



**US Army Corps
of Engineers®**
Albuquerque District

Environmental Assessment
for the

East Puerto de Luna Community Ditch Rehabilitation Project
Guadalupe County, New Mexico

Section 1113 of P.L. 99-662 (WRDA 1986)

Prepared by

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Finding of No Significant Impact
East Puerto de Luna Community Ditch Rehabilitation Project
Guadalupe County, New Mexico

The U.S. Army Corps of Engineers (Corps), Albuquerque District, in cooperation with and at the request of the New Mexico State Engineer's Office and the members of the Puerto de Luna East Side Acequia (Community Ditch) Association, is planning a project to rehabilitate the East Puerto de Luna Community Ditch, Guadalupe County, New Mexico. The project area is located along the Pecos River approximately 8 miles south of Santa Rosa and 2 miles north of the historic community of Puerto de Luna.

The proposed rehabilitation work on the East Puerto de Luna Community Ditch would be conducted under Section 1113 of the Water Resources Development Act of 1986 (Public Law 99-662), as amended. Section 1113 authorizes the Acequia Rehabilitation Program for the restoration and rehabilitation of irrigation ditch systems (acequias) in New Mexico. This acequia rehabilitation project also qualifies under Section 215 of the Flood Control Act of 1968, Public Law 90-483, as amended. Section 215 provides that the Secretary of the Army may enter into an agreement to credit or reimburse the costs of certain work accomplished by states or political subdivisions thereof, which later is incorporated into an authorized project.

East Puerto de Luna Community Ditch diverts water from the Pecos River at a small diversion dam that is located 4 miles southeast of Santa Rosa, NM via Highway 91. The acequia, which has been in operation since the 1800s, currently serves 44 members to irrigate about 376 acres of cropland. The purposes of the acequia rehabilitation project are to improve water delivery efficiency by limiting seepage and evaporative loss and to reduce maintenance required to clean sediment from the ditch. The present system of conveying irrigation water through the unlined portion of the ditch is inefficient and requires an excessive amount of maintenance time. If left as an earthen ditch, the acequia will continue to lose water due to evaporation and ground seepage and an inordinate amount of time will have to be devoted to maintaining the ditch. The proposed action would not change or affect water rights, or the amount of flows diverted.

The Corps proposes to rehabilitate the East Puerto de Luna Community Ditch by lining part of the existing earthen ditch with concrete and by replacing part of the ditch with polyethylene irrigation pipe. Project design and specifications have been provided by the Natural Resources Conservation Service (NRCS). Components include: 1) installing approximately 3120 linear feet of 2500 PSI concrete ditch lining along the existing earthen ditch; 2) installing approximately 1190 linear feet of 36-inch diameter high-density polyethylene (HDPE) irrigation pipe along the existing earthen ditch; and 3) constructing two flumes of 36-inch diameter corrugated metal pipe with concrete support structures to allow the acequia to cross arroyos. Project construction is scheduled during the non-irrigation season beginning in February, 2010 with an expected duration of about 4 months. The Community Ditch members would be responsible for assuring operation and maintenance upon project completion.

The Corps has previously undertaken three projects to rehabilitate parts of East Puerto de Luna Community Ditch (U.S. Army Corps of Engineers 1996, 2000, 2003). In 1996, the earthen diversion dam was replaced with a concrete-capped gabion dam. In 2000, a flume crossing one of the arroyos that is tributary to the Pecos River was replaced. In 2003, a 2870-foot segment of the ditch was piped to connect concrete-lined portions of the irrigation ditch, and two concrete manhole sluice structures were constructed for access.

The NRCS, under its previous name, the Soil Conservation Service, has also completed rehabilitation projects on the East Puerto de Luna Ditch. In 1967, 3650 feet of ditch were lined, and 1 flume, 5 structures for water control, and 1 overshot were constructed. In 1973, construction included 14,459 feet of ditch lining, 15 turnouts, 2 spillways, and 1 structure for water control. In 1985, 134 feet of ditch were lined, and an overshot and 1 water control structure were constructed. These projects have rehabilitated approximately 4 miles of the 8.5 mile ditch.

The East Puerto de Luna Community Ditch is eligible for nomination to the National Register of Historic Places and the New Mexico State Register of Cultural Properties. The current rehabilitation project along with previous rehabilitation projects would cumulatively affect approximately 4.8 miles or 56.7% of the 8.5-mile ditch. The Corps, therefore, determined that the proposed East Puerto de Luna Community Ditch rehabilitation project will have an "Adverse Effect to Historic Properties." The Corps considered a combination of several efforts to mitigate for the adverse effect. Mitigation would include archival research and photographic documentation, oral history interviews, and preparation of a public outreach interest story or a document on the history of the acequia and community. The Corps, the New Mexico State Historic Preservation Officer, and the East Puerto de Luna Community Ditch Association have completed Section 106 consultation, having accepted a resolution of adverse effects and codified the measures in a Memorandum of Agreement (Appendix A).

Tribes indicating an interest in activities in Guadalupe County were sent a scoping letter to assess if there were any potential tribal concerns with the project. To date, no tribal concerns have been identified, and no traditional cultural properties are known to occur within or in the vicinity of the project area.

Should previously undiscovered artifacts or features be unearthed during construction, work would be stopped in the immediate vicinity of the find, a determination of significance made, and a mitigation plan formulated in coordination with the NMSHPO and with Native American groups that may have concerns in the project area.

As required by the Endangered Species Act, the Corps has determined that the project would have no effect on any threatened or endangered species or designated or proposed critical habitat receiving protection under the Endangered Species Act.

The proposed action is the rehabilitation of an existing irrigation structure. Therefore, the project is exempt from the provisions of Sections 404 and 401 of the Clean Water Act (33 CFR 323.4). The project complies with Executive Order 11990, Protection of Wetlands because there are no wetlands and no potential to impact wetlands within the project area.


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

- The contractor would be required to have emission control devices on all equipment.
- To control dust and wind erosion, soils within the construction zone would be kept wet. Stockpiles of debris, soil, sand, or other materials that could produce dust would be watered or covered. Materials transported on- or off-site by truck would be covered. The contractor would be required to comply with local soil sedimentation and erosion-control regulations.
- All fuels and lubricants would be stored outside of the 100-year floodplain of the Pecos River and construction equipment would be inspected daily and monitored during operation to prevent leaking fuels or lubricants from entering surface water.
- A Storm-Water Pollution Prevention Plan is required. Aquatic habitat in the Pecos River channel below the acequia pipeline would be protected with silt fencing, geotextiles, or straw bales to prevent runoff of sediments from areas disturbed by construction.
- The least amount of trench possible would be left open overnight and the sides of the trench would be sloped to avoid entrapment of small animals.
- All construction equipment would be cleaned with a high-pressure water jet before entering and upon leaving the project area to prevent introduction or spread of invasive plant species.
- Following construction, the soil would be stabilized and revegetated with appropriate native plant species.

The proposed action would not change or affect water rights or the amount of water diverted. The proposed action would result in minor or temporary effects on soils, air quality, noise levels, vegetation, and wildlife species and habitat. Adverse effects to cultural resources resulting from this project would be mitigated. The following elements were analyzed, but would not be significantly affected by the proposed action: climate, physiography, geology, water quality, waters of the U.S., wetlands, floodplains, special status species, land use, visual resources, human health and safety, aesthetics, land use, Indian Trust Assets, socioeconomics, and environmental justice. Beneficial effects would occur to land use and socioeconomics with increased efficiency of the acequia.

The proposed action is being coordinated with Federal, state, and local agencies with jurisdiction over the biological and cultural resources of the proposed action area. Based upon these factors and others discussed in the following environmental assessment, the proposed action would not have significant effects on the human environment. Therefore, an environmental impact statement will not be prepared for the proposed rehabilitation work on East Puerto de Luna Community Ditch.

2/8/10
Date



Kimberly M. Colloton
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District Commander

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1.0 INTRODUCTION

1.1 Background and Location

The U.S. Army Corps of Engineers (Corps), Albuquerque District, in cooperation with and at the request of the New Mexico Office of the State Engineer and the members of the Puerto de Luna East Side Acequia (Community Ditch) Association, is planning a project that would rehabilitate part of the East Puerto de Luna Community Ditch, Guadalupe County, New Mexico. The project area is located along the Pecos River approximately 8 miles south of Santa Rosa, New Mexico via State Highway 91 and approximately two miles north of the historic community of Puerto de Luna, in south-central Guadalupe County, New Mexico (see Figures 1, 2). Puerto de Luna is about 10 miles south of Interstate Highway 40 at Santa Rosa.

The proposed rehabilitation work on the East Puerto de Luna Community Ditch would be conducted under Section 1113 of the Water Resources Development Act of 1986 (WRDA 1986; Public Law 99-662, as amended). Section 1113 authorizes the Acequia Rehabilitation Program for the restoration and rehabilitation of irrigation ditch systems (acequias) in New Mexico. The East Puerto de Luna Community Ditch rehabilitation project also qualifies under Section 215 of the Flood Control Act of 1968, Public Law 90-483, as amended. Section 215 provides that the Secretary of the Army may enter into an agreement to credit or reimburse the costs of certain work accomplished by states or political subdivisions thereof, which later is incorporated into an authorized project. The Secretary of the Army, acting through the Chief 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 bodies at water resources development projects authorized for construction under the Secretary of the Army and the supervision of the Chief of Engineers.

