MUSEUM OF NEW MEXICO

OFFICE OF ARCHAEOLOGICAL STUDIES

ADDENDUM TO ARCHAEOLOGICAL TEST EXCAVATI[illegible] 70 AND A DATA RECOVERY PLAN FOR LA 110339, MESCALERO APACHE TRIBAL LANDS, OTERO COUNTY, NEW MEXICO

Yvonne R. Oakes

ARCHAEOLOGY NOTES 221A

SANTA FE 2001 NEW MEXICO

MUSEUM OF NEW MEXICO

OFFICE OF ARCHAEOLOGICAL STUD[illegible]

ADDENDUM TO ARCHAEOLOGICAL TEST EXCAVATI[illegible] 70 AND A DATA RECOVERY PLAN FOR LA 110339, MESCALERO APACHE TRIBAL LANDS, OTERO COUNTY, NEW MEXICO

Yvonne R. Oakes

ARCHAEOLOGY NOTES 221A

SANTA FE 2001 NEW MEXICO

MUSEUM OF NEW MEXICO

OFFICE OF ARCHAEOLOGICAL STUDIES

ARCHAEOLOGICAL TEST EXCAVATIONS ALONG US 70 AND A DATA RECOVERY PLAN FOR LA 110339, MESCALERO APACHE TRIBAL LANDS, OTERO COUNTY, NEW MEXICO

Nancy J. Akins

with contributions by
James L. Moore
Mollie S. Toll
C. Dean Wilson

Submitted by Yvonne R. Oakes
Principal Investigator

ARCHAEOLOGY NOTES 221

SANTA FE 1997 NEW MEXICO

ADMINISTRATIVE SUMMARY

In September 1996, the Office of Archaeological Studies, Museum of New Mexico, visited four previously recorded sites and conducted archaeological test excavations at two sites along U.S. 70 in Otero County. This project was conducted at the request of the New Mexico State Highway and Transportation Department, which plans to reconstruct a portion of U.S. 70. All sites are located on land belonging to the Mescalero Apache Tribe and work was done under a permit issued by the Bureau of Indian Affairs and the Mescalero Apache Tribe (Appendix 4).

Three of the sites (LA 20620, a possible stone alignment; LA 20622, a lithic and ceramic artifact scatter; and LA 110335, a series of stone alignments) lie outside the project area and will not be impacted by the construction. A small portion of LA 110340, a single check dam, extends into the project area.This resource is not likely to yield information beyond what has already deen documented and no additional investigations are recommended. A circular depression at LA 110336 extends just over 1 m inside the right-of-way fence. This feature was tested and appears to be a borrow pit associated with the construction of nearby check dams. It should not be impacted by the construction. LA 110339 is a small rock shelter that is in the project limits and cannot be avoided. Testing revealed deep deposits dating from at least the Archaic period to the ceramic period, and the site contains important information on the prehistory of the area.

Submitted in fulfillment of Joint Powers Agreement J00343/97 between the New Mexico State Highway and Transportation Department and the Office of Archaeological Studies, Museum of New Mexico.

MNM Project No. 41.625, 41.6371
NMSHTD Project No. NH-070-4(30)254, CN 2514
BIA Permit BIA/AAO-96-003

CONTENTS

Figures

Tables

INTRODUCTION

At the request of the New Mexico State Highway and Transportation Department (NMSHTD), the Office of Archaeological Studies (OAS) examined six sites along U.S. 70 on Mescalero Apache tribal land (Fig. 1). Permission to work on tribal land was granted by Keith Miller, acting chairman on June 10, 1996 and a permit to conduct work under the Archaeological Resource Protection Act (BIA/AAO-96-003) was obtained from the Bureau of Indian Affairs, Albuquerque Office.

The NMSHTD proposes to reconstruct a portion of U.S. 70 from the junction of NM 48 to the access road for the Inn of the Mountain Gods in Lincoln and Otero counties. The six sites located during the archaeological survey of this area were within the proposed project area and would be impacted by construction (Hohmann 1995). OAS examination of the sites in conjunction with the current construction plans found that LA 20620, LA 20622, and LA 110335 lie completely outside the project and construction area, LA 110340 and LA 110340 are partially inside the project area, and LA 110339 is entirely within the construction area.

Updated New Mexico Cultural Resources Information System (NMCRIS) forms were completed for the sites outside the construction area, and previously drafted site maps (Hohmann 1995) were altered to reflect the current condition of the sites. One of the sites, LA 110336, partially within the right-of-way, was tested through two 1 by 1 m test pits, a NMCRIS form was completed, and it was transit mapped. Other than a piece of recent clear bottle glass in the upper fill, no cultural material was recovered, and no further work at this site is recommended. The other site, LA 110340, lying partially within the construction area is a water or erosion control feature. A NMCRIS form was completed and it was transit mapped. At LA 110339, a small rockshelter, a 1 by 1 m test pit placed in the talus in front of the shelter opening demonstrated that the site has the potential to provide important information on the prehistory of the area and requires a data recovery program.

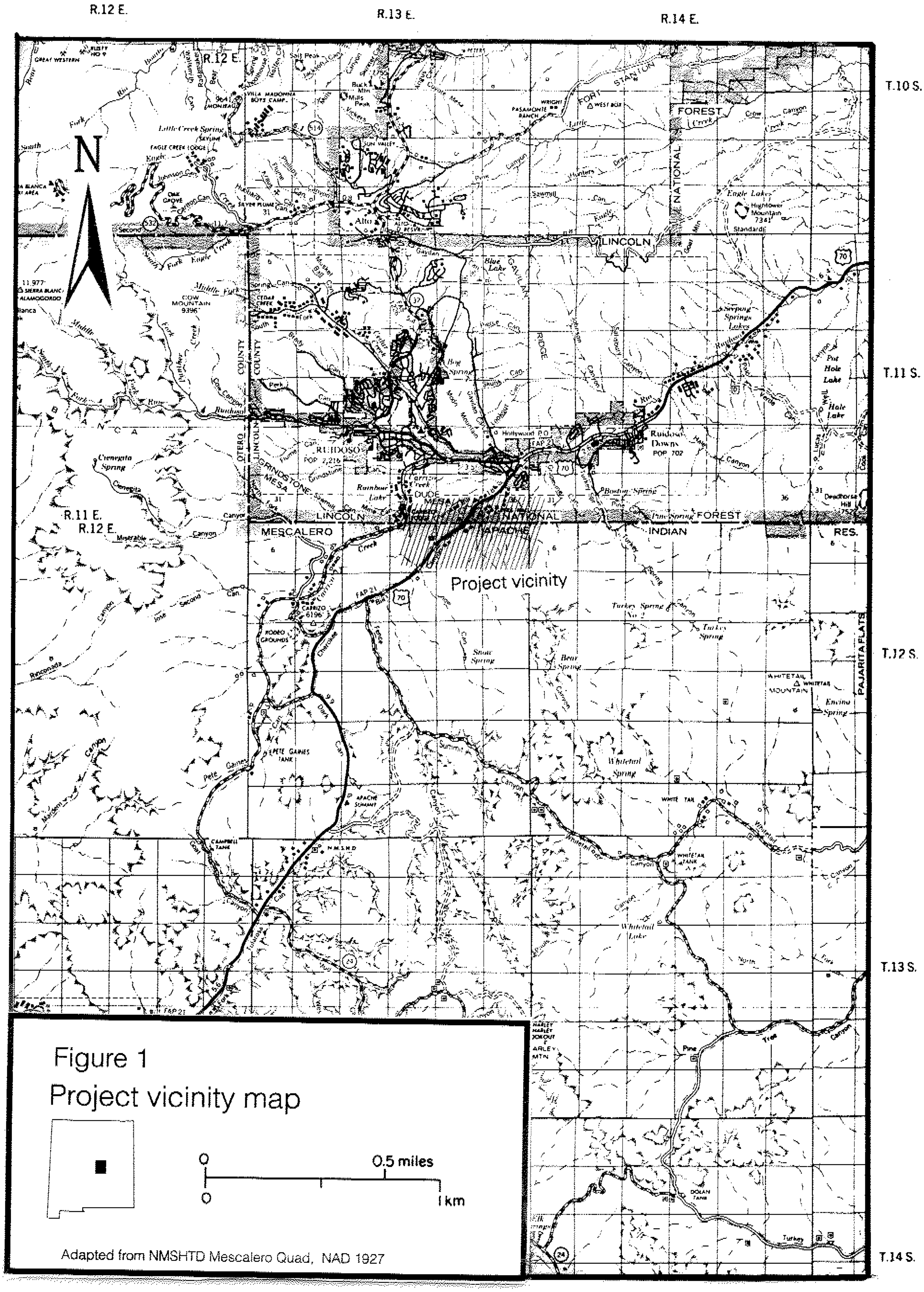

Figure 1
Project vicinity map

ENVIRONMENT

Geology and Soils

The project area is within the Sacramento section of the Basin and Range physiographic province (Fenneman 1931:394). The Sacramento Mountains are part of one of the largest mountain ranges in southern New Mexico. The northern part of this range includes the Sierra Blanca, composed primarily of igneous rocks. The southern portion, or Sacramento Mountains, form a cuesta with a rugged escarpment to the west and a gentle eastern slope extending to the Pecos River. The steep western escarpment contains a thick section of sedimentary rocks (Pray 1961:1).

Tertiary age Sierra Blanca volcanics, which are characterized by igneous rocks, occupy the area northwest of the project area. Within the project area are Permian age limestones of the Yeso formation and Sand Andres limestones and Hondo sandstones. San Andres limestone is a fossiliferous dolomite that occurs in thin to thick beds. Yeso rock is yellow and pink interbedded siltstone, limestone, dolomite, shale, and fine-grained sandstone. Hondo sandstone is well-sorted, fine- to medium-grained sandstone in massive beds of limestone (Walt 1980:10-11).

Soils in the project area are predominately of the Arosa series, formed in alluvium and derived from mixed igneous and sedimentary rocks. These soils are confined to narrow mountain valley floors and support mid to tall grasses, forbs, shrubs, and scattered ponderosa pine. Arosa soils are only slowly permeable and are generally used for livestock grazing, recreation, and wildlife. Mountain soils are Peso series or cobbly clay loams or stony silty clay loams formed from limestone and limestone bedrock. Mid to tall grass, forbs, shrubs, ponderosa pine, and mixed conifers are supported by these soils. Peso soils are moderately to slowly permeable and are used mainly for timber, recreation, and watershed. Grazing is limited to the less wooded areas (Neher 1976:6, 21; Walt 1980:14).

Climate

Between 1931 and 1983, Ruidoso had an average of 100 frost-free days; however, this is highly variable. The same years produced a range of 104 days (Prince 1980a:16). Temperatures are relatively cool, averaging 9 degrees C (48.2 degrees F), with a high of only 18 degrees C (64.6 degrees F) in July and a low of 33.1 degrees F in January. Annual precipitation over this period averaged 54 cm (21.36 inches), the greatest amounts falling in July and August (38.3 percent of the annual average). April, May, and November receive the least moisture (Mueller 1991:2). This combination produces a high, cool, and moist zone within a generally dry region, where elevation is the key determinant of precipitation and temperature (Prince 1980a:18). Mountain valleys of the Mescalero Apache area with Arosa series soils receive 45.7 to 50.8 cm (18-20 inches) of precipitation per year, with a mean annual temperature of 3.3 to 7.2 degrees C (41 to 45 degrees F). The frost-free season is from 80 to 110 days. Mountain areas nearby receive similar amounts of precipitation (45.7 to 55.9

cm, or 18-22 inches), have a mean annual temperature of 38 to 45 degrees F, and the same range of frost-free days as the valleys (Neher 1976:6, 21).

Over the past 8,000 years, this portion of the state has undergone drying, with cycles of wetter and dryer periods and a change from winter-dominant precipitation to one of summer monsoons. This has resulted in forest communities shifting to higher elevations but little overall change in the composition of the plant communities. During the early Holocene the climate was much cooler than today, and a larger area was covered by vegetative associations that are unproductive for hunters and gatherers. Paleoindian activities would have been restricted to portions of the Tularosa Basin and the plains to the east. The middle and late Holocene (8000 B.P. to the present) was characterized by warmer temperatures and summer monsoons, producing conditions more favorable for hunters and gatherers (Keesling 1980:44).

Vegetation and Wildlife Association

The project area falls within the Transition life association. In this association, trees are the major feature of the vegetation. Ponderosa pine is the most important tree, followed by occasional alligator-bark and Rocky Mountain junipers. Less important are southwestern chokecherry, black chokecherry, and black walnut in canyons and mesic areas. Narrow-leafed cottonwood, ash-leaf maple, and Rocky Mountain maple grow in riparian habitats. Gambel's oak is common and chestnut oak occasional. Numerous shrubs and shade-loving herbaceous plants occur in this association. Commonly noted grasses are prairie junegrass, several muhly grasses, three-awn, Arizona fescue, nodding brome, Kentucky bluegrass, Bigelow bluegrass, several wheat grasses, squirrel tail, foxtail barley, grama grasses, red top, sleepy grass, and wild rye (Martin 1964:174-175).

Mountain soils associated in the Mescalero Apache area support a native vegetation of ponderosa pine, fir, aspen, spruce, blue grama, side-oats grama, mountain brome, mountain muhly, needlegrass, fescue, mountain mahogany, oak brush, serviceberry, cliff rose, sedge, piñon pine, and juniper. This habitat is excellent for elk, bear, and turkey; fair for deer; and poor for fish, pheasant, dove, quail, waterfowl, and pronghorn (Neher 1976:46). Valley soils support a native vegetation of western wheatgrass, Arizona fescue, bluestem, sleepygrass, blue grama, scattered snowberry, mountain-mahogany, cliffrose, oak brush, piñon pine, juniper, and ponderosa pine, with mixed conifers at higher elevations. This habitat is excellent for pronghorn, and fair for dove, quail, bear, fish, pheasant, waterfowl, deer, and elk (Neher 1976:45).

During the testing phase of this project, late summer rains resulted in lush vegetation throughout the area. Plants were dense and left little bare ground. The valley bottom was covered with annual and perennial plants, with occasional woody shrubs, ponderosa pines, and alligator bark and Rocky Mountain juniper. Higher elevations are dense ponderosa pine forests. Table 1 provides a list of the plants observed within the project area.

Table 1. List of plants observed (compiled by Pamela McBride)

Scientific Name	Common Name
Trees and Shrubs: Conifers: *Juniperus depeana*	alligator juniper
Juniper sp.	juniper
Pinus ponderosa	ponderosa pine
Non-conifers: *Cercocarpus montanus*	mountain mahogany
Quercus	oak
Rhus triobata	skunkbush
Ulmus	elm
Herbaceous Plants: *Achillea lanulosa*	yarrow
Anoda cristada	anoda
Aster cf. *pauciflorus*	purple aster
Campanula sp.	harebell
Chenopodium sp.	goosefoot
Cirsium sp.	thistle
Commelina sp.	day flower
Convolvulus arvensis	bindweed
Cosmos cf. *bipinnatus*	cosmos
Curcubita foetidissima	coyote gourd
Dipsacus sylvestris	teasel
Gaura parviflora	small-flowered gaura
Geranium caespitosum	purple geranium
Helianthus sp.	sunflower
cf. *Hymenopappus biennis*	biennial white ragweed
cf. *Lepidium montanum*	peppergrass
Linum lewissii	blue flax
Oxalis viloacea	woodsorrel
Penstemmon sp.	penstemmon
Physallis sp.	groundcherry

Ratibida columnifera	Mexican hat
Rumex crispus	curly dock
Spaeralcea sp.	globemallow
Tragopogon dubius	yellow salsify
Typha angustifolia	cattail
Verbascum thapsus	mullein
Verbena sp.	verbena
Grasses: *Bouteloua* sp.	grama grass
Chloris verticillata	windmill grass
Panicum capillare	witch grass

CULTURAL OVERVIEW

The project area, located at the northern margin of the Mescalero Apache Reservation in the central Sacramento Mountains, is situated between several better-known localities (Fig. 2). The Sierra Blanca Region lies to the north and east, the Tularosa Basin to the southwest, and the Chupadero Region to the northwest (e.g., Kelley 1984:36). Since little comprehensive work has been done in or near the project area, background information is limited to generalities derived from the surrounding area, with a focus on adaptations rather than detailed descriptions derived from previously defined cultural phases.

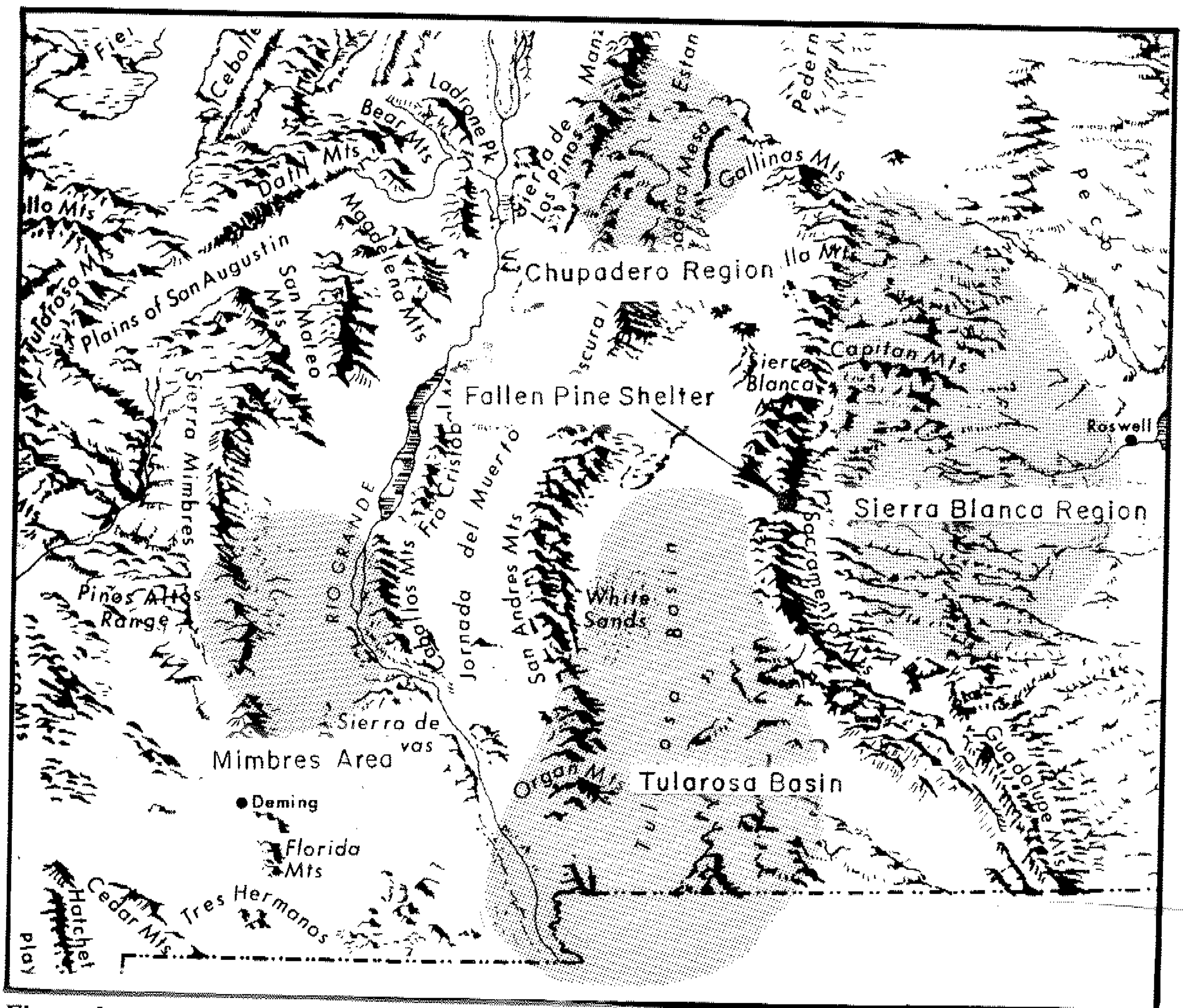

Figure 2. Project area in relation to better-known areas.

Paleoindian

As noted in a previous section, the climate during the Pleistocene and early Holocene was cooler and less productive at higher elevations. This lack of hunting and gathering resources would have severely limited utilization of the project area by early populations while favoring those of the Tularosa Basin and eastern plains (Keesling 1980:44-46).

Reported Paleoindian sites are located in the lower Tularosa Basin near dry lake beds at elevations below 1,524 m (5,000 feet), in the Jornada del Muerto south of Socorro, the lower Rio Grande Valley, and near the Texas-New Mexico state line (Dodge 1980:48-49). Survey of over 7,000 acres (2,833 ha) in the Lincoln National Forest south of the Mescalero Apache Reservation located a good number of lithic scatters and isolated projectile points, but none were assigned to the Paleoindian period (Spoerl 1985:38). With the exception of rockshelters and caves at elevations between 5,000 and 6,000 feet, Paleoindian use of mountain areas is rare (Sebastian 1989a:37). A Paleoindian projectile point and a biface or preform midsection reminiscent of a Paleoindian artifact were found during the BIA survey of Mescalero Apache commercial timber land. The point is a Folsom preform fragment found on a Late Archaic site at an elevation of 2,268 m (7,440 feet) (Broster 1980a:93, 97).

