

**Environmental Assessment for
Gonzales-Gurule Acequia,
Siphon Replacement
Rio Arriba County, New Mexico**

DRAFT

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ACRONYMS AND ABBREVIATIONS

BMP	Best Management Practice
CFR	Code of Federal Regulations
Corps	United States Army Corps of Engineers, Albuquerque District
CWA	Clean Water Act
dB	decibel
° F	degrees Fahrenheit
DOQQ	Digital Ortho Quarter Quad
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
GPS	Global Positioning System
ITA	Indian Trust Asset
msl	mean sea level
NEPA	National Environmental Policy Act
NMCRIS	New Mexico Cultural Resources Information System
NMGF	New Mexico Department of Game and Fish
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
OSE	Office of the State Engineer
P.L.	Public Law
U.S.	United States
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
WRDA	Water Resources Development Act

FINDING OF NO SIGNIFICANT IMPACT

1.0 Name of Action

Environmental Assessment (EA) for the Rehabilitation of Gonzales-Gurule Acequia, Rio Arriba County, New Mexico.

2.0 Description of Proposed Action and Alternatives

The Water Resources Development Act of 1986 (Public Law [P.L.] 99-662) authorized the restoration and rehabilitation of irrigation ditch systems and acequias in New Mexico. Due to the importance of acequias to the preservation of cultural and historic values in the State, the United States (U.S.) Army Corps of Engineers, Albuquerque District (Corps), is providing assistance to the Gonzales-Gurule Acequia to reconstruct the siphon that carries irrigation water across an arroyo. An Environmental Assessment, required to evaluate the impacts of modifying the acequia, will be prepared for the following project.

2.1 PROPOSED ACTION

The Gonzales-Gurule Acequia crosses a steep arroyo, approximately 1.2 miles downstream from the Rio Capulin through a pipe siphon that has deteriorated due to erosion of the arroyo, unstable inlet and outlet concrete structures.

The existing pipe siphon and concrete inlet and outlet structures are deteriorating so water is leaking from the system. The Proposed Action would replace the existing concrete structures and pipe with a new, more stable siphon system spanning the arroyo.

2.2 NO ACTION ALTERNATIVE

Under the No Action alternative, replacement of the existing siphon and water control structures would not occur. Water would continue to leak from the pipe and the structures would deteriorate. Consequently, efficiency of delivery of irrigation water would continue to decline.

3.0 Environmental Impacts of the Proposed Action

As required by the National Environmental Policy Act, this EA evaluates the potential environmental impacts associated with the proposed rehabilitation of the Gonzales-Gurule Acequia. The findings for each resource area are described below.

Geology, Soils. Temporary surface disturbance would result from earthmoving to the lined pipeline and other related construction, but soil erosion would be minimized through the use of Best Management Practices (BMP) during construction. Native vegetation would be seeded in some areas after construction is completed. No Prime or Unique Farmlands would be affected. No significant impacts to geology or soils would result from implementation of the Proposed Action.

Water Resources. There would be no negative impacts from implementation of the Proposed Action. Installation of the wrapped steel pipe and inlet and outlet structures would be conducted during nonirrigation periods. This timing of construction and the installation of BMPs during construction would minimize the potential for impacts to water resources.

Section 404 of the Clean Water Act provides for the protection of waters and wetlands of the U.S. from impacts associated with discharges of dredged or fill material into waters of the U.S. Certain discharges associated with the construction and maintenance of irrigation ditches are exempt from Section 404 permit requirements (33 Code of Federal Regulations 323.4[a], Exemption No. 3). Therefore, no Section 404 permit is required for the planned action because no disturbance of or discharge to streams would occur.

1 **Wetlands and Floodplains.** There are no wetlands or 100-year floodplains delineated by the Federal
2 Emergency Management Agency in the project area, so none would be affected by implementation of the
3 Proposed Action.

4 **Land Use.** The Gonzales-Gurule Acequia is used to irrigate 120 acres of hay, pasture and small grains for
5 8 irrigators. The construction would rehabilitate the ditch and would not negatively affect the land along
6 the acequia. No negative impacts to land use would result from the Proposed Action.

7 **Air Quality.** Rio Arriba County is in attainment for air quality standards set by the U.S. Environmental
8 Protection Agency. While there would be the potential for minor temporary increases in emissions and
9 dust during construction, these increases would not result in nonattainment of air quality standards. There
10 would be no significant impacts to air quality under the Proposed Action.

11 **Biological Resources.** There would be no significant impact to vegetation, wildlife, and aquatic
12 communities because there would be little change to the area as a result of the Proposed Action.
13 Vegetation would be reseeded in disturbed areas along the ditch once siphon rehabilitation is completed.

14 **Threatened and Endangered Species.** No impacts to Federal- or State-listed threatened and endangered
15 species would result from the Proposed Action because only transient occurrence may take place within
16 the area immediately surrounding the Gonzales-Gurule Acequia. Protection measures would be employed
17 to ensure no impacts to species would occur.

18 **Cultural Resources.** Excluding the Gonzales-Gurule Acequia itself, no prehistoric or historic
19 archaeological sites were found or are known to occur within or immediately adjacent to this acequia.
20 Portions of the acequia have been previously modified by structures, culverts, check dams, taps and
21 flumes. The proposed rehabilitation of the siphon and structures for the Gonzales-Gurule Acequia would
22 result in no adverse effect to historic properties under the Proposed Action. No significant impact to the
23 form, function, or alignment of the acequia would result from the Proposed Action.

24 **Indian Trust Assets.** The construction or implementation of the Proposed Action is not anticipated to
25 affect any Indian Trust Assets.

26 **Aesthetics.** No adverse effect on aesthetics would result from implementation of the Proposed Action.
27 Disturbed soil would be stabilized or reseeded.

28 **Noise.** No significant effects on noise levels would result from the Proposed Action. Noise would
29 increase for the short time that construction equipment is working, but no long-term noise impacts would
30 occur.

31 **Socioeconomics.** There is the potential for positive impacts on the productivity of the irrigated land from
32 improved water efficiency and delivery, but these impacts would be slight. The irrigated land is used to
33 feed livestock and grow grains that could supplement landowners' incomes or ability to trade products,
34 but the impact would be negligible and would be difficult to measure. There would be no negative
35 impacts resulting from the Proposed Action.

36 **Environmental Justice.** The area surrounding the Gonzales-Gurule Acequia has a relatively high
37 percentage of minorities and low-income families who could benefit to some extent from the Proposed
38 Action. The Proposed Action would not adversely affect the health or environment of minority or low-
39 income populations.

40

1 **4.0 Conclusion**

2 The planned action has been fully coordinated with the Federal and State agencies with jurisdiction over
3 the biological and cultural resources of the project area. As a result of the EA and the coordination with
4 these agencies, I have determined that the Proposed Action to construct a new siphon across the arroyo in
5 the Gonzales-Gurule Acequia will have no significant impact on the human environment. Therefore, there
6 will be no need to prepare an Environmental Impact Statement for this project.

7
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9 _____
10 Todd Wang
11 Lieutenant Colonel, U.S. Army
12 District Engineer

Date

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1.0 INTRODUCTION

1.1 BACKGROUND

The proposed construction site on the Gonzales-Gurule Acequia is located approximately 2 miles east of Gallina on State Route 96, near County Road 418 in Rio Arriba County, New Mexico (**Figure 1-1**). The irrigation system consists of a main ditch that takes water from the Rio Capulin and flows for approximately 4.2 miles before it outlets into a field north of Rio Capulin (**Figure 1-2**). The acequia supplies water to 8 irrigators farming approximately 120 acres (Jacquez 2004).

The acequia crosses a steep arroyo, approximately 1.2 miles downstream from the Rio Capulin through a pipe siphon that has deteriorated due to erosion of the arroyo, unstable inlet and outlet concrete structures. The proposed project includes: 1) removal of the old siphon system; 2) installation of a more stable pipe across the arroyo with a drain to prevent water from freezing in the line; and 3) construction of new water control inlet and outlet structures with gates. The use of Federal funds to share the cost of the proposed improvements would constitute a Federal action that requires an Environmental Assessment (EA).

The United States (U.S.) Army Corps of Engineers, Albuquerque District (Corps), at the request of the Gonzales-Gurule Acequia and the New Mexico Office of the State Engineer (OSE), is planning the reconstruction of the water control structures under the Water Resources Development Act (WRDA) of 1986 (Public Law [P.L.] 99-662). The WRDA authorized the Corps to conduct the restoration and rehabilitation of irrigation ditch systems and acequias in New Mexico. Under Section 1113 of the Act, Congress has found that New Mexico's acequias date from the eighteenth century and, due to their significance in the settlement and development of the western U.S., should be restored and preserved for their cultural and historic value to the region. The Secretary of the Army has been authorized and directed to undertake, without regard to economic analysis, such measures as are necessary to protect and restore New Mexico's acequias. The proposed improvements to this acequia satisfy the intent and purpose of this legislation. The non-Federal financial responsibility of any work carried out under this section of WRDA is 25 percent.

The Corps is providing funding and is therefore the action agency for this project. Project design and inspection is the responsibility of the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). The State of New Mexico, through the OSE, is the project sponsor. The Corps has the authority for review and approval of the environmental impacts of the proposed project, as presented in this EA. Under the process for these acequia rehabilitation projects developed between the Corps, the State, and the NRCS under Section 215 of the Flood Control Act of 1968 (P.L. 90-483), as amended. The Gonzales-Gurule Acequia would select a contractor and administer the construction contract. NRCS staff would inspect the project during construction to ensure compliance with all plans and specifications, including those written for environmental protection. The NRCS would also be responsible for certifying completion of the project according to those plans and specifications before funding would be provided. Upon successful completion of the project, funds would be made available by the Corps to the OSE to pay for rehabilitation of the structures.

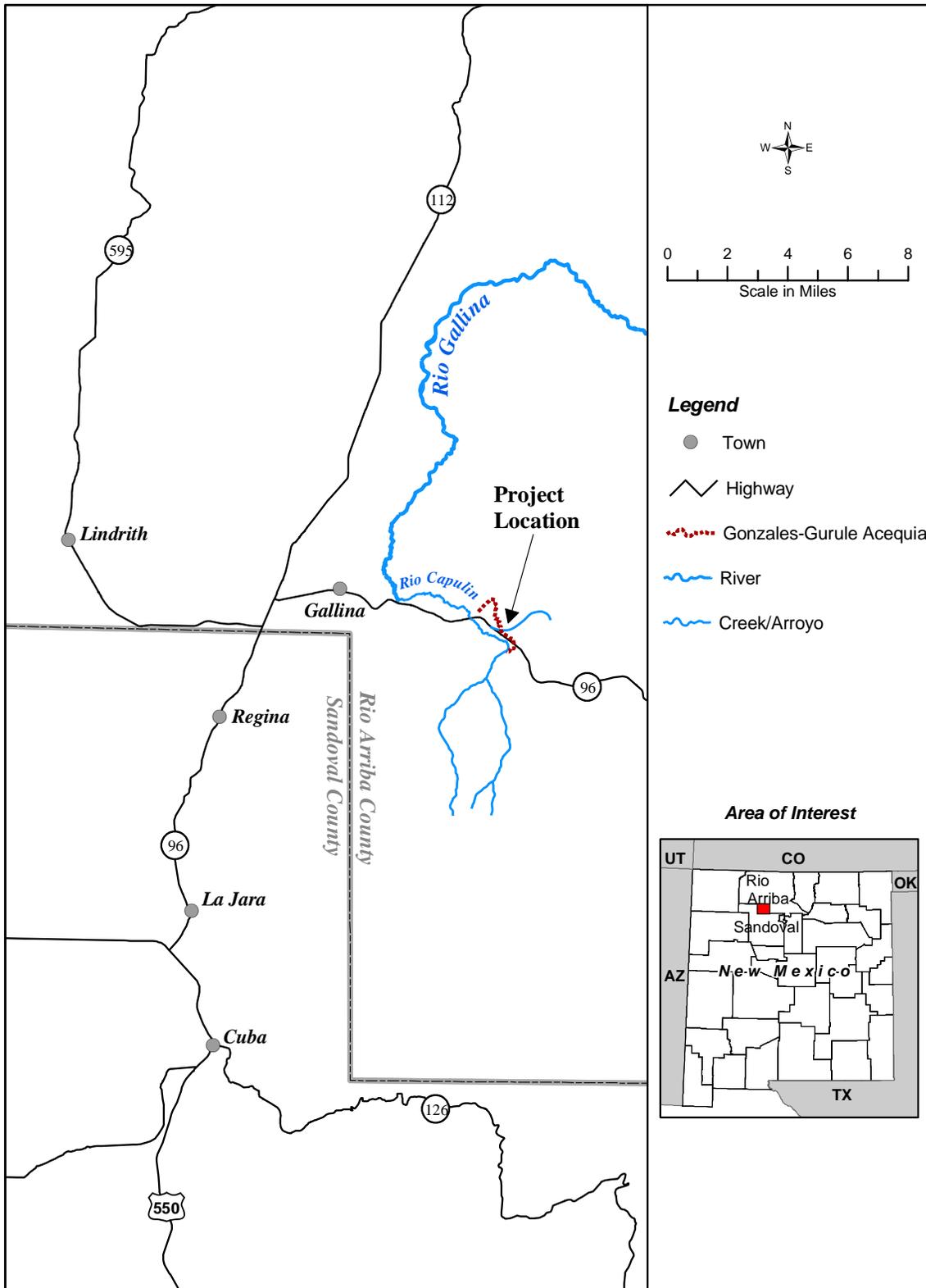
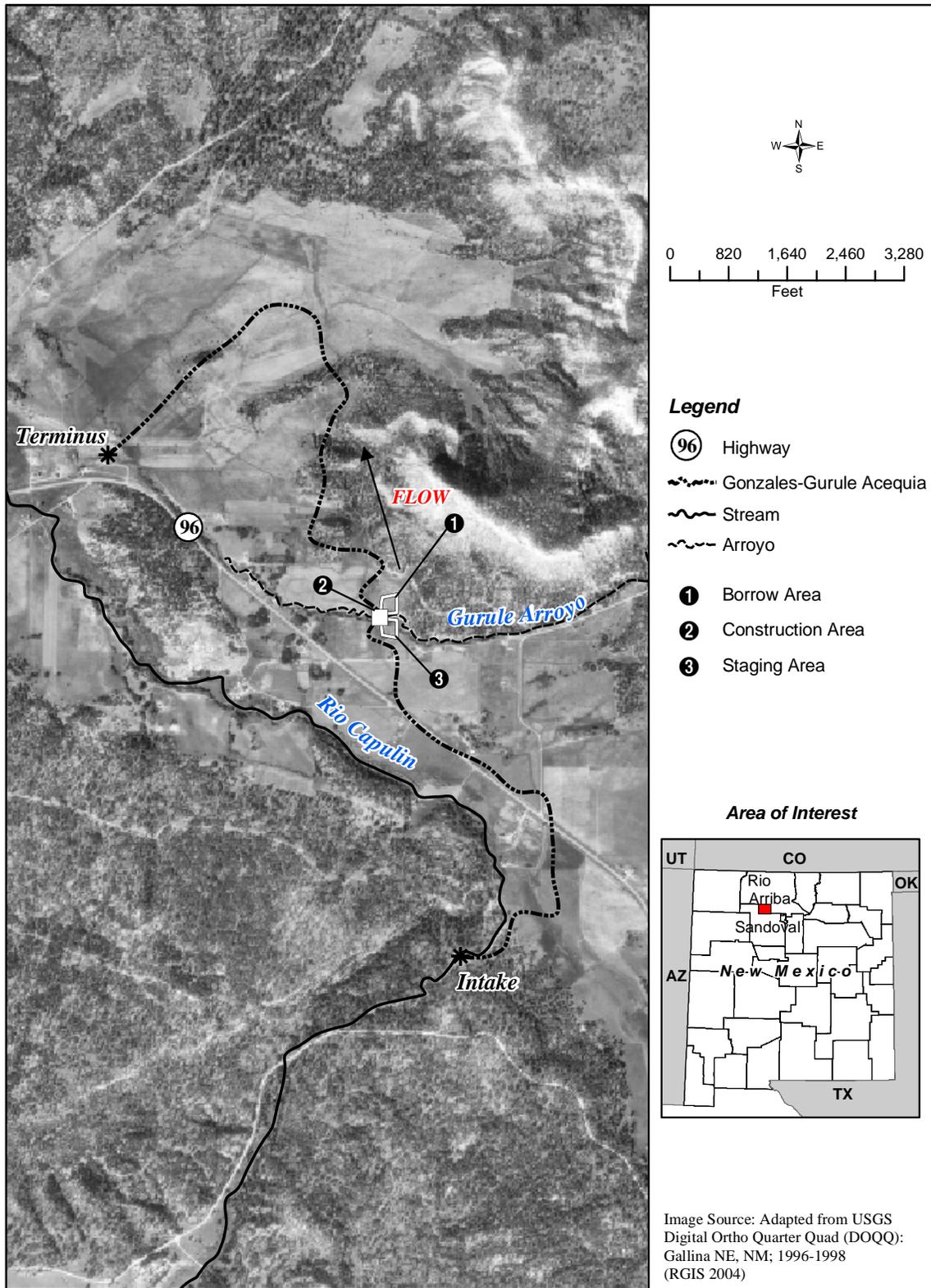


