

MUSEUM OF NEW MEXICO

OFFICE OF ARCHAEOLOGICAL STUDIES

**ARCHAEOLOGICAL TESTING AND DATA RECOVERY PLAN FOR FOUR
SITES ALONG U.S. 180 NEAR LUNA, CATRON COUNTY, NEW MEXICO**

**Yvonne R. Oakes
Dorothy A. Zamora**

Submitted by Timothy D. Maxwell
Principal Investigator

ARCHAEOLOGY NOTES 139

SANTA FE

1993

NEW MEXICO

ADMINISTRATIVE SUMMARY

In May 1993, the Office of Archaeological Studies, Museum of New Mexico, conducted an archaeological testing program at four sites along U.S. 180 between Luna and the Arizona border in Catron County, New Mexico. The testing was performed at the request of the New Mexico State Highway and Transportation Department (NMSHTD). The tested sites include a Tularosa-phase (A.D. 1100-1275) room block (LA 3279) of the Mogollon culture, a lithic artifact scatter (LA 89845), and two sherd and lithic scatters (LA 89846 and LA 89847) that may represent Pithouse-period occupation of the area. LA 3279, the Hough site, is a large pueblo tested by Wendorf in the late 1950s (Wendorf et al. 1963).

Test excavations by OAS staff revealed that subsurface cultural material exists at the room block (LA 3279) and the two possible pit structure sites (LA 89846 and LA 89847). The lithic artifact scatter (LA 89845) was thin, dispersed, and contained no subsurface depth. This site is not likely to yield information important to the prehistory of the area. A data recovery plan is presented for LA 3279, LA 89846, and LA 89847.

MNM Project 41.541 (Luna Testing).

NMSHTD Project TPA-180-1(6), CN 2352.

Gila/Apache National Forest Special Use Permit, expires December 1993.

CONTENTS

Administrative Summary	ii
Introduction	1
Physical Environment	3
Archaeological Overview	5
Existing Data Base	5
Overview	5
Cultural Setting	6
Testing Procedures	12
Testing Results	13
LA 3279	13
LA 89845	16
LA 89846	18
LA 89847	20
Discussion	22
Recommendations	24
Data Recovery Plan	25
Theoretical Orientation	25
Current Theory	26
Research Expectations	29
Site-Specific Research	32
Field and Analysis Methods	33
Project Results	37
References Cited	38
Appendix 1: Site Location Information	47
Appendix 2: Zuni Burial Policy	49
Appendix 3: Vitae	54

Figures

1. Project vicinity map	2
2. LA 3279 site map	14
3. LA 89845 site map	17
4. LA 89846 site map	21
5. LA 89847 site map	21
6. Site location map	48

Tables

1. Artifacts from testing program	23
2. Ceramic frequencies	23

INTRODUCTION

Between May 3 and May 14, 1993, the Office of Archaeological Studies, Museum of New Mexico, conducted an archaeological testing program at the request of William L. Taylor of the NMSHTD on four sites along U.S. 180 between Luna and the Arizona border in Catron County, New Mexico (Fig. 1). The NMSHTD proposes to reconstruct U.S. 180 in this area. The purpose of the testing program was to determine the boundaries, subsurface depth, and importance of the four sites. Previous surveys of the right-of-way were completed by Koczan (1983) and Zamora and Sterling (1992). Three of the four sites are on land administered by the Gila National Forest, and one is on private land. Permission was granted by landowners to test the area. Legal descriptions of all sites are given in Appendix 1.

The testing program was conducted by Dorothy Zamora, assisted by Christine Sterling and Patrick Severts, accompanied by workers Chris Cordova, John Fletcher, and Antonio Torres. Work was under the direction of Yvonne R. Oakes, principal investigator. Field time totaled 10 days for six persons. Travel totaled 1,520 miles. Analysis of recovered artifacts and report preparation took 21 days.

LA 89845 is a lithic artifact scatter on private land within the highway right-of-way. No further archaeological work is recommended for this site. The three sites on Forest Service land are LA 3279, LA 89846, and LA 89847. All are recommended for further investigation. This report presents the findings of the testing program and proposes a data recovery plan for the excavation of the three sites within the Gila National Forest.

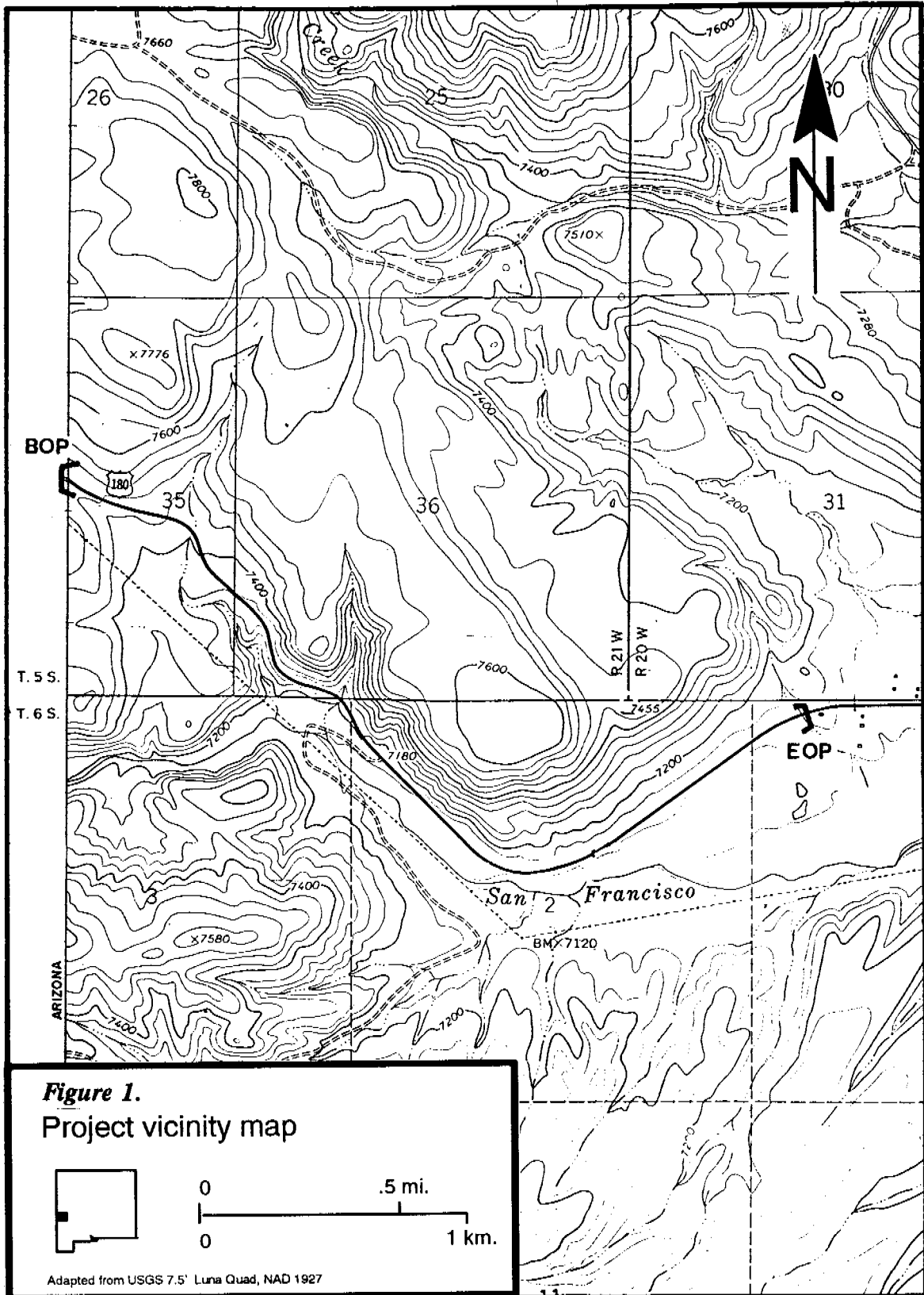


Figure 1.
Project vicinity map



Adapted from USGS 7.5' Luna Quad, NAD 1927

PHYSICAL ENVIRONMENT

The project sites lie within the Luna Valley on the first bench above the San Francisco River within the Gila/Apache National Forest. The San Francisco Mountains lie immediately to the southeast of the valley. The terrain throughout the surrounding area is mountainous and forested, characterized by steep slopes leading down to deeply cut drainages. At the location of the sites, the San Francisco River emerges from the mountains to the west and forms the meadows of the Luna Valley. The elevation in this area is 2,170 m (7,120 ft).

The west-central portion of New Mexico as a whole is "dominated by late Eocene-early Miocene volcanic rocks. Highest mountains are resurgent domes of ash-flow tuff cauldrons or andesitic stratovolcanoes, modified by subsequent Basin and Range faulting and erosion" (Elston 1982). About 8.5 km south of the sites, the geology is made up of boulder beds and coarse clastic rocks, mainly fragments of volcanic rock. In the midst of this, a narrow zone of Datil group geology intrudes: rhyolite tuff flows of welded and crystalline nature with breccias included. Closer to Luna, the geology changes to Gila conglomerate formations. The town is located just inside an area of Quaternary alluvia, a valley alluvium associated with floodplains (Dane and Bachman 1965). The town rests on terrace and pediment gravels, basalt, and bolson deposits.

The soil association in Luna Valley is San Mateo-Shanta. The land is nearly level to gently sloping and includes the floodplains of the San Francisco River. Soil texture is sandy to clayish, much of it sandy loam. About 90 percent of this land is classified as irrigable, and the soils are excellent for the production of crops under irrigation. Modern crops include alfalfa, orchards, vegetables, small grains, and sorghum (Maker et al. 1972:18-19).

Vegetation in the area consists mostly of medium to short grasses, shrubs, and scattered piñon, juniper, and oak. Cottonwood trees are found next to the San Francisco River. Other flora include tufted evening primrose, prickly pear, Ponderosa pine, alligator juniper, Indian ricegrass, mullein, aster, yellow cone flower, purple vetch, grama grass, blue grama, sunflower, orange sneeze weed, rocky mountain iris, accordion flower, June grass, Mormon tea, matt muhly, spear grass, alkali sacaton, sand dropseed, and a variety of mushrooms.

Fauna listed for the area include elk, black bear, coyote, white-tailed deer, mule deer, mountain lion, mountain sheep, beaver, cottontail rabbit, jackrabbit, red-tailed hawk, golden eagle, various squirrels, snakes, and other birds.

The climatic data for the study area is derived from records kept at the Luna Ranger Station. The mean maximum temperature at the ranger station is 18.3 degrees C

(65 degrees F), and the mean minimum temperature is -3.3 degrees C (26 degrees F) for a 46-year period. Very high temperatures are seldom recorded in the higher elevations of the region. Annual precipitation for this area is a mean of 395 cm (15.58 in) over a 60-year span. Average annual snowfall at Luna is 1,016 mm (40 in). The project area has an average of 87 frost-free days a year, compared to 120 at Reserve (Maker et al. 1972:67).

ARCHAEOLOGICAL OVERVIEW

Existing Data Base

Little archaeological work has been carried out in this part of the Mogollon Highlands compared to the areas around Reserve, Pine Lawn Valley, and Apache Creek. Most investigations have been in the form of surveys for highway projects (Koczan 1988; Marshall 1989; Zamora and Sterling 1992) or USDA Forest Service timber sales (Ellis 1990, 1991, 1992; Clifton 1990). In addition, Nightengale (1980) and Rafferty (1978) surveyed the area at the request of independent contractors. Perhaps the first systematic survey of this portion of west-central New Mexico was performed by Hough in 1905 (Hough 1907). Danson (1957) also surveyed the area near Luna and to the north in Centerfire Creek.

Only two excavations are known to have been completed in the immediate vicinity. One took place at Luna Village (LA 45507), first investigated by Hough (1919). This is a large pithouse village of the Three Circle phase (A.D. 900-1000) located in the community of Luna. In 1992, the Office of Archaeological Studies excavated five pithouses at Luna Village as part of a NMSHTD highway reconstruction project.

The Hough site, LA 3279, is the only other site partially excavated in the area. This site was also recorded by Hough (1907) and subsequently by Koczan (1988), Nightengale (1980), Rafferty (1978), and Zamora and Sterling (1992). Confusion in placing the site correctly on USGS topographic maps led to the site's having two Laboratory of Anthropology numbers, LA 3279 and LA 39988. In the late 1950s, Wendorf excavated one room and tested three others at LA 3279 immediately adjacent to the present highway (Wendorf et al. 1963).

Overview

The project sites lie near the northern edge of the Mogollon Highlands. The concept of a Mogollon culture originally created much debate among archaeologists when Emil Haury (1936) defined it as a culture unit from his surveys and excavations in the area from 1931 to 1935. Earlier work had been carried out in the project vicinity by Hough (1907, 1919) at Luna Village, LA 45507. But until Haury's studies in the 1930s, the Mogollon culture had not been distinguished from those of the Anasazi and Hohokam (Reid 1986:1). Archaeological interest in Mogollon cultural characteristics and their temporal placement ran high in the 1930s. By the late 1930s, Paul Martin had established an archaeological field camp at Pine Lawn near Reserve. Martin and John Rinaldo collaborated on site investigations in this area (Martin and Rinaldo 1947; Martin et al.

1949, 1950). Other archaeologists who have pursued a keen interest in this region include Danson (1957), Peckham (1958), and Kayser (1972). Several field schools, NMSHTD projects, and USDA Forest Service contract work have also contributed to our knowledge of the Mogollon Highlands.

Detailed overviews of the area have been completed by Berman (1979), LeBlanc and Whalen (1980), and Stuart and Gauthier (1981). Recently, scholars have shown a renewed interest in the region, concentrating on problem-solving research. Many have concerned themselves with the origins of agriculture in the project area. Gilman (1983, 1987) focuses on changing house forms as a response to varying resource needs. Minnis (1985) looks at various models for the adoption of cultigens, and Hunter-Anderson (1986) examines the role of increasing population pressure as a cause for intensification of agricultural production. Wills (1988a, 1988b) studies the geographical characteristics of population changes and mobility leading to the use of domesticates within the project area. More recently, Cordell and Gumerman (1989) have included the Mogollon area in a general scheme of changing adaptations occurring throughout the Southwest between A.D. 200 and 1540.

More intensive research in the study area is certainly warranted because of the increasing data base. We now have an opportunity to examine in even further detail such aspects of Mogollon and pre-Mogollon culture as the shift from hunting and gathering to agriculture, changing settlement sizes through time, clarification of phase designations, locational patterning, reasons for architectural variability, causes of economic stress, population dynamics, and changing resource utilization through time.

Cultural Setting

Paleoindian Period (9500-6000 B.C.)

No Paleoindian sites have been located within the project area. Sites have been recorded on the Plains of San Agustin, 45 km to the east (Hurt and McKnight 1949; Bussey and Beckett 1974). Two other late Paleoindian sites have been recorded near Quemado (Honea and Benham 1963; Honea 1969; Eck 1982). However, Paleoindian projectile point collections have been made by ranchers in the area. These include Clovis points (9500-9000 B.C.) and Cody Complex points (7000-6000 B.C.).

The occurrence of Paleoindian sites in montane areas such as the project area is rare. Some sites have been found in the Sangre de Cristo Mountains in northern New Mexico, however, and at high elevations in Colorado. In general, Paleoindian sites are located in deflated sand dunes at the edges of playas. Isolated diagnostic projectile points are also found in this setting.

Archaic Period (6000 B.C.-A.D. 200)

Archaic sites in the project area occur in a variety of elevational and topographic zones: deflated blowouts, above edges of former lake terraces, along arroyo banks and streams, near springs, and in the high mountains of the Gila/Apache National Forest. Recorded sites include rock shelters, caves, lithic artifact scatters, and one pithouse site. Once occupied caves include Tularosa Cave (Martin et al. 1952), O Block Cave (Martin et al. 1954), and Bat Cave (Dick 1965). Wet Leggett, the open pithouse site, is adjacent to the project area and was recorded by Martin and Rinaldo (1950).

Beckett (1973) thinks that cave sites were used for winter occupation, while lower-elevation dune sites were used from spring through fall. Heller (1976:18,21), however, found young faunal specimens at Tularosa Cave, suggesting a possible late summer or early fall occupation. Other researchers have disputed Beckett (1973), arguing that winter sites were occupied at the lower elevations and summer sites were located in the mountains (Davis 1963; Hunter-Anderson 1986).

Two Archaic cultural traditions are known in the general region: Cochise and Oshara. The two traditions are distinguished by projectile point style and geographic distribution of the points. The Cochise culture is considered the basis for the later Mogollon in southwest New Mexico, while the Oshara is associated with the Anasazi in northern New Mexico. Boundaries between the two are vague. The Oshara sites date from 5500 B.C. to A.D. 600, based on six separate stages devised by Irwin-Williams (1973). No sites of this type have been found in the study area.

The Cochise tradition was originally considered a manifestation of the Desert Culture, found in southeastern Arizona (Sayles and Antevs 1941). It has long been thought to include three stages: Sulphur Springs (7500-3500 B.C.), Chiricahua (3500-1500 B.C.), and San Pedro (1500-200 B.C.). Irwin-Williams (1979) has broadened these dates but left a major gap between the Sulphur Springs and Chiricahua phases. Her chronology is Sulphur Springs (9000-6000 B.C.), Chiricahua (3500-1000 B.C.), and San Pedro (1000 B.C.-A.D. 200). Sayles (1983) fills the gap with the Cazador phase (7000-6000 B.C.). However, the Cazador phase may be valid for only the Arizona area. No sites dating to the early Sulphur Springs phase have been found in New Mexico. Hogan (1985:9) suggests that Archaic populations did not occupy the mountains of the study area until late in the Chiricahua phase, about 3500 B.C.

