transwestern would continue consultations with the Ak-Chin Indian Community Council, the Gila River Indian Community, the Hopi Tribe, the Hualapai Tribe, the Salt River Pima-Maricopa Indian Community, the Yavapai-Prescott Indian Tribe, and the Pueblo of Zuni. Continued consultation may include additional meetings, field visits, and further discussions regarding questions and concerns of the tribes. Transwestern would also continue to provide project status information and copies of the final reports to the Comanche Indian Tribe, the Fort McDowell Yavapai Indian Community, the Pueblo of Acoma, the Pueblo of Laguna, the Shivwits Band of the Paiute, and the Tohono O'odham Nation.

4.9.4 General Impact and Mitigation

In order to complete the process of complying with section 106 of the NHPA for the Phoenix Expansion Project, Transwestern would need to conduct cultural resources surveys along portions of the proposed pipeline loops and laterals where project design changes have occurred, additional workspace is required, or landowner permission has not been obtained. Transwestern would also need to complete cultural resources surveys along the Waste Management Arizona Variation. In addition, 75 cultural resources sites (21 in New Mexico and 54 in Arizona) are recommended as eligible for listing on the NRHP and testing is recommended at 13 cultural resources sites (7 in New Mexico and 6 in Arizona) to determine their eligibility status. Once cultural resources surveys and evaluations are complete, the

FERC, in consultation with the New Mexico and Arizona SHPOs, the BLM, the FS, the BOR, the BIA, the Navajo Nation, and Native American tribes if applicable, would make determinations of NRHP eligibility and project effects. For affected TCPs, the appropriate Native American tribes would also be consulted. If a property would be affected, mitigation would be proposed. Mitigation may include, but not be limited to, one or more of the following measures: 1) avoidance through the use of realignment of the pipeline, relocation of temporary extra workspace, or changes in construction and/or operational design; 2) data recovery, which may include systematic professional excavation of an archaeological site or the preparation of photographic and/or measured drawings documenting standing structures; and 3) the use of landscaping or other techniques that would minimize or eliminate effects on the historic setting or ambience of standing structures.

The FERC, as the lead federal agency, has complied with section 106 of the NHPA and the implementing regulations in Title 36 CFR Part 800 and notified the ACHP on October 30, 2006 of adverse effects to afford it an opportunity to participate in consultation. Based on consultations with the THPOs and the SHPOs, and staff of other federal agencies, the FERC has determined that the project would have an effect on historic properties. Therefore, a PA has been prepared for the project and provided to the consulting parties (i.e., the Arizona SHPO, the New Mexico SHPO, the NNHPD, the BIA, the ASLD, Arizona State Museum, the FS, the BLM, Transwestern, Ak-Chin Indian Community Council, Fort McDowell Yavapai Indian Community, Gila River Indian Community, Hopi Tribe, Hualapai Tribe, Pueblo of Zuni, Salt River Pima-Maricopa Indian Community, and Yavapai-Prescott Indian Tribe) for their signatures in order that it be executed pursuant to Title 36 CFR Part 800.6(b)(iv). The PA includes copies of Transwestern's Unanticipated Discovery Plans for New Mexico and Arizona, which describe the procedures that would be implemented in the event human remains are discovered. In addition, the PA includes provisions for monitoring in the vicinity of artifact scatters, features, cultural properties, and archaeological sites during construction; curation of artifacts; and dissemination of information. The PA also provides for developing and implementing treatment plans to minimize effects on historic properties, and completing studies to identify and to evaluate these effects. Once a treatment plan is approved by the consulting parties to the PA, Transwestern would implement the specific treatment measures before notice to proceed with project construction is authorized in any given area. Implementation of treatment would occur only after certification of the proposed project. The FERC would ensure that treatment and the terms of the PA are carried out.

To ensure that the FERC's responsibilities under the NHPA and its implementing regulations are met, **the FERC staff recommends that:**

- **Transwestern shall defer implementation of any treatment plans/mitigation measures (including archaeological data recovery), construction of facilities, and use of all staging, storage, or temporary work areas and new or to-be-improved access roads <u>until</u>:**

  a. Transwestern prepares and files with the Secretary, and submits to the consulting parties, as appropriate, any outstanding cultural resources reports, any cultural resources reports that were revised to address agency comments, and necessary treatment plans, including those for the Waste Management Arizona Variation;

  b. Transwestern files with the Secretary the comments of the consulting parties on all cultural resources reports and plans submitted for review; and

c. the Director of OEP reviews and approves all cultural resources reports and plans, and notifies Transwestern in writing that treatment plans/mitigation measures may be implemented or construction may proceed.

All material filed with the Secretary containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "CONTAINS PRIVILEGED INFORMATION – DO NOT RELEASE."

4.9.5 No Action Alternative

Under the No Action Alternative, the FERC would deny Transwestern's application for a Certificate and the BLM would deny Transwestern's application for a Right-of-Way Grant for the portion of the project on federal lands. The No Action Alternative means that the project would not go forward and the project-related facilities would not be installed. Accordingly, none of the potential environmental impacts on cultural resources identified for the construction and operation of the proposed project would occur.

4.10 AIR QUALITY AND NOISE

4.10.1 Air Quality

4.10.1.1 Existing Air Quality

Climatic Conditions

Climatic conditions in the New Mexico portion of the project are characterized by moderate temperatures and a relatively low amount of precipitation, with larger amounts of precipitation usually seen from July to October. The Arizona portion of the project would be in two distinct climatic regions. The northern Arizona portion of the project would extend through areas experiencing lower temperatures and more frequent and plentiful rainfall, while the southern Arizona portion of the project would extend through areas characterized by desert conditions, with high temperatures and little precipitation.

National Ambient Air Quality Standards and Background Air Quality

Ambient air quality is protected by federal, state, and local regulations. The EPA has established National Ambient Air Quality Standards (NAAQS) for criteria pollutants for the purpose of protecting human health (primary standards) and public welfare (secondary standards). These criteria pollutants are: nitrogen dioxide (NO_2), carbon monoxide (CO), ozone, SO_2, lead (Pb), particulate matter having an aerodynamic diameter of 10 microns or less (PM_{10}), and particulate matter having an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$).

In addition to the federal NAAQS, state ambient air quality standards have been established for New Mexico and Arizona. New Mexico has adopted ambient air quality standards that are stricter than the federal standards and also include standards for hydrogen sulfide (H_2S) and total reduced sulfur. The Arizona ambient air quality standards are the same as the federal standards.

The existing ambient air concentrations in the project area were evaluated by reviewing representative air monitoring data from San Juan County in New Mexico and Yavapai, Coconino, Maricopa, and Pinal Counties in Arizona for the years 2001 through 2005. Table 4.10.1-1 lists the federal and state ambient air quality standards and the background values estimated for each of the pollutants and averaging periods. These monitoring data show that none of the existing ambient air concentrations in New Mexico exceed the federal or state ambient air quality standards, while the existing ambient air concentrations in Arizona for ozone for the 8-hour averaging period and for PM_{10} for the 24-hour and annual averaging periods exceed their respective federal and state ambient air quality standards.

Air Quality Control Regions and Attainment Status

The Air Quality Control Regions (AQCRs) were established by the EPA and local agencies in accordance with section 107 of the CAA, as a means to implement the CAA and comply with the NAAQS through State Implementation Plans (SIPs). The AQCRs are intra- and interstate regions such as large metropolitan areas where the improvement of the air quality in one portion of the AQCR requires emission reductions throughout the AQCR. Each AQCR, or portion thereof, is designated as attainment (areas in compliance with the NAAQS), unclassifiable, maintenance, or nonattainment (areas not in compliance with the NAAQS). Areas where the ambient air pollutant concentration is determined to be below the applicable ambient air quality standard are designated attainment. Areas where no data are available are designated unclassifiable. Areas where the ambient air concentration is greater than the applicable ambient air quality standard are designated nonattainment. Areas that have been designated nonattainment but have since demonstrated compliance with the ambient air quality standard(s) are designated maintenance for that pollutant. Maintenance areas are treated similar to attainment areas for the permitting of stationary sources; however, specific provisions may be incorporated through the state's

approved maintenance plan to ensure that the air quality would remain in compliance with the ambient air quality standard(s) for that pollutant.

TABLE 4.10.1-1

Federal and State Air Quality Standards and Existing Air Quality in the Phoenix Expansion Project Area

Pollutant	Averaging Period	Federal/Arizona Primary Standards	Federal/Arizona Secondary Standards	New Mexico Standards	Highest Background Values (Arizona)[a]	Highest Background Values (New Mexico)[b]
O_3	8-Hour	0.08 ppm	Same as Primary	-	0.090 ppm [c]	0.076 ppm [c]
PM_{10}	24-Hour	150 μg/m^3	Same as Primary	150 μg/m^3 [d]	276 μg/m^3 [e]	41 μg/m^3 [e]
	Annual AM [f]	50 μg/m^3	Same as Primary	60 μg/m^3 [d]	94 μg/m^3 [f]	20 μg/m^3 [f]
	7 Day Average	-	-	110 μg/m^3 [d]	NA	NA
	30 Day Average	-	-	90 μg/m^3 [d]	NA	NA
$PM_{2.5}$	24-Hour	65 μg/m^3	Same as Primary	-	42 μg/m^3 [g]	17 μg/m^3 [g]
	Annual AM[f]	15 μg/m^3	Same as Primary	-	27 μg/m^3 [f]	6.9 μg/m^3 [f]
Pb	Quarter	1.5μg/m^3	Same as Primary	-	NA	NA
CO	1-Hour	35 ppm	-	13.1 ppm	NA	NA
	8-Hour	9 ppm	-	8.7 ppm	NA	NA
NO_2	24-Hour	-	-	0.10 ppm	NA	NA
	Annual AM[f]	0.053 ppm	Same as Primary	0.05 ppm	0.037 ppm [f]	0.014 ppm [f]
SO_2	1-Hour	-	-	-	NA	NA
	3-Hour	-	0.5 ppm	-	0.016 ppm [c]	0.079 ppm [c]
	24-Hour	0.14 ppm	-	0.10 ppm	0.010 ppm [c]	0.016 ppm [c]
	Annual AM[f]	0.030 ppm	-	0.02 ppm	0.003 ppm [f]	0.004 ppm [f]
H_2S	1-Hour	-	-	0.010 ppm	NA	NA
Total Reduced Sulfur	½-Hour	-	-	0.003 ppm	NA	NA

[a] Background value is the highest value reported by the U.S. Environmental Protection Agency (EPA) for the years 2001 through 2005 for monitors located in Yavapai, Coconino, Maricopa, and Pinal Counties, Arizona.
[b] Background value is the highest value reported by the EPA for the years 2001 through 2005 for monitors located in San Juan County, New Mexico.
[c] Fourth highest value.
[d] New Mexico standard is for Total Suspended Particulate.
[e] Second highest value.
[f] Arithmetic mean.
[g] 98th percentile value.
Source: EPA, 2006

O_3 = Ozone
PM_{10} = Particulate matter having an aerodynamic diameter of 10 microns or less
$PM_{2.5}$ = Particulate matter having an aerodynamic diameter of 2.5 microns or less
Pb = Lead
CO = Carbon monoxide
NO_2 = Nitrogen dioxide
SO_2 = Sulfur dioxide
H_2S = Hydrogen sulfide
NA = No data available
- = Standard not promulgated
ppm = Parts per million
μg/m^3 = Micrograms per cubic meter

All of the project facilities in New Mexico would be located in areas designated as attainment or unclassifiable with respect to the NAAQS. However, air quality monitors in San Juan County, New Mexico recorded ozone concentrations that approached the federal 8-hour standard. As such, the NMED; the cities of Aztec, Bloomfield, and Farmington; San Juan County; and the EPA voluntarily entered into an Early Action Compact (EAC). The EAC requires implementation of a Clean Air Action Plan,

including emission control measures to ensure that San Juan County is compliant with the federal 8-hour ozone standard. The EAC will expire on December 31, 2007, at which time the area will be either compliant or non-compliant with the federal 8-hour ozone standard. The construction of the proposed facilities in San Juan County (the San Juan Lateral Loop A) would occur after the expiration of the EAC. Transwestern has committed to reviewing the attainment status for ozone in San Juan County before construction of Loop A. If San Juan County is found to be in nonattainment, Transwestern proposes to work with state officials to develop an appropriate mitigation plan to minimize NO_x and volatile organic compounds (VOC) emissions during project construction (NO_x and VOC are considered ozone precursor pollutants).

The project facilities in Yavapai County and Coconino County, Arizona would be located in areas designated as attainment or unclassifiable with respect to the NAAQS. Portions of Maricopa County and Pinal County, Arizona are designated as nonattainment or maintenance areas. The project facilities in Maricopa County would be located in areas that are designated as nonattainment for ozone, serious non-attainment for PM_{10}, and a maintenance area for CO. The project facilities in Pinal County would not be located in areas designated as nonattainment.

4.10.1.2 Air Quality Regulatory Requirements

The proposed project is potentially subject to a variety of federal, state, and local regulations pertaining to the construction and operation of air emission sources. The CAA, 42 USC 7401 et seq., as amended in 1977 and 1990, and Title 40 CFR Parts 50 through 99 are the basic federal statutes and regulations governing air pollution in the United States. The NMED is the governing agency for the portion of the project located in New Mexico, and the ADEQ, the Maricopa County Air Quality Department, and the Pinal County Air Quality Control District are the governing agencies for the portion of the project located in Arizona. The Maricopa Association of Governments (MAG) is responsible for air quality planning in the Phoenix metropolitan area.

The Phoenix Expansion Project would include modifications at the existing Bloomfield Compressor Station and Seligman Compressor Station No. 1, neither of which would involve new compression. As a result, no air emissions requiring a permit would occur during operation. A small amount of emissions would be generated by the operation and maintenance of the odorant facility; however, the emissions resulting from the facility are considered insignificant activities and would fall below applicable permitting thresholds. Therefore, none of the project facilities would be considered stationary sources.

