

Draft Finding of No Significant Impact

and

Draft Environmental Assessment

for the

Acequia de la Posecion Rehabilitation Project Rio Arriba County, New Mexico

December 2008

Prepared for:

**U.S. Army Corps of Engineers,
Albuquerque District**



**US Army Corps
of Engineers®**

Prepared by:

**Tetra Tech, Inc.
Surface Water Group
6121 Indian School Rd. NE, Suite 205
Albuquerque, New Mexico 87110**



DRAFT FINDING OF NO SIGNIFICANT IMPACT (FONSI) Acequia de la Posecion Rehabilitation Project

December 2008

The U.S. Army Corps of Engineers (Corps), Albuquerque District, at the request of the New Mexico State Engineer's Office, and the Acequia de la Posecion Association, are planning a project to rehabilitate a segment of the Acequia de la Posecion. The project area is located within the historically significant Nuestra Señora del Rosario, San Fernando, y Santiago Community Land Grant (1754) approximately three miles east of the Village of Truchas, in Rio Arriba County, New Mexico.

The proposed rehabilitation work on Acequia de la Posecion will be conducted under Section 1113 of the Water Resources Development Act of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq.), as amended. The Act authorizes the Acequia Rehabilitation Program for the restoration and rehabilitation of irrigation ditch systems (acequias) in New Mexico.

The existing system for delivering water is an earthen ditch with a manually operated diversion structure that regulates flows in the acequia. Acequia de la Posecion receives its water supply by diversions from the Rio de Truchas. The Corps proposes to rehabilitate Acequia de la Posecion by installing 24-inch polyvinylchloride (PVC) pipe. The newly piped alignment will then be buried. The total linear distance to be rehabilitated is 9,321 feet with an estimated 8.6-acre area of impact (AOI).

Acequia de la Posecion serves 17 irrigators with approximately 167 acres in farm production. Farming is largely subsistence, and crops harvested include alfalfa, beans, corn, and other vegetables. Project construction is scheduled during the non-irrigation season (October-February) with an expected duration of approximately five (5) months. The Acequia de la Posecion Association will be responsible for assuring operation and maintenance upon project completion.

The primary objectives of the rehabilitation project are to improve the efficiency of water delivery to the acequia members and reduce some persistent and troublesome maintenance needs that are both costly and tend to pose a significant risk of personal injury to association members.

The Proposed Action will not change or affect water rights or the amount of water diverted. The Proposed Action will result in minor and/or temporary effects on soils, water resources, air quality, noise levels, aesthetics, land use and recreational resources, fish and wildlife, and socioeconomics. Long-term effects include the loss of non-jurisdictional wetlands and associated wetland vegetation and the removal of an estimated maximum of 1,468 coniferous and deciduous trees ranging in size from 3 inches to greater than 3 feet in diameter; however, the actual number of trees removed may be substantively less. These trees, and the AOI, lie within the association's legally defined easement. The Proposed Action was analyzed for, but will have no effect on,

physiography, geology, Indian trust assets, hazardous, toxic, or radioactive waste, or environmental justice. There is no known irreversible and irretrievable commitment of resources or cumulative effects. As required by the Endangered Species Act of 1973, the Corps has determined that the project will have no effect on any Threatened or Endangered species, or designated/proposed critical habitat receiving protection under the Endangered Species Act.

Rehabilitation of the acequia system may cause short-term increases in turbidity and suspended sediments in the Rio de Truchas from operation of various construction equipment and work at the diversion structure. However, pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344) and Federal Regulations (33 CFR 323.4(a)(3)), certain discharges for construction or maintenance of irrigation ditches have been exempted from Section 404 permitting. The Proposed Action is the rehabilitation of an existing irrigation structure that has been in functional use since 1754 and is, therefore, exempt from Section 404 permitting requirements. Best management practices will, however, be utilized during project construction to minimize effects to all surface water quality. Section 402(p) of the Clean Water Act specifies that stormwater discharge associated with construction activities disturbing one (1) or more total acres of land must be authorized by a National Pollutant Discharge Elimination System (NPDES) Permit. NPDES permit authorization may be required for the Proposed Action. Best management practices would be used as necessary to minimize erosion and sedimentation wherever project construction activities occur. Under Section 401 of the Clean Water Act, a State of New Mexico water quality certification would be required as construction would be in the Rio de Truchas as well as in the acequia system.

The Proposed Action will result in minor, short-term changes to local air quality. An increase in particulates will be expected as a result of topsoil disturbance; elevated but localized concentrations of carbon monoxide during construction are also anticipated. Construction-related effects to air quality will be minimized by employing the use of best management practices. Mechanized operation will conform to air quality control regulations as established by the Clean Air Act and the New Mexico Air Quality Control Act.

Implementing the Proposed Action will cause temporary increases in noise levels from the operation of heavy equipment. This increase will last approximately five (5) months during the construction period (October-February). All work will occur during normal daytime working hours. To reduce temporary construction noise, construction activities will comply with State and local noise control ordinances.

The proposed project would have an adverse effect to cultural resources. The Corps considers conversion of 9,321 feet of the Acequia de la Posecion from an earthen ditch to underground PVC pipeline an adverse effect to this historic property, as this represents a change in form to a little more than half of the acequia (56 percent). The project would not introduce a new alignment; it would follow the current alignment for most of its extent but would also include the reuse of an approximately 825-foot segment discontinued shortly after its construction in the 1970s. The function of the acequia, to

convey water to fields for farming, will remain the same. To mitigate adverse effects to the acequia, the Corps recommends conducting additional research on the acequia, including photographically documenting the acequia on archival paper; conducting oral history interviews with acequia association members; scanning and translating the Association's log book, which dates from 1900; and copying and transcribing 17 hours of interviews conducted in 1971 by the Association. The Corps recommends that these efforts could serve to mitigate the adverse effect that would occur to the Acequia de la Posecion from the proposed undertaking, and is currently in consultation with the New Mexico State Historic Preservation Office and other interested parties to come to an agreement regarding resolution of adverse effects from the proposed project. No other historic properties will be affected by the proposed project. No tribal concerns have been brought to the attention of the Corps.

Measures to protect the environment that will be implemented as part of this project include the following:

- The contractor would be required to have emission control devices on all equipment
- The contractor would use best management practices to control wind and water erosion, including wetting of soils within the construction zone and compliance with local soil sedimentation and erosion-control regulations. A SWPPP, if required, would be formulated
- Construction equipment and activities would comply with State and local noise control ordinances
- All borrow and waste would come from or be delivered to pre-approved/commercial quarries/disposal sites
- All fuels and lubricants would be stored outside of the 100-year floodplain of the Rio de Truchas and construction equipment would be inspected daily and monitored during operation to prevent leaking fuels or lubricants from entering surface water or soils
- All fueling of construction equipment would take place outside the 100-year floodplain of the Rio de Truchas
- All construction equipment would be cleaned with a high-pressure water jet before entering the project area to prevent introduction of invasive plant species
- All construction equipment would be cleaned with a high-pressure water jet prior to and upon exiting a given work area to prevent spread of invasive plant species

- Should previously unrecorded artifacts or features be discovered during construction activities, work would be stopped in the immediate vicinity of the discovery, a determination of eligibility made by a qualified professional, and a mitigation plan formulated in coordination with the New Mexico State Historic Preservation Officer and with American Indian tribes that may have concerns in the project area

Implementation of the Proposed Action is expected to benefit the Acequia de la Posecion Association economically and agriculturally by improving water delivery and reducing long-term maintenance needs and personal risks when performing such maintenance. In addition, construction of the project will provide some short-term economic benefits for local businesses in the area. The planned action is being coordinated with Federal, State, and local agencies with jurisdiction over the biological and cultural resources of the project area.

Based upon these factors and others discussed in the following Environmental Assessment, the Proposed Action is recommended and will not have significant effects on the human environment. Therefore, an Environmental Impact Statement (EIS) will not be prepared for the proposed rehabilitation work on the Acequia de la Posecion.

Date

Kimberly M. Colloton
Lieutenant Colonel, U.S. Army
District Commander

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- Appendix D.** Final Cultural Resources Survey Report (FCRSR)

1.0 INTRODUCTION

1.1 Project Background and Location

The U.S. Army Corps of Engineers (Corps), Albuquerque District, at the request of the New Mexico State Engineer's Office, and the Acequia de la Posecion Association, are planning a project to rehabilitate a segment of the Acequia de la Posecion.

The Water Resources Development Act (WRDA) of 1986 (Public Law 99-662) authorized the restoration and rehabilitation of irrigation ditch systems (acequias) in New Mexico. Under Section 1113 of WRDA, Congress has found that New Mexico's acequias, due to their significance in the settlement and development of the western United States, should be restored and preserved for their cultural and historic values to the region. The Secretary of the Army, acting through the Chief of Engineers (U.S. Army Corps of Engineers), and, when he determines it to be in the public interest, may enter into agreements providing for reimbursement to states, or political subdivisions thereof, for work to be performed by such non-Federal public entities at water resources development projects authorized for construction under the Secretary of the Army and through the supervision of the Corps. The Secretary of the Army, therefore, has been authorized and directed to undertake, without regard or consideration to economic analyses, such measures as are necessary to protect and restore New Mexico's acequias.

The Acequia de la Posecion Rehabilitation Project is located approximately three miles east of the Village of Truchas, in Rio Arriba County, New Mexico. The project area is located within the historically significant Nuestra Señora del Rosario, San Fernando, y Santiago Community Land Grant (1754); USGS 7.5' Quadrangle = Truchas, NM (36105a7 1953, photo revised 1977). The diversion structure is located at 432391E, 3988169N (UTM NAD83, Zone 13N; units = meters). The terrain slope is 35.6% with a southwest aspect (206.9°) at an elevation of 8,463 feet. The location at which Posecion's acequia madre (mother ditch) terminates and branches into the laterals is 429966E, 3988024N (UTM NAD83, Zone 13N; units = meters) with a terrain slope of 2.5% and a southeast aspect (124.9°) at an elevation of 8,395 feet.

Figure 1-1 shows the location and alignment of the Preferred Alternative (green) and a portion of the existing acequia that would be abandoned (red) with the completion and implementation of the Preferred Alternative. In addition, there are two (2) 1-acre staging areas located along existing local roadways that would provide access routes to the acequia construction area.

The Preferred Alternative traverses the area for approximately 9,321 linear feet and the abandoned portion of Acequia de la Posecion is approximately 2,185 linear feet. The area of disturbance around the Preferred Alternative is approximately 8.6 acres and is defined as an area extending 15 feet upslope and 25 feet down slope of the centerline of the acequia. The Acequia de la Posecion Association holds a legal easement per the 1971 New Mexico District Court ruling (*Fernandez vs. Sandoval et al.*, No. 11554) for an area extending approximately 30 feet or

more, as necessary for the operations and maintenance activities, on either side of the ditch centerline. The area of disturbance falls completely within the legally defined easement of the acequia; however, temporary access routes and staging areas would be required for construction activities.

Having a rich cultural history, the acequia has been in operation since 1754, providing irrigation water to Acequia de la Posecion association members. The proposed rehabilitation would begin at the upstream end of the ditch at the main diversion structure (Figure 1-2) and proceed downstream to a point where the laterals depart from Posecion's acequia madre (Figure 1-3) and includes two equipment staging areas of approximately 1.0 acre each (Figure 1-1). The Proposed Action consists of replacing a portion of the existing acequia with a buried, 24-inch diameter polyvinylchloride (PVC) pipeline.

1.2 Purpose and Need

The Proposed Action would reduce difficult and continual maintenance activities performed by the acequia association. Regular maintenance includes cleaning sediment and debris deposited by stormwater and snowmelt runoff. In addition, the proposed rehabilitation would improve irrigation water deliveries to the local farmers. Currently, members of the association must walk the length of the acequia (≈ 2 miles) to remove debris. At times, debris removal can be hazardous due to the remote and rugged conditions (Figure 1-4) and the possibility of personal injury places association members at risk. Frequent breaches of the acequia can also compromise water delivery.

1.3 Related Activities

There are no known related activities associated with the Acequia de la Posecion Rehabilitation Project.

