

Final Environmental Assessment  
and  
Finding of No Significant Impact  
for the  
Labadie Ditch Rehabilitation Project,  
Guadalupe County, New Mexico

February 2008

Prepared for:

U.S. Army Corps of Engineers  
Albuquerque District



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**FINDING OF NO SIGNIFICANT IMPACT**  
**Labadie Ditch Rehabilitation Project**  
February 2008

The U.S. Army Corps of Engineers (USACE), Albuquerque District, at the request of the New Mexico State Engineer's Office, and the Labadie Ditch Association, are planning a project to rehabilitate a small segment of the Labadie Ditch in Guadalupe County, New Mexico. The project area is located on an unnamed stream, approximately two miles south of Santa Rosa, New Mexico near New Mexico Highway 91.

The proposed rehabilitation work on the Labadie Ditch 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 Labadie 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 existing system for delivering water is an earthen diversion structure with a metal weir to control flows into the open ditch. The USACE proposes to rehabilitate the Labadie Ditch diversion dam and conveyance structures by: 1) modifying the existing diversion dam through construction of a concrete headwall and installation of sheet piling; 2) installing a new head gate and sluice at the diversion; 3) replacing the existing 530-foot segment of open ditch with buried polyvinyl chloride (PVC) pipe; and 4) replacing the sluice at the end of the open ditch segment with a new gate.

The acequia serves up to 10 families growing alfalfa and vegetables on approximately 85 to 89 acres. Project construction is scheduled during the non-irrigation season with an expected duration of about one month. The Labadie Ditch Association will be responsible for assuring operation and maintenance upon project completion.

The primary objective of the acequia rehabilitation project is to improve the efficiency of water delivery to the acequia members by rectifying current problems. A secondary benefit of the proposed project will be to reduce maintenance costs for the Ditch Association.

The proposed project will not change or affect water rights or the amount of water diverted. The proposed action will result in minor or temporary effects on climate, soils, water resources, floodplains, wetlands and other waters of the U.S.; air quality, noise levels, riparian and aquatic habitat and biota, special status species, visual resources, cultural resources, and socioeconomics. The planned action was analyzed for, but will have no effect on, physiography, geology, terrestrial habitat, land use, or environmental justice. As required by the Endangered Species Act of 1973, the USACE has determined that the project will have no effect on any threatened or endangered species, or designated or proposed critical habitat receiving



protection under the Endangered Species Act. Wright's marsh thistle, a state endangered species, will be affected by the proposed action. However, due to a net increase in suitable habitat for the species as a result of the project, these impacts will be negligible.

Rehabilitation of the acequia system may cause short-term increases in turbidity and suspended sediments from placement of fill and operation of construction equipment. 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). Best management practices will be utilized during project construction to minimize impacts to surface water quality. Fill of approximately 0.05 acres of wetlands will be offset by an increase in wetland area and improved hydrologic regime upstream from the new diversion structure as a result of increased water surface elevation. The project complies with Executive Order 11990, Protection of Wetlands.

The proposed project will result in minor, short-term changes to local air quality. An increase in particulates will be expected as a result of topsoil disturbance; localized concentrations of carbon monoxide from equipment 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 one month during day time hours. To reduce temporary construction noise, construction activities will comply with state and local noise control ordinances.

An archaeological survey was conducted that covered 100-percent of the project's area of potential effect (APE). No archaeological sites were discovered within the project area. One archaeological site, LA108213, was previously reported to occur adjacent to the project's access road; however, the field survey determined that LA108213 was outside of the APE. The project will have no effect to LA108213. The original Labadie Community Ditch (acequia) system was constructed ca. 1869. Rehabilitation projects on the Labadie Ditch in 1968 and between 1988 and 1992 significantly altered the acequia's form by converting and relocating approximately 2.75-miles of ditch to underground PVC pipeline. During those projects, about 2.75-miles of historic earthen ditch was abandoned. The archaeological survey documented the abandoned ditch as archaeological site LA157994. LA157994 is eligible for nomination to the National Register of Historic Places under criteria "a" and "c." LA157994 is located outside of the current project's APE, therefore, the project will have no effect to LA157994.

The modern Labadie Community Ditch consists of the existing diversion structure, a 530-foot segment of historic earthen ditch, and about 2.75-miles of modern underground PVC pipeline. The existing diversion structure and the 530-foot segment of earthen ditch, although they have been rehabilitated numerous times in the past, are historic, and are considered eligible for nomination to the National Register of Historic Places under criteria "a" and "c." Conversion of the 530-foot segment of earthen ditch to underground PVC pipeline is an adverse effect to historic properties. The diversion structure and the 530-foot segment of earthen ditch



were documented on a New Mexico Historic Water Delivery System Inventory Form. Mitigation for the adverse effect includes photo-documentation, oral history interviews with acequia association members, and the recordation of the abandoned ditch, LA157994. The 2.75-mile segment of modern underground PVC pipeline is not eligible for nomination to the National Register because it does not meet the age criteria for nomination. No other archaeological sites or historic properties are known to occur within or immediately adjacent to the project area.

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, tribes indicating an interest in activities in Guadalupe County (based on the State of New Mexico Indian Affairs Department's 2007 Native American Consultations List) were sent a scoping letter to assess if there were any potential Tribal concerns with the project. No traditional cultural properties are known to occur within or immediately adjacent to the project area. No Tribal concerns have been brought to the attention of the Corps.

The USACE, therefore, is of the opinion that the proposed Labadie Community Ditch rehabilitation project will have an "Adverse Effect to Historic Properties;" however, the adverse effect will be mitigated for. Should previously undiscovered artifacts or features be unearthed during construction, work will be stopped in the immediate vicinity of the find, a determination of significance made, 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.

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

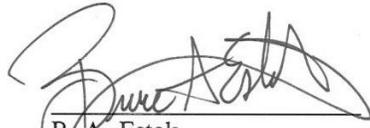
- The contractor will be required to have emission control devices on all equipment.
- The contractor will use best management practices to control wind erosion, including wetting of soils within the construction zone and compliance with local soil sedimentation and erosion-control regulations.
- Construction equipment and activities will comply with state and local noise control ordinances.
- All fill material placed in the un-named stream will be free of fines to minimize turbidity caused by reconstruction of the diversion.
- Construction areas that are below the ordinary high water mark of the un-named stream will be isolated from surface water using appropriate materials, such as concrete wall barriers, temporary sheet piling, or water bladder dams. The isolated areas will be de-watered before work is conducted.
- If concrete headwall sections are to be cast in place, all concrete will be isolated from surface water until it is cured.
- Rock used to construct the wire-enclosed rock blanket on the downstream side of the sheet piling will be free of fines to minimize turbidity.
- All fuels and lubricants will be stored outside of the 100-year floodplain of the stream and construction equipment should be inspected daily and monitored during operation to prevent leaking fuels or lubricants from entering surface water.



- Aquatic habitat in the pond above the diversion and in the stream both above and below the diversion will be protected with silt fencing to prevent runoff of sediments from areas disturbed by construction.
- The marsh wetland habitat on the northwest side of the diversion, which is also the location of the population of Great Plains ladies-tresses and high-density patches of Wright's marsh thistle, will be protected from accidental or incidental impacts during construction by temporary fencing to clearly mark the wetland. The contractor will be informed of the requirement to prevent disturbing this wetland area. Marsh wetland habitat along the east side of the stream above the diversion dam will also be fenced as a protection zone.
- All construction equipment will be cleaned with a high-pressure water jet before entering the project area to prevent introduction of invasive plant species.

Implementation of the proposed action is expected to economically benefit the Labadie Ditch Association by improving water delivery and reducing long-term maintenance costs. In addition, construction of the project will provide some short-term economic benefits for local businesses in Santa Rosa, New Mexico. 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 will not be prepared for the proposed rehabilitation work on the Labadie Ditch.

5 FEB 08  
Date

  
B. A. Estok  
Lieutenant Colonel, U.S. Army  
District Commander



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# 1.0 PROJECT PURPOSE AND NEED

## 1.1 Proposed Action

The U.S. Army Corps of Engineers (USACE), Albuquerque District, in cooperation with the New Mexico State Engineer's Office and the Labadie Ditch Association, proposes to improve the efficiency of water deliveries to irrigators by rehabilitating the Labadie Ditch. The Labadie Ditch diversion is located on an un-named stream in Guadalupe County, New Mexico (Section 19, T. 8 N., R.21 E., N.M.P.M.), approximately two miles south of Santa Rosa, New Mexico on N.M. Highway 91 (Figure 1).

The USACE proposes to rehabilitate the Labadie Ditch diversion dam and conveyance structures by: 1) modifying the existing diversion dam through construction of a concrete headwall and installation of sheet piling; 2) installing a new head gate and sluice at the diversion; 3) replacing the existing 530-foot segment of open ditch with buried polyvinyl chloride (PVC) pipe; and 4) replacing the sluice at the end of the open ditch segment with a new gate.

The proposed rehabilitation work on the Labadie Ditch 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 Act authorizes the Acequia Rehabilitation Program for the restoration and rehabilitation of irrigation ditch systems (acequias) in New Mexico. The Labadie 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.

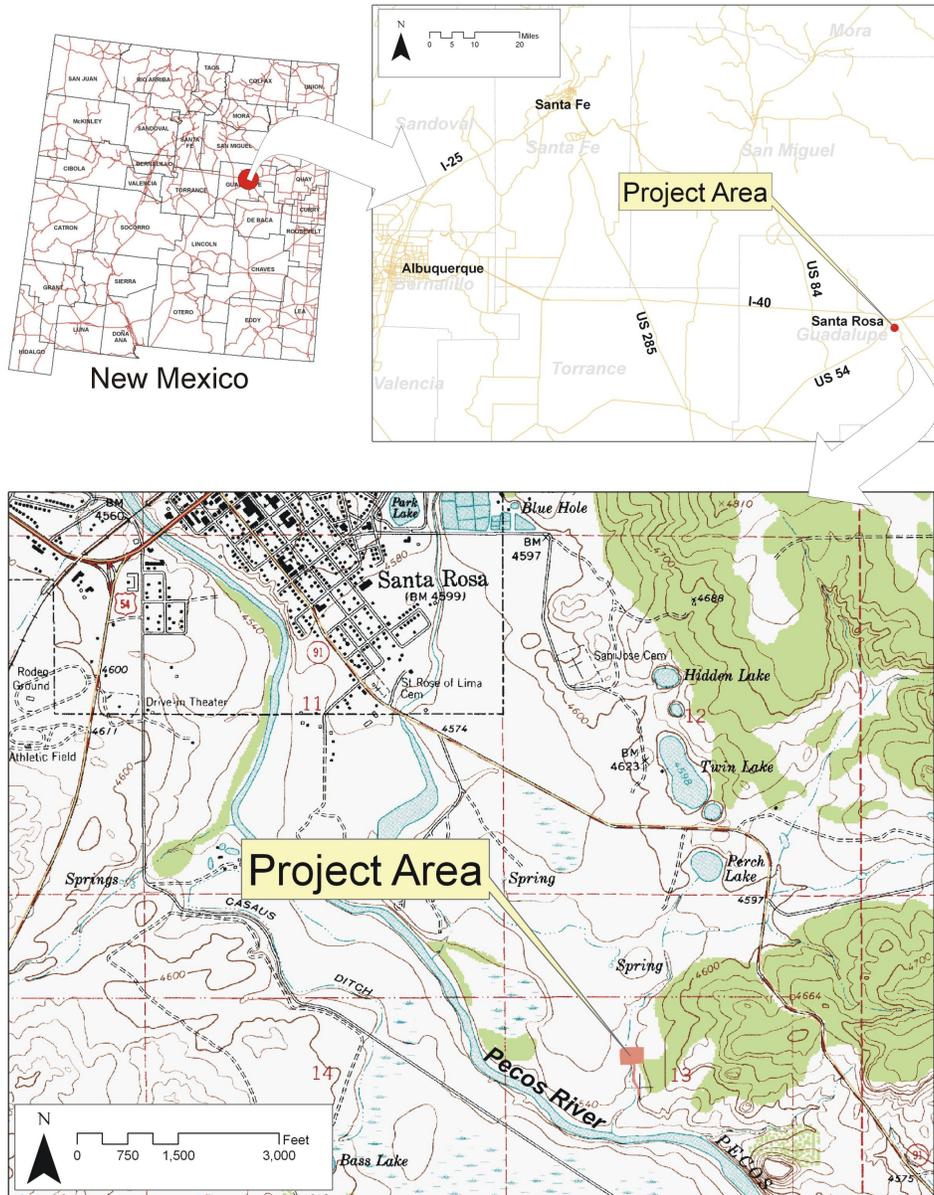
The USACE would provide 75 percent of construction funding and is, therefore, the action agency for this project. The Office of the State Engineer is the project sponsor, and with the local ditch association, would be responsible for the remaining 25 percent of construction costs. Project design and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

## 1.2 Background

Labadie Ditch, which has been in use for approximately 140 years, is about three miles long (Ariaz, 1987). The acequia system begins at a diversion on an un-named stream and extends to a small reservoir near the Pecos River (Trujillo, 1987). All of the acequia except for the 530-foot segment of open ditch in the project area was converted from earthen ditch to plastic pipe between 1968 and 1990, (Ariaz 1987; Trujillo 1987; G. Lujan, Labadie Ditch Association, 21 September 2007, pers. comm.).



**Figure 1.** The Labadie Ditch project area near Santa Rosa in Guadalupe County, New Mexico. The project area is located in Section 19, T. 8 N., R.21 E. (N.M.P.M.). The base map is the U.S.G.S. Santa Rosa, New Mexico, 7.5-minute quadrangle (map no. 34104-H6-TF-024).





Flow in the un-named stream derives from seeps and springs throughout its length upstream from the diversion. The un-named stream is perennial for a distance of about 0.45 miles above the diversion (Figure 2). Twenty years ago, the stream had average estimated flows of approximately 2,500 gallons per minute (Ariaz 1987). Current flow rates are about 2,400 gallons per minute (G. Lujan, Labadie Ditch Association, 21 September 2007, pers. comm.).

Water from the creek is currently diverted at a concrete-and-earth structure (Figure 3). The diversion can be bypassed by letting water flow through the structure to the stream via a 36-inch square gate via a 30-inch corrugated metal pipe (Ariaz, 1987). Diverted water flows through a head gate and 24-inch metal pipe and into an open, earthen ditch (Figure 3). Flow continues through the open ditch for 530 feet, at which point it enters a 15-inch diameter plastic irrigation pipe. There is a makeshift sluice or ‘desaguas’ at the transition from open ditch to pipe, where excess flow returns to the un-named stream (Figure 4).

Currently, Labadie Ditch serves up to ten families, although not all are actively irrigating crops. About 85 to 89 acres are irrigated by the ditch (G. Lujan, Labadie Ditch Association, 19 November 2007, pers. comm.). The first delivery point for irrigation water along the acequia is approximately one mile downstream from the diversion (Ariaz, 1987). Alfalfa is the most commonly-produced crop, but more recently several greenhouses have been constructed to grow tomatoes, chile, strawberries, melons, squash, okra, and other fruits and vegetables (G. Lujan, Labadie Ditch Association, 21 September 2007, pers. comm.).

## 1.3 Purpose and Need

The primary objective of the acequia rehabilitation project is to improve the efficiency of water delivery to the acequia members by rectifying current problems. A secondary benefit of the proposed project would be to reduce maintenance costs for the Ditch Association.

This section of the Labadie Ditch is in need of rehabilitation to improve the efficiency of water deliveries to irrigators. Currently, there is insufficient hydraulic pressure throughout the acequia system due to the relatively flat slope of the ditch. In addition, maintenance of the earthen ditch is time-consuming and costly due to frequent breaches of the ditch during high flow periods, the need to flush downstream pipelines to remove sediment deposited from the ditch, and removal of trash.