Federal Air Quality Requirements

Prevention of Significant Deterioration and Nonattainment New Source Review – Ambient air quality is protected by the EPA's Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR) programs. The PSD regulations apply to new major stationary sources or major modifications to stationary sources located in attainment areas. The Nonattainment NSR regulations apply to new or modified stationary sources located in nonattainment areas. The PSD regulations, as codified in Title 40 CFR Part 52.21, define a major source or major modification as:

- a source with a potential-to-emit (PTE) of more than 100 tons per year (tpy) of any criteria pollutant for a facility that is one of the 28 industrial source categories listed in Title 40 CFR Part 52.21(b)(1)(i)(a);

- a source with a PTE of more than 250 tpy of any criteria pollutant for a facility that is not one of the 28 industrial source categories listed in Title 40 CFR Part 52.21(b)(1)(i)(a);

- a modification to an existing major source that results in a net emissions increase greater than the PSD significant emission rate specified in Title 40 CFR Part 52.21 (b)(23)(i); or

- an existing minor source proposing a modification that is major by itself.

The Nonattainment NSR/PSD requirements apply to stationary sources. The proposed project would not have any stationary source emissions associated with its operation; therefore, the project is not subject to the Nonattainment NSR/PSD requirements.

Other federal regulations (e.g., the New Source Performance Standards, the National Emission Standards for Hazardous Air Pollutants (HAPs), and Title V of the CAA) that only apply to stationary sources are also not applicable to the proposed project.

Mobile Source Regulations – Title II of the CAA Amendments of 1990 contains provisions relating to highway and off-road mobile sources. Regulations aimed at reducing pollution from heavy-duty diesel engines, including marine and locomotive engines, that have been promulgated include:

- Title 40 CFR Parts 69, 80, and 86, Final Rule, Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements – This rule requires a reduction in emissions from on-road diesel engines and establishes sulfur limits for diesel fuel. Currently, the requirements are for new engines only and the standards will begin to take effect in model year 2007. Although the emissions standards are for new engines only, the reduced sulfur diesel fuel, which is required to have a sulfur content less than 0.05 percent (500 parts per million by weight (ppmw)), a limit that was lowered to 15 ppmw in June 2006, would also reduce particulate and sulfur oxides (SO_x) emissions from existing diesel engines.

- Title 40 CFR Parts 69 and 89, Final Rule, Control of Emissions of Air Pollution from Non-road Diesel Engines and Fuel – This rule requires emissions reductions from non-road diesel engines by establishing emissions limits and sulfur content limits. This rule targets agricultural equipment, construction equipment, and other non-road diesel engines. As with the previous rule, the reduced sulfur fuel would lower emissions from existing diesel engines even though the emissions limits would only apply to new engines.

Conformity of General Federal Actions

A conformity analysis must be conducted by the lead federal agency if a federal action would result in the generation of emissions that would exceed the conformity threshold levels (*de minimis*) of the pollutant(s) for which an air basin is in nonattainment. According to section 176(c)(1) of the CAA (Title 40 CFR Part 51.853), a federal agency cannot approve or support any activity that does not conform to an approved SIP. Conforming activities or actions should not, through additional air pollutant emissions:

- cause or contribute to new violations of the NAAQS in any area;
- increase the frequency or severity of any existing violation of any NAAQS; or
- delay timely attainment of any NAAQS or interim emission reductions.

General conformity assessments must be completed when the total direct and indirect emissions of a planned project would equal or exceed specified pollutant thresholds per year in each nonattainment area. With regard to the proposed project, the relevant general conformity pollutant thresholds are:

- PM_{10}: 70 tpy for projects located in serious nonattainment areas;
- ozone precursors: 100 tpy of VOC or NO_x for projects located in ozone nonattainment areas that are not within an ozone transport region and are not classified as serious, severe, or extreme;
- CO: 100 tpy for projects located in a CO maintenance area;
- SO_2: 100 tpy for projects located in any classification of nonattainment area; or
- if emissions of a nonattainment pollutant are regionally significant (i.e., emissions of a nonattainment pollutant equal or exceed 10 percent of the nonattainment area emissions of the nonattainment pollutant).

A conformity analysis must show that the emissions would conform to the currently applicable SIP and would not reduce air quality in the basin, which can be demonstrated through offsets, SIP provisions, or modeling.

As detailed in section 4.10.1.3, based on Transwestern's estimates, project emissions during construction in 2008 would exceed general conformity pollutant thresholds for NO_x emissions in a portion of Maricopa County that is designated as a Subpart 1 ozone nonattainment area. Therefore, a general conformity determination is required for Maricopa County (see section 4.10.1.4 and Appendix Q). Because no construction activities would occur in nonattainment areas in Pinal County, a General Conformity Determination is not required for Pinal County. As discussed in section 4.10.1.1, San Juan County, New Mexico, although not currently located in an area classified as nonattainment or maintenance, has entered into an EAC with the EPA because ozone concentrations in the county are approaching the federal 8-hour ozone standard. The EAC will expire on December 31, 2007. If, at that time, the region that includes San Juan County has not met all of the terms of the EAC and is not in attainment of the 8-hour ozone standard, it may be designated as nonattainment according to the EPA's 8-hour ozone implementation rules. If designated nonattainment, the project would fall within the 1-year grace period specified by section 176(c)(6) of the CAA. Therefore, the project construction emissions for San Juan County would not need to be assessed for adherence to general conformity requirements.

State Air Quality Requirements

Because there would be no stationary sources or regulated operational emissions associated with the proposed project, the stationary source permitting requirements of the NMED, the ADEQ, the Maricopa County Air Quality Department, and the Pinal County Air Quality Control District do not apply.

Fugitive dust regulations adopted by the Maricopa County Air Quality Department and the Pinal County Air Quality Control District do apply to the construction activities associated with the proposed project. Table 4.10.1-2 lists the fugitive dust regulations that apply to the project. These requirements include EPA Reasonably Available Control Measures such as using wetting agents, dust suppressants, and other means to prevent particulates from becoming airborne. In addition, these regulations specify visible opacity requirements that would apply to project construction. Dust control permits from the above-noted agencies are required for pipeline construction emissions.

TABLE 4.10.1-2 **Fugitive Dust Regulations that Apply to the Phoenix Expansion Project**		
Agency	Rule Number	Rule Description
Maricopa County Air Quality Department	310	Fugitive dust control
Pinal County Air Quality Control District	Chapter 4, Article 2	Fugitive dust rules
	Chapter 4, Article 3	Construction site fugitive dust rules

Although carbon dioxide (CO_2) is not a regulated pollutant, it is associated with greenhouse gas (GHG) emissions, along with other gases such as methane and chlorofluorocarbons. GHG emissions are vital to life on earth because they help to maintain ambient temperatures; however, excess GHG emissions augment this effect and are considered by many experts to contribute to overall global climatic changes, typically referred to as global warming. CO_2 emissions are a product of natural and anthropogenic activities, including fossil fuel combustion. Large quantities of GHG emissions would decrease the amount of infrared or heat energy radiated by the earth back to space and upset the heat balance. Global warming may ultimately contribute to a rise in sea level, destruction of estuaries and coastal wetlands, and changes in regional temperature and rainfall pattern, with significant agricultural and coastal community implications.

4.10.1.3 Air Emission Impacts and Mitigation

As discussed in section 4.10.1.2, the Phoenix Expansion Project would include modifications at the existing Bloomfield Compressor Station and Seligman Compressor Station No. 1, neither of which would involve new compression. The project would also include the construction of 285.3 miles of natural gas pipeline; a filter-separator/odorant facility near the intersection of the Transwestern mainline and Phoenix Lateral; 11 meter stations; 4 taps; 7 customer laterals; and associated pig launchers, receivers, valves, and remote blowdown valves. Except for the construction equipment and activities associated with building these facilities, there would be no air emissions generated by these aboveground or pipeline facilities that would require an air emission permit.

The anticipated construction periods for the various components of the proposed project are described in section 2.4. Construction in New Mexico would occur over a 3-month period beginning in early 2008. Construction in Arizona would occur over a 12- to 13-month period beginning in the fall of 2007. The construction activities that would be the greatest emissions-generating activities include clearing, grading, and trenching operations. These construction activities would occur in daylight hours during the construction periods, except in situations where a specific activity would need to be completed without stopping (e.g., road crossings, hydrostatic testing, HDD operation). The intermittent and short-term emissions generated by these activities would include dust from soil disruption and combustion emissions from the construction equipment. Emissions associated with construction equipment include PM_{10}, $PM_{2.5}$, NO_x, CO, SO_2, VOC, and small amounts of air toxics (HAPs). In areas not designated as nonattainment or maintenance, these emissions could result in minor, temporary impacts on air quality in the vicinity of pipeline installation. Table 4.10.1-3 lists the estimated emissions of these air pollutants that would be generated by construction of the proposed project facilities by county and year of construction in nonattainment and maintenance areas.

TABLE 4.10.1-3

Estimated Emissions of Air Pollutants from Construction of the Phoenix Expansion Project

Area/Year	PM_{10} (tons)	$PM_{2.5}$ (tons)	NO_x (tons)	CO (tons)	SO_2 (tons)	VOC (tons)	HAPs (tons)
Maricopa County, Arizona							
2007 [a]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008	173.4	23.5	106.2	48.0	16.5	7.1	0.120
Nonattainment Areas in Maricopa County, Arizona							
2007	0.0	NA	0.0	0.0	NA	0.0	NA
2008	57.0	NA	104.4	4.1	NA	6.9	NA
Pinal County, Arizona							
2007 [b]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008	64.9	9.2	39.4	17.9	6.54	3.0	0.051
Nonattainment Areas in Pinal County, Arizona							
2007	0.0	NA	0.0	0.0	NA	0.0	NA
2008 [c]	0.0	NA	0.0	0.0	NA	0.0	NA

[a] Project construction would not occur in Maricopa County in 2007.
[b] Project construction would not occur in Pinal County in 2007.
[c] Project construction would not occur in nonattainment areas in Pinal County.
PM_{10} = Particulate matter having an aerodynamic diameter of 10 microns or less
$PM_{2.5}$ = Particulate matter having an aerodynamic diameter of 2.5 microns or less
NO_x = Nitrogen oxides
CO = Carbon monoxide
SO_2 = Sulfur dioxide
VOC = Volatile organic compounds
HAPs = Hazardous air pollutants
NA = Not applicable; area not designated as nonattainment for pollutant

Emissions from construction of the pipeline and aboveground facilities would be minimized because the construction equipment would be operated on an as-needed basis during daylight hours only and the engines must be built to meet the standards for mobile sources established by the EPA. Most of the construction equipment would be powered by diesel engines and would be equipped with typical control equipment (e.g., catalytic converters). In addition, Transwestern would implement the following measures to minimize impacts on air quality:

- request construction contractors to ensure that all engines certified in accordance with mobile source regulations have required control devices and required maintenance activities performed;
- ensure that diesel-powered construction equipment is properly tuned and maintained, and shut off when not in direct use;
- prohibit engine tampering to increase horsepower;
- confine diesel engines and motors to the certificated construction corridor; and
- to the extent practicable, reduce construction-related trips for workers and equipment, including trucks.

Despite these measures, the estimated NO_x emissions in an ozone nonattainment area in Maricopa County would exceed the general conformity threshold of 100 tpy by 4.4 tpy as shown in table 4.10.1-3. Therefore, a General Conformity Determination is required (see section 4.10.1.4 and Appendix Q.) Estimated emissions from the remaining pollutants are below the general conformity threshold values.

Fugitive dust emissions (e.g., PM_{10}) would be generated during the construction portion of the Phoenix Expansion Project by activities such as traffic on paved roads, traffic on unpaved roads, and heavy construction operations. The amount of fugitive dust emissions generated would depend on the moisture content and texture of the soils that would be disturbed. The construction emissions would vary from day to day depending on the level of activity, the specific operations, and prevailing weather. The fugitive dust emissions due to construction activities on the pipeline segments as listed in table 4.10.1-3 were estimated using emission factors obtained from EPA mobile source emission estimation models. Temperature data, oxygenated fuel consumption, vapor pressure, and anti-tampering measures in the area were incorporated into the estimate based upon data provided by the ADEQ. The emissions estimate for worker travel (commuter traffic) includes the use of multi-passenger vehicles to transport construction workers.

Fugitive dust generated by construction activities would be minimized by the implementation of Transwestern's Dust Control Plan (see Appendix M). In general, the project EIs and construction contractor would be responsible for identifying dust-generating activities; implementing appropriate measures to reduce dust emissions; and ensuring compliance with all federal, state, county, and local requirements. The construction contractor would be responsible for obtaining and complying with dust control permits from counties that require them before commencing construction. The Dust Control Plan identifies activities with the potential to generate dust during construction and specifies mitigation measures for dust abatement. Some of the specific measures that would be implemented include:

- applying water, as appropriate, to stabilize soils where support equipment and vehicles would operate before use, and re-applying water as needed to maintain soils in a stable condition;
- reducing vehicle speeds where appropriate for travel on unsurfaced roads;
- maintaining construction and operation equipment properly to reduce emissions, including covering open-bodied haul trucks, as appropriate, to reduce spillage and wind-blown dust emissions;
- cleaning trackout as needed at the end of each workday;
- installing gravel pads, as appropriate, adjacent to paved roadways to limit trackout, and routing traffic over trackout control devices using enforced traffic patterns;
- using palliative in high erosion areas to control dust in residential areas and near road crossings;
- revegetating areas in accordance with the project's Restoration Plan; and
- training all project personnel regarding the Dust Control Plan.

Although many of these measures clearly specify the performance requirement, the implementation of other specific performance requirements (e.g., visible opacity requirements) and the

lack of clearly defined responsible parties would make the Dust Control Plan difficult to implement and enforce during construction. Therefore, **the FERC staff recommends that:**

- **Transwestern shall prepare a revised Dust Control Plan that specifies the following:**

  a. the measures that would be taken to limit visible density (opacity) of emissions to less than or equal to 20 percent;

  b. how visual density would be measured to determine that it is less than or equal to 20 percent;

  c. how compliance with the 20 percent visual density requirement would be recorded;

  d. the individuals with authority to determine if/when water needs to be reapplied for dust control;

  e. the individuals with authority to determine if/when a palliative needs to be used;

  f. the individuals with authority to stop work if the contractor does not comply with dust control measures; and

  g. the speed limit that would be required on unsurfaced roads.

  The revised Dust Control Plan shall be filed with the Secretary for the review and written approval of the Director of OEP <u>before construction</u>.