Some researchers maintain that the dearth of sites from this period is due to our inability to recognize aspects of the Paleoindian adaptation other than the diagnostic projectile points associated with big game hunting (Sebastian 1989a:33). However, the near lack of evidence in the Sacramento and other mountainous areas may also reflect the general absence of important resources in mountainous regions during the Paleoindian period.

Archaic

The Archaic period, considered a broad-spectrum hunting and gathering adaptation, began about 6000 B.C. in response to a warmer and drier climate (Dodge 1980:49; Sebastian 1989b:41). As with evidence for the Paleoindian period, recognizing Archaic sites in absence of diagnostic projectile points has led to inconsistent assignment of sites to this period. More productive than assignments based on projectile point topologies are approaches such as that of Moore (this volume) that examine debitage assemblages for evidence of biface manufacture characteristic of mobile hunters and gathers.

Archaic sites are rare in southeastern New Mexico (Dodge 1980:50; Sebastian 1989b:46). Eighteen Archaic or possible Archaic sites were recorded during the BIA survey of Mescalero Apache lands. Projectile points collected during the survey represent two Archaic traditions, a possible regional variant of the Cochise culture and the Oshara tradition (Broster 1980:94-95). The presence of isolated projectile points and sites indicates the upper elevations of the Sacramento Mountains were used, especially during the Late Archaic. The exact nature of this utilization has yet to be determined. A serial foraging strategy in which groups move to take advantage of the seasonal availability of particular food resources as opposed to task groups returning food to a base camp (e.g., Sebastian 1989b:55) is an option for this area. More direct evidence of subsistence systems during the Archaic is needed to address this issue.

Jornada Mogollon

The Mogollon tradition begins with the introduction of ceramic technology, accompanied by an increasing reliance on agriculture and more sedentary lifestyles around A.D. 400 (Dodge 1980:50). Kelley's (1984) sequence for the Sierra Blanca region is the closest and most applicable to the project area. Early Glencoe phase (A.D. 400 to 1100) habitation sites are pithouse villages near streams and usually at elevations below 2,134 m (7,000 feet). Pithouses continue into the late Glencoe phase (A.D. 1100 to 1200) but are accompanied by jacal and occasional masonry structures. A diversity of ceramic wares demonstrate an increase in contact and exchange with groups well outside the region. Lincoln phase (A.D. 1200-1400) habitation sites are linear blocks of masonry rooms with subterranean square kivas, generally located on ridges or terraces, often away from major streams, but usually in the piñon-juniper zone. Ceramic evidence of contact with other groups increases over the Glencoe phase (Dodge 1980:541-52).

The Glencoe phase population was small, sparse, and agriculturally based. Kelley's Glencoe phase sites occur in two valleys on the eastern slopes of the Sacramento and Sierra Blanca Mountains. Subsistence was mixed and adapted to an Upper Sonoran environment. Gathering appears to have played a larger role than in other parts of the region, while hunting may have been somewhat less important until the late Glencoe phase (Kelley 1984:48-49). Lincoln phase populations also supplemented agriculture by gathering and game may have been a substantial element of the diet. Deer, pronghorn, and smaller animal bones are numerous in sites of the Lincoln phase (Kelley 1984:54).

In the Lincoln National Forest south of the Mescalero Apache Reservation, Glencoe phase sites dating between A.D. 1100 and 1300 are along the southern tributary drainages of the Peñasco valley on broad terraces adjacent to streams or where canyons or ridges extend toward drainages. Most are at the upper end of the piñon-juniper belt or just within the ponderosa pine–dominated transitional zone. Habitations are pit structures and ceramic types associated with this phase include Chupadero Black-on-white, El Paso Polychrome, Three Rivers Red-on-terrocotta, and Mimbres Black-on-white. These higher elevation sites suggest a pattern of low site density with selective and intense use of some areas (Spoerl 1985:33-35).

The Sierra Blanca region was abandoned by agriculturalists by A.D. 1400, possibly withdrawing to the north and northeast. Evidence of hostilities at one excavated site where the structures were burned and inhabitants killed coincides with the abandonment of the region. Kelley's suggested sources for the hostilities that may have ended sedentary occupation of the region include pre-Apache nonsedentary inhabitants of the area, other agricultural groups, and Plains nomads. She also sees a deteriorating climate as a factor in causing the conflicts (Kelley 1984:156-159; Sebastian and Levine 1989:94-95).

Protohistoric and Early Historic

The era just before the Spaniards entered the Southwest is one of the poorest known. Mobile groups, including the ancestors of the Mescalero Apaches, left few distinctive remains.

Even those areas known to have been heavily utilized in the Historic period have few sites that can confidently be identified as Apache (Sebastian and Levine 1989:93).

Much debate has centered around when Apachean groups entered the Southwest. Early entry scenarios place them in southeastern New Mexico in the 1400s, while the other view considers an entry date in the 1600s (Sebastian and Levine 1989:99). The Mescalero Apaches were recognized as a distinct group in the 1600s. Their territory extended from the Rio Grande east into Texas and south into Mexico. Settlements were west of the Pecos River, and buffalo hunts and expeditions to acquire salt and horses extended farther east (Opler 1983:419).

The Spanish presence in New Mexico disrupted established relationships between native groups. Apache and Pueblo interactions alternated between raiding and trade, probably depending on climatic and other factors that disturbed basic subsistence systems. Spanish Colonial practices cut off access to items and resources necessary for Apache subsistence. With the introduction of firearms and horses, slave raids, restriction of hunting and gathering areas, and competition from Comanches, Apache raiding of Spanish and Pueblo settlements increased (Broster and Dart 1980:77-78). Historic documents relate that in 1778 the Apaches in the Sierra Blanca area had been forced out of their homes by Comanches but had returned by 1789 (Schroeder 1973:134-135). Apache raiding continued until the 1880s, when attempts by the United States government to turn the Mescalero Apaches into farmers were unsuccessful (Schroeder 1973:140-142).

The Mescalero Apache Reservation was established by executive order on May 29, 1873 (but not confirmed by Congress until 1922), beginning a long period of conflicts with ranchers and government officials (see sections of Harrill 1980, Opler 1983, Opler and Opler 1950, and Sonnichsen 1958 for detailed descriptions of historical relationships).

Mescalero Apache territory is characterized by mountain ranges and peaks separated by valleys and flats. Severe winters and short growing seasons discourage agriculture and greatly influence subsistence options, resulting in the continuation of relatively small groups of hunters and gatherers until the late historic period (Opler 1983:419-420). Extended families formed local groups of as many as 30 families constantly moving within a particular area. By around 1850, settlements or headquarters served as centers from which small parties left to obtain resources, returning to process what was acquired. The geographical distribution of plants and animals required that the Mescalero Apaches be very mobile. Their small inventory of possessions included many perishable items. The economy was based on hunting game, harvesting wild plants, and a little agriculture. High-elevation game included elk and bighorn sheep. Buffalo was a major meat source, but pronghorn and rabbits were also taken from the plains. Other food animals include deer, opossums, woodrats, squirrels, prairie dogs, ringtails, and peccary. Some groups ate birds such as turkey, quail, and dove and fish. Carnivores and reptiles were avoided unless taken for their skins or body parts or when no other food was available. Mescal was an important resource in later spring. Other utilized plants were sotol, bear grass stalks, amole, datil, prickly pear cactus tunas and fruit, mesquite pods, vetch pods, wild peas, locust, screwbean, evening primrose, tubers of sedge, rootstocks of cattail, wild potatoes, juniper berries, and agarita berries. Pine nuts, acorns, and walnuts were also gathered. Breads were made of pigweed, tumbleweed, and grass seeds. Berries, mint, wild onion, sage, wild celery, penny royal, horsemint, and hops were also components of the diet (Basehart 1973:145-170; Opler 1983:428-433; Prince 1980a:80-83).

The BIA survey of commercial timber lands in the Mescalero Apache Reservation located 53 historic sites and 9 isolated occurrences. Most date from the 1950s and 1970s. The earliest date from 1880 to 1915. The majority of these sites are attributed to the Mescalero Apaches, but a few are Euroamerican or undetermined in origin (Broster 1980b:133-135). None reflect the early hunting and gathering use, another indication of our inability to distinguish these sites from those of earlier groups.

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS ALONG U.S. 70

The most comprehensive study of the area to date was the sample survey of Mescalero commercial forests conducted by the Bureau of Indian Affairs in 1979 under the direction of Bruce G. Harrill (Broster and Harrill 1983; Harrill 1980). The purpose of the survey was to provide information on the kind and quantity of cultural resources that exist in commercial forests and provide the basis for making recommendations on how to protect, avoid, and preserve resources that could be destroyed by forest development. Only the 191,947 acres (77,681 ha) defined as commercial forest were considered, and of this sample, blocks of 160 acres (64.75 hectares) or 21,600 acres (8741.5 hectares) were surveyed (Harrill 1980:1-2). The resulting report provides useful background information as well as a summary and analysis of the sites recorded. This survey overlapped portions of U.S. 70 and was the first recording of LA 20620 and LA 20622.

The most recent survey in the vicinity was the U.S. 70 survey in anticipation of the current project. Louis Berger and Associates surveyed an area 92 m wide on either side of the pavement for 8.84 km from the junction of U.S. 70 and NM 48 to the turnoff for the Inn of the Mountain Gods. They relocated the two sites previously recorded in the BIA survey and recorded seven additional sites and 17 isolated occurrences. Tribal members working with the project determined that no traditional cultural properties are located within the project area (Hohmann 1995). Two of the sites located in this survey, LA 110337 and LA 110338, will be avoided during construction and were not revisited during this project.

A review of the site data at the Archeological Records Management Section reveals that relatively few (148) prehistoric sites have been recorded in the Ruidosa, Angus, Sierra Blanca, Mescalero, and Apache Summit quads (Table 2). The majority are Jornada Mogollon habitation and artifact scatters, followed by unknown scatters, Apache sites, and Archaic sites. No two quads have similar site distributions, undoubtedly reflecting the small portions that have been surveyed and the variability in elevation and topography.

Table 2. ARMS site counts

Quad/Site Type	Angus	Ruidoso	Sierra Blanca	Mescalero	Apache Summit	Totals
Elevation range (feet)	6620-9641	6680-8020	7165	3100-7986	7100-8400	
Archaic sites	0	1	1	2	2	6
Mogollon scatters	7	17	0	14	2	40
Mogollon habitation sites	9	0	0	19	2	30
Archaic sites	0	10	0	6	15	31
Unknown scatters	11	16	0	1	13	41
Totals	27	44	1	42	34	148

TESTING RESULTS

Field work was completed between September 9 and 20, 1996. The field crew consisted of Nancy Akins, Pamela McBride, Macy Mensel, and Marcy Snow. Sites were first located and evaluated with respect to the current construction plans. For the sites that lie outside the right-of-way and project area--LA 26020, LA 26022, and LA 110335--NMCRIS forms were completed, and previously drafted maps (Hohmann 1995) were altered to reflect the current condition of the sites.

LA 110340, a check dam across an erosional channel, lies partially within the project area. No testing was done at this site. A transit map and NMCRIS form were completed.

In the two sites that were tested, 1 by 1 meter test pits were place in areas likely to yield information on the significance of these features. All fill was removed in arbitrary 10 cm levels and was screened. At LA 110336, fill was screened through one-quarter inch mesh, and at LA 110339 through one-eighth inch mesh. Artifacts were collected by grid and level and returned to the laboratory for analysis. NMCRIS forms were completed for both sites, which were mapped with a transit.

LA 20620

LA 20620 was first recorded by BIA archaeologists as part of a sample survey of timber sale and forest development areas (Harrill 1980). It is described as two rock circles with a line of rocks along the south side. The alignment was generally one course high and of 10 to 30 cm limestone rocks. Artifacts observed include two beer cans, a beer bottle, and the base of a cold cream-like jar, probalby roadside debris. Because the site is situated in a drainage and ponderosa pines are elements of the alignments, the BIA archaeologists felt it was relatively recent (1937-78). No function was suggested for the structures (ARMS form; Broster 1980b:134, 140).

Revisiting the site, Hohmann (1995:19) also describes it as two limestone rock circles with an additional alignment along the south side. The westernmost circle was reported to have two to three courses of stones and the eastern one generally only one course.

Our examination of the site found that the features comprising this site are 17.1 m south (outside of) the southern U.S. 70 right-of-way fence, 19 m outside the right-of-way indicated on the current construction maps, and well outside of the project and construction areas (Fig. 3). The site is on a flat grassy area within a ponderosa pine forest and is the farthest southwest of the sites examined, at mile marker 256.6. It is 40 m west of LA 110335. Plants observed within the site area include ponderosa pines, abundant grasses, and composites. The elevation is 2,127 m (6,980 feet).

The western alignment is nearly circular with an internal diameter of 1.4 m and an external dimension of 2.2 m. Three ponderosa pines are incorporated into the circle, which is comprised of three to four courses of limestone rock in some areas. The eastern alignment is ovoid and may have a dividing wall. The western portion measures 1.6 m east to west and 1.9 m north to south, internally. The eastern portion is 2.2 m east to west and 3.2 m north to south. Ponderosa pines are incorporated into both portions of this alignment. The southern wall, which originates at the southeast edge of the western alignment, is 5.0 m long and could be the southern wall of another enclosure. Scattered stone lies to the east and west in an area approximately 15 by 6 m.

No further recording is recommended for this site. It lies well outside the construction area and is in no danger under the current construction plans.

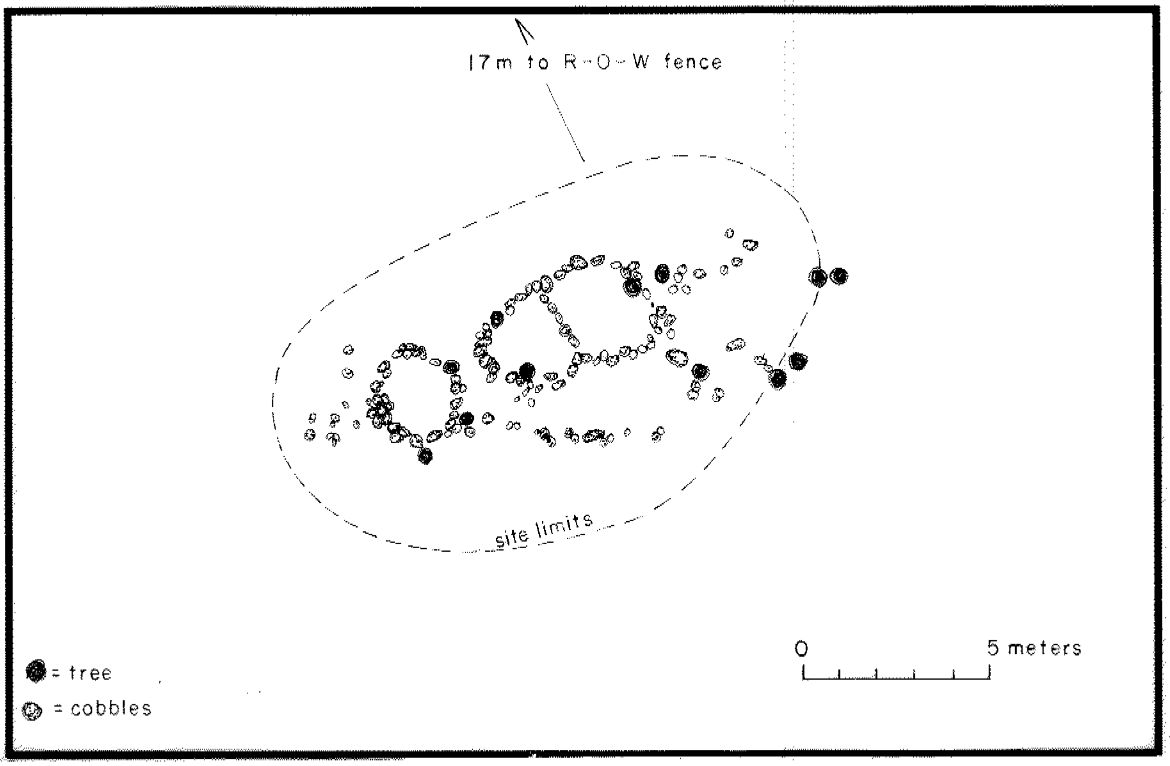

Figure 3. Plan of LA 20620.

The low walls comprising this site are unlikely human habitation structures, unless they formed the bases of temporary brush or hide structures. The lack of substantial walls and trash or other material characteristic of even seasonal habitation suggests another function. The walls may represent sheep herding activities that began in the late 1920s, when the federal government purchased and distributed 10 sheep or 20 goats per willing family to establish subsistence herding among the Apaches (Hertel 1980:72-73; Sonnichsen 1958:237). Severe winters and the expense of maintaining sheep camps soon led the token allotments of sheep and goats to be eaten or concentrated in the hands of a few families (Opler 1983:426).

LA 20622

Located near Mile Marker [redacted] and north of U.S. 70, LA 20622 was also first recorded during the BIA sample survey. It is described by the BIA survey crew as a Jornada Mogollon lithic and ceramic scatter covering an area of 10 by 15 m. Artifacts were exposed as sheet wash in cleared areas among pine duff on a ridge with a good view of the valley below. Artifacts analyzed in the field include 43 lithic artifacts and a singe Jornada Brown sherd (ARMS form; Harrill 1980:94; Prince 1980b:109). Of the lithic artifacts, most were unutilized (91 percent), one had retouch (2 percent), and 33 percent had cortex. No formal tools are reported. Prince (1980b:107-108, 115) concludes that, compared to the Archaic and undated scatters, Mogollon sites in the BIA sample were more variable, with no patterns in tool and utilized artifact types. Lithic materials were mainly local chert. Siltstone occurs only at Jornada Mogollon sites (16 percent of the Mogollon lithic artifacts are siltstone).

Hohmann (1995:19-20) describes LA 20622 as a 11 by 18.5 m scatter comprised of primary and secondary flakes, mainly of chert, but also including siltstone and fine-grained basalt. A chert projectile point fragment and two plain ware sherds were also noted. Hohmann replotted and remapped the site.

We were unable to locate the site even during two diligent searches and intense scrutiny of landmarks noted on the previous maps of the site. Grass and dense pine duff obscures much of the surface in this area of dense ponderosa pine and appears to have entirely covered the site at the time of our visits. We were able to conclude, based on the BIA and Hohmann's maps, that both had located the site in the wrong section. A USGS boundary cap lies on top of the hill, and both descriptions indicate the site should lie east of the stake at an elevation of about 2,082 m (6,830 feet). The presence of a power substation west of the hill, the position of U.S. 70, and the presence of a small drainage to the east leaves no doubt that the hill searched was the correct location, but this does not explain why both surveys placed the site in Section 3, or why we were unable to locate it. To make up for information gaps on this site, we completed a NMCRIS form including our observations on environment and topography and incorporating the previous observations on the site assemblage. Information in both surveys indicates that the scatter lies well outside the right-of-way. No additional investigations are recommended.

LA 110335

Located south of U.S. 70 at Mile Marker [redacted] this site was first recorded by Hohmann (1995:22), which places it in a small grassy meadow overlooking a wash cut and consists of a small rock ring, which the surveyors thought could represent a temporary, slightly oblong Apache structure measuring 7.5 by 2.75 m; a small cluster of stones; and a green glass whiskey bottle dating around A.D. 1905.

Figure 4. Vegetation and rock at LA 110335.

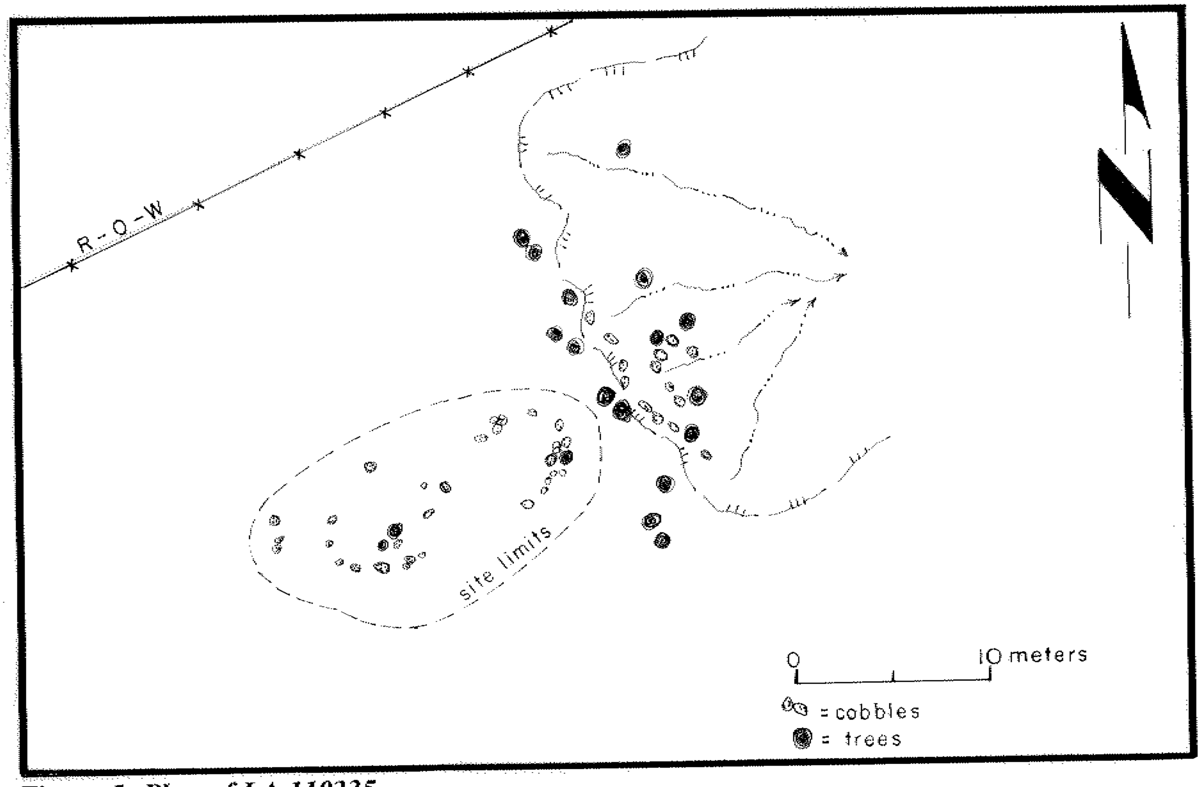

Figure 5. Plan of LA 110335.