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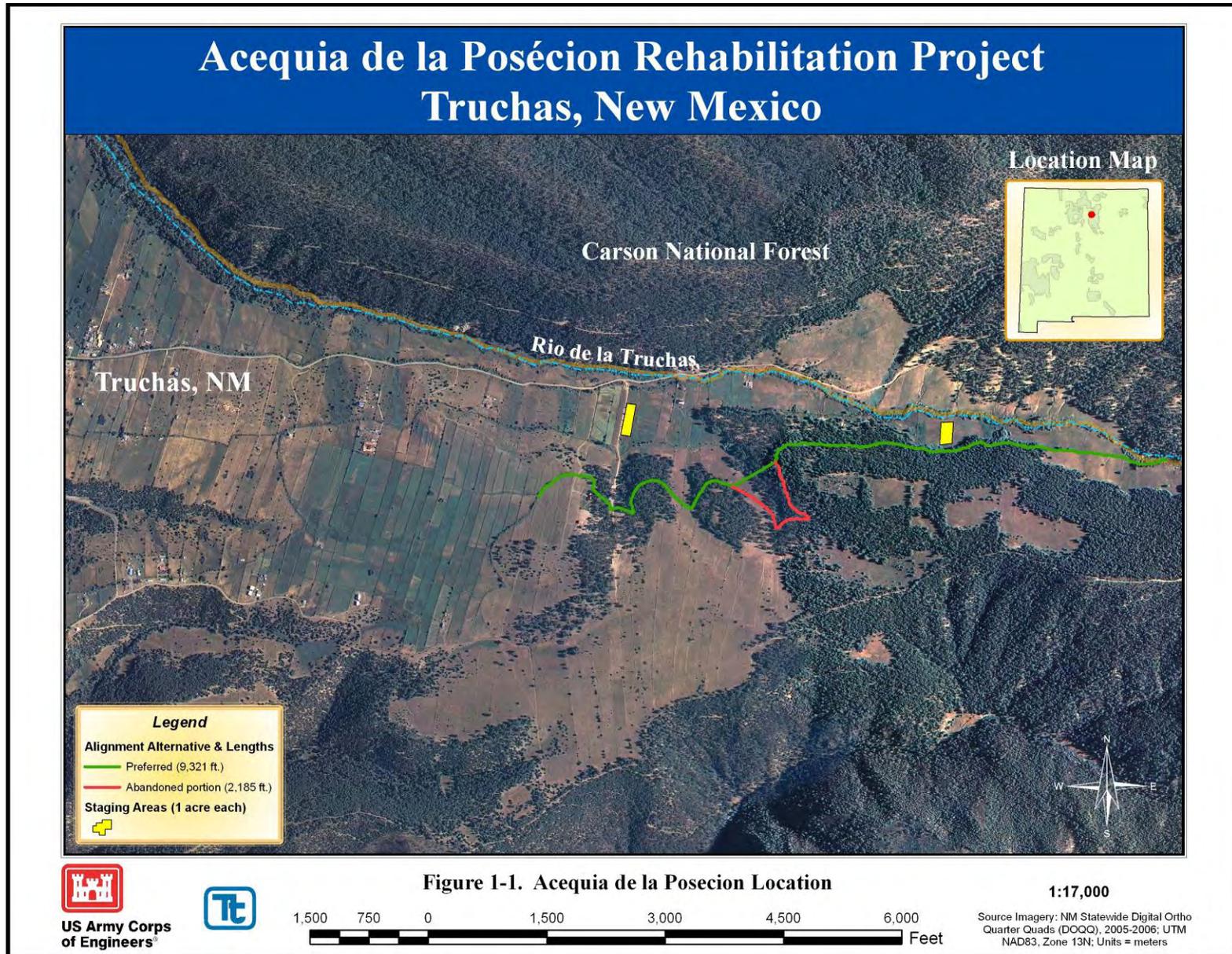




Figure 1-2. Acequia de la Posecion diversion structure – Acequia water diverted toward lower left of photo.



Figure 1-3. Branching to primary lateral – lateral flows toward upper left of photo.



Figure 1-4. Typical wooded area of acequia showing rugged conditions

1.4 Regulatory Compliance

This Environmental Assessment (EA) was prepared by the U.S. Army Corps of Engineers, Albuquerque District, in compliance with all applicable Federal Statutes, Regulations, and Executive Orders, including the following:

- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470)
- Clean Water Act of 1972 and Amendments of 1977 (CWA)
- Clean Air Act of 1972, as amended (42U.S.C. 7401 *et seq.*)
- Endangered Species Act of 1973, (ESA) as amended (16 U.S.C. 1531 *et seq.*)
- Fish and Wildlife Coordination Act of 1958 (16 U.S.C. 661 *et seq.*, as amended)
- Migratory Bird Treaty Act (16 U.S.C. 703–711)
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, 1994
- Executive Order 13112, Invasive Species, sec. 2(a)(2)(IV), 1999
- Farmland Protection Policy Act of 1981, as amended (7 U.S.C. 4201 *et seq.*)
- Federal Noxious Weed Act of 1974 (Public law 93-269; 7 U.S.C. 2801)
- Floodplain Management (Executive Order 11988)
- National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*)
- U.S. Army Corps of Engineers Procedures for Implementing NEPA (33 CFR 230, ER 200-2-2)
- Regulations of Implementing the Procedural Provisions of NEPA (40 CFR 1500 *et seq.*)
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 *et seq.*)
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001 *et seq.*)
- Protection and Enhancement of the Cultural Environment (Executive Order 11593)
- Protection of Wetlands (Executive Order 11990)
- Procedures of Implementing NEPA (33 CFR 230; ER 200-2-2)
- Safe Drinking Water Act (SDWA)

This Environmental Assessment also reflects compliance with all applicable State of New Mexico and local regulations, statutes, policies, and standards for conserving the environment such as water and air quality, endangered plants and animals, and cultural resources.

Regulations for implementing NEPA require analysis of social effects when they are interrelated with effects on the physical or natural environment (40 CFR §1508.14). Federal agencies are required to "*identify and address disproportionately high and adverse human health or environmental effects*" of their programs and actions on minority populations and low-income populations, as directed by Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations).

2.0 ALTERNATIVES AND PROPOSED ACTION

Federal agencies that assist in projects that utilize public funding are mandated by the National Environmental Policy Act to evaluate alternative courses of action so that decisions are made in the best interests of the public. Although Public Law 99-662 directs the Corps to restore New Mexico's acequias without regard to economic analysis, the Proposed Action was reviewed to provide the most viable and economical structural design. This included reasonable structural alternatives and considered a balanced approach to safe and efficient project implementation; social, economic, and environmental impacts of the proposed construction; and Federal, State, and local environmental resource protection goals.

2.1 Proposed Action

The Corps, Albuquerque District, in cooperation with the Acequia de la Posecion proposes to: (1) replace 9,321 linear feet of existing earthen ditch with a buried 24" diameter polyvinylchloride (PVC) conduit, which includes 825 linear feet for a buried inverted siphon – there is currently steel piping along this span that was previously installed by the acequia association (see Figure 1-5), (2) installation of 23 reinforced concrete manholes, and (3) a sluice structure. Two one-acre staging areas have been identified along the acequia's alignment and would utilize existing roads as access to the project area. All pipeline work would occur within the acequia's existing right-of-way (legally defined easement). The Proposed Action would not change or affect water rights or the amount of water diverted. The Proposed Action would abandon 2,185 linear feet of the existing earthen ditch in favor of using the inverted siphon's alignment (see Figures 1-1 and 1-5).



Figure 1-5. Previously installed inverted siphon

2.2 Future Without Project (No-Action)

The No Action alternative would consist of no modification of the existing open ditch conveyance system. The earthen ditch and existing sluice would continue to function and be maintained as they have in the recent past. The ditch would still suffer from the following maintenance issues: root growth, rodents and beavers, loss of water due to piping, and slope drainage issues. Typical maintenance of the acequia system in the project's area of influence would continue including cleaning of sediment and vegetation from the existing earthen ditch and piling dirt along the ditch to maintain adequate carrying capacity and minimize overflows.

2.3 Alternatives Considered but Eliminated from Further Study

Three alternatives that were considered and eliminated from further study include:

- 1) Replacing approximately 10,800 linear feet of earthen ditch with 24-inch polyvinylchloride (PVC) conduit;
- 2) Replacing approximately 10,800 linear feet of earthen ditch with concrete lining and;
- 3) Replacing approximately 10,800 linear feet of earthen ditch with half round pipe.

These alternatives were removed from further consideration. First, the siphon alignment is a more efficient way of conveying water through that stretch and reduces the need of 2,185 linear feet of pipe and pipe placement. Concrete lining and half-round pipe would not solve infilling of sediment from the embankment. These alternatives were not carried forward for further review in this EA due to factors such as cost, logistics, maintenance requirements, and/or functionality.

3.0 EXISTING ENVIRONMENT AND FORESEEABLE EFFECTS

3.1 Physiography, Geology, and Soils

3.1.1 Existing Conditions

The project area is located in the Sangre de Cristo Mountains within the Southern Rocky Mountain Physiographic Province. The Southern Rocky Mountain Province extends from south-central Colorado into north-central New Mexico as a two-pronged system of high mountain ranges separated by the deep structural basins of the northern Rio Grande rift. The Southern Rocky Mountain Province also includes the San Luis Valley, a Rio Grande rift basin that is transitional southward to the Española Valley in the Basin and Range Province. Toward the southern end of this rift basin, the Rio Grande has cut a deep canyon (the Rio Grande Gorge) in the thick accumulations of Pliocene basalt that forms the central Taos Plateau. The eastern portion of this plateau includes a plain built predominantly by alluvial fans at the base of the Sangre de Cristo Mountains. The Sangre de Cristo Mountains have a core of crystalline Precambrian rock overlain by thick layers of Paleozoic, Mesozoic, and lower Cenozoic sedimentary rock. Cenozoic volcanic and sedimentary layers cap the range in many areas.

Three soil mapping units occur in the survey area: Sedillo–Silva association, strongly sloping (SED), Manzano clay loam, 3-5% slopes (MnC), and Fernando clay loam, 3-5% slopes (FeC) (NRCS 2008). The Sedillo–Silva association occurs in about 90% of the acequia corridor; the other two are found near the east and west ends, respectively, and together make up the proportional balance of the project area in roughly equal amounts.

The soil erodibility factors, K_w and K_f , predict the long-term average soil loss that results from sheet and rill erosion. K_w considers the whole soil while K_f considers only the fine-earth (rock-free) fraction (<2 mm); values for both can range from 0.02-0.69 tons/acre. The wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion in tons/acre/year. The value applies only to the surface layer, and values can range from 0 to 310 tons/acre/year. The T factor (T) is the soil loss tolerance, defined as the maximum amount of erosion in tons/acre/year at which the quality of a soil as a medium for plant growth can be maintained. T values can range from 1-5 tons/acre/year.

Erosion hazard ratings (off-road, off-trail) indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope and soil erosion factor K (as discussed above). Soil loss is caused by sheet or rill erosion in off-road or off-trail areas when 50 to 75% of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance. The ratings are both qualitative and quantitative. The hazard is described as slight, moderate, severe, or very severe. A rating of slight indicates that erosion is unlikely under ordinary climatic conditions; moderate indicates that some erosion is likely and that erosion-control measures may be needed; severe indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and very severe indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion control measures are costly and generally impractical.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00). Table 3-1 summarizes these soil characteristics for the project area.

Table 3-1. Summary of soil properties in project area

Soil	Landform and Parent Material	Erosion Hazard	K_w	K_f	Wind Erodibility Index	T
Sedillo-Silva association, strongly sloping (SED)	Ridges. Alluvium derived from igneous and metamorphic rock and/or eolian deposits derived from sandstone and shale.	Moderate 0.50	0.24	0.37	38	5
Manzano clay loam, 3-5% slopes (MnC)	Alluvial fans. Alluvium derived from igneous and metamorphic rock.	Slight --	0.32	0.32	48	5
Fernando clay loam, 3-5% slopes (FeC)	Arroyos. Alluvium derived from igneous and metamorphic rock.	Slight --	0.32	0.32	86	5

3.1.2 Foreseeable Effects on Physiography, Geology, and Soils

No Action – The No Action Alternative would have no effect on physiography, geology, or soils. There would be no construction and existing conditions would continue.

Proposed Action – The Proposed Action would have no effects on the nature or characteristics of the area’s physiography or geology, as these resources are essentially invariant and incapable of experiencing impacts resulting from the Proposed Action. Effects to soils would be short-term, temporary, and minor – although the hydric character of the soils near the existing acequia’s alignment would likely cease to exist. Disturbed areas (*i.e.* excavated and spoil material) would be subject to erosion by wind and water as detailed above.

3.1.3 Environmental Commitments

Best management practices would minimize erosion to soils and include the use of silt fences, and other mechanical means of erosion control, and the periodic application of water to spoil piles and disturbed areas. Construction contractor would be required to comply with all other applicable erosion and sedimentation regulations. All borrow and waste would come from or be delivered to pre-approved commercial quarries/disposal sites. Upon the completion of construction activities, all disturbed areas would be reseeded with native grasses and forbes to begin the recovery of the site and further minimize erosion.