As discussed in section 4.7.4.1, in its comments on the draft EIS, the EPA expressed concern about the generation of fugitive dust emissions associated with OHV use of the right-of-way and requested that the access management plans for BLM-managed and Forest System lands include a description of the frequency of monitoring, the methodology for reassessing the implemented measures in the future, and enforcement measures. In section 4.7.4.1 the FERC staff has recommended that Transwestern file revised access management plans that address enforcement and future monitoring.

With the implementation of our recommendations, fugitive dust from project construction activities is not expected to result in a violation of federal or state ambient air quality standards or contribute substantially to an existing or projected air quality violation due to the transient and temporary nature of the construction activities. Further, all activities would be done in compliance with each agency's rules and regulations.

Construction of the project would generate emissions of non-regulated GHG. CO_2 would be formed as a primary product of combustion of the diesel and gas engines used to power construction equipment and vehicles.

Emissions of GHG could occur during facility operation. Direct releases of methane could occur as a result of pipeline repair or maintenance operations. These releases would be infrequent over the lifetime of the project and would likely involve only an isolated section of pipeline resulting in a negligible increase in GHG emissions.

None of the proposed facilities would result in increased air emissions of criteria pollutants during operation; however, the odorant facility could result in a potential for offsite odor. As discussed in section 2.1.2, Transwestern proposes to install an odorant facility at MP 0.0 of the Phoenix Lateral at Ash Fork in Yavapai County, Arizona to odorize the natural gas before delivery into the system. The odorant facility would consist of two skid-mounted 5,000-gallon storage tanks, each with spill containment in the skid and dual automatic injection pumps. The tanks would contain the odorant liquid, which is a non-toxic chemical comprising 75 percent mercaptan and 25 percent dimethyl sulfide. The odorant would be injected into the natural gas stream in small amounts to give it a distinctive odor to alert people to the presence of leaking natural gas.

In the unlikely event the odorant liquid is spilled, the material would evaporate and disperse quickly, particularly under warmer ambient conditions, giving off a strong sulphurous odor. The nearest residence is located approximately 0.54 mile to the northeast, with additional residences within a 1-mile radius. The smell would also have the potential to be perceived by motorists on Interstate 40, State Highway 89, and in the town of Ash Fork. Although not considered a health risk, the smell is unpleasant and can be alarming.

To reduce the potential for release, the steel odorant tanks would be designed to be vapor tight. Associated equipment would be designed to minimize the potential for odorant release during transfer, storage, and use of the odorant. The odorant tanks would be installed under a sunshade to prevent radiant heating of the equipment by direct sunlight. The spill containment structures would be designed for a minimum of 110 percent containment of the capacity of each tank. Consequently, the potential for liquids to spill outside the containment structures would be very remote.

Small quantities of odorant would be vented during planned maintenance of equipment and piping, which would occur annually. To the extent possible, odorant remaining in piping or equipment would be returned to the storage tanks before initiating maintenance activities. The remaining odorant not able to be recaptured would be controlled using a wet scrubber system. The uncontrolled PTE from this source would be less than applicable air permitting significant levels, as defined by Arizona Administrative Code. With the use of the proposed control equipment, the PTE from this source would be negligible. In the event of an upset condition, odorant vapors would be vented to the atmosphere via a tank safety valve. The remaining odorant would be returned to the storage tanks, and the quantities that cannot be returned to the tanks would be disposed of using a portable flaring system. Such an incident is not anticipated during normal operations and the likelihood of its occurrence is remote.

Depending on flow volumes, the odorant would be delivered to the odorant facility by truck. The truck unloading site would be designed to contain a potential spill and to minimize ground contamination. Odorant injections and alarms at the facility would be monitored remotely from the Transwestern Gas Control office. Before placing the odorant facility in service, Transwestern would prepare a site-specific spill response plan. This plan would address odorant properties, health hazards, first aid measures, handling precautions, spill containment and cleanup, and the notification of the proper authorities in the event of a spill.

The siting of the odorant facility at a relatively remote location, the specific design features of the facility, and Transwestern's adherence to maintenance procedures as well as its implementation of the site-specific spill response plan would minimize the potential for the project to create objectionable odors.

4.10.1.4 General Conformity Determination

As previously discussed, a conformity analysis must be conducted by the lead federal agency if a federal action would result in the generation of emissions that would exceed the conformity threshold

levels (*de minimis*) of the pollutant(s) for which an air basin is in nonattainment, or if the emissions are deemed to be regionally significant. A conformity analysis must show that the emissions would conform to the SIP and would not reduce air quality in the air basin, which can be demonstrated through offsets, SIP provisions, or modeling. The EPA is the agency responsible for reviewing and approving the SIP submitted by designated state agencies.

The General Conformity Rule applies to projects that are located in nonattainment or maintenance areas. The Phoenix Expansion Project would not be located in any nonattainment or maintenance areas within New Mexico. Portions of the project between MPs 101 and 134 and MPs 184 and 191 would be located in a serious PM_{10} nonattainment area within Maricopa County (the Phoenix Planning Area), as well as a Subpart 1 ozone nonattainment area between MPs 91 and 211 in Maricopa County (the Phoenix-Mesa Planning Area). Additionally, the Phoenix metropolitan area, between MPs 101 and 112, was formerly designated as a serious nonattainment area for CO and is now considered a maintenance area. Relevant general conformity plans and regulations are discussed in further detail in Appendix Q.

The FERC staff evaluated the estimated construction emissions to determine if general conformity rules would apply based upon regional significance. A project would be subject to general conformity rules based upon regional significance if the total of the direct and indirect emissions of a pollutant, while not exceeding general conformity pollutant thresholds, would represent 10 percent or more of a nonattainment or maintenance area's total emissions of a particular pollutant. The most recent available air emission inventory data from reports prepared by the Maricopa County Environmental Services Department and the MAG were reviewed to determine the regional significance of the emissions estimated for the construction of the Phoenix Expansion Project. The numeric results of this assessment are contained in Appendix Q. As demonstrated by this assessment, the project emissions would represent less than 10 percent of the area emissions of a nonattainment or maintenance pollutant and would, therefore, not be subject to general conformity requirements based upon regional significance. Because no project construction would occur in nonattainment areas in Pinal County, a similar assessment was not needed for that county.

The FERC staff also evaluated the estimated construction emissions to determine if general conformity rules would apply based upon the exceedance of conformity thresholds. As detailed in section 4.10.1.3, the conformity threshold level for NO_x would be exceeded in a nonattainment area in Maricopa County in 2008, based upon the estimated construction emissions for that portion of the project. The Phoenix-Mesa Planning Area is designated a Subpart 1 ozone nonattainment area. As previously discussed, NO_x is considered an ozone precursor pollutant.

The 8-hour ozone nonattainment designation went into effect on June 15, 2004, and a SIP addressing attainment with the standard for this pollutant was due to the EPA on June 15, 2007. The MAG was responsible for developing the 8-hour ozone SIP. At the time of the draft EIS, the draft 8-hour SIP was still under development; however, in a letter dated March 21, 2007, the MAG provided a commitment to include the 2008 construction emissions from both ozone precursors (i.e., NO_x and VOC) for the applicable portions of the Phoenix Expansion Project as part of the emissions budgets in the draft SIP (MAG, 2007). Based on the MAG's commitment, the FERC included a Draft General Conformity Determination in the draft EIS for the Phoenix Expansion Project. Since that time, the MAG completed the draft 8-hour ozone SIP, placed the document on public notice, conducted public hearings, and responded to comments. The 8-hour ozone SIP was adopted by the MAG on June 11, 2007. The 8-hour ozone SIP was transmitted by the MAG to the ADEQ, which subsequently submitted it to the EPA on June 14, 2007 for review and approval. As had been committed by the MAG, the 8-hour ozone SIP included construction emissions for NO_x and VOC for the applicable portions of the Phoenix Expansion

Project as part of the emissions budgets in the 8-hour ozone SIP for the Phoenix-Mesa Planning Area (ADEQ, 2007a).

Title 40 CFR Part 51.858(a)(5)(i) and Title 40 CFR Part 93.158(a)(5)(i) contain the federal criteria for determining conformity of general federal actions for ozone. Under Title 40 CFR Part 51.858(a)(5)(i)(A) and Title 40 CFR Part 93.158(a)(5)(i)(A), conformity of a general federal action is demonstrated if the total of direct and indirect emissions from the action (or portion thereof) is determined and documented by the state agency primarily responsible for the applicable SIP (i.e., the ADEQ), when combined with all other emissions in the nonattainment or maintenance area, to not exceed an emissions budget specified in the applicable SIP. Although the 8-hour ozone SIP for the Phoenix-Mesa Planning Area has been submitted to the EPA and contained this demonstration, it will not be considered the "applicable SIP" with respect to Title 40 CFR Part 51 and Title 40 CFR Part 93 until it has been approved by the EPA. Therefore, the "applicable SIP," as defined by Title 40 CFR Part 51 and Title 40 CFR Part 93, for ozone for the Phoenix-Mesa Planning area is the 1-hour ozone SIP, even though the 1-hour ozone standard has been revoked (EPA, 2004). The MAG completed an assessment of its 1-hour ozone SIP and determined that the emissions from the Phoenix Expansion Project, when evaluated with all other emissions in the area, would remain within the emissions budget in the 1-hour ozone SIP (ADEQ, 2007b).

Title 40 CFR Part 51.858(a)(5)(i)(B) and Title 40 CFR Part 93.158(a)(5)(i)(B) provide another option for demonstrating conformity. Under these parts, conformity of a general federal action can be determined if the state agency primarily responsible for the applicable SIP (i.e., the ADEQ) provides a written commitment to the EPA to modify the applicable SIP to include the direct and indirect emissions from the action (or portion thereof). Title 40 CFR Part 51.858(a)(5)(i)(B) and Title 40 CFR Part 93.158(a)(5)(i)(B) outline five specific items that must be included in the written commitment (see Appendix Q).

Since the issuance of the draft EIS, the FERC has worked with the MAG; the ADEQ; and the EPA, Region IX to ensure that appropriate documentation has been received to complete the general conformity analysis and allow the issuance of a Final General Conformity Determination for the project. The basis for the Final General Conformity Determination includes documentation demonstrating that the project would not exceed emissions budgets in the 1-hour ozone SIP for the Phoenix-Mesa Planning area as well as documentation from the ADEQ fulfilling the commitment requirements under Title 40 CFR Part 51.858(a)(5)(i)(B) and Title 40 CFR Part 93.158(a)(5)(i)(B) (ADEQ, 2007b). As a result, the FERC has determined that the Phoenix Expansion Project would be in conformance with the federal General Conformity requirements. The Final General Conformity Determination, which includes additional details regarding the conformity demonstration, is provided in Appendix Q.

4.10.2 Noise

4.10.2.1 Existing Noise Levels

At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of the day and throughout the week. This variation is caused in part by changing weather conditions and the effects of seasonal vegetative cover and human activity. Federal agencies use two measures to relate the time-varying quality of environmental noise to its known effect on people. The $L_{eq(24)}$ is the level of steady sound with the same total (equivalent) energy as the time-varying sound of interest, averaged over a 24-hour period. A second measure, the day-night equivalent sound level (L_{dn}), is calculated by adding 10 decibels on the A-weighted scale (dBA) to the nighttime sound levels between the hours of 10 PM and 7 AM to account for the greater sensitivity of people to sound during the nighttime hours. The A-weighted scale is used because human hearing is less sensitive to low and high frequencies than mid-range frequencies. The human ear's threshold of perception for noise change is 3 dBA.

The project would occur primarily in rural rangeland, which is generally defined as open lands consisting of plains, grasslands, and sagebrush scrublands primarily used for grazing activities, utility areas, and track lands. Noise sources in rural areas are predominantly natural, including insects, birds, wind, and weather. Accordingly, existing ambient noise levels near most of the proposed project facilities are low. Background noise levels in wilderness and rural areas typically range between 35 dBA and 45 dBA L_{dn}. The primary sources of noise in rural residential and agricultural areas are roadway traffic and farm machinery on a seasonal basis. Background noise levels are approximately 40 dBA in rural residential areas and 45 dBA in agricultural cropland with equipment operating (EPA, 1974; EPA, 1978).

Noise-sensitive areas (NSAs) include residences, schools, day care facilities, hospitals, long-term care facilities, places of worship, libraries, and parks and recreational areas specifically known for their solitude and tranquility such as wilderness areas. The majority of the pipeline and aboveground facilities would be located in areas with little to no human population and few NSAs.

The Phoenix Expansion Project would involve modifications at the existing Bloomfield Compressor Station and Seligman Compressor Station No. 1, which are considered noise-generating facilities. Principal noise sources at the compressor stations include the air inlet, exhaust, and casing of the engines. Secondary noise sources include cooling fans, yard piping, and valves. Because the proposed modifications would not increase compression or add additional noise generating units, the proposed modifications would not increase operational noise levels at the stations.

4.10.2.2 Noise Regulatory Requirements

The FERC guidelines do not specifically cover operational noise for the Phoenix Expansion Project aboveground facilities such as the meter stations, pig launchers, or pig receivers. Neither the States of New Mexico or Arizona have statewide noise regulations that would limit noise from these facilities; noise is regulated at the local level in both states. Table 4.10.2-1 details the noise ordinances that would apply to the project. Where appropriate, Transwestern has committed to specific measures to ensure compliance with these ordinances.

In 1974, the EPA published Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA, 1974). This publication evaluates the effects of environmental noise with respect to health and safety, and provides information for state and local governments to use in developing their own ambient noise standards. The EPA has determined that in order to protect the public from activity interference and annoyance outdoors in residential areas, noise levels should not exceed an L_{dn} of 55 dBA. An L_{dn} of 55 dBA is equivalent to a continuous noise level of 48.6 dBA for facilities that operate at a constant level of noise. The FERC has adopted the EPA guidelines.

4.10.2.3 Noise Level Impacts and Mitigation

Construction Noise

Noise would be generated during construction of the pipeline and aboveground facilities. Noise associated with construction activities would be both temporary and intermittent because equipment would be operated on an as-needed basis during daylight hours, with the exception of certain activities described below. Therefore, the potential for construction activities to result in the generation of or exposure of persons to excessive ground-borne vibration or ground-borne noise levels would be limited and short term.