The East Puerto de Luna Community Ditch diverts an irrigation water flow of 15 cubic feet per second from the Pecos River. The diversion structure, a concrete-capped gabion dam, is located approximately 4 miles southeast of the community of Santa Rosa at latitude 34°53'45" N, longitude 104°38'36" W. The main ditch is approximately 8.5 miles long. Approximately 4 miles of the main ditch has been lined with concrete or placed into irrigation pipe in previous rehabilitation work. The remaining length of the ditch is currently earthen. The acequia was built in about 1849 and has a priority date (when water rights were first established) of 1896. It currently serves 44 families to irrigate approximately 376 acres of crop land.

The Corps proposes to rehabilitate the Community Ditch by replacing approximately 4310 feet of existing earthen ditch with concrete ditch lining and polyethylene irrigation pipe. Two existing flumes that cross ephemeral arroyos also would be replaced. Project design and specifications have been provided by the USDA Natural Resources Conservation Service (NRCS). Project construction is scheduled during the non-irrigation season beginning in February, 2010 with an expected duration of about 4 months. The objectives of the proposed action are to improve water delivery efficiency by limiting water loss due to evaporation and seepage, and to reduce the maintenance effort required to clean sediment from the ditch. The Puerto de Luna East Side Community Ditch Association members would be responsible for assuring operation and maintenance upon project completion.

The Corps would provide 75 percent of construction funding and is therefore the action agency for this project. The Office of the State Engineer is the project sponsor, and with the local ditch association, would be responsible for the remaining 25 percent of construction costs. Project design and inspection would be undertaken by the NRCS.

Much of the information in this Environmental Assessment (EA) describing the physical and environmental resources at and near the proposed action area and the history of the East Puerto de Luna Acequia project has been taken from three previous Final Environmental Assessments that documented other rehabilitation projects completed for the acequia by the Corps: 1) "Rehabilitation of Puerto De Luna East Side Ditch, Guadalupe County, New Mexico" (January, 1996); 2) "Rehabilitation of an Irrigation Flume for the Puerto de Luna East Side Acequia, Guadalupe County, New Mexico" (October 2000); 3) "East Puerto de Luna Community Ditch Pipeline Rehabilitation, Guadalupe County, New Mexico" (September, 2003). These documents are hereby incorporated by reference.

Rehabilitation and improvements to the acequia have been undertaken several times in the past, as the acequia association obtained necessary funds. The first of these projects were completed by the Soil Conservation Service, the predecessor of the NRCS. In 1967, a 3650-foot segment of ditch was lined, and 1 flume, 5 water control structures, and 1 overshot were constructed. In 1973, construction included 14,459 feet of ditch lining, 15 turnouts, two spillways, and one structure for water control. In 1985, 134 feet of ditch were lined, and an overshot and one water control structure were constructed. Following the 1986 Water Resources Development Act's authorization of the Acequia Rehabilitation Program, the Corps provided funding for three projects on the Community Ditch. In 1996, the earthen diversion dam was replaced with a concrete-capped gabion dam. In 2000, a flume crossing one of the arroyos that is tributary to the Pecos River was replaced. In 2003, a 2870-foot segment of the ditch was piped to connect concrete-lined portions of the irrigation ditch, and two concrete manhole sluice structures were constructed for access. These projects have rehabilitated a total of approximately 4 miles of the 8.5-mile ditch. The proposed action would continue the work of rehabilitating the acequia.

1.2 Purpose and Need

The primary objective of the acequia rehabilitation project is to improve the efficiency of water delivery to the acequia members by minimizing evaporative and seepage losses from the earthen ditch segments. A secondary benefit of the proposed action would be to reduce maintenance costs for the members of the acequia.

The Community Ditch crosses several arroyos that carry runoff from adjacent uplands into the Pecos River. The flumes by which the acequia conveys water across these arroyos are critical links and must be well-designed and maintained to prevent them from washing out during flash flood events. The current project area includes two flumes which are at risk of failure. Flume 1 is aging with gaps in its pipe and erosion around its supporting abutments (Figure 3 a, b). Flume 2 lies on the surface of a wide arroyo and is at risk for washing out (Figure 3 c, d).

Currently, the earthen portions of the ditch experience water losses to seepage and evaporation. Maintenance of the earthen ditch is time-consuming and costly due to frequent accumulation of sediment and debris from the slope above the acequia. A portion of the acequia that runs between a steep cut bank of the Pecos River and State Highway 91 washed out in June or July 2008. Acequia members cut a new ditch, moving the alignment east away from the river bank, to allow ditch operation for the 2009 irrigation season (see photos, Figure 3 e, f). This alignment, and the following portion of the ditch which passes between a steep hillside and the Pecos River, would be placed into pipe.

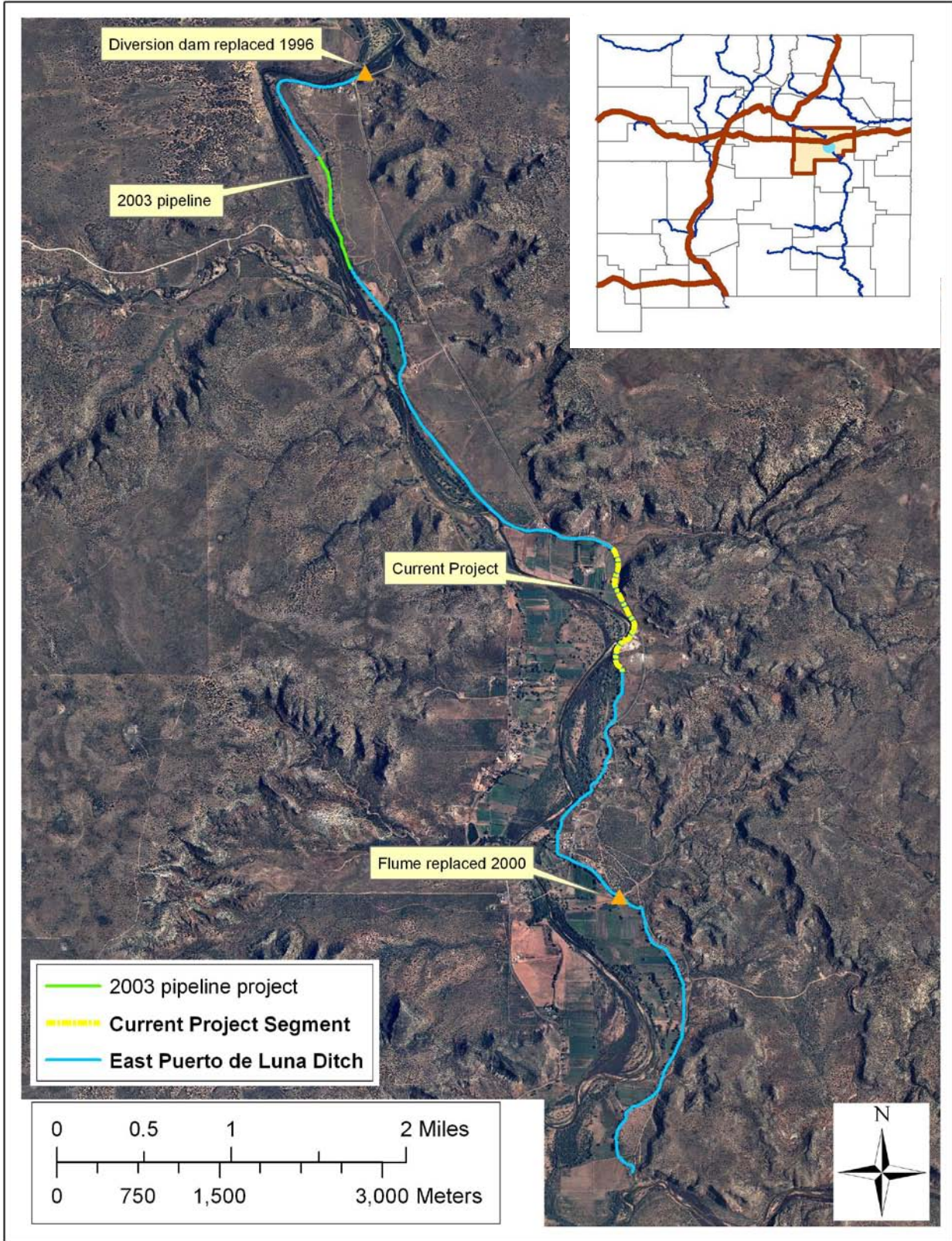


Figure 1. Map of Proposed Action Area showing previous improvement projects, Guadalupe County, New Mexico.

