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AGUA FRIA CREEK RESTORATION PROJECT EL MALPAIS NATIONAL MONUMENT CIBOLA COUNTY, NEW MEXICO: CULTURAL RESOURCES SURVEY

Submitted to

# COLORADO STATE UNIVERSITY DEPARTMENT OF EARTH RESOURCES

Submitted by

# SWCA ENVIRONMENTAL CONSULTANTS

SWA INC.

May 2002

NATIONAL PARK SERVICE Water Resources Division Fort Collins, Colorado Resource Room Property







### STOCK TANK 28

This area is part of the present project but were not surveyed during the present survey. The area was previously surveyed in 2001 by the National Park Service for a prescribed burn and the discovered sites were recorded in 2002. A preliminary report of the survey's results was prepared by Chris Corey of the National Park Service's Western Archaeological and Conservation Center in Tucson. Arizona (Corey 2002).

In brief. one site. LA 135923 (ELMA 140). is located 40m southeast of Stock Tank 28. The site is a roughly triangular alignment of local vesicular basalt cobbles. There is some doubt as to whether the site is cultural or not. It is not considered eligible for inclusion to the NRHP. A second site. ELMA 141, is located about 200m southwest of Stock Tank 28. The site is a road feature but was not recorded or assessed for eligibility to the NRHP. . These sites will be affected by the proposed stream restoration activities, therefore no recommendations for treatment are necessary.

# EL CALDERON PARKING LOT

This area is part of the present project but were not surveyed during the present survey. The area was previously surveyed in 2001 by the National Park Service for a prescribed burn and the discovered sites were recorded in 2002. A preliminary report of the survey's results was prepared by Chris Corey of the National Park Service's Western Archaeological and Conservation Center in Tucson. Arizona (Corey 2002).

Site ELMA 112 is located along the access road to the El Calderon parking lot. The site was determined to be modern and not eligible to the NRHP. Site LA 135922 (ELMA 139) is located about 350 m southwest of the El Calderon parking lot. The site is a prehistoric stone circle with associated lithic artifacts and is considered eligible for inclusion to the NRHP. These sites will be affected by the proposed stream restoration activities, therefore no recommendations for treatment are necessary.

### Reference Cited

### Corey, Chris

2002 Trip Report. El Malpais National Monument, Cibola County, New Mexico, March 18 to 28, 2002. Western Archaeological and Conservation Center, Tucson, Arizona.

# AGUA FRIA CREEK RESTORATION PROJECT EL MALPAIS NATIONAL MONUMENT CIBOLA COUNTY, NEW MEXICO: CULTURAL RESOURCES SURVEY

Submitted to

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NMCRIS Activity No. 78565 SWCA Project No. 5946-024 SWCA Cultural Resources Report No. 02-237

May 31, 2002



# TABLE OF CONTENTS

# Page

Lis Lis Abs	t of Tablesii t of Figuresii stractiv
1.	INTRODUCTION
	PROJECT DESCRIPTION
2.	RESEARCH CONTEXT
	NATURAL SETTING
	CULTURAL SETTING2.1Paleoindian Period2.2Archaic Period2.2Ceramic Period (Anasazi Occupation)2.3Historic Pueblo Occupation2.5Navajo Occupation2.6Euroamerican Occupation2.7
	PREVIOUS STUDIES
3.	METHODS
4.	RESULTS OF THE SURVEY4.1
	SURVEY AREAS4.1Stock Tank 19-24.1Dam 304.1Diversion Ditch and Dike4.1Pine Dike4.3Access Roads4.3
	ARCHAEOLOGICAL REMAINS
	ISOLATED OCCURRENCES
	SUMMARY OF FINDINGS AND RECOMMENDATIONS
5.	REFERENCES CITED 5.1



### LIST OF TABLES

# 1.1. Locations of Surveyed Areas 1.3 4.1. Isolated Occurrences 4.13

Page

# LIST OF FIGURES

1.1.	Project Location and Surveyed Areas	1.2
4.1.	Survey Locations Map	4.2
4.2.	Site Map, LA 135589	4.4
4.3.	Stock Tank 19-2. View from north end of east berm	4.5
4.4.	Stock Tank 19-2. View along old fenceline leading into tanks	4.5
4.5.	Diversion ditch and dike	4.7
4.6.	Diversion ditch and dike	4.7
4.7.	Dam 30. Outflow pipe at base of dam	4.8
4.8.	Retaining wall at juncture of diversion ditch and Dam 30	4.8
4.9.	Dam 30. Headgate mechanism	
4.10.	. Dam 30. Headgate control mounting block on top of dam	4.9
4.11.	. Dam 30. View along length of dam	4.10
4.12.	. Dam 30. View of spillway	4.10
4.13.	. Dam 30. View along length of dam	4.11
4.14.	. Dam 30. View along perpendicular berm	

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### ABSTRACT

In 2002, SWCA conducted a cultural resources survey of two access roads and four work areas for the Agua Fria Creek Restoration Project, on federal land in El Malpais National Monument in Cibola County, New Mexico. The survey was completed under contract to the Department of Earth Resources, Colorado State University, Fort Collins. CSU, in turn, is conducting the stream restoration project for the Water Resources Division, National Park Service. The total area surveyed is 14.6 ha (36.0 acres).

Prior to fieldwork, SWCA completed a check at the Archaeological Records Management Section, N.M. Historic Preservation Division, Santa Fe, for previously recorded sites within 1.0 mile (1.6 km) of the survey areas. SWCA also checked the online listings for the National Register of Historic Places and State Register of Cultural Properties, for registered projects in or adjacent to the survey areas. SWCA also checked with the Chief Ranger for Resource Management, El Malpais National Monument, for previously recorded sites within the areas to be surveyed. The goals of the fieldwork were (1) to locate and record archaeological remains of an apparent or likely age of 50 years or more, as well as any standing historical buildings or structures within or next to the survey areas; and (2) to record and assess several identified historic water control devices within the survey areas.

SWCA's studies did not locate any listed historic properties or standing historical buildings or structures within or adjacent to the survey areas. The studies did not identify any previously recorded archaeological sites within the survey areas. The studies defined one new archaeological site (consisting of three former water control features) and four isolated occurrences of archaeological remains. None of the archaeological remains appears to be eligible for the National Register of Historic Places. We do not recommend any further study or treatment of cultural resources, prior to the proposed work in the surveyed areas. If previously unknown archaeological remains are encountered during the proposed stream restoration work, activity in that area should be halted and El Malpais National Monument staff should be notified immediately.