TABLE 4.10.2-1

Local Noise Ordinances Applicable to the Phoenix Expansion Project

Municipality/ Jurisdiction	Ordinance	Measures
Town of Chino Valley	Section 131.02 Excessive noise is unlawful between 12 AM and 5 AM	Pipeline work would be limited to the hours specified by the ordinance.
Town of Prescott	City Code: Title 5, Chapter 4 – Ordinance No. 05-18 Construction is limited to 6 AM to 8 PM	Pipeline work would be limited to the hours specified by the ordinance.
Town of Dewey-Humboldt	Construction is limited to 7 AM to 8 PM	Pipeline work would be limited to the hours specified by the ordinance.
Maricopa County	Ordinance P23 Offensive noise is unlawful if it disturbs the peace and quiet of people living in the vicinity thereof	Offensive noise would be avoided.
City of Mesa	Ordinance 4253 Section 6-12-5(C) Residential Zones Construction Limitations (within 500 feet of residential property): May 1 to September 30: 5 AM to 6 PM. No Sundays or Holidays October 1 to April 30: 6 AM to 6 PM. No Sundays or Holidays	Pipeline work would be limited to the hours specified by the ordinance.
Pinal County	Pinal County Ordinance Section 8.0 – Excessive Noise Concrete Work Construction Limitations: April 15 to October 15: 5 AM to 7 PM [a] October 16 to April 14: 6 AM to 7 PM [a] Residential Zones Construction Limitations (within 500 feet of residential property): April 15 to October 15: 6 AM to 7 PM [a] October 16 to April 14: 7 AM to 7 PM [a] Other Types of Construction (non-residential property): 5 AM to 7 PM year-round [a] Weekends or Holidays: Concrete Work Construction Limitations: 6 AM to 7 PM year-round [a] Other Types of Construction (non-residential property): 7 AM to 7 PM year-round [a]	Pipeline work would be limited to the hours specified by the ordinance. [a]
City of Casa Grande	Chapter 9.24.040 Excessive noise due to building or construction projects is restricted based upon location of construction Residential Zones (within 500 feet of residential property) April 16 to October 15: 5 AM to 9 PM October 16 to April 15: 6 AM to 7 PM Commercial or Industrial Zones 5 AM to 9 PM Weekends and Holidays [b] Saturdays: 6 AM Sundays and Holidays: 7 AM	Pipeline work would be limited to the hours specified by the ordinance.

[a] Except as otherwise authorized by a Pinal County Building Permit.
[b] Previously identified construction stop-times apply during weekends and holidays.

The most prevalent sound source during construction is anticipated to be the internal combustion engines used to provide mobility and operating power to construction equipment. The sound level impacts at NSAs from construction operations would depend on the type of equipment used, the mode of operation of the equipment, the length of time the equipment is in use, the amount of equipment used

simultaneously, and the distance between the sound source and sensitive site. All of these factors would constantly change throughout the construction period, making the calculation of an L_{dn} or L_{eq} and, hence, the quantification of impacts, difficult.

Pipeline construction typically proceeds at rates averaging about 1 mile per day. However, construction activities in any one area could last for longer durations based upon sensitive resources or terrain. One example would be road bores, which are generally completed in 1 to 2 days, but may take longer for boring under major highways. Construction equipment would be operated on an as-needed basis during these periods. Nighttime noise levels during construction would be unaffected because construction activities would occur during daylight hours, with the exception of certain activities such as hydrostatic testing and the HDD of the San Juan River.

During the HDD of the San Juan River, Transwestern estimates that the drill would operate 24 hours a day for 4 to 5 weeks until the work is completed. The drill rig at the HDD entry location would be the primary source of noise from the HDD site. The nearest NSAs to the San Juan River crossing are several residences on the north side of the river, north of State Highway 64, of which the nearest NSA (NSA #1) would be 600 feet north of the HDD entry site. This residence would be separated from the activities by State Highway 64 and a wooded area approximately 100 feet wide. The next nearest NSAs are residences 1,200 feet west (NSA #2) of the HDD entry site and 1,600 feet south (NSA #3) of the HDD exit site. To identify the extent of any adverse impacts at these NSAs and ensure that they are adequately mitigated, Hoover & Keith, Inc. completed a noise analysis of the HDD area that included existing background noise levels and estimated the drilling noise contribution at these NSAs (Hoover & Keith, 2007). Table 4.10.2-2 summarizes the results of the noise analysis. As shown in table 4.10.2-2, the estimated noise contribution from the HDD operation would exceed the FERC-recommended noise standard of 55 dBA L_{dn} only at NSA #1. The noise analysis shows that mitigation measures (e.g., the installation of a noise barrier near the HDD entry site) would lower the noise contribution from the HDD activities at NSA #1 to below 55 dBA L_{dn}. As an alternative to installing a noise barrier, Transwestern has proposed to provide alternative lodging arrangements or financial compensation to the affected residents.

TABLE 4.10.2-2

Noise Quality Analysis of the San Juan River Horizontal Directional Drill (HDD) Site

Planned HDD Site	Nearest Noise-sensitive Area (NSA)	Distance and Direction of Nearest NSA	Estimated A-Weighted Sound Level due to HDD Operation (dBA[a])	Ambient L_n[b] (dBA)	A-Weighted Level of HDD Operation plus Ambient L_n	Projected Increase Above Ambient
HDD Entry Site	NSA #1	600 feet (North)	59.5	52.3	60.3	8.0
HDD Entry Site	NSA #2	1,200 feet (West)	52.5	52.3	55.4	3.1
HDD Exit Site	NSA #3	1,600 feet (South)	37.9	45.0	45.8	0.8

[a] A-weighted decibels.
[b] Night equivalent sound level.

Although certain noise-generating activities associated with pipeline construction (e.g., the HDD at the San Juan River discussed above, bore operations) would occur at a single location for extended time periods and include nighttime activities, most activities would occur for limited lengths of time at a specific location and would occur during daytime hours. Many of the noise ordinances listed in table 4.10.2-1 contain restrictions limiting the hours of construction within the jurisdiction of the applicable agency. Transwestern would be required to comply with these noise limits unless a variance is requested and approved by the applicable agency. Additionally, a majority of the activities would occur away from

population centers; therefore, the project would not result in a substantial temporary or periodic increase above existing ambient noise levels in the project vicinity.

Operational Noise

During operation, there may be short-term noise impacts from aboveground facilities due to vehicles and equipment performing routine maintenance. However, because no additional compression would be added, the project would not result in changes in noise levels at the two continuous noise-generating sources, the Bloomfield Compressor Station and Seligman Compressor Station No. 1.

In addition, blowdowns may occur at various sites along the pipeline route. Blowdowns involve the evacuation of gas, which enables piping to be taken out of or placed in service. Blowdown events are typically associated with major repairs, maintenance, or emergency events. The majority of the proposed facilities where blowdowns could occur would be isolated from residences, with the exception of the pig launcher at MP 0.0 along Loop A and a pig launcher and valve at the SRP Desert Basin Lateral beginning at MP 239.1 of the Phoenix Lateral. A short blowdown event associated with the pigging activities would occur at these sites once every 3 to 6 months. Therefore, the noise impacts associated with blowdowns would be infrequent and temporary and mostly isolated from residences.

The operation of meter and regulator facilities would result in a small amount of noise noticeable in the immediate vicinity of the sites. The SRP Desert Basin Meter Station would be located in the vicinity of several residences and would generate a small amount of noise based upon the amount of gas transmitted through the stations; however, Transwestern does not anticipate the noise levels outside of the facility fence to be significant.

In summary, the project would not result in significant operational noise levels.

4.10.3 No Action Alternative

Under the No Action Alternative, the FERC would deny Transwestern's application for a Certificate and the BLM would deny Transwestern's application for a Right-of-Way Grant for the portion of the project on federal lands. The No Action Alternative means that the project would not go forward and the project-related facilities would not be installed. Accordingly, none of the potential environmental impacts on air quality and noise levels identified for the construction and operation of the proposed project would occur.

4.11 RELIABILITY AND SAFETY

The transportation of natural gas by pipeline involves some risk to the public in the event of an accident and subsequent release of gas. The greatest hazard is a fire or explosion following a major pipeline rupture.

Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If methane is breathed in high concentration, the resulting oxygen deficiency can result in serious injury or death.

Methane has an ignition temperature of 1,000 degrees Fahrenheit and is flammable at concentrations between 5 percent and 15 percent in air. Unconfined mixtures of methane in the air are not explosive. However, a flammable concentration within an enclosed space in the presence of an ignition source can explode. It is buoyant at atmospheric temperatures and disperses rapidly in air.

4.11.1 Safety Standards

The DOT is mandated to provide pipeline safety under Title 49, USC Chapter 601. The PHMSA, OPS administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards that set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. The PHMSA ensures that people and the environment are protected from the risk of pipeline incidents. This work is shared with state agency partners and others at the federal, state, and local level. Section 5(a) of the Natural Gas Pipeline Safety Act provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing the federal standards, while section 5(b) permits a state agency that does not qualify under section 5(a) to perform certain inspection and monitoring functions. A state may also act as the DOT's agent to inspect interstate facilities within its boundaries; however, the DOT is responsible for enforcement action. The majority of the states have either section 5(a) certifications or section 5(b) agreements, while nine states act as interstate agents. Both New Mexico and Arizona have section 5(a) certifications.

The DOT pipeline standards are published in Parts 190-199 of Title 49 of the CFR. Part 192 of Title 49 CFR specifically addresses natural gas pipeline safety issues.

Under a Memorandum of Understanding on Natural Gas Transportation Facilities (Memorandum) dated January 15, 1993 between the DOT and the FERC, the DOT has the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.14(a)(9)(vi) of the FERC's regulations require that an applicant certify that it will design, install, inspect, test, construct, operate, replace, and maintain the facility for which a Certificate is requested in accordance with federal safety standards and plans for maintenance and inspection, or shall certify that it has been granted a waiver of the requirements of the safety standards by the DOT in accordance with section 3(e) of the Natural Gas Pipeline Safety Act. The FERC accepts this certification and does not impose additional safety standards other than the DOT standards. If the FERC becomes aware of an existing or potential safety problem, there is a provision in the Memorandum to promptly alert the DOT. The Memorandum also provides for referring complaints and inquiries made by state and local governments and the general public involving safety matters related to pipelines under the FERC's jurisdiction.

The FERC also participates as a member of the DOT's Technical Pipeline Safety Standards Committee, which determines if proposed safety regulations are reasonable, feasible, and practicable.

The pipeline and aboveground facilities associated with the Phoenix Expansion Project would be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in Title 49 CFR Part 192. These regulations, which are intended to protect the public and to prevent natural gas facility accidents and failures, include specifications for material selection and qualification; odorization of gas; minimum design requirements; and protection of the pipeline from internal, external, and atmospheric corrosion.

The standards in the federal regulations become more stringent as the human population density in the vicinity of the pipeline increases. Part 192 also defines area classifications, based on population density in the vicinity of the pipeline, and specifies more rigorous safety requirements for populated areas. The class location unit is an area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline. The four area classifications are as follows:

- Class 1 – Location with 10 or fewer buildings intended for human occupancy;
- Class 2 – Location with more than 10 but less than 46 buildings intended for human occupancy;
- Class 3 – Location with 46 or more buildings intended for human occupancy or where the pipeline lies within 100 yards of any building, or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12-month period; and
- Class 4 – Location where buildings with four or more stories aboveground are prevalent.

The majority of the Phoenix Expansion Project (190.4 miles) would be located in Class 1 areas. About 7.7 miles (87 percent) of the San Juan Lateral Loop A would be located in Class 1 areas and 1.2 miles (13 percent) would be located in Class 3 areas, while 15.4 miles (98 percent) of the San Juan Lateral Loop B would be located in Class 1 areas and 0.3 mile (2 percent) would be located in Class 2 areas. About 166.1 miles (65 percent) of the Phoenix Lateral would be located in Class 1 areas, 61.9 miles (24 percent) would be located in Class 2 areas, and 27.1 miles (11 percent) would be located in Class 3 areas. About 1.3 miles of the customer laterals would be in Class 1 areas and less than 0.1 mile would be in Class 2 areas. A summary of class locations based on current population density and reasonably expected future development along the proposed rights-of-way is provided in table 4.11.1-1.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. Pipelines constructed in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock. All pipelines installed in navigable rivers, streams, and harbors must have a minimum cover of 48 inches in soil or 24 inches in consolidated rock. In addition, Transwestern would consult with landowners in agricultural areas and would bury the pipeline deeper than the regulations require in certain locations to avoid damage and interference from agricultural activities. All road and highway crossings would be designed to comply with Title 49 CFR Part 192 *Transportation of Natural Gas by Pipeline: Minimum Federal Safety Standards*, which specifies a minimum depth of cover of 36 inches in road ditches. These crossings would also be designed to meet the permit requirements of the applicable state and local agencies.