Figure 1-1. Regional Map of Gonzales-Gurule Acequia

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2



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Figure 1-2. Location Map for Gonzales-Gurule Acequia Construction

2

1 **1.2 PURPOSE AND NEED**

2 Most of the existing acequia channel is earthen. The only structural modifications are gates to turn water
3 out into fields, culverts under roads, and the siphon to pipe water across the arroyo. The existing siphon
4 consists of a steel pipe that has deteriorated primarily because the soils on the site are highly corrosive to
5 unprotected steel pipe. The existing concrete inlet and outlet structures have also deteriorated since the
6 siphon was installed in the early 1960s (NRCS 2001). Further deterioration of these structures could
7 cause the landowners served by the acequia to be without irrigation water.

8 There is a need for installing a new siphon because the existing pipe is leaking and the inlet and outlet
9 structures are failing. The existing siphon pipe has been undermined due to erosion on the banks of the
10 arroyo, which has exposed more of the pipe than is stable without supports. Siphon failure would leave
11 downstream irrigators without water. This rehabilitation would improve the reliability and efficiency of
12 water delivery.

13 **1.3 REGULATORY COMPLIANCE**

14 This EA was prepared for the Corps, in compliance with all applicable Federal statutes, regulations and
15 Executive Orders (EO) including, but not limited to the following:

- 16 • National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code
17 [U.S.C.] 4321 *et seq.*)
- 18 • Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal
19 Regulations [CFR] 1500-1508)
- 20 • Clean Air Act of 1972 (42 U.S.C. 7401-7671, as amended)
- 21 • Clean Water Act (CWA) of 1977 (33 U.S.C. 1251 *et seq.*)
- 22 • Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531-1544, as amended)
- 23 • Fish and Wildlife Coordination Act of 1958 (16 U.S.C. 661 *et seq.*, as amended)
- 24 • Farmland Protection Policy Act, 1981 (7 U.S.C. 4201, as amended)
- 25 • National Historic Preservation Act of 1966 (16 U.S.C. 470, as amended)
- 26 • Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001-3013)
- 27 • American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996)
- 28 • Archaeological Resources Protection Act of 1979 (16 U.S.C. 470, as amended)
- 29 • Protection of Historic and Cultural Properties (36 CFR 800 *et seq.*)
- 30 • EO 11514, Protection and Enhancement of Environment Quality
- 31 • EO 11988, Floodplain Management
- 32 • EO 11990, Protection of Wetlands
- 33 • EO 12898, Environmental Justice
- 34 • EO 13007, Indian Sacred Sites
- 35 • EO 13084, Consultation and Coordination with Indian Tribal Governments
- 36 • EO 11593, Protection and Enhancement of the Cultural Environment

37 This EA is also in compliance with applicable State of New Mexico regulations and standards.

1 **2.0 DESCRIPTION OF ALTERNATIVES AND PROPOSED ACTION**

2 **2.1 ALTERNATIVES**

3 Two alternatives were considered to address the problems of the deterioration of the siphon and the
4 potential for loss of irrigation water from Gonzales-Gurule Acequia.

- 5 1. No Action Alternative: No rehabilitation work would be performed to address the existing
6 problems. The existing siphon pipe and inlet and outlet structures would remain in place without
7 protection or rehabilitation.
- 8 2. Proposed Action Alternative: The proposed project would include: a) removal of the old siphon
9 system; b) installation of a more stable, wrapped pipe across the arroyo with 2 supports and a
10 drain to prevent water from freezing in the line; and c) construction of new water control inlet and
11 outlet structures with gates.

12 **2.1.1 No Action Alternative**

13 Under the No Action alternative, no rehabilitation work would be done. The existing siphon pipe and
14 concrete structures would remain in place. Loss of irrigation water from the leaking pipe and unstable
15 concrete structures would continue.

16 **2.1.2 Proposed Action Alternative**

17 Figure 1-2 shows the location of the proposed construction under the Proposed Action, totaling 300 feet
18 from inlet to outlet spanning the arroyo. The existing concrete inlet and outlet structures and the siphon
19 pipe would be removed. The new concrete inlet and outlet structures would be approximately 6 feet long,
20 with the ditch at either end shaped to fit the structures. The inlet structure would have a trash rack, a 20-
21 foot sluice pipe of 6-inch diameter welded steel pipe, and the 12-inch diameter siphon pipe, with flows
22 into both pipes controlled by gates. The total length of the siphon pipe is approximately 275 feet. Where
23 the siphon pipe is to be buried with soil, it would be wrapped in polyethylene tape coating. Where the
24 siphon pipe is to be exposed, spanning the arroyo, it would be coated with rust and weather-resistant
25 primer and paint. Two concrete supports would stabilize the pipe spanning above the bottom of the
26 arroyo. At the low point in the pipe, a drain would be installed to keep frozen water from damaging the
27 pipe when it is not in use. A small area of rock riprap would be installed even with the bottom of the
28 arroyo where the drain pipe outlets.

29 The siphon would be accessed from the staging area located south of the construction site and the arroyo,
30 as shown on Figure 1-2. The staging area is approximately 1 acre. Any soil to be used as backfill to cover
31 the pipe would be obtained from the borrow area (approximately 2 acres) on the north side of the arroyo.
32 After completing the rehabilitation, the areas disturbed from construction would be reseeded as directed
33 by NRCS and approved by the landowners.

34 **2.2 ENVIRONMENTAL PROTECTION**

35 Rehabilitation of the irrigation system would utilize appropriate Best Management Practices (BMP),
36 employed during and after construction to minimize soil erosion and sedimentation in waterways.
37 Construction would occur when water is not flowing through the acequia. All construction would be done
38 within the acequia system, with no disturbance of the Rio Capulin. Appropriate BMPs to be employed
39 during construction include eliminating the acequia flows during construction and the proper grading of
40 slopes to ensure stability after project completion. Damage to existing vegetation would be avoided as
41 much as possible. NRCS staff would coordinate with the Corps to approve any additionally needed access
42 routes, borrow sites, staging areas, other high use areas, or any changes to these areas, regardless of their
43 ownership or distance, to ensure that natural and cultural resources would be protected. The State of New

1 Mexico, being the project sponsor, would be responsible for assuring operation and maintenance of the
2 project after completion.

3 To protect soils from wind and water erosion after completion of earthmoving, disturbed areas would be
4 seeded with vegetation that is appropriate for the soil and site conditions, according to recommendations
5 made by NRCS and approved by the landowners.

6 All waste material would be disposed of properly at pre-approved or commercial disposal areas or
7 landfills. Fuel, oil, hydraulic fluids, and other similar substances would be appropriately stored away from
8 the ditch and must have a secondary containment system to prevent spills if the primary storage container
9 leaks.

10 Prior to construction, all environmental protection measures as expressed by contract clauses, design
11 drawings, or other means would be reviewed with the acequia members and the contractor at a pre-
12 construction conference.

13 There are no other known actions for the Gonzales-Gurule Acequia planned by other Federal, State,
14 county, or municipal agencies.

1 The State has designated the following uses for this reach (from Rio Gallina to the headwaters) of the Rio
2 Capulin: wildlife habitat, high quality coldwater fishery, fish culture, secondary contact, domestic water
3 supply, irrigation, and livestock watering (NMWQCC 2002). All uses are fully supported in this reach
4 (NMED 2003).

5 The Gurule-Gonzales Acequia extends along the Rio Capulin, from which it diverts water, and serves 8
6 irrigators on 120 acres. It does not return flow to Rio Capulin, but terminates in a field.

7 Section 402(p) of the CWA specifies that stormwater discharge associated with construction activities
8 disturbing one or more total acres of land must be authorized by a National Pollutant Discharge
9 Elimination System (NPDES) Permit. While the borrow area is approximately 2 acres, it is projected that
10 NPDES permit authorization would not be required for the Proposed Action since the amount of fill
11 needed to be removed from the borrow area, in addition to the area disturbed in the arroyo at the
12 construction site, would total less than one acre. If it becomes necessary for more than one acre to be
13 disturbed, a Construction General Permit would have to be completed in compliance with NPDES
14 requirements. BMPs would be used as necessary to minimize erosion and sedimentation wherever project
15 construction activities occur.

16 Section 404 of the CWA provides for the protection of wetlands and waters of the U.S. from impacts
17 associated with discharges of dredged or fill material. Certain discharges associated with the construction
18 and maintenance of irrigation ditches are exempt from Section 404 permit requirements (33 CFR 323.4
19 [a], Exemption No. 3). No discharges into the Rio Capulin would occur, so no Section 404 permit is
20 required for the Proposed Action. No State water quality certification under Section 401 would be
21 required because construction would not occur in the Rio Capulin.

22 The Proposed Action would secure water delivery to the Gonzales-Gurule Acequia without disturbing the
23 stream source. There would be no effect on water quality because flow is not returned to the Rio Capulin.
24 The No Action alternative would allow the pipeline to continue to sag and to corrode, possibly damaging
25 or interrupting the water supply to irrigators but would not affect the Rio Capulin.

26 **3.4 WETLANDS AND FLOODPLAINS**

27 Wetlands are protected from development under EO 11990 (Protection of Wetlands). Guidance from the
28 Order requires Federally funded activities associated with wetlands to minimize the destruction, loss, or
29 degradation of wetlands and to preserve and enhance the natural beneficial values of wetlands.

30 EO 11988 (Floodplain Management) provides Federal guidance for activities within floodplains of inland
31 and coastal waters. Preservation of the natural values of floodplains is of critical importance to the nation
32 and to the State of New Mexico. Federal agencies are required to “ensure that its planning programs and
33 budget requests reflect consideration of flood hazards and floodplain management.” No additional
34 development of the Rio Capulin is likely to result from this project. Flood hazard zones (100-year
35 floodplains), as delineated by the Federal Emergency Management Agency, are not present in the project
36 area. As a result, neither of the alternatives would adversely affect wetlands or floodplains.

37 **3.5 LAND USE**

38 The Gonzales-Gurule Acequia supplies water to 8 irrigators. Currently, about 120 acres of mixed pasture
39 and hay and small grains, including oats and wheat, are irrigated (Jacquez 2004).

40 Under the No Action alternative, the existing 12-inch diameter pipe and concrete inlet and outlet
41 structures would continue leaking, resulting in inefficient water delivery and ongoing maintenance
42 expenses. As a result, it is possible that, over time, the irrigated land would change from cropland to
43 fallow or nonagricultural if the structures fail. Under the Proposed Action, water delivery would be more
44 efficient and reliable, and the improved design of the water delivery structures would allow for the
45 continued productivity of the irrigated land. No significant impact to land use would result from either the
46 No Action or Proposed Action alternatives.