NMCRIS Activity No. 78765 SWCA Project No. 5946-024 SWCA Cultural Resources Report No. 02-237

# CHAPTER 1

# INTRODUCTION

On April 17, 2002, SWCA Environmental Consultants conducted an archaeological survey of four work areas and two access roads for the Agua Fria Creek Restoration Project, on federal land in El Malpais National Monument in Cibola County, New Mexico (Figure 1.1). The survey was completed under contract to the Department of Earth Resources, Colorado State University, Fort Collins. CSU, in turn, is conducting the stream restoration project for the Water Resources Division, National Park Service.

CSU's primary point of contact for the project was Mr. Samuel Kunkle, watershed specialist. Mr. Herschel Schulz, Chief Ranger, was the point of contact at El Malpais National Monument. SWCA's project manager and primary point of contact was Harding Polk. Kevin Wellman was the Principal Investigator. Harding Polk and William Crews conducted the field survey. William Crews and Colleen Shaffrey prepared the report illustrations. David Phillips edited the report and Jean Haglund produced the report.

### **PROJECT DESCRIPTION**

CSU's Department of Earth Resources has developed a comprehensive restoration plan for Agua Fria Creek in the northwest portion of El Malpais National Monument (Kunkle 2002). Before establishment of the monument in 1989, Agua Fria Creek had been dammed, diverted, and otherwise controlled. Today, none of the water control features in El Malpais National Monument is used or maintained, but they continue to lead to disturbance of the natural riparian habitat and meadow ecosystems, as well as flooding and silt deposition in the caves, lava tubes, and other geological features that are highlights of the monument. SWCA surveyed four proposed stream restoration work areas and two alternative routes for access roads. The total area surveyed is 14.6 ha (36.0 acres). The survey locations fall within the USGS Ice Caves, New Mexico 7.5-minute quadrangle. Table 1.1 provides the locations of the surveyed areas, which are described individually below.

Stock Tank 19-2 was built by excavating into a meadow and piling the earth on the north and south margins of the excavated area. The tank draws down the meadow's water table. CSU proposes to fill in the stock tank and small gullies downstream from the stock tank. The area will then be reseeded.

The Diversion Dike/Ditch begins near Stock Tank 19-2; water in the ditch flows around the base of a low hill before emptying into the reservoir formed by Dam 30. Besides originally conveying water diverted from Agua Fria Creek, the Diversion Dike/Ditch collects rainwater flowing down the hillside. The Diversion Dike/Ditch consists of a berm and channel. At the north end of the hill the berm is less than 1 m tall and the channel is exposed lava bedrock. At Dam 30 the berm is nearly 3 m





Figure 1.1 Project Location and Surveyed Areas.



Name of Area	Size in Meters	Square Meters	PLSS Data	UTM Zone 13 Values
Stock Tank 19-2	200 by 150	30,000	Section 19, SE of SE of SW Section 30, NE of NE of NW	Datum at N corner: E 770294, N 3875493
Diversion Dike/Ditch	600 by 30	18,000	Section 19, SW of SW of SE; NW of SW of SE; SE of SW of SE Section 30, NE of NW of NE	NW end: E 770453, N 3875654 Dam 30 end: E 770747, N 3875276
Dam 30	235 by 45	10,575	Section 19, NE of NW of NE; SE of NW of NE; SW of NE of NE	East end: E 770991, N 3875232 West end: E 770747, N 3875276
Pine Dike	600 by 60	36,000	Section 28, SE of NW of SW; NE of SW of SW; SE of SW of SW	NW end: E 773074, N 3874402 SE end: E 773216, N 3874128
Access Road 1	400 by 30 m	12,000	Section 19, SE of NW of SE; SW of NW of SE; NW of SW of SE; NE of SE of SW; SE of SE of NW	Begin: E 770533, N 3875583 End: E 770277, N 3876147
Access Road 2	1,300 by 30 m	39,000	Section 19, NW of NW of SE; NE of NE of SW; SE of NE of SW; SW of NE of SW; SE of NW of SW; NE of SW of SW; NW of SE of SW; SW of SE of SW; SE of SE of SW Section 30, NE of NE of NW	Begin: E 770452, N 3876147 End: E 770297, N 3875521

Table 1.1. Locations of Surveyed Areas.

(All areas are in T 9 N, R 11 W, NMPM. UTM values are GPS-derived.)

tall and 1 meter wide at the top. The dike is breached in one place near Dam 30. CSU will plug the entrance to the Diversion Dike/Ditch so that flows in the meadow below Stock Tank 19-2 are not diverted to Dam 30 and instead flow into the meadow below Dam 30.

Pine Dike diverts the natural flow of Agua Fria Creek away from NM 53, preventing erosion to the roadbed. The dike causes the creek to flow toward Junction Cave and the El Calderon parking lot. During heavy rainfall, silt-laden water flows into the cave and floods the parking lot. Pine Dike is partly breached at its southeast end. The proposed action is to further breach the dike and encourage a split in the stream's flow, with part of the flow following its original course.

Dam 30 is a large dam that rarely holds water and apparently has little hydrological effect on the meadow below. No treatment of the dam is proposed, but it was surveyed nonetheless.

Both proposed access roads already exist to some degree. Access Road 1 heads south from the National Park Service's visitor center, mostly following the Continental Divide Trail. This road is very faint and is mostly apparent due to use of the trail. Access Road 2 heads northwest from the entrance to the information center, then meanders southwest and southeast until it reaches Stock Tank 19-2. This road is an active two-track road.

The proposed stream restoration also includes work at two other locations, Stock Tank 28 and the El Calderon parking lot. These two proposed work areas were examined during a recent inventory survey for a prescribed burn, and were therefore not included in SWCA's survey. The survey report for the prescribed burn is currently being prepared by Janet McVickar.

# CHAPTER 2

# **RESEARCH CONTEXT**

### NATURAL SETTING

The project area is in the Acoma-Zuni section of the Colorado Plateau physiographic province. Elevations in the area range from 2,224 to 2,268 meters (7,300 to 7,440 feet). The surrounding mountains and volcanic cones rise over 2,440 meters (8,000 feet). The project area is in a broad east-west valley with red sandstone cliffs to the north and black volcanic cones to the south. The area is at the juncture of the north end of the Chain of Craters and the southeast end of the Zuni Uplift and the west side of the Malpais lava flows. The Chain of Craters is a series of volcanic cones dating to the Quaternary period. The Zuni uplift is a cleft in Permian sandstones and limestones, revealing Precambrian gneisses and granites (Maxwell 1986; NMGS 1996). Two volcanic flows are identified for this area: Twin Craters and El Calderon. Both predate human occupation of the area (Laughlin et al 1993).

The project area is immediately east of the Continental Divide. The primary drainage for the area is Agua Fria Creek. The creek begins in the Zuni Mountains and flows southeastward (parallel to the Continental Divide); it crosses NM 53 and passes through the project area before being absorbed into the malpais.