TABLE 4.11.1-1

Class Locations Crossed by the Phoenix Expansion Project Pipeline Facilities [a, b]

Facility	Class 1 Milepost Range		Class 1 Length (miles)	Class 2 Milepost Range		Class 2 Length (miles)	Class 3 Milepost Range		Class 3 Length (miles)
San Juan Lateral Loops									
Loop A	1.2	8.9	7.7				0.0	1.2	1.2
Loop B	72.2	87.6	15.4	71.9	72.2	0.3			
Phoenix Lateral	0.0	3.6	3.6	48.7	49.2	0.5	40.7	41.0	0.3
	3.6	4.5	0.9	62.7	62.8	0.1	50.3	51.1	0.8
	4.5	40.7	36.2	63.1	65.2	2.1	52.1	54.3	2.2
	41.0	48.7	7.7	86.4	87.3	0.9	58.1	60.3	2.2
	49.2	50.3	1.1	89.9	91.3	1.4	65.5	67.1	1.6
	51.1	52.1	1.0	94.7	97.0	2.3	79.0	79.9	0.9
	54.3	58.1	3.8	97.7	111.1	13.4	87.3	89.9	2.6
	60.3	62.7	2.4	111.5	117.8	6.3	111.1	111.5	0.4
	62.8	63.1	0.3	117.9	120.3	2.4	120.3	121.9	1.6
	65.2	65.5	0.3	121.9	125.8	3.9	130.4	131.3	0.9
	67.1	79.0	11.9	127.4	130.4	3.0	133.9	136.5	2.6
	79.9	86.4	6.5	131.3	133.9	2.6	149.6	151.4	1.8
	91.3	94.7	3.4	136.5	149.6	13.1	217.8	218.7	0.9
	97.0	97.7	0.7	151.4	161.3	9.9	229.8	230.6	0.8
	117.8	117.9	0.1				238.5	244.7	6.2
	125.8	127.4	1.6				246.0	247.3	1.3
	161.3	217.8	56.5						
	218.7	229.8	11.1						
	230.6	238.5	7.9						
	244.7	246.0	1.3						
	247.3	255.1	7.8						
Customer Laterals [c]									
Southwest Gas Corporation (SWG) Sun Valley South Lateral				0.0	0.0	<0.1			
Arizona Public Service Company (APS) Redhawk Lateral	0.0	0.4	0.4						
Entegra Gila River Lateral	0.0	0.0	<0.1						
SWG Rainbow Valley Lateral	0.0	0.0	<0.1						
Salt River Project Agricultural Improvement and Power District Desert Basin Lateral	0.0	0.8	0.8						
APS Sundance Lateral	0.0	0.0	<0.1						
El Paso Natural Gas Company Pinal County Lateral	0.0	0.0	<0.1						
Project Total			190.4			62.2			28.3

[a] Based on current population density and reasonably expected future development.

[b] No Class 4 areas would be crossed.

[c] Class locations for customer laterals less than 1 mile in length were estimated base on the class location of the adjacent Phoenix Lateral.

Note: The totals shown in this table may not equal the sum of addends due to rounding.

Pipe wall thickness and pipeline design pressures, MAOP, hydrostatic test pressures, inspection and testing of welds, and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. Transwestern has stated that the pipe wall thickness of the San Juan Lateral Loops would range from 0.43 to 0.62 inch and the pipe wall thickness of the Phoenix Lateral would range from 0.40 to 0.60 inch. These pipelines would be constructed with Grade X70 carbon steel that meets American Petroleum Institute (API) specification API 5L.

If a subsequent increase in population density adjacent to the right-of-way indicates a change in class location for the pipeline, Transwestern would be required to reduce the MAOP or replace the segment with pipe of sufficient grade and wall thickness to comply with the DOT code of regulations for the new class location, unless the grade and wall thickness installed already meets the requirements for the increased population density.

Class locations also specify the maximum distance to sectionalizing remote manual block valves (referred to as valves in other sections of this document). Part 192 regulations require at least one valve every 20 miles in Class 1 locations, every 15 miles in Class 2 locations, every 8 miles in Class 3 locations, and every 5 miles in Class 4 locations. The spacing between the valves for the Phoenix Expansion Project would meet or exceed the DOT requirements for the appropriate class location.

External corrosion control measures to be used on the Phoenix Expansion Project would include a protective coating on the exterior of the pipe and use of cathodic protection systems. These systems would be designed to meet requirements established by the DOT for protection of metallic facilities from external, internal, and atmospheric corrosion. The pipe would be factory coated with a fusion bonded epoxy before transport to the project area. The field welds would be coated with the same material. The coating would be inspected both upon application and again as the pipeline is installed, and any coating damage would be repaired. A properly applied fusion bonded epoxy coating has been shown to be effective in preventing the occurrence of stress corrosion cracking on pipelines; however, Transwestern would also inspect the pipe for stress corrosion cracking whenever the pipeline requires excavation. Transwestern would inspect all welds visually and use a non-destructive inspection method such as x-ray to ensure pipeline structural integrity and compliance with the applicable DOT regulations. Those welds that do not meet established specifications would be repaired or replaced. Once the welds are approved, the welded joints would be coated with a protective coating and the entire pipeline would be visually inspected for any faults, scratches, or other coating defects. Any damage would be repaired before the pipeline is installed.

Aboveground facilities would be painted with a suitable anti-corrosion coating. Transwestern also plans to install a cathodic protection system (rectifiers and groundbeds) at various locations to resist external corrosion and protect all pipe surfaces. In accordance with Title 49 CFR Part 192, the system would be installed and in operation within 1 year following the completion of pipeline construction.

During a December 14, 2006 technical conference in the Town of Buckeye, a comment was received regarding the potential for Transwestern's proposed cathodic protection system to damage other existing or future underground facilities. Transwestern would measure the resistivity of the existing soils in the vicinity of the pipeline and identify other existing metallic structures subject to corrosion and design its cathodic protection system to minimize the effects on any structures identified. After the system is installed, Transwestern would conduct field tests to determine if the system is affecting nearby metallic structures. If it is determined that Transwestern's cathodic protection system is affecting nearby structures, Transwestern would mitigate the effects by adjusting the rectifier settings or installing an electrical interference bond between the pipeline and adjacent structure(s).

At the same technical conference, a comment was received regarding the potential for stray electrical currents emitted from overhead powerlines or other sources (e.g., alternating current (AC), direct current (DC), telluric sources) to damage the pipeline facilities. A common source of AC is overhead powerlines, which can emit electromotive force (EMF) that could affect the integrity of the pipeline coating. Transwestern would conduct field studies and gather powerline operating and design data to model the amount of EMF to which the pipeline facilities could be subjected. Based on these data, Transwestern would design and install a system to dissipate the induced current off of the proposed pipeline and into the ground to reduce the coating stress to safe levels. The system would be periodically checked by Transwestern to ensure its effectiveness. Transwestern has contracted with a third-party specialized engineering consultant to prepare a detailed design for all AC mitigation for the pipeline and pipeline facilities.

Telluric charges are a naturally occurring phenomenon prevalent on long linear metallic structures that run in a north-south orientation, typically occurring in latitudes much closer to the north and south poles. Transwestern would conduct field tests to determine if telluric-induced charges are present on the pipeline within 1 year following completion of construction. If excessive effects of telluric charges are detected, Transwestern would take mitigative steps (e.g., the installation of remote grounding systems) to minimize these effects on the pipeline.

Sources of DC current are typically from overhead DC current transmission lines such as those associated with electrical street cars and trains. Before construction, Transwestern would contact local power distribution companies to determine if any DC current transmission lines exist in close proximity to the project area. Where DC current is a potential concern, Transwestern would conduct field tests to determine if the DC current is excessive and take mitigative steps to reduce the effects of the current.

Close interval surveys are a method of determining the effectiveness of the cathodic protection system on the buried pipeline conducted by a technician walking over and along the pipeline route using a portable electrical current measurement device. During operations, Transwestern would conduct periodic close interval surveys to determine the effectiveness of its cathodic protection system. In addition, Transwestern's corrosion technicians would monitor and test the Phoenix Lateral on an annual basis to ensure the pipeline is properly grounded from any AC induction.

Internal corrosion is not expected to be a factor because Transwestern would monitor the pipeline interior through the use of in-line pigging inspection tools (i.e., smart pigs).

After construction, Transwestern would clearly mark the pipeline at line-of-sight intervals, roads, railroads, other key points, and at least every 1,000 feet in open terrain to alert the public to the presence of the pipeline. The markers would provide contact information for Transwestern in the event of an emergency. In accordance with the DOT regulations in effect since 1982, Transwestern would participate in all communication and notification "One-Call" services to prevent outside damage to the pipeline. These services provide preconstruction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts. Transwestern currently participates in the "One Call" and related pre-excavation notification organizations in the states in which it operates pipeline facilities. Additionally, Transwestern is a member of the Common Ground Alliance (CGA), which is a national industry organization that includes facility operators, excavators, one-call center operators, regulators, and other service providers. The CGA promotes damage prevention and safe excavation practices and updates the best practices document. Transwestern would become a member of the regional CGA that covers the project area.

In 2002, Congress passed an act to strengthen the nation's pipeline safety laws. The Pipeline Safety Improvement Act of 2002 (HR 3609) was passed by Congress on November 15, 2002, and signed

into law by the President in December 2002. By December 17, 2004, gas transmission operators were required to develop and follow a written integrity management program that contains all of the elements described in Part 192.911 and addresses the risks on each covered transmission pipeline segment. Specifically, the law establishes an integrity management program that applies to all high consequence areas (HCAs). The DOT (68 FR 69778, 69 FR 18228, and 69 FR 29903) defines HCAs as they relate to the different class zones, potential impact circles, or areas containing an identified site as defined in Part 192.903 of the DOT regulations.

The OPS published a series of rules from August 6, 2002 to May 26, 2004 (69 FR 29903), that defines HCAs where a gas pipeline accident could do considerable harm to people and their property and requires an integrity management program to minimize the potential for an accident. This definition satisfies, in part, the Congressional mandate in Title 49, USC 60109 for the OPS to prescribe standards that establish criteria for identifying each gas pipeline facility in a high-density population area.

The HCAs may be defined in one of two ways. In the first method, an HCA includes:

- current Class 3 and 4 locations;
- any area in Class 1 or 2 locations where the potential impact radius (PIR)[10] is greater than 660 feet and there are 20 or more buildings intended for human occupancy within the potential impact circle (PIC);[11] or
- any area in Class 1 or 2 locations where the potential impact circle includes an identified site.[12]

In the second method, an HCA includes any area within a PIC that contains:

- 20 or more buildings intended for human occupancy; or
- an identified site.

Once a pipeline operator has determined the HCAs on its pipeline, it must apply the elements of its integrity management program to those segments of the pipeline within HCAs. The DOT regulations specify the requirements for the integrity management plan at Part 192.911 that include periodic internal inspections or hydrostatic testing, and enhanced corrosion protection measures. The pipeline integrity management rule for HCAs requires a confirmatory direct assessment of the internal and external corrosion of the entire pipeline in HCAs every 7 years. About 1.1 miles of Loop A would be classified as HCAs, while no HCAs were identified along Loop B. Along the Phoenix Lateral, 22.9 miles would be classified as HCAs. Table 4.11.1-2 lists by milepost the HCAs that would be crossed by the pipeline facilities.

[10] The PIR is calculated as the product of 0.69 and the square root of the maximum allowable operating pressure of the pipeline in pounds per square inch multiplied by the pipeline diameter in inches squared.

[11] The PIC is a circle of radius equal to the potential impact radius.

[12] An identified site is an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; a building that is occupied by 20 or more persons on at least 5 days a week for any 10 weeks in any 12-month period; or a facility that is occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

TABLE 4.11.1-2

High Consequence Areas Crossed by the Phoenix Expansion Project Pipeline Facilities

Facility	Begin Milepost	End Milepost	Total (miles)	High Consequence Area Determination Method [a]
San Juan Lateral Loops				
Loop A	0.0	1.1	1.1	1
Loop B			- None -	
Phoenix Lateral	39.9	43.4	3.5	1
	50.4	51.0	0.6	1
	58.1	60.6	2.5	1
	79.0	79.9	0.9	1
	87.3	89.9	2.6	1
	107.6	108.2	0.6	2
	111.1	111.5	0.4	1
	120.3	121.9	1.6	2
	149.6	151.4	1.8	1
	217.8	218.7	0.9	1
	238.5	244.7	6.2	1
	246.0	247.3	1.3	1
Customer Laterals			- None -	
Total			24.0	

[a] HCA Determination Methods:
1 = current Class 3 and 4 locations or any area in Class 1 or 2 locations where the potential impact radius is greater than 660 feet and there are 20 or more buildings intended for human occupancy within the potential impact circle; or any area in Class 1 or 2 locations where the potential impact circle includes an identified site.
2 = an HCA includes any area within a potential impact circle that contains 20 or more buildings intended for human occupancy or an identified site.

Part 192 prescribes the minimum standards for operating and maintaining pipeline facilities including the requirement to establish a written plan governing these activities. Under section 192.615, each pipeline operator must also establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency. Key elements of the plan include procedures for:

- receiving, identifying, and classifying emergency events such as: gas leakage, fires, explosions, and natural disasters;
- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
- emergency shutdown of system and safe restoration of service;
- making personnel, equipment, tools, and materials available at the scene of an emergency; and
- protecting people first and then property, and making them safe from actual or potential hazards.

The proposed pipelines would be operated according to standards and procedures that have been approved by the DOT. All operating personnel would be thoroughly trained to perform their activities in accordance with these standards and procedures, which provide specific directions in preventive maintenance and patrols of the facilities, as well as procedures to be followed in the event of accident or natural catastrophe. Periodic training sessions and review of operating and emergency procedures would be conducted for affected operations employees. This training would include safe operation of facilities, including compressor stations, taps, meter stations, valves, and other equipment; hazardous material handling procedures; public liaison programs; and general operating procedures.

Transwestern's existing pipeline system is monitored and controlled 24 hours a day for pressure drops in the pipeline that could indicate a leak or other operating problem through a SCADA system. A detailed description of the SCADA system is included in section 2.6. When completed, the project facilities would be operated in conjunction with the existing system and subject to the same operation and maintenance procedures.

Transwestern operates a gas control center in Houston, Texas that is staffed 24 hours a day, 365 days a year to monitor system pressures, flows, and customer deliveries. Area and sub-area offices would be maintained along the pipeline route and staffed with personnel who would provide the appropriate response to emergency situations and direct safety operations as necessary. Transwestern would maintain a list of outside contractors that have appropriate heavy equipment and operators who could be dispatched to the scene of an emergency. Transwestern estimates the response time for a leak could be up to 2 hours depending on the time of day and location of personnel.

Data acquisition systems are present on Transwestern's existing system and would be installed at all of the proposed meter stations. If system pressures fall outside a predetermined range, an alarm would be activated and a notice transmitted to the gas control center that pressures at the station are not within an acceptable range. The pipeline facilities would be equipped with remote control valves, which would allow the valves to be operated remotely by the gas control center in the event of an emergency, usually evidenced by a sudden loss of pressure on the pipeline. Remotely closing the valve would allow the section of pipeline to be isolated from the rest of the pipeline system.