Several sites of the Cochise tradition have been dated through radiocarbon analysis. A date of 2556 ± 680 B.C. has been obtained for the Wet Leggett Arroyo site (Martin et al. 1949), 3981 ± 310 B.C. for the Chiricahua component at Bat Cave (Dick 1965:105), and 272 ± 200 B.C. for corn from the San Pedro phase at Tularosa Cave (Martin et al. 1952:500). These dates are uncorrected.

As a result of his investigations at Bat Cave, Dick (1965) suggested that maize

was present in this area as early as 3500 B.C., in the early Chiricahua phase. Later research has questioned the association of the early date with maize (Berry 1982; Minnis 1985; Wills 1988a). Maize does not appear again in the archaeological record in the study area until around 1250 B.C. at Tularosa Cave (Martin et al. 1952).

The Archaic period ends with the introduction of pottery. No explanation for the adoption of this significant technological change is usually offered (Hunter-Anderson 1986), although the use of ceramics corresponds with the storage and later soaking and boiling of horticultural products for winter use as populations became less mobile.

Mogollon Period (ca. A.D. 200-1350)

The transition between the Archaic and the Mogollon period is generally marked only by the appearance of brown ware pottery. In the Mogollon period, we see the use of pithouse dwellings with a gradual shift to masonry above-ground structures, ceremonial units, and an increasing use of cultigens. Reasons given for these adaptations include increasing population pressure, restricted mobility, and environmental stress.

The use of various taxonomic designations to describe cultural development in the Mogollon area is somewhat confusing. We shall follow the original taxonomic system that Haury (1936) devised specifically for the Pine Lawn Valley. Phase classifications are Pinelawn (ca. 150 B.C.-A.D. 500), Georgetown (A.D. 500-700), San Francisco (A.D. 700-900), Three Circle (A.D. 900-1000), Reserve (A.D. 1000-1100), and Tularosa (A.D. 1100-1350). We understand that there may be problems in assigning sites to rigid phases or time frames, and these difficulties will be examined as we pursue further study in the area. Some researchers classify sites as Pithouse phase or Pueblo phase, with a break after the Three Circle phase at approximately A.D. 1000. LeBlanc (1976) therefore considers Pithouse sites as Early (Pinelawn-Georgetown) or Late (San Francisco-Three Circle). Sites from all of the Mogollon phases have been recorded within the Gila/Apache National Forest.

Early Mogollon sites of the Pinelawn and Georgetown phases that have been excavated near the project area include Luna Junction (Peckham 1963), Mogollon Village (Haury 1936), Pine Lawn Camp Pithouse (Rinaldo n.d.), Promontory (Martin et al. 1949), Starkweather Ruin (Nesbitt 1938), the SU site (Martin 1943; Martin and Rinaldo 1947), Three Pines Pueblo (Martin and Rinaldo 1950), and Turkey Foot Ridge (Martin et al. 1949; Martin and Rinaldo 1950). The SU site is currently being reexamined by W. H. Wills through the University of New Mexico field school program.

Pithouses dating to these early phases indicate both year-round and seasonal use. An attempt to explain these variations in terms of mobility patterns is provided by Hunter-Anderson (1986).

Most early Mogollon sites tend to be in elevated areas such as mesa tops, knolls, ridges, and hilltops. Berman (1979:30) argues that these areas may not necessarily have been selected as defensive locations, but rather for accessibility to water or arable land, protection from flooding, presence of good drainage, or a commanding view of the area. By the San Francisco and Three Circle phases, there is a general shift in site locations to more accessible ridges or terraces, and closer to floodplain areas. Berman (1979) suggests that this may indicate increasing dependence on agriculture. Sites of the San Francisco and Three Circle phases that have been examined within or near the project area include Hillside Pueblo (Peckham 1958), Oak Springs Pueblo (Martin et al. 1949), the Sawmill site (Bluhm 1957), South Leggett Pueblo (Martin et al. 1950), Starkweather Ruin (Nesbitt 1938), the Switchback site (Peckham 1957), Three Pines Pueblo (Martin et al. 1950), Wet Leggett Pueblo (Martin et al. 1950), and Y Canyon Cave (Martin et al. 1954).

Generally, researchers indicate that pithouse sites are randomly laid out with a lack of formal planning (Bullard 1962; Berman 1979; Kayser 1988). However, Lightfoot and Jewett (1986) believe they have isolated a pattern described loosely as circular house clusters around a central ceremonial or social unit. Early pithouses tend to be round (a few are bean-shaped), with a variety of post-support patterns. By the San Francisco phase, houses are generally more square. Entryways range from long and narrow to short and wide and are often stepped; however, there is no consistent doorway alignment. The size of the pithouses varies from site to site. The largest structures (30 sq m) occur during the Pinelawn phase and decrease in size thereafter. Early ceremonial units are frequently larger pithouse types. Extramural hearths, storage pits, and burials are frequently found on pithouse sites.

Mogollon ceramics are usually sparse during the Pinelawn phase. Initial pottery consists of a plain brown ware called Alma Plain with an Alma Rough variant, followed soon after by San Francisco Red. Smudged wares are prevalent by the San Francisco phase along with Three Circle Red-on-white. By the late Three Circle phase, Reserve Black-on-white begins to appear.

Subsistence adaptations during these Mogollon pithouse phases include the procurement of wild game and plants and the raising of maize, kidney beans, squash, and various gourds.

By the Reserve phase (ca. A.D. 1000) pithouse dwellings give way to above-ground units. Sites of the Reserve phase that have been excavated near the project area are Hillside Pueblo (Peckham 1958), Oak Springs Pueblo (Martin et al. 1949), the Sawmill site (Bluhm 1957), South Leggett Pueblo (Martin et al. 1950), Starkweather Ruin (Nesbitt 1938), Switchback site (Peckham 1957), Three Pines Pueblo (Martin et al. 1950), Wet Leggett Pueblo (Martin et al. 1950), and Y Canyon Cave (Martin et al. 1954).

During the Reserve phase, site density was at a peak. Sites also extended further into previously unoccupied areas and at generally lower elevations. Sites are found on benches or terraces above drainages and on low mesas, hills, and valley floors.

In this phase, we see the appearance of above-ground masonry habitation sites. These usually consist of an L-shaped series of contiguous rooms. Units of three rooms or less are generally considered fieldhouses, while permanent residences may contain up to 30 rooms. Jacal structures are present but seem uncommon.

Black-on-white ceramics become common during this time. These include Reserve Black-on-white, Tularosa Black-on-white, and Mimbres Classic. Mogollon black-on-white ceramics have been seen as imitations of Anasazi wares, although Minnis (1981) thinks they may have developed locally. Current research by OAS analysts suggests that Reserve Black-on-white and Tularosa Black-on-white may actually have Anasazi origins.

The latest Mogollon-period sites in this part of southwest New Mexico are assigned to the Tularosa phase. Sites of this time frame that have been excavated near the project area are Higgins Flat Pueblo (Martin et al. 1957), the Hough site (Wendorf et al. 1963), Starkweather Ruin (Nesbitt 1938), and the WS Ranch site (Neely 1978).

These sites are larger than those of preceding phases; however, there are fewer of them, suggesting a consolidation of smaller villages into centralized communities. Sites range from one or two rooms to multistoried structures of over 100 rooms. Sites generally consist of 20 to 25 masonry rooms. The ceramic assemblage includes Tularosa Black-on-white, Tularosa White-on-red, and St. Johns Polychrome (a late manifestation). Although the population was primarily agricultural, wild resources were also exploited.

A gradual abandonment of the Mogollon area began around A.D. 1300. Rice (1975) believes the first abandonments occurred along minor drainages, in narrow valleys, and at the higher elevations, above 2,100 m (7,000 ft). The Pine Lawn Valley, with the exception of Starkweather Ruin, is thought to have been abandoned earlier, by the close of the Reserve phase. However, recent excavations by OAS personnel indicate the valley was still occupied during at least a portion of the Tularosa phase (Oakes 1993). The San Francisco River area near Luna contains sites dating up through the early Tularosa phase. After ca. A.D. 1350, the Gila/Apache National Forest region seems to have been completely abandoned until the arrival of the Apaches. Local Mogollon peoples may have migrated north to the Zuni area (Bullard 1962:9; Hogan 1985:11).

Apache and Spanish Periods (ca. 1600-1870s)

This section is derived primarily from Wozniak (1985). By the end of the sixteenth century and throughout the seventeenth century, the pueblos of Zuni and Acoma, to the north of the project area, were frequently raided by Apaches from the

mountains in the Mogollon area (Scholes 1942). The exact locations of Apache strongholds are unknown. Spanish records suggest there were four Apache groups centered south of Zuni (Schroeder 1974). One of these, the Chilinos, occupied the area in and around the San Francisco Mountains. Apaches remained in the area throughout the first half of the eighteenth century.

In 1747, a Spanish expedition reached the Zuni area by way of the San Francisco and Gila rivers (Thomas 1932). The expedition, under Bernardo de Miera, reported Apache *rancherías* in the San Francisco Valley. By the 1780s, Apaches and Navajos had become allies and made joint raids in Arizona and northern Mexico. In 1788, a Mexican punitive expedition headed north from Sonora and reported the presence of Apaches in the San Francisco Mountains (Thomas 1932). Another incursion from Sonora to Zuni in 1795 traversed the San Francisco and Gila rivers and again noted the presence of Apaches in these mountains.

There are no further accounts of Apaches in this area until the late 1850s. The Apaches seemed to have focused much of their attention south toward Chihuahua and Sonora. In 1857, however, Apaches raided farmsteads near Zuni and returned to the San Francisco River area (Schroeder 1974).

Navajo refugees were reported living south of Zuni by 1859. In 1860, a U.S. military campaign drove Navajos into the San Francisco and Mogollon mountains. Navajos remained in the general area until the establishment of the Navajo Reservation in 1868. This left the region open to the Apaches. In 1869, a treaty with the U.S. government supposedly confined the Indians to an area south of the Gallo Mountains. Between 1872 and 1874, various Apache groups were sent to a reservation along Tularosa Creek (Fraser 1965). But in 1874, Fort Tularosa, built in 1872 to protect government officials against attack, was abandoned because the Apaches were moved to Arizona. Through the remainder of the 1870s, Apache outbreaks continued. The defeat of Geronimo in 1885 ended Apache dominance of the Mogollon region.

Historic Period (1874-Present)

Once the Apaches were removed to a reservation in 1874, the Mogollon area became attractive to settlers from other regions. In that year, several families from Socorro settled at Lower San Francisco Plaza, south of present-day Reserve. They were soon joined by soldiers and their families from Fort Tularosa, who settled at Upper San Francisco Plaza. By the 1880s, settlement of the region was spurred by the construction of railroad lines throughout New Mexico and the resulting higher prices for sheep and cattle. In fact, there was a cattle and land boom in the general area around Quemado, culminating in the formation of large land and cattle companies. Severe winters and long droughts led to economic decline in the late 1880s and early 1890s. Smaller ranching and herding holdings developed after the decline and are the primary economic force in the area today.

TESTING PROCEDURES

The purpose of the testing procedures was to determine the nature, depth, and extent of potential cultural deposits within the proposed highway right-of-way. At all sites, testing operations followed general procedures used by the Office of Archaeological Studies. A permanent datum was first established for each site. Baselines running north-south and east-west were laid out with the use of a transit and stadia rod. Using wood stakes, a 1 by 1 m grid system was superimposed over each site. All surface artifacts and possible cultural features were marked with pin flags. Test pits measuring 1 by 1 m were then placed within the grid system at locations of high density or unusual artifacts, possible features, alignments or pit depressions, or areas of charcoal staining. Excavation in each pit continued until culturally sterile soil was reached.

Artifacts within each test pit were collected in 10 cm levels and bagged by artifact type within levels. Surface areas around each test pit were first collected. Testing employed the use of shovels, picks, trowels, and brushes. All soil was screened through 1/4 inch mesh. Augers were used in each test pit, if possible, to confirm that sterile soil had been reached. Augering was also systematically used every 2 m along portions of site baselines to examine soils between test pits. Profiles were drawn when stratigraphic layering was visible, and photographs were taken of any cultural features encountered.

Site maps were produced using the transit and stadia rod. Topographic variation, site elevations, drainages, test pit locations, site limits, and extent of the right-of-way were plotted on the maps.

All test excavations proceeded in depth until sterile soil was reached. Upon completion of the testing, all pits were backfilled. After testing, all artifacts were assigned a field specimen number by provenience. Lithic artifacts were monitored by functional and material type and the presence of wear patterns. Ceramic artifacts were analyzed for ceramic type and assigned a date. All artifacts will be reexamined upon conclusion of the data recovery program, when additional material will justify detailed statistical analysis.

TESTING RESULTS

Site descriptions and evaluations are provided for each of the four sites examined during the testing program. The locational data for each site are shown in Appendix 1. Each site description includes environmental location, site layout, testing methods, test units, and auger tests, and presents an evaluation of the testing program.

LA 3279 (Hough Site)

Site Type: Masonry-walled room block.

Cultural Association: Mogollon, Tularosa phase, ca. A.D. 1100 to 1350.

Land Status: Apache National Forest.

Elevation: 2,170 m (7,120 ft).

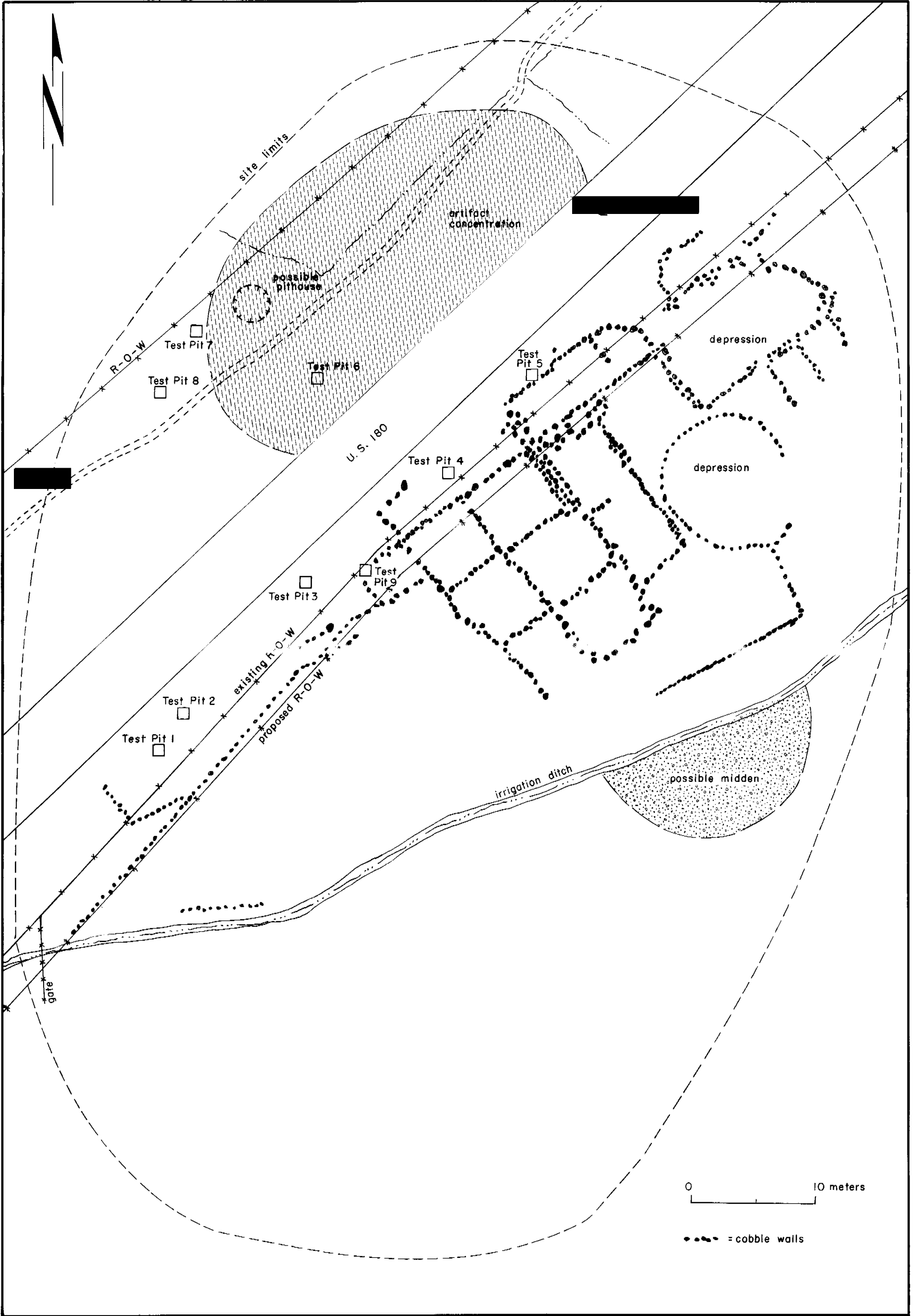
Description: The site is a medium-sized Tularosa-phase room block situated on the first terrace overlooking the floodplain of the San Francisco River. A late 1800s irrigation ditch, the Luna Irrigation Ditch, runs along the southern edge of the site. The Hough site extends along both sides of U.S. 180; a possible earlier pithouse is located on the north side (Fig. 2). On the south side of U.S. 180, the site consists of approximately 20 masonry rooms and two possible pit structure depressions. No walls are visible within the highway right-of-way, but earlier testing and subsequent maps indicate their presence within the road cut.