The local biotic communities include the Rocky Mountain (Petran) and Madrean Montane Conifer Forests (Brown 1982). Locally, these forests include ponderosa pine, Douglas fir, Rocky Mountain juniper, and piñon pine (Bleakly 1997). Chamisa, broom snakeweed, wild sunflower, aster, Russian thistle, mullein, and grasses are common. Fauna in the area include elk, mule deer, bighorn sheep (prehistorically), black bear, mountain lion, bobcat, coyote, gray fox, raccoon, badgers, skunks, cottontails, jackrabbits, porcupines, and rodents (Lightfoot 1997). The lava tube caves provide habitat for at least eight species of bats. More than 100 species of birds have been recorded at El Malpais, along with nine species of amphibians and 27 species of reptiles including a variety of frogs, toads, salamanders, lizards, and snakes.

Annual precipitation in the project area is about 300 to 380 mm (12 to 15 inches), most of it falling during the monsoon season in July and August. The number of frost-free days ranges from 120 to 140 (Beck and Haase1979; Tuan 1973; Williams 1986).

#### CULTURAL SETTING

The following is based in part on Wase et al. (2000), Tainter and Gillio (1980), and Stuart and Gauthier (1988).

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### PALEOINDIAN PERIOD

Locally, the Paleoindian period probably lasted from about 10,000 to about 5500 B.C. The primary Paleoindian occupation in the Grants area was probably the Folsom complex (about 9000 to 8000 B.C.), as a number of points of that complex have been found (e.g., Mabry et al. 1996:156). Many of these finds are unpublished, however. The local Folsom sites may have been produced by specialized bison hunters, who made use of western extensions of Plains grasslands into the area.

On Cebolleta Mesa east of El Malpais National Monument, the Bureau of Indian Affairs documented a more complete local Paleoindian sequence (Broster 1980, 1982). The project found one Clovis point, nine Folsom points (and five probable Folsom scrapers), three Midland points, five Belen points, and eight Eden points, indicating a long-lived Paleoindian occupation (which, however, was most likely minimal until about 9000 B.C.). Dittert (1959:365–366) also reports Clovis, Folsom, and "Portales complex" points from Cebolleta Mesa.

# ARCHAIC PERIOD

Current interpretations of the local Archaic occupation (5500 B.C.–A.D. 400) depend heavily on a sequence developed by Cynthia Irwin-Williams (1973, 1979) at Arroyo Cuervo, between Albuquerque and Mount Taylor. Unfortunately, only summary reports are available. The resulting Oshara Tradition phase sequence includes the Jay (5500–4800 B.C.), Bajada (4800–3000 B.C.), San Jose (3200–1800 B.C.), Armijo (1800–800 B.C.), and En Medio (800 B.C.–A.D. 400) phases. The overall pattern was one of seasonal wandering in search of wild foods, combined with reuse of base camps. The Jay and Bajada phases may reflect generalized hunting and foraging strategies by small groups; the San Jose, Armijo, and En Medio phases may represent increasingly heavy reliance on plant foods by larger groups in an increasingly crowded landscape. Ground stone tools became common during the San Jose phase and agriculture was adopted in the region during the Armijo phase.

The Arroyo Cuervo sequence replaces an earlier and incomplete sequence by Bryan and Toulouse (1943; Bryan and McCann 1943), which included a San Jose period and a subsequent Lobo period. During the current study, the Bryan and Tolouse sequence is of interest primarily because it was based on sites in the Grants area. It is worth noting that many projectile points found in the general area can be classified as Cochise Culture rather than Oshara Tradition (Elyea et al. 1994:7).

Since Irwin-Williams's seminal work, Chris Turnbow (1997) has developed a projectile point typology for the OLE project that makes it easier to date with diagnostic projectile points in surface assemblages. Though Turnbow is aware that any typology of projectile points incorporates a certain amount of subjectivity, his typology is geared more toward "replicability and defining morphological and metric breaks between types than with subtle, stylistic distinctions that rely on subjective criteria" (1997:167). The typology does base its temporal distinctions, particularly for large projectile points, on the Irwin-Williams sequence, and is a useful means for identifying Archaic period sites in the area.

Local Archaic settlement may resemble that in the San Mateo area, on the north side of Mount Taylor. Tainter and Gillio (1980:68) have remarked,

Survey in the lower elevation areas of the San Mateo Valley has revealed little evidence of Archaic occupation (Allen et al. 1976), while in the surrounding higher elevations on the Cibola National Forest, Archaic occupation was extensive (Schaafsma 1978; Powell 1978; Klager and Anschuetz 1979). Apparently, Archaic populations took the opportunity for gaining resource diversity, which is provided in topographically diverse terrain. Later agricultural adaptations, in contrast, used more intensively the flatter, lowland areas where resource diversity was lower, but where farming was possible.

A slightly different interpretation of the same data is that being less tethered to farming areas, Archaic populations were able to make better use of upland areas—and may also have been more able to pursue subsistence activities from camps near temporary sources of water, such as streams or ponds that ran only in wet years (cf. Schaafsma 1978:52). Thus, factors besides diversity of resources may have dictated changes in local settlement patterns.

Early Archaic sites are identified by characteristic projectile points. Later Archaic sites are identified by characteristic projectile points, the presence of ground stone artifacts, or both. Where detailed flake reduction data are available, it is sometimes possible to identify Archaic sites or components based on flaked stone attributes.

# **CERAMIC PERIOD (ANASAZI OCCUPATION)**

According to Dittert (1959), Ceramic period settlements in the El Malpais area were part of the Acoma Culture province. The following sequence was defined for the Cebolleta Mesa area of that province, which corresponds roughly to Ruppé's (1953) Acoma Culture Province. The following discussion is based on Dittert (1959), Wozniak and Marshall (1991), and Elyea et al. (1994).

Dittert's White Mound phase corresponds to Basketmaker III of the Pecos Classification and dates from A.D. 700 to 800. Sites are pit house villages near arable land, shelters against low cliffs, or small campsites. Key pottery types include White Mound Black-on-white and Lino Gray.

The Kiatuthlanna phase corresponds to Pueblo I and dates from A.D. 800 to 870. Pit houses were partly supplanted by jacal structures, the latter built in curving rows. Small dwellings were sometimes built against low cliffs. Key pottery types include Kiatuthlanna Black-on-white and Kanaa Gray. By the end of Pueblo I, the focus of settlement begins shifting to lower, more open areas.

The Red Mesa phase corresponds to early Pueblo II and dates from A.D. 870 to 950. Dwellings were initially jacal structures but gave way to masonry structures. Rooms were built in straight rows (one or two rooms deep), or in L-shaped or curved lines. As in the preceding phase, small dwellings were sometimes built against low cliffs. Key pottery types include Red Mesa Black-on-white, Socorro Black-on-white, and corrugated grayware.