The pipeline system would be inspected by air and on the ground to observe right-of-way conditions and identify indications of leaks, evidence of pipeline damage, evidence of encroachment (i.e., landowners building permanent structures on the permanent right-of-way), or damage to erosion controls resulting from erosion or washouts. Aerial patrols would be conducted along all portions of the project on a monthly basis. Road crossings would be checked by vehicle quarterly in Class 3 locations and semi-annually in Class 2 locations. Transwestern would comply with other DOT surveillance, leak detection requirements such as leakage surveys and pedestrian surveys of its facilities. The pipeline would be designed to be piggable, allowing for the use of smart pigs for internal integrity inspection.

4.11.2 Pipeline Accident Data

If a pipeline rupture were to occur after pipeline operation has begun, natural gas would percolate through the soil and rapidly dissipate into the atmosphere. The potential outcome would depend on the volume of natural gas released and whether an ignition source is available. A pipeline break could result in soil and debris being thrown from the area of the break, destruction of nearby vegetation, and, in the case of ignition, explosion or fire causing injury or property damage.

Since February 9, 1970, Title 49 CFR Part 191 has required all operators of transmission and gathering systems to notify the DOT of any reportable incident and to submit a report on form F7100.2 within 20 days. Reportable incidents are defined as any leaks that:

- caused a death or personal injury requiring hospitalization;
- required taking any segment of transmission line out of service;
- resulted in gas ignition;
- caused estimated damage to the property of the operator, or others, or both, of a total of $5,000 or more;
- required immediate repair on a transmission line;
- occurred while testing with gas or another medium; or
- in the judgment of the operator was significant, even though it did not meet the above criteria.

The DOT changed reporting requirements after June 1984 to reduce the amount of data collected. Since that date, operators must only report incidents that involve property damage of more than $50,000, injury, death, release of gas, or that are otherwise considered significant by the operator. Table 4.11.2-1 presents a summary of incident data for the 1970 to 1984 period, as well as more recent incident data for 1986 through 2005, recognizing the difference in reporting requirements. The 14.5-year period from 1970 through June 1984, which provides a larger universe of data and more basic report information than subsequent years, has been subject to detailed analysis, as discussed in the following sections.[13]

TABLE 4.11.2-1

Natural Gas Service Incidents by Cause

	Incidents per 1,000 miles of pipeline (percentage)	
Cause	1970-1984	1986-2005
Outside force	0.70 (53.8)	0.10 (38.5)
Corrosion	0.22 (16.9)	0.06 (23.1)
Construction or material defect	0.27 (20.8)	0.04 (15.4)
Other	0.11 (8.5)	0.06 (23.1)
Total	1.30	0.26

During the 14.5-year period, 5,862 service incidents were reported over the more than 300,000 total miles of natural gas transmission and gathering systems nationwide. Service incidents, defined as failures that occur during pipeline operation, have remained fairly constant over this period with no clear upward or downward trend in annual totals. In addition, 2,013 test failures were reported. Correction of test failures removed defects from the pipeline before operation.

Additional insight into the nature of service incidents may be found by examining the primary factors that caused the failures. Table 4.11.2-1 provides a percentage distribution of the causal factors as well as the annual frequency of each factor per 1,000 miles of pipeline in service.

The dominant incident cause is outside forces, constituting 53.8 percent of all service incidents between 1970 and 1984 and 38.5 percent between 1986 and 2005. Outside forces incidents result from

[13] American Gas Association 1986. "An Analysis of Reportable Incidents for Natural Gas Transportation and Gathering Lines 1970 Through June 1984." NG-18 Report No. 158, Pipeline Research Committee of the American Gas Association. D.J. Jones, G.S. Kramer, D.N. Gideon, and R.J. Eiber.

the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; weather effects such as winds, storms, and thermal strains; and willful damage. Table 4.11.2-2 shows that, of the service incidents caused by outside forces, human error in equipment usage was responsible for approximately 75 percent of the incidents. Since April 1982, operators have been required to participate in "One-Call" public utility programs in populated areas to minimize unauthorized excavation activities in the vicinity of pipelines. The 1986 through 2005 data show that the portion of incidents caused by outside forces has decreased to 38.5 percent (see table 4.11.2-1).

TABLE 4.11.2-2

Outside Forces Incidents by Cause (1970-1984)

Cause	Percent
Equipment operated by outside party	67.1
Equipment operated by or for operator	7.3
Earth movement	13.3
Weather	10.8
Other	1.5

The pipelines included in the data set in table 4.11.2-1 vary widely in terms of age, pipe diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of pipeline.

The frequency of service incidents is strongly dependent on pipeline age. While pipelines installed since 1950 exhibit a fairly constant level of service incident frequency, pipelines installed before that time have a significantly higher rate, partially due to corrosion. Older pipelines have a higher frequency of corrosion incidents, because corrosion is a time-dependent process. Further, new pipe generally uses more advanced coatings and cathodic protection to reduce corrosion potential.

Older pipelines have a higher frequency of outside forces incidents partly because their location may be less well known and less well marked than newer lines. In addition, smaller diameter pipelines constitute a disproportionate number of the older pipelines, which have a greater rate of outside forces incidents. Small diameter pipelines are more easily crushed or broken by mechanical equipment or earth movements.

As discussed in section 3.4.2.5, Stardust-Tartesso W-12, Inc. and Pulte Home Corporation filed a report with the Commission that identified damage from outside forces and a subsequent explosion as the greatest risk posed by the proposed project. These two parties are developers in the Town of Buckeye, Arizona municipal planning area that would be crossed by the proposed route of the Phoenix Lateral between MPs 134.5 and 159.7. The report cited potential safety impacts on the growing residential areas adjacent to the proposed route and requested that an alternative route that would avoid the Buckeye area be selected. Alternatively, the report specified certain safety-related mitigation measures (i.e., greater burial depth and installation of blast walls) that should be implemented along portions of the route in the Buckeye area should the proposed route be selected. A detailed analysis of two alternatives to avoid the Buckeye area (the North and South Buckeye Alternatives) and further discussion of safety-related issues in the Buckeye area are presented in section 3.4.2.5. We concluded in section 3.4.2.5 that the public along the proposed route in the Buckeye area would not face a significant increased safety risk and that neither of the Buckeye alternatives represent an environmentally preferable or economically viable alternative to the proposed route. We received numerous comments on the draft EIS regarding potential impacts on public safety, many of which reiterated the concerns discussed above. Responses to all comments received on the draft EIS regarding public safety are in Volume II.

Table 4.11.2-3 clearly demonstrates the effectiveness of corrosion control in reducing the incidence of failures caused by external corrosion. The use of both an external protective coating and a cathodic protection system, required on all pipelines installed after July 1971, significantly reduces the rate of failure compared to unprotected or partially protected pipe. The data show that bare, cathodically protected pipe actually has a higher corrosion rate than unprotected pipe. This anomaly reflects the retrofitting of cathodic protection to actively corroding spots on pipes.

TABLE 4.11.2-3

External Corrosion by Level of Control (1970-1984)

Corrosion Control	Incidents per 1,000 miles per year
None-bare pipe	0.42
Cathodic protection only	0.97
Coated only	0.40
Coated and cathodic protection	0.11

4.11.3 Impact on Public Safety

The service incident data summarized in table 4.11.2-1 include pipeline failures of all magnitudes with widely varying consequences. Approximately two-thirds of the incidents were classified as leaks, and the remaining one-third classified as ruptures, implying a more serious failure.

Table 4.11.3-1 presents the annual average fatalities that occurred on natural gas transmission and gathering lines from 1970 to 2005. Fatalities between 1970 and June 1984 have been separated into employees and nonemployees to better identify a fatality rate experienced by the general public. Of the total 5.0 nationwide average, fatalities among the public averaged 2.6 per year over this period. The simplified reporting requirements in effect after June 1984 do not differentiate between employees and nonemployees. However, the data show that the total annual average for the period 1984 through 2005 decreased to 3.6 fatalities per year. Subtracting two major offshore incidents in 1989, which do not reflect the risk to the onshore public, yields a total annual rate of 2.8 fatalities per year for this period.

TABLE 4.11.3-1

Annual Average Fatalities - Natural Gas Transmission and Gathering Systems [a, b]

Year	Employees	Nonemployees	Total
1970-June 1984	2.4	2.6	5.0
1984-2005 [c]	-	-	3.6
1984-2005 [c]	-	-	2.8 [d]

[a] 1970 through June 1984 - American Gas Association, 1986.
[b] U.S. Department of Transportation Hazardous Materials Information System.
[c] Employee/nonemployee breakdown not available after June 1984.
[d] Without 18 offshore fatalities that occurred in 1989 (11 fatalities resulted from a fishing vessel striking an offshore pipeline and 7 fatalities resulted from an explosion on an offshore production platform).

The nationwide totals of accidental fatalities from various manmade and natural hazards are listed in table 4.11.3-2 in order to provide a relative measure of the industry-wide safety of natural gas pipelines. Direct comparisons between accident categories should be made cautiously, however, because individual exposures to hazards are not uniform among all categories. Nevertheless, the average 2.6 public fatalities per year is relatively small considering the more than 300,000 miles of transmission and gathering lines in service nationwide. Furthermore, the fatality rate is approximately two orders of magnitude (100 times) lower than the fatalities from natural hazards such as lightning, tornados, floods, and earthquakes.

TABLE 4.11.3-2

Nationwide Accidental Deaths [a]

Type of Accident	Fatalities
All accidents	90,523
Motor vehicles	43,649
Falls	14,985
Drowning	3,488
Poisoning	9,510
Fires and burns	3,791
Suffocation by ingested object	3,206
Tornado, flood, earthquake, etc. (1984 to 1993 average)	181
All liquid and gas pipelines (1978 to 1987 average) [b]	27
Gas transmission and gathering lines Nonemployees only (1970 to 1984 average) [c]	2.6

[a] All data, unless otherwise noted, reflect 1996 statistics from the U.S. Department of Commerce, Bureau of the Census, "Statistical Abstract of the United States 118th Edition."

[b] U.S. Department of Transportation "Annual Report on Pipeline Safety - Calendar Year 1987."

[c] American Gas Association, 1986.

The available data show that natural gas pipelines continue to be a safe, reliable means of energy transportation. Based on approximately 301,000 miles in service, the rate of public fatalities for the nationwide mix of transmission and gathering lines in service is 0.01 per year per 1,000 miles of pipeline. Using this rate, the pipeline facilities associated with the Phoenix Expansion Project might result in one public fatality about every 311 years. This would represent a slight increase in risk to the nearby public and would not result in a substantial potential for incidents that would cause serious injury or death to members of the public.

Part 192 requires that each operator must establish and maintain a liaison with appropriate fire, police, and public officials to learn the resources and responsibilities of each organization that may respond to a natural gas pipeline emergency, and to coordinate mutual assistance. The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials. Transwestern maintains a liaison program for its existing system that it would adapt to include the Phoenix Expansion Project. The following are key components of Transwestern's liaison program:

- periodic fire fighting demonstrations would be conducted in each district;
- periodic visits with municipal safety officials would occur to inform them of the nature and pressure of Transwestern's facilities and to coordinate emergency response in the event of an accident;
- informational meetings and training would be conducted at the request of municipalities; and
- literature would be periodically distributed listing emergency telephone numbers and other pertinent data.

Transwestern would contact local police and fire departments and/or public officials within the communities that contain project facilities and address the following issues: inform the officials on how they may be able to assist Transwestern during an emergency; acquaint the officials with how Transwestern would respond to an emergency on its pipeline system; notify the officials of the types of pipeline emergencies for which they would be contacted; and inform them how Transwestern would cooperate in mutually assisting their departments in the protection of life or property during an

emergency. Police and fire departments and public officials would be given maps showing the project facilities within the boundaries of their towns. Transwestern would maintain a current phone list of emergency contact numbers. Transwestern would invite fire companies to participate in its periodic fire demonstrations, and, if requested, would participate in meetings with fire departments. Transwestern would also maintain a liaison with gas distribution companies that have franchises in areas where the Phoenix Expansion Project would be located to afford the distributors ready contact in the event that they identify a potential or actual emergency on a Transwestern facility.

4.11.4 Terrorism

In the aftermath of the terrorist attacks that occurred on September 11, 2001, terrorism has become a very real issue for the facilities under the FERC's jurisdiction. The FERC, like other federal agencies, is faced with a dilemma in how much information can be offered to the public while still providing a significant level of protection to energy facilities. Consequently, the FERC has removed energy facility design plans and location information from its Internet website to ensure that sensitive information is not readily available (RM02-4-000 and PL02-1-000 issued February 20, 2003).

Since September 11, 2001, the FERC has been involved with other federal agencies in developing a coordinated approach to protecting the energy facilities of the United States, and continues to coordinate with these agencies to address this issue. In addition, interstate natural gas companies are actively involved with several industry groups to chart how best to address security measures in the current environment. A Security Task Force has been created and is addressing ways to improve pipeline security practices, strengthen communication within the industry and the interface with government, and extend public outreach efforts.

Increased security awareness has occurred throughout the industry and the nation. The Office of Homeland Security was established with the mission of coordinating the efforts of all executive departments and agencies to detect, prepare for, prevent, protect against, respond to, and recover from terrorist attacks within the United States. The FERC, in cooperation with other federal agencies and industry trade groups, has joined in the efforts to protect the energy infrastructure, including the approximately 301,000 miles of interstate natural gas transmission pipelines. The pipeline system would be inspected by air and on the ground in accordance with DOT surveillance requirements as discussed in section 4.11.1. The agencies overseeing security, initially the PHMSA and now a branch of the Transportation Security Administration, within the Department of Homeland Security, have directed the pipeline operators to develop and implement security plans consistent with the security guidelines and practices developed by the INGAA following the September 11, 2001 terrorist attacks. Transwestern has done this for its existing facilities and has reviewed its plan, training, and implementation with both the PHMSA and Transportation Security Administration. Transwestern would utilize this plan for the Phoenix Expansion Project.

Safety and security are important considerations in any action undertaken by the FERC. The attacks of September 11, 2001 have changed the way pipeline operators as well as regulators must consider terrorism, both in approving new projects and in operating existing facilities. However, the likelihood of future attacks of terrorism or sabotage occurring along the proposed project, or at any of the myriad of natural gas pipeline or energy facilities throughout the United States is unpredictable given the disparate motives and abilities of terrorist groups. The continuing need to construct facilities to support the future natural gas pipeline infrastructure is not diminished from the threat of any such future acts. Moreover, the unpredictable possibility of such acts does not support a finding that this particular project should not be constructed.