1 **3.6 AIR QUALITY**

2 The project area is in attainment with National Ambient Air Quality Standards set by the U.S.
3 Environmental Protection Agency (USEPA) (Ball 2003). Increased dust and emissions from earthmoving
4 and construction equipment may contribute to temporary elevations in particulate matter. Through the use
5 of BMPs, increased dust would be kept to a minimum, so the Proposed Action alternative would not
6 produce significant reductions in air quality. No impacts to air quality would result from the No Action
7 alternative.

8 **3.7 BIOLOGICAL RESOURCES**

9 **3.7.1 Terrestrial Communities**

10 According to Dick-Peddie (1993), the project area is characterized as urban, farmland, or Montane
11 Coniferous Forest. The staging area for the siphon reconstruction is located in a small fallow field
12 bounded by fence to the east, the arroyo to the north, the acequia to the west, and a cemetery and access
13 road to the south. The borrow area is located on the north side of the arroyo (see Figure 2-1) and is
14 dominated by big sagebrush (*Artemisia tridentata*). Willow species, sedges, and grasses are distributed
15 along the banks of the ditch. Native riparian vegetation is patchy along the banks of the ditch, as the
16 majority of the ditch traverses agricultural land.

17 The predominant vegetation found within the project area during a pedestrian field survey (SAIC 2004)
18 includes willow species (*Salix* spp.), grama species (*Bouteloua* spp.), sedges (*Carex* spp.), broom
19 snakeweed (*Xanthocephalum sarothrae*), penstemon species (*Penstemon* spp.), sandverbena (*Abronia*
20 spp.), phlox (*Phlox longifolia*), Indian paintbrush (*Castilleja* spp.), globe mallow (*Sphaeralcea* spp.),
21 juniper species (*Juniperus* spp.), big sagebrush, and rubber rabbitbrush (*Chrysothamnus nauseosus*).

22 Common animals likely to occur in proximity to the project area include, but are not limited to, elk
23 (*Cervus elaphus nelsoni*), mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), woodrat (*Nestoma*
24 *fuscipes*), deer mouse (*Peromyscus maniculatus*), and pocket gopher (*Thomomys* spp.). Nuthatches (*Sitta*
25 spp.), olive warblers (*Peucedramus taeniatus*), red-faced warblers (*Cardellina rubrifrons*), hepatic
26 tanagers (*Piranga flava*), and the mountain bluebird (*Sialia currucoides*) are avifauna likely to occur
27 (Bailey 1995). During the pedestrian field survey, black-billed magpies (*Pica hudsonia*), turkey vulture
28 (*Piranga ludoviciana*), raven (*Corvus* spp.), northern flicker (*Colaptes auratus*), American robin (*Turdus*
29 *migratorius*), and sparrow species were observed (SAIC 2004).

30 The siphon rehabilitation would not take place during the typical irrigation period of May to September.
31 Construction would not pose a significant threat to these terrestrial communities due to the localized area
32 of impact and the timing of construction. Disturbed, sloped, and backfilled ground would be stabilized
33 and reseeded. Neither alternative would have a significant impact on the terrestrial flora and fauna.

34 **3.7.2 Aquatic Communities**

35 The Rio Capulin is classified by the State as a high quality coldwater fishery (NMED 2003). Fish species
36 likely to occur throughout the creek include salmonids (trout species) and sucker species (*Catostomus*
37 spp). Rio Grande cutthroat trout are found in Rio Capulin. Aquatic invertebrates of the mayfly
38 (*Ephemeroptera* spp.) and dragonfly (*Odonanta* spp.) species would likely support the prey base for many
39 of the fish species.

40 The Rio Capulin supplies the Gonzales-Gurule Acequia with irrigation water. The construction would
41 upgrade and stabilize the existing siphon structure; however, the proposed improvements would not affect
42 the existing water quality conditions because they would be for downstream from the intake and flow is
43 not returned to the stream. Neither the Proposed Action or the No Action alternative would significantly
44 affect the aquatic communities of the Rio Capulin.

1 **3.8 THREATENED AND ENDANGERED SPECIES**

2 Conservation of threatened and endangered flora and fauna are primarily managed by U.S. Fish and
3 Wildlife Service (USFWS) under the ESA, the New Mexico Department of Game and Fish (NMGF)
4 under the Wildlife Conservation Act of 1974, and the New Mexico Energy, Minerals, and Natural
5 Resources Department under the New Mexico Endangered Plant Species Act and Rule Number
6 NMFRC 91-1. Under the managing authorities, each agency maintains species lists for selected animals
7 and plants deemed to be threatened and/or endangered. The Federal and State protected species of Rio
8 Arriba County, New Mexico, are listed in **Table 3-2**.

9 **Table 3-2. Federal and State Protected Species in Rio Arriba County, New Mexico**

Species	Federal Status ¹ (USFWS)	State Status ¹	Probability of Occurrence in the Project Area
BIRDS			
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	T	T	Not likely to occur due to the lack of open water and roosting trees in the immediate project area.
American Peregrine Falcon (<i>Falco peregrinus anatum</i>)	–	T	Not likely to occur due to the lack of cliff and forest habitat with open water nearby in the immediate project area.
White-Tailed Ptarmigan (<i>Lagopus leucurus altipetens</i>)	–	E	Not likely to occur due to the lack of alpine habitat.
Whooping Crane (<i>Grus americana</i>)	E	E	Not likely to occur due to the lack of marshes and prairie potholes (summer habitat) and coastal marshes and prairies (winter habitat).
Mountain Plover (<i>Charadrius montanus</i>)	SC	–	Not likely to occur due to the lack of open prairie habitat with grazing influence.
Yellow-Billed Cuckoo (<i>Coccyzus americanus occidentalis</i>)	C	–	Not likely to occur due to the lack of dense riparian habitat.
Mexican Spotted Owl (<i>Strix occidentalis lucida</i>)	T	–	Not likely to occur due to the lack of mature coniferous forest.
Boreal Owl (<i>Aegolius funereus</i>)	–	T	Not likely to occur due to the lack of alpine habitat.
Southwestern Willow Flycatcher (<i>Empidonax traillii extinus</i>)	E	E	Not likely to occur due to the lack of dense riparian habitat.
Interior Least Tern (<i>Sterns antillarum athalassos</i>)	E	E	Not likely to occur due to the lack of habitat that is sandy and relatively free of vegetation.
Baird's Sparrow (<i>Ammodramus bairdii</i>)	–	T	Not likely to occur due to the lack of short-grass prairie habitat in the immediate project area.
MAMMALS			
New Mexican Jumping Mouse (<i>Zapus hudsonius luteus</i>)	–	T	Not likely to occur due to the lack of moist meadow habitat.
Spotted Bat (<i>Euderma maculatum</i>)	–	T	May occur.
Black-Footed Ferret (<i>Mustela nigripes</i>)	E	E	Not likely to occur. This species has been extirpated from Rio Arriba County.

Species	Federal Status ¹ (USFWS)	State Status ¹	Probability of Occurrence in the Project Area
Canada Lynx (<i>Lynx Canadensis</i>)	T	–	Not likely to occur due to the lack of mature coniferous forest habitat.
American Marten (<i>Martes americana origenes</i>)	–	T	Not likely to occur due to the lack of mature coniferous forest habitat.
FISH			
Rio Grande Silvery Minnow (<i>Hybognathus amarus</i>)	E	–	Not likely to occur. No documentation of this species in Rio Capulin or Rio Gallina.
Roundtail Chub (<i>Gila robusta</i>)	–	E	Not likely to occur. No documentation of this species in Rio Capulin or Rio Gallina.
AMPHIBIANS			
Jemez Mountain Salamander (<i>Plethodon neomexicanus</i>)	–	T	Not likely to occur due to the lack of mixed conifer and spruce-fir forests.
Western Boreal Toad (<i>Bufo boreas boreas</i>)	C	E	Not likely to occur due to the lack of suitable breeding habitat (lakes, marshes, ponds, and bogs) in spruce-fir forests and alpine meadows.
PLANTS			
Arizona Willow (<i>Salix arizonica</i>)	–	E	Does not occur in the project area (SAIC 2004). Sedge meadow, sub-alpine habitat is absent.
Chama Blazing Star (<i>Mentzelia conspicua</i>)	–	E	Does not occur in the project area (SAIC 2004). Gray to red shales and clays of the Mancos and Chinle Formations in piñon-juniper woodland are absent.
Pagosa Phlox (<i>Phlox caryophylla</i>)	–	E	Does not occur in the project area. <i>Phlox longifolia</i> (glandular pubescence present) was found along the banks of the acequia madre downstream from the project area (SAIC 2004).
Ripley's Milkvetch (<i>Astragalus ripleyi</i>)	–	E	Does not occur in the project area (SAIC 2004). Sagebrush, piñon-juniper woodland, and Gambel oak thickets in ponderosa pine forest are absent.

Notes: (1) E = Endangered, T = Threatened, SC = Species of Concern, C = Candidate.

(2) The bald eagle is proposed for delisting.

Sources: USFWS 2003; NMGF 2003, 2004; NMRPTC 1999; SAIC 2004

- 1 Specialized habitat requirements such as vegetation type and cover, elevation, and geographic location for
2 the species listed above comprise the preferred habitat regimes for these flora and fauna (NMGF 2004).
3 Of the species listed in Table 3-2, the spotted bat is the only species that may potentially occur in the
4 project area.
- 5 There is no documentation of spotted bats or roosting sites near the project area. Bats are known to travel
6 up to 40 miles from roosting sites to forage (USFWS 1995). The preferred roosting habitat for spotted
7 bats is unknown. Spotted bats are known to forage and roost in a variety of habitats from valley bottoms
8 to montane forest (NMGF 2004; AZGF 2003). Roosting and foraging habitats are likely to exist within 40
9 miles of the project area, so transient foraging bats may occur in the vicinity. Foraging periods occur
10 during dusk or nighttime, therefore not overlapping with construction activities that would occur during

1 the daytime. Transient spotted bat occurrence may take place in the project area; however, this species
2 would not be affected by the implementation of the Proposed Action or the No Action alternatives. No
3 other listed species would be affected by either the No Action or Proposed Action alternatives.

4 **3.9 CULTURAL RESOURCES**

5 **3.9.1 Culture History**

6 Much of what is known about the prehistory of the project area derives from archaeological research
7 conducted on adjoining portions of the Santa Fe National Forest, specifically Scheick's (1996) Region 3,
8 or the Jemez Ranger District. The earliest evidence of human occupations in the region occurs in the
9 PaleoIndian Period. This is followed by the Archaic Period during which the beginnings of agriculture
10 emerge. Subsequent prehistoric developments are divided into the Developmental, Coalition, Classic, and
11 Protohistoric Periods. The final period, the Historic Period, encompasses the remainder of cultural
12 manifestations in the planning area.

13 The PaleoIndian Period (pre-9000 B.C. to 5000 B.C.) was characterized by relatively small bands of
14 hunters relying on large, now extinct, Pleistocene megafauna such as mammoth and bison, many of which
15 were migratory. PaleoIndian sites are ephemeral, reflecting periodic movement of camps to areas where
16 animals might be found. There is some evidence of reliance on plant resources. There were no sites dating
17 to PaleoIndian times in Region 3, although this scarcity may be more apparent than real because
18 vegetation makes such sites difficult to locate (Scheick 1996).

19 The Archaic Period (5000 B.C. to A.D. 600) is signaled by the extinction of earlier Pleistocene fauna
20 caused by the combined effects of drought and hunting by PaleoIndian peoples. Although hunting
21 continued to be important throughout the Archaic Period, there was greater reliance on gathering wild
22 plant resources as evidenced by the appearance of new classes of artifacts, notably ground stone
23 implements used to process plant foods for consumption (Scheick 1996). The earliest evidence of
24 domesticated crops, notably maize, appears in late Archaic sites. Recent direct dates on corn remains
25 suggest that cultigens began to appear in the broader region between around 850 B.C. and A.D. 400
26 (Scheick 1996).

27 General trends in the number of Archaic sites show that Region 3 of the Santa Fe National Forest was
28 used largely during the late Archaic period (Scheick 1996). Of the sites for which information is
29 available, most consist of simple artifact scatters, particularly stone tool manufacturing localities, without
30 visible evidence of features (Scheick 1996). There are no known early Archaic (5500 to 3200 B.C.) sites
31 in the region.

32 During the Developmental Period (A.D. 600 to 1175) in Region 3, seasonal hunting and gathering in the
33 upper elevations by Pueblos residing in lower elevation agricultural villages occurred (Scheick 1996).
34 Only about 0.4 percent of the overall number of known sites in Region 3 date to the Developmental
35 Period (Scheick 1996). Most of the larger and more easily recognized sites are found at lower elevations
36 in riparian settings downstream of San Ysidro, New Mexico. Early Developmental Period sites generally
37 consist of either (1) artifact scatters with few or no features of any kind or (2) pithouses and/or surface
38 dwellings and associated refuse deposits (Scheick 1996).

39 During the Coalition Period (A.D. 1175 to 1325), populations in Chaco Canyon in northern New Mexico
40 and Mesa Verde to the northwest experienced substantial declines accompanied by the complete
41 abandonment of sites. Coalition Period sites comprise only about 2.0 percent of the overall number of
42 known sites in the region (Scheick 1996). Coalition Period settlements, notably Vallecitos Viejo, were
43 typified by large above-ground masonry roomblocks containing 60 to 70 rooms (Scheick 1996). Most
44 known sites are found in lowland valleys that contain agricultural lands.

45 One-half of all known sites (1396) in Region 3 date to the Classic Period (A.D. 1325 to 1600) (Scheick
46 1996). Many Coalition Period pueblos were abandoned and the region's inhabitants reordered into larger,

1 more defensible pueblos (Scheick 1996). At higher elevations, most sites consisted of fieldhouses, small
2 room blocks, and pueblos with five or more rooms. Large villages made up of multiple roomblocks are
3 rare, and most are situated on mesa tops (Scheick 1996). Settlement patterns seen in Region 3 during the
4 Classic Period may reflect a semiannual alternation between large riverine villages in winter, followed by
5 dispersal into smaller outlying farmsteads during the summer months. This pattern would have lead to an
6 extension of agricultural pursuits into progressively more marginal areas (Scheick 1996).