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The Cebolleta phase corresponds to Pueblo II and dates from A.D. 950 to 1100 or 1125. During this phase the Cebolleta Mesa area may have held back from participation in the Chacoan phenomenon and developed a distinct archaeological identity (Ruppé 1953). If so, Chacoan "great houses" were nonetheless established in the general area, at the Dittert site (Dittert 1959; Elyea et al. 1994), at Cubero Ruin, LA 494 (Roney 1992:125, Figure 10-1; Mabry et al. 1996:107), and at Guadalupe Ruin (Pippen 1978). Sites consist of curving blocks of rooms, usually of masonry, that partly enclose kivas. Jacal rooms may be present within the masonry room blocks. Key pottery types include Cebolleta Black-on-white, Socorro Black-on-white, and corrugated grayware. Mogollon brownwares are often common on sites of this phase.

The Pilares phase corresponds to early Pueblo III and dates from A.D. 1100 to 1200. Sites continue to consist of blocks of rooms, usually of masonry, and continue to be fairly small. Sites with 20 rooms or more are common. Key pottery types include Cebolleta, Tularosa, and Socorro Black-on-white as well as St. Johns Polychrome.

The Kowina phase corresponds to late Pueblo III and early Pueblo IV and dates from A.D. 1200 to 1400. Sites changed dramatically as populations aggregated into a few villages of 200 or more masonry structures, often on easily defended mesa tops. During the phase, populations may have shifted into the Acoma area from the San Juan Basin. Key pottery types include Tularosa and Kowina Black-on-white, St. Johns Polychrome, and other polychromes.

The Cubero phase corresponds to late Pueblo IV and dates from A.D. 1400 to 1600; the Acoma phase corresponds to Pueblo V and dates from A.D. 1600 to the present. During this period, population was concentrated at one village—Acoma—but farming sites were still occupied along the Rio San Jose.

Wozniak and Marshall (1991) have seriated the local pottery into 17 groups that correspond to subphases within Dittert's sequence, and provided new dates for that sequence. For the current survey, however, the practical implications of the Wozniak and Marshall refinements are minimal.

An alternative phase sequence derives from the San Mateo Valley, north of Mount Taylor (Allen et al. 1976:108-109; Tainter and Gillio 1980:69, Table 9). If local sites prove to have more ties to the Chacoan phenomenon than to the Acoma province, the San Mateo phase sequence might be more appropriate for classifying sites. The sequence diverges from the Acoma sequence at about A.D. 950 with the Wingate phase, featuring small amounts of Red Mesa Black-on-white and also Gallup, Escavada, Puerco, Wingate, San Mateo, and McElmo Black-on-white. The sequence continues with the Hosta Butte phase, featuring the pottery types of the Wingate phase but also including Chaco Black-on-white and small amounts Reserve, Socorro, and Klagetoh Black-on-white, St. Johns Black-on-red, and St. Johns and Houck Polychrome. The San Mateo sequence ends at A.D. 1300—at which point the Acoma sequence undoubtedly applies to remains in the area.

### HISTORIC PUEBLO OCCUPATION

In 1540, Francisco de Coronado dispatched one of his captains, Pedro de Alvarado, east from Zuni. Alvarado reached Acuco (Acoma) five days after starting out from Zuni, finding "a rock with a village on top" (Winship, in White 1932). In 1581 Acoma was visited by a small party headed by Fray Augustin Rodriguez and Sanchez Chamuscado (Hackett, in White 1932). Espejo stayed at Acoma for three days the following year. In 1598, Juan de Oñate received the obedencia (submission) of the pueblo, but the pueblo then revolted against Spanish rule, killing several Spanish soldiers. The next year, Oñate sent Vicente Zaldivar to avenge the deaths of the Spanish soldiers (including Zaldivar's brother). The Spanish crushed the Acoma revolt and forced the surviving Acoma to settle on the plains below the mesa. The Acoma were soon back on top of the mesa. In 1620 and 1629, priests claimed to have "pacified" the Acoma (White 1932). The 1629 claim was made be Father Juan Ramírez, who is believed to have built the mission church at Acoma (Benavides, in White 1932). The Acoma rose with the other Pueblos in 1680 and 1696; the second revolt, less successful than the first, included the Navajo as allies. Diego de Vargas induced the Acoma to submit peacefully after the 1696 uprising (Bandelier in White 1932). The Zunis retreated to a high mesa in 1693 for protection. It was not until the beginning of the eighteenth century did they move to the present location of their pueblo, known as the Middle Village.

The earliest Spanish documents indicate a continuation of the archaeologically defined settlement pattern. The local population was resident at Acoma but field systems existed along the Rio San Jose. To the west the resident population was the Zuni along the Zuni River. Espejo (in Ackerly 1996:6) reported that in 1582, "These people [Acoma Pueblo] have their fields two leagues distant from the pueblo, near a medium-sized river, and irrigate their farms by little streams of water diverted from a marsh near the river." Describing the same expedition, Luxán (in Ackerly 1996:6) reported, "We left [Acoma] on March 7 and went four leagues up a river which flows through some bad lands. We found many irrigated cornfields with canals and dams, as if built by Spaniards."

Although the contact period Acoma had irrigated fields in the San Jose Valley, residences away from the mesa were limited until the threat of raiding, primarily by the Navajo, was reduced (White 1932). Acoma oral history (Garcia-Mason 1979:456-458) indicates that seasonal "farming camps" were established along the river, including at McCartys. White (1932) states that at first the only houses near Acomita were temporary shelters for field workers, and these appeared in the valley after about 1870 (i.e., after the Navajo Long Walk). The first semi-permanent houses were built on the side of a steep mesa "partly from habit and partly from fear" (White 1932:29). These houses were still in use during White's work at Acoma during the 1920s. Since then, several small residential enclaves have developed along the San Jose Valley, including at Acomita and McCartys. These settlements reflect, in part, participation by the Acoma in the market economy.

The Acoma and Zuni both see El Malpais as part of their traditional use areas. The Zuni Mountains were used by the Zuni for deer hunting, grazing, and a source of minerals for religious purposes. The Acoma have similar use patterns but also recognize the Zuni Mountains as the home of the western rainmaker. Shrines for both tribes are found in the general area (Holmes 1989). There were several trails between Zuni and Acoma, one or more of which probably traversed the immediate project area.

### NAVAJO OCCUPATION

The earliest possible reference to Athabascans in the Mount Taylor area is in the chronicles of the Espejo expedition of 1582–1583 (Brugge 1983). Before 1700, however, most Navajo were concentrated in their Southwestern homeland, the Dinetah, in the eastern headwaters of the San Juan River Basin. After 1700, these Navajo shifted south and west from the Dinetah, due to drought and increased attacks by the Utes (Reeve, in Hester 1962). The Navajo spread along river valleys, including the Rio Puerco east of the survey area (Tainter and Gillio 1982).