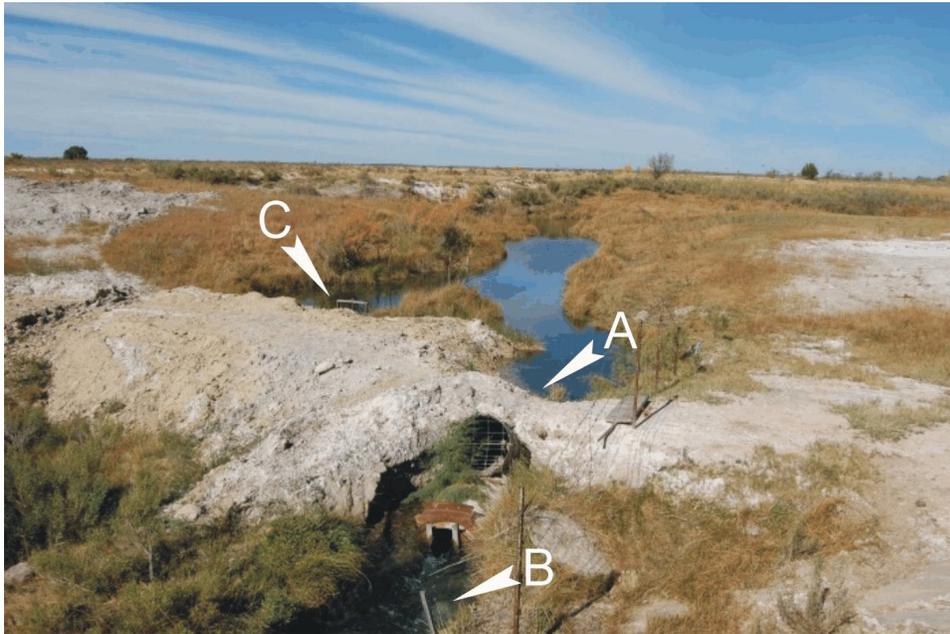
## 1.4 Regulatory Compliance

This EA was prepared by Blue Earth Ecological Consultants, Inc., for the USACE, in compliance with all applicable Federal statutes, regulations and executive orders (EO) including, but not limited to the following:

- National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] 4321 et seq.)
- Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508);
- U.S. Army Corps of Engineers Procedures for Implementing NEPA (33 CFR 230, ER 200-2-2);
- Clean Air Act of 1972 (42 U.S.C. 7401-7671, as amended);

Figure 2. Landscape features in the vicinity of the Labadie Ditch system.





**Figure 3.** The Labadie Ditch diversion structure. View is looking upstream. The head gate (A) and open ditch (B) are visible in the bottom center of the photo. The bypass gate (C) to the stream is located in the center of the diversion structure.



**Figure 4.** Lower end of the open ditch segment. The transition from open ditch to pipe (A) is in the center left. The makeshift sluice, or 'desaguas' (B) at the transition returns excess flow to the un-named stream (C).



- Clean Water Act (CWA) of 1977 (33 U.S.C. 1251 et seq.);
- Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531-1544, as amended);
- Fish and Wildlife Coordination Act of 1958 (16 U.S.C. 661 et seq., as amended);
- Farmland Protection Policy Act, 1981 (7 U.S.C. 4201, as amended);
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470);
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001-3013);
- American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996);
- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470);
- Protection of Historic and Cultural Properties (36 CFR 800 et seq.);
- Federal Noxious Weed Act (7 U.S.C. 2801);
- E.O. 11514, Protection and Enhancement of Environment Quality;
- E.O. 11988, Floodplain Management;
- E.O. 11990, Protection of Wetlands;
- E.O. 12898, Environmental Justice;
- E.O. 13112, Invasive Species Management;
- E.O. 13007, Indian Sacred Sites;
- E.O. 13084, Consultation and Coordination with Indian Tribal Governments; and
- E.O. 11593, Protection and Enhancement of the Cultural Environment.

## 1.5 Scoping Summary

Project scoping letters were sent on 16 October 2007 to 12 Federal and state government agencies, seven tribal governments, and the Labadie Ditch Association. A complete list of those receiving the scoping letter, along with responses, is contained in Appendix A. Four responses were received. These were from the New Mexico

Department of Game and Fish, New Mexico Forestry Division (Rare Plants), New Mexico Environment Department, and Labadie Ditch Association.

The Labadie Ditch Association expressed general support for the proposed project. The New Mexico Environment Department sent a non-project specific letter describing National Pollutant Discharge Elimination System permit requirements. The New Mexico State Forestry Division identified three state-listed endangered plants known to occur in wetlands in the Santa Rosa area: Pecos sunflower (*Helianthus paradoxus*), Wright's marsh thistle (*Cirsium wrightii*), and Great Plains ladies-tresses orchid (*Spiranthes magnicamporum*).

The New Mexico Department of Game and Fish identified two issues of concern. First, the state-listed bigscale logperch (*Percina macrolepida*) occurs in the Pecos River in the vicinity of the confluence of the un-named stream. The proposed project may effect this species but adverse effects can be minimized by implementing best management practices (BMPs) to contain sediment and uncured concrete during project construction. Second, the Department of Game and Fish views the proposed project as an opportunity to remove non-native plants and replace them with native riparian species where ground disturbance would occur.



## 2.0 DESCRIPTION OF ALTERNATIVES AND PROPOSED ACTION

### 2.1 Alternatives Considered in Detail

#### 2.1.1 No Action

The no action alternative would consist of no modification of the existing diversion structure and open ditch. The diversion head gate, earthen ditch, and sluice 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 flushing downstream pipelines, repairing breaches to the existing ditch, and removing trash from the sluice screen - would continue.

#### 2.1.2 Proposed Action

The earth-and-concrete diversion structure would be reconstructed by installing a concrete headwall and metal sheet piling across the channel at the location of the existing diversion. The one-foot thick headwall section would be 60 feet long and would extend eastward from the existing concrete structure. Eight linear feet of sheet piling would be installed from the concrete headwall westward, across the downstream face of the existing concrete structure. Wire-bound rock would be placed on the downstream side of the sheet piling as erosion control. A new head gate and sluice would be installed in the headwall. The head gate would regulate flow into the new 18-inch diameter pipeline. The sluice, which would be constructed of 24-inch diameter corrugated metal pipe, would

allow for regulation of water returning to the stream. The crest of the new diversion structure would be about four feet higher than the existing structure, which would increase hydraulic pressure in the acequia system. The new pipeline would have a delivery rate of about 1,800 gallons per minute. Below the diversion, the creek would continue to have a flow of about 600 to 800 gallons per minute to its confluence with the Pecos River.

A 530-foot trench would be excavated in a straight line from the new head gate to the point where the water flows from the existing open ditch into the existing buried pipe. An 18-inch PVC pipe would be bedded in the trench at a constant slope, then the trench would be back-filled. Portions of the existing open ditch not used for the trench would be backfilled. A new 24-inch diameter concrete manhole sluice would be constructed at the connection point of the new pipeline to the existing pipeline. A corrugated metal culvert would be installed from the manhole sluice to the un-named stream to serve as a sluice.

The proposed project would not change or affect water rights or the amount of water diverted. All construction would occur on lands owned either by individual acequia members or by the acequia association. Total acreage disturbed for construction would be approximately 1.25 acres.

Access to the site is via a private two-track dirt road through an association member's land. It is about 0.61 miles from NM 91 to the diversion structure via this dirt road (Figure 2). The dirt road continues for about another 0.33 miles to the



equipment staging and materials storage area on the west side of the diversion. Construction would take about one month. The work would occur in the non-irrigation season (late fall to early spring). The estimated cost for this project as of July 2006 was \$115,335 (Ariaz, 2006).

## 2.2 Environmental Protection

- Construction-related effects to air quality would be minimized by: 1) requiring the contractor to have emission control devices on all equipment; and 2) employing the use of best management practices to control wind erosion, including wetting of soils within the construction zone and compliance with local soil sedimentation and erosion-control regulations. Construction and operation would conform with air quality control regulations as established by the Clean Air Act and the New Mexico Air Quality Control Act.
- To reduce temporary construction noise, construction contracts would require that construction equipment and activities comply with state and local noise control ordinances.
- To protect water quality, all fill material placed in the un-named stream would be free of fines to minimize turbidity caused by reconstruction of the diversion. Construction areas that are below the ordinary high water mark of the un-named stream would be isolated from surface water using appropriate materials, such as concrete wall barriers, temporary sheet piling, or water bladder dams. The isolated areas would be de-watered before work is conducted. If concrete headwall sections are to be cast in place, all concrete would be isolated from surface water until it is cured. Rock used to construct the wire-enclosed rock blanket on the downstream side of the sheet piling would be free of fines to minimize turbidity. All fuels and lubricants would be stored outside of the 100-year floodplain of the stream and construction equipment should be inspected daily and monitored during operation to prevent leaking fuels or lubricants from entering surface water.
- Aquatic habitat in the pond above the diversion and in the stream both above and below the diversion would be protected with silt fencing to prevent runoff of sediments from areas disturbed by construction.
- The marsh wetland habitat on the northwest side of the diversion (labeled as “large seep” in Figure 6), which is also the location of the population of Great Plains ladies-tresses and high-density patches of Wright’s marsh thistle, would be protected from accidental or incidental impacts during construction. Although this area is outside of the proposed work area, it would be enclosed with temporary fencing to clearly mark the wetland. The contractor would be informed of the requirement to prevent disturbing this wetland area. Similarly, marsh wetland habitat along the east side of the stream above the diversion dam would also be fenced as a protection zone.
- To prevent introduction of invasive plant species, all construction equipment would be cleaned with a high-pressure water jet before entering the project area.



## 3.0 EXISTING ENVIRONMENT & FORESEEABLE EFFECTS OF THE PROPOSED ACTION

### 3.1 Physical Resources

#### 3.1.1 Climate

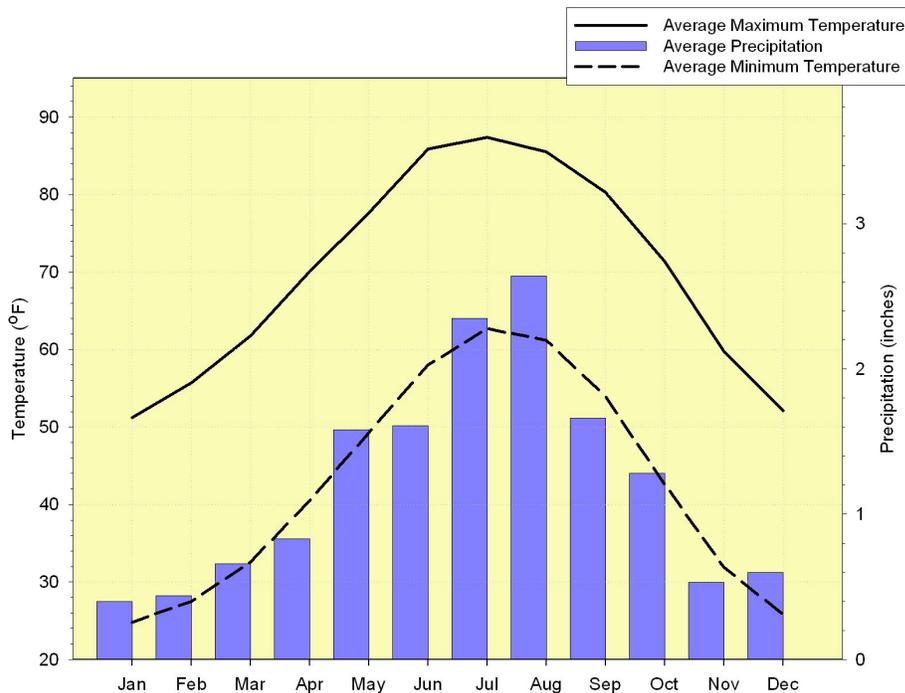
**3.1.1.1 Existing Conditions** The project area has a mid-latitude desert climate, with an annual average precipitation amount of 14.6 inches (Western Regional Climate Center, 2007). Precipitation is irregular, but there is typically a pattern of monsoonal rains in July and August as Gulf air masses penetrate into the region (Figure 5). Cyclonic precipitation occurs during winter months, with average annual snowfall in the area of about 12.5 inches. Average diurnal temperature fluctuations of 20°F to 30°F are characteristic of the project area. Summer temperatures are warm and winters are mild (Figure 5).

Average air temperatures worldwide are predicted to increase beyond the current range of natural variability because human activities have, since the Industrial Revolution, caused accumulation of greenhouse gases (*e.g.* carbon dioxide, methane, nitrous oxide, chloroflourocarbons) in the atmosphere (U.S. Environmental Protection Agency, 1998). The potential impacts resulting from climate change are varied, even within the State of New Mexico (New Mexico Agency Technical Work Group, 2005). Summer air temperatures in the southwestern U.S. 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: 627).

New Mexico Governor Bill Richardson signed Executive Order 05-33 in 2005, 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 gasses (MMtCO<sub>2</sub>e; New Mexico Climate Change Advisory Group, 2006: 2-2). Residential and commercial fuel use accounted for about five percent of total emissions in the State in 2000 (New Mexico Climate Change Advisory Group, 2006: 2-4), or about 7.3 MMtCO<sub>2</sub>e (New Mexico Climate Change Advisory Group, 2006: 2-6).

**3.1.1.2 Effects on Climate** Neither the no action alternative or proposed action would measurably affect climatic conditions or trends in climate change in the region. Operation of construction equipment for about 10 days during the month-long construction period would produce greenhouse gas emissions. Combustion of one gallon of diesel fuel generates about 22.4 pounds of CO<sub>2</sub> equivalent gasses and an average piece of construction equipment (*e.g.* tracked excavator) may burn five to eight gallons per hour (gph) of fuel.



**Figure 5.** Precipitation and temperature characteristics in the project area.

Using a fuel consumption rate of 6 gph, an average operation period of six hours per day, and assuming two pieces of equipment being operated at the site for ten days, then a total of about 720 gallons of diesel fuel would be burned in the course of constructing the project. This would result in emission of about 16,128 pounds of CO<sub>2</sub>-equivalent greenhouse gasses, or 7.3 metric tons. These emissions equate to about 0.00009 percent of the annual greenhouse gas emissions in New Mexico attributable to residential and commercial fuel use in 2000 (*i.e.* 7,300,000 metric tons) and a minute percentage of total greenhouse gas emissions in the State (*i.e.* 83,000,000 metric tons). Greenhouse gas emissions generated by the proposed action can be substantially reduced by:

- reducing idling time, which can burn up to one gallon of fuel per hour;

- using ultra-low sulfur diesel fuel, which may cost \$0.05 to \$0.10 per gallon more than off-road #2 fuel oil; and
- using equipment fitted with diesel oxidation catalysts.

Expansion of wetland area due to raising of the water table behind the new diversion structure in the project area may increase long-term sequestration of atmospheric carbon at the site (see section 3.1.5.2). About three-quarters of an acre of wetlands may be restored or enhanced by the proposed action. Carbon is sequestered in wetlands in standing crops of vegetation, litter, and through formation and accumulation of organic soils. For example, restored prairie wetlands sequestered about 1.1 tons of carbon per acre per year (Gleason *et al.*, 2005). In New Mexico, substantial accumulation of carbon in the form of organic matter (*i.e.* muck, peaty muck)

was observed in soils at a restored wetland site on the Rio Chama within two years following completion of restoration activities (J. Pittenger, Blue Earth Ecological Consultants, Inc., unpubl. data).