7 The Protohistoric Period (A.D. 1540 to 1598) encompasses a relatively short interval between initial
8 Spanish contact and the establishment of the first Spanish settlement near San Juan Pueblo to the east in
9 A.D. 1598. There is no evidence to suggest that the region was occupied by Tewa elements during the
10 seventeenth and eighteenth centuries (Schaafsma 2002). Instead, pueblos ancestral to modern Tewa
11 pueblos appear to have been concentrated along the Rio Chama below Abiquiu.

12 The Historic Spanish Colonial Period (A.D. 1598 to 1821) refers to the period between the establishment
13 of the first Spanish settlement near San Juan Pueblo and Mexican independence in 1821. Early Spanish
14 expeditions, including those of Coronado (1540), Chamuscado-Rodriguez (1581-1582), and Sosa (1589),
15 largely bypassed the Jemez region. Further settlement was impeded by the threat of raiding by Navajos
16 and Utes.

17 The Spaniards' oppressive use and abuse of Native American labor, as well as the introduction of Spanish
18 diseases, may have caused the population to plummet from about 6,000 at the time of contact to as few as
19 3,000 by 1630 (Ayer 1965). By 1630, Navajos were present along the Rio Chama upstream from Santa
20 Clara Pueblo and extending as far upriver as the Piedra Lumbre Valley (Ayer 1965; Schaafsma 2002).
21 Their persistence across the project area is confirmed by the 1687 Peñalosa map (Schaafsma 2002). On
22 the heels of the Pueblo Revolt of 1680, indigenous populations in the Jemez area may have been further
23 reduced to as few as 1,000 individuals (Scheick 1996). Faced with persistent hostile tribes, including both
24 Navajos and Utes, the Spaniards did not settle the upper reaches of the Rio Chama until the middle to late
25 eighteenth century (Swadesh 1974; Wozniak et al. 1992).

26 Throughout the 1700s, the countryside in the region was only sparsely settled. Accordingly, Spanish
27 Colonial occupations are relatively uncommon in the vicinity, and documentary materials provide few
28 insights into activities during this period. The majority of activities during this period likely revolved
29 around seasonal herding and the establishment of small scattered farmsteads (Swadesh 1974; Wozniak et
30 al. 1992).

31 The Mexican Period (A.D. 1821 to 1846) encompasses a period beginning in 1821 and ending with the
32 Anglo-American occupation of the territory in 1846. During the Mexican Period, portions of the Rio
33 Capulin were included as part of the original San Joaquin del Rio Chama Grant (Swadesh 1974). Gallina,
34 the modern town nearest the Gonzales-Gurule Acequia, was founded by Antonio Ortiz in 1818, while the
35 much larger land grant of Gonzales-Gurule was not established until 1832 (Julyan 1996). These grants
36 indicate that the region began to be occupied during the early Mexican period, although details regarding
37 subsequent developments are minimal.

38 In 1821, Abiquiu and the surrounding region had population estimates of 3,275 people, while the Pueblo
39 of Jemez's population was estimated at 864 (Bloom 1913). As in Spanish Colonial times, the region in
40 which the project area is situated was not heavily occupied. Economic activities almost certainly
41 continued to focus on seasonal herding and cultivation of crops at small scattered farmsteads. With the
42 establishment of the Old Spanish Trail (1829-1830), Abiquiu became an important port and trading
43 center, and outlying settlements likely began to provide supplies for sale to west-bound travelers
44 (Swadesh 1974; Wozniak et al. 1992).

45 The Territorial Period (A.D. 1846 to 1912) refers to the period between the 1846 arrival of U.S. troops in
46 New Mexico and when New Mexico became a State in 1912. The Jemez-Chama area was often bypassed
47 by early Anglo-Americans arriving with General Stephen Watts Kearny in 1846. Josiah Gregg, Henry

1 Turner, A. W. Whipple, some of the earliest chroniclers of Territorial New Mexico, never traveled in the
2 region. Accordingly, vintage narratives are sparse.

3 Land grant fraud in the middle nineteenth century directly affected Hispanic settlers who, in some
4 instances, had lived in the region for decades. The San Joaquin Grant was alienated by William
5 Blackmore, Thomas Catron, and others, so that the residents of such small villages as Gallina, Capulin,
6 Coyote, and Canjilon were left with only the lots on which their houses were situated and small irrigated
7 fields (Swadesh 1974). According to local lore, the Gonzales-Gurule Acequia was established in the
8 1880, diverting water from the Rio Capulin. Early descriptions of acequia systems on the Rio Capulin,
9 including those of Follett (1898) and Yeo (1910), do not provide sufficiently detailed information to
10 accurately identify the Gonzales-Gurule Acequia or describe its early operating characteristics.

11 There is very little information regarding the project area since the time of Statehood (1912 to the
12 present). Even today, priority dates for acequias situated in tributaries of the headwaters of the Rio Chama
13 have not been adjudicated. Current data indicate that the Gonzales-Gurule Acequia provides water to 8
14 irrigators farming approximately 120 acres (Jacquez 2004).

15 **3.9.2 Methodology and Survey Results**

16 Prior to conducting the field survey of the proposed project area, the New Mexico Cultural Resources
17 Information System (NMCRIS) was queried to determine if any known cultural resources were
18 previously identified near the project area. A Class III (100%) intensive pedestrian survey of the planned
19 construction, staging, and borrow areas, totaling about 3 acres, was completed using 15-meter transects.
20 The survey conformed to State of New Mexico and Federal standards. The entire length of the Gonzales-
21 Gurule Acequia alignment was walked; the inlet, locations of water control structures (e.g., culverts,
22 check structures, taps), and the terminus of the acequia were recorded using Garmin® 12-channel Global
23 Positioning System (GPS) with an intrinsic accuracy of ± 3 to 5 meters. Water was running in the acequia
24 at the time of the inspection, limiting detailed examinations of the bottom and sides of the alignment.

25 The NMCRIS query revealed that a total of 24 sites have been previously identified within 1 mile of the
26 acequia. No prehistoric or historic sites have been previously located within the boundaries of the project
27 area, other than the Gonzales-Gurule Acequia itself, previously recorded as LA134776. There are no
28 known Traditional Cultural Properties in the project area.

29 Much of the proposed staging area has been previously disturbed and no evidence of prehistoric or
30 historic cultural remains was identified during the field inspection. However, a recent grave is located just
31 outside of the designated staging area, enclosed by a chain link fence. An abandoned animal pen that has
32 been converted to a dumpster is located along the edge of the arroyo near the staging area. The proposed
33 borrow area was largely undisturbed. A few areas were previously bulldozed and no evidence of
34 prehistoric or historic cultural remains was found.

35 It is likely that the Gonzales-Gurule Acequia was not altered significantly since it was built in the 1880s.
36 The ditch is unlined and, aside from annual ditch cleaning, little disturbance of the system has occurred. A
37 total of 30 structures, including culverts, check and tap gates, a siphon, and a check dam, were identified
38 along the length of this acequia, accounting for 650 feet of modifications, or approximately 3 percent. As
39 the proposed project would replace an existing structure, it would have no effect on the overall extent of
40 alterations to the ditch.

41 A wooden flume, built in the 1920s (Jacquez 2004) and formerly used to carry water across the Gurule
42 Arroyo, is still partially extant, although no longer in use. The flume spans the Gurule Arroyo just a few
43 meters upstream of the existing 1960s siphon (Jacquez 2004). The structure is incomplete and in bad
44 condition. A portion of the flume has been removed for use elsewhere (Jacquez 2004). Much of the trestle
45 that spanned the arroyo has washed out. The structure is beginning to dry rot, and the support structure is
46 beginning to shift from its original position. The dilapidated flume, often frequented by local children

1 who climb on it, is considered a hazard by the townspeople, who would like to see it demolished (Jacquez
2 2004).

3 Although the acequia is potentially eligible for inclusion on the National Register of Historic Places under
4 criteria (a) and (d) of 36 CFR 60.4, the proposed project would have no effect on the alignment, form, or
5 function of the acequia system. Based on the proposed work and the findings of this survey, it is
6 recommended that a clearance be granted for this project. There would be no adverse effect to historic
7 properties resulting from the proposed rehabilitation project. No significant impact to cultural resources
8 would occur under either the No Action or Proposed Action alternatives.

9 **3.10 INDIAN TRUST ASSETS**

10 Indian Trust Assets (ITA) are legal interests in property held in trust by the U.S. for Indian tribes or
11 individuals. Examples of trust assets include land, minerals, hunting and fishing rights, and water rights.
12 The U.S. has an Indian Trust Responsibility to protect and maintain rights reserved by or granted to
13 Indian tribes or individuals by treaties, statutes, executive orders, and rights further interpreted by the
14 courts. This trust responsibility requires that all Federal agencies take all actions reasonably necessary to
15 protect such trust assets.

16 The construction or implementation of either the Proposed Action or No Action alternative is not
17 anticipated to affect any ITAs.

18 **3.11 AESTHETICS**

19 The Gonzales-Gurule Acequia, which meanders through pastureland, has a rural aesthetic character.
20 Construction would take place within the existing ditch; exposed soil would be reseeded according to the
21 recommended NRCS seed mixtures with landowners' approval. There would be no significant effect on
22 aesthetic quality from either the Proposed Action or No Action alternatives.

23 **3.12 NOISE**

24 Current noise levels in the vicinity of the Gonzales-Gurule Acequia are typical for rural areas.
25 Earthmoving equipment and trucks generate decibel (dB) levels 15 to 30 units higher (LHH 2001) than
26 the prescribed Federal Highway Administration recommended levels for residential areas close to
27 highways. Recommended levels of 67 dB are expressed as equivalent sound level, the constant average
28 sound level, which contains the same amount of sound energy as the varying levels of the traffic noise
29 (FHA 2000). To be considered significant, noise levels must be elevated over the long term. Construction
30 during the acequia rehabilitation would temporarily elevate noise levels, but these levels would not
31 persist. Neither alternative would significantly affect noise levels.

32 **3.13 SOCIOECONOMICS**

33 Gonzales-Gurule Acequia is located approximately 2 miles east of Gallina in Rio Arriba County.
34 Although there are no census data on record for Gallina, statistics at the county level are assumed to
35 reflect the population near the project area. Population statistics for the county are compared to those of
36 the State and Nation in **Table 3-3**.

37 The Gonzales-Gurule Acequia supplies irrigation water to 8 irrigators for about 120 acres of hayland,
38 pasture, and fields of small grains (Jacquez 2004). Typically, local farmers and ranchers supplement their
39 income from the livestock grazed in the pastures irrigated by the acequia. The Proposed Action would
40 make water delivery more reliable and efficient, potentially increasing or ensuring productivity of this
41 land. While locally favorable for the affected families and those with whom they trade, the minor
42 beneficial effects would not be significant.

43 The No Action alternative may result in the disruption of water delivery if the ditch were not
44 rehabilitated. This could adversely affect the families who irrigate from the acequia, but would not be a
45 significant effect regionally.

Table 3-3. Profile of Ethnic and Racial Demographic Characteristics, Year 2000

Geographic Area	Total Population	Race								Hispanic or Latino (of Any Race)
		One Race							Two or More Races	
		Total	White	Black or African American	American Indian	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race		
U.S.	281,421,906	274,595,678 (98%)	75%	12%	<1%	4%	<1%	6%	6,826,228 (2%)	35,305,818 (13%)
New Mexico	1,819,046	1,752,719 (96%)	67%	2%	10%	1%	<1%	17%	66,327 (4%)	765,386 (42%)
Rio Arriba County	41,190	39,837 (97%)	57%	<1%	14%	<1%	<1%	26%	1,353 (3%)	30,025 (73%)

Sources: U.S. Census Bureau 2002a, b, c

Note: Totals may not equal 100% due to rounding.

3.14 ENVIRONMENTAL JUSTICE

EO 12898, Environmental Justice, and EO 13045, Protection of Children, requires that Federal proponents assess how impacts of a Proposed Action may disproportionately affect minority and low-income persons or children under 18 years of age. Minority populations include all persons identified by the U.S. Bureau of the Census to be either of Hispanic race, regardless of country of origin, or all persons not of Hispanic origin other than White (i.e., Black, American Indian, Eskimo or Aleut, Asian or Pacific Islander, or other national origins). Low-income populations include all persons living below the poverty level, identified as a household income for a family of three of less than \$12,802 in 1997 (U.S. Census Bureau 1997).

As shown in Table 3-3, Rio Arriba County has a much higher percentage of Hispanics or Latinos (approximately 73 percent) than do the State of New Mexico or the U.S. (42 and 13 percent, respectively). There are higher percentages of American Indians in the county and State (14 and 10 percent, respectively) than there are in the Nation (less than 1 percent). African Americans comprise only a very small percentage of the county and State populations (under 1 percent and 2 percent, respectively). Other minority groups are barely represented at the State or county levels.

According to the 2000 census, approximately 28 percent of the population is under the age of 18 in New Mexico; about 29 percent in Rio Arriba County; and about 26 percent in the U.S. (U.S. Census Bureau 2000a, b, c). The 1999 poverty estimates from the census for the county, State, and Nation are shown in **Table 3-4**. The percentage of minors that live below poverty level in Rio Arriba County is comparable to the percentage living below poverty level in the State of New Mexico (within 2 percent); however, 7 percent more minors live below poverty level in Rio Arriba County than in the U.S.

The Proposed Action could have a beneficial impact on the eight families who use the irrigation water. Assuming that these owners are comprised of a similar racial and ethnic mix as the community as a whole, this could provide a positive effect for minorities. Any primary or supplemental income from trading would also be beneficial, but probably not significant. The construction would not disrupt or displace any residential or commercial structures. The work has been reviewed for compliance with EO 12898 and it has been determined that the No Action and the Proposed Action alternatives would not adversely affect the health or environment of minority or low-income populations.