The site was relocated in a small meadow in a ponderosa pine forest at an elevation of 2,128 m (6,980 feet). Plants include dense stands of grama grass, thistle, yarrow, mullein, Mexican hat, and other composites (Fig. 4). We found the rock ring far less evident than indicated by Hohmann and were unable to locate the green bottle. Considerably fewer rocks were visible (Fig. 5), which may be due in part to heavy grass and other vegetation. The wash to the east of the site appears to be a borrow pit that has eroded considerably. Ponderosa pines growing within the pit indicate it is fairly old. Attempts have been made to stabilize the banks of this pit by placing limestone rocks in the bank slopes and at the heads of small drainage cuts within the pit. Asphalt chunks are present in and around the site area. While it is possible that some rock was removed from the circle within the past year and used to help stabilize the banks, we doubt that the configuration as currently represented is a feature. Activities related to the borrow pit and road construction may well have produced this configuration. In either case, the rock comprising this site lies 16 m south of the current right-of-way fence, and the construction plans indicate that the actual right-of-way and construction zone are another 12 m north of that fence. Given its distance from the proposed project area, this site will not be impacted by the construction, and no further work is recommended.

LA 110336

South of U.S. 70 at Mile Marker [redacted] LA 110336 was first reported by Hohmann (1995:22-27). The site is described as a large stone-edged circle and two check dams. No artifacts were observed within the site area. Hohmann observed that the rock-ringed pit measured 8.7 m in diameter and was 1.3 m deep but was unable to determine if it was a prehistoric structure or modern borrow pit. The two rock check dams are of similar limestone rock and could represent efforts by the Emergency Conservation Work program to control erosion during the 1930s. The rock circle is bisected by the right-of-way fence, and testing was recommended.

LA 110336 is in a grassy area at the edge of a ponderosa forest, elevation 2,121 m (6,960 feet). Vegetation observed at the site includes ponderosa pine, juniper, grama grass, thistle, snakeweed, clover, flax, Mexican hat, and other composites (Fig. 6). Only a small portion of the rock circle lies north of and within the right-of-way fence. The fence, 15 m beyond where the right-of-way is marked on the construction plans, is 33 m south of the U.S. 70 pavement. Both check dams are well beyond the fence (Fig. 7) and far outside the proposed construction area.

Our initial impression is that the rock circle and depression represent a modern feature. It is virtually round. Rock is confined to the berm at the edge of the depression. To test this feature, two adjacent 1 by 1 m test pits were placed just north of the fence. These were excavated in 10 cm arbitrary levels, and all fill was screened. Excavation continued well beyond where the fill was considered sterile.

Figure 6. Vegetation at LA 110336.

Upper fill (Fig. 8) consisted of 20 to 48 cm of brown gray clayey loam with a fair number of rocks. It was moderately consolidated with roots and the soil churning typical of insects. The dark soil appears to result from swampy conditions where decaying plant material has darkened the soil. Beneath this, the fill was a dark gray blend of platey and looser clay forming a fairly compact layer. This grades into a harder and smoother gray clay that continues below where our excavations stopped. Within the lower two levels are pockets of pure platey and chunky gray clay. Excavations were stopped at 0.77 and 1.0 m. Auger tests confirm that similar soil continues another 30 to 35 cm before reaching a layer of sandy clay and disintegrating sandstone bedrock. The only cultural material recovered was a piece of clear bottle glass in the second level of Test Pit 1. A pocket gopher humerus found in Level 6 in Test Pit 2 most likely represents an accidental burial. Sparse flecks of charcoal were noted in Test Pit 1, Levels 3, 4, 6, 7, and Test Pit 2, Levels 4 and 8. Disturbance from rodents and insects occurs throughout.

While we are unable to reach any firm conclusions regarding the rock-rimmed depression, there is no indication that it is prehistoric or represents a significant historic feature. Our best guess is that it is a borrow pit where rock was mined to construct the check dams. This explanation, however, does not explain the amazingly round form of the feature. Without performing additional tests outside the depression (and outside the right-of-way fence)

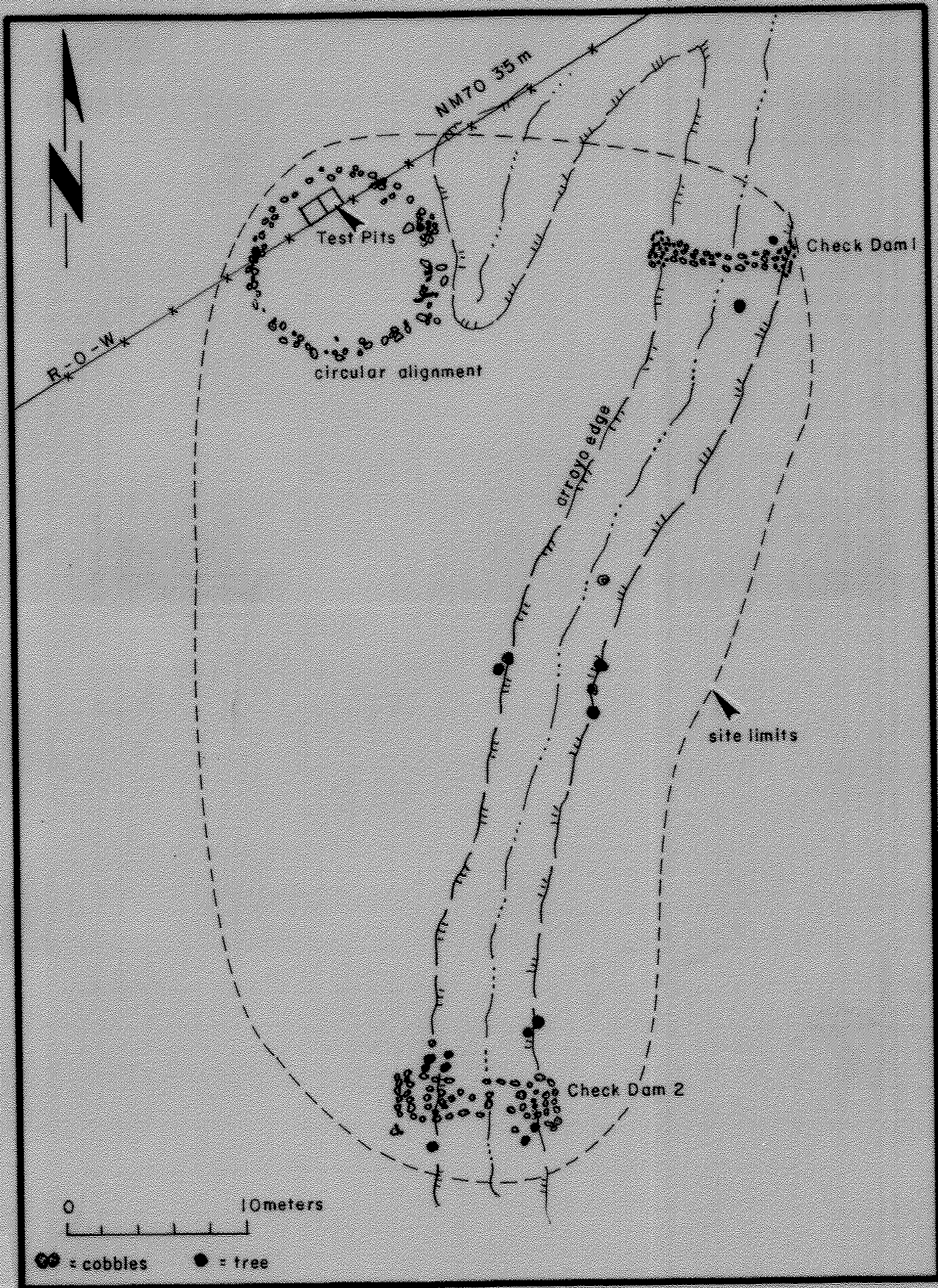

Figure 7. Plan of LA 110336.

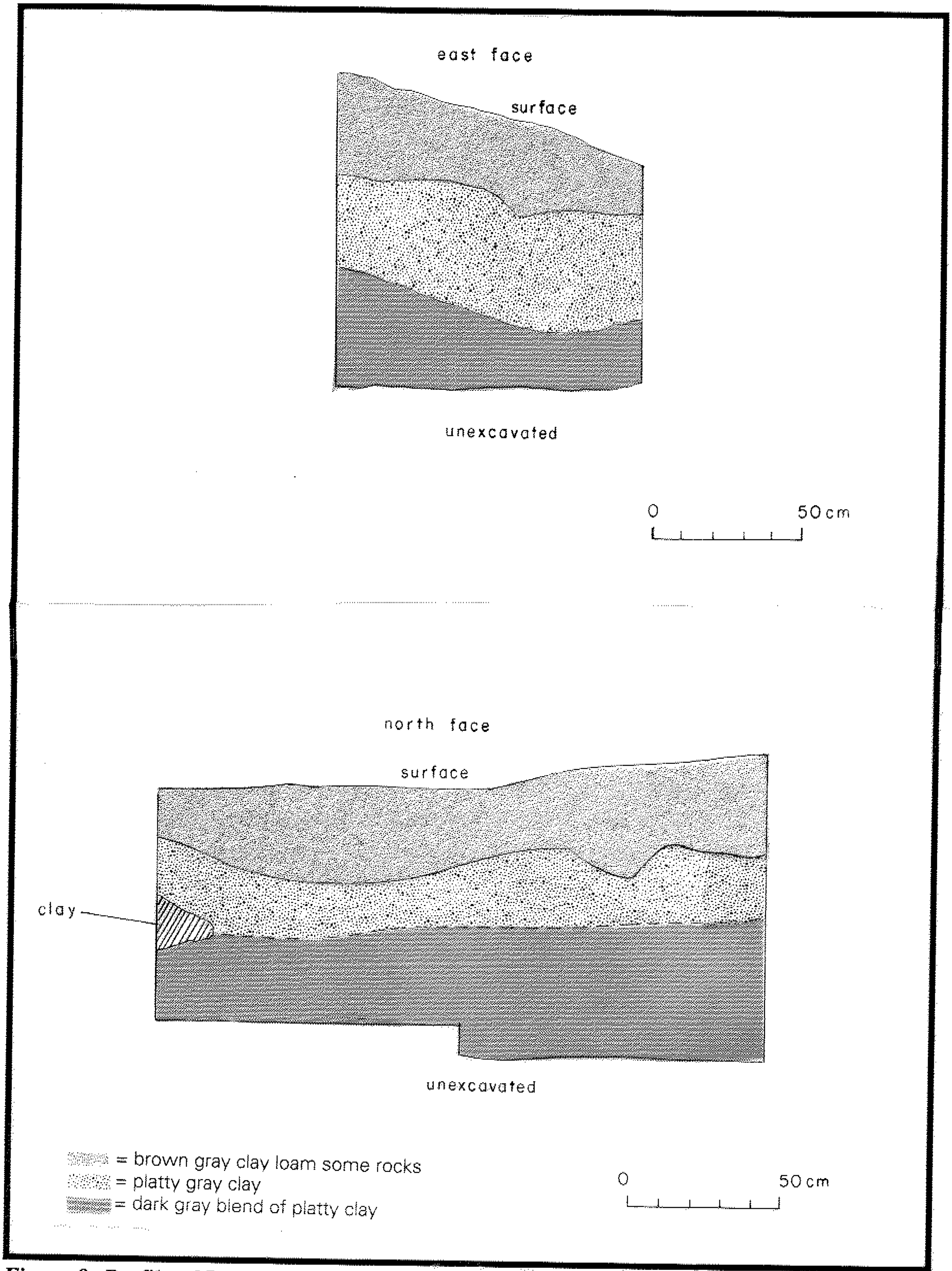

Figure 8. Profile of LA 110336 test pits.

we are unable to provide details on soil and rock distribution in an undisturbed context.

The northernmost of the check dams (Hohmann's Check Dam 2) lies approximately 12 m east of the depression and 11 m south of the fence. It measures 7.5 m across, 2.95 m of which is within the drainage. It is more or less I-shaped. The west bar or bank portion measures 1.68 m wide, and the eastern portion reaches a maximum of 1.35 m across.

The southern check dam lies 45.7 m south of the fence. It is more bar-shaped and measures 9.6 m long. It is 2.9 m wide at the west end and 2.4 m wide at the east. A small ponderosa pine grows at the center near the bottom, testifying to the relative age of this feature. Both dams are constructed of local limestone rocks ranging from 10 to 30 cm. These and other check dams are probably the work of the Emergency Conservation Work program created by the executive order of May 12, 1932. The program allowed small work groups to live at home or camp near job areas. Projects under this program included a wide range of forest and safety projects as well as erosion control dams, roads, revegetation, fences, corrals, and rodent control (USDI 1933:69-70).

The current construction maps indicate it is highly unlike that any of these features would be impacted by the road construction. A deep drainage channel north of the depression should protect these features. No further investigations are recommended.

LA 110339 (Fallen Pine Shelter)

LA 110339, or Fallen Pine Shelter, named for a recently uprooted ponderosa pine that fell across the talus slope just in front of the shelter, lies north of U.S. 70 at Mile Marker [redacted] The site was first recorded by Hohmann (1995:30) as a shallow limestone rockshelter with a charcoal stain near the opening and a flake and sherd scatter on the surface. Testing was recommended to determine if the site contains buried cultural remains.

The shelter is in the face of a limestone slope at an elevation of 2,120 m (6,980 feet). At present, the opening measures roughly 2.5 m wide, 0.75 m high, and 2.5 m deep (Fig. 9). It is within a ponderosa pine forest, and thick pine duff, oak, grass, and other vegetation cover the surface outside the shelter. The shelter opening is approximately 14 m from the U.S. 70 pavement, and current construction plans indicate that it will be completely removed during construction.

Our limited testing at this site was designed to disturb as little of the site as possible while providing information on the extent and information potential of the site. A 1 by 1 m test pit was placed in the talus about 1 m from the shelter opening. Fill was removed in arbitrary 10 cm levels and screened through one-eighth inch mesh. Screening was more effective in the lower levels once we found that removing the insert screen to an area with more light was more effective than leaning over a screen in a tree-shaded area. The fine damp clay fill coated all material, and until it dried, artifacts could not be readily distinguished from small clumps of clay and clay-coated limestone. This made screening a slow and tedious process, but we felt that the possibility of recovering small objects made the effort worthwhile. Excavation was by trowel and small pick, because the rock was dense, and the pit soon became too deep for effective shovel removal.

The test pit was excavated to a depth of 1.2 m (Fig. 10), until time and logistical considerations caused the excavations to stop. Cultural material continues below the test pit for an undetermined depth, because the density of rock precluded auger testing to determine the depth of deposits. Fill (Fig. 11) was a dark brown gray forest loam. The only differentiation was in the upper 14 to 20 cm, where rootlets and more active insect activity made the fill slightly lighter in color. Fill in the test pit is considerably darker than soil away from the mouth of the shelter. The dark coloration of the talus fill is from charcoal, probably the result of the repeated cleaning of hearths within or adjacent to the shelter. Limestone rock, ranging from pea-sized to over 10 cm and occasionally up to 40 cm in length, was abundant in all levels. In some areas, the rock was almost like a pavement. Burned rock occurred throughout. The rock originated from a combination of repeated cleaning of the shelter and down-slope movement of rock from above the shelter.

Figure 9. LA 110339, Fallen Pine Shelter.

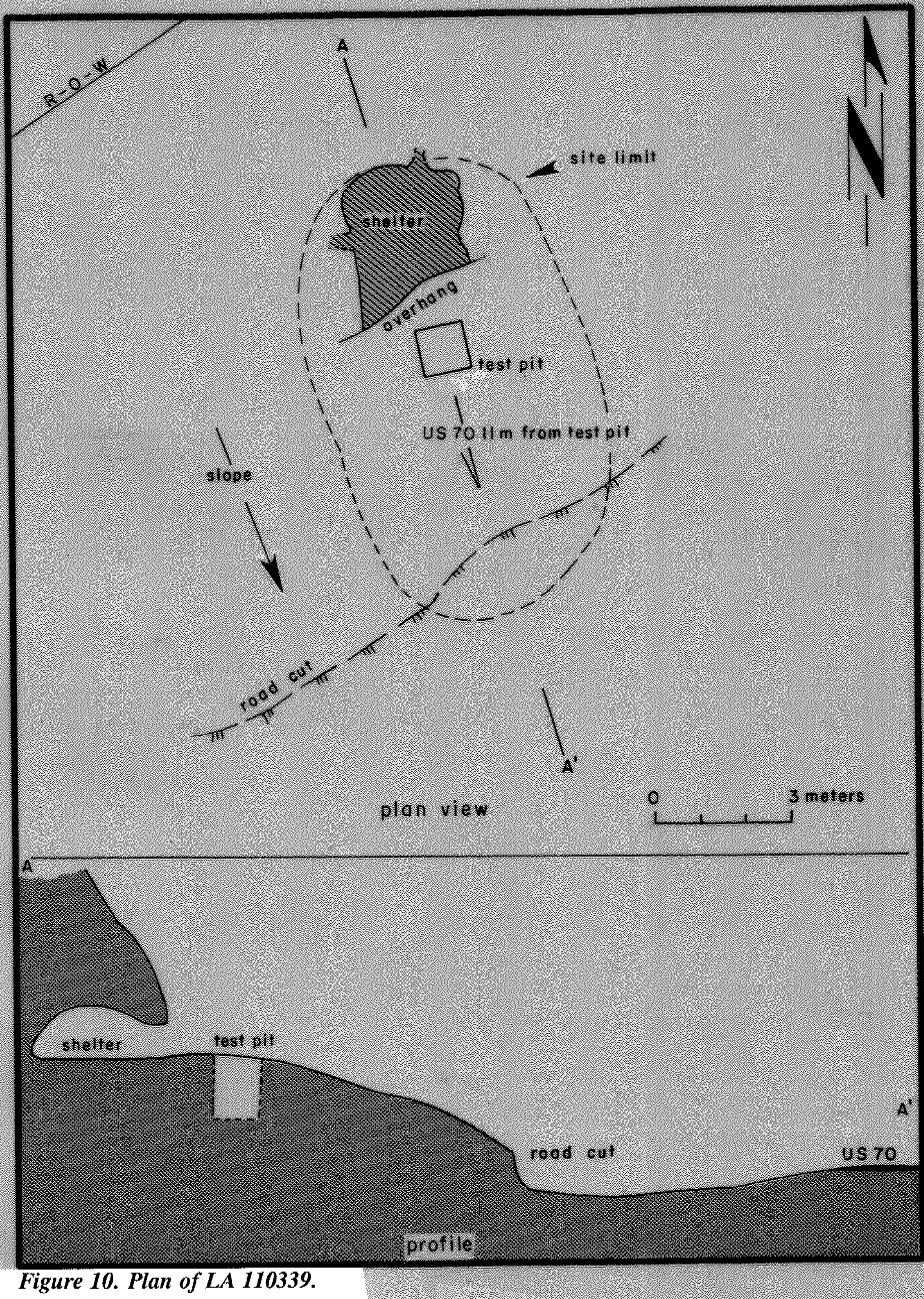

Figure 10. Plan of LA 110339.

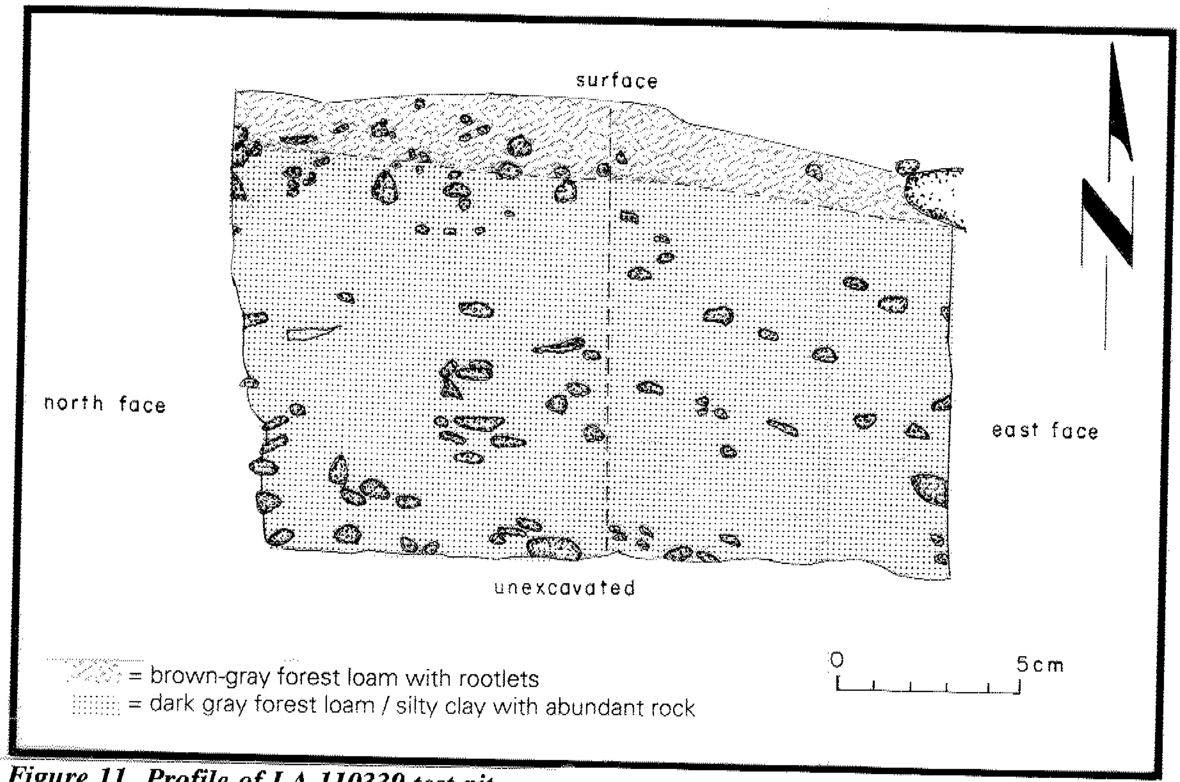

Figure 11. Profile of LA 110339 test pit.