In summary, although the proposed action would result in greenhouse gas emissions on the order of 7.3 metric tons, this is a very small proportion of the total greenhouse gas emissions in the State (83,000,000 metric tons). Project-related greenhouse gas emissions can be reduced by implementing one or more of the measures described above. Finally, expanded wetland habitat resulting from the project would result in a long-term increase in sequestration of atmospheric carbon at the site, which would more than offset the greenhouse gas emissions associated with project construction. Consequently, cumulative impacts to climate from the project would be insignificant.

### 3.1.2 Physiography and Geology

**3.1.2.1 Existing Conditions** The project area is within the Pecos Valley section of the Great Plains physiographic province (Fenneman and Johnson, 1946). The Santa Rosa area is a zone of karst topography, with numerous sinkhole lakes and artesian springs (Sweeting, 1972). The diversion site is on an un-named, spring-fed stream located on the southeastern edge of the Santa Rosa Sink. The Santa Rosa Sink is a large (*ca.* six-mile diameter), circular depression formed by dissolution of underlying Permian-age San Andres Limestone and Artesia Group rocks and evaporite deposits (Kelley, 1972; Chronic, 1987: 176-177). Sedimentary rocks of the Santa Rosa and Chinle formations, both formed in the Triassic period, outcrop along the hill slope east of the stream. These sedimentary strata include

sandstones, siltstones, and mudstones ranging in color from maroon to tan. The un-named stream originates from coalesced spring outflows below Perch Lake, which is located about 0.66 miles upstream from the existing diversion structure (Figure 2). The stream, which flows into the Pecos River about 1,240 feet downstream from the diversion, traces its way across a broad, gently sloping plain that is dotted with active and ancient artesian spring mounds. The plain is bounded on the east in the project area by a stony, dissected slope.

**3.1.2.2 Effects on Physiography and Geology** Physiographic characteristics of the project area and local geologic conditions would not be affected by either the no action or the proposed action alternatives. The proposed action would not cause any marked changes in local surface topography, nor would it involve any blasting or removal of bedrock.

### 3.1.3 Soils

**3.1.3.1 Existing Conditions** Three soil units are mapped in the project area (Natural Resources Conservation Service, 2007). Soils on the hill slopes traversed by the access road are mapped as Lacoca-Rock outcrop complex, 10 to 25 percent slopes. These soils are well drained, non-saline, and shallow. The typical profile is about one foot of fine sandy loam overlying bedrock. Soils on the broad plain west of the stream are mapped as Holloman-Reeves complex, 1 to 10 percent slopes. These soils are deep, well-drained, slightly saline loams and gypsiferous silt loams. Depth to the water table is typically greater than 80 inches. The little stream valley and adjacent floodplain and terrace surfaces are mapped as Bluhol loam, 0 to 2 percent slopes. Bluhol loam is a poorly drained soil with



moderately high to high saturated hydraulic conductivity (0.57 to 1.98 inches/hour). The water table is generally quite shallow, typically ranging from six to 18 inches below the surface. This soil is only slightly saline, with an electrical conductivity of 4 to 8 millimhos/cm. Bluhol loam is classified as a hydric soil.

### 3.1.3.2 Effects on Soils

**No Action** Soil conditions in the project area would not change with the no action alternative. Continuing maintenance of the existing facility would likely include periodic placement of fill along the diversion structure and the open ditch to repair breaches caused by high flows. The area subject to soil disturbance from placement of fill for routine maintenance in any given year likely does not exceed about 0.02 acres. These ongoing maintenance actions contribute to existing soil conditions in the project area. Consequently, they would not change the existing soil conditions in the project area.

**Proposed Action** The proposed action would include placement of soil to fill the existing ditch, bed the pipeline, and level the ground surface of the filled area. The resulting fill would cover about 0.22 acres and would be similar in composition to existing soils (*i.e.* Bluhol loam). Another 1.03 acres or so, comprising equipment and material staging areas and temporary work areas, would be subject to surface disturbance. These areas, totaling about 1.25 acres, would be devoid of vegetation in the short term and would therefore be subject to increased erosion rates compared to undisturbed, vegetated areas. About 0.13 acres of Bluhol loam soil at the diversion site would be covered by concrete, sheet piling, and rock-blanket erosion protection. These areas would not be available for plant growth in the future.

Past and ongoing actions have created the existing soil conditions in the project area. These actions have consisted primarily of disturbance of surface soils and placement of fill to maintain the diversion and repair breaches along the open ditch segment. The appropriate area of analysis for cumulative effects is the project area because effects of the proposed action on soils would diminish markedly outside of this area. There are no known future actions other than the proposed action that may affect soils in the project area. The proposed action would not overlap in time or space with past and ongoing maintenance actions that affect soil in the project area. This is because effects of the past and ongoing actions would cease with implementation of the proposed action. The maintenance actions that resulted in surface disturbance and placement of fill would be supplanted by placement of fill and surface disturbance associated with the proposed action (*i.e.* the effects would not accumulate).

## 3.1.4 Water Resources

**3.1.4.1 Existing Conditions** Designated uses of the un-named stream in the project area are irrigation, cold-water fishery, livestock watering, wildlife habitat, and primary contact (New Mexico Administrative Code §20.6.4.212). Water quality standards relevant to the proposed action that are specified for perennial tributaries to the main stem of the Pecos River from the headwaters of Sumner Reservoir upstream to Santa Rosa Dam, which includes the un-named stream in the project area, are:

- dissolved oxygen shall not be less than 6.0 mg/l;
- pH shall be within the range of 6.6 to 8.8; and
- temperature shall not exceed 68°F.



Additionally, other designated use-specific water quality criteria specified at New Mexico Administrative Code §20.6.4.900 are applicable to the reach. These use-specific standards include criteria for acute and chronic toxicity to aquatic life and numeric standards for various substances.

Attainment of designated uses in the un-named stream in the project area has not been assessed. Assessment of designated uses in the Pecos River near the project area was assessed in 2004 (New Mexico Environment Department, 2007a: 328). The assessment concluded that all designated uses except marginal warm-water aquatic life were being fully supported. The marginal warm-water aquatic life use was not supported in the Pecos River between Sumner and Santa Rosa reservoirs due to sedimentation/siltation. Probable sources of impairment were flow alteration from water diversions and rangeland grazing. Total maximum daily loads (TMDLs) for temperature and turbidity in the headwaters reach of the Pecos River were established in 2005 (New Mexico Surface Water Quality Bureau, 2005). These TMDLs do not apply to the Pecos River or its perennial tributaries in the vicinity of the project area, which includes the un-named stream.

Flow in the un-named stream in the project area is fairly constant because of its spring-fed hydrology. There is slight variation in flow on a seasonal basis as a result of evapotranspiration. Stream flow increases slightly in the winter months when evapotranspiration is low and flow decreases slightly in summer when evapotranspiration is high. Water surface elevation in the stream varies only about four inches on an annual basis (G. Lujan, Natural Resources Conservation Service, pers. comm., 21 September 2007). Average flow in the un-named stream at the diversion is about 5.3 cubic feet per second, or 2,400 gallons per minute (G. Lujan,

Natural Resources Conservation Service, pers. comm., 21 September 2007). Discharge in the un-named stream was 6.2 cfs on 29 October 2007, measured using a Marsh-McBirney Flo-Mate Model 2000 Portable Flowmeter and the mid-section method (U.S. Bureau of Reclamation, 2001: 10-16). Current velocity was measured at 0.6 depth at each interval along the cross section at the measurement location. Field measurements of water quality characteristics in the project area are shown in Table 1.

**Table 1.** Field measurements of water quality at various locations in the project area. Measurements were made on 29 October 2007 using a Yellow Springs Instruments Model 85 Hand-held Oxygen, Conductivity, Salinity, and Temperature System meter calibrated to local altitude.

Parameter	Stream Below Diversion	Open Irrigation Ditch	Pond Above Diversion	Stream Above Pond
Time	11:55	12:10	11:46	12:29
Water Temperature (°F)	63.5 °F	63.7 °F	63.3 °F	63.3 °F
Dissolved Oxygen (mg/l)	5.02 mg/l	4.99 mg/l	3.91 mg/l	5.05 mg/l
Dissolved Oxygen (percent saturation)	52.5%	52.1 %	41.4%	53.4%
Conductivity (microSiemens)	2308 µS	2315 µS	2294 µS	2322 µS
Specific Conductance (microSiemens)	2696 µS	2699 µS	2691 µS	2718 µS
Salinity (parts per thousand)	1.4 ppt	1.4 ppt	1.4 ppt	1.4 ppt

### 3.1.4.2 Effects on Water Resources

**No Action** Operation of the existing diversion facility would continue to have impacts on water quality downstream from the diversion caused by depletion of flows from the stream during the irrigation season. These impacts likely include increased water temperature and reduced dissolved oxygen concentration. Based on field observations of abundant fish in the stream below the diversion, it does not appear that these impacts are substantial enough to limit aquatic life. Also, periodic spikes in turbidity likely occur with routine maintenance operations such as placement of fill to repair the diversion or ditch and cleaning of the head gate. Existing patterns of water withdrawal and occasional short-term increases in turbidity and suspended sediments

related to maintenance of the diversion facilities would continue with the no action alternative.

**Proposed Action** The proposed project would not change or affect water rights or the amount of water diverted. Water resources would be impacted by proposed rehabilitation of the existing diversion. Operation of the diversion would not have any additional impacts above those that occur with the existing facility and likely would result in reduced incidences of turbidity spikes associated with repair of the earthen diversion. Reconstruction of the diversion dam and head gate would cause short-term increases in turbidity and suspended sediments from placement of temporary diversion materials to de-water the work area and operation of construction equipment to place concrete



headwall sections and sheet piling. These activities would disturb about 200 ft<sup>2</sup> of stream bottom. Most of this area is associated with placement of sheet piling and wire-enclosed rock blanket material on the downstream side of the piling. The maximum duration of disturbance of the stream bottom area would be about three days. The proposed action is not likely to affect water quality in the Pecos River because: 1) turbidity spikes would be of short duration, 2) the amount of suspended sediment would be relatively low due to the small area of impact, 3) flow in the un-named stream is relatively low and therefore sediment would precipitate relatively quickly downstream from the construction site, and 4) flow in the Pecos River would dilute to very low levels any suspended sediments that reach the confluence.

The appropriate area for cumulative effects analysis for water resources is the un-named stream from the diversion downstream to the confluence with the Pecos River, which is a distance of about 1,240 feet. The effects of the proposed action would be insignificant beyond this point. The effect of past and ongoing actions on water quality in the project area are represented by the existing conditions. There are no known future actions that may impact water resources and that would overlap spatially or temporally with the proposed action. Consequently, the project would not have any cumulative effects on water resources.

**Best Management Practices** Construction areas that are below the ordinary high water mark of the un-named stream should be isolated from surface water using appropriate materials, such as concrete wall barriers, temporary sheet piling, or water bladder dams. The isolated areas should be de-watered before work is conducted. If concrete headwall sections are to be cast in place, all

concrete should be isolated from surface water until it is cured. Rock used to construct the wire-enclosed rock blanket on the downstream side of the sheet piling should be free of fines to minimize turbidity. All fuels and lubricants should be stored outside of the 100-year floodplain of the stream and construction equipment should be inspected daily and monitored during operation to prevent leaking fuels or lubricants from entering surface water.

### 3.1.5 Floodplains, Wetlands, and Waters of the U.S.

**3.1.5.1 Existing Conditions** Floodplains in the project area are associated with the un-named stream. The floodplain area is relatively narrow in the project area due to the entrenched nature of the stream channel, the relatively small drainage catchment area, and the relatively constant flow regime associated with the springs and seeps that create flow in the stream. However, debris rafts suspended in riparian vegetation indicate that high flows associated with storm-water runoff do occasionally occur.

A preliminary wetland assessment was conducted on 21 September 2007 using the methodology in the draft Arid West Supplement to the 1987 Corps of Engineers Wetlands Delineation Manual (U.S. Army Corps of Engineers, 2005). This assessment was conducted to identify plant communities in the project area that are likely to be indicative of jurisdictional wetlands. A list of plant species identified in the project area is included in Appendix C. The assessment indicated that wet meadow areas dominated by plants such as saltgrass (*Distichlis spicata*), marshy spike-rush (*Eleocharis palustris*), alkali bulrush (*Bolboschoenus maritimus*), Mexican rush (*Juncus arcticus mexicanus*), and yerba-de-pasmo



(*Baccharis pteronioides*) are jurisdictional wetlands (Figure 6). Areas with standing water or with soil saturation at the surface, including the margins of the stream and open ditch, the margins of the pond behind the diversion dam, and seeps and spring along both sides of the stream are also jurisdictional wetlands (Figure 6). These marsh areas were dominated by obligate wetland plant species such as clasping yellowtops (*Flaveria chlorifolia*), Wright's marsh thistle (*Cirsium wrightii*; see section 3.2.3), beaked spike-rush (*Eleocharis rostellata*), three-square bulrush (*Schoenoplectus pungens*), chairmaker's bulrush (*S. americanus*), and hardstem bulrush (*S. acutus*). A third wetland plant community was found on the west side of the un-named stream, just above the marsh zone associated with the numerous seeps and springs along the slope to the stream channel (Figure 6). This plant community was dominated by halophytic species including iodinebush (*Allenrolfea occidentalis*), inland saltgrass, shrubby seepweed (*Suaeda nigra*), three-square bulrush, Mexican rush, and alkali bulrush.

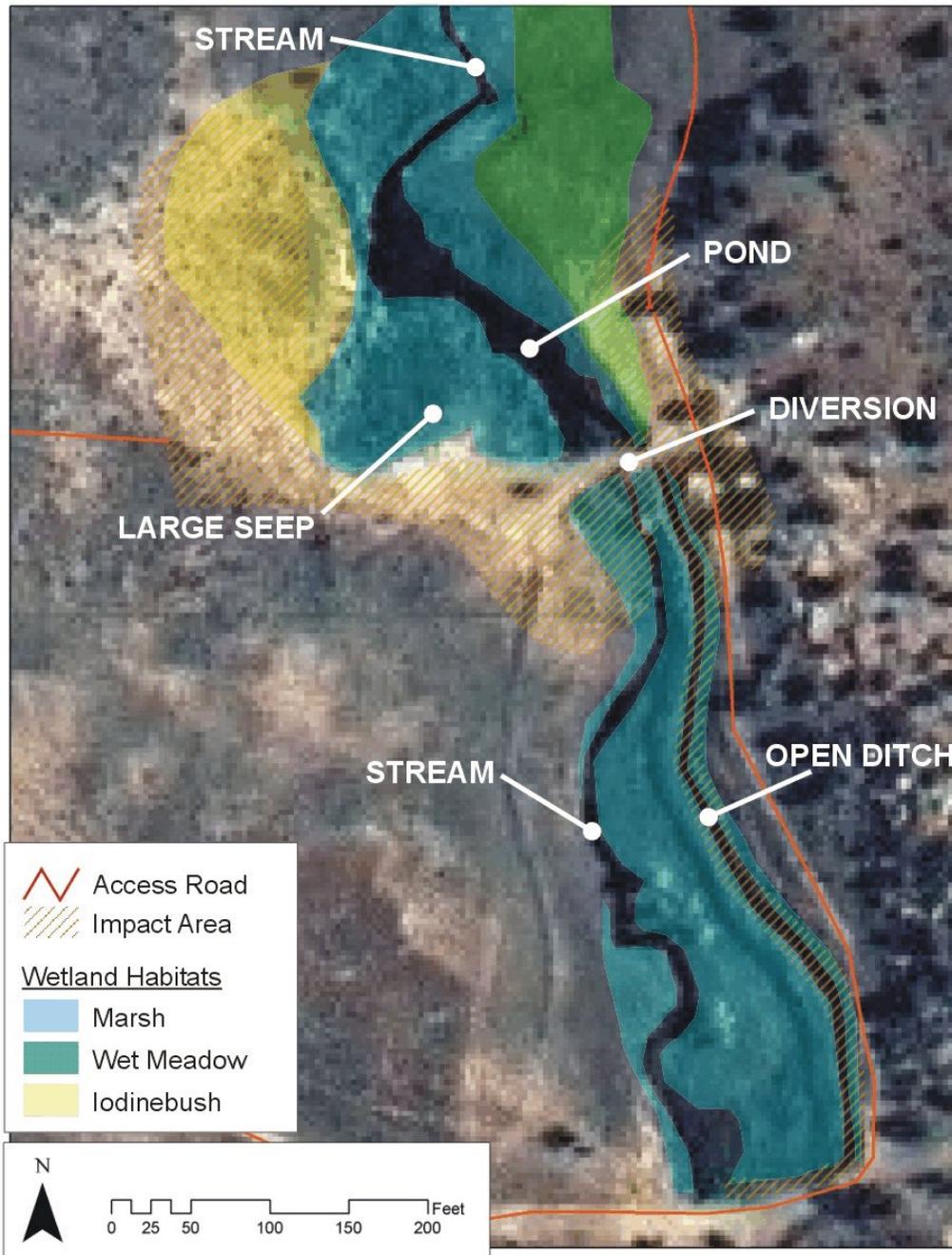
Indicators of wetland hydrology in these plant communities included one or more of the following: surface water (wetland hydrology indicator A1); high water table (wetland hydrology indicator A2); saturation (wetland hydrology indicator A3); biotic crust (wetland hydrology indicator B10); salt deposits (wetland hydrology indicator C5); and the FAC-neutral test (wetland hydrology indicator D7). Hydric soil indicators were present in these plant communities and included: 1 cm muck (hydric soil indicator A9); depleted below dark surface (hydric soil indicator A11); loamy gleyed matrix (hydric soil indicator F2); or depleted matrix (hydric soil indicator F3).