1

Table 3-4. Percent of Population Below Poverty, 1999 Estimate

	Rio Arriba County	New Mexico	U.S.
All Persons	20	18	13
Minors	23	25	17

Sources: U.S. Census Bureau 2000a,b,c

2 **3.15 CUMULATIVE EFFECTS OF THE PROJECT**

3 No other foreseeable actions by Federal, State, Tribal, or local officials are known to be planned for the
4 project area. According to the field survey of the Gonzales-Gurule Acequia, approximately 650 feet
5 (3 percent) of the entire acequia has been previously modified by structures. The Proposed Action would
6 involve primarily reconstructing existing structures, with no net increase in modifications after
7 completion of the Proposed Action. Therefore, the potential impacts due to the implementation of the
8 Proposed Action would not significantly affect natural, cultural, or socioeconomic resources.

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4.0 CONCLUSIONS

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The No Action alternative was rejected because the present irrigation system is in need of improvement to preserve its form and function. This alternative would not meet the purpose and need of the project to reduce maintenance and improve the reliability of water delivery, nor would it preserve the cultural and historic values of this acequia to the region, as intended under Section 1113 of the WRDA.

The Proposed Action is the preferred alternative because it would be beneficial to the entire acequia and its users by replacing water control structures that are in danger of failure. It would also maintain the beneficial use of the acequia, a property listed on the National Register of Historic Places. It has the potential to result in positive impacts by improving reliable water delivery during the irrigation season. This alternative satisfies the purpose and need for the project and the intent of Section 1113 of WRDA.

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5.0 LIST OF PREPARERS, CONSULTATION, AND COORDINATION

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5.2 COORDINATION

Agencies, tribes, and entities contacted formally or informally in preparation of this Draft EA include:

- Comanche Indian Tribe
- Gonzales-Gurule Acequia, Henry Jacquez, majordomo
- Hopi Tribe
- Jicarilla Apache Nation
- Kiowa Tribe of Oklahoma
- Natural Resources Conservation Service
- Navajo Nation
- New Mexico Department of Energy, Minerals, and Natural Resources
- New Mexico Department of Game and Fish
- New Mexico Environment Department
- New Mexico Office of the State Engineer
- New Mexico State Historic Preservation Office
- Pueblo of Pojoaque
- Pueblo of San Ildefonso
- Pueblo of San Juan
- Pueblo of Santa Clara
- Pueblo of Taos
- U.S. Fish and Wildlife Service

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APPENDIX A
CONSULTATION WITH STATE HISTORIC
PRESERVATION OFFICE AND TRIBES



DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

April 27, 2004

Planning, Project and Program Management Division
Planning Branch
Environmental Resources Section

**Example of Consultation Letter sent to
Tribal Leaders and Cultural
Resources Staff:**

The U. S. Army Corps of Engineers (Corps), Albuquerque District, at the request of the New Mexico State Engineer and the Acequia de Gurule-Gonzales Ditch Association, is planning the rehabilitation of an irrigation flume on the Gurule-Gonzales Acequia system under the Water Resources Development Act of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq.), as amended. The existing flume crosses an unnamed arroyo and is located in the northwest quarter of Section 14, Township 23 North, Range 1 East, approximately 2.0 miles east of the Gallina High School in Gallina, Rio Arriba County, New Mexico. Gallina is located on State Highway 96 approximately mid-way between Abiquiu Reservoir and the community of Cuba, New Mexico. Cuba is approximately 80 miles northwest of Albuquerque which is the largest city in New Mexico (see map figures enclosed).

The proposed project involves removal of the failing flume and construction of a new flume with reinforced concrete inlet and outlet structures. The new flume will be welded steel pipe supported by two reinforced concrete supports. Portions of the arroyo bank will be protected with rock rip-rap. The construction area will be approximately 50 feet in width by 350 feet in length; covering about 0.4 acres. The project utilizes a design prepared by the U.S. Department of Agriculture Natural Resources Conservation Service.

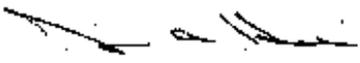
The Corps is seeking early input for consideration during planning of the project. Your input will be used in preparing an environmental assessment to comply with the National Environmental Policy Act (NEPA). Therefore, please use this opportunity for the people of your community to identify any potential issues or areas of concern. Written comments,

supporting information, data and/or references should be submitted no later than May 28, 2004.

Please provide written comments regarding environmental concerns to Patty Phillips, Biologist; and, comments regarding cultural resources to Gregory Everhart, Archaeologist, at the above address.

If you have any questions or require additional information, please contact Ms. Phillips at (505) 342-3354 or Mr. Everhart at (505) 342-3352.

Sincerely,



Julie A. Hall
Chief
Environmental Resources Section

Enclosures

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Chairman, Comanche Indian Tribe
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Lawton, OK 73502

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Governor, Pueblo of Pojoaque
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Santa Fe, NM 87506

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Chairman, Hopi Tribal Council
Post Office Box 123
Kykotsmovi, AZ 86039

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Post Office Box 1846
Taos, NM 87571

Mr. Richard Aspenwind, Cultural Affairs
Pueblo of Taos
Post Office Box 1846
Taos, NM 87571

THE HOPI TRIBE



Wayne Taylor, Jr.
CHAIRMAN

May 11, 2004

Julie A. Hall, Chief, Environmental Resources Section
Department of the Army, Albuquerque District, Corps of Engineers
4101 Jefferson Plaza, NE
Albuquerque, New Mexico 87109-3435

Rec'd 6-1-2004
GDE

Dear Ms. Hall,

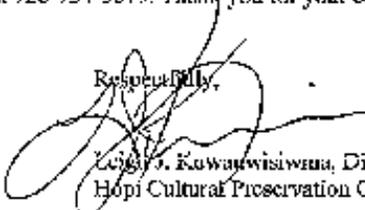
This letter is in response to your two correspondences to Chairman Taylor dated April 27, 2004, and May 6, 2004, and a correspondence from Science Applications International Corporation dated April 19, 2004, regarding the U.S. Army Corps of Engineers preparing environmental assessments for the proposed (1) rehabilitation of an irrigation flume on the Gurule-Gonzales Acequia system in Gallup, (2) rehabilitation of an irrigation diversion/slicing structure on the Tierra Amarilla acequia system, and (3) the diversion dam that regulates the flows for the Los Gonzales Acequia in San Miguel County.

The Hopi Tribe claims cultural affiliation to prehistoric cultural groups in New Mexico, and the Hopi Cultural Preservation Office supports the identification and avoidance of prehistoric archaeological sites and Traditional Cultural Properties. Therefore, we appreciate your solicitation of our input and your efforts to address our concerns.

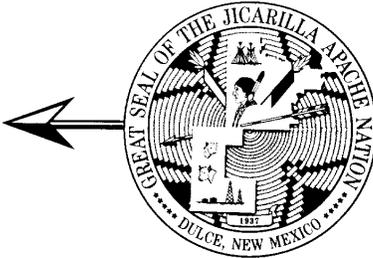
The Hopi Cultural Preservation Office is not aware of any Hopi Traditional Cultural Properties in these project areas. However, if the State Historic Preservation Office requests a cultural resources survey or overview of the project areas, please provide us with a copy for review and comment. In addition, we recommend that if any cultural features or deposits are encountered during project activities, these activities must be discontinued in the immediate area of the remains, and the State Historic Preservation Office must be consulted to evaluate their nature and significance. If any Native American human remains or funerary objects are discovered during construction they shall be immediately reported as required by law.

Should you have any questions or need additional information, please contact Terry Morgart at the Hopi Cultural Preservation Office at 928-734-3619. Thank you for your consideration.

Respectfully,


LeRoy J. Kawaywisiwma, Director
Hopi Cultural Preservation Office

cc: New Mexico State Historic Preservation Office



THE JICARILLA APACHE NATION

P.O. BOX 507 • DULCE, NEW MEXICO • 87528-0507

Rec'd 6-17-2004
GDE

*Jicarilla Apache
Traditional
Culture
Committee*

June 15, 2004

Irvin M. Phone
President

Howard Vigil
Vice President

Myra Sandoval
Secretary

Bryan F. Vigil
Treasurer

Gregory Everhart, Archaeologist
Planning, Project and Program Management Division
Environmental Resources Section
Department of the Army
4101 Jefferson Plaza NE
Albuquerque, NM 87109-3435

Subject: Rehabilitation of irrigation flume on the Gurule-Gonzales Acequia System

Dear Mr. Everhart,

*"dedicated to the
preservation
and
perpetuation
of the
Jicarilla Apache
culture
and
traditions"*

I am responding to the consultation request the Jicarilla Apache Nation received from Julie A. Hall, Chief, Environmental Resources Section regarding the above referenced project. We have no objection to the proposed project proceeding. We support any efforts to protect cultural properties that may have been identified in the cultural resources survey.

In the event of an inadvertent discovery of human remains or associated funerary objects, we are requesting immediate notification of such finding. If you have any questions, please feel free to call me at 505-759-1343.

Sincerely,

Lorene Willis, Director
Jicarilla Apache Cultural Affairs

Cc: Vice President Lamavaya Caramillo



APPENDIX B
CULTURAL RESOURCES SURVEY REPORT

1 **CULTURAL RESOURCES SURVEY REPORT FOR THE**
2 **GONZALES-GURULE ACEQUIA**
3 **RIO ARRIBA COUNTY, NEW MEXICO**

4 Prepared by
5 Neal W. Ackerly, Ph.D. and
6 Esther Steudli
7 Dos Rios Consultants, Inc.
8 P.O. Box 1247
9 Silver City, NM 88062

10 *under subcontract to*

11 **Science Applications International Corporation**

12 for the
13 U.S. Army Corps of Engineers, Albuquerque District

14 **August 2004**

15 **New Mexico Cultural Resources Information System No. 88967**

1

ACRONYM LIST

- | | | |
|---|--------|--|
| 2 | Corps | U.S. Army Corps of Engineers, Albuquerque District |
| 3 | GPS | Global Positioning System |
| 4 | NMCRIS | New Mexico Cultural Resource Information System |
| 5 | OSE | Office of the State Engineer |
| 6 | DOQQ | Digital Ortho Quarter Quad |
| 7 | UTM | Universal Transverse Mercator |

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1 **1.0 ABSTRACT**

2 On June 18 and 19, 2004, Dos Rios Consultants, Inc., subcontractor to Science Applications International
3 Corporation under contract to the United States (U.S.) Army Corps of Engineers, Albuquerque District
4 (Corps), conducted a cultural resources inventory of the proposed construction area of the Gonzales-
5 Gurule Acequia (LA134776) in Rio Arriba County, New Mexico under New Mexico Cultural Resource
6 Information System (NMCRIS) Number 88967. A Class III (100%) field inspection of the planned
7 construction, staging, and borrow areas, totaling about 3 acres, was completed. The survey was conducted
8 in anticipation of the proposed replacement of the pipe flume and siphon that currently carry water from
9 the Gonzales-Gurule Acequia across the Gurule Arroyo. The cultural resources investigation also
10 documented the alignment of the acequia and location of ditch structures. Aside from the Gonzales-
11 Gurule Acequia itself, no prehistoric or historic cultural remains eligible for inclusion in the National
12 Register of Historic Places were found within the boundaries of the proposed project area. An abandoned
13 animal pen of recent vintage and a grave were found near the proposed staging area. Although these are
14 not important archaeologically, they should be avoided as they are on private property. Also, within the
15 boundaries of the Gonzales-Gurule Acequia, there is a wooden open-box flume dating to the 1920s,
16 scheduled for demolition by the Acequia (Jacquez 2004). The recordation and documentation presented in
17 this report has exhausted the research potential of this structure. Based on the findings of this survey, it is
18 recommended that a clearance be granted for this project. There would be no adverse effect to historic
19 properties resulting from the proposed rehabilitation project.

20 **2.0 INTRODUCTION**

21 The Corps, at the request of the New Mexico Office of the State Engineer (OSE) and Gonzales-Gurule
22 Acequia, is planning a project that would replace a siphon pipe across an arroyo. Work would be
23 conducted under the Water Resources Development Act of 1986 (Public Law 99-662), which authorized
24 the Corps to conduct the restoration and rehabilitation of irrigation ditch systems and acequias in New
25 Mexico. Under Section 1113 of the Act, Congress found that New Mexico’s acequias date from the
26 eighteenth century and, due to their significance in the settlement and development of the western U.S.,
27 should be restored and preserved for their cultural and historic value to the region. The Secretary of the
28 Army has been authorized and directed to undertake, without regard to economic analysis, such measures
29 as are necessary to protect and restore New Mexico’s acequias. The proposed improvements to this
30 acequia satisfy the intent and purpose of this legislation.

31 **3.0 DESCRIPTION**

32 The Gonzales-Gurule Acequia is located in Rio Arriba County, New Mexico (**Figure 1**), in Sections 11,
33 12, 13, 14, and 24 of Township 23 North and Range 1 East (Gallina, NM 7.5’ Quadrangle [1963]; 36106–
34 B7). The acequia, believed to be built in the 1880s, heads at Rio Capulin and flows for approximately 4.2
35 miles before ending in the fields of Henry Jacquez, the majordomo of the acequia. The acequia serves 8
36 irrigators and at least 120 acres of land (Jacquez 2004; OSE 1987:72). The acequia flows intermittently,
37 depending on the winter rains; water rotation begins at the start of the growing season. Crops grown
38 include mixed pasture, hay, and some small grains such as oats and wheat.

39 The nominal acequia right-of-way width is 25 feet. A number of field laterals extend from the acequia,
40 but these are privately maintained and not considered part of the Gonzales-Gurule Acequia
41 administratively. The proposed rehabilitation project would replace the pipe flume and siphon that
42 currently carry water from the Gonzales-Gurule Acequia across the Gurule Arroyo. Since construction of
43 the siphon in the 1960s, the arroyo has widened and eroded around the pipe causing the pipe to sag below
44 its original elevation. Further, the soil covering the pipe is corrosive and has weakened the steel in the
45 pipe. The proposed project would run a wrapped steel pipe across the arroyo, thereby eliminating leaks
46 and ensuring reliable water delivery.