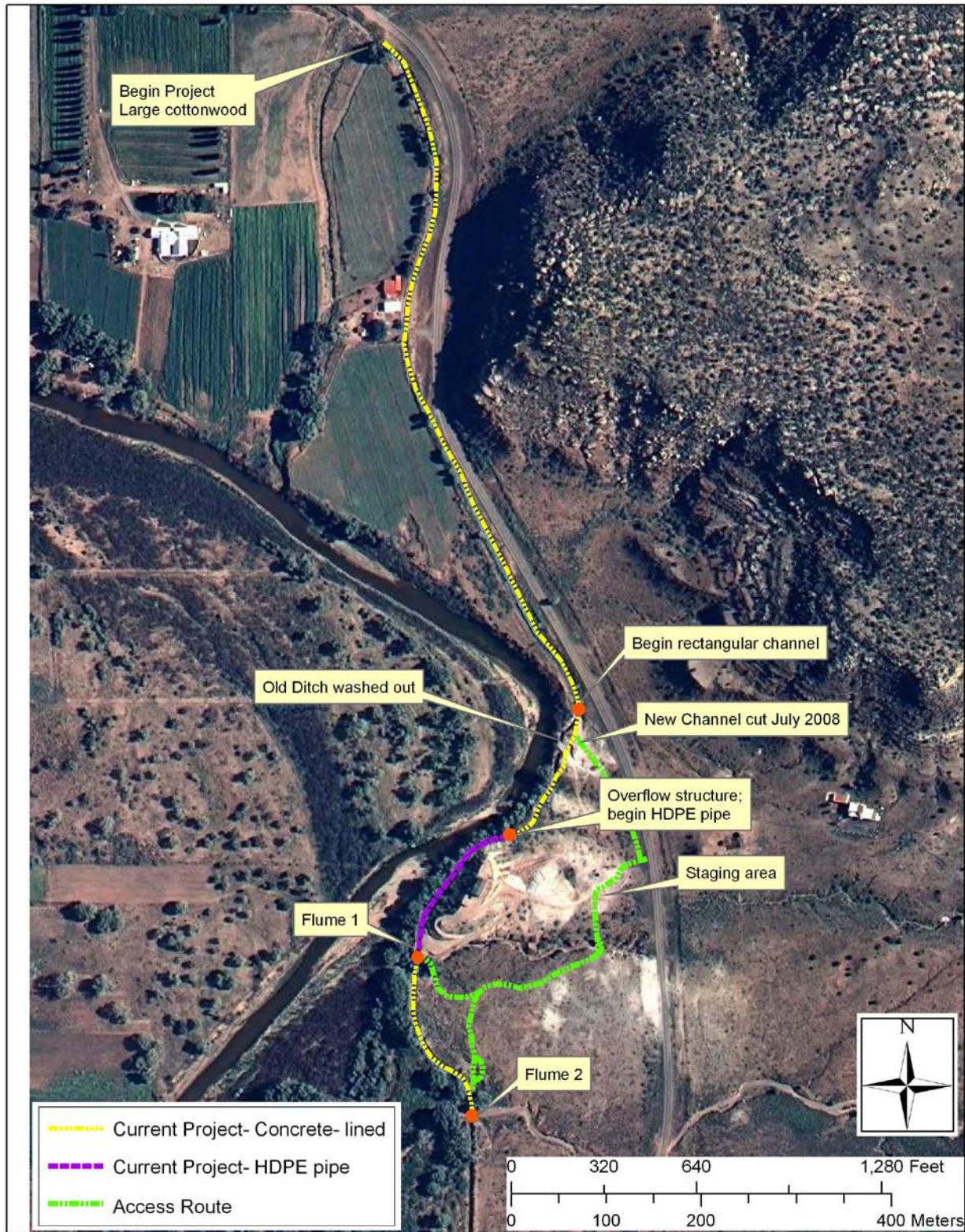


Figure 2: East Puerto de Luna Community Ditch Project Area Aerial Photo



a. Flume 1, erosion around concrete abutment



b. Flume 1, erosion around pipe.



c. Flume 2, pipe laying on surface of arroyo



d. Flume 2, gap in existing pipe.



e. Downstream view: New ditch alignment (left) cut July 2008 in response to wash-out of previous channel (right)



f. Upstream view: Pecos river bank; note disturbed ground from cutting new ditch channel.

Figure 3. East Puerto de Luna Ditch: Existing Conditions

1.3 Regulatory Compliance

This Environmental Assessment (EA) was prepared by the Corps, 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 *aa et seq.*)
- Clean Water Act (33 U.S.C 1251 *et seq.*)
- Clean Air Act (42 U.S.C. 7401 *et seq.*)
- Endangered Species Act (16 U.S.C. 1531 *et seq.*)
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations
- Executive Order 11988, Floodplain Management
- National Environmental Policy Act (42 U.S.C 4321 *et seq.*)
- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Part 1500 *et seq.*)
- National Historic Preservation Act (16 U.S.C. 470 *et seq.*)
- Native American Graves Protection and Repatriation Act (25 U.S.C. 3001 *et seq.*)
- Executive Order 11593, Protection and Enhancement of the Cultural Environment
- Executive Order 11990, Protection of Wetlands
- U.S. Army Corps of Engineers' Procedures for Implementing NEPA (33 CFR Part 230; ER 200-2-2)
- Farmland Protection Policy Act (7 U.S.C. 4201 *et seq.*)
- Executive Order 13112, Invasive Species

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

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

The Corps proposes to rehabilitate the East Puerto de Luna Community Ditch by 1) installing approximately 3120 linear feet of 2500 PSI concrete ditch lining along the existing earthen ditch; 2) installing approximately 1190 linear feet of 36-inch diameter high-density polyethylene (HDPE) irrigation pipe, with pipe alignment blocks as needed; and 3) replacing two flumes with new 36-inch diameter corrugated metal pipe supported by concrete structures to allow the acequia to cross arroyos. The pipeline alignment would use the new channel in the area that has washed out adjacent to the steep Pecos River bank and would divert to the east of the existing ditch alignment in the vicinity of Flume 1. After laying the concrete and pipe, the area would be reseeded with appropriate native plants. Existing roads and pasture tracks would be used for access to the area. Equipment staging and refueling would be confined to existing roads and bladed areas outside the floodplain of the Pecos River

The concrete-lined section would begin at the upstream end of the project, connecting to a section that was previously lined with concrete. A new headwall and slide gate would be constructed at the upstream end of the project. A large cottonwood at this location would not be disturbed. The proposed concrete-lined ditch would have a trapezoidal section, 2 feet wide at the bottom and 7 to 10 feet wide at the top; depth would vary from 2 ½ to 4 feet. Gratings would be installed across the ditch where needed to allow pedestrian crossing. An existing driveway crossing would be retained by constructing a hand-formed transition from the concrete ditch to the existing 36-inch corrugated metal pipe culvert and its rock-faced abutments. Existing waterlines would not be disturbed. Where the acequia enters the steep riverbank area, the ditch would transition from trapezoidal to a rectangular channel for 500 feet. An overland flow inlet structure with trash rack would be constructed to accommodate runoff inflow without damaging the ditch. At the transition from the rectangular ditch section to the piped section, an overflow structure would be constructed to return excess water to the Pecos River.

The piped section of the acequia would be placed up to 20 feet to the east of the existing ditch to avoid river bank erosion. In order to install the pipeline, a trench approximately 5 ½ feet wide at the bottom and 4 ½ feet deep with sloping sides would be dug. After laying the pipe, the trench would be backfilled according to NRCS specifications. Concrete pipe alignment boxes would be constructed at angles and at transitions between concrete-lined ditch and pipeline.

Flume 1 would be abandoned in place with a new flume to be constructed 20 feet to the east. The new flume would be supported by upstream and downstream structures of reinforced concrete. Because this flume is short, it would not need additional support beyond these two structures. Below the downstream structure, a 10-foot transition would be constructed into the second section of concrete-lined ditch.

Flume 2 would be removed and replaced. Similar to Flume 1, it would be supported by reinforced concrete structures at the upstream and downstream ends. Additionally, six concrete piers would be constructed at 15-foot intervals to support the corrugated metal pipe. The downstream structure at the end of Flume 2 would transition back into the original earthen ditch and marks the end of the project. The access route to Flume 2 would require driving across an open field on a previously used track. The contractor would be provided with a map and GPS coordinates for the access route to ensure that equipment stays within the surveyed work area.

During project analysis and design, completed by NRCS, the proposed action was determined to be most effective. The design would allow flow at a rate of 15 cubic feet per second (CFS). The design was based on current water usage as well as the irrigation water needs of the community and the acequia's allocation.

2.2 The No-Action Alternative

Under the no-action alternative there would be no modification of the existing open ditch and deteriorating flumes. The earthen ditch and corrugated metal flumes would continue to function and be maintained as they have in the recent past. Typical maintenance of the acequia system in the project's area of influence would continue, including cleaning sediment and vegetation from the existing earthen ditch with mechanized equipment and piling dirt along the

ditch to maintain its carrying capacity and minimize overflows. Failure of the flumes would be possible and would leave downstream landowners without irrigation water, threatening their livelihood and that of the small historic agricultural community.

2.3 Alternatives Considered but Not Analyzed

Alternatives that were considered and eliminated from further analysis included: replacing the flumes and re-excavating the ditch but leaving it earthen; replacing all 4310 linear feet of this earthen ditch segment with 36-inch HDPE irrigation pipe; or lining the entire ditch segment with concrete. These alternatives were removed from further consideration. Leaving an earthen ditch would not meet the project purposes of conveying water efficiently and reducing maintenance. Replacing the entire ditch segment with PVC pipe would increase the project costs unacceptably. Lining the entire segment with concrete would not solve the problem of sediments washing into the ditch in the steep riverbank area. Also, due to the low gradient of the ditch in this segment, ditch lining was determined not to be feasible for water conveyance. These alternatives were not carried forward for further review in this EA.