Hester (1962) indicated that Navajos were living in the vicinity of Mount Taylor and the Rio Puerco by the 1700s. The Spanish claimed to have converted 500 Navajos to Christianity at Cebolleta in 1746 (Hackett in Hester 1962). In 1748 and 1749, the Spanish established missions for the Navajo at Cebolleta and Encinal, east of the survey area, in an attempt to stop Navajo raiding (McNitt 1972:28; Brugge 1983), but the Navajo dispersed back to the eastern slopes of Mount Taylor (Carroll 1979). Evidence of that residence is supported by Navajo groups named in 1786 (Bartlett in Hester 1962). The names include refer to San Mateo and Cebolleta. Similarly, Cordero named ten Navajo communities in 1796, including at least five named for geologic features along the east side of the Mt. Taylor uplift (Matson and Schroeder in Hester 1962). These settlements were Guadalupe, Cerro Cabezon, Agua Salada, Cerro Chato, and Sevolleta.

Brugge (1980) mentions other references to a Navajo occupation of the eastern Mount Taylor area. He quotes a document dated April 12, 1788 describing the return of a Navajo headman to his home near Big Bead Mesa, and mentions that early settlements such as Cubero and Cebolleta probably supplied local Navajos with alcohol (Brugge 1980:22–23).

The Navajo raided the nearby Pueblos of Acoma and Laguna, the Spanish settlers, and sometimes other groups of Navajos in a shifting pattern of alliances and hostilities. The Navajo attacks often drove Pueblo and Hispanic settlers away from the Mount Taylor area—the Spanish back to the Rio Grande, and the Laguna back to the Rio San Jose. The raiding continued until the forced removal of the Navajo to Bosque Redondo in 1863. After their release, some Navajos violated their treaty with the U.S. government by returning to the area east of Mount Taylor, along the Rio Puerco. This group was allowed to stay in the area and was assigned a reservation now called To'hajiilee (formerly Cañoncito).

Surveys by Carroll (1979) and Irwin-Williams (no report; records at ARMS) recorded large numbers of Navajo sites on the east edge of the Mount Taylor uplift. More recently, SWCA recorded a number of Navajo sites along the south edge of the same uplift (Wase et al. 2000). The Mount Taylor area Navajo sites can be identified by a distinctly Navajo form of habitation, the hogan, indicated by rough circles of dry-laid stones (in many cases not coursed, and often incorporating boulders, large rocks, and other natural features as part of the structure). Where openings are apparent, they are often but not always open to the east (Keur 1941; Jett and Spencer 1981). Sites are often in areas that are hidden, or sheltered, especially in broken landscape (Jett and Spencer 1981). Artifacts are rare or absent. The sites may or may not have associated diagnostic artifacts such as Navajo Utility Ware sherds. On some Navajo sites, historic Pueblo pottery is present.

The Navajo also claim El Malpais as part of their traditional use area. The Navajo used this area for grazing, hunting, and as a source of other raw materials. As with the Zuni and Acoma, El Malpais figures into many of their myths and religious beliefs. The Navajo use area is mostly focused on Mt. Taylor and the north end of the lava flows near Grants but they probably ventured down to the project area on occasion (Holmes 1989).

# EUROAMERICAN OCCUPATION

Beginning in the middle 1700s, Spanish settlers made repeated attempts to settle west of the Rio Grande Valley, but were usually driven back by the Navajo. In 1753 the Montaño Grant was verified by the Spanish governor (Haecker 1976). The Montaño Grant lay along the eastern border of the Laguna use lands, west of the Rio Puerco. Navajo raiding was a contributing factor to the temporary abandonment of the grant, but a lack of potable water that caused the settlers to petition for a change of location (Land Grant 1768:12; cited in Haecker 1976). As Hispanic settlement finally took root at Cebolleta in 1800 and at Cubero and San Mateo in 1833 (Tainter and Gillio 1980:130-133), the Navajo population added raids on these Spanish settlements to their seasonal round (Carroll 1979). The Spanish population continued to shift between the Rio Grande and Rio Puerco Valleys until the confinement of the Navajo at Bosque Redondo.

When conditions allowed, the Hispanic settlers farmed and herded sheep (and later cattle). As their neighbors did, the Hispanics exploited locally available resources.

After the seizure of New Mexico in 1846, the U.S. military tipped the balance of power against the Navajo. Early U.S. military posts in the vicinity included ones at Cebolleta (1850–1851), Cubero (1850–1862), and the first Fort Wingate (1862–1868; in present day San Rafael). The forced removal of the Navajo to Bosque Redondo in 1864 allowed the resident Hispanics to expand their holdings. In 1872, Don Jesus Blea founded a home he called Los Alamitos that was later patented in 1880. A few Anglos began to enter the area, establishing trading posts and ranching operations. The area's economy and society was transformed when the Atlantic and Pacific Railroad was extended west from Albuquerque in 1880–1881 (Myrick 1990:17-19), tying the Rio San Jose Valley firmly into the national economy. Two brothers from Ontario, Canada built a railroad stop at Los Alamitos, which then became known as Grants Camp (Metzger 1991). The town, which became known as Grants in 1935, was a local shipping point.

Cibola County has been has been the scene of a number of booms and busts. In the early 1880s the Zuni Mountains became the source of railroad ties for the push to extend the Thirty Fifth Parallel route to California (Glover and Hereford 1990). In the early 1900s the Zuni Mountains were again heavily logged, with millions of board feet of lumber being shipped to Albuquerque. During the 1930s and 1940s, Grants area farms produced large quantities of vegetables, particularly carrots. Also during this period, pumice was mined on Mt. Taylor and fluorspar in the Zuni Mountains. In the 1940s the discovery of oil near Ambrosia Lake brought another boom (Metzger 1991). In 1950 Paddy Martinez, a Navajo shepherd, started a uranium rush that became the mainstay of Grant's economy for several decades. Fed by the uranium subsidies of the Cold War, mines such as the Anaconda Jackpile Mine (Dannenbaum 1994) provided hundreds of jobs but also created enormous

amounts of hazardous waste. With the closing of the Jackpile Mine in the 1980s, the local economy fizzled.

On a smaller scale, volcanic cinders were mined from the El Malpais deposits. Tourism has been a part of the local economy for decades, thanks to Route 66 and now Interstate 40. Side trips from Grants were directed along NM 53 past the project area to such attractions as the Candelaria Ice Caves and Bandera Volcano, El Morro and Inscription Rock, and Zuni Pueblo. In the past two decades Grants has survived primarily as a service town and by encouraging the construction of prisons.