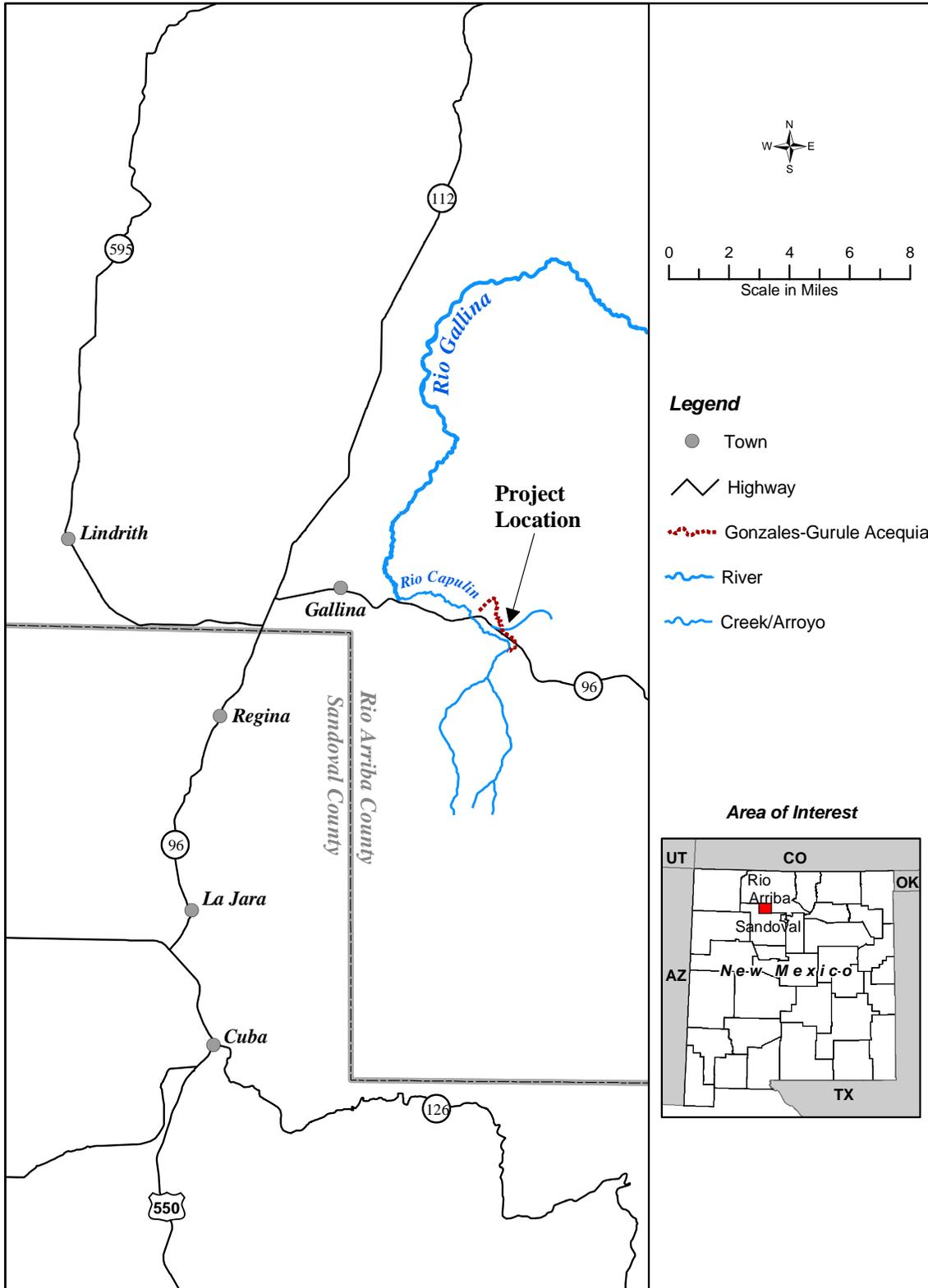


Figure 1. Regional Map of the Gonzales-Gurule Acequia

1

2

4.0 CULTURE HISTORY

Much of what is known about the prehistory of the region derives from archaeological research conducted on adjoining portions of the Santa Fe National Forest, specifically Scheick’s (1996) Region 3, or the Jemez Ranger District. There were at least 2,346 known sites in this region in 1996, most of which were fieldhouse sites associated with agricultural pursuits (Scheick 1996: Tables 4.119 to 4.122).

In general, the prehistory of the Santa Fe National Forest and surrounding region is divided into seven major periods (**Table 1**). The earliest evidence of human occupations in the region occurs in the PaleoIndian Period. This is followed by the Archaic Period during which the beginnings of agriculture emerge. Subsequent prehistoric developments are divided into the Developmental (A.D. 500–1100), Coalition (A.D. 1100–1300), Classic (A.D. 1300–1450), and Protohistoric (A.D. 1450–1598) Periods. The Historic Period (A.D. 1598–present) encompasses the remainder of cultural manifestations in the region. Each of these periods is discussed in more detail below.

Table 1. Alternate Culture History Periodization Schemes

Pecos (Kidder 1927)	Age	Period (Scheick 1996)	Period (Santa Fe NF)
PaleoIndian	9000–5000 B.C.	PaleoIndian	PaleoIndian
Archaic	5000–3000 B.C.	Early Archaic	Archaic
	3000–1800 B.C.	Early-Middle Archaic	
	1800 B.C.–A.D. 1	Middle-Late Archaic	
Basketmaker II	A.D. 1–500	Late Archaic	
Basketmaker III	A.D. 500–700	Developmental	Developmental
Pueblo I	A.D. 700–900		
Pueblo II	A.D. 900–1100		
Pueblo III	A.D. 1100–1300	Coalition	Coalition
Pueblo IV	A.D. 1300–1600	Classic	Classic (A.D. 1300-1450)
Pueblo V	A.D. 1600–1700	Protohistoric (A.D. 1540-1598)	Protohistoric
	A.D. 1598–1821	Spanish Colonial	Spanish Colonial
	A.D. 1821–1846	Mexican	Mexican
	A.D. 1846–1912	Territorial	Territorial
	A.D. 1912–1945	Statehood	Statehood
	A.D. 1945–present	Atomic	Atomic

1 **Prehistoric Period**

2 *PaleoIndian Period (pre-9000 B.C. to 5000 B.C.)*

3 The PaleoIndian Period was characterized by relatively small bands of hunters relying on large, now
4 extinct, Pleistocene megafauna. The New Mexico sites are consistent with a focus on large game animals
5 such as mammoth and bison, many of which were migratory. PaleoIndian sites are ephemeral, reflecting
6 periodic movement of camps to areas where animals might be found. At the same time, there is some
7 evidence of reliance on plant resources. There were no sites dating to PaleoIndian times in Region 3,
8 although this scarcity may be more apparent than real because vegetation makes such sites difficult to
9 locate (Scheick 1996:207).

10 *Archaic Period (5000 B.C. to A.D. 600)*

11 The Archaic Period is signaled by the extinction of earlier Pleistocene fauna caused by the combined
12 effects of drought and hunting by PaleoIndian peoples. Although hunting continued to be important
13 throughout the Archaic Period, there was greater reliance on gathering wild plant resources (Scheick
14 1996:207). Correlating with this subsistence shift is the appearance of new classes of artifacts, notably
15 ground stone implements used to process plant foods for consumption.

16 As in the PaleoIndian Period, Archaic hunting-and-gathering groups remained small in size, probably
17 consisting of no more than a few co-residential, extended families (Scheick 1996:208). Archaic sites are
18 somewhat more visible than PaleoIndian sites, but remain relatively ephemeral (Scheick 1996:211). This
19 is consistent with high mobility when groups continually move to take advantage of geographic and
20 seasonal variations in the availability of plant and animal resources.

21 General trends in the number of Archaic sites show that Region 3 of the Santa Fe National Forest was
22 used largely during the late Archaic period (Scheick 1996:190). Potential Archaic Period sites comprise
23 only 8.6 percent of all known sites in Region 3 and most date to late Archaic times (Scheick 1996:90,
24 208). Of the sites for which information is available, most consist of simple artifact scatters, particularly
25 stone tool manufacturing localities, without visible evidence of features (Scheick 1996: 211).

26 There are no known early Archaic (5500 to 3200 B.C.) sites in the region. There are a few middle Archaic
27 sites, but most date to late Archaic (3200 B.C. to A.D. 400) times. Population growth was not very
28 pronounced. It appears that the higher elevations of Region 3 may have been used seasonally by groups
29 residing at lower elevations.

30 The earliest evidence of domesticated crops, notably maize, appears in late Archaic sites. Recent direct
31 dates on corn remains suggest that cultigens began to appear in the broader region between 850 B.C. and
32 A.D. 400 (Scheick 1996:210). This presages the much greater reliance on domesticated crops that
33 characterizes the later prehistory of the region.

34 *Developmental Period (A.D. 600 to 1175)*

35 During the Developmental Period in Region 3, especially in upper elevations, seasonal hunting and
36 gathering continued by Puebloans residing in lower elevation agricultural villages (Scheick 1996:215).
37 For this reason, some suggest that archaeological manifestations from this period would closely resemble
38 those from earlier Archaic occupations. However, sites dating to the Developmental Period have been
39 interpreted by some as potentially reflecting population in-migration from the northeastern part of New
40 Mexico (Scheick 1996:217).

41 Only about 0.4 percent of the overall number of known sites in Region 3 date to the Developmental
42 Period (Scheick 1996:211). Further, most of the larger and more easily recognized sites are found at lower
43 elevations in riparian settings downstream of San Ysidro, New Mexico (Scheick 1996:214).

1 Of the very few sites for which information is available, early Developmental Period sites generally
2 consist of either (1) artifact scatters with few or no features of any kind or (2) pithouses and/or surface
3 dwellings and associated refuse deposits (Scheick 1996:211).

4 *Coalition Period (A.D. 1175 to 1325)*

5 The Coalition Period, as manifested in Region 3 of the Santa Fe National Forest, varies markedly from
6 patterns observed in other parts of northern New Mexico. During this period, populations in Chaco
7 Canyon in northern New Mexico and Mesa Verde to the northwest experienced substantial declines
8 accompanied by the complete abandonment of sites. During this period, the number of occupations in the
9 upper reaches of the Jemez watershed increased somewhat, leading some to infer in-migration from areas
10 to the west (Scheick 1996:217). However, Coalition Period sites comprise only about 2 percent of the
11 overall number of known sites in the region (Scheick 1996:215).

12 Coalition Period settlements, notably Vallecitos Viejo, were typified by large above-ground masonry
13 roomblocks containing 60 to 70 rooms (Scheick 1996:216). Such patterns are consistent with a very
14 intensive but seemingly short-lived occupation of riparian areas in the Santa Fe National Forest which
15 lasted only two centuries. As in Developmental times, most known sites are found in lowland valleys that
16 contain agricultural lands.

17 *Classic Period (A.D. 1325 to 1600)*

18 About one-half of all known sites (1,396) in Region 3 date to the Classic Period (Scheick 1996:218).
19 Archaeological data suggest that many Coalition Period pueblos were abandoned and the region's
20 inhabitants reordered into larger, more defensible pueblos (Scheick 1996:221). However, in higher
21 elevations most sites consisted, in declining order of importance, of "fieldhouses," small room blocks,
22 and pueblos with five or more rooms. Large villages made up of multiple roomblocks are rare, and most
23 are situated on mesa tops (Scheick 1996:218-219).

24 The settlement patterns seen in Region 3 during the Classic Period may reflect a semiannual alternation
25 between large riverine villages in winter, followed by dispersal into smaller outlying farmsteads during
26 the summer months. Caused in part by population growth, this pattern would have led to an extension of
27 agricultural pursuits into progressively more marginal areas (Scheick 1996:221).

28 *Protohistoric Period (A.D. 1540 to 1598)*

29 The Protohistoric Period encompasses a relatively short interval between initial Spanish contact and the
30 establishment of the first Spanish settlement near San Juan Pueblo to the east in A.D. 1598. There is no
31 evidence to suggest that the region was occupied by Tewa elements during the seventeenth and eighteenth
32 centuries (Schaafsma 2002:200-207). Rather, pueblos ancestral to modern Tewa pueblos appear to have
33 been concentrated along the Rio Chama below Abiquiu.

34 **Historic Period Occupations**

35 *Spanish Colonial Period (A.D. 1598 to 1821)*

36 The Spanish Colonial Period refers to the period between the establishment of the first Spanish settlement
37 near San Juan Pueblo and Mexican independence in 1821. Early Spanish expeditions, including those of
38 Coronado (1540), Chamuscado-Rodriguez (1581-1582), and Sosa (1589), largely bypassed the Jemez
39 region. Settlement was impeded by the threat of raiding by Navajos and Utes.

40 Initially, at least, Spanish contact with indigenous peoples residing in the Jemez region promised to be
41 intense. In 1598, Oñate reportedly visited nine villages in the Jemez region (Scheick 1996:222). In that
42 same year, a priest was stationed at the village of Giusewa, an ancestral Jemez pueblo, only to leave in
43 1601 (Scheick 1996:222). After a 20-year hiatus, the mission was reestablished by Salmeron (Scheick
44 1996:223).

Spaniards' oppressive use and abuse of Native American labor, along with the introduction of Spanish diseases, may have caused the population to plummet from almost 6,000 at the time of contact to as few as 3,000 by 1630 (Ayer 1965:24-25, 242). By 1630, Benavides' account indicates that Navajos were present along the Rio Chama upstream from Santa Clara Pueblo and extending as far upriver as the Piedra Lumbre valley (Ayer 1965:44; Schaafsma 2002:241). Their persistence across the region is confirmed by the 1687 Peñalosa map (Schaafsma 2002:259).

Faced with persistent hostile tribes, including both Navajos and Utes, the Spaniards did not settle the upper reaches of the Rio Chama watershed until the middle to late eighteenth century (Swadesh 1974: 34; Wozniak et al. 1992:13-14, 27, 31, 61, 102). For example, the land grant of El Barranco located 2 miles west of Abiquiu was not awarded until 1735 (Julyan 1996:118), while the Abiquiu Land Grant was not founded until 1740 (Julyan 1996:2).