Artifact densities vary by material (Table 3). Ceramics were found from the first through the seventh levels. The greatest densities were in Levels 4 and 5. The absence of ceramics from the lower levels indicates that the site contains both preceramic and ceramic deposits. Lithic artifacts were found from top to bottom, with greater densities in Levels 5 and 6, and again in Levels 10-12. The single projectile point, a reworked Archaic point, was found during cleaning and could not be assigned a level. Bone was recovered from all levels, but densities are greatest near the base from Levels 10 to 12. Descriptions of the artifacts and analysis are found in a later section of this report.

Table 3. Artifact densities by level

Level	Ceramics	Lithics	Fauna
No level		1	
1	8	2	2
2	21	4	6
3	11	3	2

5	28	9	2
6	16	11	5
7	3	7	7
8		5	6
9		8	11
10		18	60
11		18	51
12		13	41
Totals	114	111	194

This site has the potential to provide information on the prehistory of the area, and further investigations are recommended. A research design and data recovery plan are included in this report.

LA 110340

LA 110340, a check dam, is north of U.S. 70 at Mile Marker [redacted] It was first reported by Hohmann (1995:30-31) as a large limestone check dam with no associated artifacts. It is typical of the dams built by the Emergency Conservation Work Force in the mid to late 1930s and may have been constructed as part of that program.

This check dam is one of many attempts to slow water and erosion in the main Cherokee Bill Canyon arroyo. More recent attempts include placing whole ponderosa pines and large debris in the arroyo. Other less prominent rock features occur elsewhere in this drainage and indicate a long-term and continuing attempt to control the water flow. Much of this particular feature has been washed away (Fig. 12). The most substantial remaining portion is on the north bank and measures roughly 7.5 by 4.5 m. There is a gap between the stone on the arroyo bank and the center of the arroyo where lines of rocks placed around boulders and elm and ponderosa pine trees are all that remain. A similar gap occurs between the line of rocks and a relatively small number of rocks at the southern edge of the arroyo bank.

Located in and at the sides of the arroyo (elevation 2,109 m, or 6,920 feet), vegetation is ponderosa pine, one large elm tree, grama and other grass, yarrow, and thistle. Our activities at this site were limited to transit mapping and photo documentation. Unfortunately, dense grass obscures the distribution and details of the features. The proposed project area extends about 8 m beyond the current fence to the southern edge of the LA 110340 feature.

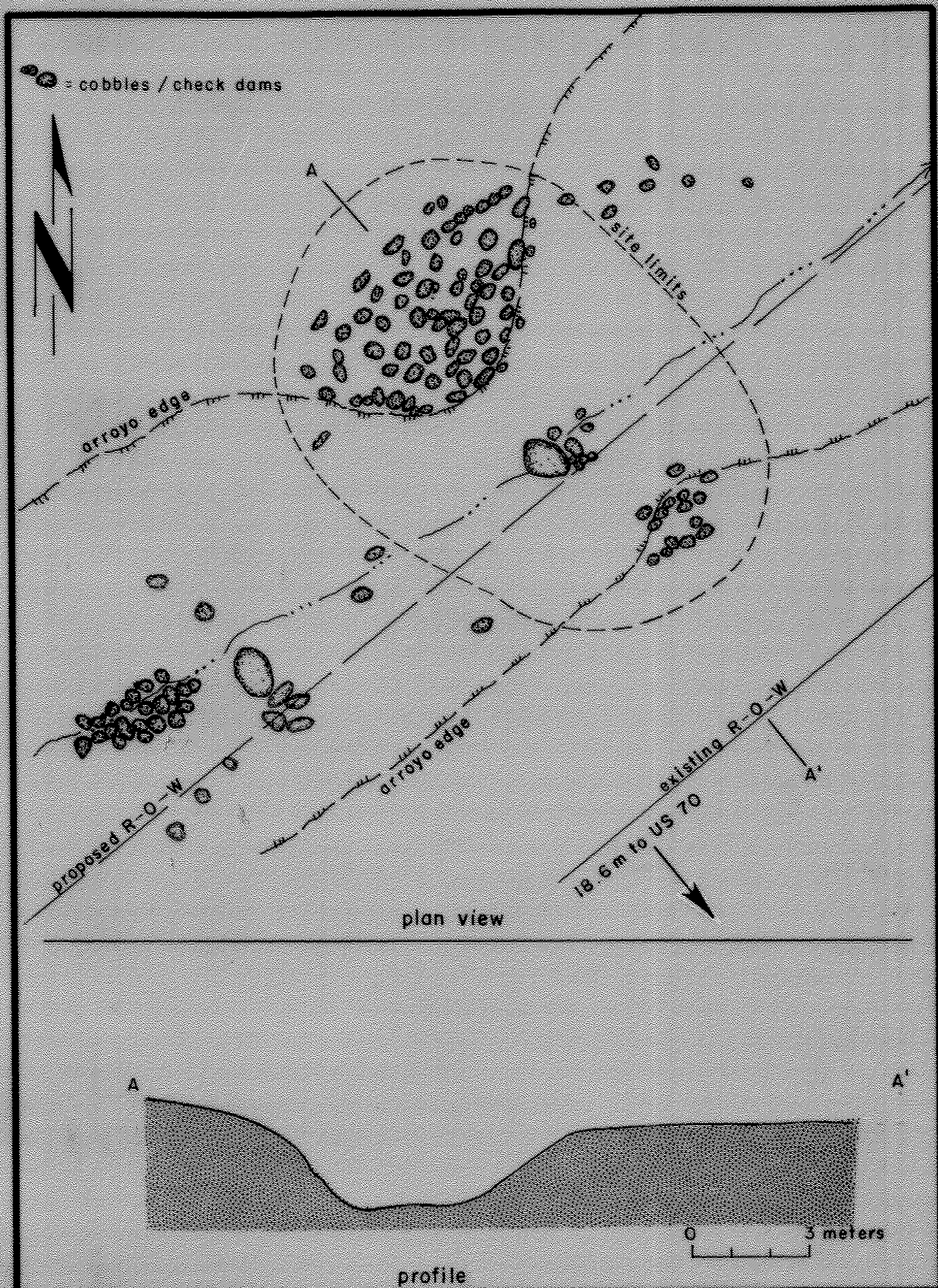

Figure 12. Plan of LA 110340.

110340

ANALYSIS OF MATERIALS RECOVERED FROM LA 110339
(FALLEN PINE SHELTER)

Ceramic Analysis, by C. Dean Wilson

A total of 114 sherds were recovered during the testing phase of LA 110339 (Table 4). Data recorded during ceramic analysis provides information for examining basic trends and formulating ceramic-related research strategies and questions for subsequent investigations planned for this site. Analysis of testing-phase ceramics involved recording a small number of descriptive attributes and typological categories similar to those recorded in previous studies of ceramics from this area (Hill 1996).

Table 4. Ceramic groups

Ceramic Type	Count	Percent
Plain brown body	79	69.3
Plain brown rim	1	.9
Unpolished striated	1	.9
Smudged brown	2	1.8
Plain slipped red body	12	10.5
Playas incised red	2	1.8
Smudged red	1	.9
Indeterminate red	3	2.6
Chupadero Black-on-white	5	4.4
El Paso Polychrome	5	4.4
Indeterminate painted white	1	.9
Mimbres Classic Black-on-white	2	1.8
Totals	114	100.0

Descriptive Attributes

The recording of descriptive attributes reflecting resource use, manufacturing technology, and vessel form provides for the examination of various patterns. Ceramic attributes recorded include temper, pigment, surface manipulation, slip, and vessel form.

Temper. Temper categories (Table 5) were identified by examining freshly broken sherd surfaces through a binocular microscope. Most of the brown utility ware sherds exhibited very similar temper consisting of relatively large white angular fragments with smaller darker fragments. This appears to represent the use of crushed granite. Temper comprised of similar fragments were placed into two separate categories based on the fineness of the granite fragments. *Tuff* refers to the use of fine volcanic tuff temper or self-tempered clays with tuff inclusions. This temper consists of fine light to dark dull tuff as well as shiny angular lithic fragments. *Tuff and sand* refers to similar fragments with small clear to white sand grains. *Sherd* refers to the use of crushed potsherds as tempering material. Sherd temper exhibits angular to subangular particles that are relatively small and usually white, buff, gray, or orange. The presence of sherd temper along with numerous fine dark particles was recorded as *sherd and fine inclusions*.

Table 5. Temper by ceramic group

	Brown Utility		Red Utility		Chupadero White		El Paso Polychrome		Mimbres White		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Large granite fragments	77	92.8	14	93.3			4	80.0			95	83.3
Small granite fragments	3	3.6	1	6.7			1	20.0			5	4,4
Fine tuff	1	1.2							2	66.7	3	2.6
Sand and tuff	2	2.4							1	33.3	3	2.6
Sherd					2	25.0					2	1.8
Fine inclusion and sherd					6	75.0					6	5.3
Totals	83	100.0	15	100.0	8	100.0	5	100.0	3	100.0	114	100.0

Pigment. Paint pigment categories were recorded for interior and exterior surfaces. Pigment categories were differentiated by surface relief, delineation, and color (Shepard 1956). *Mineral* refers to the use of ground minerals as pigments, usually iron oxides. Mineral pigment forms a physical layer resting on the vessel surface and is often thick enough to exhibit visible relief. Mineral pigments are usually dull in appearance and cover or obscure surface polish and irregularities. *Organic* pigment refers to the use of vegetal pigments only. The organic paint is soaked into rather than deposited on the vessel surface. Organic pigments do not obscure surface irregularities, and streaks and polish are visible through the paint. The painted surface is lustrous, depending on the degree of surface polishing. The edges of the painted designs are often fuzzy and indistinct.

Surface Manipulation. The type of surface texture and polishing was noted for interior and exterior sherd surfaces. *Plain unpolished* refers to surfaces where coil junctures have been completely smoothed, but surfaces are unpolished. *Plain polished* refers those that have been intentionally polished after smoothing. Polishing implies intentional smoothing with a polishing stone to produce a compact and lustrous surface. *Polished incised* indicates polished surfaces with intentional decorations created by incising the surface with a fingernails or a sharp tool.

Striated refers to the presence of a series of long shallow parallel grooves resulting from brushing with a fibrous tool on an unpolished surface.

Slip. This term refers to the intentional application of a distinct clay, pigment, or organic deposit over the entire vessel surface. Such applications may be used to achieve black, white, or red surface color, not obtainable using paste clays or firing methods normally employed. Categories recognized include unslipped, white slip, red slip, and smudged (Tables 6 and 7).

Table 6. Interior slip by ceramic group

	Brown Utility		Red Utility		Chupadero White		El Paso Polychrome		Mimbres White		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
None	76	91.6	2	13.3	6	75.0	4	80.0			88	77.2
White slip	5	6.0			2	25.0			3	100.0	10	8.8
Red slip			12	80.0			1	20.0			13	11.4
Smudged	2	2.4	1	6.7							3	2.6
Totals	83	100.0	15	100.0	8	100.0	5	100.0	3	100.0	114	100.0

Table 7. Exterior slip by ceramic group

	Brown Utility		Red Utility		Chupadero White		El Paso Polychrome		Mimbres White		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
None	78	94.0	11	73.3	7	87.5	4	80.0	3	100.0	103	90.4
White slip	5	6.0			1	12.5					6	5.3
Red slip			4	26.7			1	20.0			5	4.4
Totals	83	100.0	15	100.0	8	100.0	5	100.0	3	100.0	114	100.0

Vessel Form. Sherd-based vessel form categories were identified by rim shape or the presence and location of polish and painted decorations (Table 8). While it is often possible to identify the basic form (bowl versus jar) of body sherds from many southwestern regions by the presence and location of polishing, such distinctions are not as easy for Jornada Brown Ware types. For example, Jornada Brown Ware bowl and jar sherds can be polished or smoothed on either side. These observations result in a reluctance to assign Jornada Brown Ware sherds to specific vessel form categories. Therefore, body sherds were placed in a series of categories reflecting the presence and location of surface polishing.

Categories recorded for body sherds include *both sides not polished*, *both sides polished*, *interior side polished*, *exterior side polished*, *bowl body painted on interior*, and *jar* *body painted on exterior*. The only nonrim sherds assigned to more distinct form categories reflect *jar neck* sherds as identified by the presence of distinct curves. *Jar rim* sherds also exhibit the distinct curves of a necked jar. *Bowl rim* refers to sherds exhibiting inward rim curvature indicative of bowls.

Table 8. Vessel form by ceramic group

	Brown Utility		Red Utility		Chupadero White		El Paso Polychrome		Mimbres White		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Body not polished	3	3.6			1	12.5					4	3.5
Body polished both sides	59	71.1	5	33.3							64	56.1
Body interior polished	8	9.6	8	53.3							16	14.0
Body exterior polished	7	8.4			2	25.0	3	60.0			12	10.5
Bowl body interior painted					2	25.0	2	40.0	3	100.0	7	6.1
Jar body exterior painted					3	37.5					3	2.6
Jar rim	1	1.2									1	.9
Bowl rim	3	3.6	1	6.7							4	3.5
Jar neck	2	2.4	1	6.7							3	2.6
Totals	83	100.0	15	100.0	8	100.0	5	100.0	3	100.0	114	100.0

Ceramic Types

Ceramic types are groups that relay information about spatially and temporally important trait combinations. Ceramic items are assigned to typological categories based on a series of observations. First, an item is placed into a spatially distinct ceramic tradition based on temper, paste, and technological traits. Next, it is assigned to a particular ware group based on technological and surface attributes. Finally, it is placed into a type category based on temporally sensitive surface textures or design styles.

All the sherds analyzed (Table 4) represent types found at sites in this area of the Jornada Mogollon, including types associated with a variety of traditions produced in a number of distinct regions in southern New Mexico. Identified ceramic types are Plain Utility, Plain Red Slipped Utility, El Paso Polychrome, Chupadero Black-on-white, and Mimbres White Ware.

Plain Brown Wares. Plain brown ware is pottery produced in southern New Mexico possibly as early as A.D. 200 until the end of the Jornada Mogollon occupation. Different typologies have been employed for the plain brown wares from various areas of the Jornada region in southeastern New Mexico. These regional classification systems are based on postulated differences in surface color, polish, and temper noted for the plain brown ware from different areas of the Jornada Mogollon region (Jelinek 1967; Jennings 1940; Lehmer 1948). A great deal of overlap in the attributes of brown utility ware tempering materials utilized in different areas of the Jornada Mogollon region including the El Paso area and Sacramento Mountains has been noted ((Hill 1996; Whalen 1994), and it may not be possible to consistently identify sherds produced in many separate localities. There is also some debate concerning the significance of such differences. Therefore, during this analysis, brown ware sherds were simply assigned to descriptive types based on surface characteristics. Surface and temper characteristics that are used by some to recognize various regional types were, however, recorded as distinct attributes.

Brown utility sherds were assigned to a series of categories based on various surface characteristics. Sherds exhibiting plain polished surfaces were assigned to either a *plain brown body* or *plain brown rim* category. Similar sherds with highly polished and smudged interiors were assigned to a *smudged brown* category. These sherds are similar to Reserve Smudged, but contain local temper. Sherds exhibiting striated surfaces were assigned to *unpolished striated brown or dark gray striated.* The great majority of sherds assigned to all these categories exhibit very similar pastes and temper, indicating that they could have been locally produced at or near LA 110339, or at least a common source.

Red Utility Wares. Sherds with the same pastes and temper noted in the brown utility wares, along with a red slip on at least one surface, were assigned to *red utility ware.* Slipped sherds with plain surfaces were classified as *plain slipped red.* Similar sherds with at least one missing surface were classified as *indeterminate red.* Sherds exhibiting a slipped exterior and smudged interior were classified as *smudged red.* Those exhibiting both incised and slipped treatments on the exterior surface were classified as Playas Incised Red.

El Paso Polychrome. Sherds exhibiting similar pastes and temper, but decorated with a black organic paint were classified as El Paso Polychrome. El Paso Polychrome is characterized by large geometric motifs executed in red and black paint (Stallings 1931). All the sherds assigned to El Paso Polychrome during the present study were small and exhibit black organic paint. Since decoration on jars is often limited to the rim or neck areas, unpainted body sherds from El Paso Polychrome may be classified as *plain brown body.* The ceramic component of LA 110339 appears to be associated with the earlier span of El Paso Polychrome (Whalen 1981), and earlier forms are probably represented. Given apparent similarities between the temper and pastes used along the Rio Grande drainages near El Paso and the Sacramento Mountains (Hill 1996), it is difficult to determine if a local variety of El Paso Polychrome could be represented, or if these represent vessels produced in the El Paso area.

Chupadero Black-on-white. Chupadero Black-on-white refers to a long-lived and unique white ware occurring at Jornada Mogollon sites (Hayes 1981; Mera 1931). This type may have been produced in a number of areas, including Chupadero Mesa, the Gran Quivera area, and the Sierra Blanca, Capitan, and Los Patos Mountains (Hill 1996; Kelley 1984; Wiseman 1982). Sherds belonging to this type exhibit dense light gray to white paste and sherd temper. The decorated surfaces of Chupadero Black-on-white are often unpolished with striated or scored surfaces resulting from scraping. The decorated surface is covered with a white slip which is often streaky. Painted designs often consist of alternately hatchured and solid motifs.

Mimbres White Ware represents a long sequence of painted pottery produced in the Mimbres region of the Mogollon. Mimbres white wares identified during the present study appear to be associated with the latest period of their production, as similar Mimbres Black-on-white sherds are associated with Post-Classic occupations in eastern Mimbres. Mimbres white wares were produced with the same type paste clays as local brown utility ware vessels, but are distinguished from these by the addition of a white slip, usually decorated with mineral pigmented applied over the slipped surface. Surfaces are usually moderately to lightly polished. Slip tends to be soft and easily weathered, resulting in the obliteration of painted or slipped surfaces. Painted decorations are often distinct from contemporary painted types from other regions of the Southwest. Mimbres White Ware sherds not exhibiting distinct temporally sensitive designs were classified as *unpainted Mimbres white* or *indeterminate painted white*. A few sherds exhibiting distinct geometric designs indicative of pottery produced during the last occupations of the Mimbres area were classified as Classic Mimbres.

Summary and Conclusions

The ceramic assemblage from LA 110339 is dominated by brown ware sherds with granitic temper. Unslipped brown ware types include plain brown body, plain brown rim, unpolished striated, and smudged brown. Slipped types identified include slipped red body, Playas Incised Red, smudged red, and indeterminate red. Decorated types are El Paso Polychrome, Chupadero Black-on-white, and Mimbres Black-on-white. Chupadero Black-on-white and Mimbres Black-on-white exhibit pastes and temper distinct from those observed in the dominant brown wares.

The distribution of ceramic types indicates that the ceramic component of LA 110339 dates from the poorly dated Glencoe phase (A.D. 1100-1200). Some scenarios would date the assemblage somewhat earlier based on a pre-A.D. 1100 ending date for Mimbres Black-on-white. Other scenarios extend the dating, based on a projected A.D. 1200 date for Chupadero Black-on-white, thus dating similar assemblages into the thirteenth century.

Given what appears to be a confusing situation, where the earliest-dating ware (Mimbres Black-on-white) was found in Levels 1 and 7, and the latest ware (Chupadero Black-on-white) in Levels 2, 4, and 5 (Table 9), a careful evaluation the stratigraphy and of ceramic dating will be critical once a larger sample is collected. It is likely that the various painted types were produced in several regions and may represent exchange with groups from various areas or seasonal use of this locality by groups from different regions. More in-depth analysis, including petrographic examination of pastes and temper, and a larger sample of ceramics will allow us to explore patterns of movement and exchange through time.

Chipped Stone Artifacts, by James L. Moore

A total of 111 chipped stone artifacts was recovered during testing at LA 110339. Standardized OAS chipped stone analysis methods were employed to examine this assemblage and are detailed below. The only deviation from this format was the inclusion of a material variety variable. Specific material varieties noted during analysis were described and assigned numbers. Initially, this led to the description of nearly every piece of debitage. However, as analysis proceeded, only varieties represented by multiple examples continued to be catalogued. The use of this attribute was expected to allow us to determine whether multiple components are present at this site.