Hough first recorded the site in 1907. One room was excavated by Wendorf et al. (1963), and three others were partially tested. It is not possible to determine the location of this work from the site report. A later, detailed map of the site was drawn by Rafferty (1978).

Based on Wendorf et al. (1963), the depth of fill within the room blocks averages about 1 m below the present ground surface. In the excavated room, they uncovered a hearth, ash pits, a ventilator, a platform, and a posthole. The floor consisted of a thin layer of adobe laid over sterile clay. They recovered thousands of artifacts including ceramics, lithic artifacts, ground stone, bone awls, and a grooved axe.

On the north side of the road, on a low rise overlooking the room block to the south, about 90 artifacts were observed on the site surface and eroding down the embankment to the roadway.

Figure 2. LA 3279 site map.



The site measures 100 m north-south by 70 m east-west and covers approximately 5,600 sq m. About 20 percent of the site lies within the proposed highway right-of-way.

Nine 1 by 1 m test pits were hand-excavated on the site. Six were placed within the existing right-of-way to determine the length of the site along the highway. Three test pits were situated on the north rise in an attempt to locate a possible pit structure. Test pits ranged in depth from 0.2 m (incomplete) to 0.7 m below ground surface with an average depth of 0.43 m. Not all test pits encountered room features on the south side of the highway, and previous highway construction work has probably lowered the height of standing walls. In all cases, artifacts extended in depth to the level of culturally sterile soil.

Test Pits 1 and 3 encountered artifact-free soil almost immediately below the ground surface. A wall was found at a depth of 35 cm in Test Pit 2. Test Pit 4, near the center of the site, revealed a hearth and a portion of a wall. A possible floor surface was found in Test Pit 5 at 40 cm, and Test Pit 9 was likely within a room. On the north side of the road, Test Pit 6 may have located the probable pithouse. A dirt wall and a bench or floor at 40 cm indicate the presence of a structure. Artifacts extended 30 cm below the ground surface in nearby Test Pits 7 and 8.

A total of 412 artifacts were recovered from the nine test pits at LA 3279. Of these, 330 are ceramics, 75 are lithic artifacts, 4 are faunal remains, 2 are ground stone, and 1 is a clay animal effigy. The lithic assemblage includes one obsidian projectile point and two biface fragments. The ceramics on the room block include Alma Plain and Polished, Indented Corrugated, Incised Corrugated, Alternating Corrugated, Tularosa Patterned Corrugated, Reserve Smudged, Tularosa Fillet Rim, Tularosa Black-on-white, Tularosa White-on-red, and White Mountain red ware. The ceramic assemblage suggests a date of A.D. 1200 for the site, placing it within the Tularosa phase of the Mogollon culture. The possible pithouse area contains Alma Polished sherds, Reserve Smudged, Indented Corrugated, and Alternating Corrugated wares. White wares were observed on the surface but not collected for analysis. It is difficult to ascertain if the ceramics are sufficiently different in distribution and type from the room block to warrant the identification of a earlier cultural component.

Evaluation: The Hough site represents a Tularosa-phase room block with multiple rooms and a possible earlier pit structure. Cultural material is found at depths of 0.4 m to 1.0 m below ground surface. Tularosa-phase sites have rarely been excavated in this area. Because LA 3279 contains abundant material and has excellent architectural preservation, it should provide data on subsistence and settlement practices of peoples during the last years of prehistoric occupation in the Luna Valley. Additional investigations are recommended.

LA 89845

Site Type: Lithic artifact scatter.

Cultural Association: Unknown.

Land Status: Private.

Elevation: 2,173 m (7,130 ft).

Description: The site is situated on a low rise which extends to both sides of U.S. 180. The rise is part of the first bench to the north above the San Francisco River. LA 89845 measures 50 m north-south by 45 m east-west and covers 1,800 sq m (Fig. 3). The lithic artifact scatter is sparse, with no obvious concentrations.

A total of six test pits were placed in areas of the densest artifact deposits. These were dug in arbitrary 10 cm levels. The site proved to be very shallow, with an average depth of 30 cm. Below this were numerous subsurface rocks and culturally sterile soil. Only 14 artifacts were recovered below the present ground surface, mostly at a depth of 1-20 cm. A series of auger tests was planned for the site; however, only eighteen were completed because of the extremely rocky soil. These reached depths between 0.35 and 1.14 m, confirming the presence of a culturally sterile clay substrate (5 YR 3/2, dark reddish brown, on the Munsell scale).

The test pits yielded 14 artifacts, including one piece of ground stone. Another 25 artifacts were recorded on the site surface. An in-field analysis was performed on these 25 artifacts to record type of lithic artifact and material and the presence of wear. Most lithic material is chalcedony (76 percent), followed by lesser amounts of rhyolite, "Luna agate" (a distinctive form of blue chalcedony), and chert. Artifacts consist of thinning flakes (48 percent), angular debris (32 percent), tertiary flakes (16 percent), and one core flake. No cultural features were found. Based on the few artifacts and limited diversity of the assemblage, LA 89845 was probably a short-term camping locale for an unknown group of prehistoric or protohistoric people.

Evaluation: The absence of diagnostic tools makes it impossible to assign a cultural association to the site. All known artifacts on the site have been collected or recorded. LA 89845 is not likely to yield any further important information on the prehistory of the area. No further archaeological study is recommended.

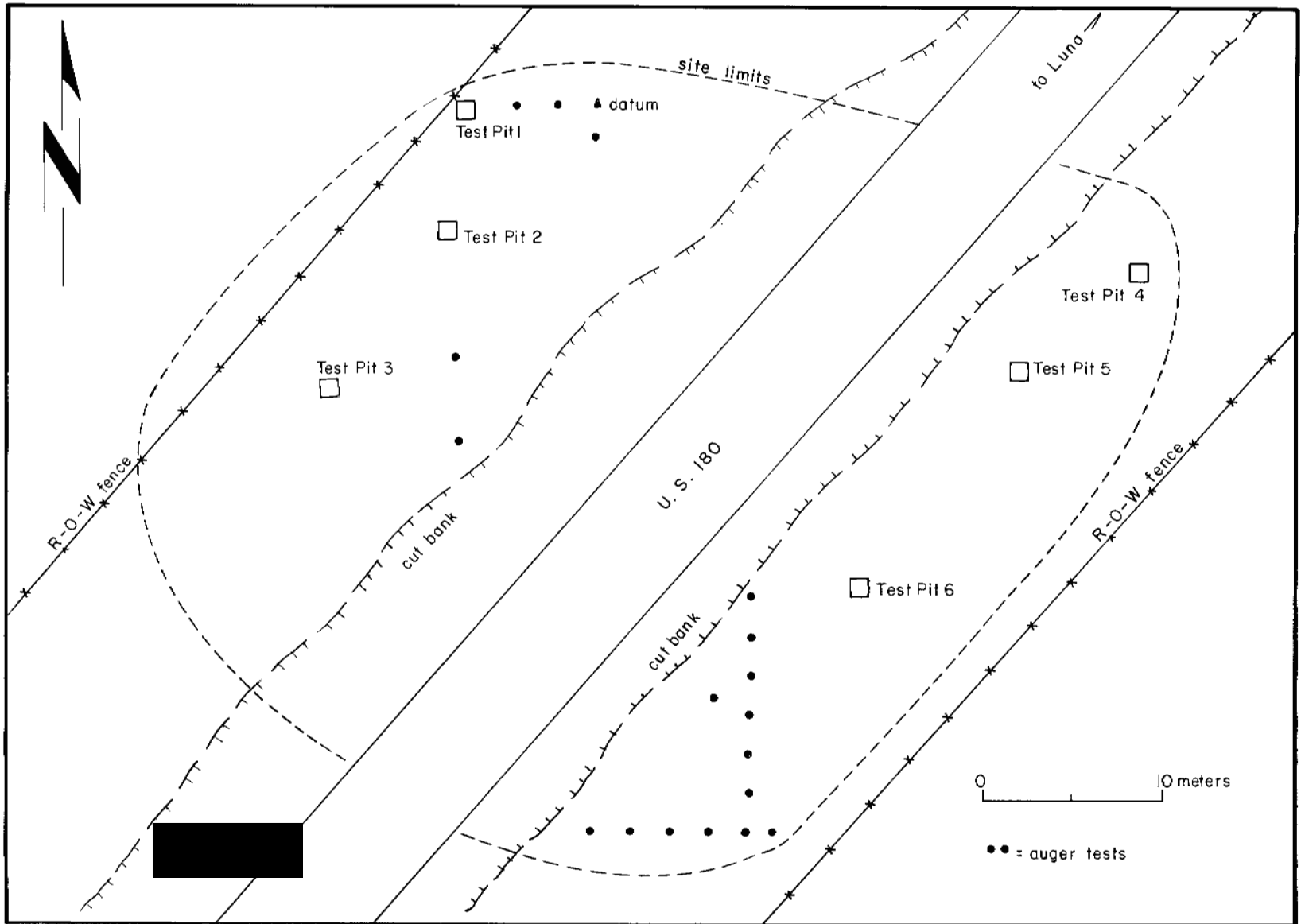


Figure 3. LA 89845 site map.

LA 89846

Site Type: Sherd and lithic artifact scatter.

Cultural Association: Three Circle phase (A.D. 900-1000), Mogollon culture.

Land Status: Apache National Forest.

Elevation: 2,168 m (7,115 ft).

Description: The site is located within the right-of-way of U.S. 180 at the [REDACTED] of a [REDACTED] immediately [REDACTED] plain of the [REDACTED]. It consists of a sparse sherd and lithic artifact scatter which measures 18 m north-south by 40 m east-west, covering an area of 575 sq m (Fig. 4). It is bound on the north by the Luna Irrigation Ditch.

Three test pits were placed within the sparse artifact scatter, and 12 auger probes were also placed within this area. Test Pit 1 yielded five lithic artifacts and one nonhuman bone (no ceramics) to a depth of 50 cm. Test Pit 2 was placed higher on the slope of the site to a depth of 70 cm. The soil was charcoal-flecked and contained 8 sherds and 12 lithic artifacts. An auger test in the center of this test pit produced charcoal to a depth of 1.3 m before reaching bedrock. Test Pit 3 was located on the east end of the site and excavated to 40 cm. An auger was extended to 94 cm to ensure the presence of sterile soil. Only one ceramic and one lithic artifact were found in the upper 10 cm of this test pit.

The twelve auger probes reached an average depth of 48 cm, with a maximum of 1.10 m. Charcoal was present in three of these auger tests and Test Pit 2, ranging in depth from 0.1 m to 1 m.

Twenty-five artifacts were recovered from LA 89846, nine of which were ceramics of Alma Polished, Indented Corrugated, and Reserve Smudged. Lithic artifacts are made of chalcedony, rhyolite, basalt, and siltstone. No tools were found. The ceramic assemblage suggests that the site represents a Pithouse-period occupation during the Three Circle phase, A.D. 900-1000.

Evaluation: It was at first thought that the assemblage was the result of artifacts washing down from an unrecorded site high on top of the steep slope immediately to the north. However, the presence of artifacts to a depth of 70 cm and a definable concentration of charcoal in Test Pit 2 and surrounding auger probes strongly suggests the presence of a pithouse structure in this area. It is likely that LA 89846 will yield information important to the late pithouse occupation in Luna Valley. Further archaeological studies are recommended.

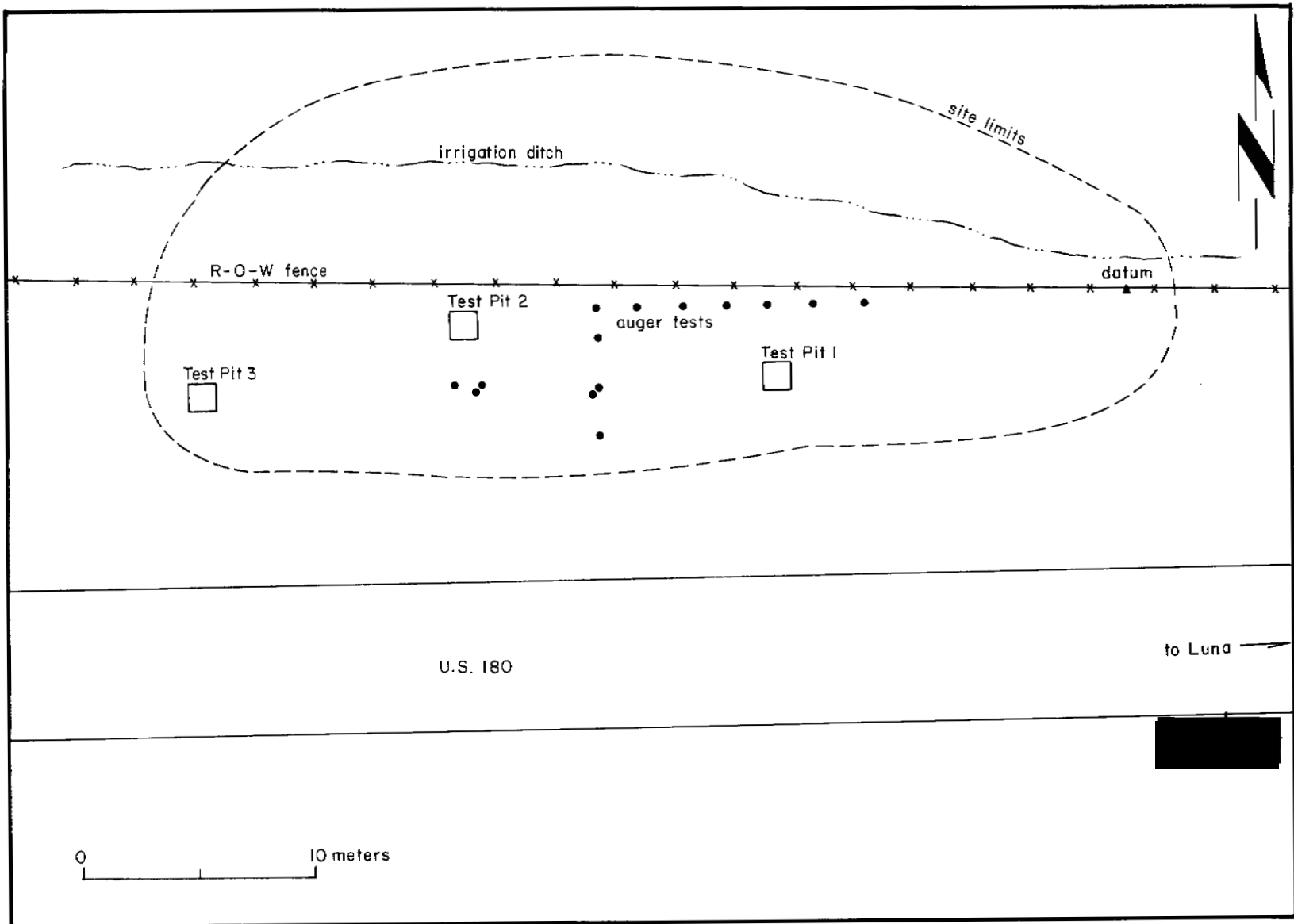


Figure 4. LA 89846 site map.

Site Type: Sherd and lithic artifact scatter.

Cultural Association: San Francisco/Three Circle phase, ca. A.D. 700-1000.

Land Status: Apache National Forest.

Elevation: 2,170 m (7,120 ft).

Description: The site is situated at the [REDACTED] of the [REDACTED]. The Luna Irrigation Ditch runs [REDACTED]. The artifact density of the scatter is low. The site measures 20 m north-south by 25 m east-west, an area of 400 sq m (Fig. 5).

Three test pits and 13 auger tests were employed on the site to determine the presence of subsurface cultural materials. Test Pit 1 was placed within a small artifact concentration. Excavations revealed 17 ceramics and one lithic artifact to a depth of 80 cm. An auger probe continued to 1.20 m, where a culturally sterile fine sand was reached. Test Pit 2, in which three artifacts were found, reached a cultural depth 30 cm before encountering sterile red clay. The auger test reached bedrock at 1.10 m. In Test Pit 3, at the highest point on the slope immediately south of the irrigation ditch, historical artifacts (wire, clear glass fragments) were found to a depth of 40 cm. An auger continued the probe, and at 60 cm, seven prehistoric ceramics were uncovered. The grid was then excavated to this level. Another auger test revealed that artifacts continued to 90 cm before reaching sterile soil.

The 13 auger tests encountered charcoal to a depth of 1.10 m. They did not locate any artifacts. On the east edge of the site, under some pine trees, is a small depression, 3 by 2.5 m. This area was augered to a limited depth of 45 cm because of tree roots. The tests also recovered charcoal. It is possible that a cultural feature is present here.

Artifacts consisted of 25 ceramics, 2 lithic items, and 1 nonhuman bone. The ceramics consisted of Alma Plain, Polished and Neck Banded; San Francisco Red; and smudged ware. Lithic artifacts were flakes of basalt and chalcedony. The ceramic assemblage suggests a San Francisco- to Three Circle-phase occupation.

Evaluation: The site may contain a pithouse occupation of the Late Pithouse period. Artifacts extend to a depth of 1.20 m, and charcoal is evident in most areas of the site. LA 89847 may contain information important to the prehistory of the Luna Valley area. Further archaeological study is recommended.