A 1744 census showed only 20 Spanish families near Abiquiu and another 46 families near Ojo Caliente (Swadesh 1974:34). Early efforts to settle the headwaters and tributaries of the Rio Chama were aborted in 1747, only to be resumed a few years later (Swadesh 1974:17, 35; Wozniak et al. 1992:119, 125). A 1758 Spanish inscription from the Abiquiu Reservoir area and a tree-ring date of A.D. 1760 from a Navajo Protohistoric site (LA25322), which also contained Spanish ceramics, suggests seasonal shepherding along the Rio Chama as far upstream as Piedra Lumbre by the mid-eighteenth century (Wozniak et al. 1992:103, 114). Tamaron's pastoral visitation of 1760 noted that the village of Abiquiu had, at that time, a population of 166 Indians and 617 Spaniards (Adams 1953:292), while the Pueblo of Jemez had only 373 persons (Adams 1953:295). Similarly, Dominguez's pastoral visitation of 1776 to Abiquiu and Jemez Pueblo noted that Abiquiu had 254 Spaniards and 136 Indians (Adams and Chavez 1956:126), while Jemez Pueblo had a population of 345 (Adams and Chavez 1956:181). Perhaps the broadest sense of in-migration rates can be gleaned, at least in part, from De Anza's estimates that the population of Abiquiu increased from 176 people in 1765 to 851 people in 1779 (Thomas 1932:95; Swadesh 1974:46).

In short, the countryside in the region was sparsely settled. Spanish Colonial occupations are relatively uncommon and documentary materials provide few insights into activities during this period. Investigations near the Abiquiu Reservoir to the east indicate that the majority of activities during this period likely revolved around seasonal herding and the establishment of small, scattered farmsteads (Swadesh 1974:32; Wozniak et al. 1992:152).

Mexican Period (A.D. 1821 to 1846)

The Mexican Period begins in 1821 and ends with the Anglo-American occupation of the territory in 1846.

There is some suggestion that portions of the Rio Capulin were included as part of the original San Joaquin del Rio Chama Grant (Swadesh 1974:49). During this period, Gallina (also known as Jaquez), the modern town nearest the Gonzales-Gurule Acequia, was founded by Antonio Ortiz in 1818. The much larger land grant of Tierra Amarilla was not established until 1832 (Julyan 1996:143, 353). These grants indicate that the area began to be occupied during the early Mexican Period, although details regarding subsequent developments are minimal.

According to Bloom (1913:14), Abiquiu was identified as a post for a detachment of soldiers, although it is not clear whether this actually took place. In 1821, Abiquiu and the surrounding region had population estimates of 3,275, while the Pueblo of Jemez's population was estimated at 864 (Bloom 1913:28). As in Spanish Colonial times, the region was not heavily occupied. Economic activities continued to focus on seasonal herding and cultivation of crops at small, scattered farmsteads. With the establishment of the Old Spanish Trail (1829-1830), Abiquiu became an important port and trading center, and outlying settlements likely began to provide supplies for sale to west-bound travelers (Swadesh 1974:60-61; Wozniak et al. 1992:157).

1 *Territorial Period (A.D. 1846 to 1912)*

2 The Territorial Period refers to the period between the 1846 arrival of American troops in New Mexico
3 and New Mexico statehood in 1912. Unlike other parts of New Mexico, the area was often bypassed by
4 early Anglo-Americans arriving with General Stephen Watts Kearny in 1846. Josiah Gregg, Henry
5 Turner, A. W. Whipple, and others, some of the earliest chroniclers of Territorial New Mexico, never
6 traveled in the region. Accordingly, vintage narratives are sparse.

7 In May, 1852, James Bennett (Brooks and Reeve 1948:42), recounting passing through the Jemez valley,
8 added that he:

9 Proceeded to Jemez of which I have spoken on Nov. 14, 1851. Travelled [sic] through the
10 finest mountain country I have seen. Wild game is here in abundance. Camped in the
11 mountains. Navajo Indians had been here but had left.

12 As elsewhere, land grant fraud in the mid-nineteenth century directly affected Hispanic settlers who, in
13 some instances, had lived in the region for decades. The San Joaquin Grant was alienated by William
14 Blackmore, Thomas Catron, and others, so that the residents of such small villages as Gallina, Capulin,
15 Coyote, and Canjilon were left with only the lots on which their houses were situated and small irrigated
16 fields (Swadesh 1974:70).

17 According to local lore, the Gonzales-Gurule Acequia was established in the 1880s, diverting water from
18 the Rio Capulin. Early descriptions of acequia systems on the Rio Capulin, including those of Follett
19 (1898) and Yeo (1910), do not provide sufficiently detailed information to accurately identify the
20 Gonzales-Gurule Acequia. Accordingly, its early operating characteristics are unknown.

21 *Statehood (A.D. 1912 to present)*

22 There is very little information regarding the region during the twentieth century. Even today, priority
23 dates for acequias situated in tributaries of the headwaters of the Rio Chama have yet to be adjudicated
24 and hydrographic surveys of acequias such as the Gonzales-Gurule Acequia have not been completed.

25 Current statistics compiled by the OSE indicate that the Gonzales-Gurule Acequia provides water to eight
26 (8) irrigators farming approximately 120 acres (OSE 1987; Jacquez 2004). During recent years, many of
27 the small villages on tributaries of the Rio Chama have struggled to maintain both their economic
28 viability and self-identity.

29 **5.0 METHODOLOGY AND SURVEY RESULTS**

30 **5.1 Methodology**

31 Prior to conducting the field survey of the proposed project area, the NMCRIS was queried to determine
32 if any known cultural resources were previously identified near the project area. A total of 24 sites have
33 been previously identified within 1 mile of the acequia. No prehistoric or historic sites have been
34 previously identified within boundaries of the project area.

35 A Class III (100%) intensive pedestrian survey of the planned construction, staging, and borrow areas,
36 totaling about 3 acres, was completed using 15-meter transects. The survey conformed to State of New
37 Mexico and Federal standards. The entire length of the Gonzales-Gurule Acequia alignment was walked;
38 the inlet, locations of water control structures (e.g., culverts, check structures, taps), and the terminus of
39 the acequia were recorded using Garmin® 12-channel Global Positioning System (GPS) with an intrinsic
40 accuracy of ± 3 to 5 meters. Water was running in the acequia at the time of the inspection, limiting
41 detailed examinations of the bottom and sides of the alignment.

5.2 Previous Archaeological Studies

A total of 24 sites was previously identified within a 1-mile radius of the acequia and planned project area. Of these 24 sites, 13 fall within the immediate vicinity of the planned project area.

Of the 13 nearest sites, nine (LA24172, LA24214, LA24215, LA24218, LA24219, LA107262, LA119698, LA134387, and LA134399) are prehistoric sites. One of these prehistoric sites (LA134399) is an Archaic site dating from 5500 B.C. to A.D. 1200. The remaining 8 prehistoric sites contain characteristics of the Anasazi culture; the earliest date for these sites is A.D. 1000 and the latest date for these sites is A.D. 1300. The four remaining sites include a single historic site, two multi-component sites, and a site of unknown age. The historic site (LA134776) is the Gonzales-Gurule Acequia. The first of the multi-component sites (LA134388) contained Anasazi cultural characteristics dating from A.D. 1100 to A.D. 1275 and Anglo-American cultural characteristics dating from A.D. 1940 to A.D. 1960. The second multi-component site (LA134390) contained Hispanic cultural characteristics dating from A.D. 1897 to A.D. 1940, and unknown cultural characteristics probably dating from 9500 B.C. to A.D. 1880. The last site (LA134400) is attributed to an unknown culture and contained no temporally diagnostic artifacts.

All 24 sites are located within the boundaries of the Southwestern Region (Region 3) of the Santa Fe National Forest as a result of forest management activities. Nearly all of these sites, including the 13 closest sites, have been identified and revisited by 10 projects. The majority of these projects fall into three types: archaeological surveys (Fulgham 1985; Dussinger 2001; Hill and Willis 1995; Horton 1998; Raymond et al. 2003; Salazar 1980); archaeological surveys with cultural overviews and literature reviews (Baldwin 2002; Schub 2002); and monitoring/damage assessments (Yates 1995). One additional project, a monitoring/damage assessment project, is currently in progress by the Forest Service.

Three other projects were archaeological surveys (Lawrence 1984; Scheick 1987; Viklund 1987), and the fourth project was a damage assessment of site LA23926 (Cartledge 1986).

5.3 Survey Results

The Gonzales-Gurule Acequia (LA134776) is the only archaeological resource eligible for the NRHP found in the immediate vicinity of the project area. A wooden flume, built in the 1920s, formerly used to carry water across the Gurule Arroyo is still partially extant, although no longer in use. There are no known Traditional Cultural Properties in the project area.

Table 2 lists the locations and attributes of water control structures and acequia-related features identified in the Gonzales-Gurule Acequia alignment shown in **Figure 2**. Representative examples of structures are shown in **Photographs 1** through **18**. **Photographs 19** and **20** show the proposed staging and borrow areas.

Much of the proposed staging area has been previously disturbed and no evidence of prehistoric or historic cultural remains was identified. However, a recent grave (UTM Zone 13, E 338948 and N 4010176, NAD27) is located just outside of the designated staging area. It is enclosed by a chain link fence that is highly visible, and care should be taken to avoid this grave (**Photograph 21**). An abandoned animal pen that has been converted to a dumpster is located along the edge of the arroyo (UTM Zone 13, E 338965 and N 4010218, NAD27) in the staging area. The proposed borrow area is largely undisturbed. A few areas that were previously bulldozed were examined for evidence of cultural remains, but no evidence of prehistoric or historic cultural remains was found.

An abandoned flume still present in the project area is presented in **Figure 3** and **Photographs 22** to **25**. This 1920s vintage flume originally spanned the Gurule Arroyo just a few meters upstream of the existing 1960s siphon (Jacquez 2004). The structure, which spanned approximately 37 meters (121.5 feet) and measures about 2.5 meters (8 feet) wide, is constructed of cut logs, milled lumber, and tin. The flume is constructed of 2-inch by 12-inch milled lumber to form a three-sided box and the interior is lined with tin.

1 Milled 2-inch by 4-inch lumber lengths were used as cross-ties across the upper side of the box to help
 2 hold the flume together (**Figure 4**). The trestle was constructed using cut log uprights partially buried in
 3 the earth. Milled lumber was then nailed to the uprights to hold the structure together and provide support
 4 for the flume. The construction of this flume is consistent with construction techniques utilized in other
 5 flumes found across the state (Condie et al. 1987). A wood pipe (essentially a short segment of fully-
 6 enclosed, box-shaped wooden flume) carried water from the ditch to the flume.

7 The structure is incomplete and in poor condition. A portion of the flume has been removed for use
 8 elsewhere (Jacquez 2004); and much of the trestle has washed out. The structure is beginning to dry rot,
 9 and the support structure is beginning to shift from its original position. Although not a part of this
 10 project, the dilapidated structure is often frequented by local children who play and climb on the structure
 11 despite warnings from adults (Jacquez 2004) and, therefore, is considered a hazard by the townspeople
 12 who would like to see it demolished.

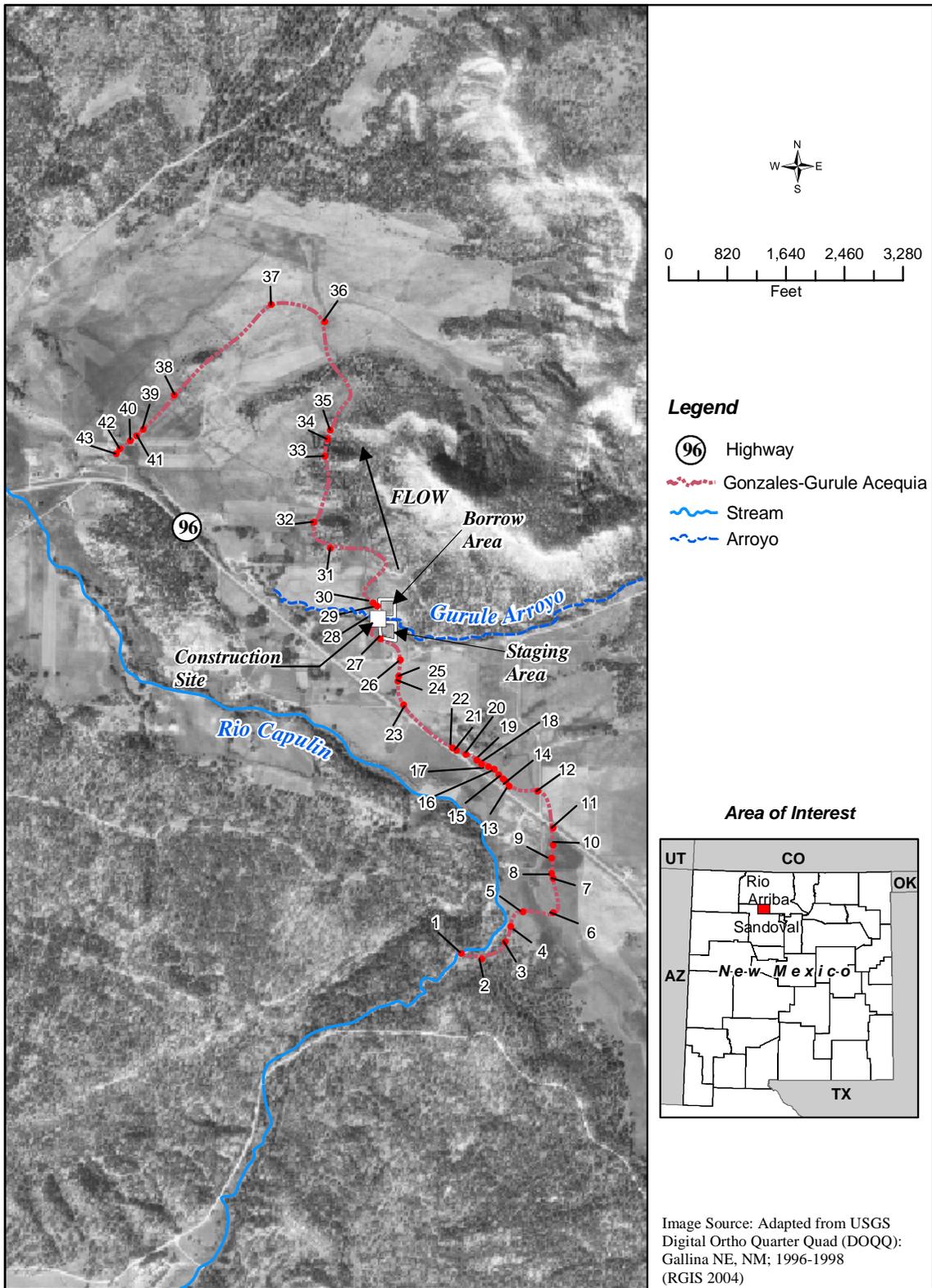
13 **Table 2. Locations of Structures and Key Points on the Gonzales-Gurule Acequia**