3.0 EXISTING ENVIRONMENT AND FORESEEABLE EFFECTS

3.1 Physiography, Geology, and Soils

The Santa Rosa/Puerto de Luna area lies within the Plains and Great Basin Grassland biotic province as defined by Brown and Lowe (1977), in the Pecos Valley in east-central New Mexico. Elevations in the region vary from about 1,520 to 1,830 meters (5,000 to 6,000 feet) on the mesas and upland areas on either side of the Pecos valley to about 1,365 meters (4,480 feet) at the project area.

The geology of the Santa Rosa area includes underlying sedimentary deposits of the Paleozoic San Andres limestone with some karst topography as seen in the area's numerous shallow sinks. Triassic sediments, primarily red sandstones, overlie the limestone. Surficial deposits of soil, gravel, silt, and clay of late Tertiary and Quaternary age cover the Triassic rocks in places. Most of these materials were deposited during the past two million years as the Pecos River cut into its present valley.

Between Santa Rosa and Puerto de Luna, in the immediate project area, surface geology includes the Paleozoic Artesia Group along the Pecos River bottoms and the Triassic Santa Rosa formation east of the Pecos (New Mexico Bureau of Geology and Mineral Resources 2005; New Mexico Environmental Department Surface Water Quality Bureau 2005). In previous works, the Santa Rosa Formation was included in the Chinle Group, comprised of red Triassic sandstone, siltstone, and conglomerate. Subsurface limestone is evident in the immediate project area where the new acequia channel was cut through the high bank of the Pecos River (Figure 3). The recommended plan and the no action alternative would have no foreseeable effects upon existing or potential geologic resources of the area.

Soils within the project area are mapped in three units. The Pecos River floodplain and northern part of the project area is La Lande loam, 0 to 2 percent slopes. The area where the acequia will be piped, from a sharp bend in the Pecos River south to Flume 1, is Regnier-Rock outcrop-Lacocca complex, 30 to 80 percent slopes. The southernmost part of the project area, from Flume 1 to Flume 2, is Ima-La Lande fine sandy loams, 2 to 10 percent slopes. (USDA NRCS 2009).

La Lande loam is found on stream terraces and is associated with the Clay Loam ecological site. This is a well drained, nonsaline soil containing up to 15 percent calcium carbonate and 2 percent gypsum. Depth to water table is more than 80 inches. Regnier-Rock outcrop-Lacocca complex soils are in the breaks north exposure ecological site and occur on 30 to 80 percent slopes. These soils are derived from redbed sandstone and shale. They are well drained, nonsaline to very slightly saline soils containing up to 30 percent calcium carbonate and up to 5 percent gypsum. These are shallow soils with a depth to bedrock of 4 to 20 inches and depth to water table of greater than 80 inches. Ima-La Lande soils are associated with the Sandy Loam ecological site and occur on alluvial fans and slopes. These are also well-drained, nonsaline soils derived from redbed sandstone and shale. Depth to water table is greater than 80 inches. Ima and La Lande soils contain up to 15 percent calcium carbonate and 2 percent gypsum.

The proposed action would have a minor, temporary effect to these soils during construction. Where the ditch will be concrete-lined, it would be excavated to a standard trapezoidal cross-section. A trench would be excavated in order to lay the pipe for the acequia and would be backfilled according to NRCS specifications. These actions would disturb the soil profile in an area 1.1 acre in size; surface disturbance associated with construction vehicles would total approximately 2 acres. Standard Best Management Practices (BMPs) to prevent on- and off-site erosion would be incorporated in contract specifications, and would include silt fences, straw bales, geotextiles, or similar measures. Following installation of the PVC irrigation pipe, the soil would be stabilized and revegetated using appropriate native plant materials. Use of these BMPs would ensure that soils are only minimally affected by the proposed work. The No-Action alternative would have no effect to soils. Because each of the past rehabilitation projects on the East Puerto de Luna Community Ditch has used BMPs to control wind and water erosion, cumulative impacts to soils would be negligible.

The rehabilitation of the acequia would provide a benefit to soils outside the immediate project area. Ensuring the continued delivery of irrigation waters would allow valley croplands to remain productive, preventing soil erosion in the project area. The no action alternative could potentially lead to decline of the acequia system and abandonment of farmland, which would be prone to soil erosion unless revegetated with native grasses.

3.2 Climate

The climate of the Pecos Valley is semiarid, with average annual precipitation of about 12 to 14 inches. The summers are hot and breezy and the winters are clear and sunny. The majority of the annual precipitation comes from brief but intense afternoon thunderstorms, some of which can be severe. These storms usually occur during the late summer and early fall.

Humidity is generally low. Winter snowfall is low, but common. The average annual temperature is about 58° to 60° Fahrenheit with maximum summer temperatures in the 90's and winter lows in the 20's. The frost-free season is 180 to 200 days (USDA, NRCS 2009).

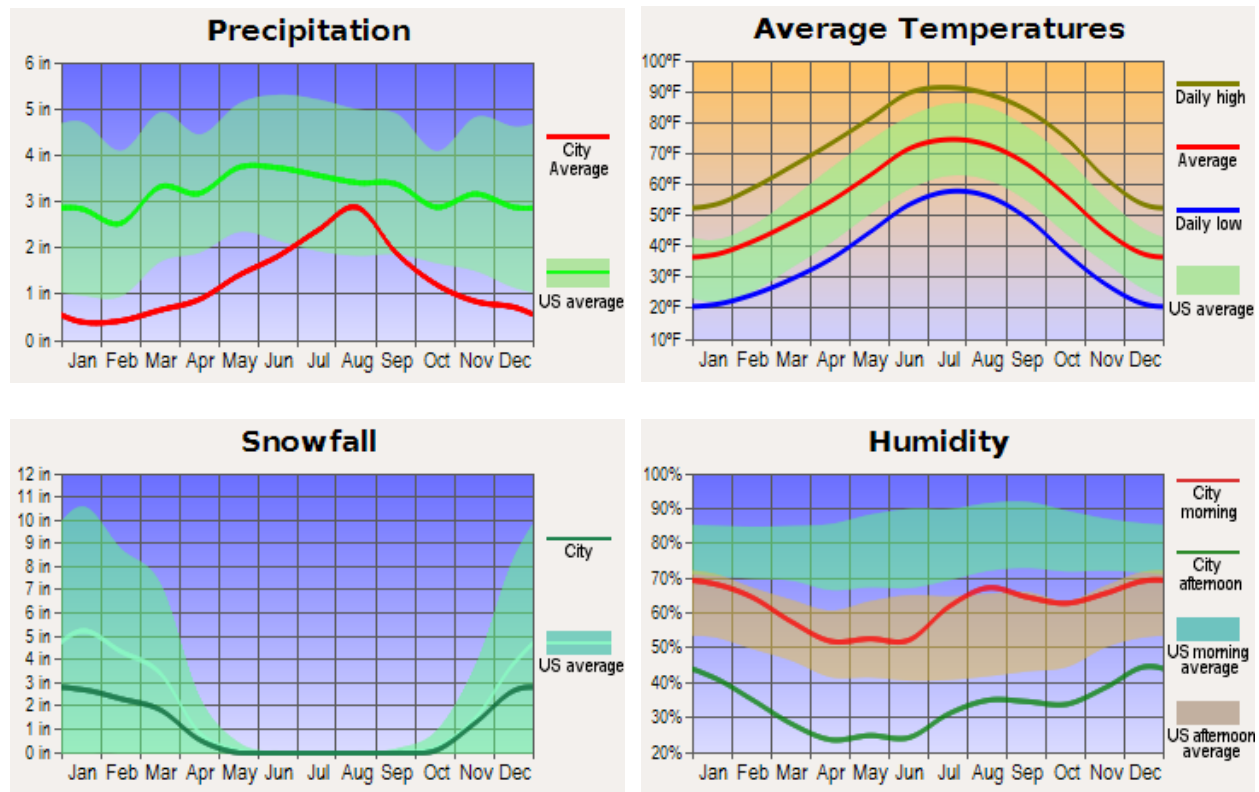


Figure 4. Climate characteristics in Santa Rosa, Guadalupe County, NM near project area. Graphs generated by City-data.com (2009).

Global climate change related to emissions of greenhouse gases (*e.g.* carbon dioxide, methane, nitrous oxide, chlorofluorocarbons) is predicted to result in a dryer Southwest with greater variation in precipitation (Backlund, Janetos, and Schimel 2008). In 2005, New Mexico Governor Bill Richardson signed Executive Order 05-33, which included development of recommendations for reducing greenhouse gas emissions in the State to year 2000 levels by 2012, 10 percent below 2000 levels by 2020, and 75 percent below 2000 levels by 2050. The year 2000 reference level is 83 million metric tons of carbon dioxide equivalent gases (MMtCO₂e; New Mexico Climate Change Advisory Group 2006: 2-2).

The contribution of the proposed action to greenhouse gas emissions would likely be negligible. The construction phase of the proposed project would produce carbon emissions; however, it is likely that the reduced need for maintenance of the acequia would result in less vehicular travel to the project site over the longer term, producing correspondingly lower carbon emissions. Thus, neither the proposed action nor the No-Action alternative would have a detectable effect on climate in the short or long term.