4.11.5 No Action Alternative

Under the No Action Alternative, the FERC would deny Transwestern's application for a Certificate and the BLM would deny Transwestern's application for a Right-of-Way Grant for the portion of the project on federal lands. The No Action Alternative means that the project would not go forward and the project-related facilities would not be installed. Accordingly, none of the potential safety issues identified for the construction and operation of the proposed project would occur.

4.12 CUMULATIVE IMPACTS

Cumulative impacts may result when the environmental effects associated with a proposed project are superimposed on, or added to, either temporary (construction-related) or permanent (operation-related) impacts associated with past, present, or reasonably foreseeable future projects. Although the individual impact of each separate project may be minor, the additive or synergistic effects of multiple projects could be significant.

Existing environmental conditions in the project area reflect changes based on past projects and activities. Much of the project area is undeveloped rangeland. However, significant changes to portions of the project area have resulted from activities related to agriculture, transportation projects, and residential/commercial development. In addition, current growth trends indicate that increased residential/commercial development will continue to encroach into and convert or modify the native landscape particularly in Pinal County, Arizona where by the year 2020 the population is expected to increase by 239 percent over census estimates for the year 2000 (Arizona Department of Economic Security, Research Administration, 2006). Significantly more moderate growth rates are projected for the remaining counties affected by the project (Arizona Department of Economic Security, Research Administration, 2006; University of New Mexico, 2004).

Table 4.12-1 lists present or reasonably foreseeable future projects or activities that may cumulatively or additively impact resources that would be affected by construction and operation of the Phoenix Expansion Project. Construction schedules of the future projects depend on factors such as economics, funding, and regulatory considerations. Projects and activities included in this analysis are generally those of comparable magnitude and nature of impact, and are located within the same counties that would be affected by the Phoenix Expansion Project. The majority of these projects are planned for Yavapai, Maricopa, and Pinal Counties, Arizona. With some exceptions, more geographically distant projects are not assessed because their impact would generally be localized and, therefore, would not contribute significantly to cumulative impacts in the proposed project area.

4.12.1 Geology and Soils

The facilities associated with the Phoenix Expansion Project are expected to have a temporary but direct impact on near-surface geology and soils. Impacts on geology and soils could lead to poor revegetation potential and indirectly affect wildlife and aquatic resources as a result of poor vegetative cover and increased erosion and sedimentation. The soil stabilization and revegetation requirements included in Transwestern's UECRM Plan (see Appendix F) and Restoration Plan[14] would prevent or minimize any indirect impacts. Because the direct effects would be highly localized and limited primarily to the period of construction, cumulative impacts on geology and soils would only occur if other projects are constructed at the same time and place as the proposed facilities. The construction of several of the projects listed in table 4.12-1 would coincide with the schedule proposed for the Phoenix Expansion Project. Projects that require significant excavation or grading such as the transportation projects, the natural gas storage project, and residential developments would also have temporary, direct impacts on near-surface geology and soils. While there would be the potential for cumulative impacts on geology and soils if the projects would be in close proximity and constructed concurrently with the Phoenix Expansion Project, any cumulative impact on these resources would be minimized by the implementation of erosion control and restoration measures during the construction and restoration of the projects. Consequently, any potential cumulative impacts on geological resources and soils would be temporary and minor.

[14] This plan is too voluminous to include in this EIS but can be viewed on the FERC Internet website at http://www.ferc.gov. Using the "eLibrary" link, select "General Search" from the eLibrary menu and enter the docket number excluding the last three digits in the "Docket Number" field (i.e., CP06-459). Be sure to select an appropriate date range. It is also available for public inspection at the FERC's Public Reference Room in Washington, DC (call (202) 502-8317 for instructions).

TABLE 4.12-1

Existing or Proposed Activities Cumulatively Affecting Resources of Concern for the Phoenix Expansion Project

State/Activity/Project	County	Description	Anticipated Construction Date
		TRANSPORTATION	
New Mexico			
U.S. Highway 491 and Interstate 40 interchange in Gallup	McKinley	Construction of clover leaf interchange and bridge over a railroad crossing.	Under construction, to be completed in 2007
U.S. Highway 491	McKinley and San Juan	Expansion of highway from two to four lanes, restoration of existing bridges, and construction of six new bridges over a 68-mile stretch; improvements and widening along a 15-mile stretch.	Spring of 2009 and 2011
U.S. Highway 64, San Juan/Rio Arriba County Line to U.S. Highway 84	Rio Arriba	Improvements to U.S. Highway 64 along a 46-mile stretch.	2010
Arizona			
Interstate 17 Black Canyon Freeway	Maricopa, Yavapai	Expansion and improvements to freeway including new traffic lanes, interchanges, frontage roads, and other related improvements.	In progress through 2024
U.S. Highway 93 Corridor Construction	Maricopa, Mohave, Yavapai	Rehabilitation of Antelope Wash, Burro Creek, and Cottonwood Canyon-Bridle Creek; in total consisting of approximately 17 miles of construction.	In progress
State Route (SR) Highway 85 Widening	Maricopa	Construction of a 34-mile segment between Gila Bend and Interstate 10.	2007 to 2009
Interstate 17	Maricopa	Reconstruction and widening of approximately 9 miles of Interstate 17.	2007
U.S. Highway 60	Maricopa	Expansion of approximately 13 miles of new lanes and roadway widening.	2007 to 2010
SR 89 and SR 89A	Yavapai	Construction of traffic interchange at intersection of SR 89 and SR 89A.	2007
Intersection of SR 89 and SR 69	Yavapai	Construction of traffic interchange at SR 89 and SR 69.	2009
SR 89 Construction	Yavapai	Construction of approximately 2.8 miles of a five-lane urban roadway.	2007
Verde River Bridge Work Interstate 17	Yavapai	Deck rehabilitation of approximately 2.0 miles of bridged portion of Interstate 17.	2007
Partridge Creek Bridges Rehabilitation	Yavapai	Bridge restoration work on Interstate 40.	2007
State Highway 260	Yavapai	Reconstruction of approximately 24.5 miles of roadway sections.	2007, 2008, 2010, 2011
SR 89	Yavapai	Roadway reconstruction, right-of-way acquisition, and utility relocation work affecting about 6.6 miles.	2007
State Highway 195	Yuma	Construction of 26 miles of New Yuma area roadway.	Unknown
		UTILITIES	
New Mexico			
TransWest Express Project	New Mexico/ Arizona	Installation of new electric transmission line from Wyoming to Arizona and New Mexico.	Unknown

TABLE 4.12-1 (cont'd)

Existing or Proposed Activities Cumulatively Affecting Resources of Concern for the Phoenix Expansion Project

State/Activity/Project	County	Description	Anticipated Construction Date
Arizona			
Arizona Public Service Company Palo Verde Hub to North Gila 500 kilovolt (kV) Transmission Line Project	Maricopa, Yuma	Installation of 115-mile-long, 500 kV single-circuit transmission line.	2012
VV01 to Copper Canyon 69 kV Transmission Line Project	Yavapai	Installation of new 500/69 kV substation and double-circuit 69 kV transmission line.	Unknown
Yavapai to Paulden 69 kV Transmission Line Project	Yavapai	Installation of three new separate 69 kV transmission lines and two substations.	2008
Salt River Project Agricultural Improvement and Power District (SRP) Pinal West-to-Southeast Valley/Browning 500 kV Transmission Line Project	Pinal	Installation of 100-mile-long, 500 kV electric transmission line.	2007 to 2011
SRP Desert Basin 230 kV Transmission Line Project	Pinal	Installation of 230 kV transmission line (route to be determined).	2011
El Paso Natural Gas Storage Project	Pinal	Construction of four underground salt caverns capable of storing approximately 3.5 billion cubic feet of natural gas.	2008 to 2011
COMMERCIAL/RESIDENTIAL DEVELOPMENTS			
Arizona			
Numerous planned developments	Yavapai, Maricopa, Pinal	See table 4.7.3-2.	Various
Casa Grande Mall	Pinal	Commercial/retail development.	2007
Auto Mall	Pinal	Commercial/retail development.	Unknown
The Viewpoint Community	Yavapai	Residential development of 2,600 homesites.	In Progress
American Ranch near Prescott	Yavapai	Residential development of a 600-acre parcel.	In Progress
Prescott Valley Crossroads	Yavapai	Commercial/retail development.	2006, to open in 2008
Mingus West	Yavapai	Residential development.	In Progress
Big Sky Business Park	Yavapai	Commercial development.	Unknown

4.12.2 Waterbodies and Wetlands

The Phoenix Expansion Project would require the crossing of 8 perennial waterbodies and approximately 805 intermittent and ephemeral waterbodies. The proposed project would not involve the construction of permanent diversions or dams and, therefore, is expected to have only temporary impacts on surface water quality. Most of the waterbodies are expected to be dry during construction and would be crossed by typical overland construction techniques. The Verde River crossing would result in the greatest potential for impact on water resources. The Verde River would be crossed using a dry crossing technique (a variation of the flume method), which would isolate and maintain streamflow during the crossing. However, increased sedimentation is likely to occur during installation and removal of the flume pipes and temporary dams, which could result in impacts on downstream water quality although this effect would be temporary.

Transwestern proposes to cross the San Juan River using the HDD crossing method, which would avoid direct in-stream effects. While there would be no in-stream construction if the San Juan River were to be crossed using the HDD method, there would be the potential for impacts on this waterbody if a frac-out were to occur during the crossing. Transwestern has prepared an HDD Plan (see Appendix I) that describes how the HDD operation would be conducted and monitored to minimize the potential for inadvertent drilling mud releases as well as corrective actions and procedures for clean up of drilling mud releases and for sealing the hole if the HDD cannot be completed. Implementation of the HDD Plan would reduce the potential impact of a frac-out in the San Juan River. If the HDD crossing fails, the San Juan River would be crossed using the wet open-cut method, which would result in increased sedimentation downstream. Runoff from construction activities near waterbodies could also result in cumulative impacts, although this effect would be relatively minor and would be controlled by implementation of erosion and sediment control measures and by compliance with federal, state, and local requirements. Additionally, indirect economic impacts on individuals and/or communities could result if surface waters were to become contaminated and/or limitations were placed on the beneficial uses (e.g., fishing, recreation, and agricultural livestock watering) of the affected waters. However, the potential for contamination during the construction of the Phoenix Expansion Project would be minor and would be further minimized by implementation of Transwestern's SPR Procedures (see Appendix H).

Most of the projects listed in table 4.12-1 are located within the watersheds crossed by the Phoenix Expansion Project, and some of these projects (e.g., the U.S. Highway 93 Corridor Construction and Verde River Bridge Work Interstate 17 Projects) could potentially result in impacts on surface waters; however, water quality impacts resulting from construction of the proposed project, if any, would be temporary. Additionally, the potential for erosion and sedimentation resulting from the disturbance of areas adjacent to waterbodies in the project area is low given the arid climate of the project area.

Although there is the potential that cumulative impacts could result if the Phoenix Expansion Project were constructed in addition to other projects listed in table 4.12-1, the geographic extent and duration of disturbances caused by construction of the Phoenix Expansion Project would be minimal and further minimized by the implementation of Transwestern's UECRM Plan, WWCM Procedures (see Appendix G), Restoration Plan, and SPR Procedures. Therefore, the collective effects of these projects on surface water resources are expected to be minor.

Impacts on wetlands would result from construction of the proposed project and potentially some of the other reasonably foreseeable future projects. The Phoenix Expansion Project would not result in the permanent loss or alteration of wetlands. Wetlands affected by the Phoenix Expansion Project would be restored following construction and would likely revegetate within 2 to 3 years. Therefore, construction and operation of the Phoenix Expansion Project would not contribute to cumulative long-term impacts on wetlands within the region.

4.12.3 Vegetation, Wildlife and Habitat, and Aquatic Resources

When projects are constructed at or close to the same time, they could have a cumulative impact on vegetation and wildlife occurring in the area. Right-of-way clearing and grading and other construction activities associated with the Phoenix Expansion Project along with the transportation, utility, and commercial/residential development projects listed in table 4.12-1 would result in the removal of vegetation; alteration of wildlife habitat; displacement of wildlife; and other potential secondary effects such as increased population stress, predation, and the establishment of invasive plant species. These effects would be greatest where the other projects are constructed within the same time frame and area as the proposed project and where the recovery time of the vegetation/habitat is equal to that of the project (i.e., long term). Because of the long-term impacts that would occur as a result of clearing desert vegetation, the Phoenix Expansion Project, if constructed along with the other projects listed in table 4.12-1, would result in cumulative impacts on vegetation and wildlife habitats. Transwestern's proposal to overlap its right-of-way onto existing previously disturbed rights-of-way and to adjust its clearing limits to avoid certain types of vegetation would minimize the areas of previously undisturbed vegetation that would be affected and thereby reduce potential additional cumulative impacts on vegetation communities and wildlife habitats. Implementation of Transwestern's UECRM Plan and Restoration Plan would promote revegetation of the right-of-way following construction. Additionally, the amount of vegetation/habitat affected would be small compared to that which is regionally available, and the majority of the right-of-way would be allowed to return to preconstruction conditions.

The projects listed in table 4.12-1 that are linear in nature (e.g., the transportation and utility projects) have the greatest potential to fragment wildlife habitat; however, this effect would be minimal because many of these projects, specifically the transportation projects, would be adjacent to existing linear facilities and would only incrementally widen existing corridors as is the case with the Phoenix Expansion Project. In addition, some of the projects would implement mitigation measures to reduce the potential for habitat fragmentation. For example, the State Highway 260 Project would incorporate "wildlife underpasses" into the highway design to allow wildlife to cross beneath the traffic lanes and maintain wildlife corridors (Arizona Department of Transportation, 2006a). The potential for habitat fragmentation resulting from the proposed Phoenix Expansion Project would be reduced because a majority of the disturbed areas would be allowed to return to pre-existing conditions although, in the case of desert habitats, this would occur over the long term. All of the projects would implement mitigation measures designed to minimize the potential for long-term erosion, increase the stability of site conditions, and in many cases control the spread of noxious weeds, thereby minimizing the degree and duration of the cumulative impacts of these projects.