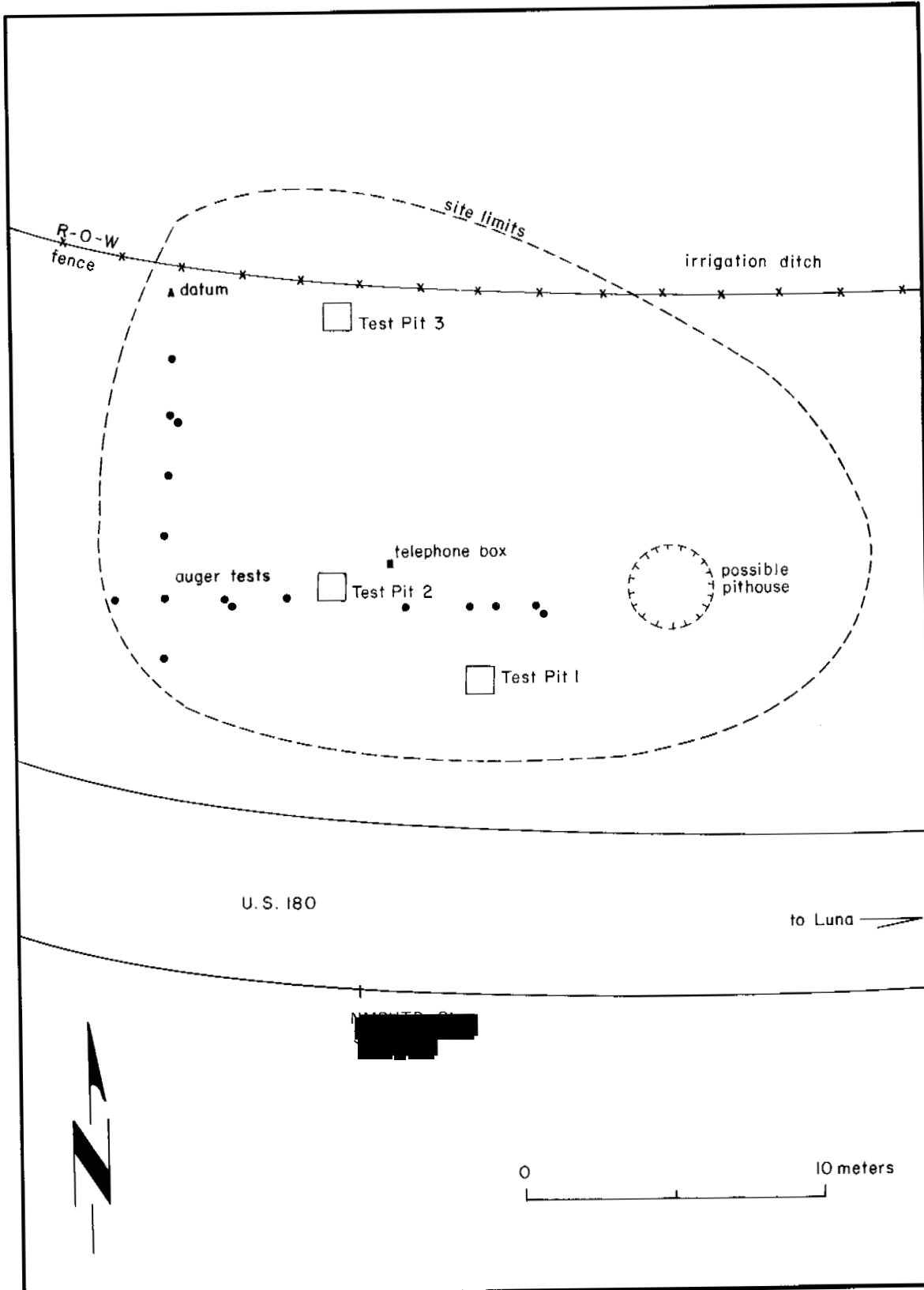


Figure 5. LA 89847 site map.

DISCUSSION

The four sites tested for NMSHTD Project TPA-180-1(6) date to the Late Pithouse (ca. A.D. 700-1000) and Late Pueblo (ca. 1100-1350) periods of the Mogollon culture. Testing confirmed the presence of a masonry room block with a possible pit structure associated with it, and possible pithouse features on two other sites.

A total of 533 artifacts were collected or recorded during the testing program (Table 1). These include 392 ceramics, 3 pieces of ground stone, 6 faunal fragments, 1 clay effigy, and 131 lithic artifacts. Analysis was purposely kept to a minimum during this phase of the project. Detailed studies will be performed on this material upon completion of the proposed data recovery plan.

Ceramic frequencies from the three Mogollon sites are shown in Table 2.

Most ceramics (27 percent) are of the Alma brown ware series, a type that occurs from the earliest pithouse period, ca. A.D. 200, through A.D. 1300. More temporally diagnostic are the smudged wares, the Tularosa wares, and the White Mountain red wares, which indicate a Late Pueblo-period occupation of LA 3279. Ceramics from the possible pithouse sites of LA 89846 and LA 89847 are so few and are such poor temporal indicators that assignment of Mogollon phases was very tenuous. Dates used in the ceramic classifications are:

Alma Plain/Variants	A.D. 250-1300
Reserve Smudged	A.D. 950-1130
White Mountain red wares	A.D. 1050-1300
Tularosa Series	A.D. 1175-1300

The lithic artifacts represent material types that are all locally available: rhyolite, basalt, chalcedony, chert, quartz, siltstone. Obsidian, while available from several regional sources, may be the only nonlocal material. We will source obsidian samples from each of the sites through trace mineral analysis during data recovery. We will also look at changing material type selection because sites vary in time and location from the Pine Lawn Valley to the Luna Valley. So few diagnostic lithic tools are represented in the small lithic assemblage that temporal classifications based upon diagnostics are not possible.

Table 1. Artifacts from testing program

Site	Sherds	Lithics	Ground Stone	Fauna	Miscellaneous	Total
LA 3279	347	75	2	4	1	429
LA 86845	-	39	1	-	-	40
LA 89846	15	15	-	1	-	31
LA 89847	30	2	-	1	-	33
Total	392	131	3	6	1	533

Table 2. Ceramic frequencies

Type	LA 3279	LA 89846	LA 89847	Total
Alma Plain	11		5	16
Alma Polished	105	12	10	127
Alma Neck Banded	-	-	1	1
Plain Corrugated	32	-	-	32
Indented Corrugated	66	1	-	67
Ineised Corrugated	1	-	-	1
Alternating Corrugated	6	-	-	6
San Francisco Red	-		3	3
Reserve Smudged	88	2	11	101
Tularosa Fillet Rim	17	-	-	17
Tularosa Indented	4	-	-	4
Tularosa Black on white	6	-	-	6
Tularosa White-on-red	1	-	-	1
Reserve/Tularosa Black-on white	2	-	-	2
White Mountain Red Ware	1	-	-	1
Indeterminate red ware	3		-	3
Indeterminate white ware	3	-	-	3
Indeterminate black-on-white	1	-	-	1
Total	347	15	30	392

RECOMMENDATIONS

Four prehistoric sites were tested by the Office of Archaeological Studies for the NMSHTD (Project TPA-180-1(6) CN 2352). Three of these sites (LA 3279, LA 89846, and LA 89847) have potential subsurface remains, including formal architectural features, and are likely to yield important information on the prehistory of the region. Further data recovery is recommended at these sites. LA 89845 was found to have no subsurface remains and a minimal number of artifacts within the proposed project limits. Important cultural materials are not likely in the site area outside of the proposed right-of-way. No further archaeological work is recommended.

DATA RECOVERY PLAN

This section presents a data recovery plan for the portions of LA 3279, LA 89846, and LA 89847 within the proposed project limits.

Theoretical Orientation

The three sites within the proposed project area range in time from the Late Pithouse period (A.D. 700) to the Late Pueblo period (A.D. 1150). Because of this 450-year continuum, we believe that the sites have the potential to answer important archaeological questions regarding subsistence strategies and their effect on settlement in the Mogollon Highlands, and the Luna Valley specifically, as influenced by dependence on agriculture.

The premise that guides the data recovery plan may be set forth as follows: In the Mogollon Highlands, if there is a continuum from full mobility in the early prehistoric occupation of the area to full sedentism by the Pueblo period because of an increasing dependence on agricultural products, then that increasing shift should be visible in the archaeological record. In other words, we propose a general model that suggests a positive relationship between dependence on cultigens and decreasing mobility. The logic of this argument is that if cultigen dependency increases, the bulk of harvested food increases, cultigens are stored, and, because storage entails investment in facilities and the reuse of sites, residential mobility declines. This is a traditional model for explaining change in site structure through time. However, we do not believe the model is as simple as it sounds, and we definitely think that events in the Mogollon Highlands during the Pueblo period (A.D. 1000) did not follow this model. The model merely provides us with a premise from which we can test the relationship between subsistence and settlement strategies in the Mogollon Highlands.

We are broadly classifying project sites as Late Pithouse or Pueblo as a basis for comparison. The following temporal categories are used: Late Pithouse period, A.D. 700 to A.D. 1000; and Pueblo period, A.D. 1000 to A.D. 1350. Given our current knowledge, these two temporal groupings should include sites that exhibit varying degrees of agricultural dependence and sedentism as part of the subsistence strategies of site occupants. The data recovery plan presents specific expectations for each category of site. Basically, we want to know what conditions lead from mobility to sedentism among prehistoric populations in the Mogollon Highlands and if they support our general model. Data from recently excavated sites in the area by the research team will be used to supplement data from the three sites selected for study. How did dependence on cultigens influence mobility patterns? How sedentary were the Pueblo groups? Are there other options besides sedentism to increasing agricultural dependence? Are Pithouse and

Pueblo sites structured differently? Do the types of resources used inform on mobility patterns? Is resource depletion evident in the Late Pueblo period prior to abandonment of the area? If so, does site structure change with the presence of stress?

The data recovery plan will focus on two aspects of Mogollon adaptations to examine variability in mobility patterns. We have chosen to study variations in site structure and subsistence activities through time among these prehistoric groups. Most arguments for or against changing subsistence strategies revolve around the degree to which prehistoric populations practiced agriculture. Our research will focus on this question as it applies to the study area.

Current Theory

The Mogollon Highlands, encompassing the mountains and valleys near Reserve, Luna, Apache Creek, and the Pine Lawn Valley, have long been considered the homeland of the adoption of agriculture in the American Southwest. The dating of charcoal lenses supposedly associated with maize at nearby Bat Cave to approximately 6000 to 5600 B.P. (Dick 1965) revolutionized existing concepts about the adoption of agriculture. Because no other southwestern sites yielded such an early date at that time (Tularosa Cave, at 2400 B.P., was the next oldest), Haury (1962) proposed that agriculture was first introduced to the Southwest from Mesoamerica via a mountain route at about 6000 B.P. He believed agriculture was limited to the Mogollon Highland area because of a favorable climatic regime. He then assumed, on the basis of available C-14 dates, that the practice of agriculture did not spread to the rest of the Southwest until over 2,000 years later. Archaic hunter-gatherers were thought to have eventually adopted cultigens in response to environmental stress, ceased their continuous wanderings in search of subsistence goods, settled down by streams and arable land, adopted the use of pottery, and eventually become sedentary, building pithouses and then surface rooms and practicing full-scale agriculture.

Recently, this view has changed, in part because of new investigations carried out by the University of Michigan at Bat Cave (Wills 1988a). The new work has produced revised dates for cultigens (maize and squash) at Bat Cave from 3100 to 2000 B.P., consistent with other sites in the area such as Tularosa Cave. We no longer must postulate a 2,000 year developmental period before the spread of agriculture to other areas. In fact, Wills (1988a:148-149) thinks Southwestern agriculture was probably first introduced in the Rio Grande Valley or southern Arizona and notes that by 3000 B.P. it is documented in the Jemez Mountains, San Juan Basin, southern New Mexico, and the Tucson Basin. However, Hunter-Anderson (1986:106) believes that people in the Mogollon Highlands may have felt the pressure of a high human population and thus opted for domestication of cultigens, implying that it was an indigenous process. Wills (1988a) argues that the adoption of agriculture is not an inevitable effect of population

pressure, although he agrees that variations in population size would probably create an unevenness in environmental productivity. The presence of cultigens at Archaic sites has, thus far, only been documented for cave sites near the San Agustin Plains. Our research team is examining subsistence data from recently excavated Archaic sites in the project locale for the presence of cultigens.

Growth in Archaic populations in the Mogollon Highlands may have occurred because of the widespread availability and diversity of subsistence resources. Resources known to be present in the uplands include deer, elk, rabbit, antelope, mountain sheep, small game, berries, piñon nuts, available water, lithic raw material, chenopods, and grasses (Wills 1988a; Fish et al. 1990). However, resources are subject to, among other factors, variability in timing and the amount of available moisture, season of availability, degree of utilization by humans, presence of disease, mobility of resource, and low yield. Today, Archaic populations are characterized as loose knit, with changing group size, fully mobile, moving freely from resource to resource, and using primarily wild plant foods as availability warranted.

Thus, we have a traditional picture of Archaic hunters and gatherers moving freely over the landscape prior to the utilization of agriculture. In recent years, debate has focused on the nature of Archaic mobility patterns in the Mogollon Highlands. Most recent models of Archaic settlement patterns postulate winters spent in the highlands and summers in the lowlands because of temporal and spatial variations in the abundance of resources (Beckett 1973; Hunter-Anderson 1986:49). Evidence of this pattern has not yet been found archaeologically. Winter residences in the mountains are expected to be small and the location dependent on the availability of game (Hunter-Anderson 1986). Wills (1988a:93) believes populations wintered not in the mountains but in lowlands to the south, where resources such as agave, sotol, mesquite, and cacti were plentiful. He maintains that high-elevation sites such as Bat Cave and Tularosa Cave imply a spring occupation (Wills 1988b:477). Obviously, the archaeological record is necessary for testing the various models of Archaic mobility patterns.

We do know that between 3100 and 2000 B.P., maize and squash made their appearance at several cave sites in the Mogollon Highlands. At some point, therefore, Archaic peoples probably gradually incorporated cultigens into their subsistence systems. Traditionally, the introduction of cultigens has perhaps simplistically implied an end to mobility, the beginning use of ceramic vessels, and a shift to permanent residences, albeit these may have occurred over periods of time. Researchers debate the causes for agricultural adoption, which vary from human population stress on available resources (Cordell and Gumerman 1989; Hunter-Anderson 1986) to a strategy for enhancing resource availability (Irwin-Williams 1973; Ford 1981; Cordell 1984; Minnis 1985). Wills (1988a:5) sees the two models as noncompeting. Increasing populations may lead to the increasing employment of agriculture as a security measure against other resource failure, enhancing subsistence strategies already in place. He thinks the environment of the highlands would not have yielded enough surplus winter consumption, making the

practice of agriculture a necessary rather than a choice (Wills 1988a:146).

The cultivation of plants in the Mogollon Highlands requires planting of crops in the spring and harvesting in the fall. Repeated return to fields during the growing season is also necessary, although for some groups, such as the Apaches, this strategy is not followed. Thus, Wills (1990:324) points out that the conception of agriculture as a casual or simple adaptation is incorrect. The practice of agriculture places potential limitations on mobility patterns. Mountain cultivation may indicate a conscious decision to stay in the uplands and utilize local resources there from spring through fall. Wills (1988b:477), however, cautions that spring use of mountains may have already been part of the Archaic seasonal round.

The use of storage facilities at early agricultural sites would allow populations to maintain mobile lifestyles between highlands and uplands (Wills 1988b:477), but as noted by Hunter-Anderson (1986), it may also have permitted them to reduce movement. As Wills (1988b:461) states, this issue is unresolved because no early sites have yet yielded storage facilities.

The presence of residential architecture or ceramics has also not been documented in the Mogollon Highlands until after the adoption of agriculture. Thus, Wills (1988a:479) believes agriculture is not a necessary prerequisite for sedentism. However, if agriculture was initiated as a supplement in the highlands, not a substitute (Johnson 1989:372) for foraging strategies, then sedentism is not tied to the development of agriculture. The very quality, quantity, and diversity in resources that permit hunter-gatherer mobility, as pointed out by Fish et al. (1990:77-78), may also encourage sedentism.

A recent argument ties increasing sedentism to increasing population density (Sarah Schlanger, personal communication, 1990). People may be forced to reduce their residential mobility because permanent residence near producing fields is necessary for crop maintenance and because there may be populations in the area that would tend to occupy prime land left unattended by part-time horticulturalists.

In the Mogollon Highlands, it is generally believed that maize agriculture did not play a significant role in the subsistence economy of late Archaic populations (Gilman 1987). However M. Nelson (1990) views foraging with associated mobility or sedentism as part of continuously changing subsistence strategies practiced throughout much of the prehistoric occupation of the highlands. As needs vary, site use may shift on a seasonal basis, site populations vary periodically, and structures change. In the words of B. Nelson (1990:157), "Today, we expect diversity rather than unity, adaptive change as not necessarily permanent, and different trajectories occurring possibly simultaneously in the same area."

Research Expectations

Site Structure

Mobile and sedentary adaptations should be reflected in site structure. Analysis will examine structural and temporal diversity between projects sites and compare them to other excavated sites in the nearby area, such as Luna Village, the DZ site, the SAK site, and the Hummingwire site.

The presence or absence of storage facilities depends on the type of site and the activities pursued. Storage is a viable choice when mobility is restricted. Storage facilities may be temporary, located near gathering sites, and seasonally used, or more permanently located near long-term residences (Hunter-Anderson 1986:35).

What is the length of time each site is occupied? Length of site occupation can be determined from examining site structure and from artifact analyses such as those recommended by Schlanger (1990) and J. Moore (1988). A seasonal occupation might be evidenced by depth of dwellings, presence of interior hearths, storage facilities, labor investment in structures, and types of resources recovered from sites. Pithouse populations in the Mogollon Highlands range in age from A.D. 200 to A.D. 1000. They are typically characterized as sedentary, with a labor investment in dwellings, hearths, and storage facilities. Occupation lengths are thought to vary from seasonal to annual or longer. If pithouse sites do represent mobile populations, then use should reflect seasonality or short-term occupation.