The un-named stream is perennial and is tributary to the Pecos River. Consequently, it would be considered a water of the U.S. pursuant to Section 404 of the Federal Clean Water Act. Dredge and fill activities below the ordinary high water mark in waters of the U.S. are typically regulated by the U.S. Army Corps of Engineers under Section 404. However, construction and maintenance of irrigation facilities and functionally related structures are activities that are exempt from Section 404 of the Clean Water Act.

### 3.1.5.2 Effects on Floodplains, Wetlands, and Other Waters of the U.S.

**No Action** Operation and maintenance of the existing diversion and ditch would cause recurring impacts to small portions of the wetlands adjacent to the diversion and along the ditch. Placement of fill below the ordinary high water mark of the un-named stream may also occur periodically with repair of the existing diversion dam. No encroachments on the floodplain would occur with continued operation and maintenance of the existing diversion facility.

**Figure 6.** Wetlands in the project area. The approximate “footprint” or area of impact associated with the proposed action is indicated by the orange-colored diagonal hachures. The existing access road is indicated by the solid red line.





**Proposed Action** Field observations indicated that about 0.16 acres of the project area is within the floodplain of the un-named stream. This area includes portions of the concrete headwall and sheet piling sections of the proposed diversion dam. Reconstruction of the diversion dam would not affect floodplain capacity or function in the project area. The existing floodplain would not be diminished in size or extent by the proposed action.

About 0.17 acres of wet meadow habitat on the east side of the stream near the diversion and 0.54 acres of iodinebush wetland would be temporarily impacted by the proposed action (Figure 6). This would result from operation of construction equipment during the course of reconstructing the diversion dam. About 1,742 ft<sup>2</sup> (0.04 acres) of marsh wetland below the existing diversion dam would be filled by placement of wire-wrapped rock on the downstream side of the sheet piling. Conversion of the open ditch to a buried pipeline would result in filling of about another 628 ft<sup>2</sup> of marsh wetland along the margins of the ditch (Figure 6). Therefore, a total of about 2,370 ft<sup>2</sup> (0.05 acres) of wetlands would be filled by the proposed action.

The proposed action would raise the water surface elevation behind the diversion dam. The crest of the new diversion dam would be about four feet higher than the existing structure (Natural Resources Conservation Service, 2003: Sheet 5). This increase in water surface elevation behind the dam would result in a substantial increase in elevation of the shallow water table upstream from the dam, and this effect would extend for a considerable distance due to the low slope of the floodplain and terrace. Subjective field estimates made on-site suggest that the wetland area upstream from the diversion dam could increase about three-fold. Most of the increased wetland

area would be marsh habitat with standing water or with soil saturation at the surface. Up to about 0.35 acres of wetland area could be created by the raised water level. Hydrologic regime in about another 0.43 acres of existing wet meadow habitat may be enhanced, thereby converting it to marsh-type wetland.

The appropriate boundary for analysis of cumulative effects on wetlands, other waters of the U.S., and floodplains is the project area because the proposed action would not have any effects on these resources beyond the project area limits. The effect of past and ongoing actions on wetlands in the project area is represented by the existing condition. Ongoing actions that are affecting wetlands in the project area include livestock grazing and maintenance and operation of the existing diversion. Ongoing maintenance actions that are affecting wetlands in the project area would be supplanted by the proposed action and, therefore, would not accumulate with the proposed action. There are no known future actions that are likely to affect wetlands in the project area. Although the proposed action would result in filling of about 0.05 acres of wetlands, a net increase in the spatial extent of wetlands in the project area is likely to occur as a result of increased water surface elevation behind the proposed diversion structure. Therefore, the cumulative effect of the proposed action would be a net increase in wetland area overall, including an increase in the acreage of marsh-type wetland habitat. There are no known future actions that would affect floodplains or other waters of the U.S. in the project area. Consequently, the proposed action would not result in cumulative effects on floodplains or other waters of the U.S.

**Best Management Practices** The marsh wetland habitat on the northwest side of the diversion (labeled as “large seep” in Figure 6),



which is also the location of the population of Great Plains ladies-tresses (*Spiranthes magnicamporum*) and high-density patches of Wright's marsh thistle (*cf.* section 3.2.3), should be protected from accidental or incidental impacts during construction. Although this area is outside of the proposed work area, it should be enclosed with silt fencing or similar material to clearly mark the wetland. The contractor should be informed of the requirement to prevent disturbing this wetland area. Similarly, marsh wetland habitat along the east side of the stream above the diversion dam should also be fenced as a protection zone.

### 3.1.6 Air Quality

The Clean Air Act of 1970, as amended, established National Ambient Air Quality Standards for six criteria air pollutants: ozone, airborne particulates, carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. If measured concentrations of the six pollutants exceed their respective standards, the U.S. Environmental Protection Agency can designate the area as nonattainment area for that pollutant.

**3.1.6.1 Existing Conditions** No exceedences of the National Ambient Air Quality Standards have been measured in the air quality monitoring network in Guadalupe County (New Mexico Environment Department, 2007b). Therefore, the area is currently in attainment of all Federal air quality standards.

#### 3.1.6.2 Effects on Air Quality

**No Action** The no action alternative would not affect existing air quality as no changes would occur in regards to rehabilitation of the acequia.

**Proposed Action** The proposed project would result in short-term effects to local air quality from heavy equipment operation during construction. An temporary increase in particulates (dust) would be expected as a result of soil disturbance. Also, local concentrations of carbon monoxide would increase from equipment emissions for about 10 days during the month-long construction period. No long-term effects to air quality are anticipated as a result of operation of the proposed facilities.

The appropriate area for cumulative effects analysis for air quality is the area within 300 feet of the project area. Effects of the project on air quality beyond that distance would be negligible. The effect of past and ongoing actions on air quality in airshed are represented by the existing conditions. There are no known future actions that may impact air quality and that would overlap spatially and temporally with the proposed action. Consequently, the project would not have any cumulative effects on air quality.

**Best Management Practices** Construction-related effects to air quality would be minimized by: 1) requiring the contractor to have emission control devices on all equipment; and 2) employing the use of best management practices to control wind erosion, including wetting of soils within the construction zone and compliance with local soil sedimentation and erosion-control regulations. Construction and maintenance of the proposed project would conform with air quality control regulations as established by the Clean Air Act and the New Mexico Air Quality Control Act.



### 3.1.7 Noise Levels

In considering potential effects of increased noise levels, sensitive noise receptors are identified in a project area. Sensitive receptors include but are not limited to homes, lodging facilities, hospitals, parks, and undeveloped natural areas.

**3.1.7.1 Existing Conditions** The project area generally has a moderate to low level of noise as most of the area is undeveloped or agricultural lands and developed areas are some distance away. Natural sounds heard during the field survey in September 2007 include water flowing in the un-named stream and Labadie Ditch, animals, including birds, insects, cows, and horses, and the wind rustling through plants.

Sounds created by humans included vehicle traffic traveling on N.M. Highway 91, marching band practice at the local high school football field, heavy equipment working at the state fish hatchery across the Pecos River, airplanes flying overhead, and the whistle of trains passing through Santa Rosa.

#### 3.1.7.2 Effects on Noise Levels

**No Action** The no action alternative would not result in any construction in the project area. Therefore, there would be no effect on current noise levels.

**Proposed Action** If the proposed action is implemented, there would be temporary increases in noise levels from the operation of heavy equipment, which for about 10 days during the month-long construction period. Additional construction-related noise from vehicles and people at the site would persist throughout the construction period. These increases in noise

would occur in day time hours and may disrupt the relatively quiet project setting. Wildlife that use this area may be temporarily displaced by the increased level of noise.

Cumulative effects of noise increases were assessed using an approximately one-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 from vehicles on N.M. Highway 91 and other roads, airplanes, trains, and fish hatchery equipment operation and noise generated at the high school and other surrounding homes and ranches, resulting in a cumulative increase in noise levels during the period of construction.

**Best Management Practices** To reduce temporary construction noise, construction contracts would require that construction equipment and activities comply with state and local noise control ordinances.

## 3.2 Biological Resources

### 3.2.1 Terrestrial Habitat

A biological field survey of the project area was conducted on 21 September and 29 October 2007. The project area is situated in a zone where Plains-Mesa Grassland merges with Juniper Savanna (vegetation terminology following Dick-Peddie, 1993). Upland terrestrial habitat in the project area was limited to the access road. Vegetation adjacent to the access road was dominated by one-seed juniper (*Juniperus monosperma*), honey mesquite (*Prosopis glandulosa*), desert scrub oak (*Quercus turbinella*), wait-a-minute-bush (*Mimosa aculeaticarpa*), broom snakeweed (*Gutierrezia*



*sarothrae*), blue grama (*Bouteloua gracilis*), plains blackfoot-daisy (*Melampodium leucanthum*), and Tahoka daisy (*Machaeranthera tanacetifolia*). A list of plant species identified in the project area is contained in Appendix C.

### 3.2.1.2 Effects on Terrestrial Habitat

**No Action** The no action alternative would not result in any changes to terrestrial habitat conditions in the project area. Existing levels of disturbance from vehicle travel, equipment operation, and human activity associated with operation and maintenance of the diversion and ditch would continue.

**Proposed Action** The proposed action would not result in any additional impacts to upland terrestrial vegetation in the project area compared to existing conditions. The access route that would be used is an existing dirt road with regular vehicle traffic. The road would not be widened or otherwise altered for the purpose of rehabilitating the acequia.

## 3.2.2 Riparian and Aquatic Habitat and Biota

3.2.2.1 Existing Conditions Riparian habitat in the project area is characterized by wetlands dominated by herbaceous plants. Wetlands are discussed in section 3.1.5. A list of plant species identified in riparian and wetland habitat in the project area is provided in Appendix B. Bird species observed in the project area during the field surveys are listed in Table 2. Other species of wildlife known to occur in the project area include coyote (*Canis latrans*), black bear (*Ursus amblyceps*), gray fox (*Urocyon cinereoargenteus*), turkey (*Meleagris gallopavo*), and mule deer (*Odocoileus hemionus*; G. Lujan,

Labadie Ditch Association, 21 September 2007, pers. comm.).

Maximum water depth in the pond upstream from the diversion exceeded six feet. The water was very clear and the pond had abundant growths of submerged aquatic plants. The banks of the stream and pond upstream from the diversion had lush herbaceous wetland vegetation. Habitat in the un-named stream was characterized by a deep, narrow channel with undercut banks, very clear water, low to moderate current velocity, and a substrate ranging from clay to deep muck (Figure 7). Aquatic habitat is also present in the existing open ditch. This habitat has relatively homogeneous depth, flow and substrate. The ditch bottom has abundant submerged vegetation, but the herbaceous vegetation along the banks is less dense than in along the pond and stream due to more intensive livestock grazing. Average depth in the open ditch is about 1.6 feet and average width is about six feet. The substrate is sandy muck and flow is relatively swift.

Biota observed in the stream and pond included northern leopard frog (*Rana pipiens*), northern crayfish (*Orconectes virilis*, an introduced species), and Rio Grande chub (*Gila pandora*; Figure 8). A centrarchid (*i.e.* sunfish), probably green sunfish (*Lepomis cyanellus*) was also observed in the pond but was not collected.



**Table 2.** Bird species observed in the project area during the field surveys conducted on 21 September and 29 October 2007.

Common Name	Scientific Name
Green Heron	<i>Butorides virescens</i>
Turkey Vulture	<i>Cathartes aura</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Swainson's Hawk	<i>Buteo swainsoni</i>
Ring-necked Pheasant	<i>Phasianus colchicus</i>
American Coot	<i>Fulica americana</i>
Rock Dove	<i>Columba livia</i>
Mourning Dove	<i>Zenaida macroura</i>
Northern Flicker	<i>Colaptes auratus</i>
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>
Western Scrub-jay	<i>Aphelocoma californica</i>
American Crow	<i>Corvus brachyrhynchos</i>
Common Raven	<i>Corvus corax</i>
Barn Swallow	<i>Hirundo rustica</i>
Black-capped Chickadee	<i>Peocile atricapilla</i>
Bushtit	<i>Psaltriparus minimus</i>
Bewick's wren	<i>Thryomanes bewickii</i>
Canyon Wren	<i>Catherpes mexicanus</i>
Yellow Warbler	<i>Dendroica petechia</i>
Wilson's Warbler	<i>Wilsonia pusilla</i>
Chipping Sparrow	<i>Spizella passerina</i>
Dark-eyed Junco	<i>Junco hyemalis</i>
Western Meadowlark	<i>Sturnella neglecta</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>



**Figure 7.** Aquatic habitat in the stream above the existing diversion. Habitat was characterized by very clear, deep water, dense, overhanging herbaceous wetland vegetation (e.g. beaked spike-rush), and narrow channel width. A small school of Rio Grande chub is visible in the stream in the center of the photo.



**Figure 8.** Rio Grande chub was abundant in the stream and pond habitat.



### 3.2.2.2 Effects on Riparian and Aquatic Habitat and Biota

**No Action** The no action alternative would not result in any changes to riparian and aquatic habitat conditions in the project area. Existing levels of disturbance from vehicle travel, equipment operation, and human activity associated with operation and maintenance of the existing diversion and ditch would continue.

**Proposed Action** The proposed action would impact wetlands, as described in section 3.1.5.2. To recapitulate, about 0.05 acres of wetland would be filled by reconstruction of the diversion structure and installation of the buried pipeline and about 0.71 acres of wet meadow and iodinebush wetland would be temporarily disturbed by construction activities. However, an increase in water surface elevation of about four feet would occur with the new diversion structure, which would increase wetland area behind the diversion by about 0.35 acres and enhance hydrologic regime in another 0.43 acres. This would benefit riparian and wetland associated biota in the project area.