3.3 Water Quality

Section 402 of the Clean Water Act (CWA; 33 U.S.C. 1251 *et seq.*), as amended, regulates point-source discharges of pollutants into waters of the United States and specifies that storm-water discharges associated with construction activities shall be conducted under the National Pollution Discharge Elimination System (NPDES) guidance. Construction activities characterized by clearing, grading, and excavation are associated with storm-water discharges, subjecting the underlying soils to erosion by storm-water. The NPDES general permit guidance would apply to this project because the total project area is more than one acre. Therefore, a Storm-Water Pollution Prevention Plan (SWPPP) is required. Standard Best Management Practices to prevent on- and off-site erosion, sediment and storm-water discharges would be incorporated in contract specifications, as described in Section 3.1 above. Therefore, impacts from storm-water due to the proposed work are expected to be negligible and short-term.

Section 404 of the CWA, (CWA; 33 U.S.C. 1251 *et seq.*) as amended, provides for the protection of waters of the United States through regulation of the discharge of dredged or fill material. The proposed action is the rehabilitation of an existing irrigation structure. Therefore, the project is exempt from the provisions of Sections 404 and 401 of the Clean Water Act (33 CFR 323.4). See Appendix B for a summary of the Irrigation Exemption from the Regulatory Division, Albuquerque District Corps.

Under Section 303(d)(1) of the CWA, states are required to develop a list of waters within the state that do not support their designated uses as established in the state water quality standards (WQS). For each water body on this §303(d) list, states must establish a total maximum daily load (TMDL) for each pollutant that causes the waters to be “impaired.” A TMDL analysis is established to restore a water body and to ensure that WQS are maintained for that water body. The New Mexico Environment Department’s Surface Water Quality Bureau (NMED-SWQB) completed a water quality assessment for the Pecos headwaters watershed in 2001 (NMED-SWQB 2001). Water quality in the lower part of the Pecos headwaters, including the Puerto de Luna area, is relatively good. Between Sumner Reservoir and Santa Rosa Reservoir, most of the Pecos River’s designated uses, including fish culture, irrigation, livestock watering, wildlife habitat, and secondary contact, are fully supported. However, water quality was found “not supporting” of marginal warmwater aquatic life because the water quality standard for sedimentation/siltation was exceeded. Water quality in this reach is therefore classified as “impaired for one or more designated or existing uses”. NMED-SWQB (2008) identified the sources of water quality impairment as flow alterations from water diversions and rangeland grazing. TMDLs have been developed only for the northern portion of the Pecos Headwaters, and not for the reach between Santa Rosa and Sumner Lakes, which includes Puerto de Luna. In general, BMPs are encouraged to reduce sedimentation/siltation in the river.

During construction of the proposed project, BMP’s would be used to control erosion in the project area and to prevent sediment from entering the Pecos River, as described in Paragraph 3.1, and a SWPPP would be required. Therefore, the proposed action would not increase sedimentation and would have no effect on water quality or quantity in the Pecos River. Similarly, previous rehabilitation projects did not change the amount of water withdrawn from

the Pecos River or increase its sediment load. Therefore, there would be no measurable cumulative impacts on water quality due to the proposed work.

3.4 Floodplains and Wetlands

Executive Order 11988 (Floodplain Management) requires Federal agencies to take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains. The Federal Emergency Management Agency has not mapped flood risk in rural Guadalupe County; therefore, the boundary of the 100-year floodplain of the Pecos River in the project area has not been determined. It is possible that part of the proposed action area may lie within areas inundated by the 100-year flood. The nature of acequia systems inherently depends on the diversion structure or distribution system being located in the floodplain. However, no additional development would occur within the floodplain. The acequia's water users are all located downstream and their substantial structures are believed to be located above the floodplain. Rehabilitating the acequia with its small water allocation would not contribute to additional development, but would allow present agricultural land uses to continue. Neither the proposed action nor the No-Action alternative would result in any additional development in the Pecos River floodplain. Therefore, no adverse effect to the floodplain is anticipated.

Executive Order 11990 (Protection of Wetlands) requires that Federal agencies take action to minimize the destruction, loss or degradation of wetlands. Agencies must avoid undertaking or providing assistance for new construction located in wetlands whenever there is a practicable alternative. There are no naturally occurring wetlands within the project area, and therefore, no impacts to wetlands would occur. Neither the proposed action nor the No-Action alternative would affect wetlands or change wetland acreage in the area.

3.5 Air Quality, Noise, and Aesthetics

Air quality in the Santa Rosa Area is generally good. The New Mexico Environment Department Air Quality Bureau (NMED-AQB) monitors air quality throughout the state in areas of State jurisdiction according to need. In 2008 the Bureau operated 30 criteria air pollutant monitoring sites located in 11 of the State's 33 counties. All air monitoring locations are sited in major population centers or near known pollution sources. The NMED-AQB formerly monitored carbon monoxide (CO) and particulate matter in Guadalupe County. Currently, the county does not have an air-quality monitoring station because air quality standards were met in past monitoring and because of the absence of industries that would produce regulated pollutants. The nearest monitoring stations are in Santa Fe (~90 miles northwest) and Roswell (~110 mi south) Guadalupe County is classified as an air quality attainment area (USEPA 2009).

Class I air quality areas are designated natural areas, including national parks, national monuments, and wilderness areas, where air quality is subject to maximum limits on degradation. The Class I air quality areas closest to the project are the Pecos wilderness in the Santa Fe National Forest, 75 miles away, and Bitter Lake National Wildlife Refuge, about 90 miles from Puerto de Luna. (NMED-AQB 2009) Due to their distance from the proposed action

and the limited scope and duration of the proposed work, Class I air quality areas would not be affected by the project or by the No-Action alternative.

The proposed action would result in a temporary but negligible, localized increase in suspended dust (coarse particles) from construction activities. BMP's to be followed during construction to minimize dust include the following: Access roads and disturbed soil would be wetted. All vehicles involved in transporting fill material, rubble and spoil to or from the project site would be covered and would have required emission control equipment. Stockpiles of debris, soil, sand, or other materials that could produce dust would be watered or covered. These practices would minimize dust and emissions-related air quality impacts during construction. Once construction is complete, the operation of the acequia would have no further long-term effects on air quality. Therefore, air quality in the city of Santa Rosa or Guadalupe County would not be affected by the proposed project or by the No-Action alternative.

Background noise levels in the proposed action area are low, as typical for an agricultural area. The Occupational Safety and Health Administration (OSHA) noise standards limit noise levels to 90 decibels (dBA) averaged over an eight-hour day (29CFR 1910.95). The Noise Center (League for the Hard of Hearing, 2009) advises that noise levels above 85 dBA will harm hearing over time and noise levels above 140 dBA can cause damage to hearing after just one exposure. During construction, noise would temporarily increase in the vicinity during vehicle and equipment operation and may be audible from nearby residences. Noise levels in the immediate work area would likely be comparable to that generated by a tractor (up to 90 dBA) during work hours. The increase in noise during construction would not be loud enough to harm hearing and would be temporary, ending when construction is complete. To reduce temporary construction noise, construction contract BMPs will require that construction equipment and activities comply with state and local noise control ordinances. Therefore, the proposed action would have no significant affect on noise levels in the environment. The No-Action Alternative would not change the background noise levels in the project area.

Cumulative effects of noise increases were assessed using an approximately one-half mile radius from the project area, assuming that large equipment noise may be heard from that distance at times. The increase in noise generated by construction of the project would add to noise levels generated from surrounding homes, resulting in a cumulative increase in noise levels during the period of construction. To reduce temporary construction noise, construction contract BMPs will require that construction equipment and activities comply with state and local noise control ordinances.

Aesthetically, the project area is rural with open space, minimal development with ample space between residences and associated farm buildings, and a mix of native and cultivated vegetation. The Pecos Valley is scenic, with a wooded riparian corridor, farm land in the valley bottom, and adjacent hills and uplands in a relatively natural state. During construction, equipment would be temporarily present in the more developed valley near farm buildings where farm vehicles and equipment are already present. The short-term presence of vehicles and disturbed ground in the fields during construction would be the only apparent visual change to the area. After project completion, the landscape would return to its 'natural' appearance. Aesthetic conditions would therefore not be affected in the long term by the proposed action or

by the No-Action alternative. As the project will not affect visual resources or land uses, there will be no cumulative effects to land use and visual resources.

3.6 Vegetation Communities

The proposed action area lies within the Plains and Great Basin Grassland biotic community (Brown and Lowe 1977; Brown 1982) or Plains-Mesa Grassland as described by Dick-Peddie (1993). New Mexico's Comprehensive Wildlife Conservation Strategy (NMDGF 2006) places the area within the Southern Shortgrass Prairie Ecoregion. The Pecos River riparian corridor itself is an altered Floodplain-Plains riparian community. Corps personnel visited the site on 22 January and 14 April, 2009. A list of plants observed on the site visit is provided in Table 1. Photographs taken along the acequia route show the existing vegetation condition (Figure 5). The Pecos River channel supports a thinly wooded riparian community of cottonwood mixed with non-native Russian olive and saltcedar. Along the flat bottomland portion of the acequia alignment, mature cottonwoods grow over a giant sacaton (*Sporobolus wrightii*) grassland. Where the acequia traverses hill slopes, much of the ground has been disturbed. The remaining vegetation in these hilly areas consists of native and introduced perennial grasses, native forbs and shrubs, yucca and cacti with sparse ground cover. Bare patches are undoubtedly colonized by annual weeds during the growing season. The existing ditch supports thin strips of native soapberry trees. The No-Action alternative would result in no effects to this vegetation.