3.2 Climate

3.2.1 Existing Conditions

Nestled high in the Sangre de Cristo Mountains of northern New Mexico, the project area lies at an elevation of approximately 8,400 feet above mean sea level. According to the New Mexico Climate Center Cooperative Observer Network, the total average annual precipitation in Truchas is 14.5 inches; however, reporting of these of data should always be given in context. For example, the Western Regional Climate Center shows substantively lower totals for a roughly commensurate, overlapping period of record (Figure 3-1). That is, 9.64 inches from 1961-1990 and, more similarly, 14.62 inches for the period of record from 1909-1962. Figure 3-1 also shows the monthly distribution of average minimum and maximum temperatures and precipitation totals for the period of record 1961-1990 (Western Regional Climate Center). Frost-free days are from 120-150 (Williams 1996) and the coldest winter temperatures typically occur in December with a 4.2°F average minimum. The warmest months are typically June and July with an average maximum temperature of 77.6°F and 77.8°F respectively. Winter snow packs in the area average 55 inches but can readily exceed 70 inches in wet years such as in 2005-2006. Late winter or early spring snows often contribute substantively to a given year’s total snowpack.

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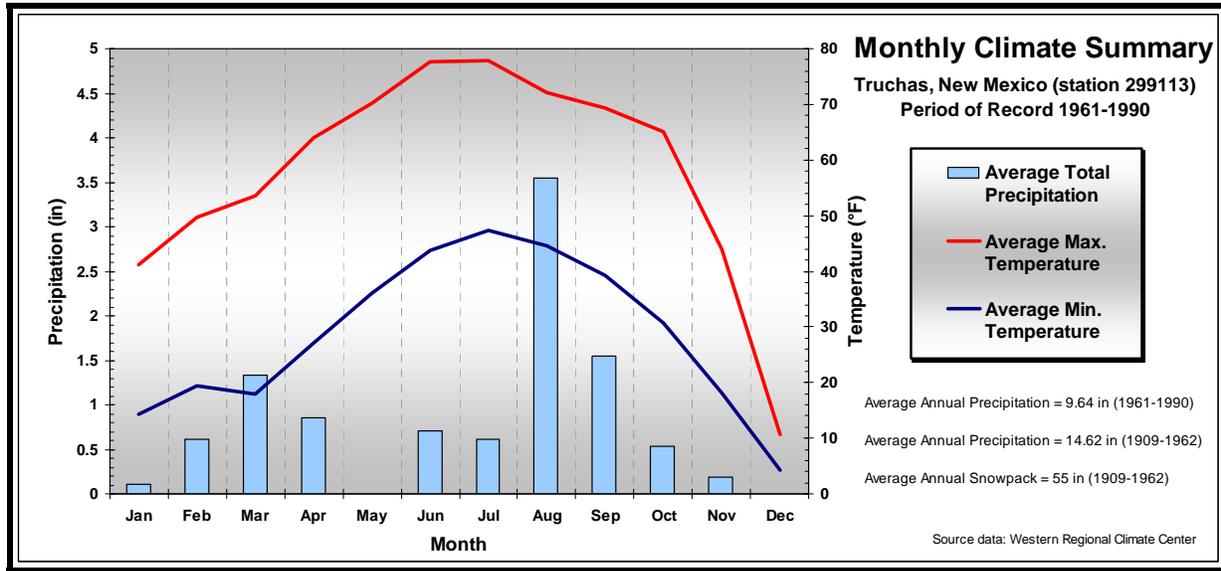


Figure 3-1. Climate summary for Truchas, New Mexico

Orographic (high or rising elevation) effects to the mid-latitude climatic patterns of the arid southwest often lead to significant increases in precipitation when compared to areas of lower elevations. New Mexico typically receives from 40-50% of its precipitation in a seasonal monsoon pattern (July-August/September) in which a subtropical high-pressure ridge moves northward from central Mexico to west Texas. This pattern can also be seen in Figure 3-1 where the monthly average precipitation for August (3.55 inches) far exceeds any other month of the year. The northward shift in the high-pressure ridge increases humidity, and thus thunderstorm activity over the southwest, by tapping the warm surface waters of the Gulf of Mexico and the Gulf of California and transporting that energy (latent heat of vaporization) in the prevailing winds aloft – a classic monsoonal flow that is a direct analog to monsoon patterns of more tropical regions. New Mexico and Arizona, however, lie at the northern most reaches of this climate pattern and tend to only marginally benefit from its effects. This pattern can be easily modulated by annual climate or sea-surface temperature variability, resulting in a disruption or amplification of the monsoonal flow. Leading to drought conditions, failure of the monsoons rapidly affect the regions water supply and tend to exacerbate and/or extend the forest fire season in mid to late summer.

Climate Change – Average air and sea-surface temperatures worldwide are predicted to increase beyond the current range of natural variability as human activities have, in the period since the onset of the Industrial Revolution, caused an accumulation of greenhouse gases (*e.g.* carbon dioxide) in the global atmosphere (U.S. Environmental Protection Agency, 1998). The potential effects resulting from climate change are varied and imprecise; however, there is a virtual certainty that human-induced climate change represents a clear and ever-increasing threat to the natural and human environments.

As a result of climate change, summer air temperatures in the southwestern United States are predicted to rise considerably from 2010 through 2039, average annual precipitation is expected to decrease, and mountain snow-packs are predicted to decrease significantly (Field et al. 2007). New Mexico Governor Bill Richardson signed Executive Order 05-33 in 2005, which included development of recommendations for reducing greenhouse gas emissions in New Mexico to year 2000 levels by 2012, 10% below 2000 levels by 2020, and 75% below 2000 levels by 2050. The year 2000 reference level is 83 million metric tons of carbon dioxide equivalent gasses (New Mexico Climate Change Advisory Group 2006). Residential and commercial fuel use accounted for about five percent of total emissions in the State in 2000, or about 7.3 million metric tons of carbon dioxide equivalent gasses (New Mexico Climate Change Advisory Group 2006).

Measuring or quantifying inputs to climate change variables or overall patterns in a given area is difficult at best as the atmosphere is a well-mixed, essentially open system. Nonetheless, limits on greenhouse gasses are a growing and necessary reality of our time.

3.2.2 Foreseeable Effects on Climate

No Action – The No Action alternative would pose no effects to the areas climate or trends in climate change. There would be no construction and existing conditions would continue.

Proposed Action – The Proposed Action would not pose any measurable effects to the area's climate or trends in climate change. Operation of construction equipment during the construction period would produce greenhouse gas emissions. Combustion of one gallon of diesel fuel generates about 22.4 pounds of carbon dioxide equivalent gasses and an average piece of construction equipment may burn five to eight gallons per hour of diesel fuel. Likely constructions equipment includes backhoes, dump trucks, chainsaws, and ordinary pick-up trucks.

3.2.3 Environmental Commitments

Best management and efficient construction practices would minimize the emissions from construction equipment and contractor vehicles and construction equipment would be required to have operable emission control devices.

3.3 Hydrology and Hydraulics

3.3.1 Existing Conditions

The area surrounding the existing acequia currently retains the runoff produced by any precipitation in the immediate upstream area. Any runoff in the acequia can be used as irrigation water and have the chance to infiltrate into the fields, thus returning to the watershed at a lower elevation. Surface runoff or sheet flows often damage the acequia and can transport debris into the existing open ditch.

3.3.2 Foreseeable Effects on Hydrology and Hydraulics

No Action – The No Action alternative would pose no effects to the hydrology and hydraulics of the acequia or any of the surrounding areas. There would be no construction and existing conditions would continue.

Proposed Action – The hydraulics of the Proposed Action would remain similar to the existing acequia. Water collected from the stream bypass sluice-gate would run downhill in the existing direction with slight modifications to the existing horizontal and vertical alignment. The proposed pipeline could convey a larger flowrate of water due to the lower friction of PVC versus a soil ditch and a steadier slope along the length of the pipeline. A benchmark or guideline should be established when installing the new control structure/valve for the new pipeline as to prevent the flooding (overwatering) of irrigated fields.

3.4 Net Water Depletions

3.4.1 Existing Conditions

Water flowing downhill as storm water runoff is retained by the existing acequia and is used as irrigation. This irrigation water can also infiltrate into the soil with some evaporation if left standing. Groundwater flow gradients are generally toward the Rio de Truchas in the valley floor. The acequia's water losses can currently be attributed to either evapotranspiration of the surrounding vegetation or groundwater seepage. Although not quantified, these losses serve to reduce the acequia association's irrigation water availability. Warmer temperatures will increase evapotranspiration losses.

3.4.2 Foreseeable Effects on Net Water Depletions

No Action – The No Action alternative would pose no effects on net depletions of the acequia or any of the surrounding water bodies. Current water-loss rates would remain and would continue to affect the acequia association. There would be no construction and existing conditions would continue.

Proposed Action – Overall, there would be negligible water depletions in the immediate watershed and a net water addition should occur after the proposed construction of the enclosed pipeline. Any water flowing in the acequia, which would normally be exposed to atmospheric conditions, would be enclosed within a PVC pipe and would not have the ability to evaporate.

3.5 Water Quality

3.5.1 Existing Conditions

Water quality in the area is generally good (NMED 2000). Although no sampling or testing occurred, observations during the surveys revealed un-impacted water that was clear in appearance; however, some areas were more turbid where vegetation was sparse and bank erosion more prevalent. Benthos appeared healthy although of low primary productivity. No

known data has been collected for the acequia, but water quality in the Rio de Truchas and the Rio Quemado watershed are considered good; although some impacts have been noted that indicate probable source(s) of pollutants/threats as agricultural and land disposal while specific pollutants or threats are siltation, temperature, and stream bottom deposits (NMED 2000). Similar water quality conditions are likely to exist in the acequia.

3.5.2 Foreseeable Effects on Net Water Quality

No Action – The No Action alternative would pose no effects to the water quality of the acequia or any of the surrounding water bodies. There would be no construction and existing conditions would continue.

Proposed Action – The water quality of the immediate area could be slightly affected during the proposed construction due to exposed soil and erosion; however, construction is scheduled during October-February when the acequia is not in operation. Little or no water will be passing through the ditch and therefore represents no substantive or foreseeable impact to water quality during the construction period. Section 402(p) of the CWA specifies that stormwater discharge associated with construction activities disturbing one (1) or more total acres of land must be authorized by a National Pollutant Discharge Elimination System (NPDES) Permit. NPDES permit authorization is required for the Proposed Action.

Once the proposed construction is complete, the area would be restored to its original land-shape and form. The area immediately adjacent to proposed pipeline would allow precipitation to infiltrate or run downhill to the next basin versus joining the water in the existing acequia. Returning this water to its natural drainage could improve the flow-rate and quality of the downhill stream basin (Rio de Truchas). Additional water quality benefits may occur with the proposed construction by the prevention of fecal material from livestock from entering the irrigation water and thus potentially inhibit the contamination of agricultural lands with pathogenic organisms such as *Escherichia coli* (*E. coli*).

3.5.3 Environmental Commitments

Best management practices would be used as necessary to minimize erosion and sedimentation wherever project construction activities occur. Reseeding with native grasses and forbes would ameliorate the majority of post-construction water quality issues.

3.6 Air Quality and Noise

3.6.1 Existing Conditions

The Clean Air Act of 1970 and amendments provide a comprehensive national program with the goal of reducing the levels of pollutants in the ambient air. The United States Environmental Protection Agency (USEPA) classifies air quality within designated Air Quality Control Regions (AQCR) according to whether the concentrations of criteria air pollutants in the atmosphere exceed primary or secondary criteria identified as National Ambient Air Quality Standards

(NAAQS). Criteria air pollutants include ozone, airborne particulates, carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. Areas within each AQCR are assigned a designation of attainment or nonattainment for each criteria air pollutant. An attainment designation indicates that air quality within an area is as good as or better than the NAAQS. Class 1 Federal lands include areas such as national parks, national wilderness areas, and national monuments, which are granted special air quality protections under Section 162(a) of the Clean Air Act. In such areas, limits are placed on the maximum allowable increases of sulfur dioxide, particulate matter, and nitrogen oxides above established baseline concentrations.

The project area is located in the Upper Rio Grande Valley Intrastate Air Quality Control Region, which consists of Santa Fe, Taos, Los Alamos Counties, and portions of eastern Rio Arriba County. The nearest Class 1 areas are the Pecos Wilderness to the southeast and the Bandelier Wilderness within the Bandelier National Monument to the southwest. Air quality at the project area is good. Intermittent dust is raised from vehicle use of dirt roads and from agricultural activities. There is occasional smoke from wood stoves, fireplaces, and debris burning. Rio Arriba County is in attainment status for State and Federal ambient air quality standards for all criteria pollutants. No exceedances of NAAQS have been recorded (NMED 2003a, 2003b, 2007a, 2007b).

Noise is generally defined as unwanted or harmful sound. It can be any sound that is undesirable because it interferes with communications or other human activities, is intense enough to damage hearing, or is otherwise annoying. Noise may be intermittent or continuous, steady or impulsive. Vibration is an element of impulsive noise that can cause annoyance and in fact structural damage if it is of sufficient magnitude. Human response to noise is extremely diverse and varies according to the type of noise source, the sensitivity and expectations of the receptor, the time of day, and the distance between the source and the receptor. Noise also can adversely affect and disturb wildlife. Noise analyses focus on the effects on sensitive receptors.