The increase in water surface elevation with the new structure would also increase mean depth and surface area of aquatic habitat upstream from the diversion structure, which would benefit aquatic biota. Aquatic habitat in the existing open ditch would be lost, however. The areal amount of open-ditch aquatic habitat that would be lost is about 0.07 acres. This loss would be offset by the increase in aquatic habitat above the diversion. Flow in the un-named stream below the diversion is expected to be similar to the existing condition (*cf.* section 2.1.2).

The appropriate boundary for analysis of cumulative effects on riparian and aquatic habitat

and biota is the project area because the proposed action would not have any effects on these resources beyond the project area limits. The effect of past and ongoing actions on riparian and aquatic habitats in the project area is represented by the existing condition. Ongoing actions that are affecting riparian and aquatic habitats in the project area include livestock grazing and maintenance and operation of the existing diversion. Ongoing maintenance actions that are affecting riparian and aquatic habitats in the project area would be supplanted by the proposed action and, therefore, would not accumulate with the proposed action. There are no known future actions that are likely to affect riparian and aquatic habitats in the project area. Consequently, the proposed action would not result in cumulative effects on riparian and aquatic habitats and associated biota.

**Best Management Practices** Aquatic habitat in the pond above the diversion and in the stream both above and below the diversion should be protected with silt fencing to prevent runoff of sediments from areas disturbed by construction. Other best management practices measures described for water resources (*cf.* section 3.1.4.2) and wetlands (*cf.* section 3.1.5.2) would also eliminate or minimize potential impacts to aquatic and riparian habitats and biota.



### 3.2.3 Threatened and Endangered Species

**3.2.3.1 Existing Conditions** A list of special status animal species that may be found in Guadalupe County was compiled from information obtained from the U.S. Fish and Wildlife Service and the Conservation Services Division of the New Mexico Department of Game and Fish. Special status plant species occurring in Guadalupe County were identified using the Rare Plant List developed by the New Mexico Rare Plant Technical Council and the scoping response provide by the State Botanist. Information on the distribution and habitat of each species was gathered from published and unpublished reports, databases, and personal communications and the list was refined based on the geographic location and habitat characteristics of the project area.

There are 33 special status species that occur or may occur in Guadalupe County (Table 3). The general vegetation type that each species is known from is listed in Table 3 in the "Habitat" column. Four species that are known to occur or that may potentially occur in the project area were considered as potentially affected by the proposed project. The four species, highlighted in bold in Table 3, include three plant species and one fish species. One of the four species has status under the Federal Endangered Species Act: Pecos sunflower (*Helianthus paradoxus*). Pecos sunflower is also state endangered, as are the other two plant species, Wright's marsh thistle (*Cirsium wrightii*) and Great Plains ladies-tresses (*Spiranthes magnicamporum*). Rio Grande chub is a state-sensitive species.

Wright's marsh thistle, Great Plains ladies-tresses, and Rio Grande chub were all found in the project area. One Pecos sunflower plant was found on the

left (east) bank of the un-named stream about 984 feet upstream from the diversion dam, which is outside of the project area. No Pecos sunflower plants were found inside the project area. Bigscale logperch, identified by the New Mexico Department of Game and Fish in their scoping comments as occurring in the Pecos River near the project area, was not found in the un-named stream.

Great Plains ladies-tresses was found in the large seep area on the northwest side of the existing diversion (Figure 9). This habitat sloped moderately (*ca.* 25 percent slope) eastward to the pond. The ground was saturated throughout and there were many seeps and small springs throughout the slope wetland, in addition to one larger flowing spring on the north side of the area. Great Plains ladies-tresses was found scattered throughout this wetland area. Twenty-eight plants were found in this wetland area. The orchid was not found in any other locations in the project area.

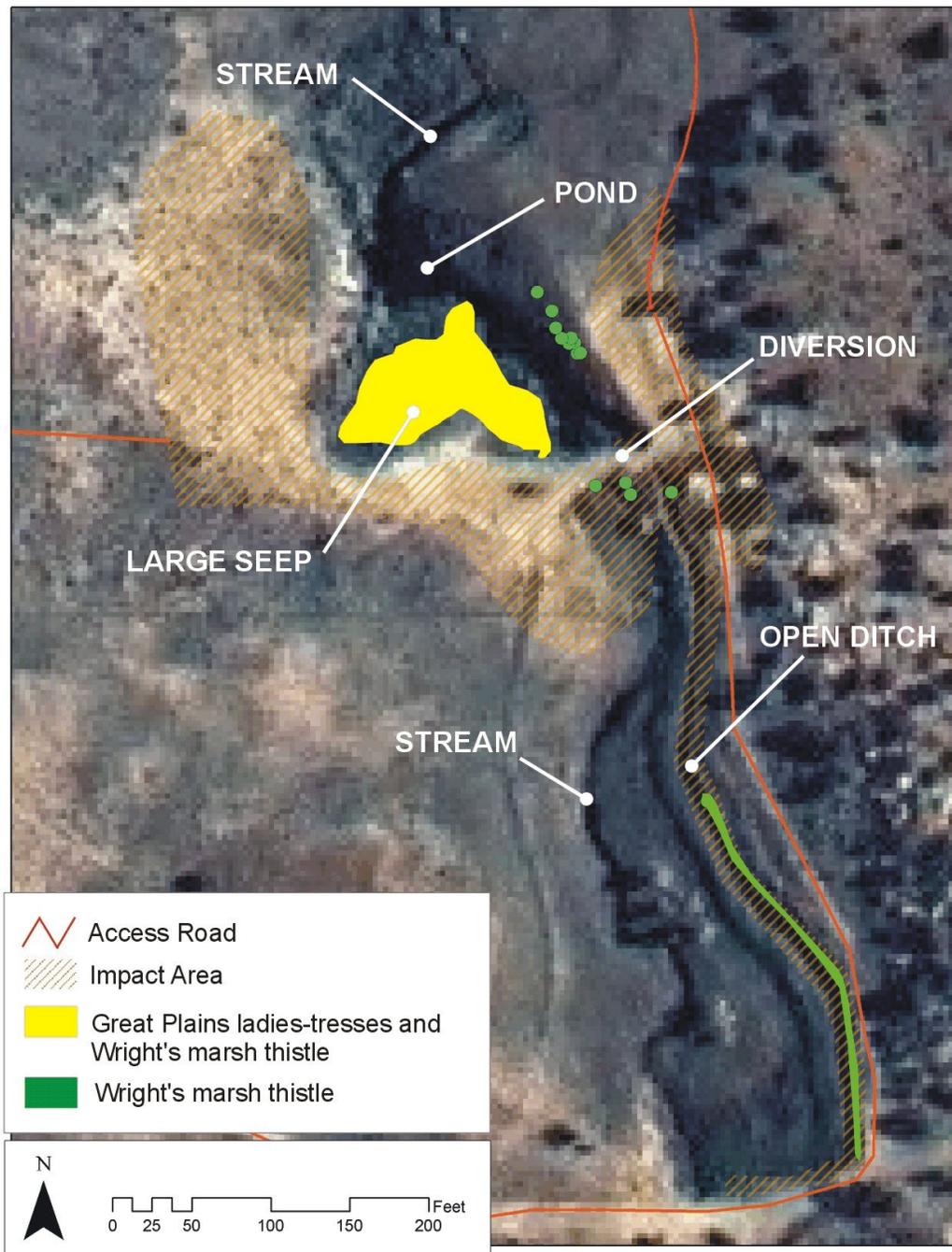
Wright's marsh thistle (Figure 10) was found throughout the project area along the un-named stream both above and below the diversion, along the open ditch, and in the large seep wetland with Great Plains ladies-tresses (Figure 9). A total of 176 plants were found in the project area. Ninety of these were flowering and 86 were rosettes. About three-quarters of the flowering plants had been grazed. Livestock grazing was not apparent in the large seep area, likely due to the saturated, deep, mucky soil there. Grazing was most evident along the banks of the open ditch and along the east side of the pond and stream above the diversion (Figure 9).

**Table 3.** Special status plant and animal species that may occur in Guadalupe County. Species that are known to occur or that may potentially occur in the project area are highlighted in bold.

Status is: Federal endangered (**FE**); Federal threatened (**FT**); Federal proposed as threatened (**FPt**) or endangered (**FPe**); Federal candidate (**FC**); Federal species of concern (**FS**); state endangered (**SE**); state threatened (**ST**); and state species of concern (**SS**). Habitat is coded as: **TUN** = alpine tundra; **SCF** = subalpine coniferous forest; **MCF** = Rocky Mountain upper or lower montane coniferous forest; **SAG** = subalpine-montane grassland; **PJW** = piñon-juniper woodland or juniper savanna; **MSC** = montane scrub; **PMG** = plains-mesa grassland; **DGR** = desert grassland; and **CDS** = Chihuahuan desert scrub. Special habitats are coded as: **Rip** = riparian; **Wet** = wetlands; **Aq** = aquatic; **Rck** = rock outcrops, rocky areas or cliffs; **Mal** = malpais (lava flow); and **Log** = large woody debris on the ground surface.

Common Name	Scientific Name	Status		Habitat
<u>Plants (4 taxa)</u>				
Flint Mountains milkvetch	<i>Astragalus siliceus</i>	-	SS	PJW, PMG
<b>Wright's marsh thistle</b>	<b><i>Cirsium wrightii</i></b>	<b>FS</b>	<b>SE</b>	<b>PMG, DGR, CDS/Wet</b>
<b>Pecos sunflower</b>	<b><i>Helianthus paradoxus</i></b>	<b>FT</b>	<b>SE</b>	<b>PMG, DGR, CDS/Wet</b>
<b>Great Plains ladies-tresses orchid</b>	<b><i>Spiranthes magnicamporum</i></b>	-	<b>SE</b>	<b>PMG/Wet</b>
<u>Invertebrates (1 taxon)</u>				
Conchas crayfish	<i>Orconectes deanae</i>	-	SS	PMG,PJW/Aq
<u>Fishes (5 taxa)</u>				
Mexican tetra	<i>Astyanax mexicanus</i>	-	ST	CDS,DGR/Aq
<b>Rio Grande chub</b>	<b><i>Gila pandora</i></b>	-	<b>SS</b>	<b>DGR-MCF/Aq</b>
Rio Grande shiner	<i>Notropis jemezianus</i>	FS	-	CDS,DGR/Aq
suckermouth minnow	<i>Phenacobius mirabilis</i>	-	ST	DGR,PMG,PJW/Aq
bigscale logperch	<i>Percina macrolepida</i> (Native pop.)	-	ST	CDS,DGR/Aq
<u>Birds (14 taxa)</u>				
Bald Eagle	<i>Haliaeetus leucocephalus</i>	FT	ST	CDS-MCF/Rip
Northern Goshawk	<i>Accipiter gentilis</i>	FS	-	MCF
Common Black-hawk	<i>Buteogallus anthracinus anthracinus</i>	-	ST	CDS-MCF/Rip
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	FS	ST	CDS-MCF/Rck
Arctic Peregrine Falcon	<i>Falco peregrinus tundrius</i>	FS	-	CDS-MCF/Rck
Lesser Prairie Chicken	<i>Tympanuchus pallidicinctus</i>	FC	SS	DGR,PMG
Piping Plover	<i>Charadrius melodus circumcinctus</i>	-	ST	PMG/Rip,Sand
Mountain Plover	<i>Charadrius montanus</i>	FS	SS	DGR,PMG/Aq
Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	FS	SS	DGR-MCF/Aq,Wet
Burrowing Owl	<i>Athene cunicularia hypugaea</i>	FS	-	CDS-PMG
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	FE	SE	CDS-MCF/Rip,Aq
Loggerhead Shrike	<i>Lanius ludovicianus</i>	-	SS	CDS-PMG
Gray Vireo	<i>Vireo vicinior</i>	-	ST	PJW
Baird's Sparrow	<i>Ammodramus bairdii</i>	FS	ST	DGR,PMG
<u>Mammals (9 taxa)</u>				
western small-footed bat	<i>Myotis ciliolabrum melanorhinus</i>	FS	SS	PJW,MCF/Rip
black-tailed prairie dog	<i>Cynomys ludovicianus</i>	FS	SS	DGR,PMG
Pecos River muskrat	<i>Ondatra zibethicus ripensis</i>	FS	SS	CDS-PJW/Aq,Wet
red fox	<i>Vulpes vulpes</i>	-	SS	CDS-MCF
swift fox	<i>Vulpes velox velox</i>	FS	SS	DGR,PMG
black-footed ferret	<i>Mustela nigripes</i>	FE	-	DGR,PMG
ringtail	<i>Bassariscus astutus</i>	-	SS	CDS,PMG
hog-nosed skunk	<i>Conepatus leuconotus</i>	-	SS	CDS-MCF
western spotted skunk	<i>Spilogale gracilis</i>	-	SS	CDS-MCF

Figure 9. Locations of Great Plains ladies-tresses and Wright's marsh thistle in the project area.





**Figure 10.** Wright's marsh thistle. The browsed flowering stem on the left side of the plant are the result of livestock grazing.

Rio Grande chub was collected in the stream both above and below the existing diversion, in the pond behind the diversion, and in the open ditch. It was common in the ditch and abundant in the stream and pond.

### 3.2.3.2 Effects on Threatened and Endangered Species

**No Action** The no action alternative would not result in any changes to the status of threatened, endangered, or sensitive species in the project area. Existing levels of disturbance associated with livestock grazing and operation and maintenance of the existing diversion and ditch would continue.

**Proposed Action** Great Plains ladies-tresses is not likely to be affected by the proposed action because the large seep area is not within the 'footprint' of the proposed construction activities (Figure 9). Rio Grande chub is also unlikely to be

adversely affected by the proposed action. Potential impacts to aquatic habitat would be localized and of short duration.

About 21 flowering Wright's marsh thistle and 32 rosettes were found along the open ditch (Figure 9). Because the plant is a biennial, the 21 plants that flowered in 2007 would not be affected by the proposed action (*i.e.* they would be dead). However, the 32 rosettes would be destroyed by the proposed action. Also the thistle rosettes below the existing diversion (*ca.* four plants) would be destroyed. Additionally, wetland habitat occupied by the species below the diversion and along the open ditch would be lost.

The appropriate boundary for analysis of cumulative effects on Wright's marsh thistle is the project area because the proposed action would not have any effects on this species beyond the project area limits. The effect of past and ongoing actions on Wright's marsh thistle in the project

area is represented by the existing condition. Ongoing actions that are affecting the thistle in the project area include livestock grazing and maintenance and operation of the existing diversion. These ongoing actions appear to be limiting the population size of Wright's marsh thistle in the project area.

The proposed action would contribute to limiting the population size of Wright's marsh thistle in the project area by destroying rosettes that could flower in 2008 and by eliminating habitat areas below the diversion and along the open ditch. However, increased water surface elevation resulting from construction of the new diversion and associated expansion of wetland habitats (*cf.* section 3.1.5.2) may offset these impacts. In particular, expansion of wetlands with standing water or saturated soils may increase the area of suitable habitat for Wright's marsh thistle that is not subject to intensive grazing pressure.

**Best Management Practices** Best management practices measures described for protection of wetlands and aquatic habitat would also serve to protect special-status species in the project area (*cf.* sections 3.1.4.2, 3.1.5.2, and 3.2.2.2). Most importantly, temporary fencing of the large seep and wetland area on the east side of the stream would prevent impacts to Great Plains ladies-tresses and Wright's marsh thistle in those locations. Measures to protect water quality and aquatic habitat, including placement of silt fence as described in section 3.2.2.2, would minimize impacts to Rio Grande chub.

**Determination of Effects to Federally Listed or Proposed Species and Critical Habitat** The USACE determines that the proposed action would have no effect on federally listed species known to occur in Guadalupe County, New Mexico. The proposed project area

is not within, and therefore would not affect, any proposed or designated critical habitat.