Under the proposed action, a small amount of vegetation (1-2 acres) would be disturbed. The native grasses and forbs are expected to return following construction and reseeded. The trees along the existing ditch route may decline, as lining the ditch will make water less available to these trees. Cumulatively, this and other rehabilitation projects that reduce water loss from the acequia may result in a small decrease in tree cover along the acequia route.

3.7 Noxious Weeds and Invasive Species

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 impacts that invasive species cause. In addition, the State of New Mexico, under administration of the New Mexico Department of Agriculture (NMDA), designates and lists certain weed species as being noxious (NMDA 2009). "Noxious" in this context means plants not native to New Mexico that may have a negative impact on the economy or environment and are targeted for management or control. In order to prevent new infestations of noxious weeds and invasive species, all equipment would be cleaned with a high-pressure water jet before entering the area. Following construction, native species would be planted, minimizing the opportunity for invasive species to colonize the area. No federal or state noxious weeds were identified during the site visits. Russian thistle, which is not listed due to being widespread, is present. To minimize the spread of this and other invasive species that may have escaped detection, the contractor would also be required to clean equipment upon leaving the project area. Therefore, the proposed action is in compliance with the Federal Noxious Weed Act and Executive Order 13112.



a. Bottom land at southern end of acequia project: Cottonwoods and giant sacaton grassland



b. Pasture near northern end of acequia project area; recently cleaned ditch in foreground



c. Pecos River valley, downstream view

Figure 5: East Puerto de Luna Ditch Vegetation, Existing Conditions

Table 1: List of plants observed at East Puerto de Luna Community Ditch project site

Family	Genus-species	Common name
Agavaceae	<i>Nolina microcarpa</i>	sacahuista
	<i>Yucca glauca</i>	soapweed yucca
Apiaceae	<i>Cymopterus sp.</i>	spring-parsley
Apocynaceae	<i>Apocynum cannabinum</i>	Indian hemp
Asteraceae	<i>Artemisia filifolia</i>	sand-sage
	<i>Artemisia ludoviciana</i>	Louisiana sage
	<i>Baccharis salicifolia</i>	seep-willow
	<i>Chaetopappa ericoides</i>	baby aster
	<i>Erigeron sp</i>	fleabane daisy
	<i>Gutierrezia sarothrae</i>	broom snakeweed
	<i>Helianthus annuus</i>	annual sunflower
	<i>Tetaneuris sp</i>	perky Sue
	<i>Xanthium strumarium</i>	cocklebur
Brassicaceae	<i>Physaria fendleri</i>	Fendler bladderpod
Cactaceae	<i>Opuntia imbricata</i>	cholla
	<i>Opuntia engelmannii</i>	prickly pear
Chenopodiaceae	<i>Atriplex canescens</i>	four-wing saltbrush
	<i>Salsola tragus</i>	Russian thistle
Cupressaceae	<i>Juniperus monosperma</i>	one-seeded juniper
Cyperaceae	<i>Carex sp.</i>	unidentified sedge
Equisetaceae	<i>Equisetum arvense</i>	field horsetail
Fabaceae	<i>Astragalus sp</i>	locoweed, milk-vetch
	<i>Melilotus officinalis</i>	yellow sweet clover
	<i>Prosopis glandulosa</i>	mesquite
Liliaceae	<i>Allium sp.</i>	onion
Malvaceae	<i>Sphaeralcea sp</i>	globe-mallow
Elaeagnaceae	<i>Elaeagnus angustifolia</i>	Russian olive
Onagraceae	<i>Calylophus sp</i>	sundrops
	<i>Gaura sp.</i>	gaura
	<i>Oenothera sp.</i>	evening primrose
Poaceae	<i>Bothriochloa laguroides</i>	silver bluestem
	<i>Bouteloua gracilis</i>	blue grama
	<i>Cenchrus incertus</i>	sandbur
	<i>Distichlis spicata</i>	saltgrass
	<i>Elymus longifoliusi</i>	squirreltail
	<i>Elymus canadensis</i>	Canada wild-rye
	<i>Muhlenbergia repens</i>	creeping muhly
	<i>Setaria leucopila</i>	plains bristlegrass
	<i>Sorghastrum nutans</i>	Indiangrass
	<i>Sorghum jalapense</i>	Johnsongrass
	<i>Sporobolus airoides</i>	alkalai sacaton

	<i>Sporobolus contractus</i>	spike dropseed
	<i>Sporobolus wrightii</i>	giant scaton
Polygonaceae	<i>Rumex sp.</i>	dock
Ranunculaceae	<i>Clematis ligusticifolia</i>	virgin's bower
Salicaceae	<i>Populus deltoides</i>	cottonwood
Sapindaceae	<i>Sapindus saponaria</i>	soapberry
Scrophulariaceae	<i>Verbascum thapsus</i>	mullein
Solanaceae	<i>Lycium pallidum</i>	wolfberry
	<i>Solanum elaeagnifolium</i>	silver-leaf nightshade
Tamaricaceae	<i>Tamarix sp</i>	saltcedar
Verbenaceae	<i>Glandularia bipinnatifida</i>	Dakota vervain

3.8 Wildlife

The wildlife species discussed here represent a partial list of species occurring in Guadalupe County, New Mexico, as listed by previous Environmental Assessments (USACE 1996, 2000, 2003), BISON-M (New Mexico Department of Game and Fish 2009) and New Mexico's Comprehensive Wildlife Conservation Strategy (NMDGF 2006).

Mammals occurring in Guadalupe County typically include small mammals such as squirrels, mice, gophers, rats, rabbits, badgers, raccoon, and skunks as well as larger mammals such as foxes (*Urocyon cinereoargenteus*, *Vulpes macrotis*, *V. vulpes*, *V. velox*), coyote (*Canis latrans*), bobcat (*Lynx rufus baileyi*), and mule deer (*Odocoileus hemionus*). Mountain lion (*Puma concolor*) are unlikely to venture within the immediate project area due to proximity to humans. New Mexico's Comprehensive Wildlife Conservation Strategy (NMDGF, 2006) identifies the following mammals as Species of Greatest Conservation Need (SGCN) for the Southern Shortgrass Prairie Ecoregion: Least Shrew (*Cryptotis parva*), Arizona Myotis (*Myotis occultus*), Prairie Vole (*Microtus ochrogaster*), Black-Tailed Prairie Dog (*Cynomys ludovicianus*), Swift Fox (*Vulpes velox*) and Mule Deer (*Odocoileus hemionus*). For riparian habitats, 33 mammalian species are listed as SGCN's, including several bats, shrews, mice, voles, squirrels, and Black Bear (*Ursus americanus*). However, the Pecos River riparian corridor is generally at a lower elevation than the acequia route and would not be affected by the proposed work.

Resident and migratory birds observed or expected in the area include Western Kingbird (*Tyrannus verticalis*), Turkey Vulture (*Cathartes aura*), Northern Mockingbird (*Mimus polyglottos*), Common Raven (*Corvus corax*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Western Meadowlark (*Sturnella neglecta*), Great Horned Owl (*Bubo virginianus*), Red-tailed Hawk (*Buteo jamaicensis*), American Kestrel (*Falco sparverius*) and various swallows and sparrows. Bird Species of Greatest Conservation Need for the Southern Shortgrass Prairie and occurring in Guadalupe County include Bald Eagle (*Haliaeetus leucocephalus*), Scaled Quail (*Callipepla squamata*), Sandhill Crane (*Grus canadensis*), Mountain Plover (*Charadrius montanus*), Long-Billed Curlew (*Numenius americanus*), Wilson's Phalarope (*Phalaropus tricolor*), Baird's and Grasshopper Sparrow (*Ammodramus bairdii*, *A. savannarum*), Ferruginous Hawk (*Buteo regalis*), Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*), Mourning Dove (*Zenaida macroura*), Burrowing Owl (*Athene cunicularia*), and Loggerhead Shrike (*Lanius ludovicianus*) (NMDGF 2006). Due to the limited scope of work and the timing of construction outside the nesting season, there would be no effect to these species from the proposed action.

Reptiles and amphibians (herptiles) in the area may include Plains spadefoot (*Spea bombifrons*), Woodhouse's toad (*Bufo woodhousii*), Great Plains toad (*B. cognatus*), yellow mud turtle (*Kinosternon flavescens*), plateau striped whiptail (*Cnemidophorus velox*), southern prairie lizard (*Sceloporus undulatus consobrinus*), prairie ringneck snake (*Diadophis punctatus arnyi*), short-horned lizard (*Phrynosoma hernandesi*), Great Plains skink (*Eumeces obsoletus*), whiptails (*Aspidoscelis* spp.), garter snakes (*Thamnophis* spp.), and Western rattlesnake (*Crotalus viridis*). Species of Greatest Conservation Need in the Southern Shortgrass Prairie include Western Chorus Frog (*Pseudacris triseriata*), Plains Leopard Frog (*Rana blairi*), Tiger Salamander (*Ambystoma*

tigrinum), Ornate Box Turtle (*Terrapene ornata*), Collared Lizard (*Crotaphytus collaris*), Milk Snake (*Lampropeltis triangulum*), Western Diamondback Rattlesnake (*Crotalus atrox*), and Desert Massasauga (*Sistrurus catenatus edwardsii*) (NMDGF 2006). Because construction is scheduled for late fall when these species are not active, the proposed work would have no effect on herptiles.