Site structure on pithouse sites ranges from single pit units to villages of pithouses with intramural and extramural hearths, storage pits, and outside work areas. To assess mobility versus sedentism of the various site occupants, several avenues may be examined. Seasonal or repeated use of pithouses may be evidenced by reconstruction within structures, ample storage facilities, layering of floor levels, and overlapping features. To look at the problem of mobility among pithouse dwellers, we must, for example, look at site layout and labor investment in the project's two pithouse sites (LA 89846 and LA 89847). We must determine if the floors and walls have prepared surfaces. Are there numerous ancillary features within the structures? Is there a plan to site layouts? Are hearths formally constructed, or do they exhibit expediency in preparation? Are hearths both inside and outside of structures? Are storage facilities both inside and outside of structures? Are there specific work areas?

The number of contemporaneous storage pits on a site relative to dwellings is an indicator of the quantity of goods being stored. The nature of stored resources and the form in which they are stored may indicate whether immediate or future use is intended. Storage facilities outside of pithouse structures are thought to indicate seasonal use.

Length of occupation can also be determined by such methods as Schlanger's artifact deposition model (1990), labor-investment comparisons, and degree of storage dependency.

Dependence on cultigens is traditionally assumed for pithouse sites. However, this assumption may or may not be correct. Hard (1990) has developed a simple but apparently effective model to assist in the quantification of degree of agricultural dependence. He uses a mean mano length index to show that through time, manos increase in length and grinding surface, which he believes suggests a greater dependence on cultigens. Hard's methods can be applied to the mano assemblages and ethnobotanical data recovered from all project sites for verification of his model.

Pueblo sites of post A.D. 1000 in the Mogollon Highlands are represented by supposedly permanent structures, storage facilities, middens, and dispersed fieldhouses, indicative of the shift to greater agricultural dependency (Hunter-Anderson 1986:49). It is thought that mobility was greatly constrained in these populations because of the substantial labor investment and strong dependence on agriculture.

Unlike hunter-gatherers, pueblo residents produced expedient lithic flake tools. Bifaces such as projectile points and knives were prepared for specific purposes rather than general use. This statement can be tested through a comparison of lithic technologies at the two types of sites within the project area.

Subsistence Adaptations

The study of subsistence adaptations will focus on the types of resources used by each group of site occupants, if the resources were expediently prepared, and if storage was a part of the subsistence system. The various subsistence strategies such as foraging, collecting, and farming will be examined in relationship to their effects on mobility. Seasonality of resource availability will be calculated and potential seasonal rounds proposed following a model by Hofman (1984). At this point, archaeologists do not have the data to confirm seasonal rounds between highlands and lowlands or in highland areas only. Determining the source of specific resources such as lithic raw material, ceramic clays, and trade wares is necessary to provide information on the mobility of people and goods through the cultural systems. We will also examine the balance between utilized floral and faunal resources as a key to determining seasonality of procurement and possible use.

The presence of domesticated cultigens at sites, particularly maize and squash, will be evaluated in terms of their relative presence in the food assemblages. Variations in ceramic vessel form, ground stone assemblages, and lithic tool use will also aid in determining subsistence practices for each site. Ground stone implements may retain some of the materials that were ground and suggest what food use was intended. Hearths

are another source for recovering food items.

If Pithouse peoples at LA 89846 and LA 89847 were limited in their mobility, then subsistence activities would have been more labor intensive. Resource items might include those brought in from longer distances as well as those locally available.

Drying of food items indicates preparation for future use. Dried foods may be present in storage pits and ceramic vessels. The shift to preparation of dried food may have encouraged the use of pottery for boiling food prior to processing and preservation (Hard 1990). It is possible that the number of cooking vessels will increase as the use of dried food increases. A comparison of ratios of cooking vessel sherds with other artifacts in site assemblages may indicate such an increase.

Certain food items, such as maize and squash, require intensive scheduled monitoring, harvesting, and processing before being consumed or stored. If pithouse site assemblages indicate a stronger dependence on floral resources other than maize and squash, then we can assume that site dwellers were not constrained by agricultural pursuits. Whether domesticated crops were the predominant subsistence foods, however, must be ascertained from comparison with other food resources utilized.

We have assumed agricultural dependency for the Hough site (LA 3279), a Pueblo-period site. We hope to be able to assess the degree of agricultural dependence in the subsistence economy of the site occupants as opposed to other floral and faunal resources.

In conclusion, we are proposing to use the three sites recommended for data recovery as a data base for examining current research questions about occupation of the Mogollon Highlands. We believe the project sites have the integrity and the variety to provide such a balance.

Some questions may prove to be easily answered through the implementation of the data recovery plan. Can site structure studies indicate a seasonal taking of resources as proposed by Wills (1980)? What resources were used by the different groups in the area? What is the proportion of cultigens to other resources? Does increasing mano length correspond with greater dependency on agriculture on these sites? Were ceramics being traded into sites or were they locally made? From how far away were lithic raw materials actually obtained?

Answers to the proposed research questions may be obtained by compiling appropriate data sets. Artifacts will be subject to traditional dimensional analyses and those proposed in this report. To address the question of residential mobility, lithic artifact analysis will include a detailed study of biface manufacture and discard, following Kelly's (1988) model. According to Kelly, biface discard varies with the type and length of site occupation. We will also look at the amount of lithic manufacture versus the

amount of lithic maintenance, the investment in storage facilities and domestic architecture, length of site occupation, and amount of reuse or reconstruction to assess mobility strategies.

Determining the sources of resources--floral, faunal, lithic raw material, and ceramic--is important for understanding the mobility patterns of each prehistoric group. The identification of floral and faunal resources is especially useful for information on foods consumed and season of use. To examine the dependency on cultigens, we have developed several lines of investigation to measure that dependency: amount of cooking vessels present, percent of surface on manos, amount and kind of storage facilities, and relative amount of faunal resources.

When necessary, specialists will be employed to undertake these studies. Additionally, we will take palynological, phytolith, and macrobotanical samples from available pits, structures, hearths, floors, and cultural fill.

Placing structures and sites in an accurate temporal framework is critical for useful comparisons between site units and sites. Presently, we have only a few temporally diagnostic sherds to indicate the time of occupation of the pithouse sites, LA 89846 and LA 89847. We shall obtain absolute dates with C-14, dendrochronological, archaeomagnetic, and obsidian hydration samples whenever possible.

Data will be compared to the other prehistoric sites in the Mogollon Highlands to broaden the subsistence data base for the region. By examining mobility patterns, our knowledge of diversity in subsistence adaptations by these groups within the Mogollon area should be substantially expanded.

Site-Specific Research

LA 3279

LA 3279 dates to the Late Pueblo occupation (Tularosa phase) of the Mogollon Highlands, A.D. 1100-1350. It is the only site of this late time period excavated in the Luna Valley. It consists of a cobble-walled room block of about 20 rooms. Less than half of these are within the proposed highway right-of-way. Preservation appears to be very good. One room was previously dug by Wendorf (1963).

The site structure of such late sites in the Mogollon Highlands is not well known. LA 3279 provides the opportunity to examine site layout, relationship of pits to above-ground dwelling units, and use of various facilities. Artifact analysis will be used to document site function and assist in determining relative dependence on cultigens. Mano and cooking vessel analyses will also be used for this determination. Estimating the duration of site use is important for this late site and will enable us to compare lengths

of site occupation through time in the project area. To examine this, we will note building construction sequences, particularly evidence of reconstruction or reuse through time.

LA 89846

LA 89846 represents a pithouse occupation of the Three Circle phase (ca. A.D. 900-1000). The structure should contain floral and faunal remains that will identify types of resources used by the site occupants and allow for an assessment of the season of use and type of food preparation. Evidence of storage should be present. The examination of manos and cooking vessels will provide data on food preparation techniques and dependency on cultigens. Studies of food resource ratios will also provide this information. The balance between expedient and curated tools will be explored and applied to our theories on residential mobility. Site structure, the relationship between cultural features, the type of construction, and any evidence of reuse will allow for estimates of occupation length, seasonal use or reuse, and labor investment in the site.

LA 89847

LA 89847 is a Pithouse-period site dating to ca. A.D. 700-1000, of the San Francisco or Three Circle phase. As with LA 89846, the structure should contain floral and faunal remains that will identify types of resources used by the site occupants and allow for an assessment of the season of use and type of food preparation. Evidence of storage should be present. The examination of manos and cooking vessels will provide data on food preparation techniques and dependency on cultigens. Studies of food resource ratios should also provide this information. The balance between expedient (showing little use or wear) and curated tools will be explored and applied to our theories on residential mobility. Site structure, the relationship between cultural features, the type of construction, and any evidence of reuse will allow for estimates of occupation length, seasonal use or reuse, and labor investment in the site.

Field and Analysis Methods

Expectations for the type of features and cultural materials at the project sites and how they will answer the proposed research questions are detailed under "Research Expectations." Basically, the following standard field and analysis techniques will be used to extrapolate the specific structural and temporal data required by the data recovery plan. These include an accurate chronometric ordering of sites through various dating mechanisms such as radiocarbon analysis, archaecomagnetic sampling, obsidian hydration, and dendrochronology. Determination of time frames for each site is also important for dating the use of cultigens and other resources by site occupants. The data recovery plan also commits us to examine site structure in detail in terms of expedient versus reuse or

long-term use. We plan on collecting sufficient macrobotanical and palynological samples to assess subsistence adaptations. These will be taken from floors, walls, and fill of structural units on each site. The chronometric data will be taken from burned structural material, hearths, and pit fill, if possible. Ceramic artifacts will also be used to augment the dating of sites and assess site function.

For determining the functional differences between the temporally different sites, we will test the various proposed artifact analysis models put forth in the data recovery plan. Variations in artifact assemblages are important to our study, and recovery of statistically valid artifact samples is critical. In addition, the collection of adequate floral and faunal remains is vital to our understanding of the various subsistence adaptations that may be present on our sites. These samples will be collected wherever possible, for example in pit fill, hearths, floor surfaces, ground stone surfaces, and trash areas.

Field Methods

A primary datum will first be established for each of the three sites on the project, from which at least two baselines will be run with a stadia rod and transit. From these, a 1 by 1 m grid system will be imposed over each site. Surface collections and initial excavation units will be made within the grid system. Hand tools such as trowels, shovels, picks, brushes, and dental picks will be used for the excavation of cultural material and features. Mechanical equipment will be used, if necessary, to strip disturbed or sterile overburden from portions of sites.

Excavation units will consist of 1 by 1 m grids placed initially within known cultural features. They will be dug in 10 cm arbitrary levels unless natural or cultural stratigraphic breaks are evident. If natural breaks are defined, excavations will continue in levels determined by the depth of the strata. The excavation units will be expanded out from the exploratory grids to determine the nature and extent of any cultural deposits and features that are encountered. Surface stripping and selected test units will be used to ensure that all subsurface features will be found.

Soil recovered from excavation procedures will be screened through 1/4-inch mesh hardware cloth, and all artifacts will be bagged by level. However, artifacts recovered from floors or other use surfaces will be mapped in place and collected separately. Pollen and flotation samples will be collected from all cultural strata, including middens, floors, or other use surfaces. In addition, an off-site pollen control sample will be taken for comparison with other site samples. Flotation samples will be taken from each cultural stratum and feature encountered. If available, charcoal, archaeomagnetic, and tree-ring samples will be collected to determine the dates of the sites.

Soil augers will be used to investigate areas of the sites where cultural features are not visible. Any artifacts collected in this manner will be bagged by depth and grid provenience. Subsurface cultural deposits encountered in any auger tests will be further examined through grid excavations or trenched by a backhoe to determine their extent.

We will attempt to locate all site features through the above methods. Features that have the potential to answer the questions posed by the data recovery plan will be completely excavated. At LA 3279, partially excavated features extending outside the highway right-of-way will be completely excavated as requested by the Gila National Forest. Individual field forms will be filled out for each level excavated, detailing depth of level, type and amount of artifacts recovered, and soil type and color based on the Munsell scale.

All stratigraphic levels and feature profiles will be drawn, along with plan views of each feature. Features will be photographed before and after excavation. The site, including all cultural features, locations of excavation units, and topographic elevations will be mapped with a transit and stadia rod.

Should human remains be discovered during the data recovery program, standard archaeological excavation techniques will be employed. These include defining the burial locale, using small hand tools to expose skeletal materials, mapping and photographing the skeleton and any associated grave goods, and retrieving soil for pollen and coprolite analysis.

The field treatment of any human remains and other sensitive cultural materials will be based on the Museum of New Mexico Rule 11, "Policy on Collection, Display, and Repatriation of Culturally Sensitive Materials," adopted January 17, 1991, and other applicable state and federal regulations. If human remains or other sensitive materials are uncovered, appropriate law enforcement agencies and Native American tribal groups will be notified. No person will be allowed to handle or photograph the remains except as part of scientific data recovery efforts. Photographs of sensitive materials will not be released to the media or general public.

There is the possibility of encountering human remains when conducting excavations of the three sites in the project area. Therefore, treatment of burials by OAS will follow policy and procedures adopted by the Pueblo of Zuni, which claims cultural affiliation with the Mogollon area under the Native American Graves Protection and Repatriation Act of 1980 (NAGPRA). This policy is reproduced in Appendix 2.

Laboratory Analysis

Laboratory analysis will be conducted by the staff of the Office of Archaeological Studies and specialized professional consultants. When brought in from the field, artifacts

will first be washed, sorted, and catalogued. Any remains that do not appear to be stable will be treated in consultation with the museum's conservation department.

Ceramic Artifacts. To assign dates, function, and cultural affinity to the ceramic assemblage, a detailed analysis of morphological attributes will be undertaken. Artifacts will be identified by existing type name; vessel and rim form; vessel diameter; paste texture and color; temper material; surface color and finish; slip; design style; thickness; presumed function; and presence of attributes such as burning, smudging, mending, or reworking. A binocular microscope will be used to facilitate the analysis. A sample of sherds of each type will be submitted for petrographic analysis and for x-ray refraction analysis to determine the origin of the sherds. Clay sources for pottery production will be sought during the field excavations and matched with sherd samples in the laboratory.

Lithic Artifacts. Lithic artifacts will be analyzed for material type and texture, artifact type, breakage type, use, and presence of thermal treatment. Attributes to be monitored on formal and informal tools include edge angle and shape, type of modification, and/or wear. A binocular microscope will be used to identify retouch and wear patterns. Debitage will be examined for evidence of reduction strategy, reduction stage, platform type, percentage of dorsal cortex, platform lipping, artifact portion, direction of dorsal scarring, and size. These studies should allow an evaluation of reduction technology, tool production and use, and raw material procurement strategies. A specialized analysis will involve the study of biface manufacture and use to test Kelly's model (1988) of differential biface use between mobile groups and sedentary farmers.

Comparison of lithic artifact data with other sites on the project and in the nearby region may assist in the identification of specific manufacturing techniques and use patterns that may help identify varying subsistence strategies of the different cultural groups in the project area.

Faunal Remains. The faunal analysis will focus on the identification of species, age, and bone elements to assist in determining species used as food resources and portions used by each prehistoric population. Season of death for faunal remains will be determined for young species, if possible. Butchering and processing methods will be examined. We will also investigate the use of faunal materials as tools. Information from the faunal analysis will be used to aid in the determination of season of occupation of sites, hunting patterns and dependency, and subsistence strategies pursued.

Floral Remains. Floral remains will be identified by species when possible and compared with plant data from other sites to determine floral resources used by the various groups. It will also be used to help determine the season of use and subsistence strategy employed at each site. Identification of plant types will help determine if domestication of cultigens was practiced.

Human Remains. The main goal of the skeletal analysis will be a nondestructive study of remains to add to the data base on prehistoric populations from the Mogollon area. The analysis will include standard metric studies, aging and sexing of the remains, and documentation of pathologies, particularly those related to food stress. If bone tissue samples are present, these will be submitted for carbon isotope studies to determine the relative proportion of maize in the diet of site populations.

Project Results

The final data recovery and analysis report will be published in the Museum of New Mexico's Archaeology Notes series. The report will present the results of the excavations, analyses, and interpretation of the data. It will include photographs, site and feature maps, data summaries, and statistical manipulations. Field notes and maps, analytic data sheets, and photographs will be deposited with the New Mexico Cultural Records Information System, located at the Laboratory of Anthropology in Santa Fe.

REFERENCES CITED

- Beckett, Patrick
1973 *Cochise Culture Sites in South Central and North Central New Mexico.* M.A. thesis, Eastern New Mexico University, Portales.
- Berman, Mary Jane
1979 *Cultural Resources Overview of Socorro, New Mexico.* USDA Forest Service and Bureau of Land Management, Albuquerque and Santa Fe.
- Berry, Michael S.
1982 *Time, Space and Transition in Anasazi Prehistory.* University of Utah Press, Salt Lake City.
- Bluhm, E.
1957 *The Sawmill Site, a Reserve Phase Village.* Fieldiana: Anthropology Series 47(1). Chicago.
- Bullard, William R.
1962 *The Cerro Colorado Site and Pithouse Architecture in the Southwestern United States prior to A.D. 500.* Papers of the Peabody Museum of American Archaeology and Ethnology 44(2). Harvard University, Cambridge.
- Bussey, Stanley, and Patrick Beckett
1974 *A Final Report on the Archaeological Survey of a Portion of the Southwest Arm of the National Radio Astronomy Observatory VLA Project.* Cultural Resources Management Report. Las Cruces.
- Clifton, Don
1990 *An Archaeological Survey of the Swapp-Booth Timber Sale Luna Ranger District, Apache National Forest, Catron County, New Mexico.* Report 14, Don Clifton Archaeological Consultant. Las Cruces.
- Cordell, Linda S.
1984 *Prehistory of the Southwest.* Academic Press, Orlando.
- Cordell, Linda S., and George Gumerman
1989 *Dynamics of Southwest Prehistory.* Smithsonian Institution Press, Washington, D.C.
- Dane, Carle H., and George O. Bachman
1965 *Geologic Map of New Mexico.* Department of the Interior, New Mexico

Institute of Mining and Technology, State Bureau of Mines and Mineral Resources Division, and the University of New Mexico, Department of Geology.