## 3.3 Social, Economic, and Cultural Resources

### 3.3.1 Visual Resources and Land Use

**3.3.1.1 Existing Conditions** As described in section 3.1.2.- Physiography and Geology, the project area is located in the Pecos River valley. The acequia diversion site is on an un-named stream. The stream, which is the source of the Labadie Ditch, traces its way across a broad, gently sloping plain, bounded on the east in the project area by a stony, dissected slope. Sedimentary rock outcrops ranging in color from maroon to tan are visible along this hill slope. Below the diversion, the stream continues in an generally southerly direction while the ditch turns southeast. Water in both the stream and ditch is very clear, allowing visibility to the bottom.

Views of the surrounding area are pastoral with pastures and crop fields bounded by fences. A state fish hatchery with its associated facilities can be seen to the southwest across the Pecos River. The river itself is not visible from the project area but its location can be identified by the crowns of trees located along its banks. Facilities at the Santa Rosa High School (e.g. football stadium) can be seen to the north. Other homes and ranch buildings are scattered across the landscape.

Land in the project area is privately owned by either members of the Labadie Ditch Association or the Association itself, which owns about two acres surrounding the diversion (G. Lujan, Labadie Ditch Association, 21 September 2007,



pers. comm.). The nearest residences are those of members of the ditch association, one whose property is crossed to access the site and others downstream of the diversion outside of the project area. Land within and adjacent to the project area is used for livestock grazing (horse and cattle) and access roads.

The Labadie Ditch and associated acequia features (*i.e.*, diversion dam, gates) are the primary visual features within the project area. Other man-made features in the project area include barbed wire fences and metal gates. Livestock grazing occurs on both sides of the ditch and stream up to the banks so that grass is cropped short. There are large areas with sparse vegetation on either side of the diversion. Placement of fill along the diversion structure and the open ditch to repair breaches caused by high flows and the roughly-placed barbed-wire fencing around the diversion is a visual detractor from the pastoral setting.

### 3.3.1.2 Effects on Visual Resources and Land Use

**No Action** The no action alternative would not result in any effect on current land uses or visual resources in the project area. Land uses would continue as are currently being undertaken.

**Proposed Action** The presence of heavy equipment, workers' vehicles, and staging area facilities in the project area would detract from the project area setting for the two-week construction period. Installation of 60 feet of concrete headwall and 80 feet of sheet piling would create a much larger diversion structure than currently exists. The effect of this on project area scenery is debatable, but since the alterations would only be observable by acequia members, the effect would not be significant. Use of the

two areas with sparse vegetation on either side of the diversion for the staging areas would have little effect on visual resources.

This alternative would not change current agricultural land uses in the project area. Implementation of the proposed action would be expected to benefit the agricultural land users (see section 3.3.3 Socioeconomics).

The cumulative effects assessment for impacts to land use and visual resources used the project area as the area of impact. Past and current maintenance of the acequia facilities (*i.e.*, piling fill material on the diversion or along breaches to the ditch) have created the existing conditions in regards to visual resources in the project area. As there are no known projects that would create visual impacts to the project area that would overlap in time or space with the proposed action, there would be no cumulative effects to visual resources. As land use in the project area would not be affected by the proposed project, there would be no cumulative impact to land use from the proposed project.

## 3.3.2 Cultural Resources

3.3.2.1 Existing Conditions An archaeological survey covering 100-percent of the project area was conducted on 21 September 2007 and 11 October 2007 (Raymond 2008). The survey report is available upon request to the USACE. The intensive pedestrian survey targeted the project-area segment (530 feet) of the Labadie Ditch, the diversion dam, the access road, and a staging area adjacent to the diversion dam for a total of 7.7 acres. In addition, an abandoned segment of the historic Labadie Ditch, a 2.75-mile alignment, was surveyed, recorded, and photo documented.

Prior to the intensive survey, an archival literature search and a search of the New Mexico Archaeological Records Management Section database and map server, the State Register of Cultural Properties, and the National Register of Historic Places were completed. The records review reflected the presence of one previously-recorded archaeological site, LA 108213, near the entry point of the access road on N.M. Highway 91. No portion of that site was relocated within or immediately adjacent to the access road.

American Indian Tribes that have indicated that they have cultural resource concerns in Guadalupe County were given the opportunity to comment on the proposed project (Appendix A). No traditional cultural properties are known to occur in the vicinity of the project area and no Tribal concerns were identified for this project.

The original Labadie Community Ditch system, constructed in approximately 1869, was an earthen ditch which included the 530-foot project area segment and a now-abandoned earthen, concrete, and natural stone ditch. The abandoned segment extends from the project area in a southerly, then southeasterly, direction following the contours of the landscape above the Pecos River for a distance of about total of 2.75 miles. The Labadie Community Ditch has a priority date of 1873 based on the Hope Decree of 1933. The ditch was constructed and used during the early years of the development of the Santa Rosa area. It is associated with the settlement of the middle Pecos River valley and represents early modification of the landscape by Hispanic and Euro-american settlers.

Rehabilitation projects on the Labadie Ditch in 1968 and between 1988 and 1992 significantly altered the acequia's form by converting and relocating approximately 2.75-miles of ditch to

underground PVC pipeline. During those projects, about 2.75-miles of historic earthen ditch was abandoned (Ariaz 1987). Some segments of the PVC pipe were placed in the original ditch alignment, but most were not and were designed, located, and installed at calculated gradients that were most efficient for the system.

Today, the Labadie Ditch system is a largely modern, buried pipe irrigation system with the exception of the project area below the diversion dam, which is the only remaining segment of the original, earthen ditch system being used today. The buried PVC pipe and PVC siphon gates make up 96 percent of the present-day system, and the historic 530-foot earthen ditch in the project area is four percent of the current system.

Although much of the original earthen ditch is no longer intact, its historic alignment is visible and the nature of its design, construction, and materials is apparent. Thus, it was recorded as an archaeological site (LA 157994) during the fall 2007 survey. The original ditch has sufficient integrity of location, setting, design, materials, workmanship, association, and feeling to convey its significant historical and design characteristics. Therefore, the LA 157994 portion of the Labadie Ditch is recommended eligible to the National Register of Historic Places and contributes to a rural historic landscape at the state level. It is recommended eligible under Criterion A for its association with the settlement of middle Pecos River Valley and the agricultural and economic development of the Santa Rosa area during the last part of the nineteenth century and the early- to mid-twentieth century. It is also recommended under Criterion C for its engineering design characteristics and under Criterion D for its potential to yield additional information.



The modern Labadie Ditch system no longer retains integrity of design, materials, workmanship, setting, or feeling. The new system is generally parallel to the original alignment for the first mile; after that, the two systems diverge where the terrain opens near the irrigated agricultural fields. The system no longer conveys its significance as a historic acequia; therefore, the operating Labadie Ditch is recommended as not eligible for the National Register of Historic Places. No other archaeological sites or historic properties were identified along the alignment of the abandoned ditch or project area segment of the ditch. There are no historically-significant properties along the access road or in the staging area, and no further archaeological investigations are recommended.

### 3.3.2.2 Effects on Cultural Resources

**No Action** The no action alternative would not affect cultural resources in the project area as no ground disturbance would be undertaken.

**Proposed Action** An archaeological survey was conducted that covered 100-percent of the project's area of potential effect (APE). No archaeological sites were discovered within the project area. One archaeological site, LA108213, was previously reported to occur adjacent to the project's access road; however, the field survey determined that LA108213 was outside of the APE. The project would have no effect to LA108213. The original Labadie Community Ditch (acequia) system was constructed ca. 1869. Rehabilitation projects on the Labadie Ditch in 1968 and between 1988 and 1992 significantly altered the acequia's form by converting and relocating approximately 2.75-miles of ditch to underground PVC pipeline. During those projects, about 2.75-miles of historic earthen ditch was abandoned. The archaeological survey

documented the abandoned ditch as archaeological site LA157994. LA157994 is eligible for nomination to the National Register of Historic Places under criteria "a" and "c." LA157994 is located outside of the current project's APE, therefore, the project would have no effect to LA157994.

The modern Labadie Community Ditch consists of the existing diversion structure, a 530-foot segment of historic earthen ditch, and about 2.75-miles of modern underground PVC pipeline. The existing diversion structure and the 530-foot segment of earthen ditch, although they have been rehabilitated numerous times in the past, are historic, and are considered eligible for nomination to the National Register of Historic Places under criteria "a" and "c." Conversion of the 530-foot segment of earthen ditch to underground PVC pipeline is an adverse effect to historic properties. The diversion structure and the 530-foot segment of earthen ditch were documented on a New Mexico Historic Water Delivery System Inventory Form. Mitigation for the adverse effect includes photo-documentation, oral history interviews with acequia association members, and the recordation of the abandoned ditch, LA157994. The 2.75-mile segment of modern underground PVC pipeline is not eligible for nomination to the National Register because it does not meet the age criteria for nomination. No other archaeological sites or historic properties are known to occur within or immediately adjacent to the project area. No traditional cultural properties are known to occur within or immediately adjacent to the project area. No Tribal concerns have been brought to the attention of the Corps.

The USACE, therefore, is of the opinion that the proposed Labadie Community Ditch rehabilitation project would have an "Adverse Effect to Historic Properties." However, the adverse effect would



be mitigated. 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 New Mexico State Historic Preservation Officer and with American Indian Tribes that may have concerns in the project area.

### 3.3.3 Socioeconomics and Environmental Justice

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).

#### 3.3.3.1 Existing Conditions

**Community** The project area is located in unincorporated Guadalupe County, about one mile south of the city of Santa Rosa. Santa Rosa is the seat of Guadalupe County and, thus, is the center for various county services. Santa Rosa is a full-service community with emergency services (i.e. fire, medical, police), a small hospital and health clinic, a public library, public schools, and public recreation and cultural facilities, and a small airport (City of Santa Rosa 2007).

**Population** Guadalupe County had a population of 4,680 in 2000 (U.S. Census Bureau, 2007a). A

July 2006 estimate shows that the County population may have decreased slightly since the census to 4,365 residents (U.S. Census Bureau, 2007b). In 2000, Santa Rosa had population of 2,744 (U.S. Census Bureau, 2007c), but the July 2006 estimate for the city also shows a decrease in residents to 2,486 (U.S. Census Bureau 2007b). There are no residences in the project area, but the Labadie Ditch serves up to ten families (G. Lujan, Labadie Ditch Association, 19 November 2007, pers. comm.).

**Economics** Leading employment sectors in the county and city are the arts, entertainment, recreation, and hospitality businesses and education, health care, and social services (U.S. Census Bureau, 2007d and 2007e). The former industry group employs almost 30 percent of Santa Rosa's workforce (U.S. Census Bureau, 2007e). Other major employment sectors are public administration and retail trade, each employing more than 10 percent of the workforce in both the city and county (U.S. Census Bureau, 2007d and 2007e). Agriculture employs about five percent of the county's workers (U.S. Census Bureau, 2007e).

The acequia system irrigates about 85 to 89 acres of agricultural fields on which are grown alfalfa to feed livestock and vegetables and fruits, some of which are consumed by the ditch member families and others are sold locally (G. Lujan, Labadie Ditch Association, 21 September 2007, pers. comm.). Irrigators using the ditch system are not full-time farmers but are also employed in other professions.

**Environmental Justice** Selected demographic characteristics of the population of New Mexico, Guadalupe County, and Santa Rosa are shown in Table 4. The city and county have quite similar racial, economic, and age characteristics which



vary substantially from the populace of New Mexico as a whole. Between 54 percent and 58 percent of the populations of Guadalupe County and the City of Santa Rosa are white, while almost 67 percent of New Mexicans classified themselves as white during the 2000 census (Table 4). Populations of the county and city are each about 81 percent Hispanic or Latino as compared to only 42 percent of all New Mexico residents (Table 4).

Residents of Guadalupe County and Santa Rosa are older and less well-off financially than the average New Mexican (Table 4). The median age in both the county and city is about two to three years more than that of residents across the state as a whole. Also, there is a higher percentage of residents age 65 or over in the county and city than in the state (Table 4).

The per capita income in Guadalupe County and Santa Rosa is about two-thirds that of the average New Mexico resident. (Table 4) Correspondingly, the percentage of persons living below the poverty level in the county and city is about 21.6 percent and 23.2 percent, respectively, while the state average is 18.4 percent.

### 3.3.3.2 Socioeconomic and Environmental Justice Effects

**No Action** As no changes would occur in the project area with the no action alternative, there would be no effects related on socioeconomics of the area and no effects related to environmental justice issues. The Labadie Ditch Association would continue to maintain the open ditch and water delivery pressure would continue to be insufficient, especially for last users on the system.

**Proposed Action** There would be no effect from the proposed project on community services, such as law enforcement, fire protection, emergency medical care, or schools. No property would be acquired so no residents or businesses would be affected by relocations. The proposed project is not expected to create adverse effects on human health or the environment.

Increased water pressure as a result of implementation of the proposed project would improve water delivery to all irrigators but would be particularly beneficial to those located farthest from the diversion. Additionally, elimination of the open ditch segment would result in a reduction of on-going maintenance costs for the Labadie Ditch Association.

Lower maintenance costs would result from reduced sediment deposits that currently require flushing of the downstream pipeline. Elimination of the need to repair breaches in and clean trash from the open ditch would further reduce costs for maintenance. Reduced costs for association members would result in more profitable farming operations.

In addition, construction of the project would provide some short-term economic benefits for local businesses in Santa Rosa. Depending on whether the construction contractor is local or not, financial expenditures may result in the form of purchasing supplies, renting equipment, workers' wages, and hotel and meal purchases. Some of the state gross receipts taxes on goods and services purchased locally would return to Guadalupe County and Santa Rosa for local government use. These expenditures would contribute to cumulative economic effects on the local economy.



**Table 4.** Selected social demographic data for the state of New Mexico, Guadalupe County, and the city of Santa Rosa (U.S. Census Bureau 2007a, 2007c, 2007f). Note: Percentages do not always sum to 100 due to rounding.

Social Demographic Factor	New Mexico	Guadalupe County	Santa Rosa
Total population	1,829,146	4,680	2,744
<b>Race (percent of total population)</b>			
white	66.8%	54.1%	57.5%
black	1.9%	1.3%	2.2%
American Indian	9.5%	1.1%	1.7%
Asian	1.1%	0.5%	0.9%
Hawaiian or Pacific Islander	0.1%	0.0%	0.0%
some other race	17.0%	39.1%	33.1%
two or more races	3.6%	3.8%	4.6%
<b>Hispanic origin (percent of total population)</b>			
Hispanic or Latino (of any race)	42.1%	81.2%	81.2%
not of Hispanic origin	57.9%	18.8%	18.8%
<b>Age</b>			
median age (years)	34.6	37.5	36.3
65 years and over (% of total pop.)	11.7%	13.8%	12.0%
<b>Income</b>			
per capita income (dollars)	\$17,261	\$11,241	\$11,168
persons below poverty level	18.4%	21.6%	23.2%

Although the racial and economic profiles of Guadalupe County, Santa Rosa, and the project area indicate that there are higher percentages of minority and low-income persons in these areas as compared with the rest of the state, there would be no disproportionate adverse effects on these populations. Rather, there would be a beneficial

economic benefit to the ditch association members and the surrounding community. Therefore, the proposed action complies with Executive Order 12898.



### 3.4 Irreversible and Irretrievable Commitment of Resources

Irreversible commitments of resources are those effects that cannot be reversed. For example, the extinction of a species is an irreversible commitment. Irretrievable commitments of resources are those that are lost for a period of time, but may be reversed, such as building a shopping center on farmland. The land cannot be used for farming again until the pavement is removed and soils are restored to productivity. There are no irreversible or irretrievable commitments of resources associated with the proposed project.

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 one month). 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 zone of influence of the direct or indirect impact being analyzed.

### 3.5 Cumulative Effects

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).