Fifty-eight Species of Greatest Conservation Need, including eighteen fish, are associated with aquatic habitats of the Pecos watershed (NMDGF 2006). The Pecos bluntnose shiner does not occur in this reach of the Pecos River. Pecos Watershed SGCN's in Guadalupe County include bigscale logperch (*Percina macrolepida*), rainwater killifish (*Lucania parva*), central stoneroller (*Campostoma anomalum*), Mexican tetra (*Astyanax mexicanus*), Rio Grande chub (*Gila Pandora*), smallmouth buffalo (*Ictiobus bubalus*), and speckled chub (*Macrhybopsis aestivalis*) (BISON-M 2009). There are no perennial waters within the work area and BMP's would be used to prevent sediment from entering the Pecos River. Therefore, no fish or other aquatic species would be affected by the proposed work.

The foreseeable effects of the proposed action on wildlife of the proposed construction area would be minor, of short duration, and temporary in nature, and would result in negligible disturbance. Wildlife species in or near the proposed construction area generally have adapted to the existing human presence. There are no foreseeable effects from the no-action alternative other than those effects resulting from the existing human presence and the existing conditions along the irrigation ditch. Under the proposed action, some wildlife species would be temporarily displaced during construction, but are expected to return after construction is complete. Because the work would take place during the late fall, there would be no effect to migratory birds or to nesting or breeding behavior. Herptiles and many small mammals would not be active during this time. Nevertheless, entrapment of small vertebrates would be minimized by following USFWS recommendations for trenching operations. The least amount of trench possible would be left open overnight and trench sides would be sloped or escape ramps would be provided to avoid trapping wildlife (USFWS 2009). No direct negative impacts are expected occur to wildlife as a result of the proposed action or the No-Action alternative.

3.9 Special Status Species

Three agencies have primary responsibility for protecting and conserving plant and animal species within the proposed action area. The United States Fish and Wildlife Service (USFWS), under authority of the Endangered Species Act of 1973, has the responsibility for Federal listed species. The New Mexico Department of Game and Fish (NMDGF) has the responsibility for state-listed wildlife species. The New Mexico State Forestry Division (Energy, Minerals, and Natural Resources Department) has the responsibility for state-listed plant species. Special status species that occur in Guadalupe County are listed below in Table 2 (USFWS 2008, NMDGF 2008).

None of the special status animals listed in Table 2 have been detected in the project area on two site visits, nor is suitable habitat present. These species would not be affected by the

proposed action due to the limited disturbance and the lack of preferred habitat in the project area.

The Forestry Division of the New Mexico Energy, Minerals, and Natural Resources Department has the responsibility for maintaining the state list of rare, threatened and endangered plant species. The New Mexico Rare Plants Technical Council list indicates that there are three rare plant species that occur in Guadalupe County (New Mexico Rare Plants Technical Council 2008; included in Table 2). Populations of the federally-threatened Pecos sunflower exist in the Santa Rosa area and critical habitat has been designated at Blue Hole and Westside Spring in Santa Rosa. Both Pecos sunflower and the state-endangered Wright's marsh thistle require spring and cienega habitats, which are not present in the proposed action area. Although these plants occur in Guadalupe County, they are not known to exist within the project area, nor were these species or their habitats detected in site visits. Therefore, there would be no direct, indirect or cumulative effect to these rare plants by the proposed action or the No-Action alternative.

Table 2: Federal and State Threatened, Endangered, and Candidate Species Listed for Guadalupe County, New Mexico with Potential to Occur in the Project Area

Common Name	Scientific Name	Federal Status (USFWS) ^a	State of New Mexico status
Lesser prairie-chicken	<i>Tympanuchus pallidicinctus</i>	C	-
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E	E
Black-footed ferret	<i>Mustela nigripes</i>	E	X
Pecos sunflower	<i>Helianthus paradoxus</i>	T	E
Baird's sparrow	<i>Ammodramus bairdii</i>	SoC	T
Mountain plover	<i>Charadrius montanus</i>	SoC	-
Northern goshawk	<i>Accipiter gentilis</i>	SoC	-
Western burrowing owl	<i>Athene cunicularia hypugaea</i>	SoC	-
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	C	-
Bald eagle	<i>Haliaeetus leucocephalus</i>	DM	T
Peregrine falcon	<i>Falco peregrinus anatum</i>	SOC	T
Arctic peregrine falcon	<i>Falco peregrinus tundrius</i>	SOC	T
Gray vireo	<i>Vireo vicinior</i>	-	T
Common Black-Hawk	<i>Buteogallus anthracinus</i>	SoC	T
Neotropic Cormorant	<i>Phalacrocorax brasilianus</i>	-	T
Piping plover	<i>Charadrius melodus circumcinctus</i>	T (not in county)	T
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>	SoC	-
Pecos River muskrat	<i>Ondatra zibethicus ripensis</i>	SoC	-
Swift fox	<i>Vulpes velox</i>	SoC	-
Rio Grande shiner	<i>Notropis jemezianus</i>	SoC	-
Bigscale Logperch	<i>Percina macrolepida</i> (Native pop.)	-	T
Suckermouth Minnow	<i>Phenacobius mirabilis</i>	-	T
Mexican Tetra	<i>Astyanax mexicanus</i>	-	T
Wright's marsh thistle	<i>Cirsium wrightii</i>	SoC	E
Flint Mountains milkvetch	<i>Astragalus siliceus</i>	SoC	SoC

^a **Endangered Species Act (ESA)** (as prepared by U.S. Fish and Wildlife Services) **status:**

E= Endangered: any species that is in danger of extinction throughout all or a significant portion of its range.

T= Threatened: any species that is likely to become and endangered species within the foreseeable future throughout all or a significant portion of its range.

C= Candidate: taxa for which the Services has on file sufficient information to support proposals to list them as endangered or threatened species.

SOC = Species of concern (included for planning purposes; not protected under ESA)

^b **State of New Mexico status:**

E= Endangered: Animal species whose prospects of survival or recruitment within the state are in jeopardy.

T= Threatened: Animal species whose prospects of survival or recruitment within the state are likely to become jeopardized in the foreseeable future.

S= Sensitive Taxa (informal).

X= Taxa considered to be Extirpated

3.10 Cultural Resources

As a ground-disturbing project, this undertaking has the potential to affect historic properties. The Corps conducted a pedestrian survey of the proposed action area to determine what historic properties were present, as detailed in the report title “A Cultural Resources Inventory of 7.8 Acres for an Acequia Rehabilitation Project on the East Puerto de Luna Community Ditch, Guadalupe County, New Mexico” (see Appendix A). Most acequias are considered historic properties in New Mexico; they are eligible for listing on the National Register of Historic Places (36 CFR 800). The East Puerto de Luna Community Ditch, which was thought to be constructed at least by the mid-1860s, is no exception. Excluding the ditch, no other historic properties were discovered during the survey or through literature searches that would be affected by this project.

Consistent with the Department of Defense’s American Indian and Alaska Native Policy, signed by Secretary of Defense William S. Cohen on October 20, 1998, and based on the State of New Mexico Indian Affairs Department and the Historic Preservation Division’s Native American Consultations List, American Indian tribes that have indicated they have concerns in Guadalupe County have been contacted regarding the proposed action. To date, the Corps has received no indication of tribal concerns in regard to this project. Copies of tribal correspondence are included in Appendix A. No Traditional Cultural Properties are known by the Corps to occur in or near the project area.

The Corps determined that this project would adversely affect the Community Ditch. The function and alignment of the ditch, both important historic aspects, would not be affected. However, as detailed in the cultural resources report, the form—also important historically—of the acequia has been extensively modified over the years. The form has been altered primarily from an open earthen ditch to concrete-lined ditch or under-ground pipeline, but also by replacement of the diversion structure. The Corps, through three projects, has modified approximately 2,920 linear feet of ditch (6.5 percent). The Natural Resources Conservation Service modified about 18,243 linear feet (40.6 percent). The current project is proposing to install 3,120 feet of concrete ditch lining, 1,100 feet of underground pipeline and about 89 feet of corrugated metal pipe for a total of about 4,310 feet (9.6 percent). With the current project, and considering the cumulative impacts, more than one-half of the original earthen ditch will have been altered in form (56.7 percent).

The Corps considered construction options that would reduce or minimize the effects to form, alignment, and function of the acequia. Due to local topography and the Community Ditch’s location, staying in the original alignment, constricted between the Pecos River and State Highway 91, would have the least impact to the historic character of the acequia and would be the only viable alignment alternative that would meet the needs of the Community. With the three previous Corps projects and the currently proposed project, the Corps will have affected only about 16.1 percent of the acequia system; however, the Corps has determined the cumulative effects of the modifications to be an adverse effect to the historic character of the ditch.