There are no noise studies relevant to the project area, but noise levels are low and typical of rural areas. The project area is approximately three miles east of the village of Truchas, which is along N.M. Highway 76 and County Road 75. Local unpaved access roads and County Roads 639 and 637 pass near the project area. Existing noise sources includes intermittent noise from wind, vehicles, farm equipment, and aircraft. There are no sensitive receptors present other than the occupants of a small number of residences. Wildlife and birds that may be sensitive to noise are likely present in the project area. Because human hearing is not equally sensitive to all sound frequencies, various frequency weighting schemes have been developed to approximate the way people hear sound. The A-weighted decibel scale (dBA) is normally used to approximate human hearing response to sound.

3.6.2 Foreseeable Effects to Air Quality and Noise

No Action – The No Action Alternative would have no effect on air quality or noise. There would be no construction and existing conditions would continue.

Proposed Action – Implementing the Proposed Action would result in short-term increases in fine particulate matter (PM10) and other air pollutants due to construction-related fugitive dust, vehicle use, soil disturbance, and diesel and chainsaw exhaust emissions. Visibility impacts due to dust would be temporary and would decrease after construction and as soils stabilize. Clearing the 30-foot pipeline alignment and removal of wood and woody debris may lead to additional vehicle use in the alignment and access areas and slow recovery of ground cover, prolonging dust impacts. The project would not violate any air quality standard or contribute substantially to air quality degradation.

Implementing the Proposed Action would also result in loud noise and ground-borne vibrations from construction vehicles, chainsaws, and other equipment. These effects would be short-term and variable, but may exceed 80 dBA in the immediate vicinity of the activity. Noise during the construction period (October-February) would disrupt the quiet setting during the daytime hours for nearby residents and temporarily displace birds and wildlife. Increased levels of noise during construction would be noticeable up to a mile away. After completion of the construction, these noise impacts would cease. The operation of the siphon would not produce any major noise, but there would be loss of the natural sound of flowing water that may be currently enjoyed by some residents.

3.6.3 Environmental Commitments

The Corps would incorporate measures to reduce emissions and particulate matter from human-caused sources into the project construction plans. The contractor would be required to have emission control devices on all equipment. Best management practices would be required to control erosion and reduce construction related dust, including the wetting soils in the construction zones and compliance with local soil sedimentation and erosion-control regulations. Disturbed areas would be reseeded with native grasses and forbes. With these measures, only minor effects would be expected.

Noise suppression measures would be taken to minimize disturbance of residents and protect workers during construction. Work would be confined to the daylight hours. Construction contracts would require that construction equipment and activities comply with applicable State and local noise control ordinances. All construction activities would be conducted outside of bird breeding season (see also Section 3.10.3).

3.7 Aesthetics

3.7.1 Existing Conditions

Aesthetics or visual resources refer to both the natural and artificial landscape features that contribute to perceived visual images and the aesthetic value of a view. This value is determined by contrasts, forms, and textures exhibited by geology, vegetation, and human-made features. Individuals respond differently to changes in the physical environment, depending on prior experiences and expectations and proximity and duration of views. Therefore, visual effects analyses tend to be highly subjective.

The visual setting and landscapes of the project area have not been formally assessed, but are typical of the rural agricultural communities in the mountains of northern New Mexico. Much of the project area is steeply sloped and wooded. The acequia is not generally visible from public viewpoints; however, the acequia does pass through some non-forested areas and terminates in agricultural fields. Primary potential viewpoints near the project area would include local roads and nearby residences. Distance views may be observed from homes along some ridgelines in the village of Truchas. In most parts of Truchas along County Road 75 and N.M. Highway 76, the project area is not visible due to topography. There are few man-made structures interrupting the views near the project area other than roads, the acequia, and a few homes and outbuildings. Background views include the forests and dramatic mountain peaks. The sensitivity of the visual resources specific to project area and the extent to which they are observed and valued locally is not known; however, the area is largely a mature coniferous forest (Figure 1-4, page 4).

3.7.2 Foreseeable Effects to Aesthetics

No Action – The No Action Alternative would have no effect on aesthetics. There would be no construction and current conditions would continue.

Proposed Action – Implementing the Proposed Action would result in long-term changes on aesthetics in those areas where trees would be removed to construct the pipeline. The cleared areas along the pipeline alignment through these areas would be visible from local viewpoints and may be visible from a distance as well. Changes to the visual setting and landscape on cleared lands and in staging areas would be less apparent. The change from a natural open ditch to a buried pipeline would likely be less aesthetically pleasing to residents and visitors near the corridor. The presence of heavy equipment, worker's vehicles, and staging areas would temporarily detract from the project area's setting during the construction period.

3.7.3 Environmental Commitments

The Corps would incorporate measures to reduce visual effects into the project design and construction plans. Disturbed areas would be reseeded with native grasses and forbes in order to reduce the visual scar on the landscape. However, the large trees that would be removed (see Section 3.9.3) would not be replaced.

3.8 Floodplains and Wetlands

3.8.1 Existing Conditions

Wetlands are areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR Part 328.3.b.). Wetlands generally include swamps, marshes, bogs, and similar areas. To be classified as a Corps of Engineers jurisdictional wetland, a site must simultaneously contain three types of physical evidence each with clearly specified and defined parameters. It must exhibit wetland hydrology, contain hydric (wetted) soils, and support sufficient numbers of hydrophytic (water or wetted-soil adapted)

plants (Environmental Laboratory 1987; U.S. Army Corps of Engineers 2008a). Wetland indicator metrics include one or more of the following:

- Surface water – wetland hydrology indicator A1
- High water table – wetland hydrology indicator A2
- Saturation – wetland hydrology indicator A3
- Biotic crust – wetland hydrology indicator B10
- Salt deposits – wetland hydrology indicator C5
- Facultative (FAC)-neutral vegetation test – wetland hydrology indicator D7

By definition, Corps of Engineers jurisdictional wetlands are Waters of the United States and are protected under the Clean Water Act of 1972 and Amendments of 1977.

A narrow fringe of hydrophytic plants and wetland-type habitats exist along both sides of most of the survey area, hydric soils probably exist in the acequia as a result of seasonal inundation and wetland hydrology occurs during the growing season when the ditch contains water (Figure 3-2).



Figure 3-2. Hydrophytic plants along alignment

It was also noted that several areas of acequia seepage support some hydrophytic plants; however, Corps regulatory staff have evaluated the entire project area and issued a site determination of non-jurisdictional wetlands due to the acequia being a man-made structure. Since Acequia de la Posecion is, therefore, not Waters of the United States, Corps jurisdictional wetlands are not present along the ditch or in the seepage (ditch leakage) areas; the presence of the wetlands is a result of ditch leakage.

Active floodplains located along the Posecion acequia madre's alignment are limited to the area around diversion structure. Through the remaining portions of the acequia, the ditch is greatly incised and flows regulated at the existing diversion structure are not sufficient to produce an active or dynamic floodplain. The acequia rapidly diverges from the Rio de Truchas and thus remains separated from its natural floodplain processes. In effect, the natural floodplain processes of the Rio de Truchas are not influenced from the presence or operation of the Acequia de la Posecion.

3.8.2 Foreseeable Effects on Floodplains and Wetlands

No Action – The No Action Alternative would have no effect on floodplains or wetlands. There would be no construction and existing conditions would continue.

Proposed Action – The installation of pipe with the Proposed Action would likely eliminate the hydric conditions that support the limited wetlands adjacent to the existing, un-piped alignment; however, the high elevation may be sufficient to support the established wetlands. If this is not the case, hydrophytic (obligate) wetland plants would cease to exist, and the area would revert to being dominated by facultative (able to exist in either hydric or more xeric soil conditions) and/or upland plant species. Wetland-related services (*i.e.* nutrient dynamics) would also cease; water diverted from the Rio de Truchas would remain essentially unchanged through the length of piped section. These effects are permanent and long-term, but not irretrievable. The elimination of the wetlands would reduce the biodiversity of both the project and surrounding areas. Food-web resources for terrestrial wildlife (and potentially fishes) would be accordantly reduced and assume the characteristics of an upland coniferous forest with no water source. The Proposed Action would have no effect on the Rio de Truchas floodplain as no change in ditch operation or water volume delivered would occur.

3.8.3 Environmental Commitments

Pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344) and Federal Regulations (33 CFR 323.4(a)(3)), certain discharges for the construction or maintenance of farm or stock ponds or irrigation ditches have been exempted from requiring a Section 404 permit. Included in the exemption is the construction or maintenance of farm or stock ponds or irrigation ditches; therefore, the Proposed Action will not require Section 404 permitting.

3.9 Vegetation Communities

3.9.1 Existing Conditions

The project area primarily passes through upper montane coniferous forest (Dick–Peddie et al. 1993). The acequia traverses approximately 500 feet of montane riparian vegetation near its divergence from the Rio de Truchas and, near the east and west ends, about 2,800 feet of agricultural fields and pastures. Since the target acequia segment is 9,321 feet long, the length passing through upper montane coniferous forest is approximately 5,900 feet. Hydrophytic vegetation grows in narrow strips along both sides of the majority of the acequia's alignment. The staging areas are located in grass and forb moist meadows, which appear to be used, at least intermittently, as pastures.

In the survey area, the dominant trees in the upper montane coniferous forest are Rocky Mountain fir (*Abies bifolia*) and Douglas fir (*Pseudotsuga menziesii*); other trees, principally Aspen (*Populus tremuloides*) and Ponderosa Pine (*Pinus ponderosa*), are fairly common in certain areas. In some places, the tree canopy is sufficiently dense that understory plant diversity is markedly reduced; elsewhere the canopy is open enough that understory shrubs, forbs, and grasses are abundant. Plant diversity is greatest in the more open places and in proximity to the acequia. Thinleaf Alder (*Alnus incana* ssp. *tenuifolia*) is common in the montane riparian

vegetation at the east end of the corridor near the Rio de Truchas, and other plants typically found in this type of riparian habitat are present. The existing agricultural fields and pastures likely occur where grassland or woodland once grew. Many forbs and grass species occur throughout much of the survey area, especially in open meadows.

3.9.2 Survey Results

A list of the plants observed and cataloged during surveys conducted on September 17, 2008 is shown in Appendix A. Seasonal surveys, conducted over a longer periods, may reveal additional plant species not identified here (Flora of North America 1993; Martin and Hutchins 1980).

3.9.3 Tree Density and Removal Estimates

Estimates of tree densities along the ditch were obtained in order to approximate a *maximum* number of trees that would need to be removed for acequia rehabilitation efforts. All living trees of any size, ranging from 1 inch to 3 feet in diameter, were counted by species in six (6) randomly sampled plots adjacent to the ditch in wooded areas. Each plot was a right triangle with two sides of 25 feet long and a hypotenuse of 35 feet (approximately 312.5 sq ft). The number of trees per acre was calculated by multiplying the average number of each species across all six plots by 139.4 (*i.e.* 43,560 sq ft per acre / 312.5 sq ft per plot) – again, providing an estimate of the number of trees per acre across all species. The result was then multiplied by the total disturbance zone (5.4 acres) to provide *maximum* estimate of trees removed.

Table 3-2 shows the results for tree density estimation on six (6) plots within forested areas along the acequia's surveyed alignment. There is, therefore, an average of 272 trees per acre (of any given species or size indicated in Table 3-2) within the forested areas of the alignment; however, the distribution of trees is somewhat patchy and species composition within patches varies. No single plot contains all of the species encountered across all of the plots and the calculated density per acre for each species applies only to locations that support those species. For example, aspen will generally not be found in places that have dense stands of Rocky Mountain fir and Douglas fir and vice versa.

Again, the total forested area within the disturbance zone (extending 15 feet upslope and 25 feet down slope from the ditch banks) along the alignment is approximately 5.4 acres. Consequently, the estimation of the *maximum* number of trees to be removed is 1,468. The actual number of trees removed is likely to be significantly less as construction activities and impacts would alternate from the upslope to down slope sides of the ditch, and certainly not call for the complete clearing of all trees in the acequia's legal easement (which extends 30 feet on either side of the ditch's centerline). Nonetheless, there would be a need for substantial tree removal for equipment access; the extent of which would be determined, but minimized, on-site.

Table 3-2. Tree density in forested areas of Acequia de la Posecion’s Disturbance Zone; forested areas = 5.4 acres, total disturbance zone = 8.6 acres

	Count of living trees of any size (plots = 312.5 sq. ft.)						Average	Trees per acre
	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6		
Rocky Mtn. fir				7	4		1.8	251
Douglas fir			13	6	6		4.2	585
Ponderosa pine				1	1	2	0.7	98
Common juniper						1	0.2	28
Rocky Mt. juniper			1				0.2	28
Alder	3						0.5	70
Aspen	7	34				6	7.8	1,087
Willow tree	1						0.2	28
Total	11	34	14	14	11	9		2,175

3.9.4 Foreseeable Effects on Vegetation Communities

No Action – The No Action Alternative would have no effect on vegetation communities. There would be no construction and existing conditions would continue.