Construction of the Phoenix Expansion Project at the same time as other projects listed in table 4.12-1 that would affect waterbodies could cause cumulative impacts on aquatic resources within the project area. The crossings of the San Juan River and Verde River have the greatest potential to affect aquatic resources because they support federally and/or state-listed endangered species or other special status species and potential critical habitat. The geographic extent and duration of disturbances caused by construction of the Phoenix Expansion Project would be minimal and further minimized by the implementation of Transwestern's WWCM Procedures and site-specific crossing plans prepared in consultation with the Agency Staffs and other agencies. Additionally, the other projects listed in table 4.12-1 that would involve direct in-stream impacts on fisheries would be required to obtain permits from the COE, the NMDGF, and the AGFD, and consult with the FWS as well. These agencies would require measures to mitigate impacts on aquatic resources associated with these other projects.

If the San Juan River is successfully crossed using the HDD method, impacts would not be expected to occur. Should a frac-out occur during the San Juan River HDD crossing, any effects would be minimized by the implementation of Transwestern's HDD Plan. The duration of any disturbances

caused by construction of the Phoenix Expansion Project would be minimal and further minimized by the implementation of Transwestern's WWCM Procedures, SPR Procedures, and HDD Plan in addition to any conditions required by the COE, the NMDGF, and the AFGD, as part of their respective permit approvals. If the San Juan River HDD is unsuccessful, an additional 3.0 acres of riparian vegetation would be affected, which could result in additional impacts on aquatic habitat. However, because of the potential for special status species to occur in the vicinity of the San Juan River crossing, additional mitigation measures would be implemented to reduce potential impacts on aquatic resources should an open-cut crossing be required (see section 4.6).

Animal and plant species that are federally and/or state-listed threatened and endangered species and their critical habitat were identified in the project area. Cumulative impacts on these species could result if other foreseeable future projects would affect the same species or their habitats. We have determined that three special status species (the Colorado pikeminnow, the razorback sucker, and the spikedace) would likely be adversely affected by the project (see section 4.6). We have also determined that the project is likely to result in the destruction or adverse modification of designated critical habitat for the spikedace, which occurs at the proposed crossing location of the Verde River (see section 4.6). Therefore, the Phoenix Expansion Project would result in cumulative impacts on special status species if other projects listed in table 4.12-1 would also occur within habitats that support these species.

For the Phoenix Expansion Project, the FERC staff initiated formal consultation with the FWS and the FWS is expected to issue a BO regarding whether the proposed project would likely jeopardize the continued existence of the Colorado pikeminnow, the razorback sucker, and the spikedace or result in the destruction or adverse modification of critical habitat for the spikedace. The BO would contain the FWS' non-discretionary terms and conditions in order to ensure that the project would not jeopardize the continued existence of these species. Similar consultation with jurisdictional agencies would occur for the other foreseeable future projects, and conservation measures would likely be required for each of the projects to minimize potential impacts on federally and state-listed species. These conservation measures would be project-specific and would be expected to reduce impacts such that the projects would not adversely affect the majority of special status species or would not jeopardize the continued existence of a species or cause the adverse modification of critical habitat.

4.12.4 Land Use, Recreation and Special Interest Areas, and Visual Resources

The proposed project and several other foreseeable future projects would result in both temporary and permanent changes to current land uses. Much of the land that would be disturbed by construction is open land. Construction of the Phoenix Expansion Project would temporarily disturb about 5,992.2 acres of land of which 66 percent would be rangeland, 28 percent would be developed land, 6 percent would be agricultural land, and less than 1 percent would be residential land. The transportation and commercial/residential development projects listed in table 4.12-1 would disturb thousands of additional acres of land affecting a variety of land uses although the primary land use affected would be rangeland. While most of these projects would have permanent impacts on land uses, the majority of land use impacts associated with the Phoenix Expansion Project would be temporary, as most land uses would be allowed to revert to prior uses following construction. Permanent impacts on land use would be small because 94 percent of the land affected by construction of the pipeline facilities would be allowed to revert to prior uses following construction with no restrictions; although about 347.8 acres of additional land would be required for the operation of aboveground facilities (19.7 acres) and use of the permanent access roads (328.1 acres).

The proposed project, if built at the same time as other foreseeable future projects, could result in cumulative impacts on recreation and special interest areas if these projects would affect the same area or feature (e.g., trails) at the same time. The proposed pipeline facilities would cross or be located adjacent

to several recreation and special interest areas. However, because the Phoenix Expansion Project would be constructed primarily within or adjacent to existing rights-of-way and would not substantially affect the current land uses, most project-related impacts would be short term, often lasting only for the duration of construction through that area, after which the area would be restored to its preconstruction condition.

The visual character of the existing landscape is defined by historic and current land uses such as agriculture, recreation, conservation, and development. The visual qualities of the landscape are further influenced by existing linear installations such as highways, railroads, pipelines, and electrical transmission and distribution lines. Within this context, the proposed meter stations, valves, and other aboveground facilities would have the most visual impact, while the pipeline portion of the proposed project would be visually subordinate to the existing landscape character and would contribute only incrementally to overall visual conditions, particularly after completion of reclamation and the re-establishment of vegetation. However, the majority of the project would affect desert vegetation where the impact would be greater because it would take many years to regenerate. The transportation, utility, and commercial/residential projects listed in table 4.12-1 would have the most impact on visual resources in the area. Because 91 percent of the San Juan Lateral Loops and 86 percent of the Phoenix Lateral would be located adjacent to existing rights-of-way, the visual impact would be minimal. In addition, Transwestern's UECRM Plan and Restoration Plan would promote revegetation of the right-of-way with native herbaceous and scrub species. A relatively short section of Loop A would cross an area on BLM-managed lands designated as VRM Class II, and the area where the Phoenix Lateral crosses Little Hell Canyon Reservoir on Forest System lands is designated as SIO Level 2 High. Because Transwestern coordinated with the BLM and the FS to develop visual studies and site-specific visual mitigation measures for the respective areas, it is expected that visual impacts would be adequately mitigated and not result in cumulative impacts on visual resources (see section 4.7.7). To reduce impacts on visual resources associated with the new aboveground faculties, Transwestern would paint the facilities to blend with the surrounding landscape. In addition, the majority of these aboveground facilities occur within rural landscapes where visual impact would be minimal.

4.12.5 Socioeconomics

Present and reasonably foreseeable future projects and activities could cumulatively impact socioeconomic conditions in the project area. Employment, housing, infrastructure, and public services could experience both beneficial and detrimental impacts.

Economy and Employment

The projects considered in this section would have cumulative effects on employment during construction if more than one project is built at the same time. Transwestern estimates that the Phoenix Expansion Project would employ up to 2,220 workers during the peak construction months, of which, about 40 percent of its construction workforce would be local hires. If the larger projects are built simultaneously, the demand for workers could exceed the local supply of appropriately skilled labor. The counties affected by the project have a civilian labor force of about 1,758,850 people and an average unemployment rate of 4.8 percent. This suggests that the local labor force could meet much of the employment needs induced by construction of these projects, although it is unknown whether a sufficient number of these unemployed persons have the necessary skills to work on these projects. Therefore, if these projects are constructed at the same time, the demand for local workers may exceed supply. It is assumed that the remainder of the employment positions would be filled by non-local hires. Transwestern anticipates hiring between three to four full-time staff to fill permanent positions associated with operation and maintenance of the facilities. This small increase in full-time positions within the project area would have a positive effect on the economy.

In addition to impacts on local employment, these projects would provide an increase in tax revenue for New Mexico and Arizona, the counties, and other local economies through the payment of payroll tax, sales tax, property tax, and other taxes and fees. As discussed in sections 4.8.1 and 4.8.6, the estimated payroll for the proposed Phoenix Expansion Project would be about $69 million during the construction phase and the annual property taxes are anticipated to be $16.2 million. A similar net increase in payroll and tax revenues could be expected from the other projects listed in table 4.12-1. The proposed project would have both short- and long-term beneficial impacts on state, county, and local economies.

Temporary Housing

Temporary housing for the construction workers would be needed for the portion of the workforce not drawn from the local area. Given the vacancy rates, the number of rental housing units in the area, and the number of hotel/motel rooms and campgrounds available in the cities and towns in the vicinity of the project, construction crews should not encounter difficulty in finding temporary housing. If construction occurs concurrently with other projects, temporary housing would still be available but may be slightly more difficult to find and/or more expensive to secure. Regardless, these effects would be temporary, lasting only for the duration of construction, and there would be no long-term cumulative effect on housing from the proposed project.

Public Services

The cumulative impact of the Phoenix Expansion Project and the other projects listed in table 4.12-1 on infrastructure and public services would depend on the number of projects under construction at one time. The small incremental demands of several projects occurring at the same time could become difficult for police, fire, and emergency service personnel to address. This problem would be temporary, occur only for the length of construction, and could be mitigated by the various project sponsors providing their own personnel to augment the local capability or by providing additional funds or training for local personnel. No long-term cumulative effect on infrastructure and public services is anticipated from the proposed project.

Transportation and Traffic

Where installation of the proposed project occurs at road crossings, road traffic could be temporarily disrupted or delayed. Construction activities could disrupt traffic flow, and result in cumulative impacts on traffic in the project area if several projects are being constructed at once. Major roads and highways would be bored and construction would not affect traffic. The addition of traffic associated with construction personnel commuting to and from the project sites could affect traffic congestion in the region if several of the projects listed in table 4.12-1, particularly the transportation projects, would occur within the same time frame. However, workers associated with the Phoenix Expansion Project would commute to and from the pipeline right-of-way, pipe storage and contractor yards, and aboveground facility sites during off-peak traffic hours (e.g., before 7:00 AM and after 6:00 PM) and much of this activity would occur within more rural areas having less congestion. Moreover, it is unlikely that each project would reach peak traffic conditions simultaneously; therefore, potential cumulative impacts on traffic from construction, should they occur, are expected to be temporary and short term. Once construction of the project is complete, there would be no impacts on traffic from operation or maintenance of the facilities.

Environmental Justice

As discussed in section 4.8.7, no disproportionately high and adverse human health or environmental effects on minority and/or low-income communities have been identified. Therefore, the project would neither result in a disproportionately high and adverse effect or impact on minority or low-income populations nor contribute to a cumulative impact on these populations.

4.12.6 Cultural Resources

Past disturbances to cultural resources sites in the project area have been related to accidental disturbance by OHV users; intentional destruction or vandalism; and construction and maintenance operations associated with existing roads, railroads, and transmission lines. The currently proposed projects listed in table 4.12-1 that are defined as federal actions would include mitigation measures designed to avoid or minimize additional direct impacts on cultural resources. Where direct impacts on significant cultural resources are unavoidable, mitigation (e.g., recovery and curation of materials) would occur before construction. Non-federal actions would need to comply with any mitigation measures required by the affected states. Increased access by rights-of-way and service roads would increase the potential for trespass or vandalism at previously inaccessible sites. Therefore, the proposed project may incrementally add to the effects of the other projects. However, this incremental increase would not be significant.

4.12.7 Air Quality and Noise

The Phoenix Expansion Project and the projects listed in table 4.12-1 would all involve the use of heavy equipment that would generate emissions of air contaminants, fugitive dust, and noise. The majority of these impacts would be minimized because the construction activities would occur over a large geographical area.

Any air quality impacts would be localized and confined primarily to the airsheds in which the projects occur. Cumulative impacts on air quality, therefore, would be limited primarily to areas where more than one project is proposed within the same airshed and would be constructed simultaneously. Several projects, including both transportation and housing development projects, are planned in the vicinity of the project and may be constructed within the same time frame. These effects could temporarily add to the ongoing effects from any commercial activities and traffic in the project area. Mitigation measures similar to those outlined in section 4.10.1.3 for the proposed project would likely be required for these other projects. Because the projects listed in table 4.12-1 would take place over a large area; have varying construction schedules; and adhere to federal, state, and local regulations for the protection of ambient air quality, long-term cumulative impacts on air quality would not be anticipated. A portion of the proposed project would traverse the Phoenix-Mesa Planning Area, which is classified as a Subpart 1 nonattainment area with respect to the federal 8-hour ozone standard. As discussed in section 4.10.1.4, the MAG has included the 2008 NO_x and VOC construction emissions from the proposed project in the Phoenix-Mesa Planning Area as part of the emissions budgets in the 8-hour ozone SIP that was sent by the ADEQ to the EPA for approval. This plan, along with additional documentation provided by the ADEQ to the EPA formed the basis for the Final General Conformity Determination that was prepared for the Phoenix Expansion Project (see Appendix Q). The FERC has determined that the Phoenix Expansion Project would be in conformance with the federal General Conformity requirements. Additionally, because no additional compression would be installed, the proposed project would not add any stationary or permanent sources of NO_x, CO, VOC, PM_{10}, $PM_{2.5}$, or SO_2 to the environment; therefore, operation of the Phoenix Expansion Project would not contribute cumulatively to air quality.

Because the impact of noise is highly localized and attenuates quickly as the distance from the noise source increases, cumulative impacts associated with construction or operation would be unlikely unless one or more of the projects listed in table 4.12-1 is constructed at the same time in the same location. However, even short-term additional noise during construction could, for example, create enough disturbance to nesting birds to constitute a potential adverse impact. Although the project could result in cumulative noise impacts if other projects listed in table 4.12-1 would be constructed within the same time frame and vicinity, the majority of these impacts would be limited to the period of construction.

4.12.8 Reliability and Safety

Impact on reliability and public safety would be mitigated through the use of the DOT Minimum Federal Safety Standards in Title 49 CFR Part 192, which are intended to protect the public and to prevent natural gas facility accidents and failures. In addition, Transwestern's construction contractors would be required to comply with the OSHA Safety and Health Regulations for Construction in Title 29 CFR Part 1926. No cumulative impacts on safety and reliability would be anticipated to occur.

4.12.9 Conclusion

The majority of cumulative impacts would be temporary and minor. However, long-term cumulative impacts would occur on vegetation, wildlife habitat, and special status species. Long-term cumulative benefits to the community would be realized from the increased tax revenues. Short-term cumulative benefits would also be realized through jobs and wages and purchases of goods and materials.

4.12.10 No Action Alternative

Under the No Action Alternative, no resources as discussed in each section would be affected; therefore, no cumulative impacts would result from this alternative.