Point #	UTM		Structure
	Easting	Northing	
1	339260	4008978	Intake (Photograph #1)
2	339336	4009005	Overflow (Photograph #2)
3	339427	4009072	Fence
4	339508	4009162	Footbridge (Photograph #3)
5	339611	4009145	Fence
6	339646	4009359	Fence
7	339634	4009383	Pipe culvert under NM 96 (N) (Photograph #4)
8	339622	4009436	Cattle tank/water retention pond (Photograph #5)
9	339618	4009478	Pipe culvert under Rio Arriba Co. Rd 0422
10	339604	4009497	Field lateral
11	339602	4009497	Fence
12	339530	4009671	Check (Photograph #6)
13	339366	4009710	Metal Pipe lining (pipe split along length) begin (Photograph #7)
14	339352	4009714	Foot bridge and hose siphon
15	339342	4009719	Metal Pipe lining (pipe split along length) end (Photograph #8)
16	339325	4009735	Foot bridge
17	339323	4009746	Fence
18	339323	4009766	Foot bridge
19	339285	4009812	Foot bridge
20	339230	4009839	Check (Photograph #9)

Point #	UTM		Structure
	Easting	Northing	
21	339179	4009850	Fence
22	339168	4009851	Check (Photograph #10)
23	338948	4010072	Pipe culvert
24	338929	4010208	Sluice/pipe culvert (Photograph #11)
25	338923	4010215	Open wood (12x12) tin lined culvert, siphon over arroyo (Photograph #12)
26	338902	4010278	Water exits pipe, ditch unlined, pipe to lateral
27	338870	4010349	Fence
28	338873	4010476	Tap/Pipe culvert (Photograph #13)
29	338864	4010482	Fence
30	338675	4010728	Fence
31	338673	4010731	Check and tap (Photograph #14)
32	338597	4010882	Fence
33	338681	4011157	Metal and earthen check/retention pond (Photograph #15)
34	338656	4011237	Fence
35	338654	4011248	Check and tap (Photograph #16)
36	338649	4011726	Check and tap
37	338433	4011808	Fence
38	338017	4011408	Fence
39	337842	4011245	Earthen check
40	337860	4011273	Earthen check
41	337874	4011179	Earthen check (Photograph #17)
42	337774	4011179	Earthen check
43	337760	4011163	Terminus (Photograph #18)

Notes: UTM—Universal Transverse Mercator Coordinates are in UTM Zone 13, North American Datum of 1927, collected using a Global Positioning System with ± 3 to 5 meter accuracy.

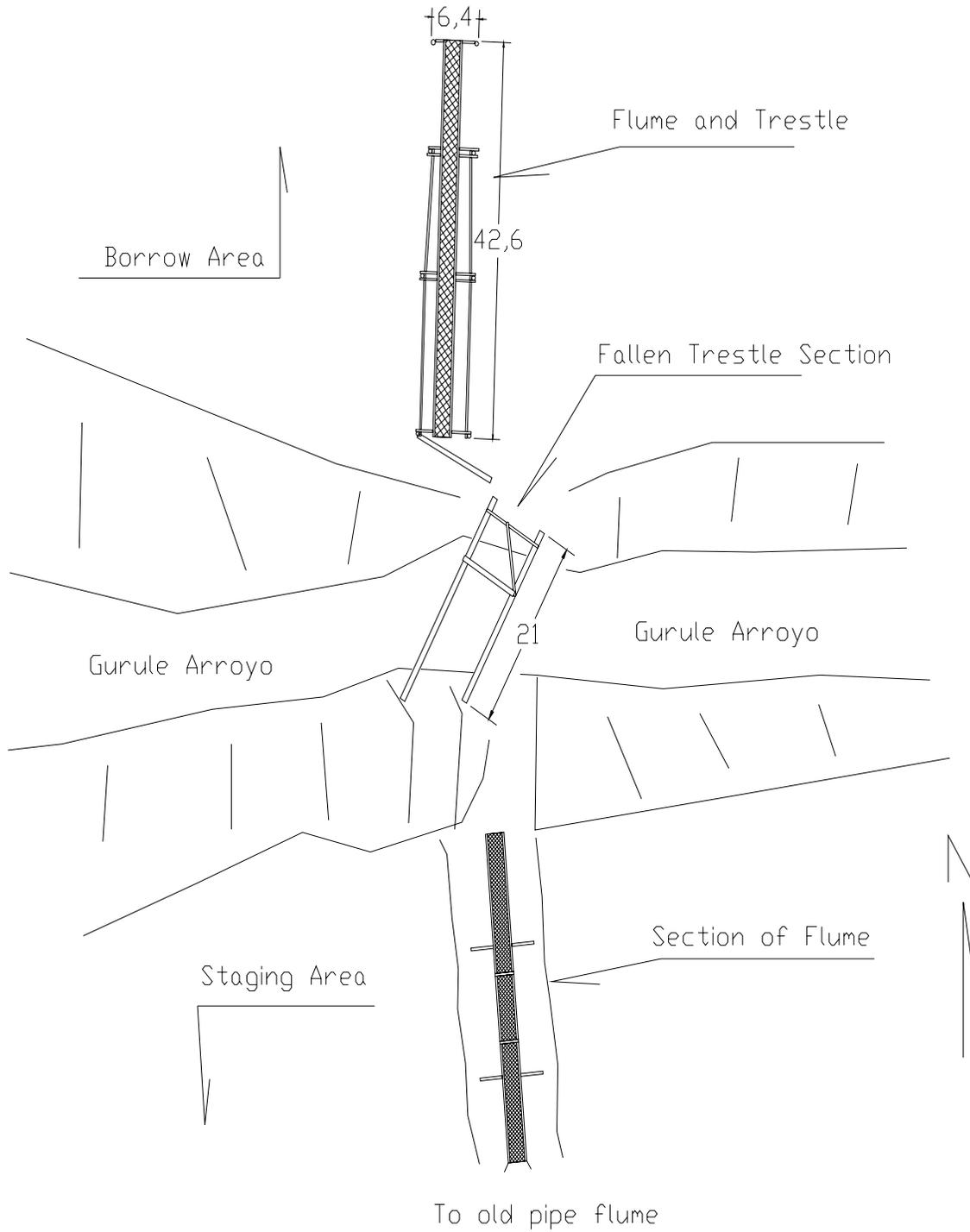
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1

Figure 2. Gonzales-Gurule Acequia Key Points and Structures

2



1 Note: Boundaries of the Gurule Arroyo presented in this map are approximations. The acequia flows south to north and the
2 arroyo flows east to west.

3 **Figure 3. Plan View of Abandoned 1920s Vintage Flume**

4



1

Photograph 1. Intake of the Gonzales-Gurule Acequia (Point #1)



2

Photograph 2. Earthen Overflow Check (Point #2)

3



1 **Photograph 3. Example of Footbridge Found on the Acequia (Point #4)**



2 **Photograph 4. Metal Pipe Culvert under NM 96 (Point #7)**

3



1

Photograph 5. Water Retention Pond (Point #8)



2

Photograph 6. Wooden Check Gate (Point #12)

3



1 **Photograph 7. Metal Pipe Split Along its Length Lines a Short Stretch of the Acequia (Point #13)**



2 **Photograph 8. Footbridge and Water Hose Siphon (Point #14)**

3



1

Photograph 9. Wooden Check Gate (Point #20)



2

Photograph 10. Wooden Check Gate (Point #22)

3



1 **Photograph 11. Sluice and Metal Pipe Culvert (Point #24)**



2 **Photograph 12. Tin-Lined Wood Culvert (Point #25)**

3



1

Photograph 13. Metal Pipe Check and Tap Gates (Point #28)



2

Photograph 14. Wooden Check and Tap Gates (Point #31)

3



1 **Photograph 15. Metal and Earthen Check Gate Used to Divert Water to Retention Pond (Point #33)**



2 **Photograph 16. Metal Check and Tap Gates (Point #35)**

3



1

Photograph 17. Earthen Check (Point #41)



2

Photograph 18. Gonzales-Gurule Acequia Terminus (Point #43)

3



1 **Photograph 19. Planned Staging Area, Facing South**



2 **Photograph 20. Planned Borrow Area, Facing North**

3



1

Photograph 21. Grave of Carlota Salazar (1917-2002)



2

Photograph 22. Profile View of Flume and Trestle, Facing West

3



1

Photograph 23. View of Fallen Trestle Section, Facing South



2

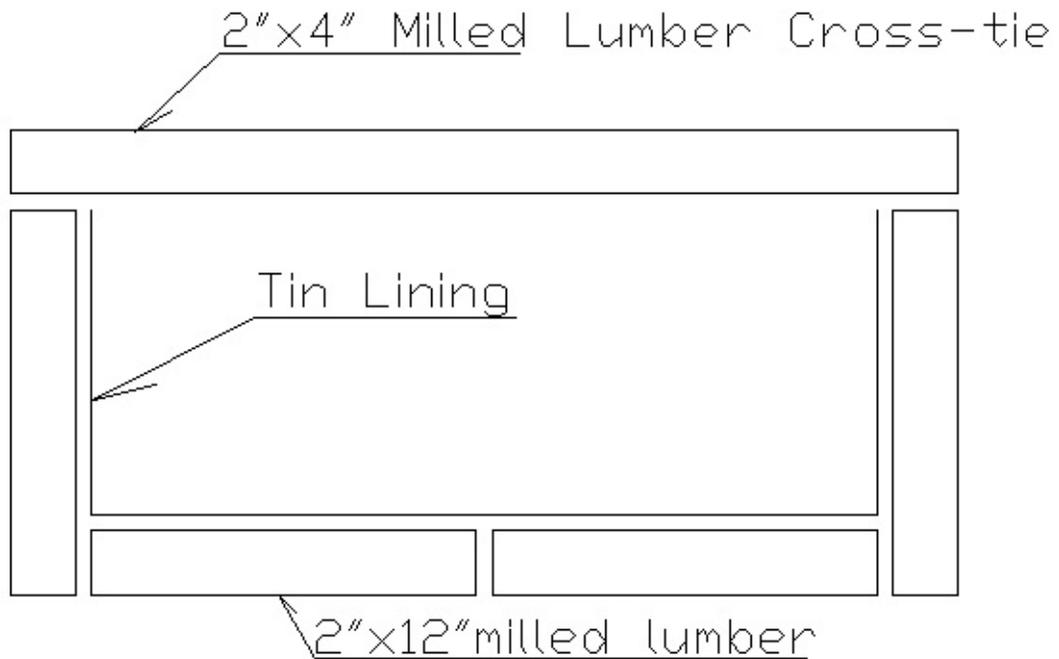
Photograph 24. Section of Flume on South Bank of Arroyo

3



1

Photograph 25. Old Pipe Flume Constructed of 2''x12'' Milled Lumber



2

Figure 4. Cross Section Showing the Construction of the 1920s Vintage Flume

1 **6.0 CONCLUSIONS**

2 No prehistoric or historic archaeological sites are known within or immediately adjacent to the Gonzales-
3 Gurule Acequia. A total of 24 archaeological sites are known within 1 mile of the ditch, but none would
4 be affected by the project. The Gonzales-Gurule Acequia (LA134776), located on the Gallina 7.5'
5 Quadrangle (1963; 36106-B7), has been previously identified and was investigated under NMCRIS
6 Number 88967. No formal determination of eligibility has been made, but the acequia is potentially
7 eligible for inclusion on the National Register of Historic Places under criteria (a) and (d) of 36 CFR 60.4.

8 It is likely that the Gonzales-Gurule Acequia has not been altered significantly since it was built in the
9 1880s. The ditch is unlined and, aside from annual ditch cleaning, little disturbance of the system has
10 occurred. A total of 30 structures, including culverts, check and tap gates, a siphon, and a check dam,
11 were identified along the length of this acequia. In total, these structures account for approximately 650
12 feet of modifications. No more than 3 percent of the ditch (which measures about 4.2 miles in length) has
13 been altered. As the proposed project would replace an existing structure, it would have little effect on the
14 overall extent of alterations to the ditch.

15 The Gonzales-Gurule Acequia, which obtains water from Rio Capulin, provides water for 8 irrigators and
16 at least 120 acres of land. It remains pivotal to the economy and cultural characteristics of the local area.

17 The 1920s vintage flume is slated for demolition by the Gonzales-Gurule Acequia members. The
18 recordation and documentation presented above has exhausted the research potential of this structure. As
19 such, there is no reason why the structure, which is considered a hazard by the residents of Gallina,
20 cannot be demolished.

21 No NRHP eligible prehistoric or historic cultural remains were found within the boundaries of the
22 proposed staging, construction, and borrow areas. However, a structure of recent vintage and a grave were
23 found in the vicinity of the proposed staging area. Although these are not important archaeologically, they
24 should be avoided.

25 The proposed project would have little effect on the alignment, form, or function of the acequia system.
26 Based on the proposed work and the findings of this survey, it is recommended that a clearance be
27 granted for this project. There would be no adverse effect to historic properties resulting from the
28 proposed rehabilitation project.

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