Proposed Action – The Proposed Action would result in the disturbance of approximately 5.4 acres of coniferous forest. A *maximum* of 1,468 trees (species noted above) would require removal for equipment access and pipe installation; however, the actual number of trees removed should be substantively less. Regardless of the number of trees removed, effects would be long-term but not irreversible; canopy openings would allow for colonization, re-growth, and forest regeneration. Further, an increase of edge habitats and herbaceous growth would provide additional forage for deer, elk, and other herbivores. Disturbance to understory vegetation would result in temporary, short-term effects. Felled trees will be hauled to the staging areas for use as firewood for local residents. The firewood distribution would modestly contribute to air quality and noise pollution from intermittent vehicle traffic, emissions, and use of chainsaws.

3.9.5 Environmental Commitments

The Corps commits to minimizing the number of trees removed to those necessary for the proper installation of the pipe, which, in large part, would be determined on site. No tree transplantation is planned at this time. Areas of disturbance would be reseeded with native grasses and forbes to foster site recovery and minimize wind and water erosion to base soils and colonization by surrounding woody vegetation will occur over time.

3.10 Fish and Wildlife

3.10.1 Existing Conditions

Supporting bear, bobcat, cougar, and variety of herbivores, the area is typical of an upper-elevation montane coniferous forest. Terrestrial wildlife diversity is considerable but patchy (migratory at various spatial and temporal scales) as primary productivity that serves as forage is generally limited to breaks in the canopy where energy inputs (sunlight) produce suitable plant growth. The general area (Carson and Santa Fe National Forests) is home to one the largest elk herds in New Mexico and carnivore distribution and abundance is typically a function of prey species. The Nuestra Señora del Rosario, San Fernando, y Santiago Community Land Grant and the project area are nestled in an area between the Carson and Santa Fe National Forests; however, there are many fence-lines in the area, which tend to discourage wildlife use and transit.

On September 17, 2008, surveys for extant fish and wildlife were conducted along a portion of the Acequia de la Posecion, east of the village of Truchas, New Mexico. In addition, two one-acre staging areas north of the acequia's alignment in the valley floor were surveyed (Figure 1-1).

Two (2) biologists completed a pedestrian assessment of the survey area; defined previously as 9,321 linear feet of the acequia's alignment and further defined as an 8.6-acre zone of disturbance extending 15 feet upslope and 25 feet down slope from the ditch banks. The staging areas are approximately one (1) acre each and the known access routes are along existing local and frequently traveled dirt roads. Observations were recorded and are presented in the following sections.

3.10.2 Survey Results

Thirteen bird and four mammal species were observed or evidence of their presence was noted in the survey area (Table 3-3). Under the Migratory Bird Treaty Act (16 U.S.C. 703–711), it is unlawful to take, capture, possess or kill any bird species, nest, or egg listed in CFR 10.13. All of the bird species observed during the survey are classified as migratory and are therefore covered under the Migratory Bird Treaty Act. No bird nests were noted in the survey corridor; however, given the date of survey, the sighting of active nests, or observing nesting/pair-nesting behavior is highly unlikely.

Surveys conducted during all seasons and times of day in more than a single year would reveal other wildlife species, which live in or utilize the survey area. These would include reptiles, birds, and mammals (Findley et al. 1975; BISON–M, New Mexico Department of Game and Fish).

No fish of any kind were observed in the surveyed acequia's alignment or near the western diversion structure in the Rio de Truchas. Consultation responses from the New Mexico

Department of Game and Fish (NMDGF) indicate the there is a core conservation population of Rio Grande cutthroat trout in the upper Rio de Truchas (genetically distinct having >99% native alleles). In addition, the NMDGF also indicated that historic diversions in the area (including those for the Acequia de la Posecion) have contributed to the preservation of this population from encroachment from non-native trout. Lastly, the NMDGF requested the Corps to consider the effects to hydrologic connectivity of the lower Rio Quemado watershed in lieu of the increased efficiency of the piped section.

Table 3-3. Wildlife observed in the survey area

COMMON NAME	SCIENTIFIC NAME	EVIDENCE
BIRDS		
Mourning dove	<i>Zenaida macroura</i>	Observed
Northern flicker	<i>Colaptes auratus</i>	Observed
Olive-sided flycatcher	<i>Contopus cooperi</i>	Observed
Steller's jay	<i>Cyanocitta stelleri</i>	Observed
Clark's nutcracker	<i>Nucifraga columbiana</i>	Observed
Black-billed magpie	<i>Pica pica</i>	Observed
Common raven	<i>Corvus corax</i>	Observed
Mountain chickadee	<i>Poecile gambeli</i>	Observed
White-breasted nuthatch	<i>Sitta carolinensis</i>	Observed
Western bluebird	<i>Sialia mexicana</i>	Observed
Yellow-rumped warbler	<i>Dendroica coronata</i>	Observed
Chipping sparrow	<i>Spizella passerina</i>	Observed
Dark-eyed junco	<i>Junco hyemalis</i>	Observed
MAMMALS		
Chipmunk	<i>Eutamias</i> sp.	Observed
Red squirrel	<i>Tamiasciurus hudsonicus</i>	Heard; observed
Pocket gopher	<i>Thomomys</i> sp.	Mounds
Coyote	<i>Canis latrans</i>	Observed

3.10.3 Foreseeable Effects on Fish and Wildlife

No Action – The No Action Alternative would have no effect on fish or wildlife. There would be no construction and existing conditions would continue.

Proposed Action – The Proposed Action may pose a variety of effects to fish and wildlife in the area. Construction activities represent a short-term disturbance (October-February) that would clearly affect the use and transit of the area by terrestrial and avian species. Other short-term effects include the disturbance to the acequia's alignment through excavation and backfilling, and the displaced food resources that disturbance area represents. Long-term effects include the removal of trees; however, again, this can also serve as an increase of edge habitats as newly established herbaceous growth would provide additional forage for deer, elk, and other herbivores. Although no nests were observed, the tree removal/disturbance area would remove

nesting and foraging avian habitat. Of the observed birds, the olive-sided flycatcher would likely be most affected through the elimination of the open-water/riparian/wetland habitats. These effects should be considered long-term. Another long-term effect would be the removal of a free-water source. Although deer and other ungulates can obtain water from forage, animals such as bear and wild turkey need free water. The acequia has been established since 1754 and has unquestionably provided an additional water source for the area's wildlife; however, the Rio de Truchas is nearby and provides an additional, consistent water source. Therefore, although long-term, this effect is not irretrievable in lieu of the proximity of the Rio de Truchas.

Although no fish were observed in the acequia's alignment, the Proposed Action would eliminate any potential aquatic habitat in the acequia's rehabilitated alignment. As indicated through consultation, the NMDGF does not foresee any deleterious impacts resulting from the Proposed Action.

3.10.4 Environmental Commitments

The Corps would make every effort to minimize effects to fish and wildlife that may result from the implementation of the Proposed Action. The construction of the proposed pipeline would comply with the Migratory Bird Treaty Act (16 U.S.C. 703–711). The project would not directly affect migratory birds because no active nests, birds, or nestlings would knowingly be destroyed. In places planned for vegetation removal and where active nests have been found, construction would take place only after the nests have been vacated (typically after August and before March). Construction is planned for the period of October-February. In areas where there are no active nests, vegetation removal can potentially take place year-round. An active nest is one that is currently being constructed or rehabilitated or that has eggs or young birds incapable of independent life. When young birds can fly and feed themselves, the nest is vacated. All areas of disturbance would be reseeded with native grasses and forbes.

3.11 Threatened, Endangered, and Special Status Species

3.11.1 Existing Conditions

The Endangered Species Act (16 U.S.C. 1531 *et seq.*) of 1973 as amended (ESA) provides for the protection from harm, harassment, or destruction of habitat for listed species. The New Mexico Wildlife Conservation Act and New Mexico Endangered Plant Species Act protect State-listed species by prohibiting take (death or removal of a species) without a permit from the New Mexico Department of Game and Fish or the New Mexico Forestry and Resources Conservation Division.

Species with special conservation status include U.S. Fish and Wildlife Service (USFWS) and State of New Mexico Species of Concern (informal designations), Bureau of Land Management Special Status Species, U.S. Forest Service Sensitive Species, and plants considered Rare by the New Mexico Rare Plant Technical Council (NMRPTC).

Standard database searches for special status species, as defined above, were conducted for Rio Arriba County, New Mexico. Queried databases included: the Biota Information System of New Mexico (BISON-M), USFWS Southwest Region 2 New Mexico Ecological Services Field

Office - Listed and Sensitive Species, and the NMRPTC. Review of the database queries resulted in a list of 43 listed species for Rio Arriba County (Appendix B).

A list of *targeted* special status species (13) was compiled through a detailed literature review and evaluation of the available information regarding the abundance, distribution, and habitat characteristics of those species either known or likely to occur in the project area. The target species are highlighted yellow in the table in Appendix C. The Corps is expressly concerned regarding the disposition and effects of project implementation on the Rio Grande cutthroat trout (*Oncorhynchus clarki virginalis*) and the Mexican spotted owl (*Strix occidentalis lucida*). Further information on these species is provided below. Site investigations will, therefore, focus on these and the other target species; however, vigilance for all special status species was maintained throughout the surveys.

Rio Grande cutthroat trout – A spotted trout, the Rio Grande cutthroat differs from the greenback and Colorado River cutthroat trout by having fewer scales (typically 150-180 in the lateral series and 35-45 above the lateral line) and by the irregular shape of the spots on the caudal peduncle – the narrow part of the fish's body to which the caudal or tail fin is attached (Behnke 1992; Figure 3-3). It spawns from March through July, depending on water temperature (Sublette et al. 1990) and mainly May-June in New Mexico (USFWS 2002). In colder waters, growth is typically slow, and age at maturity may be four (4) years (Rinne 1995). The Rio Grande cutthroat feeds opportunistically on terrestrial insects and aquatic macroinvertebrates. Young-of-year and juvenile fishes such as Rio Grande chub, longnose dace, Rio Grande sucker, white sucker, creek dace, and southern redbelly dace may also serve as prey for adult fish (Rinne 1995). Riverine (creek) habitat is typically high-gradient pools and structured riffles with suitable benthic habitat areas (wintering habitat).



Figure 3-3. Rio Grande cutthroat trout

The historical range is not clearly known but is likely to have been all trout waters in the Rio Grande drainage, including the Chama, Jemez, and Rio San Jose drainages along with those of the Pecos and Canadian drainages (Sublette et al. 1990, Behnke 1992). It is uncertain whether this subspecies was naturally present historically in the Canadian River basin (USFWS 2002). Present range includes New Mexico and Colorado and the southernmost occurrence is in Indian Creek in the Lincoln National Forest and Animas Creek in the Gila National Forest (Rinne 1995). The species ranges north to the headwater tributaries in the Rio Grande and San Juan National Forests in southwestern Colorado. There are few lake and introduced populations and possibly may have occurred historically in Texas and Mexico (Behnke 1992). Currently most populations are restricted to small headwater streams (Behnke 1992) where allochthonous materials are the primary energy input (Sublette et al. 1990). Spawning occurs in clean gravel

and nursery habitat is often along stream margins in slower water. Winter habitat includes deep pools, which may be limiting in headwaters (USFWS 2002). Stream lengths of about 5 miles (8 km) or more provide the most favorable habitat (USFWS 2002). Management techniques typically involve the removal of non-native salmonids and installing barriers to prevent upstream movement of non-native trout are vital to maintaining and increasing range and abundance (Rinne 1995). See USFWS (2002) for further information on conservation measures.

Mexican spotted owl – Three (3) owl species within the genus *Strix* occur north of Mexico: spotted (*S. occidentalis*), barred (*S. varia*), and great gray (*S. nebulosa*). Mexican spotted, barred, and fulvous owls (*S. fulvescens*) occur in Mexico. The Mexican spotted owl (*S. o. lucida*) is one of three subspecies of spotted owl recognized by the American Ornithologist’s Union (AOU; Figure 3-4). The other two subspecies are the northern (*S. o. caurina*) and the California spotted owl (*S. o. occidenta*).

The Mexican subspecies is geographically isolated from both the California and northern subspecies. Through allozyme variation, Barrowclough and Gutierrez (1990) showed major allelic differences between the Mexican spotted owl and the two coastal subspecies suggesting that the Mexican spotted owl has been genetically isolated from the other subspecies for a considerable time. As such, the Mexican spotted owl has followed a divergent evolutionary history and can therefore be considered a separate species.