## 4.0 LIST OF PREPARERS

This EA was prepared by the Albuquerque District project delivery team, including Blue Earth & Mussetter, LLC and their subconsultants. Members of the team included:

### Albuquerque District, Corps of Engineers

Patricia Phillips	Civil Project Management Branch
Ondrea Linderoth-Hummel	Biologist, Environmental Resources Section
Gregory Everhart	Archaeologist, Environmental Resources Section
Julie Alcon	Supervisory Ecologist, Environmental Resources Section

### Consultants

Karen Yori	Project Manager/Sr. Planner, Blue Earth Ecological Consultants, Inc.
John Pittenger	Senior Ecologist, Blue Earth Ecological Consultants, Inc.
Gerry Raymond	Principal Investigator, Criterion Environmental Consulting, LLC



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---

## 5.0 CONSULTATION AND COORDINATION

The following agencies and organizations were consulted during the planning process for the Labadie Ditch Rehabilitation Project:

U.S. Bureau of Reclamation  
U.S. Environmental Protection Agency, Region 6  
U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office  
U.S.D.A. Natural Resources Conservation Service  
New Mexico Department of Game and Fish, Conservation Services Division  
New Mexico Department of Game and Fish, Fisheries Management Division  
New Mexico Department of Game and Fish, Division of Wildlife  
New Mexico Energy, Minerals and Natural Resources Department, Rare Plants Program  
New Mexico Environment Department, Surface Water Quality Bureau  
New Mexico Historic Preservation Officer  
New Mexico Interstate Stream Commission  
Navajo Nation  
Jicarilla Apache Nation  
Pueblo of Isleta  
Comanche Nation of Oklahoma  
Kiowa Tribe of Oklahoma  
Mescalero Apache Tribe  
Labadie Ditch Association  
Private landowner (Sheehan)

Copies of the EA were also provided to:

Postmaster  
Santa Rosa, New Mexico 88435

Moise Memorial Library  
208 Fifth Street  
Santa Rosa, New Mexico 88435



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## 6.0 LITERATURE CITED

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- Ariaz**, A.D. 2006. Engineer's cost estimate, Labadie Ditch diversion dam. USDA Natural Resources Conservation Service - Area East, Santa Rosa, New Mexico.
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## APPENDIX A

# Project Scoping Letter and Responses



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16 October 2007

Dear Interested Party:

The U.S. Army Corps of Engineers (Corps), Albuquerque District, at the request of the Labadie Ditch Association, is planning the rehabilitation of the Labadie Ditch diversion dam and conveyance structures under the Water Resources Development Act of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq.), as amended. The project area is located on Labadie Creek, approximately two miles south of Santa Rosa on New Mexico Highway 91 in Guadalupe County, New Mexico (Figure 1).

The Labadie Ditch is in need of rehabilitation to improve the efficiency of water deliveries to irrigators by increasing the hydraulic pressure throughout the acequia system. General project components potentially include: 1) rebuilding the earthen diversion structure using sheet piling and concrete; 2) replacing the existing heading structure with poured concrete and a brass inlet valve or gate; and 3) installing approximately 530 linear feet of 16-inch plastic pipe (i.e. PVC) to replace the existing open earthen ditch.

The Corps is seeking public and agency input for consideration during planning of the project. Your input will be used in preparing an environmental assessment to comply with the National Environmental Policy Act (NEPA) currently being prepared by Blue Earth Ecological Consultants, Inc. under contract to the Corps.

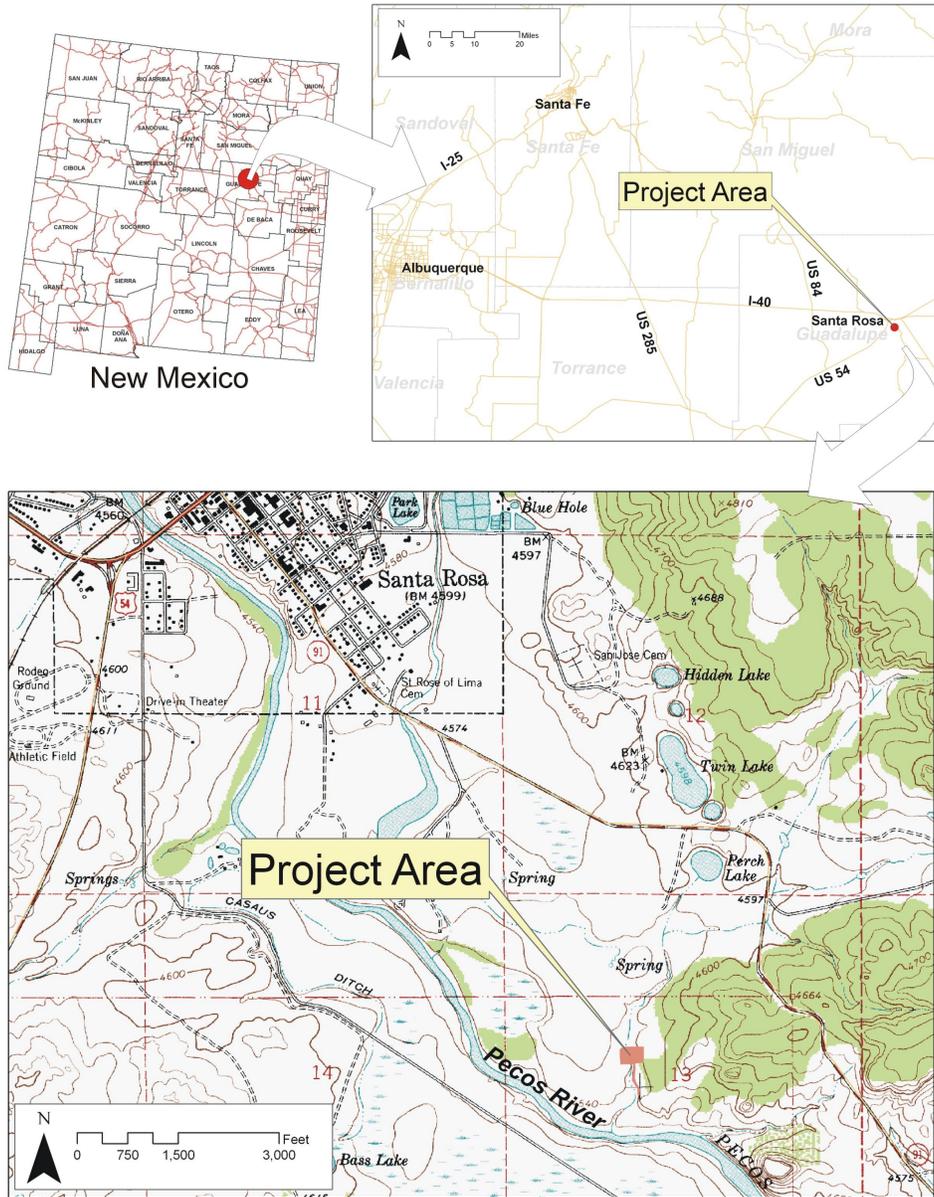
Please mail or fax comments by **2 November 2007**. You may use the attached form or send a letter to the address on the form. If you have any questions or require additional information, please contact Ms. Karen Yori at (505) 983-2687 x106.

Sincerely,

Karen Yori  
Senior Planner



Figure 1. The Labadie Ditch project area near Santa Rosa in Guadalupe County, New Mexico. Section 19, T. 8 N., R.21 E., Santa Rosa, New Mexico Quadrangle (34104-H6-TF-024)





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**Labadie Ditch Rehabilitation Project  
Guadalupe County, New Mexico**

**Comment Form**

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the project?

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2. Other comments about the project.

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Please attach additional sheets if desired.



- Please keep my name on the project mailing list.
- Please remove my name from the project mailing list.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Please mail, e-mail, or fax your specific written comments **for receipt by close of business on 2 November 2007** to:

Karen Yori  
Blue Earth Ecological Consultants, Inc.  
1345 Pacheco Street  
Santa Fe, NM 87505

Fax: (505) 983-2960

e-mail: [kyori@blueearthecological.com](mailto:kyori@blueearthecological.com)



---

### Labadie Ditch Scoping Letter Mailing List

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5989 Oak Grove Court  
Liberty Township, Ohio 45011

Rob Lawrence  
U.S. Environmental Protection Agency, Region 6  
Office of Planning and Coordination (6EN-XP)  
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Field Supervisor  
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Albuquerque, NM 87113

Ms. Connie Rupp  
Area Manager  
U.S. Bureau of Reclamation  
555 Broadway NE, Suite 100  
Albuquerque, NM 87102-2352

Mr. Art. D. Ariaz  
NRCS-Santa Rosa Service Center  
586 9<sup>th</sup> Street  
Santa Rosa, New Mexico 88435

David Hogge  
Surface Water Quality Bureau  
New Mexico Environment Department  
Harold Runnels Building, N2050  
P.O. Box 26110  
Santa Fe, NM 87502

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NMISC  
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Santa Fe, New Mexico 87504-5102

Ms. Janell A. Ward  
NMDGF - Conservation Services Division  
P.O. Box 25112  
Santa Fe, NM 87504

Division Chief  
Conservation Services Division  
New Mexico Department of Game and Fish  
1 Wildlife Way  
Santa Fe, NM 87507

Robert Sivinski  
New Mexico Forestry and Resources  
Conservation Division  
Energy, Minerals and Natural Resources  
Department  
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Santa Fe, NM 87504

Mike Sloan  
Fisheries Management Division  
New Mexico Department of Game and Fish  
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Santa Fe, NM 87504

Mr. Luis Rios  
Division Chief  
Division of Wildlife  
New Mexico Dept. of Game and Fish  
1 Wildlife Way  
Santa Fe, NM 87507

Ms. Marcy Leavitt  
Surface Water Quality Bureau  
Harold Runnels Building, N2050  
P.O. Box 26110  
Santa Fe, NM 87502



David Sheehan  
HRC 68  
Santa Rosa, NM 88435

President Levi Pesata  
Jicarilla Apache Nation  
P.O. Box 507  
Dulce, New Mexico 87528

Ms. Lorene Willis  
Office of Cultural Affairs  
Jicarilla Apache Nation  
P.O. Box 507  
Dulce, New Mexico 87528

President Joe Shirley  
Navajo Nation  
P.O. Box 9000  
Window Rock, Arizona 86515

Mr. Alan Downer  
Tribal Historic Preservation Officer  
Navajo Nation  
P.O. Box 4950  
Window Rock, Arizona 86515

Mr. Tony H. Joe, Jr.  
Traditional Culture Program  
Historic Preservation Department  
Navajo Nation  
P.O. Box 4950  
Window Rock, Arizona 86515

Governor Robert Benevidas  
Pueblo of Isleta  
P.O. Box 1270  
Isleta Pueblo, New Mexico 87022

Lt. Governor Max Zuni  
Pueblo of Isleta Post Office  
Box 1270  
Isleta Pueblo, New Mexico 87022

Chairman Wallace Coffey  
Comanche Nation of Oklahoma  
P.O. Box 908  
Lawton, Oklahoma 73502

Ms. Ruth Toahty  
NAGPRA Coordinator  
Comanche Nation of Oklahoma  
P.O. Box 908  
Lawton, Oklahoma 73502

Chairman Billy Evans Horse  
Kiowa Tribe of Oklahoma  
P.O. Box 369  
Carnegie, Oklahoma 73015

President Mark Chino  
Mescalero Apache Tribe  
P.O. Box 227  
Mescalero, New Mexico 88340

Ms. Holly Houghton  
Tribal Historic Preservation Officer  
Mescalero Apache Tribe  
P.O. Box 227  
Mescalero, New Mexico 88340



OCT-22-2007 08:37 From:NM STATE FORESTRY 15054763330 To:505 983 2960 P.1/2

**Labadie Ditch Rehabilitation Project  
Guadalupe County, New Mexico**

**Comment Form**

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the project?

*3 state-listed endangered plants occur in the  
Santa Rosa wetlands - Lejos sunflower, Wright's  
marsh wistle and Great Plains lady tresses orchid.*

2. Other comments about the project.

Please attach additional sheets if desired.



01-22-2007 08:38 From: NM STATE FORESTRY 15054763330 10:505 983 2960 P.2/2

Please keep my name on the project mailing list.  
 Please remove my name from the project mailing list.

Name: Robert Sivinski

Address: NM-Forestory Division, P.O. Box 1948

City, State, Zip: Santa Fe, NM 87504

Please mail, e-mail, or fax your specific written comments **for receipt by close of business on 2 November 2007** to:

Karen Yori  
Blue Earth Ecological Consultants, Inc.  
1345 Pacheco Street  
Santa Fe, NM 87505

Fax: (505) 983-2960

e-mail: [kyori@bluearthecological.com](mailto:kyori@bluearthecological.com)



GOVERNOR  
Bill Richardson



DIRECTOR AND SECRETARY  
TO THE COMMISSION

Bruce C. Thompson, Ph.D.

Robert S. Jenks, Deputy Director

STATE OF NEW MEXICO  
DEPARTMENT OF GAME & FISH

One Wildlife Way  
Post Office Box 25112  
Santa Fe, NM 87504  
Phone: (505) 476-8008  
Fax: (505) 476-8124

Visit our website at [www.wildlife.state.nm.us](http://www.wildlife.state.nm.us)  
For information call: 505/476-8000  
To order free publications call: 1-800-862-9310

STATE GAME COMMISSION

Alfredo Montoya, Chairman  
Alcalde, NM

Dr. Tom Arvas, Vice-Chairman  
Albuquerque, NM

Sandy Buffett, Commissioner  
Santa Fe, NM

Jim McClintic, Commissioner  
Albuquerque, NM

Terry Z. Riley, Ph.D., Commissioner  
Tijeras, NM

M. H. "Dutch" Salmon, Commissioner  
Silver City, NM

Leo V. Sims, II, Commissioner  
Hobbs, NM

November 2, 2007

Ms. Karen Yori  
Blue Earth Ecological Consultants, Inc.  
1345 Pacheco Street  
Santa Fe, NM 87505

Re: Environmental Assessment for Rehabilitation of the Labadie Ditch Diversion Dam and Conveyance Structures, Guadalupe County  
NMGF No. 11763

Dear Ms. Yori,

In response to your letter dated October 16, 2007, regarding the Environmental Assessment (EA) for rehabilitation of the Labadie Ditch diversion dam and conveyance structures, the New Mexico Department of Game and Fish (Department) has identified several issues we would like you to consider in the EA. The State-listed bigscale logperch (*Percina macrolepida*) occurs in the Pecos River in the vicinity of the confluence of Labadie Creek and the Pecos River. Downstream effects of instream work in Labadie Creek on this species can be minimized if Best Management Practices are implemented to contain sediment and uncured concrete during project construction. The Department considers this project an opportunity to remove non-native species and replace with native riparian species where habitat disturbance is necessary.

Thank you for the opportunity to comment on this EA. If you have any questions, please contact Randy Floyd, Aquatic Habitat Specialist, at (505) 476-8091 or [randy.floyd@state.nm.us](mailto:randy.floyd@state.nm.us).