Table 9. Ceramic type by level (count/percent)

Ceramic Type	Level							
	1	2	3	4	5	6	7	Total
Plain brown body	5 62.5	16 76.2	7 63.6	17 63.0	16 57.1	16 100.0	2 66.7	79 69.3
Plain brown rim			1 9.1					1 .9
Unpolished striated					1 3.6			1 .9
Smudged brown	1 12.5			1 3.7				2 1.8
Plain slipped red body				3 11.1	9 32.1			12 10.5
Playas Incised Red		2 9.5						2 1.8
Smudged red				1 3.7				1 .9
Indeterminate red	1 12.5			1 3.7	1 3.6			3 2.6
Chupadero Black-on-white		3 14.3		1 3.7	1 3.6			5 4.4
El Paso Polychrome			3 27.3	2 7.4				5 4.4
Indeterminate painted white				1 3.7				1 .9
Mimbres Classic Black-on-white	1 12.5						1 33.3	2 1.8
Totals	8	21	11	27	28	16	3	114

Analysis Methods

Each artifact was examined under a binocular microscope to aid in defining certain attributes and determine whether it was used as a tool. The level of magnification varied between 15x and 80x. Higher magnification was used to identify wear patterns and other modifications. Edge angles on tools were measured with a goniometer; other dimensions were measured with a sliding caliper. The results of this examination were entered in a computerized data base and analyzed using the Statistical Package for the Social Sciences (SPSS/PC+ version 4.0.1).

Analysis was completed using the OAS's (1994) standardized methods, which examine material selection, reduction technology, tool use, and site taphonomy. While material selection studies cannot reveal *how* materials were obtained, they can usually provide some indication of *where* they were procured. In particular, by examining the type of cortex present on artifacts, it is possible to determine whether materials were obtained at outcrops or secondary deposits. The types of tools present on a site can be used to help assign a function, particularly for artifact scatters lacking features. Tools can also be used to help assess the range of activities that occurred at a site. Finally, some attributes can be used to judge the reliability of other attributes, providing a large enough sample is obtained. This entails analysis of artifact breakage and edge damage patterns, and can provide information concerning the source of damage. Unfortunately, the size of the sample currently available from LA 110339 is insufficient for this type of study.

Table 10 lists the attributes examined during this study and indicates which relate to each category of artifact. Four categories were recognized: flakes, angular debris, cores, and formal tools. These categories are defined as follows:

1. Flakes are debitage that were intentionally struck from parent material and possess definable dorsal and ventral surfaces, a bulb of percussion, and a striking platform. Flake fragments often lack some of these attributes, but are assigned to this category when one or more are present.

2. Angular debris are debitage generated incidentally to the production of flakes and lack definable ventral and dorsal surfaces, bulbs of percussion, and striking platforms.

3. Cores are pieces of parent material from which flakes have been struck and are defined by the presence of two or more negative scars originating from one or more surfaces. Nodules on which only a single negative scar occurs are defined as tested cobbles.

4. Formal chipped stone tools are artifacts that were intentionally altered to produce specific shapes or edge angles. If edge damage was incidental to use rather than a by-product of intentional alteration, artifacts were classified as informal tools.

Table 10. Correlation of attributes analyzed with chipped stone artifact categories

Attribute	Flakes	Angular Debris	Cores	Formal Tools
Material type	x	x	x	x
Material quality	x	x	x	x
Artifact morphology	x	x	x	x
Artifact function	x	x	x	x
Cortex	x	x	x	x
Cortex type	x	x	x	x
Portion	x	x	x	x
Platform type	x			
Platform lipping	x			
Dorsal scarring	x			
Distal termination type	x			
Thermal alteration	x	x	x	x
Wear patterns	x	x	x	
Modified edge angles	x	x	x	x
Dimensions	x	x	x	x

Attributes recorded on all artifacts included material type and quality, artifact morphology and function, amount of cortical surface, portion, evidence of thermal alteration, edge damage, and dimensions. Material type was coded by gross category unless specific sources or varieties could be identified. Varieties were assigned individual numbers in the latter case. Texture was measured subjectively to examine flakeability. Most materials were divided into fine, medium, and coarse categories depending on grain size, and such measures were applied within material types but not across them. Obsidian was classified as glassy by default, and this category was applied to no other material. The presence or absence of visible flaws that would affect material flakeability was also noted.

Two attributes were used to provide data about artifact form and function. The first was morphology, which categorized artifacts by general form. The second was function, which categorized tools by inferred use. Cortex was recorded in 10 percent increments, and cortex type was defined when possible. All artifacts were coded as whole or fragmentary. When fragmentary, the portion was recorded if it could be identified. Two types of alteration were noted: thermal and edge damage. When present, the type and location of thermal alteration were recorded. This information was used to determine whether or not the artifact was purposely altered. Edge damage, both cultural and noncultural, was recorded and described when present. Edge angles were measured on all artifacts demonstrating cultural edge damage, and on all formal tools. Edges lacking evidence of cultural damage were not measured.

Dimensions were measured on each artifact. On angular debris and cores, length was defined as the artifact's largest measurement, width as the longest dimension perpendicular to the length, and thickness as the smallest measurement. On flakes and formal tools, length was the distance between the platform (proximal end) and termination (distal end), width was the distance between edges paralleling the length, and thickness was the distance between dorsal and ventral surfaces.

Four attributes were examined on flakes only: platform type, platform lipping, dorsal scarring, and distal termination. Platform type is an indicator of reduction technology and stage. Any modifications on platforms were noted, as were missing and collapsed platforms. Platform lipping usually indicates soft hammer reduction (Crabtree 1972) and is often an indication of the later reduction stages. Analysis of dorsal scarring entailed noting whether scars originating at the distal end of a flake were present. These are opposing scars, which are often evidence of removal from a biface. The type of distal termination was noted to help determine whether it was a successful removal or ended prematurely, and to provide data on manufacturing versus post-removal breakage.

Flakes were divided into removals from cores and bifaces using a polythetic set of variables (Table 11). A polythetic framework is one in which fulfilling a majority of propositions is both necessary and sufficient for inclusion in a class (Beckner 1959). Rather than requiring an artifact to satisfy the entire array of conditions, only a set percentage in any combination need be fulfilled. The array of conditions models an idealized biface flake and includes data on platform morphology, flake shape, and earlier removals. When a flake fulfilled 70 percent of the conditions, it was considered a removal from a biface. This percentage is high enough to isolate flakes produced during the later stages of biface production from those removed from cores, while at the same time it is low enough to permit flakes that were removed from a biface but do not fulfill the entire set of conditions to be properly identified. While not all flakes removed from bifaces could be identified by the polythetic set. Those that could were considered definite evidence of biface reduction. Flakes that fulfilled less than 70 percent of the conditions were classified as core flakes. Instead of rigid definitions, the polythetic set provides a flexible means of categorizing flakes and helps account for variability seen during experiments.

Table 11. Polythetic set for distinguishing manufacturing flakes from core flakes

Whole Flakes

1. Platform:
    a. has more than one facet
    b. is modified (retouched and abraded)
2. Platform is lipped.
3. Platform angle is less than 45 degrees.

4. Dorsal scar orientation is:
    a. parallel
    b. multidirectional
    c. opposing
5. Dorsal topography is regular.
6. Edge outline is even, or flake has a waisted appearance.
7. Flake is less than 5 mm thick.
8. Flake has a relatively even thickness from proximal to distal end.
9. Bulb of percussion is weak (diffuse).
10. There is a pronounced ventral curvature.

Broken Flakes or Flakes with Collapsed Platforms

1. Dorsal scar orientation is:
    a. parallel
    b. multidirectional
    c. opposing
2. Dorsal topography is regular.
3. Edge outline is even.
4. Flake is less than 5 mm thick.
5. Flake has a relatively even thickness from proximal to distal end.
6. Bulb of percussion is weak.
7. There is a pronounced ventral curvature.

Artifact Is a Manufacturing Flake When:

1. If whole, it fulfills 7 of 10 attributes.
2. If broken or platform is collapsed, it fulfills 5 of 7 attributes.

Material Selection and Sources

Table 12 shows the breakdown of material types by morphological categories. Various cherts were the most common material category, comprising just over half the assemblage. Cherts are precipitates formed as nodules in sedimentary rocks such as limestone and sandstone. Silicified woods resemble cherts but are formed by a mineralization process in which wood fiber is replaced by silica. Since this generally occurred within sediments, at a gross level silicified wood can also be classified as sedimentary. Other sedimentary materials include limestone and siltstone, and this category of materials comprises 70.3 percent of the assemblage.

Various igneous materials also make up much of the assemblage. Basalt, andesite, and rhyolite are relatively common, while obsidian and ashflow tuff are rare. This category comprises 22.5 percent of the assemblage. The remaining 7.2 percent is made up of quartzite, a metamorphic material.

Of course, material selection was based on suitability for a range of tasks rather than the original source of rocks. Some materials, like chert and obsidian, produce sharp edges that are good for cutting and scraping. Unfortunately they are also rather fragile and will rarely withstand strenuous use. That type of use requires durable materials that can stand up to the force produced by pounding or chopping like basalt, quartzite, andesite, and rhyolite. These characteristics carry over into the manufacture of formal tools. Tools used for cutting or scraping are usually made from materials that produce sharp edges, while those used for chopping or pounding are generally made from durable materials. However, materials were not always exclusive in the range of tools that could be produced from them. Very fine-grained basalt, andesite, and rhyolite produce sharp cutting edges and were often used for formal tools like projectile points, while coarser-grained varieties were often used to manufacture chopping and pounding tools.

Table 13 shows the breakdown of materials by their quality or general grain size. Surprisingly, no coarse-grained materials were found. Glassy and fine-grained materials comprise 73 percent of the assemblage, and 27 percent are medium-grained. Cherts are predominantly fine-grained, as are quartzites and andesites. Basalts and rhyolites are mostly medium-grained, and limestone is rather evenly split. Siltstone and ashflow tuff are represented by single examples each, and both are fine-grained. This distribution suggests that materials were mostly selected with their suitability for producing cutting edges and formal tools in mind. Table 14 shows the distribution of artifact morphology by material quality. With the exception of a projectile point made from medium-grained silicified wood, bifaces and biface flakes are all of fine-grained or glassy materials. Only one biface flake is not chert or obsidian.

Table 12. Material type by artifact morphology for chipped stone artifacts (frequencies and row percentages)

Material Type	Angular Debris	Core Flakes	Biface Flakes	Bifaces	Totals
Chert	8 14.0	38 66.7	9 15.8	2 3.5	57 51.4
Silicified wood	0 0.0	0 0.0	0 0.0	1 100.0	1 0.9
Obsidian	0 0.0	0 0.0	1 100.0	0 0.0	1 0.9
Basalt	3 33.3	6 66.7	0 0.0	0 0.0	9 8.1
Andesite	1 12.5	7 87.5	0 0.0	0 0.0	8 7.2
Rhyolite	0 0.0	5 83.3	1 16.7	0 0.0	6 5.4
Ashflow tuff	0 0.0	1 100.0	0 0.0	0 0.0	1 0.9

Limestone	11 57.9	8 42.1	0 0.0	0 0.0	19 17.1
Siltstone	0 0.0	1 100.0	0 0.0	0 0.0	1 0.9
Quartzite	6 75.0	2 25.0	0 0.0	0 0.0	8 7.2
Total Percent	29 26.1	68 61.3	11 9.9	3 2.7	111 100.0

Table 13. Material type by quality for chipped stone artifacts (frequencies and row percentages)

Material Type	Glassy	Fine-grained	Medium-grained	Totals
Chert	0 0.0	50 87.7	7 12.3	57 51.4
Silicified wood	0 0.0	0 0.0	1 100.0	1 0.9
Obsidian	1 100.0	0 0.0	0 0.0	1 0.9
Basalt	0 0.0	2 22.2	7 77.8	9 8.1
Andesite	0 0.0	7 87.5	1 12.5	8 7.2
Rhyolite	0 0.0	2 33.3	4 66.7	6 5.4
Ashflow tuff	0 0.0	1 100.0	0 0.0	1 0.9
Limestone	0 0.0	11 57.9	8 42.1	19 17.1
Siltstone	0 0.0	1 100.0	0 0.0	1 0.9
Quartzite	0 0.0	6 75.0	2 25.0	8 7.2
Total Percent	1 0.9	80 72.1	30 27.0	111 100.0

Table 14. Artifact morphology by material quality for chipped stone artifacts (frequencies and row percentages)

Material Type	Glassy	Fine-grained	Medium-grained	Totals
Angular debris	0 0.0	17 58.6	12 41.4	29 26.1
Core flake	0 0.0	49 74.2	17 25.8	66 59.5
Biface flake	1 9.1	10 90.9	0 0.0	11 9.9
Bipolar flake	0 0.0	2 100.0	0 0.0	2 1.8
Early stage biface	0 0.0	1 100.0	0 0.0	1 0.9
Middle stage biface	0 0.0	1 100.0	0 0.0	1 0.9
Late stage biface	0 0.0	0 0.0	1 100.0	1 0.9
Total Percent	1 0.9	80 72.1	30 27.0	111 100.0

Knowing whether materials used at a site are of local or exotic origin can be critical to a discussion of reduction strategies. Tools were produced in anticipation of need in curated strategies, while in expedient strategies they were usually only made when needed. These strategies constitute the opposite ends of a behavioral continuum (Bamforth 1989), and it is likely that the way in which materials were reduced usually fell somewhere in between, with most groups using a combination of curated and expedient strategies depending on the availability of suitable materials and the requirements of their lifestyle. Curated strategies are often considered indicative of mobility, while expedient strategies suggest a sedentary lifestyle.

Unfortunately, insufficient information is available from this assemblage to adequately address the question of which materials are local or exotic. No identifiable exotic materials were found, with the exception of a small obsidian flake. This specimen is not visually distinct and is too small for sourcing. However, it is still possible to obtain limited information on material sources from this assemblage.

Rocks move around the landscape by natural as well as artificial means. In particular, water tends to deposit rocks in locations that are often quite distant from their sources. Thus, material sources can be divided into primary and secondary types. Primary sources are locations in which materials outcrop, while secondary sources are places where materials were transported by natural processes. Perhaps the only way to determine whether materials were obtained from primary or secondary sources is to examine any cortex that is present. Cortex is the outer rind on nodules and represents material altered by chemical and/or mechanical weathering. Cortex on nodules subjected to mechanical transport is usually battered, with sharp edges removed and smoothed. This is rarely the case for cortex on materials at or near their source, which often evidence chemical but not mechanical weathering. Thus, by examining cortex it is often possible to determine whether materials were obtained at primary or secondary sources. Of course, it must be kept in mind that most artifacts possess no cortical surfaces, and even when they do it is often impossible to determine whether evidence of mechanical transport is present. Still, this attribute is useful in assessing where many materials were obtained.

Cortex occurs on only 22.5 percent of this assemblage, and the distribution of cortex types by materials is shown in Table 15. Nonwaterworn cortex predominates in this sample. Only rhyolite is dominated by waterworn cortex, and since there is only one cortical specimen of that material, this observation is hardly reliable. Cherts were obtained from both primary and secondary sources, with the former prevailing. Similar distributions are seen for limestone and quartzite, while andesite and basalt both seem to have been exclusively obtained from primary sources.

As noted, these results are hardly conclusive, yet they provide some clues for future investigation. Unless some materials were manually transported some distance from their primary sources, several suitable types probably outcrop near LA 110339, including certain cherts, limestone, quartzite, basalt, and andesite. Other cherts and quartzites as well as rhyolite appear to have been obtained from secondary sources.

Table 15. Cortex type for materials (frequencies and row percentages)

Material Type	Waterworn	Nonwaterworn	Indeterminate	Totals
Chert	1 20.0	4 80.0	0 0.0	5 20.0
Basalt	0 0.0	2 50.0	2 50.0	4 16.0
Andesite	0 0.0	2 100.0	0 0.0	2 8.0
Rhyolite	1 100.0	0 0.0	0 0.0	1 4.0
Limestone	1 10.0	9 90.0	0 0.0	10 40.0
Quartzite	1 33.3	2 66.7	0 0.0	3 12.0
Total Percent	4 16.0	19 76.0	2 8.0	25 100.0

Reduction Techniques and Strategy

The reduction process can be divided into two domains: technique and strategy. The former involves the methods used to break lithic materials, while the latter is the approach used to guide the reduction process. While physical evidence can be used to study both domains, strategy is more open to interpretation and disagreement. With such a small assemblage it is impossible to examine either domain in detail, yet there are enough data to provide clues about the direction future research could take.

Lacking direct evidence of the tool kit used for flintknapping at this site, we can use physical evidence to conjecture about the techniques used for lithic reduction. One of the most obvious is debitage morphology. Flakes comprise 71.2 percent of the assemblage. Within this category, 83.5 percent are core flakes, 13.9 percent are biface flakes, and 2.5 percent are bipolar flakes. The latter are particularly interesting because they possess characteristics indicative of a specific reduction technique. Bipolar flakes often have impact points at both proximal and distal ends, reflecting the fact that they were produced by smashing a nodule between an anvil and a hammerstone. When one impact point is absent, bipolar flakes can often be defined by a very angular shape and the presence of positive bulbs of percussion at each end (Whittaker 1994:115). Bipolar reduction is difficult to control (Whittaker 1994:115) but was sometimes used to break round or very small nodules. The examples in this assemblage are of igneous origin and include specimens of fine-grained basalt and andesite.

More common reduction techniques include direct percussion and pressure flaking. The direct percussion technique involves striking a flake with either a soft or hard hammer. Hard hammers usually produce a comparatively thick bulb of percussion, while soft hammers produce a diffuse (or flat) bulb. Soft hammer percussion also tends to generate lipped platforms, which rarely occur when a hard hammer is used. Platforms on all 11 biface flakes are lipped, while no core flakes have lipped platforms. This suggests that biface flakes were produced by soft hammer percussion, and core flakes by hard hammer percussion.

Bulbs of percussion were not measured separately from the thickness of the main flake body. However, the presence of diffuse bulbs was used to define biface flakes, and it occurred on all of them. Thus, it should be possible to examine differences in relative bulb thickness between core and biface flakes. Bulbs are present on whole flakes and proximal fragments, which include all of the biface flakes and nearly half of the core flakes. The ratio between width and maximum thickness (which is at the bulb of percussion) should be greater for flakes struck by hard hammers than those struck by soft hammers because their bulbs should be thicker. Indeed, core flakes had a mean width to thickness ratio of 1:4.24 (range=1:1.88 to 1:7.50), while this ratio for biface flakes was 1:6.56 (range=1:4.00 to 1:12.00). While some overlap was noted, the contrast in this ratio suggests that different techniques were used to strike each of these categories. Pressure flakes often have a similar configuration to those struck by soft hammers. However, preliminary experimental data suggest that pressure flakes are generally so small that they are only rarely recovered by screens with meshes larger than 1/8 inch. While the biface flakes recovered from LA 110339 are not exactly large, they all appear to have been struck from biface edges by soft hammer percussion.

Reduction techniques are often closely related to strategy. In general, two distinct reduction strategies are recognized in the post-Paleoindian Southwest. Curated strategies involve the production of tools for anticipated needs, while tools are usually produced when needed in expedient strategies. Of course, neither strategy is exclusive, and most societies used both to a greater or lesser extent. Curated strategies are usually associated with mobile societies, while expedient strategies are most often associated with sedentary societies. A major difference between these strategies is in the production of large unspecialized bifaces. These tools were commonly made by mobile hunter-gatherers and used for general chopping or cutting tasks, as cores from which flakes could be efficiently removed for use as expedient tools, and as blanks for the production of specialized tools. Sedentary farming societies focused on the production of expedient tools, and their bifaces tend to be specialized in both form and function.

While this model remains theoretical, enough data exist to suggest that reliance on large unspecialized bifaces is characteristic of most Archaic societies, while the virtual absence of these tools is characteristic of sedentary farmers. Thus, by examining a chipped stone assemblage it is possible to estimate the reduction strategy employed, and thus the level of residential mobility. A variety of attributes can be used to examine this question. However, thus far we have considered only the small assemblage from LA 110339 as a whole. Before going any further it is necessary to determine whether the assumption that the assemblage represents a single component is correct, or whether multiple components are present.

Components

Defining components proved to be simpler than anticipated. There appears to be a distinct break between Excavation Levels 9 and 10. Assemblages from above and below that point are quite distinct. In particular, these assemblages differ in material variety makeup. As discussed earlier, several material varieties were visually distinguished and are described in Table 16. Nearly all varieties were described early in the analysis, and only those that are represented by more than one example were described later in the analysis. Thus, while up to 7 examples of individual varieties were found, 18 varieties are represented by only a single specimen apiece. The upper 9 levels contained 42 examples of described varieties, and 18 specimens were recognized in the lower three levels. In only one case is there any overlap. Variety 18 is represented by four specimens, three from above Level 10 and one from below Level 10. Otherwise, Varieties 1 through 25 were restricted to the upper nine levels, and Varieties 26 through 28 occurred only in the lower three. These data allow us to assign Levels 1 through 9 to Component 1, and Levels 10 through 12 to Component 2. A total of 61 artifacts are assigned to Component 1 and 49 to Component 2. A single projectile point recovered during trench wall cleaning could not be assigned to a component because it was assigned no level number.