- Danson, E. B.
1957 *An Archaeological Survey of West Central New Mexico and East Central Arizona*. Papers of the Peabody Museum of American Archaeology and Ethnology 44(1). Harvard University, Cambridge.
- Davis, E. L.
1963 The Desert Culture of the Western Great Basin: A Lifeway of Seasonal Transhumance. *American Antiquity* 29(2):202-212.
- Dick, Herbert W.
1965 *Bat Cave*. School of American Research Monograph 27. Santa Fe.
- Eck, David C.
1982 *Fence Lake Coal Exploration: An Archaeological Survey on the Hubbell Ranch near Quemado, New Mexico, for the Salt River Project*. Office of Contract Archeology, University of New Mexico, Albuquerque.
- Ellis, Cathy Dodt
1990-
1992 Site survey files. New Mexico Cultural Resources Information System, Archaeological Records Management Section, Santa Fe.
- Fish, Suzanne K, Paul R. Fish, and John Madsen
1990 Sedentism and Settlement Mobility in the Tucson Basin Prior to A.D. 1000. In *Perspectives on Southwestern Prehistory*, edited by Paul E. Minnis and Charles L. Redman. Investigations in American Archaeology. West View Press, Oxford.
- Ford, Richard
1981 Gardening and Farming before A.D. 1000: Patterns of Prehistoric Cultivations North of Mexico. *Journal of Ethnobiology* 1:6-27.
- Fraser, Robert W.
1965 *Forts of the West*. University of Oklahoma Press, Norman.
- Gilman, Patricia A.
1983 *Changing Architectural Forms in the Prehistoric Southwest*. Ph.D. diss., University of New Mexico, Albuquerque.
- 1987 Architecture as Artifact: Pit Structures and Pueblos in the American

Southwest. *American Antiquity* 52:538-564.

Hard, Robert J.

1990 Agricultural Dependence in the Mountain Mogollon. In *Perspectives on Southwestern Prehistory*, edited by Paul E. Minnis and Charles L. Redman. Investigations in American Archaeology. Westview, Oxford.

Haury, Emil W.

1936 *Mogollon Culture of Southwestern New Mexico*. Medallion Papers 20. Gila Pueblo, Globe, Arizona.

Heller, M. M.

1976 *Zoo-archaeology of Tularosa Cave, Catron County, New Mexico*. M.A. thesis, University of Texas, El Paso, El Paso.

Hofman, Jack L.

1984 Hunter-Gatherers in the Nashville Basin of Tennessee, 8000-5000 B.P. *Tennessee Anthropologist* 9(2):129-192.

Hogan, Patrick

1985 *Prehistoric Settlement Patterns in West-Central New Mexico: The Fence Lake Coal Lease Surveys*. Office of Contract Archeology, University of New Mexico, Albuquerque.

Honea, Kenneth

1969 The Rio Grande Complex and the Northern Plains. *Plains Anthropologist* 14(43):57-70.

Honca, Kenneth, and B. Benham

1963 *Highway Culture Inventory*. Archaeological Records Management System, Historic Preservation Bureau, Santa Fe.

Hough, Walter

1907 *Antiquities of the Upper Gila and Salt River Valleys in Arizona and New Mexico*. BAE Bulletin 35. Smithsonian Institution, Washington, D.C.

1919 *Exploration of a Pithouse Village at Luna, New Mexico*. Proceedings: U.S. National Museum 55. Washington, D.C.

Hunter-Anderson, Rosalind L.

1986 *Prehistoric Adaptation in the American Southwest*. Cambridge University Press, Cambridge.

- Hurt, William R., and D. McKnight
 1949 Archaeology of the San Agustin Plains: A Preliminary Report. *American Antiquity* 14(3):172-193.
- Irwin-Williams, Cynthia
 1973 *The Oshara Tradition: Origins of Anasazi Culture*. Contributions in Anthropology 5(1). Eastern New Mexico University, Portales.
 1979 Post Pleistocene Archaeology, 7000-2000 B.C. In *Handbook of North American Indians*, vol. 9, *Southwest*, edited by Alfonso Ortiz, pp. 31-42. Smithsonian Institution Press, Washington, D.C.
- Johnson, Gregory A.
 1989 Dynamics of a Southwestern Prehistory Far Outside--Looking In. In *Dynamics of Southwest Prehistory*, edited by Linda S. Cordell and George J. Gumerman. Smithsonian Institution Press, Washington, D.C.
- Kayser, David W.
 1972 *Armijo Springs Project: Archaeological Salvage in the Harris Creek Valley Area of the Gallo Mountains*. Laboratory of Anthropology Notes 56. Santa Fe.
 1988 Cultural-Historical Setting. In *Archaeological Investigations in West-Central New Mexico*, vol. 3, *Report of the Final Field Season*, edited by D. W. Kayser and C. H. Carroll. BLM, Santa Fe.
- Kelly, Robert L.
 1988 The Three Sides of a Biface. *American Antiquity* 53:717-734.
- Koczan, Steven A.
 1983 *Cultural Resource Investigations along U.S. 180 from Luna, New Mexico to the Arizona State Line*. Environmental Section/Technical Support Bureau, NMSHTD, Santa Fe.
- LeBlanc, Steven A.
 1976 Mimbres Archaeological Center: Preliminary Report of the Second Field Season, 1975. *Journal of New World Archaeology* 2(2):1-24.
- LeBlanc, Steven A., and Michael E. Whalen
 1980 *An Archeological Synthesis of Southcentral and Southwestern New Mexico*. USDA Forest Service and USDI Bureau of Land Management, Albuquerque and Santa Fe.

- Lightfoot, Kent G., and Roberta Jewett
 1986 *The Shift to Sedentary Life: A Consideration of the Occupation Duration of Early Mogollon Villages.* In *Mogollon Variability*, edited by Charlotte Benson and Steadman Upham, pp. 9-43. Occasional Papers 15. New Mexico State University, Las Cruces.
- Maker, H. J., R. E. Neher, and J. U. Anderson
 1972 *Soil Associations and Land Classification for Irrigation, Catron County.* Agricultural Experiment Station Research Report 229. Las Cruces.
- Marshall, Sandra L.
 1989 *A Cultural Resource Survey for a New Bridge Location on US 180 near the Arizona/New Mexico State Line BRF-013-2(5).* Environmental Section/Project Development Bureau, New Mexico State Highway and Transportation Department. NMSHTD 89-31. Santa Fe.
- Martin, Paul S.
 1940 *The SU Site, Excavations at a Mogollon Village, Western New Mexico.* Fieldiana: Anthropological Series 32(1). Field Museum of Natural History, Chicago.
- 1943 *The SU Site, Excavations at a Mogollon Village, Pine Lawn Valley, Western New Mexico, Second Season, 1941.* Fieldiana: Anthropology Series 32(2). Field Museum of Natural History, Chicago.
- Martin, Paul S., and John R. Rinaldo
 1947 *The SU Site, Excavations at a Mogollon Village, Western New Mexico: Third Season, 1946.* Fieldiana: Anthropological Series 32(3). Field Museum of Natural History, Chicago.
- 1950 *Turkey Foot Ridge Site, a Mogollon Village, Pine Lawn Valley, Western New Mexico.* Fieldiana: Anthropology Series 38(2). Field Museum of Natural History, Chicago.
- Martin, Paul S., John B. Rinaldo, and Ernst Antevs
 1949 *Cochise and Mogollon Sites, Pine Lawn Valley, Western New Mexico.* Fieldiana: Anthropology Series 38(1). Field Museum of Natural History, Chicago.
- 1950 *Cochise and Mogollon Sites, Pine Lawn Valley, Western New Mexico.* Fieldiana: Anthropology Series 39(1). Field Museum of Natural History, Chicago.

- Martin, Paul S., John B. Rinaldo, and E. R. Bluhm
 1954 *Caves of the Reserve Area*. Fieldiana: Anthropology Series 42. Field Museum of Natural History, Chicago.
- Martin, Paul S., John B. Rinaldo, E. Bluhm, H. C. Cutler, and R. Grange, Jr.
 1952 *Mogollon Cultural Continuity and Change: The Stratigraphic Analyses of Tularosa and Cordova Caves*. Fieldiana: Anthropology Series 40. Field Museum of Natural History, Chicago.
- Minnis, Paul E.
 1981 *Economic and Organizational Responses to Food Stress by Non-Stratified Societies: An Example from Prehistoric New Mexico*. Ph.D. dissertation, University of Michigan, Ann Arbor.
- 1985 *Social Adaptation to Food Stress: A Prehistoric Southwestern Example*. University of Chicago Press, Chicago.
- Moore, James I.
 1988 *Archaeological Test Excavations at the Cherry Creek Site near Tyrone, Grant County, New Mexico*. Laboratory of Anthropology Notes 462. Museum of New Mexico, Santa Fe.
- Neely, James
 1978 The Archaeology of the WS Ranch Site, West-Central New Mexico: The 1977 Season. Paper presented at the 43rd Annual Meeting of the Society for American Archaeology, Tucson.
- Nelson, Ben A.
 1990 Comments: Southwestern Sedentism Reconsidered. In *Perspectives on Southwestern Prehistory*, edited by Paul E. Minnis and Charles L. Redman. Investigations in American Archaeology Westview Press, Oxford.
- Nelson, Margaret C.
 1990 Comments: Sedentism, Mobility, and Regional Assemblages: Problems Posed in the Analysis of Southwestern Prehistory. In *Perspectives on Southwestern Prehistory*, edited by Paul E. Minnis and Charles L. Redman. Investigations in American Archaeology. Westview Press, Oxford.
- Nesbitt, Paul H.
 1938 *Starkweather Ruin*. Logan Museum Publications in Anthropology, Bulletin 6. Beloit College, Beloit, Wisconsin.

- Nightengale, Chris
 1980 Site survey files. New Mexico Cultural Resources Information System, Archaeological Records Management Section, Santa Fe.
- 1988 Site survey files. New Mexico Cultural Resources Information System, Archaeological Records Management Section, Santa Fe.
- Oakes, Yvonne R.
 1993 *Test Excavations at East Ridge Pueblo (AR-03-06-03-373) on the Gila/Apache National Forest*. Archaeology Notes 135. Museum of New Mexico, Santa Fe.
- Peckham, Stewart
 1957 The Switchback Site: A Stratified Ruin near Reserve, New Mexico. *Highway Salvage Archaeology* 3(11):10-38. New Mexico State Highway Department and Museum of New Mexico, Santa Fe.
- 1958 Hillside Pueblo: Early Masonry Architecture in the Reserve Area, New Mexico. *El Palacio* 65(3):81-94.
- 1963 The Luna Junction Site: An Early Pithouse in the Pine Lawn Valley, New Mexico. *Highway Salvage Archaeology* 4(17):41-55, edited by Fred Wendorf. New Mexico State Highway Department and Museum of New Mexico, Santa Fe.
- Rafferty (first name unknown)
 1978 Site survey files. New Mexico Cultural Resources Information System, Archaeological Records Management Section, Santa Fe.
- Reid, J. Jefferson
 1986 Historical Perspective on the Concept of Mogollon. In *Mogollon Variability*, edited by Charlotte Benson and Steadman Upham. Occasional Papers 15. New Mexico State University, Las Cruces.
- Rice, Glenn E.
 1975 *A Systematic Explanation of a Change in Mogollon Settlement Patterns*. Ph.D. diss., University of Washington, Seattle.
- Rinaldo, John B.
 n.d. Notes on Minor Excavations in the Reserve Area, West Central New Mexico. Ms. on file, Field Museum of Natural History, Chicago.
- Sayles, E. B.
 1983 *The Cochise Cultural Sequence in Southeastern Arizona*. University of

Arizona Press, Tucson.

- Sayles, E. B., and Ernst Antevs
1941 *The Cochise Culture*. Medallion Papers 29. Gila Pueblo, Globe, Arizona.
- Schlanger, Sarah H.
1990 Artifact Assemblage Composition and Site Occupation Duration. In *Perspectives on Southwestern Prehistory*, edited by Paul E. Minnis and Charles L. Redman. *Investigation in American Archaeology*. Westview, Oxford.
- Scholes, France V.
1942 *Troublous Times in New Mexico: 1650-1672*. University of New Mexico Press, Albuquerque.
- Schroeder, Albert A.
1974 A Study of the Apache Indians. In *American Indian Ethnohistory*, vol. 4, *Indians of the Southwest*. Garland Publishing, New York.
- Stuart, David E., and Rory Gauthier
1981 *Prehistoric New Mexico, Background for Survey*. State Planning Division, Historic Preservation Bureau, Santa Fe.
- Thomas, Alfred B.
1932 *Forgotten Frontiers: A Study of the Spanish Indian Policy of Don Juan Bautista de Anza, Governor of New Mexico, 1777-1787*. University of Oklahoma Press, Norman.
- Wendorf, Fred, E. N. Ferdon, Jr., and J. Bradbury
1963 A Tularosa Phase Pueblo near Luna, New Mexico. *Highway Salvage Archaeology* 4(16):29-40. New Mexico State Highway and the Museum of New Mexico, Santa Fe.
- Wills, W. H.
1988a *Early Prehistoric Agriculture in the American Southwest*. School of American Research Press, Santa Fe.
- 1988b Early Agriculture and Sedentism in the American Southwest: Evidence and Interpretations. *Journal of World Prehistory* 2(4):445-448.
- 1990 Cultivating Ideas: The Changing Intellectual History of the Introduction of Agriculture in the American Southwest. In *Perspectives on Southwestern Prehistory*, edited by Paul E. Minnis and Charles L. Redman. *Investigations in American Archaeology*. Westview Press,

Oxford.

Wozniak, Frank E.

1985 History of the Nations Draw Area. In *Prehistoric Settlement Patterns in West-Central New Mexico: The Fence Lake Coal Lease Surveys*, edited by Patrick Hogan, pp. 13-28. Office of Contract Archeology, University of New Mexico, Albuquerque.

Zamora, Dorothy A., and Christine Sterling

1992 *Archaeological Survey and Testing Proposal for Sites along U.S. 180, Luna to the Arizona State Line, Catron County, New Mexico*. Archaeology Notes 104. Museum of New Mexico, Santa Fe.

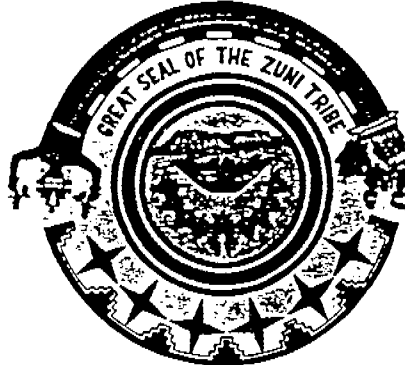
APPENDIX 2: PUEBLO OF ZUNI, NEW MEXICO, POLICY STATEMENT
REGARDING THE PROTECTION AND TREATMENT OF HUMAN REMAINS
AND ASSOCIATED FUNERARY OBJECTS

PUEBLO OF ZUNI

P. O. BOX 339
ZUNI, NEW MEXICO 87327

ROBERT E. LEWIS
Governor
PESANCIO LASILOO
Lt. Governor
JOSEPH DISHTA
Hd. Councilman
VAL R. PANTEAH, SR.
Councilman

EDISON R. WATO, SR.
Councilman
AUGUSTINE A. PANTEAH
Councilman
CHARLOTTE T. BRADLEY
Councilwoman
OWEN R. BOBELU
Councilman



505-782-4481

PUEBLO OF ZUNI, NEW MEXICO

POLICY STATEMENT
REGARDING THE PROTECTION AND TREATMENT
OF
HUMAN REMAINS AND ASSOCIATED FUNERARY OBJECTS

November 1992

In reply refer to:

1. PREAMBLE

The Zuni Tribe declares that the following statement is in no way to be construed as condoning nor endorsing any specific project or undertaking.

Any proposed project or undertaking that will entail the disturbance of human remains and associated funerary objects is a disturbance the Zuni Tribe opposes. Traditional Zuni lifeways have no provisions for the premeditated disturbance of human remains and associated funerary objects (burials). Even being asked to consider such disturbance requires the Zuni Tribe to think about burials in ways that have no place in traditional beliefs.

2. TRADITIONAL VIEW CONCERNING BURIALS

The traditional Zuni belief about life is that each person's life has four stages through which they must pass. The first stage is life as we know it here and now. Following this first stage are three others of which very little is known. It is essential for each person to pass through each of the four stages of their life cycle before it is complete. All burials to which the Zuni Tribe may have cultural affinity are at some point in their journey through the three latter stages of the life cycle.

To disturb burials while on their life cycle journey is not the traditional Zuni way. The ramifications of disturbing burials cannot be determined. How disturbance affects the life cycle journey, a journey that must be completed, is unknown, but it may well have detrimental ramifications which cannot as yet be foreseen.