Sincerely,

Matt Wunder, Chief  
Conservation Services Division

MW/rif

cc: Roy Hayes, SE Area Operations Chief, NMGF  
George Farmer, SE Area Habitat Specialist, NMGF





11/07/2007 13:10 FAX

001/002



BILL RICHARDSON  
GOVERNOR

State of New Mexico  
ENVIRONMENT DEPARTMENT  
Office of the Secretary  
Harold Runnels Building  
1190 St. Francis Drive, P.O. Box 26110  
Santa Fe, New Mexico 87502-6110  
Telephone (505) 827-2855



RON CURRY  
SECRETARY

CINDY PADILLA  
DEPUTY SECRETARY

November 6, 2007

Karen Yori  
Senior Planner  
Blue Earth Ecological Consultants Inc.  
1345 Pacheco Street  
Santa Fe, NM 87505

Fax: 983-2960

Dear Ms. Yori:

**RE: REHABILITATION OF THE LABADIE DITCH DIVERSION DAM**

The U.S. Environmental Protection Agency (USEPA) requires National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) coverage for storm water discharges from construction projects (common plans of development) that will result in the disturbance (or re-disturbance) of one or more acres, including expansions, of total land area. Because this project appears to exceed one acre (including staging areas, etc.), it may require appropriate NPDES permit coverage prior to beginning construction (small, one - five acre, construction projects may be able to qualify for a waiver in lieu of permit coverage - see Appendix D).

Among other things, this permit requires that a Storm Water Pollution Prevention Plan (SWPPP) be prepared for the site and that appropriate Best Management Practices (BMPs) be installed and maintained both during and after construction to prevent, to the extent practicable, pollutants (primarily sediment, oil & grease and construction materials from construction sites) in storm water runoff from entering waters of the U.S. This permit also requires that permanent stabilization measures (revegetation, paving, etc.), and permanent storm water management measures (storm water detention/retention structures, velocity dissipation devices, etc.) be implemented post construction to minimize, in the long term, pollutants in storm water runoff from entering these waters. In addition, permittees must ensure that there is no increase in sediment yield and flow velocity from the construction site (both during and after construction) compared to pre-construction, undisturbed conditions (see Subpart 9.C.1)



11/07/2007 13:10 FAX

002/002

Karen Yori  
November 6, 2007  
Page 2

general contractor who has day-to-day operational control of those activities at the site, which are necessary to ensure compliance with the storm water pollution plan and other permit conditions, and possibly other "operators" will require appropriate NPDES permit coverage for this project.

The CGP was re-issued effective July 1, 2003 (see **Federal Register/Vol. 68, No. 126/Tuesday, July 1, 2003** pg. 39087). The CGP, Notice of Intent (NOI), Fact Sheet, and Federal Register notice can be downloaded at:  
<http://cfpub.epa.gov/npdes/stormwater/cgp.cfm>

We appreciate the opportunity to comment on this project.

Sincerely,

Gedi Cibas, Ph.D.  
Environmental Impact Review Coordinator

NMED File No. 2545ER



**Labadie Ditch Rehabilitation Project  
Guadalupe County, New Mexico**

**Comment Form**

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the project?

THERE ARE NO NEGATIVE ISSUES ASSOCIATION  
WITH THE LABADIE DITCH DIVERSION DAM  
UP-GRADE THAT THE ASSOCIATION IS AWARE  
OF. THE IMPROVEMENT WILL PROVIDE MUCH  
BETTER WATER MANAGEMENT CAPABILITIES.

2. Other comments about the project.

THE LABADIE DITCH ASSOCIATION FULLY  
SUPPORTS THIS PROJECT, WE CAN NOT  
AFFORD TO BE OPERATING THE ACEQUIA



- Please keep my name on the project mailing list.
- Please remove my name from the project mailing list.

Name: VINCENT R. CORDOVA  
Address: 5989 OAK GROVE,  
City, State, Zip: LIBERTY TOWNSHIP, OHIO 45011

Please mail, e-mail, or fax your specific written comments **for receipt by close of business on 2 November 2007** to:

Karen Yori  
Blue Earth Ecological Consultants, Inc.  
1345 Pacheco Street  
Santa Fe, NM 87505

Fax: (505) 983-2960

e-mail: [kyori@blucearthecological.com](mailto:kyori@blucearthecological.com)



NOV-21-2007 01:11PM FROM-US.FISH AND WILDLIFE +5053462542 T-093 P.001/003 F-517



## United States Department of the Interior

FISH AND WILDLIFE SERVICE  
New Mexico Ecological Services Field Office  
2105 Osuna NE  
Albuquerque, New Mexico 87113  
Phone: (505) 346-2525 Fax: (505) 346-2542

NOV 21 2007

Thank you for your recent request for information on threatened or endangered species or important wildlife habitats that may occur in your project area. The New Mexico Ecological Services Field Office has posted lists of the endangered, threatened, proposed, candidate and species of concern occurring in all New Mexico Counties on the Internet. Please refer to the following web page for species information in the county where your project occurs: [http://www.fws.gov/southwest/es/NewMexico/SBC\\_intro.cfm](http://www.fws.gov/southwest/es/NewMexico/SBC_intro.cfm). If you do not have access to the Internet or have difficulty obtaining a list, please contact our office and we will mail or fax you a list as soon as possible.

After opening the web page, find New Mexico Listed and Sensitive Species Lists on the main page and click on the county of interest. Your project area may not necessarily include all or any of these species. This information should assist you in determining which species may or may not occur within your project area.

Under the Endangered Species Act, as amended (Act), it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with us further. Similarly, it is their responsibility to determine if a proposed action has no effect to endangered, threatened, or proposed species, or designated critical habitat. If your action area has suitable habitat for any of these species, we recommend that species-specific surveys be conducted during the flowering season for plants and at the appropriate time for wildlife to evaluate any possible project-related impacts. Please keep in mind that the scope of federally listed species compliance also includes any interrelated or interdependent project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations) and any indirect or cumulative effects.

Candidates and species of concern have no legal protection under the Act and are included on the web site for planning purposes only. We monitor the status of these species. If significant declines are detected, these species could potentially be listed as endangered or threatened. Therefore, actions that may contribute to their decline should be avoided. We recommend that candidates and species of concern be included in your surveys.

Also on the web site, we have included additional wildlife-related information that should be considered if your project is a specific type. These include communication towers, power line safety for raptors, road and highway improvements and/or construction, spring developments and livestock watering facilities, wastewater facilities, and trenching operations.



NOV-21-2007 01:11PM FROM-US.FISH AND WILDLIFE +5053462542 T-093 P.002/003 F-517

2

Under Executive Orders 11988 and 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and floodplains, and preserve and enhance their natural and beneficial values. We recommend you contact the U.S. Army Corps of Engineers for permitting requirements under section 404 of the Clean Water Act if your proposed action could impact floodplains or wetlands. These habitats should be conserved through avoidance, or mitigated to ensure no net loss of wetlands function and value.

The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, nests, and eggs, except as permitted by the U.S. Fish and Wildlife Service. To minimize the likelihood of adverse impacts to all birds protected under the MBTA, we recommend construction activities occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until nesting is complete.

We suggest you contact the New Mexico Department of Game and Fish, and the New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division for information regarding fish, wildlife, and plants of State concern.

Thank you for your concern for endangered and threatened species and New Mexico's wildlife habitats. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area.

Sincerely,

Wally Murphy  
Field Supervisor



---

### Labadie Ditch Scoping Letter Mailing List

Mr. Vince Cordova  
5989 Oak Grove Court  
Liberty Township, Ohio 45011

Rob Lawrence  
U.S. Environmental Protection Agency, Region 6  
Office of Planning and Coordination (6EN-XP)  
1445 Ross Avenue  
Dallas, TX 75202-2733

Wally Murphy  
Field Supervisor  
New Mexico Ecological Services Field Office  
2105 Osuna NE  
Albuquerque, NM 87113

Ms. Connie Rupp  
Area Manager  
U.S. Bureau of Reclamation  
555 Broadway NE, Suite 100  
Albuquerque, NM 87102-2352

Mr. Art. D. Ariaz  
NRCS-Santa Rosa Service Center  
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Santa Rosa, New Mexico 88435

David Hogge  
Surface Water Quality Bureau  
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Mr. Ray Acosta  
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Division Chief  
Conservation Services Division  
New Mexico Department of Game and Fish  
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## APPENDIX B

### List of Plant Species Identified in the Project Area

\* indicates non-native species



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		<b>HABITAT</b>	
		<u>UPLAND</u>	<u>WETLAND/ RIPARIAN</u>
<b>EQUISETACEAE</b>			
smooth horsetail	<i>Equisetum laevigatum</i>		X
<b>PTERIDACEAE</b>			
southern maiden-hair	<i>Adiantum capillus-veneris</i>		X
<b>CUPRESSACEAE</b>			
one-seed juniper	<i>Juniperus monosperma</i>	X	
<b>RANUNCULACEAE</b>			
traveler's-joy	<i>Clematis ligusticifolia</i>		X
<b>FAGACEAE</b>			
desert scrub oak	<i>Quercus turbinella</i>	X	
<b>PLUMBAGINACEAE</b>			
southwestern sea-lavender	<i>Limonium limbatum</i>		X
<b>CACTACEAE</b>			
cane cholla	<i>Cylindropuntia imbricata</i>	X	
desert Christmas cholla	<i>Cylindropuntia leptocaulis</i>	X	
plains prickly-pear	<i>Opuntia phaeacantha</i>	X	
starvation prickly-pear	<i>Opuntia polyacantha</i>	X	
<b>CHENOPODIACEAE</b>			
iodinebush	<i>Allenrolfea occidentalis</i>		X
kochia	<i>Kochia scoparia*</i>	X	
shrubby seepweed	<i>Suaeda nigra</i>		X
<b>POLYGONACEAE</b>			
winged wild-buckwheat	<i>Eriogonum alatum</i>		X
tall wild-buckwheat	<i>Eriogonum tenellum</i>		X
<b>TAMARIACEAE</b>			
saltcedar	<i>Tamarix chinensis*</i>	X	

**CLEOMACEAE**

Rocky Mountain beeplant                      *Cleome serrulata*                      X

**BRASSICACEAE**

slim-leaf plains mustard                      *Hesperidanthus linearifolius*                      X

**ELAEAGNACEAE**

Russian olive                      *Elaeagnus angustifolia*\*                      X

**FABACEAE**

wooly locoweed                      *Astragalus mollissimus*                      X

wait-a-minute-bush                      *Mimosa aculeaticarpa*                      X

honey mesquite                      *Prosopis glandulosa*                      X

two-leaf senna                      *Senna bauhinioides*                      X

**EUPHORBIACEAE**

Texas croton                      *Croton texensis*                      X

**VITACEAE**

canyon grape                      *Vitis arizonica*                      X

**ANACARDIACEAE**

littleleaf sumac                      *Rhus microphylla*                      X

skunkbush sumac                      *Rhus trilobata*                      X

**ZYGOPHYLLACEAE**

puncture-vine                      *Tribulus terrestris*\*                      X

**APIACEAE**

spotted water-hemlock                      *Cicuta maculata*                      X

**PEDALIACEAE**

Wooton's devil's-claw                      *Proboscidea parviflora*                      X

**GENTIANACEAE**

prairie gentian                      *Eustoma exaltatum*                      X

**APOCYNACEAE**

Indian-hemp                      *Apocynum cannabinum*                      X

**SOLANACEAE**

sacred thorn-apple	<i>Datura wrightii</i>	X
silverleaf nightshade	<i>Solanum elaeagnifolium</i>	X
buffalo-bur	<i>Solanum rostratum</i>	X

**ASTERACEAE**

prairie aster	<i>Aster falcatus</i> var. <i>commutatus</i>		X
wormwood	<i>Artemisia ludoviciana</i>	X	
yerba-de-pasmo	<i>Baccharis pteronioides</i>		X
ragged-leaf bahia	<i>Bahia dissecta</i>	X	
Wright's marsh thistle	<i>Cirsium wrightii</i>		X
rabbitbrush	<i>Ericameria</i> sp.	X	
clasping yellowtops	<i>Flaveria chlorifolia</i>		X
curly-cup gumweed	<i>Grindelia squarrosa</i>		X
broom snakeweed	<i>Gutierrezia sarothrae</i>	X	
fall sneezeweed	<i>Helenium autumnale</i>		X
plains sunflower	<i>Helianthus petiolaris</i>	X	
smooth oxeye	<i>Heliopsis helianthoides</i>	X	
Tahoka daisy	<i>Machaeranthera tanacetifolia</i>	X	
plains blackfoot-daisy	<i>Melampodium leucanthum</i>	X	
wooly paper-daisy	<i>Psilostrophe tagetina</i>	X	
Canadian goldenrod	<i>Solidago canadensis</i>		X
naked rubberweed	<i>Tetraeneuris scaposa</i>	X	
Navajo-tea	<i>Thelesperma megapotamicum</i>	X	
smooth sleep-daisy	<i>Xanthisma glaberrimum</i>	X	

**CYPERACEAE**

alkali bulrush	<i>Bolboschoenus maritimus paludosus</i>		X
swamp saw-grass	<i>Cladium californicum</i>		X
hardstem bulrush	<i>Schoenoplectus acutus</i>		X
chairmaker's bulrush	<i>Schoenoplectus americanus</i>		X



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three-square bulrush	<i>Schoenoplectus pungens</i>		X
softstem bulrush	<i>Schoenoplectus tabernaemontani</i>		X
marshy spike-rush	<i>Eleocharis palustris</i>		X
beaked spike-rush	<i>Eleocharis rostellata</i>		X
<b>JUNCACEAE</b>			
Mexican rush	<i>Juncus arcticus var. mexicanus</i>		X
<b>POACEAE</b>			
silver bluestem	<i>Bothriochloa laguroides torreyana</i>	X	
sideoats	<i>Bouteloua curtipendula</i>	X	
black grama	<i>Bouteloua eriopoda</i>	X	
blue grama	<i>Bouteloua gracilis</i>	X	
coastal sandbur	<i>Cenchrus spinifex</i>	X	
feather fingergrass	<i>Chloris virgata</i>	X	
inland saltgrass	<i>Distichlis spicata</i>		X
fowl mannagrass	<i>Glyceria striata</i>		X
bristly wolftail	<i>Lycurus setosus</i>	X	
vine mesquite	<i>Panicum obtusum</i>		
common reed	<i>Phragmites australis</i> <sup>?</sup>		X
galleta	<i>Pleuraphis jamesii</i>	X	
rabbitfootgrass	<i>Polypogon monspeliensis</i> <sup>*</sup>		X
plains bristlegrass	<i>Setaria leucopila</i>	X	
Indiangrass	<i>Sorghastrum nutans</i>	X	
alkali sacaton	<i>Sporobolus airoides</i>		X
<b>NOLINACEAE</b>			
beargrass	<i>Nolina microcarpa</i>	X	
<b>AGAVACEAE</b>			
soapweed yucca	<i>Yucca glauca</i>	X	
<b>ORCHIDACEAE</b>			
Great Plains ladies-tresses	<i>Spiranthes magnicamporum</i>		X



## APPENDIX C

### Cultural Resources Coordination



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OFFICE OF THE GOVERNOR



505-869-3111 / 6333  
FAX: 505-869-4236

## PUEBLO OF ISLETA

P.O. BOX 1270 ISLETA, NM 87022

November 16, 2007

Blue Earth Ecological  
Consultants, Inc.  
Karen Yori  
1345 Pacheco Street  
Santa Fe, NM 87505

Dear Ms. Yori:

This letter is in response to your correspondence received October 16, 2007 regarding the proposed rehabilitation of the Labadie Ditch diversion dam and conveyance structures under the Water Resources Development Act located on Labadie Creek, approximately two miles south of Santa Rosa on New Mexico Highway 91 in Guadalupe County, NM.

I am pleased to inform you that this project will not have an impact on religious or cultural sites affiliated with the Pueblo of Isleta. However, in the event that discoveries are found during construction, we would appreciate being advised of such findings. Please forward all environmental assessment plans to our office.

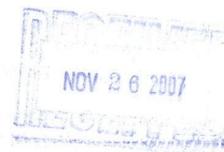
Thank you for your consideration in contacting this office to express our concerns.

Sincerely,

PUEBLO OF ISLETA

  
Robert Benavides,  
Governor

cc: files





APPENDIX D  
Public and Agency Comments and Responses  
on the Draft EA