Table 16. Material variety descriptions

Variety	Description
1	medium-grained light pink chert, slightly porous
2	very fine-grained basalt, some fissures stained with iron oxide
3	medium-grained basalt containing numerous small black phenocrysts
4	fine-grained white chert with some dark gray mottling and occasional round dark gray fossils
5	fine-to medium-grained gray-brown chert containing some white silica masses
6	gray flow-banded medium-grained andesite
7	fine-grained dark gray chert with occasional small voids
8	fine-grained gray and tan banded chert, possibly oolite
9	fine-grained andesite with reddish hues
10	aphanitic andesite, gray with some light bands
11	fine-grained yellow-brown quartzite, may be grading into a siltstone
12	fine-grained laminar chert, white with brown streaking, some large silica masses, possibly fossils
13	medium-grained brown chert, probably grading into Variety 5
14	fine-grained basalt
15	fine-grained yellow-tan siltstone

16	fine-grained light brown chert with some dark brown and white spots
17	fine-grained gray-brown chert with numerous white inclusions, possibly fossils
18	medium-grained gray-brown rhyolite containing large white feldspar phenocrysts
19	fine-grained brown quartzite
20	medium-grained reddish-brown quartzite
21	fine-grained gray chert
22	fine-grained gray chert with small dark gray and brown inclusions
23	fine-grained white chert with black inclusions
24	fine-grained light tan chert with white stripes
25	fine-grained light brown flow-banded andesite
26	fine-grained gray chert with white, gray, and brown inclusions
27	fine-grained brown chert with some dark mottling
28	fine-grained mottled tan chert

Along with differences in material varieties, components also vary in material type selection (Table 17). Over 80 percent of Component 2 artifacts are cherts and obsidian, while these materials make up only about 30 percent of Component 1. Basalt, ashflow tuff, and siltstone were only found in Component 1, and limestone and quartzite are much more common in that component. Variability also occurs in material quality. Nearly 82 percent of Component 2 materials are glassy or fine-grained, while only slightly more than 62 percent of Component 1 materials fall into these categories. Flakeability seems to have been more important in material selection for Component 2 than for Component 1.

Table 17. Material types by component (frequencies and column percentages)

Material Type	Component 1	Component 2
Chert	18 29.5	39 79.6
Obsidian	0 0.0	1 2.0
Basalt	9 14.8	0 0.0
Andesite	6 9.8	2 4.1
Rhyolite	4 6.6	2 4.1
Ashflow tuff	1 1.6	0 0.0

Limestone	15 24.6	4 8.2
Siltstone	1 1.6	0 0.0
Quartzite	7 11.5	1 2.0
Total Percent	61 55.5	49 44.5

Unfortunately, when the assemblage is divided in this way sample size becomes a problem. Only 19 pieces of cortical debitage occur in Component 1, as opposed to a mere 6 in Component 2. Percentages of waterworn cortex are very similar (15.8 percent to 16.7 percent), suggesting that most materials were procured locally for each component. However, small sample size suggests that little reliance can be placed on these conclusions.

The character of each assemblage in terms of artifact morphology is quite distinct. Component 1 contains 34.5 percent angular debris and 64.5 percent flakes, while Component 2 contains only 18.8 percent angular debris and 82.2 percent flakes. Only 1 (1.7 percent) biface flake was recovered from Component 1, while 10 (20.8 percent) were found in Component 2. Both bipolar flakes in this assemblage were found in Component 1. Whole debitage from Component 1 average 2.1 cm long (sd=.85), while those in Component 2 average 1.5 cm long (sd=.60). This relationship continues when only whole core flakes are considered: those in Component 1 average 2.2 cm long (sd=1.13), and those from Component 2 average 1.5 cm long (sd=.84). The only complete biface flake recovered was from Component 2, so mean lengths for that category are not available.

Flake breakage patterns also vary between components: 45 percent of Component 1 flakes are whole, while only 15 percent of those in Component 2 are complete. Breakage could be due to two very different processes: fracturing during removal, and post-removal processes. Preliminary experimental data suggest there are differences in fracture patterns between flakes struck from cores and tools. Though reduction techniques are more controlled during tool manufacture, flake breakage increases because debitage get thinner as reduction proceeds. Thus, there should be more broken flakes in an assemblage in which tool were manufactured than in one that simply reflects core reduction. Much flake breakage during reduction is caused by secondary compression, in which outward bending causes flakes to snap (Sollberger 1986). Characteristics of the broken ends of flake fragments can be used to determine whether breakage was caused by this sort of bending. Breakage by processes other than secondary compression tends to cause snap fractures. This pattern is common on flakes broken by processes like trampling or erosional movement, but it also occurs during reduction. Core reduction tends to create a high percentage of snap fractures, while biface reduction results in a high percentage of manufacturing breaks.

The presence of a much larger percentage of broken flakes in Component 2 may reflect more late-stage reduction. This can be examined using data on breakage patterns, platforms, and artifact morphology. Twenty-one flakes from Component 1 are broken, 11 (52.4 percent) of which were broken in manufacture. In contrast, only 48.5 percent of Component 2 flakes were broken in manufacture. This pattern is opposite the expected and may be due to combining core and biface flakes. When these categories are separated, 50.0 percent of the Component 1 core flakes and only 41.7 percent of those from Component 2 were broken in manufacture. In contrast, the only biface flake from Component 1 and 78 percent of those from Component 2 were broken in manufacture. The amount of manufacturing breakage seen in the biface flake assemblages is consistent with preliminary experimental data (Moore n.d.). The same is true of the broken core flakes in Component 2. However, a higher than expected percentage of manufacturing breaks occurs in the Component 1 core flake assemblage. The core and biface flake assemblages in Component 2 may represent mutually distinct populations, while we cannot currently explain the percentages in Component 1.

Two material varieties in Component 2 contain examples of both core and biface flakes, which may argue against separate populations. Varieties 26 and 28 were predominantly coded as core flakes, but a single biface flake was recorded for each. Variety 26 contained five specimens, including two proximal and three distal fragments. There were four examples of Variety 28, including one proximal and three distal fragments. In most cases, it is nearly impossible to determine whether distal fragments represent core or biface flakes, so they are assigned to the former by default. Thus, all distal fragments in these categories were coded as core flakes but could just as easily have been parts of biface flakes. Indeed, since the only example of Variety 28 with a platform is a biface flake, it is likely that all four specimens of this material represent similar removals. The same case is not as easily made for Variety 26. It is possible that the single proximal core flake fragment represents an early removal from a biface edge that did not fit enough conditions of the polythetic set to be properly classified, or that this material was transported to the site as multiple artifacts, with at least one core and one biface represented. Unfortunately, our sample is too small to confidently verify either possibility. The seven remaining biface flakes in Component 2 do not overlap with the materials present in the core flake population.

While this argument is conjectural, it is possible that the cores and bifaces reduced in Component 2 were mutually distinct. If true, biface manufacture probably did not occur in this component, and the biface flakes represent tool resharpening, flakes struck from unspecialized bifaces for use as informal tools, or the shaping of unspecialized bifaces into more specific forms.

A comparison of platforms between components is also illuminating (Table 18). Simple platforms (cortical and single facet) predominate in Component 1, but are absent or uncommon in Component 2. Similarly, more complex platforms are rare in Component 1 but predominate in Component 2. When platforms that are obscured or absent are removed from consideration, the proportions become even more lopsided. Simple platforms comprise 90.5 percent of this sample in Component 1, and only 17.7 percent in Component 2. Conversely, no platform in Component 1 evidences signs of modification, while 35.3 percent in Component 2 are modified. Multifacet platforms do not fall into either category and represent removals from a core or tool edge that was previously flaked. This variety is much more common in

Component 2 (47.1 percent) than in Component 1 (9.5 percent). All biface flakes in Component 2 had either multifacet or modified platforms, and the same categories comprise 60 percent of the core flake platforms. The only biface flake in Component 1 had a collapsed platform, and only 9.5 percent of the core flake platforms were multifacet.

The relatively large percentage of multifacet or modified core flake platforms in Component 2 may be evidence of early stage biface manufacture. Flakes removed early in the production of a biface often resemble those removed from cores so closely that they cannot be discriminated. If this observation is correct, it negates the possibility that biface manufacture did not occur in this component. Only further research will be able to determine which possibility is correct.

Table 18. Platform information by component and flake morphology (frequencies and column percentages)

Platform Type	Component 1		Component 2	
	Core Flakes	Biface Flakes	Core Flakes	Biface Flakes
Cortical	5 13.5	0 0.0	0 0.0	0 0.0
Single facet	14 37.8	0 0.0	3 10.3	0 0.0
Multifacet	2 5.4	0 0.0	4 13.8	4 40.0
Multifacet and abraded	0 0.0	0 0.0	0 0.0	1 10.0
Retouched	0 0.0	0 0.0	1 3.4	2 20.0
Retouched and abraded	0 0.0	0 0.0	0 0.0	2 20.0
Collapsed	2 5.4	1 100.0	2 6.9	1 10.0
Crushed	1 2.7	0 0.0	1 3.4	0 0.0
Snap fracture	4 10.8	0 0.0	9 31.0	0 0.0
Broken in manufacture	9 24.3	0 0.0	9 31.0	0 0.0
Totals Percent	37 97.4	1 2.6	29 74.4	10 25.6

Thermal Alteration. Evidence of thermal alteration was found on six artifacts (Table 19), four from Component 1 and two from Component 2. Two forms of alteration were noted: potlid fractures and crazing. Both are evidence of improper thermal alteration, either purposeful or accidental. Potlid fractures tend to occur when materials are heated too rapidly and internal moisture turns to steam and causes a portion of the surface to explode outward. Multiple interlocking potlids can form by the same process and sometimes remain as an internal flaw. Crazing is usually caused by rapid cooling, which results in uneven contraction and cracking.

Thermal treatment of both pieces of angular debris in Component 1 was probably unintentional. The presence of potlid fractures on these artifacts and their general unsuitability for reduction into formal tools suggests that thermal alteration occurred after they were struck. Intentional alteration cannot be ruled out for the remaining artifacts. The presence of potlid fractures on dorsal surfaces indicates that thermal alteration could have occurred either before or after the core flakes that exhibit those characteristics were struck. Similarly, the core flake that exhibits crazing could have been struck before or after thermal treatment (though the former is more likely). The biface fragment from Component 1 provides much stronger data. A flaw consisting of multiple interlocking potlid fractures was encountered as this tool was being flaked. This caused it to be fractured and led to its discard. Thermal treatment was undoubtedly intentional in this case.

Table 19. Thermal alteration by artifact morphology and component (frequencies)

Thermal Alteration Type	Component 1			Component 2
	Angular Debris	Core flake	Biface	Core flake
Potlids on dorsal surface	0	0	0	1
Potlids on other surface	2	0	1	0
Crazed	0	0	0	1
Crazed with potlids on dorsal surface	0	1	0	0
Totals	2	1	1	2

Tool Use. Only five tools were recovered during testing, including two informal tools (both from Component 1) and three bifaces. One informal tool is a flake that exhibited wear on its distal end, which also appeared to be polished. The second is a piece of angular debris on which two edges exhibit evidence of modification. Both were minimally retouched, one in a concave configuration reminiscent of a spokeshave. Both areas of retouch appear to be intentional rather than incidental to use, and there is no visible evidence of wear. Thus, it is possible that this artifact represents a tool that was abandoned during manufacture, or one that was made but only minimally used before being lost or discarded.

Three formal tools were also recovered, one from each component and one of vertical provenience. A biface fragment from Component 1 appears to have been discarded when a large flaw caused by improper thermal treatment was encountered during flaking, fracturing the tool. Discard after breakage is also responsible for the formal tool in Component 2. In this case, the biface was broken very early in the manufacturing sequence, though improper thermal treatment was not the cause. Marginal pressure flaking is visible along the edges of this tool, bifacial in one location and unifacial in another. The only finished formal tool is a San Pedro point, complete except for a small impact fracture at its tip. Unfortunately, this artifact could not be assigned to a component.

Few conclusions can be made from this tiny array of tools. The lack of informally used biface flakes in Component 2 seems to rule out the possibility that unspecialized bifaces were used as cores to produce expedient tools. Unfortunately, at the level of magnification used in this analysis, the only informal tools that were identified are those whose edges were damaged during use. Experiments by Schutt (1980) and Vaughan (1985) indicate that visible edge damage is not always a consequence of informal tool use, so the reliability of this conclusion is questionable. About all we can say at this point is that informal tool use can be documented for Component 1, but not for Component 2.

The presence of formal tools discarded during manufacture provides more definite information. Formal tool manufacture appears to have occurred in each component. In both cases the tool being manufactured was small, and the technique used for manufacture was pressure flaking (at least for the specimen from Component 2). The presence of an impact-fractured San Pedro point indicates that either hunting or tool refurbishing occurred during one occupation.

Discussion and Conclusions

Though only a small chipped stone assemblage is available from a single test pit at LA 110339, we were able to derive quite a bit of information. At least two components are present, the break occurring between Levels 9 and 10. This conclusion is based on analysis of material varieties and is supported by many other types of data. Of 28 material varieties defined, only 1 is represented by artifacts that occur both above and below the Level 9/10 horizon. A single example of Variety 18 occurred in Level 11, while three other examples of this variety were found in Levels 6, 7, and 9.

In general, materials in Component 1 appear to have been selected for durability, while those in Component 2 were selected for flakeability and sharpness. This difference is probably due to variation in reduction strategies. The strategy evidenced by Component 1 is more focused on expedient reduction, while that in Component 2 is more focused on the manufacture of curated tools. In turn, this suggests that Component 1 reflects an occupation by sedentary farmers, while Component 2 appears to represent use by Archaic hunter-gatherers.

Examination of cortex types suggests that several materials are available near the site. In particular, many of the cherts, limestones, and igneous materials (except for obsidian) found at the site have nonwaterworn cortex, which is indicative of procurement at or very near an outcrop rather than from secondary deposits. A study of local material availability may help isolate varieties that could only have been obtained at a distance from the site and thus represent curated artifacts.

Several activities can be tentatively defined for both components from the limited evidence available, including core reduction, formal tool manufacture or reduction (both soft hammer and pressure flaking), and informal tool use. However, core reduction was more prevalent in Component 1 and included the only examples of bipolar reduction, while most of the evidence for biface reduction was found in Component 2. Hunting was probably done during at least one occupation, but the only artifact that provides direct evidence for this activity could not be assigned to a vertical excavation level.

In conclusion, analysis of the chipped stone assemblage suggests that there were at least two discrete periods of occupation at this site, and that each focused on different reduction strategies. Data were too few to determine whether the site was used as a temporary camp or a more permanent residence. However, the relatively small number of chipped stone artifacts from each level (9.25) suggests that the former is more likely. There is evidence that several activities were pursued during each occupation, and this is more consistent with use as a general campsite than as a logistical base.

Fauna

Faunal assemblages from cave and rockshelter sites present a unique set of problems since their inhabitants may include not only humans but rodents, raptors, and carnivores. The most basic questions addressed by this analysis concern the identification of resources utilized by the humans and the determination of whether this utilization remained static between the preceramic and ceramic periods. The 1 m sq test at Fallen Pine Shelter provides a limited view of the kinds of animals utilized over the period of human occupation.

A large array of mammal and bird species inhabit the coniferous forests of the Sacramento Mountains (Dart 1980:36-45; Findley et al. 1975). Mammals known to inhabit the area include ten species of bats, cottontail rabbits, chipmunks, rock squirrels, red squirrels, pocket gophers, beavers, at least nine species of small rodents, porcupines, coyotes, gray wolves, gray foxes, black bears, ringtails, raccoons, weasels, skunks, mountain lions, bobcats, elk, mule deer, white-tailed deer, and mountain sheep. At least 82 species of birds occur in the White and Sacramento Mountains on a fairly regular basis. These include a variety of hawks, golden eagles, falcons, owls, woodpeckers, jays, ravens, and numerous smaller bird species (see Dart 1980:41-42 for a comprehensive list of species). Amphibians, reptiles, and fish are less common.

Humans rarely utilize the entire range of species available. Faunal assemblages from archaeological sites in the Sacramento and White Mountains and ethnographic sources for the Mescalero Apaches identify rabbits, squirrels, occasional rodents and carnivores, deer, mountain sheep, and turkeys as the most likely food taxa (Dart 1980:45).

Analysis Methods

Variables recorded during the faunal analysis provide the information necessary to address a number of issues. Foremost are the identification of the animal and the body part represented, how that animal and part was processed for consumption or other purposes, and what taphonomic or environmental conditions may have affected the specimen.

Each specimen (piece of bone, eggshell, or mollusk shell) was identified and recorded using a modified version of the OAS faunal recording format. Variables that were computer coded and analyzed using SPSS/PC version 4.0 are the field specimen (FS) number, the lot or specimen number for that item, number of items that fit this description, an indication that an identification is uncertain, the taxon, whether the element was part of an articulation or pieces that fit together with an old break, the element or body part represented, element side, element completeness, portion of the element represented, the age of the animal, criteria for aging, environmental alteration and degree, animal alteration and location, burning degree and location, rounding, processing type and location, and whether the specimen is a tool, ornament, or manufacturing debris.

Taxonomic identifications are as specific as possible. Elements that could not be identified to the species or family level were assigned to a range of indeterminate categories based on the size of the animal and whether it is a mammal, bird, other animal, or could not be determined. Each specimen was counted only once, even when broken into a number pieces by the archaeologist. If the break occurred prehistorically the pieces were counted separately.

Taxa Recovered

Testing at Fallen Pine Shelter produced a sample of 190 pieces of bone, 2 pieces of eggshell, and 2 mollusks (Table 20). Like other rockshelter faunal assemblages (e.g., McKusick 1986:245; Wimberly and Eidenbach 1981:23-24), the vast majority of the bone is small (generally under 2 cm) fragments identifiable only to the size of the animal. Unidentified specimens ranged from rodent to large artiodactyl. The majority were classed as large mammal (51.5 percent) or medium to large mammal (19.0 percent). Small forms are generally rare, as are birds.

Table 20. Taxa recovered

Taxon	Common Name or Description	Count	Percentage
Small mammal or medium-large bird		10	5.2
Small mammal	rabbit or smaller	6	3.1
Small to medium mammal	up to dog size	11	5.7

Medium mammal	fox to dog size	2	1.0
Medium to large mammal	dog to deer size	35	18.0
Large mammal	deer or larger	100	51.5
Cf. *Cynomys ludovicianus*	black-tailed prairie dog	2	1.0
Tamiasciurus hudsonicus	red squirrel	1	.5
Neotoma sp.	wood rats	3	1.5
Medium to large rodent	pocket gopher or larger	2	1.0
Sylvilagus sp.	cottontail rabbit	1	.5
Urocyon cinereoargenteus	gray fox	1	.5
Medium artiodactyl	pronghorn, deer, mountain sheep in size	12	6.2
Large artiodactyl	elk or bison	1	.5
Cervid	deer or elk	1	.5
Cf. *Odocoileus hemionus*	mule deer	1	.5
Medium bird	jay to falcon size	1	.5
Egg shell (large bird)	chicken or larger	2	1.0
Mollusk		2	1.0
Totals		194	100.0

The identified taxa are all available at or near the site. The black-tailed prairie dog, represented by a proximal radius and a portion of a mandible, generally occupies shortgrass plains but was once more widespread, inhabiting marginal habitats such as open woodlands (Findley et al. 1975:130). Red squirrels are found in coniferous and spruce-fur forests (Findley et al. 1975:138). The single element here is a maxillary premolar. The only rodent identified is a woodrat. Both the white-throated (*Neotoma albigula*) and Mexican (*Neotoma mexicana*) are present in the area today. Mexican woodrats tend to be the more common of the two in mesic canyons, where mixed conifers, ponderosa, and woodland are intermixed (Findley et al. 1975:241). The elements here are two partial tibiae and a maxilla fragment. The presence of an active woodrat nest within the shelter during testing suggests that some or all of specimens could be intrusive.

The single small fragment of a cottontail is a femur fragment. The eastern cottontail (*Sylvilagus floridanus*) occupies the Sacramento Mountains and is the most likely species represented. A gray fox radius fragment is the only carnivore element identified. It is burned, indicating that it was probably left by humans. Artiodactyl elements are relatively numerous (15 specimens), but only one could be identified as deer and another as cervid (a small piece from the tip of an antler). The deer element is an incisor and is consistent with mule deer in size. A fragment of a humerus from a medium-sized bird is the only definite bird remain. The egg shells are white and from large eggs, possibly turkey.

The mollusk shells are complete. They represent two species that inhabit the Sacramento Mountains area and are accidental additions to the archaeological record. The one from Level 2 is cf. *Rabdotus dealbouts;* from Level 12, *Zonitoides* (Brian Lang, New Mexico Game and Fish Department, personal communication, January 1997).

Utilization through Time

To examine the faunal assemblage, information from the ceramic and lithic artifact analyses was used to assign the excavation levels to three groups. Ceramics were recovered from Levels 1 through 7, while the lithic assemblage indicates a technological break between Levels 9 and 10. Lithic artifacts above Level 10 reflect an expedient technology and materials typical of sedentary groups, while Level 10 and below are a curated technology more like that of mobile hunters. Thus, for comparative purposes, the fauna is examined in units consisting of Levels 1-7, Level 8 and 9, and Levels 10-12.