3. GEOGRAPHIC AND TEMPORAL RANGE OF BURIALS CULTURALLY AFFILIATED WITH ZUNI

All burials within the the lands for which the Zuni Tribe has held aboriginal title from time immemorial and continuing through and including at least A.D. 1846 are potentially culturally affiliated with the Zuni Tribe. The Zuni Tribe claims cultural affiliation with all pre-Puebloan, prehistoric Puebloan and ancestral historic Puebloan burials within the area of Zuni aboriginal land title as determined by the United States Claims Court, whether in marked or unmarked locations. The only exceptions would be identifiable historic Athabascan, Hispanic, Anglo, or other burials not culturally affiliated with Zuni. The area of aboriginal title (see attached map) was exclusively used and occupied by the Zuni Tribe, for purposes such as habitation, life sustaining activities, and religious worship. (Opinion and Findings of Judge Judith Ann Yanello, United States Claims Court, May 27, 1987, Docket No. 161-79L, The Zuni Tribe of New Mexico v. the United States).

The Zuni Tribe also claims cultural affiliation with all pre-Puebloan, and Puebloan, and historic Zuni burials beyond the area of Zuni aboriginal title, within the entirety of the maximum geographic extent of the prehistoric Anasazi and Mogollon culture areas, and parts of the Hohokam culture area. Throughout the prehistoric period the Zuni Tribe was on its migrations from the place of emergence to find the middle place, present day Zuni, and prehistoric sites of these ancient cultures are regarded by the Tribe as ancestral Zuni.

4. PROCEDURES FOR PROTECTING BURIALS

Traditional Zuni belief is that the only appropriate procedure for protecting burials is to avoid disturbing them. The Zuni Tribe prefers that no ancestral culturally affiliated burials be disturbed.

5. EXCAVATION OF BURIALS

The Zuni Tribe understands that developments, projects and undertakings may not be able to avoid disturbance to all burials. Because avoidance of all burials may not always be possible it may be necessary for some burials to be disturbed.

The Zuni Tribe also understands that archaeological excavations of areas to be disturbed by some projects and undertakings may involve only a sample of the total number of archaeological sites located within the area of potential effect, and that even then only a portion of each site will be selected for archaeological excavation. This may leave many sites, and portions of sites, without archaeological investigation. Consequently many areas that potentially contain burials will remain unexcavated at the conclusion of archaeological sampling. To find burials that may not have been excavated during archaeological sampling, the Zuni Tribe wants to ensure that each and every site with the potential to contain burials (i.e., the areas and sites not sampled by archaeologists) be carefully and completely stripped so that these sites may be exposed in order for all burials to be identified and subjected to controlled archaeological excavation prior to disturbance.

The Zuni Tribe also recognizes that there is the potential for burials to be discovered in areas initially thought unlikely to contain burials. These discoveries must be accorded the same respect and dignity accorded all other

burials. Project activities in the area of the burial must cease immediately upon discovery of a burial to provide for controlled archaeological excavation.

If it is impossible for a burials to be avoided by project activities then each burial must be accorded as much respect and dignity as possible. Excavation of all such burials must be performed only by fully permitted professional archaeologists or physical anthropologists. In all instances burial excavations must be under conditions of a fully archaeologically controlled and approved provenience system. No preservatives or markings may be applied directly to the skeletal remains. The Tribe prefers that no pollen, flotation, or other soil samples be taken within a distance of less than one foot from the skeletal remains. Samples for pollen, flotation, or other purposes may, however, be taken from within any associated funerary objects.

6. DOCUMENTATION OF BURIALS

The Zuni Tribe is concerned with the identification and distinction of culturally affiliated burials from non-culturally affiliated burials (i.e., Athabascan, Hispanic, and Anglo burials, etc.), and the age and sex of each individual.

As stated above the Tribe believes that the most appropriate treatment for burials is to avoid them and not disturb them at all. If avoidance cannot be achieved then the Tribe will permit non-destructive analysis of the human remains and their associated funerary objects. Analysis must take place within the project area, which may include a field laboratory set up in the project area.

Detailed sketches, plan views, and profiles may be made of each in situ burial. Photographs of skeletal remains may only be made for required official scientific documentary purposes. Photography of the associated funerary objects for official scientific documentary purposes is acceptable.

For any burials covered under this policy no curation of any human remains will be permitted, nor will any associated funerary objects be permitted to be curated.

Under no circumstances at any time can any human remains and/or associated funerary objects be transported across or through any portion of the Zuni Indian Reservation (including trust lands around Zuni Salt Lake, New Mexico, and trust lands in Arizona).

7. DEFINITIONS

Burials are defined as being human remains and associated funerary objects.

Human remains are defined as the skeletal remains and other organic remains of a human being.

Associated funerary objects are defined as objects that, as part of the interment rite ceremony, are reasonably believed to have been placed with the human remains at the time of interment. These associated funerary objects include, but are not limited to, complete and broken and almost complete, ceramic vessels, projectile points, ground stone items, crystals, shaped or

unshaped minerals, animal bone artifacts, basketry, textiles, and mats, etc.

Non-destructive analysis is defined as that which keeps all human remains and associated funerary objects intact.

8. REBURIAL

The Zuni Tribe expects all culturally affiliated human remains and their associated funerary objects to be reburied. All reburied human remains and associated funerary objects must be reburied as close as possible to their original resting place but out of harm's way. Any reburial location must be protected in perpetuity.

It is preferred that the reburial area(s) are selected, identified, and secured prior to the initiation of archaeological excavation.

Human remains and associated funerary objects not culturally affiliated with Zuni must be separately reburied from any culturally affiliated burials.

Culturally affiliated burials must be reburied with the human remains being in the same position as when excavated and with the associated funerary object(s) in the same relative position(s) to the human remains as when excavated. The skull of each reburied individual must be oriented to the east. Reburial is to be conducted by fully permitted professional archaeologists.

Reburial must be at a minimum depth of six feet below modern ground surface. No vertical layering of reburials within the reburial area(s) will be permitted. Reburials shall not be in containers or wrappings of any kind.

The Zuni Tribe has no objection to reburial ceremonies that may be conducted by other tribes with demonstrable cultural affiliation to the burials.

The reburial area(s) must be accurately located by legal description. Each reburial must be accurately mapped within the reburial area(s) and minimally have the reburial's original site number, archaeological excavation provenience, and date of excavation, marked on the reburial area(s) map(s). An aluminum tag noting the original site number, archaeological excavation provenience, and date of excavation, shall be placed near, but not touching, the feet or legs of each reburial.

The reburial area(s) must be accurately mapped and located so that the reburial area(s) can be protected from any future disturbance. No location maps or descriptions may note the actual purpose of the protected area to further protect the reburials from future disturbance.

9. COSTS

The Zuni Tribe expects that all costs associated with the identification, excavation, documentation, and reburial of all human remains and associated funerary objects will be borne by the development, project, or undertaking sponsor.

APPENDIX 3: VITAE

VITA

YVONNE ROYE OAKES

HOME ADDRESS: Route 10, Box 88B, Santa Fe, New Mexico 87501
Telephone: (505) 471-7980

OFFICE: Office of Archaeological Studies
Museum of New Mexico
Santa Fe, New Mexico 87504-2087
Telephone: (505) 827-8953

EDUCATION: B.S. in Health and Physical Education (1958)
West Chester State University, West Chester, Pa.

M.A. in Anthropology (1981)
University of New Mexico, Albuquerque, NM.

ARCHAEOLOGICAL EXPERIENCE:

- 1988- Assistant Director, Office of Archaeological Studies, Museum of New Mexico. Serve as Acting Director in absence of Director. Perform managerial duties as assigned by Director. Serve as Principal Investigator for all projects in southern half of New Mexico. Responsible for evaluation of assigned project supervisors. Serve as project director for survey, testing, and data recovery programs including writing of research designs and budgets, supervision of field personnel, interpretation of analyzed data, and preparation of final reports.
- 1987 Acting Director, Research Section, Laboratory of Anthropology, Museum of New Mexico in absence of Director. Administer contract (\$1 million a year) and research program. Responsible for preparation of annual budgets, supervision of project directors, and maintain support staff. Serve as Principal Investigator for Research Section projects. Hire new personnel. Oversee report production.
- 1979 Lithic Analyst, part-time. Analyzed lithic artifacts for Dr. John Campbell, University of New Mexico. Submitted six reports.
- 1977 Project Supervisor, Research Section, Laboratory of Anthropology, Museum of New Mexico. Devise and conduct data recovery programs through writing of research designs, preparation of budgets, field excavations, supervision of analyses, interpretation of data and submission of final reports.

1975 Crew member, Research Section, Laboratory of Anthropology, Museum of New Mexico. Served on field crews and analysis teams. Responsible for various chapters in reports.

PROFESSIONAL MEMBERSHIPS:

Arizona Archaeological Society
Historical Society of New Mexico
New Mexico Archaeological Council
Society for American Archaeology
Society for Historical Archaeology

PROFESSIONAL JOURNALS:

American Antiquity
Historical Archaeology
New Mexico Historical Review
Pottery Southwest
The Kiva

GRANTS AND HONORS:

- 1993 Gila National Forest. Grant to map and test site at Pueblo Park Campground, Reserve.
- 1992 Museum of New Mexico Committee on Excellence. Award to present paper on Luna excavations at Mogollon Conference, Las Cruces.
- 1990 Elected Treasurer, New Mexico Archaeological Council.
- 1989 Museum of New Mexico Committee on Excellence. Award for travel to Historic Mining Conference, Death Valley, CA.
- 1989 Committee on Research and Publication, Research Section. Award to prepare talk on Carthage coal fields at Historical Society of New Mexico conference, Socorro, New Mexico.
- 1988 New Mexico Endowment for the Humanities. Award for analysis of Glorieta Burial material and preparation of Museum exhibit.

PROFESSIONAL PAPERS:

- 1993 Apaches in the Mogollon Highlands. Pecos Conference, Springerville.
- 1992 Archaeological Excavations in the Mogollon Highlands. Mogollon Conference, Las Cruces.
- 1992 Preliminary Results of Excavations in the Mogollon Highlands. Pecos Conference, Pecos.
- 1992 Archaeology of the Mogollon Highlands. Arizona

Archaeological Society, Springerville.

- 1990 Excavation of 18 Sites in the Mogollon Highlands. Mogollon Conference, Las Cruces.
- 1989 Historic Mining Community of Carthage. Historical Society of New Mexico, Socorro.
- 1989 The Battle of Glorieta. Los Alamos Historical Society, Los Alamos.
- 1989 The Glorieta Burials. Albuquerque Archaeological Society, Albuquerque.
- 1987 Excavation of an Hispanic Homestead near Roswell. Jornada Mogollon Conference, Tularosa.
- 1985 Spanish-American Homestead Patterns in Eastern New Mexico. Conference on The Homestead Phenomenon in Archaeological and Historical Perspective, Los Alamos.
- 1981 It's All Women's Work. Jornada Mogollon Conference, Portales.
- 1980 Delineation of Site Function through Artifact Analysis. Sixteenth Annual Meeting of the Southwestern Federation Symposium of Archaeological Societies.

PROFESSIONAL INTERESTS:

Hispanic settlement patterns in Southwest
Late Territorial period sites in New Mexico
Mogollon subsistence and settlement adaptations
Early Navajo settlement in Southwest

PUBLICATIONS:

- 1993 Test Excavations at East Ridge Pueblo (AR-03-06-373) on the Gila/Apache National Forest. Archaeology Notes 135, Museum of New Mexico, Santa Fe.
- 1993 The State Road 12 Archaeological Project: Results of Testing at Ten Sites and Data Recovery Plan for Four Sites Near Reserve, New Mexico. Archaeology Notes 118, Museum of New Mexico, Santa Fe.
- in press Archaeological Testing and Data Recovery Plan for Four Sites along U.S. 180 near Luna, Catron County, New Mexico. Archaeology Notes, Museum of New Mexico, Santa Fe.
- in press Pigeon's Ranch and the Glorieta Battlefield: An Archaeological Assessment. Archaeology Notes 123, Museum of New Mexico, Santa Fe.

- in press Archaeological Survey of Reserve Area Arroyos and Proposed Weigh Station, Gila National Forest, Catron County, New Mexico. Archaeology Notes 66, Museum of New Mexico, Santa Fe.
- 1992 Clearance Report and Damage Assessment for Two Sites Along the Old Luna Road, Gila National Forest, Catron County, New Mexico. Archaeology Notes 105, Museum of New Mexico, Santa Fe.
- 1992 The Glorieta Project: Excavations at Eight Prehistoric Sites between Glorieta and Pecos, New Mexico. Archaeology Notes 45, Museum of New Mexico, Santa Fe.
- 1991 Archaeological Survey of a Proposed Weigh Station, Waste Areas and Excess Materials Disposal Areas, and CMEs and TCPs near U.S. 180, Catron County, New Mexico. Archaeology Notes 50, Museum of New Mexico, Santa Fe.
- 1991 Testing Results and Data Recovery Plan for Sites in the San Francisco Mountains, Catron County, New Mexico. Archaeology Notes 20, Museum of New Mexico, Santa Fe.
- 1990 Testing Results and Data Recovery Plan for Sites in the Mogollon Highlands, Catron County, New Mexico. Archaeology Notes 3, Museum of New Mexico, Santa Fe.
- 1990 Archaeological Survey of the Mogollon Highlands along US 180, Catron County, New Mexico. Laboratory of Anthropology Notes 500, Museum of New Mexico, Santa Fe.
- 1989 Archaeological Survey of the Riley Mine, Socorro County, New Mexico. Laboratory of Anthropology Notes 484, Museum of New Mexico, Santa Fe.
- 1989 The Wilson Homestead: An Early Twentieth Century Site on the Canadian River, Quay County, New Mexico. Laboratory of Anthropology Notes, Museum of New Mexico, Santa Fe.
- 1988 An Archaeological Survey near Nogal, New Mexico for Twin Mountain Rock Company. Laboratory of Anthropology Notes 445, Museum of New Mexico, Santa Fe.
- 1988 The Civil War Engagement at Glorieta, New Mexico. Grant proposal, New Mexico Endowment for the Humanities.

- 1987 Archaeological Survey of Mine Lands at Carthage, Socorro County, New Mexico. Laboratory of Anthropology Notes 412, Museum of New Mexico, Santa Fe, New Mexico.
- 1987 Archaeological Survey of Mine Lands at Mentmore, New Mexico for the Abandoned Mine Land Bureau. Laboratory of Anthropology Notes 404, Museum of New Mexico, Santa Fe.
- 1987 Archaeological Survey of Mine Lands, Raton Coal Field for the Abandoned Mine Land Bureau. Laboratory of Anthropology Notes 386, Museum of New Mexico, Santa Fe.
- 1987 Archaeological Survey of Mine Lands at La Ventana, Sandoval County, New Mexico for Abandoned Mine Land Bureau. Laboratory of Anthropology Notes 382, Museum of New Mexico, Santa Fe.
- 1986 The Fite Ranch Project: The Excavation of Two Pueblo Sites along San Pedro Wash, Socorro County, New Mexico. Laboratory of Anthropology Notes 432, Museum of New Mexico, Santa Fe.
- 1986 Archaeological Survey of Skull Shaft Mine, Santa Fe County, New Mexico, for Abandoned Mine Land Bureau. Laboratory of Anthropology Notes 383, Museum of New Mexico, Santa Fe.
- 1986 Archaeological Survey of Mine Lands at Tortugas Mountain, Dona Ana County, New Mexico, for Abandoned Mine Land Bureau. Laboratory of Anthropology Notes 381, Museum of New Mexico, Santa Fe.
- 1986 Archaeological Survey of Mine Land at Organ, Dona Ana County, New Mexico, for Abandoned Mine Land Bureau. Laboratory of Anthropology Notes 380, Museum of New Mexico, Santa Fe.
- 1986 Archaeological Testing of Three Historic Sites at Lincoln State Monument, Lincoln County, New Mexico. Laboratory of Anthropology Notes 357, Museum of New Mexico, Santa Fe.
- 1986 Navajo and Basketmaker III-Pueblo I Occupations of Two Sites near Quemado, Catron County. Laboratory of Anthropology Notes 355, Museum of New Mexico, Santa Fe.
- 1986 Testing of Two Small Lithic Sites along U.S. 285, Chaves County, New Mexico. Laboratory of Anthropology Notes 351, Museum of New Mexico, Santa

Fe.

- 1985 An Assessment of Gathering Sites near Hackberry Lake, Eddy County, New Mexico. Laboratory of Anthropology Notes 415, Museum of New Mexico, Santa Fe.
- 1985 Clearance Survey along SR 44 between Lybrook and the Santa Fe National Forest, for Contel of the West. Laboratory of Anthropology Notes 369, Museum of New Mexico, Santa Fe.
- 1985 The Sims Mesa Project. Laboratory of Anthropology Notes 329, Museum of New Mexico, Santa Fe.
- 1985 It's All Women's Work. In Views of the Jornada Mogollon: Proceedings of the Second Jornada Mogollon Conference (Editor, Colleen M. Beck). Eastern New Mexico University Contributions in Anthropology, 12. Portales.
- 1984 Testing Proposal for Glorieta Battlefield and Pigeon's Ranch, Glorieta, New Mexico. Laboratory of Anthropology Notes 370, Museum of New Mexico, Santa Fe.
- 1984 An Archaeological Survey near Cuba, New Mexico for Contel of the West. Laboratory of Anthropology Notes 366, Museum of New Mexico, Santa Fe.
- 1984 Archaeological Assessment of the El Rito-Ojo Caliente Transmission Line for Contel of the West. Laboratory of Anthropology Notes 340, Museum of New Mexico, Santa Fe.
- 1984 Results of Testing Program for Eleven Sites along U.S. 380 near Carthage, New Mexico. Laboratory of Anthropology Notes 328, Museum of New Mexico, Santa Fe.
- 1983 Colfax, New Mexico: A Study of Land Use Patterns on the Maxwell Land Grant. Laboratory of Anthropology Notes 313, Museum of New Mexico, Santa Fe.
- 1983 The Ontiberos Site: A Hispanic Homestead near Roswell, New Mexico. Laboratory of Anthropology Notes 311, Museum of New Mexico, Santa Fe.
- 1982 Prehistoric Gathering Sites near Hackberry Lake, Eddy County, New Mexico. Laboratory of Anthropology Notes 305, Museum of New Mexico, Santa Fe.