The Corps' Section 106 consultation letter to the New Mexico State Historic Preservation Officer (NMSHPO), dated October 20, 2009, is presented in Appendix A. The Corps considered a combination of several efforts to mitigate adverse effects to the acequia, including additional archival research, conducting oral history interviews, photographically documenting the existing acequia, and conducting public outreach and education. These recommendations were submitted to the NMSHPO and to the East Puerto de Luna Community Ditch Association for consideration as a resolution to the adverse effects. The Corps also notified the Advisory Council on Historic Preservation (ACHP) regarding the adverse effects to the EPdL Ditch in a letter dated November 19, 2009. The ACHP has determined not to participate in the Section 106 process (see Appendix A). The East Puerto de Luna Community Ditch Association is considered to be a concurring party and the New Mexico Interstate Stream Commission has also determined not to participate. The Corps received no Section 106 comments regarding the Corps' archaeological survey report or the draft MOA; therefore, the Corps proceeded with the Section 106 process and submitted the MOA to the consulting and concurring parties for signature in our letter dated December 22, 2009 (see Appendix A). The parties have agreed that the above mitigation measures would result in a resolution of adverse effects; the measures have been accepted and codified in a Memorandum of Agreement (MOA) between the Corps, the NMSHPO, and the East Puerto de Luna Community Ditch Association, dated February 2010 (see Appendix A). Due to the MOAs largely archival tasks, the proposed project construction will not interfere with the completion of the MOA. With the exception of the photographic documentation, construction can begin prior to the completion of the MOA tasks. The Corps recommends that construction be permitted to proceed.

3.11 Socioeconomic Considerations and Land Use

The population of Guadalupe County was 4,680 persons in 2000 (U.S. Census Bureau 2000). The July 2008 population estimate was 4,346, a decline of 7.1 percent (U.S. Census Bureau, USA Counties, 2009). The estimated 2007 median household income was \$26,929 while the personal income per capita in 2006 was \$17,047. Personal and median household income in Guadalupe County is significantly lower than that estimated for New Mexico as a whole (\$41,509). During 2007, 25.5 percent of the Guadalupe County population and 30 percent of the population under 18 was below the poverty level. Ethnically, approximately 81 percent of Guadalupe County is Hispanic, a greater percentage than the State of New Mexico as a whole (42.1%). The Native American population of Guadalupe County (1.1 percent) is proportionally smaller than that of the state as a whole. The nearby community of Santa Rosa is the county seat and the largest town in Guadalupe County. In Santa Rosa, the local employers are primarily in retail trade, tourism (including lodging), and food services. Other local work involves health care, social assistance, construction and transportation. Public services include education, utilities, and government services.

The annual average unemployment rate in 2008 was 5.7% for Guadalupe County compared to the statewide rate of 4.2% (New Mexico Department of Workforce Solutions 2008). In 2009 the monthly unemployment rates were slightly higher; Guadalupe County's unemployment rate of 6.4% in May 2009 was similar to the statewide rate of 6.5%.

The proposed action area is rural with small farms and residential housing. There is no Prime Farmland in the project area. Current land use centers on families farming small acreages of irrigated cropland with livestock grazing (cattle, sheep, goats, and horses). Other land use includes gravel and rock quarrying. Recreational use of the proposed action area may include hiking, horseback riding, and nature appreciation.

The proposed action would not result in any significant alteration of existing land uses or socioeconomic resources in the project area and would permit the traditional acequia culture to continue. All acequia members would benefit from the proposed action. Cumulatively, this and other rehabilitation projects on the acequia would benefit the agricultural community of the Puerto de Luna area. The No-Action alternative, in contrast, would compromise the viability of the East Puerto de Luna Community Ditch. Irrigated agriculture and the historic community of Puerto de Luna would stagnate or possibly decline as maintenance of the acequia system would become increasingly difficult. Under the No-Action alternative, the increasing difficulty of acequia maintenance, combined with a trend of decline in available labor and the farming population, would threaten the acequia's viability and the agricultural economic base of the community. (Ackerly 1996).

3.12 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in assets held in trust by the United States for Indian tribes or individuals. Examples of ITAs include land, minerals, hunting and fishing rights, water rights, titles and money. The Indian Trust Responsibility requires that all Federal agencies take all actions reasonably necessary to protect such trust assets. The Department of Defense's American Indian and Alaska Native Policy, signed by Secretary of Defense William S. Cohen on October 20, 1998, and DOI's Secretarial Order 3175 require that the Corps consult with tribes and assess the impacts of its projects on ITAs. American Indian tribes that have indicated they have concerns in Guadalupe County have been contacted regarding the proposed project, as described in Section 3.10 above. To date, the Corps has received no indication of concern regarding effects to ITAs from the proposed work. There would be no effect on Indian Trust Assets by the proposed action or the No-Action alternative.

3.13 Human Health and Safety

There would be no effect from the proposed action on community services, such as law enforcement, fire protection, emergency medical care, or schools. Neither the proposed action nor the No-Action alternative is expected to create adverse effects on human health or safety.

3.14 Hazardous, Toxic, and Radioactive Waste (HTRW)

Since the proposed action would be in a rural area and the water would be used exclusively for irrigation, there appear to be little risk of HTRW contamination.

All work planned to construct the proposed features would be conducted in accordance with Federal, State, and local pollution control laws. Requirements would include the contractor's storage and use of fuels, herbicides, and other potential contaminants, and the implementation of the National Pollutant Discharge Elimination System (NPDES) permit for storm water pollution prevention from construction activities. Therefore, there would be no adverse effect to or by HTRW by the Proposed Action.

3.15 Environmental Justice

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Low-Income Populations; February 11, 1994) was designed to focus the attention of federal agencies on the human health and environmental conditions of minority and low-income communities. It requires federal agencies to adopt strategies to address environmental justice concerns within the context of agency operations and proposed actions. The 1995 EPA guidance document, "Environmental Justice Strategy: Executive Order 12898" defines the approaches by which the EPA will 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.

The proposed acequia rehabilitation project would 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 Section 1113 program is largely intended to provide needed technical and financial assistance to Acequia and Community Ditch associations in which water resources are degrading and in need of improvement. Acequia associations find maintenance of these systems increasingly challenging. The proposed action would benefit all acequia members and the community as a whole by allowing the culturally and historically significant East Puerto de Luna Community Ditch to continue to function. All proposed work would be in a rural, agricultural area. The construction would not disrupt or displace any residential or commercial structures. There would be no disproportional affect on the health or environment of minority and low-income communities as a result of the proposed action. Under the No-Action alternative, the acequia members would likely face increasing difficulty in maintaining the acequia system. As Guadalupe County residents have relatively lower incomes than average for New Mexico, the No-Action alternative likely would adversely affect this low-income community.

3.16 Cumulative Impacts

NEPA defines cumulative effects as "...the impact on the environment which results from the incremental impact of the action when added to other, past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

Cumulative effects are analyzed individually for each resource area in Sections 3.1 through 3.3. These analyses 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 the analysis. 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 time frame for analysis 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 (about four months). Conversely, indirect effects resulting from operation of the rehabilitated acequia system will persist for the life of the facility. Similarly, the geographic bounds for cumulative effects analysis varied with the resource under consideration, depending on zone of influence of the direct or indirect impact being analyzed.

The proposed action lies within a rural area in Guadalupe County (Figures 1, 2). The proposed improvements to the acequia would not significantly impact the current conditions of the local environment and would help retain the farming practices of the community. For these reasons, the proposed project when combined with past, present, or future activities in the East Puerto de Luna Community Ditch area will not significantly add to or raise local cumulative adverse environmental impacts to a level of significance.

4.0 CONCLUSIONS AND SUMMARY

This Environmental Assessment addresses the potential effects of the rehabilitation of the East Puerto de Luna Community Ditch. The proposed location is in the Pecos River valley approximately 8 miles south of Santa Rosa. Impacts to the environment would be non-significant and short-term. Long-term benefits to the acequia members and to the historic character of the Puerto de Luna community would result from the project. The proposed project would not result in any moderate or significant, long-term, or cumulative adverse effects. Therefore, construction of the proposed project would not significantly affect the quality of the human environment and is recommended for implementation.

5.0 PREPARATION, CONSULTATION AND COORDINATION

5.1 Preparation

This Environmental Assessment was prepared by the U.S. Army Corps of Engineers, Albuquerque District. Personnel primarily responsible for preparation include:

Dana M. Price	Botanist
Gregory Everhart	Archaeologist
Patricia Phillips	Project Manager

5.2 Quality Control

This EA has been reviewed for quality control purposes. Reviewers include:

Julie A. Alcon	Chief, Environmental Resources Section
Michael D. Porter	Senior Biologist
Lance A. Lundquist	Archaeologist

5.3 Consultation and Coordination

Agencies and entities that were consulted in preparation of this Environmental Assessment include:

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Mr. Andy Madrid, Chairman/Agent
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5.5 Summary of Public Review Comments and Corps' Responses

The Draft Environmental Assessment (DEA) was available for public review and comment from September 24 to October 23, 2009. A Notice of Availability was published in the Guadalupe County Communicator on September 24, 2009 (Appendix C). The DEA was available on the Corps' website and at the Moise Memorial Library, 208 S 5th St., Santa Rosa, New Mexico.

A summary of the public and agency comments with the Corps' responses is provided below. Comments were received from the Regulatory Division, U.S. Army Corps of Engineers, Albuquerque District and from the New Mexico Environment Department. The Navajo Nation Historic Preservation Department (letter dated October 13, 2009; Appendix A) identified no concerns but requested that they be informed of any new cultural resource discoveries. No other comments were received.

1. Regulatory Division, U.S. Army Corps of Engineers, Albuquerque District: The project is exempt from Section 404 of the Clean Water Act permitting, provided that conditions set out in the Irrigation Exemption are met.

Corps' Response: Concur.

2. New Mexico Environment Department: This project may require a Section 401 Water Quality Certification.. The need for certification depends on the jurisdictional determination made by the U.S. Army Corps of Engineers.

Corps' Response: Because the project is exempt from Section 404 permitting, it is also exempt from Section 401 certification.

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