The most obvious difference in the three samples (Table 21) is in the quantity of bone. Seventy centimeters of fill associated with the ceramic occupation produced only 26 faunal specimens, with a range of 2 to 7 specimens per level. The intermediate sample, representing 20 cm of fill, recovered 17 specimens (n=6 and 11), while the lowest, probably Archaic deposits occupy only 30 cm but contribute 151, or 77.8 percent, of the fauna recovered (n= 60, 51, and 41). The most diversity in taxa occurs in the Archaic sample. This is as expected, since the number of taxa in a sample is highly correlated with the sample size. In most archaeological assemblages, a few taxa are very abundant, while most are represented by small numbers and require larger samples to detect rare taxa (Grayson 1984:132-134).

Table 21. Taxa by level groupings

Taxon	Levels 1-7		Levels 8-9		Levels 10-12		Totals	
	n	%	n	%	n	%	n	%
Small mammal medium-large bird	1	3.8			9	6.0	10	5.2
Small mammal					6	4.0	6	3.1
Small to medium mammal	3	11.5	2	11.8	6	4.0	11	5.7
Medium mammal	1	3.8	1	5.9			2	1.0
Medium to large mammal	1	3.8	3	17.6	31	20.5	35	18.0
Large mammal	14	53.8	10	58.8	76	50.3	100	51.5
Prairie dog			1	5.9	1	.7	2	1.0

Red squirrel					1	.7	1	.5
Wood rat					3	2.0	3	1.5
Medium to large rodent					2	1.3	2	1.0
Cottontail					1	.7	1	.5 g
Gray fox	1	3.8					1	.5
Medium artiodactyl	3	11.5			9	6.0	12	6.2
Large artiodactyl	1	3.8					1	.5
Cervid					1	.7	1	.5
Deer					1	.7	1	.5
Medium bird					1	.7	1	.5
Egg shell					2	1.3	2	1.0
Mollusk	1	3.8			1	.7	2	1.0
Totals	26	13.4	17	8.8	151	77.8	194	100.0

When the taxa are grouped by body size (Table 22), large animals comprise the largest proportion in all samples, with a slight decrease from the earliest to the latest sample (79.7, 76.5, and 76.0 percent). Small mammals contribute equivalent amounts of the ceramic and Archaic samples, with most of the variation in the medium and large sizes. Considering the size of the samples, the numbers are remarkably similar and suggest little variation in the relative use of species through time.

Table 22. Summary of observations by level

Observation	Levels 1-7		Levels 8-9		Levels 10-12		Totals	
	n	%	n	%	n	%	n	%
Proportion by size* Small animals	4	16.0	1	5.9	24	16.2	29	15.3
Medium animals	2	8.0	3	17.6	6	4.0	11	5.8
Large animals	19	76.0	13	76.5	118	79.7	150	78.9
Animal age* Immature					1	.7	1	.5
Juvenile			1	5.9	2	1.3	3	1.6
Mature	24	100.0	16	94.1	146	97.3	186	97.9

Environmental alteration Pitted/corroded	7	26.9			24	15.9	31	16.0
Checked/exfoliated	1	3.8	5	29.4	21	13.9	27	13.9
Root etched	3	11.5	2	11.8	6	4.0	11	5.7
Animal alteration Rodent					1	.7	1	.5
Possible alteration	1	3.8	1	5.9			2	1.0
Completion complete	1	3.8			1	.7	2	1.0
50-75% complete					1	.7	1	.5
25-50% complete			1	5.9	2	1.3	3	1.5
< 25% complete	25	96.2	16	94.1	147	97.4	188	96.9
Burning Scorch/brown	2	7.7	3	17.6	6	4.0	11	5.7
Brown/black	2	7.7					2	1.0
Sooted/black	6	23.1	4	23.5	51	33.8	61	31.4
Calcine/white	2	7.7	2	11.8	16	10.6	20	10.3
Processing Cuts					3	2.0	3	1.6
Impact break	3	12.0					3	1.6
Spiral break	3	12.0	2	11.8	7	4.7	12	6.3

* Egg shell and mollusks are not included.

This, of course, presumes that the deposits are mostly, if not entirely the result of human deposition. At Fallen Pine Shelter, this is a fairly reasonable assumption. While both woodrats and carnivores are represented in the faunal assemblage, there is little direct evidence that either taxa greatly altered the content. Possible animal alteration by an unknown agent was observed on one specimen each from the ceramic and intermediate samples and rodent gnawing on a single element from the Archaic sample. Woodrats also redistribute bones. In one experiment over half of the bones placed in a cave were moved up to 5 m from where they had been left. Few bones in a woodrat nest display evidence of gnawing that would indicate activity by these rodents (Lyman 1994:193-194). Similarly, owls roosting in caves and rockshelters leave behind pellets containing bones and teeth, and raptors tend to accumulate more juvenile than mature rabbit bones (Lyman 1994:197-198). Bone from carnivore scat is highly fragmented, rarely more than 1 cm in size, and may display punctures from gnawing or digestive corrosion (Lyman 1994:205-206). While any or all of these agents may have contributed or displaced bone within Fallen Pine Shelter, there is no evidence of a substantial effect on this limited sample (Table 22).

There is some evidence that animals were processed and prepared differently in the preceramic and ceramic periods (Table 22). Selection of taxa and age groups appears similar, because both groups relied heavily on mature large-sized animals. In terms of processing, small fragments predominate throughout. The only complete specimens are the intrusive mollusk shells. Cut marks were found only in the preceramic assemblage, while the ceramic sample has proportionally more impact and spiral breaks. This could indicate differences in processing; however, a much larger sample will be necessary to confidently identify any patterning. Preparation and discard, as viewed from burning, also differs slightly. Ceramic period deposits have more scorched or scorched and sooted bone indicative of roasting. More sooted and calcine bone was recovered from the preceramic deposits, which could indicate differences in processing, that bone was habitually discarded into the fire, or that preservation favors burned bone in these older deposits. Again, a larger sample is needed to explore these differences.

Species Composition of Partially Carbonized Wood from LA 110339, by Mollie S. Toll

The three samples of partially carbonized wood collected from the shelter were dominated by a conifer type judged to be ponderosa pine. The configuration of rings resembles that of ponderosa very closely, with an abrupt transition between early and late wood, and a significant late wood band. Few resin ducts were discernible, however, and these should be large, surrounded by thin-walled epithelial cells, and distributed chiefly in the late wood and the latter part of early wood. I was not happy with these specimens. Without more abundant, clear resin ducts I can only honestly give them an "undetermined conifer" designation. They do *not,* however, conform to either of the regional genera that lack resin ducts (*Juniperus, Abies*), and ponderosa is the best overall match.

FS 6 from Levels 3 and 4 contained a single fragment of carbonized oak wood (Table 23).

The sample of material recovered from Fallen Pine Shelter demonstrates that LA 110339 has the potential to contribute to our knowledge and understanding of prehistoric adaptations in south-central New Mexico. Too small to have housed more than a few persons, and probably during the snow-free time of the year, the site was repeatedly used for thousands of years. While no direct evidence of more recent use was found, detecting Apache use of the site may require absolute dating of upper-level materials and a further examination of lithic materials and technology. Ceramic period use is evidenced by ceramics, lithic artifacts characteristic of an expedient technology, and a relatively sparse faunal accumulation, all of which suggest use by populations that were largely dependent on agriculture. Deeper deposits, probably from the Archaic period, have a lithic technology characteristic of mobile hunters and gatherers and larger quantities of bone.

Repeated use of Fallen Pine Shelter by groups with distinct economic and mobility strategies indicates that Cherokee Bill Canyon provided a set of resources attractive to both groups or served as a corridor for movement from the Sierra Blanca region to the Tularosa

Basin and other western resource and exchange areas. Data recovery at Fallen Pine Shelter should provide the information to evaluate a number of problem domains.

Table 23. Wood species composition

Species	FS 4 Level 3	FS 6 Levels 3 and 4	FS 10 Level 8
Undetermined conifer cf. *Pinus ponderosa*	1 122.08 g	10 6.47 g	15 4.58 g
Quercus oak		1 .80 g	

The most basic questions that will be addressed with information generated by the data recovery phase of this project concern how groups with varying adaptations utilize the same locale and what this reveals about regional economic systems and social relationships. Use of this shelter, which could not have served as a full-time residence, implies some degree of mobility for all those who utilized this locale. At an elevation of 2,120 m (6,980 feet) in a ponderosa pine forest, Fallen Pine Shelter has a floor area of about only 6.25 sq m. Yet, this small shelter was utilized, and utilized repeatedly, for thousands of years. As a potential resource extraction area or way station between the Sierra Blanca region and the Tularosa Basin, the shelter provides a record of long-term and perhaps changing use of Cherokee Bill Canyon.

Previous inhabitants of the area faced a number of constraints. South-central New Mexico is characterized by severe weather and short growing seasons in the mountains, while lowlands have variable water supplies and resources that tend to be scattered and subject to fluctuations in quality and quantity. These conditions are most effectively utilized by groups that exploit large regions and are highly mobile (Prince 1980c:80). While we cannot hope to reconstruct a complete record of the prehistoric groups using Cherokee Bill Canyon, this project can contribute to our understanding of the role of high-elevation resources in their economies.

Far more attention has been paid to hunter gatherer mobility than to that of agricultural groups. The most common framework for describing hunter gatherer subsistence and mobility is a continuum with foragers at one end and collectors at the other. Foragers occupy seasonal residences that are moved with respect to seasonal resource availability. Storage is not practiced, and members of the group range out from the base, taking food on an encounter basis, returning to the base for processing and consumption. Such a system produces two kinds of sites: a residential base where most processing, manufacture, and maintenance occurs; and a location where extractive tasks are carried out. Locations are scattered over the landscape and of short duration, so few tools or other materials accumulate. Collectors rely more on a logistic strategy in which resources are gathered by task groups comprised of skilled individuals who leave camp for extended periods to acquire specific resources. Storage is practiced. Collectors produce not only residential bases and locations, but also field camps or temporary centers of operations where they eat, sleep, and maintain their tools; stations or information gathering locales such as hunting stands; and caches or field storage facilities (Binford 1983:339-346).

Others have built on this framework and incorporated ethnographic data to develop general principals and expectations (e.g., Chatters 1987; Dean 1984). For example, the residential camps of foragers taking resources on an opportunistic basis should display more variability in taxa acquired than a task force seeking a narrow range of resources and operating out of a field camp (Chatters 1987:343-345).

Examining prehistoric use of southwestern mountain areas, Dean (1984) notes that hunter gatherers exploit high-altitude resources somewhat differently from agriculturalists, especially when the resources sought are concentrated. When resources are concentrated, hunter and gatherers locate their residential bases near these concentrations, and camps are used repeatedly producing visible indications. Agriculturalists, whose residences cluster in arable areas, also exploit concentrated resources from base camps but return the resources to the residential site. Their base camps are of shorter duration but are again repetitive. Both hunters and gatherers and agriculturalists exploit dispersed or mobile resources through task groups that leave scattered short-term and largely invisible sites (Dean 1984:13-14).

While most researchers accept that agriculturalists also depend on hunting and gathering to meet their resource needs, the role of these alternative resources and degree of mobility required is a frequent topic of discussion. Mobility and diversification are often viewed as coping strategies rather than integral parts of the subsistence system of agricultural groups (e.g., Minnis 1996:60; Rautman 1990:211). Others postulate the existence of parallel economies in southeastern New Mexico during the ceramic period, one practicing agriculture, the other retaining a hunting and gathering adaptation (Sebastian 1989c:83-84).

Material recovered from Fallen Pine Shelter indicates that the site contains data that can be used to address prehistoric mobility and economic strategies in southcentral and southeastern New Mexico. Both the lithic and the faunal data demonstrate that the ceramic and preceramic occupations were distinctly different in both respects. Data recovery and the analysis will focus on defining these differences and their implications.

Problem Domains

Research concerns for LA 110339 fall into three general categories or problem domains: chronology, assessment of site function, and regional settlement systems.

Chronology

Dating and chronology are always important issues in prehistoric research. Before we can compare the adaptations of the occupants of Fallen Pine Shelter, these must be defined and related to site stratigraphy. Special efforts are needed to determine if there is an Apache component to the site. Analysis of the upper level materials from the test pit gave no such indications. Chronometric dating methods (radiocarbon and tree ring dating) may be the best means to identify a relatively late use of the shelter.

Ceramic period deposits are dominated by long-lived brown wares and poorly dated painted wares. Chronometric dating in conjunction with relative dating based on ceramic assemblages from nearby sites will help to determine the span of use by agricultural populations. Ceramic-bearing levels comprise much of the test pit fill and could represent use over the entire ceramic period or more intensive use during the late Glencoe phase. A better understanding of chronology is necessary to relate the deposits to regional climatic patterns affecting agriculturalists.

The Archaic period, spanning a 6,000 to 7,000 year period, allows ample room for differing strategies. Absolute dates will help define the character and duration of Archaic use of higher altitudes in the Sacramento Mountains. It will also determine if even older deposits exist.

Assessment of Site Function

Cherokee Bill Canyon and LA 110339 probably served a number of needs throughout prehistory. Detailed examinations of the fauna and macrobotanical remains will provide an idea of the available resources, the seasons when they were utilized, and the extent to which they were processed for use at the site or to return to a base or residential site. Rates of trash deposition, the features present, and ground stone, lithic, and bone tool assemblages will provide additional information on the range of tasks carried out, group composition, and duration of occupation.

Once the activities represented at the site are defined and related to the chronological components, we can begin to determine the nature of use and changes in subsistence, mobility, and social interaction. Our test pit artifact data indicates that the ceramic period occupants were agriculturalists who had contacts with groups occupying much of southern New Mexico. Their use of Cherokee Bill Canyon could be either as a regular resource extraction zone where resources were hunted or collected and returned to residential sites, or as a stopping spot along an established exchange route. Similarly, the lower deposits were left by mobile hunters and gatherers. Whether their use of Cherokee Bill Canyon was more as foragers, repeatedly visiting the same area because of resources available and as part of an established seasonal round, or as collectors ranging out from a base to collect a seasonally available resource, is yet to be established.

Regional Settlement Systems

The final research domain involves integrating the chronological and site function data with that from the region as a whole. Data from ceramic period residential sites is far more common that from resource-extraction or other limited-activity sites and undoubtedly provide a biased view of subsistence and regional interaction. Data from all kinds of sites are needed to complete our understanding of how agriculturalists utilize their effective environments. Comparing classes of data for similarities and differences for residential and limited-use sites should help to identify the ranges covered on a habitual basis as well as to trace more occasional interactions with distant groups.

Archaic ranges, group sizes, and subsistence should be addressed at a regional level. Abundance and predictability of critical resources often determine patterns of utilization

(Dyson-Hudson and Smith 1978:25) at the local and regional levels. Data concerning resource availability and procurement of resources from Fallen Pine Shelter can be compared with other sites with similar dates to help reconstruct seasonal patterns of utilization within a region.

Field Methods

Data recovery at Fallen Pine Shelter provides a unique opportunity to examine high-altitude adaptations over a relatively long time span. Test excavations indicate that the data necessary to address questions concerning mobility among a range of economic strategies exists in this one location. Because there is a unique opportunity to provide important information on the prehistory of southeastern New Mexico, and because the site will be lost during the road widening project, we are proposing considerable excavations (about 80 percent).

Gridding the shelter and midden into 1 m units results in approximately 10 grids within the shelter and 35 grids in the midden (Fig. 13). Data recovery will begin by establishing a 1 by 1 m grid system and determining the elevation of each northwest corner stake in relation to a site datum for horizontal control. Next, a line of test pits will be excavated to provide a continuous profile of the midden area and eventually the shelter. Because excavations will be deep, OSHA regulations require stepping back the excavations to allow quick exit in case of collapsing trench walls. The grids comprising the primary stratigraphic trench will be excavated to a depth no greater than 1.2 m before those grids immediately to the east and west are excavated in steps to help prevent collapse of the trench sides. This will require that the profile be executed in at least two stages. Side grids will be excavated to a depth of about 50 cm to allow reasonable steps. A sample of these will also be excavated to greater depths to collect a sufficient sample of Archaic material. In addition, all grids within the shelter and within three meters of the shelter entrance will be excavated to sterile. These grids should have the greatest potential of containing features.

Our test pit excavation suggests that there are no clearly demarcated stratigraphic breaks. Activity areas within shelters and middens may be evidenced by no more than an array of flat-lying rocks (Glen Greene, personal communication, December 1996). Examination of the stratigraphic profile by a soils geologist will be an integral part of interpreting the fill sequence and determining excavation strategies.

Excavations will be in 1 m grids and in 10 cm levels unless stratigraphic units or features are defined. All fill will be screened through no larger than one-quarter inch mesh. The profile trench, shelter grids, and a sample of the grids near the entrance and more distant grids will also be passed through one-eighth inch screen to recover small fragments of bone, lithics, and macrobotanical remains. Fine screening was part of our testing procedures and was especially time consuming. Small pieces of bone and rock were coated with clay and could not be distinguished until the material had dried. To expedite this process, residue in the eighth-inch screen will be collected and sorted at a later time. OAS excavation unit forms will be completed for each level of each grid. The main trench profile will serve as the north-south profile for the site. East-west profiles will be produced for a line of grids in front of the shelter

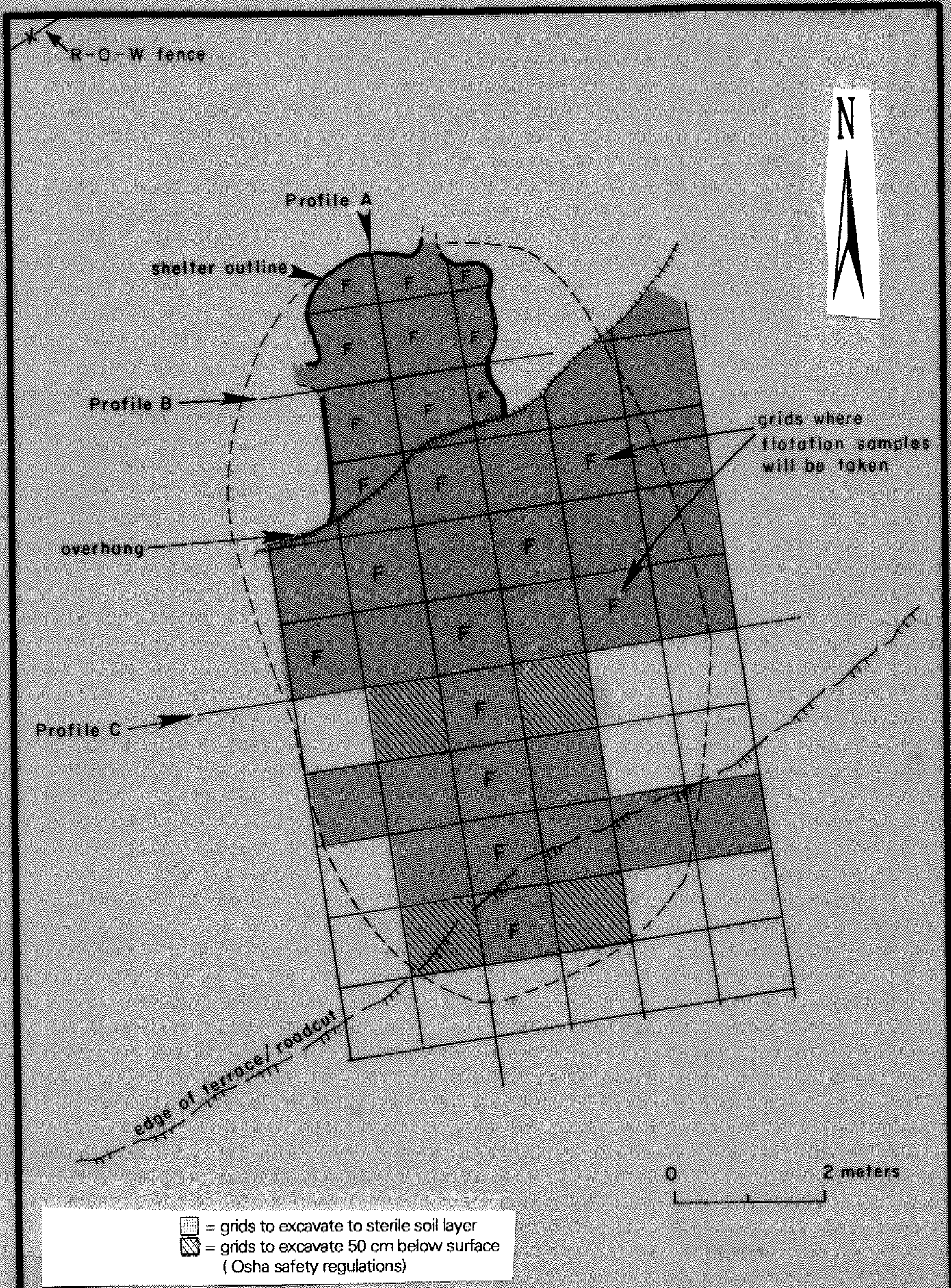

Figure 13. Profile location and flotation sample units at LA 110339.

and from within the shelter. Grids within the shelter will be profiled when they provide additional information. The main profile will pass through the shelter for a continuous record of the back wall of the shelter to the foot of the midden. All significant artifacts, such as large pieces of ground stone, projectile points, and perishable objects will be located in horizontal and vertical space (point plotted) when encountered. Bulk material (ceramics, lithic artifacts, and bone) will be collected by grid and level. Should perishable materials such as baskets and sandals be encountered, the OAS staff and museum conservation personnel will be consulted on the best means of preservation. A variety of packing material and containers will be on hand, and this material will be handled so as to preserve as much as possible.