The Mexican spotted owl currently occupies a broad geographic area, but does not occur uniformly throughout the range. Rather, it discontinuously occurs in isolated localities that correspond to secluded mountain systems and canyons. In the United States, 91% of the owls known to exist between 1990 and 1993 occur on lands administered by the USDA Forest Service (USFWS 1995).



Figure 3-4. Mexican spotted owl

The Mexican spotted owl is mottled in appearance with irregular white and brown spots on the abdomen, back, and head with a distinctly darker facial ring. The spots of the Mexican spotted owl are larger and more numerous than the other two subspecies, giving it an overall lighter appearance; clear morphological evidence of its separate evolutionary history and speciation. *Strix occidentalis* translates as “owl of the west” and *lucida* means “light” or “bright”. Unlike most owls, spotted owls have dark eyes, but are characteristically large and owl-like. This provides the owl with extraordinary eyesight. Several thin, uniformly spaced white bands mark an otherwise brown tail, as shown in Figure 3-4 above.

Adult male and female spotted owls are generally indistinguishable by plumage color and characteristics, but the sexes can be readily distinguished by voice. Juveniles, sub-adults, and adults can, however, be distinguished by plumage characteristics (Forsman 1981, Moen et al. 1991). Juvenile spotted owls (hatchling to approximately five months) have a progressively decreasing downy appearance as they mature. Sub-adults (5 to 26 months) closely resemble adults, but have pointed retrices with a pure white terminal band (Forsman 1981, Moen et al. 1991). The retrices of adults (>27 months) have rounded tips, and the terminal band is mottled brown and white as seen in the photo above. Like most owls, spotted owls exhibit reversed sexual dimorphism (*i.e.* females are larger than males) to accommodate reproductive metabolic demands.

Mexican spotted owls nest, roost, and forage, in a diverse collection of vegetative assemblages and communities that can vary widely throughout its range. Mature, mixed-conifer forests (Douglas fir, white fir, limber pine, ponderosa pine, etc.) are commonly used throughout most of the range. The understory is often consists of the above conifer species but can also include Gambel oak, maple, box elder, and New Mexico locust. In the northern portions of New Mexico and southern Colorado, however, Mexican spotted owls occur mostly in steep-walled, rocky canyons (USFWS 1995). Along the Mogollon Rim in Arizona and New Mexico, habitat use can be less constrained and include mixed ponderosa pine-Gambel oak forests and their associated deciduous riparian forests (USFWS 1995).

Mexican spotted owls consume a variety of prey throughout their range but commonly eat small- and medium-sized rodents such as woodrats, mice, and voles. Spotted owls also consume bats, birds, reptiles, and arthropods. The diet varies by geographic location (*i.e.* more voles than birds or mice, etc.) that likely reflects the distribution of both prey and owl itself.

3.11.2 Survey Results

On September 17, 2008, two (2) biologists completed a pedestrian assessment of the survey area for plants and wildlife listed as Endangered or Threatened by the USFWS or the State of New Mexico, USFWS Candidate or Proposed plants and wildlife, and special conservation status plants and wildlife. In addition, the two (2) one-acre staging areas north of the acequia's alignment (Figure 1-1) in the valley floor were also surveyed. Observations were recorded and are presented in the following sections.

Plants – No Threatened, Endangered, or special status plants of any conservation concern were observed in the survey area at the time of survey.

Wildlife – No Threatened, Endangered, or special status wildlife of any conservation concern were observed in the survey area at the time of survey.

3.11.3 Foreseeable Effects on Threatened, Endangered, and Special Status Species

No Action – The No Action Alternative would not result in any changes to the status of Threatened, Endangered, or special status species in the project area or Rio Arriba County, New Mexico. Existing levels of disturbance associated with grazing and operation and maintenance of the existing diversion structure and acequia would continue.

Proposed Action – There were no Threatened, Endangered, or special status species observed in the project area. No wildlife species in Rio Arriba County, New Mexico, which are Listed as Endangered or Threatened by the USFWS under the Endangered Species Act, are likely to occur in the survey area due principally to the lack of suitable habitat.

No Critical Habitat designated by the USFWS exists for any wildlife species in the survey area; however, two (2) Critical Habitat Units (SRM-NM-5a and SRM-NM-5b) for the Mexican spotted owl exist approximately 19 miles to south and southwest of the project area within the Santa Fe National Forest. Because Mexican spotted owls tend to favor steep-walled, rocky canyons in northern New Mexico, the Proposed Action would likely pose no threat to any known population.

The Rio de Truchas upstream of the Acequia de la Posecion is considered a conservation area for Rio Grande cutthroat trout. The headgate for the Acequia de la Posecion on the Rio de Truchas is approximately 1.2 miles downstream of the Rio de la Cebolla confluence. The New Mexico Department of Game and Fish conducted electrofishing surveys for Rio Grande cutthroat trout in the Rio de Truchas upstream and downstream of the Rio de la Cebolla confluence in September 2007 (NMDGF 2007). The extensive irrigation diversions (including Acequia de la Posecion) between Truchas and the Rio de la Cebolla confluence provide a barrier to upstream movement of non-native trout species. No fish have been observed in the Acequia de la Posecion at the completion of the irrigation season (Mr. Curtiss Frank, pers. comm.). The proposed action would not change the hydrology of the acequia system, and would not provide a route for colonization of the Rio de Truchas by non-native trout upstream of the acequia.

No wildlife species Listed as Endangered or Threatened by the State of New Mexico (19 NMAC 21.2) are likely to occur in the survey area. No plants Listed by the USFWS as Threatened or Endangered under the Endangered Species Act are known to grow in Rio Arriba County, New Mexico. Additionally, none are proposed or are candidates for Listing by the USFWS. No Critical Habitat designated by the USFWS exists in Rio Arriba County, New Mexico for any plant. No plant species Listed as Endangered or Threatened by the State of New Mexico (19 NMAC 21.2) are known to occur in Rio Arriba County, New Mexico. The Proposed Action would not result in any changes to the status of Threatened, Endangered, or special status species in the project area or Rio Arriba County, New Mexico. The Proposed Action should not harm, harass, or destroy habitat for any Federally or State of New Mexico listed species.

3.11.4 Determination of Effects to Federally Listed or Proposed Species and Critical Habitat

The Corps determines that the Proposed Action would have *No Effect* on Federally Listed species known to occur in Rio Arriba County, New Mexico. The proposed project area is not within or nearly adjacent to any existing or proposed Critical Habitat.

3.12 Cultural Resources

3.12.1 Existing Conditions

A cultural resource inventory of the proposed project area was conducted in early October 2008 (Messerli and Eakin 2008). A copy of the inventory report is attached in Appendix D. The pedestrian archaeological survey included the Acequia de la Posecion project area and two 1-acre staging areas, totaling approximately 19.2 acres. Prior to the pedestrian survey, an archival literature search, and searches of the New Mexico Archaeological Records Management Section database, the State Register of Cultural Properties, and the National Register of Historic Places (NRHP) were completed. Six previous cultural resource investigations have been conducted within one mile of the project area. One archaeological site (LA 130785), consisting of remnants of a historic-period structure, was recorded as a result of these investigations. This structure will be completely avoided by the proposed construction. The records review determined that there are no State or Federal registered historic properties within one mile of the project area.

The pedestrian survey identified two historic properties: the Acequia de la Posecion and a dilapidated historic cabin (LA 161069). Known as the Atkinson Cabin, this is considered by the current landowner to be a late 19th century log cabin with some early 20th century improvements. During the mid-20th century, it was used by shepherds who were summer-pasturing their sheep on the land grant. The cabin is located outside of the project area approximately 39 feet south of the acequia, and will not be affected by this project. SWCA, Inc. recommends that LA 161069 is eligible for listing on the NRHP under Criterion D, for its ability to contribute to the understanding of the rural lifestyle of the Truchas area during the late 19th and early 20th centuries. The Corps concurs with this eligibility determination.

The Acequia de la Posecion is a 19,107 foot-long open earthen ditch system that diverts water from the Rio de Truchas, travels 10,681 feet west before splitting into one 3,953 foot-long northern alignment and one 4,473 foot-long southern alignment that parallel each other and drain into (desagua) the Acequia Medio. The Acequia de la Posecion serves a portion of the community of Truchas, and dates to 1754. In 1900, by-laws were established to define the roles and cooperation of the acequia members, and dictate the division of labor associated with the acequia.

The proposed project is to pipe the acequia madre from the diversion structure to the split at 10,681 feet. As part of this process, a more direct route (following approximately 825 feet of an earlier alignment) will be re-established. This shorter alignment was briefly in use in the early 1970s as an alternate alignment, but was not well engineered and was abandoned soon thereafter. The acequia is relatively unmodified from its original form, function, and alignment, although as part of the early 1970s alternate alignment process, approximately 2,350 feet of the existing

acequia were piped with concrete; and the alternate alignment, measuring approximately 825 feet, used a steel pipe siphon (totaling 17 percent). Much of this piping and concrete has since been removed, returning the ditch to an open, earthen form.

SWCA Inc. recommends that the Acequia de la Posecion is eligible for nomination to the NRHP under Criteria A, C, and D, for its association with the development of irrigation and agriculture in the Truchas Valley, as well as the associated settlement of Truchas; for its engineering design characteristics; and for its potential to yield additional information on acequia construction and function. The Corps concurs with SWCA's recommendations for Criteria A and C, but does not agree that significant information could be derived from excavation of the active physical ditch. There are no unique features or technological challenges associated with this ditch that would warrant a Criterion D eligibility determination.

American Indian tribes that have indicated that they have potential cultural resource concerns in the Rio Truchas valley were given the opportunity to comment on the Proposed Action. No traditional cultural properties are currently known to exist in the vicinity of the project area. The Navajo Nation responded that the project would not impact any Navajo Traditional Cultural Properties or historic properties; however, they wish to be contacted in the event of any unanticipated discoveries. The Hopi Tribe responded that since they consider themselves to be culturally affiliated with prehistoric archaeological sites in the project region, that wish to be consulted regarding any prehistoric cultural resources identified during survey or inadvertently discovered during project activities.

3.12.2 Foreseeable Effects on Cultural Resources

No Action – The no-action alternative will not have a direct affect on cultural resources in the project area as no ground disturbance from this Federal action would be undertaken. However, the acequia association would likely continue their operations and maintenance activities, which may include ground disturbance, and this work could be completed without Section 106 compliance if no Federal assistance is used. This would have an unknown, but potentially adverse effect to the cultural resources of the region.

Proposed Action – The Corps considers conversion of 9,321 feet of the Acequia de la Posecion from an earthen ditch to underground PVC pipeline an adverse effect to this historic property, as this represents a change in form to a little more than half of the acequia (56 percent). The project would not introduce a new alignment; it would follow the current alignment for most of its extent but would also include the reuse of an approximately 825-foot segment discontinued shortly after its construction in the 1970s. The function of the acequia, to convey water to fields for farming, will remain the same.

The Corps considered construction options that would reduce or minimize the effects to form, function, and alignment to the acequia. The steep terrain, roots, beavers, rodent burrows, water loss, arroyos, and heavily forested nature of the proposed project area does not leave many viable alternatives. Half-piping while staying in the original alignment would have the least impact to the historic character of the acequia, but would not resolve the problem of significant

sedimentation and accumulation of debris in the ditch. In addition, access for cleaning and maintenance over the last decades has become extremely problematic to the 17 remaining acequia association members. There are approximately 30 private non-acequia landowners whose boundary fences cross the acequia and make access to the acequia right-of-way difficult. Due to the steep forested terrain, it is not possible to drive up the acequia to maintain it. In the end, the proposed piping through the portion with recent land-ownership issues and ongoing debris problems will allow the declining number of acequia association members to continue operating the acequia.

To mitigate adverse effects to the acequia, the Corps recommends conducting additional research on the acequia, including photographically documenting the acequia on archival paper; conducting oral history interviews with acequia association members; scanning and translating the Association's log book, which dates from 1900; and copying and transcribing 17 hours of interviews conducted in 1971 by the Association. The Corps recommends that these efforts could serve to mitigate the adverse effect that would occur to the Acequia de la Posecion from the proposed undertaking.

The Corps is currently consulting with the New Mexico State Historic Preservation Office (NMSHPO) on the identification of properties, assessment of effects, and proposed mitigation of effects (see Appendix D). The Corps, in consultation with the NMSHPO and other consulting parties who choose to participate in the Section 106 process, will work to resolve adverse effects to the acequia and to other historic resources in the region.

Based on the information available to date, no other historic properties or artifacts would be affected by this Proposed Action, and no tribal concerns have been brought to the attention of the Corps. The Corps is of the opinion that the proposed Acequia de la Posecion rehabilitation project would have an adverse effect to historic properties. However, the adverse effect may be mitigated by the collection and recordation of information, as described above.