Away from towns and permanent streams, one activity seems to predominate throughout the historic period—grazing, first of sheep and then of cattle. Old World livestock were permanently introduced to New Mexico in 1598, and the importance of this industry is shown by the fact that woolen goods were one of New Mexico's main exports (perhaps *the* main export) for the next two centuries or more. Sheep were raised on a commercial scale, forming the source of the wealth behind many of New Mexico's leading families. The industry's growth was stunted, however, by Indian raiding (which often focused on stealing sheep) and the great distances to the markets in Chihuahua and beyond. By the 1880s, the linking of New Mexico to the U.S. economy, the elimination of Indian raiding, and the arrival of the railroad led to an explosive expansion in commercial flocks. One of the biggest sheep owners was Mariano Otero, whose flocks were forced off the Jicarilla and Navajo Reservations in 1890. Otero shifted his headquarters to Las Lagunitas, north of the Miera y Pacheco and Montaño land grants (Lopez, in Wase 1982). Otero owned more than 90,000 sheep (Calkins 1937).

The livestock industry in New Mexico began shifting from sheep to cattle in the 1920s (Calkins 1937). Sheep herding is far more labor-intensive than cattle raising, and in the 1900s the available labor pool for sheepherders had been drastically reduced, in part due to the growing labor demands of towns and industries. In addition, the national taste was shifting away from mutton towards beef, encouraging the conversion of ranges from sheep to cattle. After World War II, the demand for wool dropped drastically as synthetic fibers became available. One result of the 1900s shift from sheep to cattle is the proliferation of range improvements such as dirt water tanks, windmills, and fences.

# **PREVIOUS STUDIES**

Based on SWCA's files checks, seven prior archaeological studies have been conducted within the vicinity of the survey areas, as listed and described below. Twenty-two sites were previously recorded within 1.0 mile (1.6 km) of the survey areas. The sites are also described below.

In 1973, Stewart Peckham of the Laboratory of Anthropology, Museum of New Mexico conducted a survey for a proposed AT&T buried cable between Clovis and Zuni New Mexico (Peckham 1973). In the vicinity of the current surveys the cable route extended along NM 53. None of the sites discovered by Peckham were near the current survey areas.
In 1989, the New Mexico State Highway and Transportation Department conducted a survey along 42 km (26 miles) of NM 53, covering 321 acres (130 ha) (Marshall 1989). The survey was conducted prior to proposed tree clearing along the highway. No new sites were discovered but three sites were revisited. One site, LA 89954, is within 1.0 mile (1.6 km) one of the project areas. The site was a small historic community and included six houses, a sawmill, and two outhouses. The site dates between 1912 and 1945.

In 1992, Cibola National Forest conducted a survey for a water development project on the north side of NM 53, less than 0.8 km (0.5 mile) north of the northwest end of the current survey areas. (Nicoll 1992). The Forest Service survey covered 19 acres in a linear transect. No sites were discovered or revisited.

In 1994, Zuni Cultural Resource Enterprise conducted a survey of NM 53 for highway improvements near the project areas (Whitley 1994). The survey was conducted along 45 km (28 miles) of the highway and covered 289 ha (713) acres. During this survey two sites were revisited and 12 sites were discovered. One of the revisited sites (LA 89954; described above) and four of the new sites (LA 103302, 103303, 103305, and 103310) are within 1 mile (1.6 km) of the current survey areas. The first three sites are historic artifact scatters dating to the first half of the 1900s. The last site is a rock cairn of unknown age. None of the sites is close enough to the proposed stream restoration work to be affected by that work.

In 1995, Cibola National Forest conducted a survey of a road easement on the north side of NM 53, about 1 mile (1.6 km) east of the Pine Dike survey area (Rhodes and Popelish 1995). The Forest Service survey covered 2.4 ha (6 acres). One site, LA 103300, was revisited; the site is more than 1 mile (1.6 km) from the current survey areas. LA 103300 is a historic artifact scatter with two hearths, and dates between 1900 and 1949. One site, LA 109385, was discovered; it is just less than 1 mile (1.6 km) from the current survey areas. LA 109385 site is a historic refuse deposit dating between 1920 and the 1940s. Neither site is close enough to be affected by the proposed stream restoration work.

In 1996, the Bureau of Land Management conducted a survey of part of the Continental Divide Trail (Lutonsky 1996). The survey corridor began at the El Calderon parking lot and headed southeast; at its closest, the survey was only 0.8 km (0.5 mile) from Pine Dike. No archaeological sites were revisited or discovered during the BLM survey.

In 2001 and 2002, the National Park Service conducted a survey around the El Calderon parking lot area (Corey 2002). The survey was conducted for a prescribed burn and covered 600 acres in two parcels. The survey identified 32 sites and 12 isolated occurrences. The northwest end of the NPS survey overlapped with the current survey coverage, including the southern portion of Pine Dike and all of Stock Tank 28. Of the 32 sites found by the NPS, 15 are within 1 mile (1.6 km) of the current Pine Dike survey area. The sites include seven road segments, four historic to recent artifact scatters, one cairn, and five rock features (of which three are clearly prehistoric) (the total is more than 15 because some sites have more than one feature).

It is worth noting that in 1991 the University of New Mexico's Office of Contract Archaeology conducted a transect survey of eight parcels, totaling 1,684 ha (4,160 acres) about 3 km (2 miles) south of the current survey areas (Marshall 1993). The OCA survey resulted in the discovery of 26 sites and 30 isolated occurrences. An additional 18 sites were located off transect.

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# CHAPTER 3

## **METHODS**

Prior to fieldwork, SWCA completed a check of the USGS maps on file at the Archaeological Records Management Section, N.M. Historic Preservation Division, Santa Fe, for previously recorded sites within 1.0 mile (1.6 km) of the survey areas. Sites near the survey areas were plotted on SWCA's field maps, and copies of the site forms were obtained for field use. SWCA also checked the online listings for the National Register of Historic Places and State Register of Cultural Properties, for registered projects in or adjacent to the survey areas. SWCA also checked with the Chief Ranger for Resource Management, El Malpais National Monument, for previously recorded sites within the areas to be surveyed.

Fieldwork took place on April 17, 2002. Harding Polk served as the field supervisor and William Crews served as the field assistant. Fieldwork and site recording required 14 person hours. The goals of the fieldwork were (1) to locate and record archaeological remains of an apparent or likely age of 50 years or more, as well as any standing historical buildings or structures within or next to the survey areas; and (2) to record and assess several identified historic water control devices within the survey areas. The survey was conducted in transects no wider than 15 m. Along the access roads the crew members walked just off either side of the road, providing some overlap of transects along the extant roadbed (where ground visibility was the best).