- 1982 Testing Results and Proposed Research Design for Colfax, New Mexico. Laboratory of Anthropology Notes 304, Museum of New Mexico, Santa Fe.
- 1981 An Archaeological Survey near Dilia, New Mexico. Laboratory of Anthropology Notes 279, Museum of New Mexico, Santa Fe.
- 1981 Prehistoric Subsistence Adaptations on White Sands Missile Range. Laboratory of Anthropology Notes 277, Museum of New Mexico, Santa Fe.
- 1979 The Cross L Ranch Site: A Study of Plains Adaptations. Laboratory of Anthropology Notes 164, Museum of New Mexico, Santa Fe.
- 1979 Excavations at Deadman's Curve, Tijeras Canyon, Bernalillo County, New Mexico. Laboratory of Anthropology Notes 137, Museum of New Mexico, Santa Fe.
- 1979 A Cultural Resource Survey and Recommendation Proposal, New Mexico State Highway Department Project FLH-12(19). Toadlena Turnoff- Little Water, San Juan County, New Mexico. Laboratory of Anthropology Notes 136, Museum of New Mexico, Santa Fe.
- 1978 A Cultural Resource Investigation of Proposed Water System Improvements, Village of Los Lunas, Valencia County, New Mexico. Laboratory of Anthropology Notes 252, Museum of New Mexico, Santa Fe.
- 1978 An Archaeological Clearance Investigation of Two Proposed Borrow Pits on Zia Indian Reservation. Laboratory of Anthropology Notes 176, Museum of New Mexico, Santa Fe.
- 1977 Cultural Resource Clearance Investigation of Proposed Drill Locations, Zuni Mountains, Cibola National Forest, Valencia County, New Mexico, for Continental Oil Company. Laboratory of Anthropology Notes 250, Museum of New Mexico, Santa Fe.
- 1976 A Cultural Resource Investigation of a One-half Section Tract Northeast of Arch Mesa, Southwestern Sandoval County, New Mexico, for Kerr-McGee Corporation. Laboratory of Anthropology Notes 418, Museum of New Mexico, Santa Fe.
- 1976 Archaeological Clearance Investigation for the Ralph E. Vail Consulting Engineer Company, Sile, New Mexico. Laboratory of Anthropology Notes 359,

Museum of New Mexico, Santa Fe.

- 1976 A Cultural Resource Investigation of the Nageezi Area, San Juan County, New Mexico, for the Salt River Project. Laboratory of Anthropology Notes 202, Museum of New Mexico, Santa Fe.
- 1976 An Archaeological Clearance Investigation for the Exxon Company, Rio Arriba County, New Mexico. Laboratory of Anthropology Notes 126, Museum of New Mexico, Santa Fe.

VITA

Dorothy Ann Zamora

Education:

3 years New Mexico State University. Currently enrolled in B.A. program, College of Santa Fe, 9 hrs at the Santa Fe Community College, 11 hrs at the College of Santa Fe, and 12 hrs at the University of New Mexico.

Work Experience:

12 years with the Museum of New Mexico, Laboratory of Anthropology, Research Section.

Current position:

Cultural Resource Specialist I Research Section, State of New Mexico.

Professional Memberships

New Mexico Archaeological Council

Publications:

- 1984 *Prehistoric Overview. IN Results of a Testing Program for Eleven Sites Along U.S. 380 near Carthage, New Mexico. Laboratory of Anthropology Notes No. 382, Museum of New Mexico, Santa Fe.*
- 1987 *Excavation at the Coal Mining Community of Carthage New Mexico. Laboratory of Anthropology Notes. Museum of New Mexico.*
- 1987 *Testing Results and Research Proposal for the Cristo Rey Site, Sunland Park, New Mexico. Laboratory of Anthropology Notes 406, Museum of New Mexico, Santa Fe.*
- 1987 *An Archaeological Survey of a Proposed Borrow Pit and Yard on Fort Stanton Mesa, Lincoln County, New Mexico. Laboratory of Anthropology Notes 410, Museum of New Mexico, Santa Fe.*
- 1988 *Archaeological Survey near Clayton, New Mexico.*

Laboratory of Anthropology Notes 427, Museum of New Mexico, Santa Fe.

- 1988 *Archaeological Survey of Mine Lands near Cedar Crest, New Mexico, for the Abandoned Mine Lands Bureau.* Laboratory of Anthropology Notes 438, Museum of New Mexico, Santa Fe.
- 1989 *Testing Results on the Canada Larga and Los Ojitos Sites, In Rio Arriba County, New Mexico.* Laboratory of Anthropology Notes 486, Museum of New Mexico, Santa Fe.
- 1989 *Excavation at The Cristo Rey Site, Doña Ana County, New Mexico.* Laboratory of Anthropology Notes, Museum of New Mexico, Santa Fe.
- 1990 *Caprock Survey, Chaves County, New Mexico.* Office of Archaeological Studies, Archaeology Notes 2, Museum of New Mexico, Santa Fe.
- 1990 *The Ollie Lucas Homestead at Red Hill, Lincoln County, New Mexico.* Office of Archaeological Studies, Archaeology Notes, Museum of New Mexico, Santa Fe.
- 1990 *Testing Results From Seven Sites Along New Mexico 134, In San Juan County, Near Crystal New Mexico.* Office of Archaeological Studies, Archaeology Notes, Museum of New Mexico, Santa Fe.
- 1992 *Archaeological Survey and Testing Proposal Along U.S. 180, Luna To The Arizona State Line, Catron County, New Mexico.* Office of Archaeological Studies, Archaeology Notes, Museum of New Mexico, Santa Fe.

Workshops:

- 1982 Conservation Workshop, Laboratory of Anthropology.
- 1983 Southwestern Archaeological Symposium, Hobbs New Mexico.
- 1985 Graphics course, Santa Fe Community College.
- 1985 Southwestern Archaeology, Santa Fe Community College.
- 1986 Archaeomagnetic Dating Course, Southern Methodist University.

Conferences

- 1981 Jornada Mogollon Conference.
- 1984 Pecos Conference, Pecos, New Mexico
- 1985 Jornada Mogollon Conference.
- 1986 Pecos Conference, Pecos, New Mexico
- 1986 Historical Society of New Mexico, Las Vegas, New Mexico.
- 1986 Santa Fe Trail Symposium, Trinidad, Colorado.
- 1986 Navajo Conference, Albuquerque.
- 1987 Jornada Mogollon Conference.
- 1987 Pecos Conference.
- 1988 Mogollon Conference, Las Cruces.
- 1988 New Mexico Archaeological Council Protohistoric Conference, Albuquerque.
- 1988 Pecos Conference, Dolores, Colorado.
- 1989 New Mexico Historical Society.
- Pecos Conference, Bandalier National Monument.
- Mogollon Conference, Las Cruces, New Mexico.
- Southwest Ceramics Workshop, Silver City, New Mexico.
- Binford Symposium, Albuquerque, New Mexico
- 1990 Society for Historical Archaeology, Tucson, Arizona.
- 1991 Arizona Archaeological Society Meeting, Springerville.
- 1992 Southwestern Symposium, Tucson, Arizona.
- 1992 Jornada Mogollon Conference, Las Cruces, New Mexico.
- 1992 Arizona Archaeological Society Meeting, Springerville.
- 1993 Jornada Mogollon Conference, Tularosa, New Mexico.

Papers

- 1989 Archaeological Excavations at a Coal Mining Community of Carthage, New Mexico. New Mexico Historical Society, Socorro, New Mexico.

Grants

- 1989 Museum of New Mexico Committee for Excellence.
- 1990 Museum of New Mexico Committee for Excellence.
- 1992 Museum of New Mexico Committee for Excellence.
- 1992 Committee on Research and Development.
- 1993 Committee on Research and Development.

Research Interests:

Lithic raw material identification.
Archaeology of Southwestern New Mexico.
Historical research, Territorial Period.
Mining Communities of New Mexico.
Analysis of historical artifacts.

Archaeological Experience

Cultural Resource Specialist I

- 1992 Testing along the Old Luna Highway (Nov. 1992; 3 days).
- 1992 Survey along US 180 near Luna, New Mexico (Dec. 1992; 1 week).
- 1990-1992 Testing and excavation of prehistoric sites in Catron County, New Mexico, (Apr. 1990 to July 1992; 24 months).
- 1990 Caprock Survey (July 1990; 1 week).
- 1989 Resurvey of State Road 50 (Dec. 1989; 2 days).
- 1989 Testing of 7 prehistoric sites near Crystal, New Mexico (July to Aug. 1989; 1 month).
- 1989 Testing of two prehistoric sites in the Jicarilla Reservation (April 1989; 5 days).
- 1989 Survey along NM 180, Near Reserve, New Mexico (Feb to March; 2 weeks).
- 1989 Survey along NM 180, Near Luna, New Mexico (Feb, 1989; 1 week)
- 1989 Survey for Abandoned Mines at Tokay, New Mexico (June 6, 1989; 1 day).
- 1989 Riley Survey for Abandoned Mine Bureau (June 5, 1989; 1 day).
- 1989 Testing program of a historic homestead near Carrizozo, New Mexico (Sept. 1989; 3 days).
- 1988 Survey near Clayton, New Mexico (Feb. 1988; 1 week).

- 1988 Phase I La Plata Excavation (March to Dec. 1988; 9 months).
Archaeological Survey for the Abandoned Mine Bureau in Cedar Crest (April 1988; 1 week).
- 1987 Cristo Rey Site Testing: Supervisor of a Jornada Mogollon Site, in charge of 3 crew members. Responsible for research proposal and further excavation of the site (Sept 1987; 3 weeks).
Excavation of the Glorieta Confederate Soldiers: supervised 12 workers and volunteers in retrieval of 31 skeletal remains from a mass burial including numerous grave artifacts such as fabric, leather, wood, ceramics, metal and rubber (July 1987; 3 weeks).
Archaeological Survey for a Proposed Borrow Pit and Yard for Twin Mountain Rock Company in Lincoln County, New Mexico (Dec. 1987; 1 week).
- 1987 Carthage Excavation: In charge of a crew of 5 during the excavation of 11 structures and 5 trash areas in the historic mining town of Carthage, also the excavation of two prehistoric lithic sites along U.S. 380. Responsible for the analysis and the report write up (Nov. 1986 to April 1987; 6 months).

Cultural Resource Assistant II

1986

Quemado Testing: Supervisor assistant on a ceramic and lithic scatter. Trained and supervised the utility workers in field excavation procedures (Nov. 1986; 1 week).

Pigeon's Ranch Testing: Assistant to supervisor in which I trained the utility workers and volunteers in digging and collection procedures. Mapped the site using survey equipment (March 1986 to April 1986; 1 month).

Roswell Testing: Assistant in testing two lithic scatters along U.S. 285 near Roswell, New Mexico. In charge of the analysis and computer entry of raw data. Responsible for write-up on the cultural material and data manipulations (Sept. 1986; 1 week).

Pigeon's Ranch Testing: Assistant on the testing of the historic site of Pigeon's Ranch along State Road 63. Did research in the Santa Fe County courthouse, and library. In

charge of the analysis (Sept 1986 to Oct. 1986; 4 weeks).

Canadian River Testing: Assistant in the testing of an old homestead near Logan, New Mexico. Did record research and oral interviews. In charge of historic analysis and data input (Dec. 1986; 2 weeks).

Abandoned Mine Survey: Assistant in doing extensive survey and mapping of abandoned mine land in Cuba (Aug. 1986; 1 day), Carthage (Aug. 1986; 3 days), Las Cruces (Aug. to Sept. 1986; 4 weeks), and Organ (Sept. 1986; 2 days) for the Bureau of Mines.

Florida Avenue Excavation: Assistant to site supervisor in which crew of 6 utility workers were assigned and trained. All paperwork and photographing was assigned to my section where I acted as a supervisor. Prepared recovered materials for analysis and helped in the material identification (Feb. to April 1986; 3 months).

Buffalo Curves: Assistant for testing of a ceramic scatter in Bernalillo County (Jan. to Feb. 1986; 1 month).

Cultural Resource Assistant I

1985

Lincoln Courthouse Excavation: Assisted in the excavation of the historic Lincoln courthouse in New Mexico. In charge of the analysis (April 1985; 1 month).

Medanales Testing: An assistant to supervisor in which two historic sites were tested and mapped. Trained high school students in field procedures. Did the historical analysis and wrote them up (April 1985 to July 1985; 2 months).

Nutt Testing: Crew member on a large quarry site near Nutt, New Mexico (March 1985; 2 weeks).

Contel Survey: Assistant on a survey between Lybrook and Cuba (March 1985; 2 days).

Las Cruces Airport: Trained new supervisor in field procedures (March 1985; 1 week).

I-40 Survey: Assistant on a 32 mile long survey along Interstate 40 (Jan. 1985; 1 week).

Laguna Excavation: Assistant on a large lithic and ceramic site which contained a pithouse, several roasting pits and hearths Dec. 1984 to Jan. 1985; 1 month).

1984

Contel Survey: Assistant on a survey near Ojo Caliente (Oct. 1984; 3 days).

Coors Road Testing: Supervisor's assistant on a two week testing program on Coors Road in Albuquerque (Nov. 1984 to Dec. 1984; 1 month).

WIPP Project Excavation: Excavation of 5 lithic sites near Carlsbad, New Mexico. In charge of the lithic analysis and computer data manipulations (Aug. to Sept. 1984; 1 month).

Fite Ranch Excavation: Assistant in the excavation of a pithouse site and a field house site. In charge of the laboratory analysis and preparation of the recovered materials for curation. Responsible for entering data into the Kaypro computer (Oct. to Dec. 1983; 2 months).

Lybrook Survey: Survey on State Road 44 from Lybrook to Blanco (Feb. 1984 to March 1984; 1 week).

1983

Carthage Testing: Limited testing of 11 sites along U.S. 180 (Oct. to Dec. 1983; 2 months).

WIPP Project Testing: Assistant on a testing program of 5 lithic sites near Carlsbad, New Mexico. In charge of the lithic analysis and preparation of the report (Feb. to March 1983; 1 month).

Sims Mesa Excavation: Crew member on the excavation phase of several sites on Sims Mesa. Laboratory analysis of historic artifacts and prehistoric ceramics (April to Aug. 1983; 4 months).

Trementina Testing: Archaeological testing of the town of Trementina, New Mexico (Jan. 1983; 3 days).

Gran Quivera: Survey along State Road 14 (Sept. 1983 1 week).

1982

Hunter Wash Trading Post Excavation: Crew member on the excavation of a Navajo trading Post. Some record research was involved (April to July 1982; 3 months).

Colfax Excavation: Assistant to supervisor on the excavation of

the old railroad town of Colfax. Archival research and record research was done (Nov. to Dec. 1982; 1 month).

Townshend Site: Crew member on the testing of a prehistoric site near Roswell, New Mexico (Dec. 1982; 1 week).

Cloudcroft Site Excavation: Crew member on a extensive lithic site in High Rolls, New Mexico, near Cloudcroft (May to June, 1982; 1 month).

Colfax Survey: Assistant in the survey of the town of Colfax (April 1982; 1 week).

Brimhall Trading Post: Crew Member in the excavation of a Navajo Trading Post near Farmington. Assisted in historical analysis (Feb. 1982 to May 1982; 3 months).

Taylor Ranch Testing: Crew member in the testing of a pueblo along the Intersection of Montañño and Coors road in Albuquerque, New Mexico (Jan. 1982; 1 week).

1981

Ontiberos Homestead: Crew member in the excavation of a hispanic homestead near Roswell, New Mexico. Assisted in the historical analysis. Did archival research at the State Archival records and the County courthouse (Sept. to Oct. 1981; 3 weeks).

Brown's Pit: Crew member on a lithic scatter near Farmington, New Mexico. Assisted in the analysis of the recovered materials (Aug. to Sept. 1981; 2 weeks).

Dila Survey: Assisted in an extensive survey and mapping of Dila (Aug. 1981; 2 weeks).

Alma Bridge: Crew member on a lithic site near Glenwood, New Mexico (July 1981 3 weeks).

Mescalero Testing: Crew member on one historic and 3 prehistoric sites near Mescalero, New Mexico (June to July 1981; 2 weeks).

Moncisco Wash: Crew member on a Navajo hogan site near Farmington, New Mexico. Assisted in the historical analysis (Feb. to March 1981; 1 month).

1980

White Sands: Assistant to project supervisor which includes supervising field crews in the absence of field director. Laboratory analysis of prehistoric and historic artifacts.

Assisted in report preparation (October 1980 to Feb. 1981; 4 months).

Utility Worker

1979

Utility Worker for assisting PHd scholar under a Museum of New Mexico Foundation Grant. Assisted in lithic material separation and identification for PHd dissertation for visiting scholar (June 1979 to July 1979; 1 months).

1978

Utility worker for the Museum of New Mexico on a local excavation of a pithouse village in Angus, New Mexico (March 1978 to Oct. 1978; 7 months).