3.12.3 Environmental Commitments

There is the potential for unanticipated discoveries of cultural resources that were not identified during the cultural resource inventory. Should previously undiscovered artifacts or features be discovered during construction activities, work would be stopped in the immediate vicinity of the discovery, a determination of eligibility made by a qualified professional, and a mitigation plan formulated in coordination with the NM SHPO and with American Indian tribes that may have concerns in the project area.

3.13 Socioeconomic Considerations

3.13.1 Existing conditions

Socioeconomic considerations include an analysis of any changes in employment, income, business volume, population or housing and secondary effects on community services. National

Environmental Policy Act (NEPA) regulations require analysis of effects on the human environment including social and economic effects.

The project area is in an unincorporated section of Rio Arriba County. The population, demographic, and economic characteristics of Rio Arriba County are detailed in Table 3-4, along with comparable data from the State of New Mexico and the US. The estimated population of the county in 2006 was 40,949 a decrease of 0.6% from 2000. During the same period, New Mexico's population increased by 7.5% (U.S. Census Bureau 2008a, 2008b). From these data, the University of New Mexico's Bureau of Business and Economic Research projected a declining rate of growth for Rio Arriba County from 2010 through 2030. Growth in the county is hampered by several issues, such as the availability of land and water, and the relative lack of high paying jobs. However, based on its own research, the county projects a small increase (0.87%) in population over the same period (Rio Arriba County 2008b). Española, which is partially in Santa Fe County, is the largest city in Rio Arriba County with a population of 9,549 in 2007. Major employment sectors include education, health care, social services, government, arts and entertainment, recreation, accommodations and food service, and construction. Agriculture employs about four percent of the county's workers. Total non-farm employment in the county increased by 18.9% from 2000 to 2005, compared with an 8.4% increase in New Mexico and a 2.0% increase in the US (NMDWS 2008a, 2008b, 2008c; U.S. Census Bureau 2008c, 2008d).

Truchas has a population of approximately 950 residents. In addition to small-scale agriculture and businesses typical of a small town, there are also art galleries and some small lodging facilities. Community services include a volunteer fire department/EMS, senior center, library, post office, medical clinic and domestic water and sewage system. Public safety is provided by the county sheriff. Truchas shares an elementary school located south of town with other mountain communities. There are no secondary schools in Truchas. Other community services and most major commercial enterprises are available in Española approximately 20 miles away.

3.13.2 Foreseeable Effects to Socioeconomic Considerations

No Action – Implementing the No Action Alternative would not result in changes to socioeconomic conditions. The local economy would not benefit from construction expenditures or improvements to the irrigation delivery system.

Proposed Action – Implementing the Proposed Action would result in minor temporary increases in spending for construction support materials, fuels, equipment rental, labor, lodging, and meals. Businesses in Truchas and other parts of Rio Arriba County would likely be the main beneficiaries depending on the location of the construction contractor and his labor and supply sources. There would be no effect on local services or housing. Enclosing the acequia in a pipe would improve irrigation efficiency, reduce losses of irrigation water, and reduce expenditures and labor required to maintain the system. These changes may have a positive effect on the economic viability of continuing subsistence agricultural traditions and productivity. There

would be minor long-term contributions to the tax base from construction expenditures, agricultural productivity, and land values.

Table 3-4. Population, Demographics, Economic Characteristics, and Poverty Status

	Rio Arriba County	New Mexico	United States
Total Population (2006 Estimate)	40,949	1,954,599	299,398,485
Percent White (2006)	82.9	84.6	73.9
Percent Black (2006)	0.6	2.5	12.4
Percent American Indian and Alaska Native (2006)	15.2	9.8	0.8
Percent Asian (2006)	0.3	1.3	4.4
Percent Native Hawaiian or Other Pacific Islander (2006)	0.2	0.1	0.1
Percent reporting two or more races (2006)	0.8	1.6	2.2
Percent reporting Hispanic/Latino Origin (2006; may be of any race)	72.2	44.0	14.8
Percent unemployment rate (2008)	5.6	4.7	6.1
Personal income per capita (2006)	\$23,976	\$25,670	\$31,472
Median household income (2006)	\$34,364	\$37,603	\$48,451
Percent Individuals Below Poverty Level (2004)	20.1	16.7	13.3

Note: Original data were gathered from a variety of sources using different methods. Race and ethnic categories are based on self-reporting and statistical estimates. Sources NMDWS 2008a, 2008b, 2008c; U.S. Census Bureau 2004, 2008a, 2008b, 2008c; 2008d.

3.13.3 Environmental Commitments

The Proposed Action would not result in any negative effects on socioeconomic conditions, so no further measures to reduce effects or environmental commitments are required.

3.14 Land Use and Recreational Resources

3.14.1 Existing conditions

Land use refers to the current activities or designated use of land for economic production; for residential, recreational, or other purposes; and for natural or cultural resource protection. Related to land use is the issue of property ownership and management. Land use is frequently regulated in some manner by different levels of government through plans, policies, or ordinances that stipulate the permissible uses within an area in order to protect designated areas

or ensure compatible uses. Recreational resources refer to public or private land uses or facilities that provide opportunities for public recreation.

The project area is on private land approximately three miles east of the unincorporated village of Truchas. Development planning and permitting is provided by Rio Arriba County and is guided by the Rio Arriba County Comprehensive Plan and a variety of planning and zoning ordinances addressing specific project types (Rio Arriba County 2008a, 2008b). This land was part of the historic Nuestra Señora del Rosario, San Fernando y Santiago Community Land Grant established in 1754. This land grant, now commonly referred to as the Truchas Land Grant, still manages some common lands, and consults with Federal agencies on land use issues. Under U.S. law, most of the land designated for communal grazing and common forestlands under the land grants were set aside as forest reserves, which later became the national forests. To the land grant heirs the federalization of former land grants remains a difficult and controversial issue that is being addressed through the judicial and legislative processes (Rio Arriba County 2008a, 2008b).

The recognized local government unit for the diversion, distribution, and use of the surface water is the Acequia de la Posecion. The ditch association has a 60-foot wide right-of-way centered on the acequia for maintenance. Much of the land near the right-of-way is undeveloped woodlands, agricultural fields, grazing lands and a few residences. National Forest lands are accessed immediately north of the project area. Currently, the Acequia de Posecion has 17 irrigators and 167 irrigated acres (pers. com. P. Phillips Corps Project Manager; October 10, 2008). In 1987, the Acequia de la Posecion had 24 irrigators and 186 irrigated acres (NMAC 1987). Farms in the Truchas area are typically small with homes on the site or nearby. Most of the surrounding nonagricultural land uses such as small businesses, residences, and government and community services are concentrated in a strip along State Highway 76 and County Road 75, west of the project area. The nearest city is Española, 20 miles to the southeast. The valley is surrounded by Forest Service and Bureau of Land Management (BLM) lands.

There are no public recreational activities associated with the project area. The adjacent public lands provide opportunities for fishing, hunting, camping, hiking, snowshoeing, and off-road vehicle use. State Highway 76, the High Road to Taos, is an alternate route to Taos for sightseeing and enjoyment of historic landscapes and buildings. Truchas, and its galleries and adobe church is a popular tourist stop along the route.

3.14.2 Foreseeable Effects on Land Use and Recreational Resources

No Action – The No Action Alternative would have no effect on land use or recreation. There would be no construction and existing conditions would continue.

Proposed Action – Implementing the Proposed Action would not change current land uses in the project area. There are no zoning or land use designations that would be affected by the Proposed Action. Agricultural efficiency would be enhanced by the proposed improvements to

water delivery, helping to preserve the economic viability of current subsistence agricultural land uses and the historical nature of Truchas' farming heritage.

3.14.3 Environmental Commitments

The Proposed Action would not negatively affect land use or recreation, so no measures to reduce effects or environmental commitments are required.

3.15 Indian Trust Assets

3.15.1 Existing Conditions

Consistent with the Department of Defense's American Indian and Alaska Native Policy, signed by Secretary of Defense William S. Cohen on October 28, 1998, and based on the State of New Mexico Indian Affairs Department's 2008 Native American Consultations List, American Indian Tribes that have indicated they have concerns in Rio Arriba County include the Jicarilla Apache Nation, Comanche Indian Tribe, Navajo Nation, Ohkay Owingeh, Hopi Tribal Council, Kiowa Tribe of Oklahoma, Pueblo of San Ildefonso, Pueblo of Pojoaque, Pueblo of Santa Clara, and the Pueblo of Taos. Informal consultation (scoping) letters were mailed to these tribes on September 17, 2008. Responses were received from the Navajo Nation and Hopi. To date, the Corps has received no indication of tribal concerns that would affect this project. No Traditional Cultural Properties (TCPs) are known to occur in the area. A copy of the scoping letter and Tribal response letters are located in Appendix A.

3.15.2 Foreseeable Effects on Indian Trust Assets

No Action – The No Action Alternative would have no effect on Indian Trust Assets. There would be no construction from this Federal action and existing conditions would continue.

Proposed Action – No Indian Trust Assets are known to occur within or adjacent to the project area, therefore there would be no effects to these resources.

3.16 Hazardous, Toxic, and Radioactive Waste (HTRW)

3.16.1 Existing Conditions

An evaluation of public records obtained from a private data vendor, findings from interviews that were conducted of individuals familiar with the study area, and observations made during a site reconnaissance visit led to the conclusions that there are no hazardous, toxic, or radiological waste (HTRW) sites within the study area. This work was performed under a Phase I Environmental Site Assessment (ESA), which was conducted in accordance with the protocol established in American Society for Testing and Materials (ASTM) Standard E 2247-02, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property (U.S. Army Corps of Engineers 2008b).

The Acequia de la Posecion is located to the east of Truchas, New Mexico, and follows the lower slope of a north-facing mountain. The acequia was dug by hand around the middle of the 18th century for irrigation purposes. The narrow acequia land is managed and maintained by the Acequia de la Posecion Association, which regularly cleans out sediment and brush from the approximately 10,800-foot-long irrigation ditch that trends in a roughly east to west direction. The acequia closely follows the contour of the land surface and descends roughly 50 feet in elevation along its length from about 8,440 feet above mean sea level at its diversion gate to about 8,390 feet above mean sea level at its terminus.

The physical setting of the acequia is remote, rural acreage passing through privately owned land that is characterized by widely spaced residential properties, light agricultural land, grazing of limited number of livestock, including cows, goats, and yaks, mature, virgin coniferous forest land, wetlands, and open mountain meadows. The adjoining properties and their uses are not interpreted to present an environmental threat to the study area. Spoils comprised of sediment dug from the ditch during routine maintenance were observed to be spread in low piles along stretches of the ditch embankment. The spoils piles have largely overgrown grasses and are not interpreted to present an environmental threat to the study area. The water in the ditch was observed to be clear and visibly free of suspended material.

Shallow ground water flow beneath the study area is interpreted to be west-northwest, parallel to sub-parallel with the slope of the surface topography and is also expected to be influenced by shallow bedrock, which is exposed in places in the study area.

Interviews with an official of the local Truchas Volunteer Fire Department and with the Chairman of the Acequia de la Posecion Association did not reveal any evidence or knowledge of dumping of contaminating substances along the study area or in the acequia. Due to the remoteness of the study area, the rugged terrain, and very limited access to the ditch by narrow, unimproved, dirt, two-track paths and private, often gated, driveways, historical illicit dumping is not known to exist or be documented in the study area and is not expected to occur.

3.16.2 Foreseeable Effects on HTRW

No Action – The No Action Alternative would have no effect on HTRW. There would be no construction and existing conditions would continue.

Proposed Action – The Proposed Action would not result in the addition of Hazardous, Toxic and Radioactive Waste to the project area. All construction activities will be monitored and the use of best management practices will be implemented.

3.16.3 Environmental Commitments

Should any HTRW issues be encountered during construction (discovery, spills, etc.) appropriate precautions and measures would be taken through notification of the Corps' expert staff. All fuels and lubricants would be stored outside of the 100-year floodplain of the stream and

construction equipment would be inspected daily and monitored during operation to prevent leaking fuels or lubricants from entering surface waters.

3.17 Environmental Justice

3.17.1 Existing conditions

On February 11, 1994, President Clinton issued Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. This Executive Order requires Federal agencies to identify and address disproportionately high or adverse human health and environmental effects of Federal programs, policies, and activities on minority and low-income populations. An accompanying memorandum and guidance from the White House Council on Environmental Quality emphasized that Federal agencies would analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities as part of the NEPA analysis and provide opportunities for community input.

In April of 1995, the EPA released a guidance document entitled Environmental Justice Strategy: Executive Order 12898. In short, this document defines the approaches by which the EPA would ensure that disproportionately high environmental and/or socioeconomic effects on minority and low-income communities are identified and addressed. Further, it establishes agency wide goals for all Native Americans with regard to Environmental Justice issues and concerns.