When cultural materials were first encountered they were marked with pin flags, and the crew searched the surrounding area to determine the distribution and possible clustering of the remains. The crew then determined whether the materials were at least 50 years old and whether they should be treated as an isolated occurrence (IO) or a site. IOs are locations with evidence of isolated behavioral events (generally fewer than 10 artifacts and no evidence for formal features or subsurface cultural deposits). Sites are locations with evidence for substantial human activity (generally 10 or more artifacts, or one or more formal features, or evidence for subsurface cultural deposits, or some combination of these attributes).

One new site was defined. At the site, the crew placed a datum consisting of 3/4 inch rebar with an aluminum cap. The cap was stamped with the field number and the company initials. The location of the datum and other relevant points were recorded with a Garman GPS 12 CX GPS handheld unit.

Site recording did not include surface collections or ground-disturbing activities. The site was recorded on a Laboratory of Anthropology archaeological site form. Paired photographs (using black and white print film and color slide film) were taken of the site. The photographs were documented using a field photo log. A scale map was drawn of the site, incorporating survey work for the proposed stream restoration project. The sites were also plotted on the local USGS topographic map.



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Isolated occurrences were located using the GPS unit, were plotted on the local topographic map, and were recorded using an SWCA IO form. Original field records from the project will be submitted to El Malpais National Monument.



# CHAPTER 4

## **RESULTS OF THE SURVEY**

SWCA's studies did not identify any listed properties or standing historical buildings or structures within or adjacent to the surveyed stream mitigation work areas. The pre-field check identified seven previously recorded archaeological sites within 1 mile (1.6 km) of the survey areas. None of these sites extended into the project areas; all but two cases are located along NM 53. The survey resulted in the definition of one new archaeological site and five isolated occurrences of cultural remains. The locations of these remains are shown on Figure 4.1. The results of the cultural resource survey are first presented in terms of survey areas, and then in terms of remains found.

## SURVEY AREAS

#### STOCK TANK 19-2

Based on previous historical research (in Kunkle and Ingles 2002), Stock Tank 19-2 was built between 1936 and 1945 and is therefore of historical age (50+ years). The stock tank was treated as an archaeological property and recorded as one locus of LA 135589. The field crew focused on finding artifacts or other evidence to corroborate the age determined from archival sources, and on recording any details that reflected on the site's archaeological values. Aside from the stock tank itself, no archaeological materials were found at this location.

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#### **DAM 30**

Based on previous historical research (in Kunkle and Ingles 2002), Dam 30 was built between 1936 and 1945 and is therefore of historical age. Dam 30 was treated as a second locus of LA 135589, as it was probably built at the same time. As Dam 30 will not be affected by the proposed stream restoration project, the pool behind the dam was not surveyed. The maximum pool covers an estimated 50 acres, nearly double the entire area surveyed for this project. Much of the pool area was most likely disturbed during the construction of the dam, as material was scraped up to form the dam.

IO 5, a retouched flake, was recorded on the dam, obviously out of its original context of deposition. The Continental Divide Trail courses along the top of the entire length of the dam.

## **DIVERSION DITCH AND DIKE**

Based on previous historical research (in Kunkle and Ingles 2002), the Diversion Ditch and Dike were built between 1936 and 1945 and is therefore of historical age. It was included as a third locus of LA 135589, as the tie that binds Stock Tank 19-2 and Dam 30. No archaeological materials were

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Figure 4.1 Cultural Resources.



found in association with the ditch and dike. The Continental Divide Trail extends along most of the top of the dike.

## PINE DIKE

Based on previous historical research (in Kunkle and Ingles 2002), Pine Dike was probably built in 1957 or 1958. The dike is thus not a historical feature and thus was not recorded as an archaeological site. No other archaeological features or artifacts were noted at on the Pine Dike.

## ACCESS ROADS

Access Road 1 forms the last leg of the Continental Divide Trail, between the Diversion Ditch and Dike and the NPS visitor center. At present this is not a vehicle road, but appears to been used by vehicles from time to time. It is likely very recent. IO 1, a Cibola White Ware sherd (possibly Red Mesa Black-on-white), was found on this road.

Access Road 2 is an extant two-track road designated Road 100E. This limited access road is used only by National Park Service personnel and by crews responding to forest fires. Portions of the road are depicted on the USGS Ice Caves quadrangle, which was published in 1952, so the road is at least 50 years old.

## ARCHAEOLOGICAL REMAINS

## LA 135589

Field Number: 19-2 Site Type: water control features Cultural Affiliation and Age: Euroamerican, ca. 1937–1945 Size: 480 by 90 m

## Description:

LA 135589 consists of three water control features, in an area characterized by wooded hills and flat, open meadows (Figure 4.2). Vegetation on the hills includes piñon, juniper, and ponderosa pine. Other local plant cover includes grasses (including rye and grama), chamisa, broom snakeweed, aster, wild sunflower, Apache plume, yarrow, and Russian thistle.

Stock Tank 19-2 is a large earthen structure oriented roughly northeast-southwest and measuring about 200 by 150 m (Figures 4.3 and 4.4). It occupies most of an upper meadow south of the original Agua Fria drainage. The southwest side of the stock tank is flanked by a sandstone ridge and the northwest side is flanked by a lava flow. The stock tank was built by excavating the bottom of the meadow and forming large berms to the northwest and southeast. The northeast and southwest ends of the tank are open. There is an apparent divider berm that separates the northeast third of the tank from the southwest two-thirds. The function of this divider could not be determined. A small shallow



Figure 4.2 Site Map, LA 135589.





Figure 4.3. Stock Tank 19-2 from north end of east berm. Note fence posts. View to WSW.



Figure 4.4. Stock Tank 19-2. View along old fence line leading into tanks. View to SW.





ditch extends from the north-northeast into the northeast end of the stock tank. The ditch may have served to channel water into the tank.

An old fence line extends through the stock tank. The fence line is apparent from standing posts, stubs of posts, posts lying on the ground, and wire lying along the route of the fence. The fence line enters the stock tank from the northwest and crosses the northwest berm near its center point. The fence continues to the bottom of the southwestern tank subsection and then curves to the northeast, exiting the tank at an approximate right angle to its prior orientation. The route of the fence through the tank makes it apparent that it postdates the use of the tank.

A second fence line is suggested by a discontinuous alignment of juniper posts and other recent debris (beer cans, plywood, etc.). This possible fence line follows the base of the hill and then continues along the junction of the southeast berm and the tanks. The beer cans date to the mid-1970s and may indicate when this fence line was dismantled.

A dirt two-track road traverses the northwest berm and continues southwestward. The road is a continuation of Access Road 2 and is designated Road 100E. The road probably postdates the use of the tank.