Consideration of environmental justice concerns includes compilation of race and ethnicity data and the poverty status of populations. The 2006 estimated median household income in Rio Arriba County was \$34,364 (Table 3-1) and 20.1% of the residents were classified as living in poverty, a higher percentage than in New Mexico (16.7%) or in the US (13.3%). Minority populations, as defined by the U.S. Census Bureau, are also present in the county. Rio Arriba County has a much higher percentage of Hispanics (72.2%) and American Indians (15.2%) when compared to New Mexico and the United States.

3.17.2 Foreseeable Effects to Environmental Justice

No Action – There would be no disproportionate effects on minority and low-income populations. Under the No Action Alternative there would be no change in existing conditions.

Proposed Action – There would be no disproportionate effects on minority and low-income populations under the Proposed Action. Although that there are high percentages of minority and low-income persons, all project impacts are expected to be minor or negligible. Beneficial economic effects are anticipated to result from the project, especially to traditional irrigators through improved water delivery, reduced losses, and reduced system maintenance. Therefore, the Proposed Action complies with Executive Order 12898.

3.17.3 Environmental Commitments

Because there would be no disproportionate effects on minority and low-income populations under the Proposed Action, no measures to reduce impacts or environmental commitments are needed.

3.18 Noxious Weeds

3.18.1 Existing Conditions

The Federal Noxious Weed Act of 1974 (Public law 93-269; 7 U.S.C. 2801) provides for the control and eradication of noxious weeds and their regulation in interstate and foreign commerce. Executive Order 13112 directs Federal agencies to prevent the introduction of invasive (exotic) species and to control and minimize the economic, ecological, and human health effects that invasive species cause. In addition, the State of New Mexico, under administration of the U.S. Department of Agriculture, designates and lists certain weed species as being noxious (Nellessen 2000). “Noxious” in this context means plants not native to New Mexico that may have a negative effect on the economy or environment and are targeted for management or control. Class C- listed weeds are common, widespread species that are fairly well established within the State. Management and suppression of Class C weeds is at the discretion of the lead agency. Class B weeds are considered common within certain regions of the State but are not widespread. Control objectives for Class B weeds are to prevent new infestations, and in areas where they are already abundant, to contain the infestation and prevent their further spread. Class A weeds have limited distributions within the State. Preventing new infestations and eliminating existing infestations is the priority for Class A weeds.

3.18.2 Foreseeable Effects to Noxious Weeds

No Action – The No Action Alternative would have no effect on noxious weeds. There would be no construction and existing conditions would continue. Colonization or noxious weed infestation would not result from any disturbance or acequia rehabilitation activities.

Proposed Action – Seed dispersal occurs through various means and of noxious weeds often gains a foothold in an area through disturbance (natural or man-made). In addition, when construction activities are involved, equipment used at a previous site may harbor and transport seed thus setting the stage for establishment and infestation. The Proposed Action involves the disturbance of approximately 8.6 acres along the acequia’s alignment and up to two (2) additional acres of staging area.

3.18.3 Environmental Commitments

To guard against the potential of noxious weed infestation, all equipment would be thoroughly washed-down prior to use at the site. Although not an absolute guarantee, these best management practices would limit potential for site contamination with unwanted or noxious weed seed material. In addition, all equipment would be cleaned with a high-pressure water jet prior to entering a work area, leaving a work area, and before entering a new work area. There

would be no post-construction control for noxious weed control; however all areas of disturbance would be reseeded with native grasses and forbes.

3.19 Irreversible or Irretrievable Commitment of Resources

The National Environmental Policy Act requires consideration be given to the extent to which the project would commit nonrenewable resources during the initial and ongoing life of the project. Although the project would require numerous resources (raw materials, labor, energy, fuel) to construct, it would not constitute a substantial irreversible commitment of resources. The consumption of these resources during construction would be justified by the overall benefits of the project.

3.20 Cumulative Effects

Cumulative effects were considered for each resource area in sections 3.1 through 3.18 and address the cumulative impact of the direct and indirect effects of the Proposed Action when added to the aggregate effects of past, present, and reasonably foreseeable future actions. For all resources, the aggregate effect of past and present actions was considered to be represented by the current, existing condition of the resource (Council on Environmental Quality, 2005). Therefore, the specific effects of individual past and present actions *typically* were not cataloged. In order for direct or indirect effects to incrementally add to the effects of past, present, or reasonably foreseeable future actions, they must overlap with those effects in time or space (Council on Environmental Quality, 1997). The period for consideration of cumulative effects varied, depending on the duration of direct and indirect effects. For example, direct effects resulting from construction were expected to persist for relatively short periods of time (period of construction of October-February). Conversely, indirect effects resulting from operation of the rehabilitated acequia system would persist for the life of the facility. Similarly, the geographic bounds for cumulative effects analysis varied with the resource under consideration, depending on the zone of influence of the direct or indirect effect being analyzed. Based on information provided by the association and through the scoping process, there are no other projects planned in the project vicinity in the foreseeable future; therefore, there are no cumulative effects that can be reasonably anticipated in this regard.

4.0 CONCLUSIONS

4.1 Summary of Effects

The Proposed Action would result in short-term effects associated with equipment mobilization and construction activities, including noise, aesthetics, air quality, and wildlife disturbances. Subsequent to construction, other short-term effects would center on the disturbance area and its gradual recovery. Reseeding areas of disturbance with native grasses and forbes will foster site recovery and improve the post-construction habitat value and aesthetics of the area. Felled trees

will be hauled to the staging areas for use as firewood for local residents. The firewood distribution would modestly contribute to air quality and noise pollution from intermittent vehicle traffic, emissions, and use of chainsaws.

Long-term effects include the removal of the water source of established wetlands by eliminating the seepage from the existing ditch by placing the flows in a pipe. The wetlands fate cannot be determined; the area may be high enough in elevation to support an established wetland. No mitigation is required for the wetland removal, as these wetlands were deemed non-jurisdictional by the Corps. No tree transplantation is planned.

4.2 Project Benefits

The principal benefits of the Proposed Action are:

- 1) **Improved water delivery** – The Proposed Action is likely to improve the conveyance of irrigation water from the diversion structure to the primary lateral, which provides irrigation water for 17 acequia association members with 167 acres of farmland. While no formal, quantitative depletion studies were conducted, water losses are likely to be considerable through infiltration and ditch leakage/breaks. In addition, the majority of the acequia’s alignment is situated along an upper-valley contour that produces a strong hydraulic gradient toward the valley floor and the Rio de Truchas’ flow path (Figure 1-1). This gradient causes inherent losses to the water in the acequia. The Proposed Action would eliminate infiltration and leakage losses and conserve the water resources in the area; improving the efficiency and utilization the association’s existing water rights.

- 2) **Reduced maintenance** – During the 4-5 month of the growing season (May-September), the Mayor Domo of the ditch, or other association members, must walk the entire length of the alignment to clear debris (large tree braches, leaf litter, etc.) at least once per week. As noted, previously, the area is quite remote and can be very treacherous. This type of maintenance is dramatically increased during the summer monsoons or other thunderstorm events as sheet flow from upslope areas bring even more debris into the ditch. Further, frequent “blow-outs” of the ditch banks require repair many times per year (pers. com. J. Sandoval, Mayor Domo, Acequia de la Posecion). The Proposed Action would eliminate the need for such maintenance and reduce the risk of personal injury to association members.

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5.0 PREPARATION, CONSULTATION, AND COORDINATION

5.1 List of Preparers

This Environmental Assessment (EA) was prepared by the U.S. Army Corps of Engineers, Albuquerque District Project Delivery Team, including Tetra Tech, Inc., Surface Water Group and SWCA Environmental Consultants. All members are listed below:

U.S. Army Corps of Engineers, Albuquerque District

Patricia Phillips	Civil Works Project Management Branch
Michael Porter	Fisheries Biologist, Environmental Resources Section
Gregory Everhart	Archaeologist, Environmental Resources Section

Tetra Tech, Inc., Albuquerque, NM

Mike Marcus	Project Manager
Mark Horner	Biologist
David Bleakly	Biologist
Robin Cunningham	Hydraulic Engineer
Kevin Doyle	NEPA Specialist
Kathy Roxlau	Cultural Resource Specialist

Tetra Tech, Inc., Tucson, AZ

David Broadfoot	NEPA, QA/QC
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SWCA Environmental Consultants

Joanne Eakin	Archaeologist
Tom Messerli	Archaeologist

5.2 Consultation, Coordination, and Notice of Availability

Mr. Curtis Frank, President, Acequia de la Posecion Association

Rob Lawrence, U.S. Environmental Protection Agency, Region 6

Wally Murphy, Field Supervisor, U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office

Mr. John Poland, Area Manager, U.S. Bureau of Reclamation

Ms. Amy Unthank, Fish Biologist, U.S. Forest Service

Mr. Thomas Gonzales, Española Service Center

U.S. Forest Service, Santa Fe National Forest, Española Ranger District

U.S. Forest Service, Carson National Forest, El Rito Ranger District

Mr. Ray Acosta, NM Interstate Stream Commission

Ms. Janell A. Ward, Conservation Services Division, New Mexico Department of Game and Fish

Mr. Matt Wunder, Division Chief, Conservation Services Division, New Mexico Department of Game and Fish

Mr. Robert Sivinski, New Mexico Forestry and Resources Conservation Division, Energy, Minerals and Natural Resources Department

Mr. Mike Sloan, Fisheries Management Division, New Mexico Department of Game and Fish

Mr. R. J. Kirkpatrick, Division Chief, Wildlife Management Division, New Mexico Department of Game and Fish

Ms. Marcy Leavitt, Surface Water Quality Bureau

Honorable Wallace Coffey, Chairman, Comanche Indian Tribe

Honorable Benjamin Nuvamsa, Chairman, Hopi Tribal Council

Mr. Leigh Kuwanwisiwma, Director, Arizona Cultural Preservation Office

Honorable Levi Pesata, President, Jicarilla Apache Nation

Ms. Lorene Willis, Director, Office of Cultural Affairs, Jicarilla Apache Nation

Honorable Billy Evans Horse, Chairman, Kiowa Tribe of Oklahoma

Mr. Dewey Tsonetokoy, NAGPRA Representative, Kiowa Tribe of Oklahoma

Honorable Joe Shirley, Jr., President, Navajo Nation

Alan S. Downer, Ph.D., Director, Navajo Nation Historic Preservation Department

Honorable Earl Salazar, Governor, Ohkay Owingeh

Mr. Herman Agoyo, NAGPRA Representative, Ohkay Owingeh

Honorable George Rivera, Governor, Pueblo of Pojoaque

Honorable Leon T. Roybal, Governor, Pueblo of San Ildefonso
Mr. Myron Gonzales, Cultural Resources Technician, Pueblo of San Ildefonso

Honorable J. Michael Chavarria, Governor, Pueblo of Santa Clara

Jackie Gutierrez, Environmental Culturalist, Pueblo of Santa Clara

Honorable Paul T. Martinez, Governor, Pueblo of Taos

Mr. Donovan Gomez, Tribal Administrator, Pueblo of Taos

Members of the Acequia de la Posecion Association

Copies of the EA and/or were also furnished to the following:

Truchas Community Library
60 County Road 75
Truchas, NM 87578

Notice of Availability

Draft Environmental Assessment for the Acequia de la Posecion Rehabilitation Project

Pursuant to and in accordance with the National Environmental Policy Act (NEPA) of 1969, Public Law 91-190, as amended, the Council on Environmental Quality (CEQ) Code of Federal Regulation (40 parts 1500-1508), and the U.S. Army Corps of Engineers regulations for implementing NEPA (ER-200-2-2), the U.S. Army Corps of Engineers, Albuquerque District (USACE) has completed a Draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for a proposal to rehabilitate the Acequia de la Posecion in Rio Arriba County, New Mexico. The project area is located approximately three miles east of the Village of Truchas within the Nuestra Señora del Rosario, San Fernando, y Santiago Community Land Grant (1754).

The project will: 1) replace 9,321 linear feet of existing earthen ditch with a buried 24" diameter polyvinylchloride (PVC) conduit, which includes 825 linear feet for a buried inverted siphon; 2) install 23 reinforced concrete manholes; and 3) install a new sluice diversion structure.

The Draft EA/FONSI is open for a 30-day public comment period and is available on the USACE web site at <http://www.spa.usace.army.mil>. Paper copies may also be requested by contacting Michael Porter, USACE, at (505)342-3264 or by e-mail at



michael.d.porter@usace.army.mil. Additional copies are available at the Truchas Community Library located at 60 County Road 75, Truchas, NM 87578.

All comments should be submitted to Ms. Joni Wood, Tetra Tech, Inc. (505)881-3188 ext. 125 at 6121 Indian School Rd. NE, Suite 205, Albuquerque, NM 87110 or by e-mail at joni.wood@tetrattech.com.

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