Prior research for this project (Kunkle and Ingles 2002) included an analysis of aerial photographs at the Earth Data Analysis Center of the University of New Mexico. A photograph dating to 1935 or 1936 did not show this structure, while a photograph from 1945 did. Given the date of Stock Tank 19-2, it was conceivably built by the CCC or other federal relief agency.

The Diversion Ditch and Dike (Figures 4.5 and 4.6) is a sinuous structure begins at the base of the northern end of a sandstone ridge south of Agua Fria Creek (and south of the visitor center). This is where Agua Fria Creek was diverted from its original channel to flow into the ditch, in order to fill the pool behind Dam 30. At this point the dike is apparent only as a low berm with lava bedrock exposed in the ditch. As the ditch and dike continue southeastward, the dike becomes larger and the ditch behind it becomes wider and deeper. Where the dike joins the west end of Dam 30, the dike is almost 3 m tall and the ditch is 3 m across. A wall of native sandstone was built at the juncture of the dike and dam, to prevent water in the ditch from eroding the end of the dam. That wall is now partly collapsed.

The Diversion Ditch and Dike may have also caught overflow from Stock Tank 19-2, to add to the pool behind Dam 30. The Diversion Ditch and Dike would have further served to capture runoff from the adjacent hill.

Dam 30 stretches between two sandstone hills south of Agua Fria Creek (Figures 4.7–4.14). The dam is 235 m long and about 4 m tall. The top the dam is 2 m wide and the base about 10 m wide. An overflow spillway is present where the dam abuts the eastern hill. The dam was designed so that overflow crosses sandstone bedrock, minimizing erosion of the structure.

A headgate is present 27 m from the east end of the dam. The headgate controls the flow of water through a 15 inch (38 cm) internal diameter concrete pipe at the base of the dam. The outflow from



Figure 4.5. Diversion ditch and dike (on left). View to SE.



Figure 4.6. Diversion ditch and dike (on left). View to E.





Figure 4.7. Dam 30. Out flow pipe at base of dam. View to SW.



Figure 4.8. Retaining wall at juncture of diversion ditch and Dam 30. View to NE.







Figure 4.9. Dam 30. Headgate mechanism. View to N.



Figure 4.10. Dam 30. Headgate control mounting block on top of dam. View to W.





Figure 4.11. Dam 30. View along length of dam. Spillway in foreground. Note Continental Divide Trail cairn. View to W.



Figure 4.12. Dam 30. View of spillway. Note Continental Divide Trail cairn and marker. View to S.







Figure 4.13. Dam 30. View along length of dam, Reservoir to right. View to E.



Figure 4.14. Dam 30. View along perpendicular berm. View to S.





the pipe is directed onto lava bedrock, which channels the outflow back into Agua Fria Creek. The headgate is a Model 101 slide type manufactured by the R. Hardesty Manufacturing Company of Denver, Colorado. Based on a patent number on the cover of the headgate (No. 1445921), the design was patented on February 20, 1923 by Karl Johann Thorsby and Raymond Charles Force of the California Corrugated Culvert Company of Oakland, California.

The operation of the headgate is simple. The headgate slides up or down on two flanges on either side of the drain hole, thus controlling the volume of flow. The gate is raised or lowered by means of an attached rod with threads at the upper end. The threaded portion is fitted through a permanently affixed wheel. Turning the wheel raises or lowers the rod and thus the gate. The headgate and rod are aligned parallel to the interior face of the dam. Six concrete anchors secure the rod to the face of the dam. Each anchor measures 10 by 12 inches and is 18 inches tall 25 by 30 by 46 cm). The upper end of the assembly, where the control wheel is mounted, is on an anchor measuring 24 by 36 inches 61 by 91 cm).

There may have been a small wooden building protecting the control wheel, as indicated by a scatter of milled boards in the vicinity. The boards are mostly one inch thick and up to 12 inches wide. One board measured 8 feet, three inches long. A number of wire nails were noted (10, 50 and 60 d or 3, 5  $\frac{1}{2}$ , and 6 inches) were probably used in the building's construction.

A white chert retouched flake, was noted on the face of the dam, near the headgate mechanism. It was designated IO 5 but, given its location, is instead part of LA 135589. The fact that it was found on the dam indicates that it is out of its original context of deposition.

Aside from items mentioned above, no artifacts were found that might be associated with construction and use of the water control features.

## **Evaluation:**

LA 135589 is of historical age, but is not known to be associated with important events or persons in history. Given the age of the site, the stock tank, ditch and dike, and dam may have been built as part of a federal relief program such as the CCC—but that association is purely speculative, unsupported by distinctive design qualities or historical records. Instead, LA 135589 is indistinguishable from thousands of similar 1900s water control features dotting the New Mexico landscape. Similarly, the water control features do not stand out in any way as historically important examples of rural agricultural design. Finally, further study of the water control features is unlikely to yield important information on local history. Given its lack of historical associations, lack of important historical design qualities, and lack of information potential, LA 135589 does not appear to be eligible for the National Register of Historic Places.

## **Recommendations:**

SWCA recommends no further cultural resource studies or treatment for LA 135589.

## **ISOLATED OCCURRENCES**

Five isolated occurrences were defined during the survey, but one of those (IO-5) actually falls within LA 135589. The other four IOs were all found along the two proposed access roads to Stock Tank 19-2. IOs are locations that are too limited to be historically important, including as sources of information on local culture history. We do not recommend any further study or treatment of those locations. The IOs are summarized in Table 4.1.

IO No.	Quantity	Description	UTM Coordinates ((28 Datum)	
			Easting	Northing
1	1	Cibola White Ware, poss. Red Mesa B/W, jar sherd	770496	3875765
2	2	Angular debris, red and pink chert	770015	3875829
3	1	Can, 4.8 inches tall, lapped top and bottom seams, sanitary side seam, friction lid,	770004	3876062
4	1	Grayware sherd: plain, gray paste, possible pumice temper	770057	3786067
5	1	Retouched flake, white chert, no cortex (part of LA 135589)	770967	3875237

## Table 4.1. Isolated Occurrences.

## SUMMARY OF FINDINGS AND RECOMMENDATIONS

A cultural resources survey of three proposed stream restoration work areas and two access roads did not locate any listed historic properties or standing historical buildings or structures within or adjacent to the survey areas. The survey did not identify any previously recorded archaeological sites within the survey areas. The survey defined one archaeological site (consisting of three former water control features), as well as four isolated occurrences of archaeological remains along the proposed access roads. None of the archaeological remains appears to be eligible for the National Register of Historic Places. We do not recommend any further study or treatment of cultural resources, prior to the proposed work in the surveyed areas. If previously unknown archaeological remains are encountered during the proposed stream restoration work, activity in that area should be halted and El Malpais National Monument staff should be notified immediately.

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