All material recovered from features will be screened through one-eighth inch mesh. Features will be excavated, when possible, to provide a profile of the fill. Fill within deep features will be removed in 10 cm levels or by natural stratigraphic units. Each feature will be profiled, mapped, and recorded using standard OAS feature forms.

Macrobotanical sampling will consist of flotation samples taken from all features, each level of every grid in the profile trench, every grid and level within the structure, and every other grid in the entrance area (see Fig. 13). Pollen columns will be taken from the profile trench both outside and inside the shelter and from unburned features. Radiocarbon samples will be taken whenever a concentration of charcoal may be adequate for dating.

At the request of the Mescalero Apache tribe, a Native American observer will be present throughout the excavations. Caves and rockshelters are common sites of ceremonies and offerings, and a qualified observer will determine the treatment of potential ceremonial materials and human remains as they are encountered.

Analysis Methods

Prior to analysis, all material will be cleaned, and those requiring conservation will be treated. The assemblage will be analyzed by general artifact categories including ceramics, lithics, ground stone, fauna, and macrobotanical and flotation remains. At the conclusion of the analysis, the artifacts, nonartifactual samples, and site and artifact documentation will be returned to the Mescalero Tribe.

Laboratory analysis will be conducted by the Office of Archaeological Studies staff and qualified professional consultants. Established analytical procedures and formats, several of which are described in the testing analysis of this report, will be utilized to address aspects of the problem domains.

Feature and Stratigraphic Information

Feature and stratigraphic information provide basic information on the duration and type of occupancy. Large accumulations of debris imply long-term or repeated utilization of an area. When scarce, materials such as fire-cracked rock are reused and provide an unconventional source of data on availability and daily ranges. Numbers and types of features can indicate repeated occupancy: the more repeated the occupancy the more disruptive of feature integrity (Chatters 1987:346). Careful examination of feature and trash disposal helps in determining the nature of the occupation and how this changed over time.

Ceramic Artifacts (C. Dean Wilson)

The analysis will address questions of when, where, and how Fallen Pine Shelter was utilized during the ceramic period. Methods, definitions, and practices will follow those outlined in the testing result section above.

*Dating.*Future studies will include a careful examination of dating information from investigations in surrounding areas. These will examine dating assignments from nearby sites with similar assemblages as well as the dating arguments based on the associated types. In particular, close attention will be directed towards the arguments concerning an ending date for Mimbres Black-on-white and beginning date for Chupadero Black-on-white.

Data from data recovery investigations at LA 110339 may provide additional information concerning ceramic change and dating in this area. Distribution of types and attributes from stratigraphic sequences will be used to examine potential temporal changes in ceramics.

Exchange and Typology. As spatially sensitive attributes such as paste and temper have long been used to define regional types, issues concerning typology and ceramic exchange are closely linked. For example Jornada region brown wares have been divided into spatially sensitive types based on slight difference in paste and granitic temper. The differences between Middle Pecos, El Paso, and Jornada Brown Wares, as previously defined, are based on the relative color and size of temper fragments. An important question is whether regional differences are in fact represented or if variation within various regional sources may be represented. Petrographic analysis may provide important information concerning both the identification of local versus nonlocal brown wares, as well as the appropriate regional typology for ceramic items recovered.

It is very likely that various painted types were produced in other regions and represent exchange with these groups or seasonal use of this locality by groups from other regions. Determination of the area of origin of painted types will provide important information on the nature of exchange and regional interaction. Therefore, the visual and petrographic characteristics of temper in Mimbres Black-on-white, Chupadero Black-on-white, El Paso Polychrome, and other painted wares will be compared with information about these types from sites in other regions. A comparison of the dominant temper in probable local brown wares and decorated wares will also be used to help determine if some decorated vessels could have been locally produced.

Collections and characterizations of samples from potential clay and temper sources near LA 110339 may also help identify local versus nonlocal ceramics. Extensive photo documentation of painted and unpainted wares will aid other researchers in identifying these wares.

Vessel Form and Function. The LA 110339 assemblage is dominated by plain brown wares. While a variety of forms and treatments are represented, most brown wares are polished on both sides. The fairly wide range of ware groups and traditions may reflect a wide range of uses associated with ceramics exhibiting various pastes, treatments, and forms. As much as possible, vessel form and wall thickness data will be used to assess mobility. Recent studies suggest that sedentary groups produce larger, heavier vessels that are less portable than those of more mobile groups. But in some areas, thermal characteristics rather than portability were important in ceramic manufacture, and vessel size and wall thickness provide clues to what was processed (Whalen 1994:8).

Lithic Artifacts

Analysis of the chipped stone artifacts will follow the procedures outlined in the testing results section of this report. This will provide information on material selection, reduction technology, and tool use.

Material Selection. Material type, texture, and presence of cortex provides information on selection and whether the material was procured near the site or from more distant locations. Distinctive, nonlocal materials reflect the scale of mobility and interactions within the region.

Highly mobile groups tend to carry a limited number of tools, which may be smaller, lighter, and more multifunctional than those of less mobile groups (Shott 1986:19-20). Under such constraints, selection for materials suited to a variety of uses should be reflected in the materials selected. Groups with larger ranges have more opportunity to select suitable material resulting in the use of higher-quality local and nonlocal materials appropriate for the anticipated tasks. Exotic materials can serve as a measure of the scale of mobility (Binford 1983:275).

Analysis of the test pit material from LA 110339 shows differences in material selection between the upper or ceramic period and lower or Archaic period assemblages. More chert and obsidian are found in the Archaic component, indicating selection for flakability and sharpness, while the ceramic component has more durable materials. The larger assemblage from the data recovery phase will allow us to determine if this trend continues and, hopefully, to address questions concerning the scale of mobility and factors influencing material selection.

Reduction Technology. Numerous researchers have found that highly mobile groups invest substantial amounts of labor in tool production and produce high-quality implements that can be used for a number of tasks. Implements of less mobile groups have little modification and are discarded when they become dull or the task is completed (Whalen 1994:9). This dichotomy is often referred to as curated and expedient technologies. Tools manufactured for future use and maintained, repaired, and recycled are curated tools. Expedient tools are produced when needed and used until dull, broken, or no longer needed (Chatters 1987:341). In the Southwest, curated strategies produce large unspecialized bifaces that were used for general chopping or cutting tasks, as cores for removing flakes for use as expedient tools, and as blanks. When bifaces are found in expedient technologies, these tend to be specialized in form and function (Moore, this volume).

As with material type, the LA 110339 test pit assemblage shows differences between the ceramic and Archaic components. The predominant strategy in the ceramic component was expedient, while that in the Archaic was focused on the manufacture of curated tools. If this distribution continues through the data recovery assemblage, we will be able to refine our observations on technology and address broader issues such as the degree of mobility.

Tool Use. The size of the tool inventory, as well as the tools themselves, is smaller when mobility reduces transport capacity. Tools also become less specialized and more multifunctional (Shott 1986:20). In contrast, when groups set out to perform a specific task, the tool kit may include specialized tools and facilities carefully designed for a certain food type (Chatters 1987:337).

The types and diversity of tools provides information on activities that occurred at the site and on site function. Sites where a number of resources are processed and those that are occupied for extended periods of time should display evidence of a greater number of tasks. Field camps, where a narrow range of resources was exploited or the occupation was of limited duration, should contain fewer tool types (Chatters 1987:341).

The small sample of lithic artifacts from LA 110339 produced two informal tools and three bifaces. A larger sample will provide better information on the range of activities that took place and how the shelter was used.

Ground Stone

No groundstone was recovered during testing. If any is recovered, the specimens will be examined for morphology, material type, manufacture, and evidence of specific processing activities using an established OAS format. Like lithic artifacts in general, characteristics of grinding implements have implications for mobility and provide information on the resources that were processed. For example, one-hand manos and basin metates were used for grinding wild seeds, while two-hand manos and trough metates indicate a heavy reliance on corn (Whalen 1994:9). Material selection, portability, and tool diversity will be used to address issues such as mobility, seasonality, resource exploitation, and group composition.

Fauna

The faunal remains will be analyzed using the methods described for the testing sample. Special attention will be paid to identifying the animals utilized, the season they were taken, the parts represented, and how the remains were processed.

In general, sedentary groups exploit a greater variety of animals than more mobile ones. They also depend more on smaller animals and use more traps, ambush hunting, and long-distance hunts (Kent 1989:3). Similarly, hunter-gatherer residential base camps from which groups hunt opportunistically should contain more diverse resources, while field camps are generally situated to acquire one or a few species (Chatters 1987:341). Species composition and seasonal implications for a larger sample of fauna from the shelter should provide information on differences in animal utilization over time. Comparison with assemblages from other sites (e.g. the Sierra Blanca Region), especially residential sites, should provide information on potential resources sought in Cherokee Bill Canyon. Speth and Scott's (1992:272) finding that Sierra Blanca sites show a shift toward greater use of large mammals, especially deer, can be examined from the perspective of a potential resource-extraction area.

Species behavior and habitat preferences (e.g., Tainter 1984:25-26) can be used to deduce the decision-making process inherent in deciding which animals to hunt, and on optimum group size and composition. Examining faunal data from the Sierra Blanca region, Driver (1985:59) found that assemblages from sites near extensive grasslands were dominated by pronghorn, while those near more dissected environs had more deer.

A great deal of attention has been devoted to determining which skeletal parts are returned to a habitation or campsite. The general assumption, at least with larger animals, is that not all parts will be transported back to camp and that the parts left at the kill site are those with the least utility, generally those with small amounts of usable meat. This concept has been refined somewhat so that the variability in relative frequencies of parts is viewed as resulting from different strategies in the use of foods (Lyman 1994:224-225). Observations of modern hunter and gatherers have been used to produce indices reflecting the parts actually transported (Lyman 1994:234). When combined with data concerning survivorship of parts, these approaches may be useful in comparing the assemblages at Fallen Pine Shelter, where the upper and lower deposits appear to reflect differences in mobility.

Bone fragmentation is often viewed as a measure of the degree of processing. Since consumption occurs proportionately more often at base and residential camps, and less often at field or logistic camps oriented to animal procurement, there should be measurable differences in the assemblages from these site types. Bone fragmentation may also serve as an indicator of food shortage, so that bone crushing and marrow extraction is more likely when resources are low (Chatters 1987:344). Much of the Fallen Pine Shelter assemblage is small fragmented bone, presumably resulting from extensive processing. Analysis of a larger sample should provide information on discrete areas of processing and differences in processing over time. This data can be compared with that from other sites in the region to gain perspectives on processing at residential versus that at limited activity sites.

Botanical

The macrobotanical sampling strategy was designed to provide information on the resources utilized by shelter inhabitants and on their discard practices. Plant remains provide information on the kinds of resources sought, utilized, and perhaps brought to the shelter. Crucial to our understanding is determining the season or seasons of occupation and plant use.

Macrobotanical remains collected through water flotation will be analyzed for species mix, collecting and processing methods, and seasonality. Special emphasis will be placed on determining the species diversity and changes in diversity through time. Other macrobotanical remains will supplement this data.

Material densities will be monitored to provide information on the quantity and spatial distribution of lost and discarded plant remains. Intensive analysis of material from the profile trench and other sample grids will provide baseline data for future research. Dispersal and preservation can be quantified and will serve as a guide for future sampling and analyses of midden material.

Dry caves and shelters often contain quantities of perishable materials rarely found in open air prehistoric sites. Fresnal Shelter, a much larger shelter between the Tularosa Basin and the Sacramento Mountains, produced plant remains from over 50 species (Bohrer 1973:211-218), as well as coiled basketry, and twilled and twined matting (Allan 1973:403-405). Another, much larger shelter, Hermit's Cave in the Guadalupe Mountains, contained sandals, coiled basketry, matting, cording, netting, fiber bundles, and grass rings (Ferdon 1946:7). If materials of this type are found, they will be analyzed for the materials that went into their construction as well as for technological attributes.

Human Remains

If human remains are encountered, treatment will be determined by the Native American observer and the Mescalero Apache Tribe. The OAS field crew will include a human osteologist who can make observations on age, sex, and health status as allowed by the tribe. Procedures will follow Museum of New Mexico burial policy (Appendix 2).

Research Results

A final report on the excavations and analysis will be published in the Office of Archaeological Studies Archaeology Notes series. This report will describe the excavations, analyses, and interpretive results. Multiple data sets are needed to address complex issues concerning human adaptation, and this report will endeavor to integrate the unique perspectives of each into a comprehensive assessment of the human use of Fallen Pine Shelter.

REFERENCES CITED

Allan, William C.
1973 General Description of the Basketry from Fresnal Shelter. In *Technical Manual: 1973 Survey of the Tularosa Basin: The Research Design*, pp. 403-405. Human Systems Research, Albuquerque.

Bamforth, Douglas B.
1989 Settlement, Raw Material, and Lithic Procurement in the Central Mojave Desert. *Journal of Anthropological Archaeology* 9:70-104.

Basehart, Harry W.
1973 Mescalero Apache Subsistence Patterns. In *Technical Manual: 1973 Survey of the Tularosa Basin: The Research Design*, pp. 145-181. Human Systems Research, Albuquerque.

Beckner, Morton
1959 *The Biological Way of Thought.* Columbia University, New York.

Binford, Lewis R.
1983 *Working at Archaeology*. Academic Press, New York.

Bohrer, Vorsilla L.
1973 Tentative List of Utilized Plant Remains from Fresnal Shelter. In *Technical Manual: 1973 Survey of the Tularosa Basin: The Research Design*, pp. 211-218. Human Systems Research, Albuquerque.

Broster, John B.
1980a Projectile Point Analysis. In *A Cultural Resource Management Plan for Timber Sale and Forest Development Areas on the Mescalero Apache Indian Reservation*, edited by Bruce G. Harrill, pp. 93-103. Forestry Archeology Program, Bureau of Indian Affairs, Albuquerque Area Office, Albuquerque.

1980b Historic Site Typology. In *A Cultural Resource Management Plan for Timber Sale and Forest Development Areas on the Mescalero Apache Indian Reservation*, edited by Bruce G. Harrill, pp. 133-143. Forestry Archeology Program, Bureau of Indian Affairs, Albuquerque Area Office, Albuquerque.

Broster, John B., and Al Dart
1980 Summary. In *A Cultural Resource Management Plan for Timber Sale and Forest Development Areas on the Mescalero Apache Indian Reservation*, edited by Bruce G. Harrill, pp. 77-78. Forestry Archeology Program, Bureau of Indian Affairs, Albuquerque Area Office, Albuquerque.

Broster, John B., and Bruce G. Harrill
1983 Investigations of Prehistoric Remains at High-Altitudes in the Sacramento Mountains of South-Central New Mexico. In *High Altitude Adaptations in the Southwest*, edited by Joseph C. Winter, pp. 159-167. Cultural Resources Management Report No. 2. USDA Forest Service, Southwestern Region.

Chatters, James C.
1987 Hunter-Gatherer Adaptations and Assemblages. *Journal of Anthropological Archaeology* 6:336-375.

Crabtree, Don E.
1972 *An Invitation to Flintworking*. Occasional Papers of the Idaho State Museum No. 28. Pocatello.

Dart, Al
1980 Animal Resources. In *A Cultural Resource Management Plan for Timber Sale and Forest Development Areas on the Mescalero Apache Indian Reservation*, edited by Bruce G. Harrill, pp. 36-45. Forestry Archeology Program, Bureau of Indian Affairs, Albuquerque Area Office, Albuquerque.

Dean, Jeffrey S.
1984 Environmental Aspects of Modeling Human Location Behavior. In *Stage 1 Site Locational Modeling in the Southwestern Region*, edited by Linda S. Cordell and Dee F. Green, pp. 8-20. Cultural Resources Management Report No. 5. USDA Forest Service, Southwestern Region.

Dodge, William A.
1980 Prehistory of the Sacramento Mountains. In *A Cultural Resource Management Plan for Timber Sale and Forest Development Areas on the Mescalero Apache Indian Reservation*, edited by Bruce G. Harrill, pp. 48-52. Forestry Archeology Program, Bureau of Indian Affairs, Albuquerque Area Office, Albuquerque.

Driver, Jonathan C.
1985 *Zooarchaeology of Six Prehistoric Sites in the Sierra Blanca Region, New Mexico*. Research Reports in Archaeology, Contribution 12. Museum of Anthropology, University of Michigan Technical Reports No. 17. Ann Arbor.

Dyson-Hudson, Rada and Eric Alden Smith
1978 Human Territoriality: An Ecological Reassessment. *American Anthropologist* 80:21-41.

Fenneman, Nevin M.
1931 *The Physiographic Provinces of the Western United States*. McGraw-Hill, New York.

Ferdon, , Edwin N., Jr.
1946 *An Excavation of Hermit's Cave, New Mexico.* Monographs of the School of American Research, University of New Mexico Press, Albuquerque.

Findley, James S, Arthur H. Harris, Don E. Wilson, and Clyde Jones
1975 *Mammals of New Mexico.* University of New Mexico Press, Albuquerque.

Grayson, Donald K.
1984 *Quantitative Zooarchaeology: Topics in the Analysis of Archaeological Faunas.* Academic Press, Orlando.

Harrill, Bruce G. (editor)
1980 *A Cultural Resource Management Plan for Timber Sale and Forest Development Areas on the Mescalero Apache Indian Reservation.* Forestry Archeology Program, Bureau of Indian Affairs, Albuquerque Area Office, Albuquerque.

Hayes, Alden C.
1981 *Excavation of Mound 7, Gran Quivera National Monument, New Mexico.* National Park Service Publications 16. Washington, D.C.

Hertel, Joelle
1980 Early Statehood Period to Present. In *A Cultural Resource Management Plan for Timber Sale and Forest Development Areas on the Mescalero Apache Indian Reservation*, edited by Bruce G. Harrill, pp. 72-73. Forestry Archeology Program, Bureau of Indian Affairs, Albuquerque Area Office, Albuquerque.

Hill, David V.
1996 Ceramics for the Diamond-Shamrock Natural Gas Pipeline Project: West Texas and Southeastern New Mexico. Report on file, Office of Archaeological Studies.

Hohmann, John W.
1995 *A Phase I (Class III) Archaeological Survey of 5.5 miles Along U.S. 70, Lincoln and Otero Counties, New Mexico.* Cultural Resource Group Report No. 45. Louis Berger & Associated, Albuquerque.

Jelinek, Arthur J.
1967 *A Prehistoric Sequence in the Middle Pecos Valley, New Mexico.* Anthropological Papers No. 31. Ann Arbor: Museum of Anthropology, University of Michigan.

Jennings, Jesse D.
1940 *A Variation of Southwestern Pueblo Culture.* Technical Series Bulletin No. 19. Laboratory of Anthropology, Museum of New Mexico, Santa Fe.

Keesling, Henry S.
1980 Past Climate. In *A Cultural Resource Management Plan for Timber Sale and Forest*

Development Areas on the Mescalero Apache Indian Reservation, edited by Bruce G. Harrill, pp. 44-46. Forestry Archeology Program, Bureau of Indian Affairs, Albuquerque Area Office, Albuquerque.

Kelley, Jane Holden
1984 *The Archaeology of the Sierra Blanca Region of Southeastern New Mexico*. Anthropological Papers No. 74. Museum of Anthropology, University of Michigan, Ann Arbor.

Kent, Susan
1989 Cross-cultural Perceptions of Farmers as Hunters and the Value of Meat. In *Farmers as Hunters*, edited by Susan Kent, pp. 1-17. Cambridge University Press, Cambridge.

Lehmer, Donald J.
1948 *The Jornada Branch of the Mogollon*. Social Science Bulletin No. 17. University of Arizona, Tucson.

Lyman, R. Lee
1994 *Vertebrate Taphonomy*. Cambridge University Press, Cambridge.

Martin, William C.
1964 Some Aspects of the Natural History of the Capitan and Jicarilla Mountains, and Sierra Blanca Region of New Mexico. *Guidebook of the Ruidoso Country*, edited by Sidney R. Ash and Leon V. Davis. New Mexico Geological Society, Fifteenth Field Conference.

McKusick, Charmion R.
1986 Faunal Remains. In *The Archeology of Gila Cliff Dwellings*, by Keith M. Anderson, Gloria J. Fenner, Don P. Morris, George A. Teague, and Charmion McKusick, pp. 245-272. Publications in Anthropology 36. Western Archeological and Conservation Center, National Park Service, Tucson.

Mera, H. P.
1931 *Chupadero Black on White*. Laboratory of Anthropology Technical Series Bulletin No. 1. Santa Fe.

Minnis, Paul E.
1996 Notes on Economic Uncertainty and Human Behavior in the Prehistoric North American Southwest. In *Evolving Complexity and Environmental Risk in the Prehistoric Southwest*, edited by Joseph A. Tainter and Bonnie Bagley Tainter, pp. 57-78. Vol. 14, Proceedings, Santa Fe Institute Studies in the Sciences of Complexity. Addison-Wesley, Reading.

Moore, James L.
n.d. Analysis of the Chipped Stone Assemblages. In *Prehistoric and Historic Occupation*

of Los Alamos and Guaje Canyons: Data Recovery at Three Sites Near the Pueblo of San Ildefonso, by J. Moore, J. Gaunt, D. Levine, and L. Mick-O'Hara. Office of Archaeological Studies. Museum of New Mexico. Santa Fe.

Mueller, Jerry E.
1991 Climate of Cloudcroft-Ruidoso Country. In *Geology of the Sierra Blanca, Sacramento and Capitan Ranges, New Mexico*, edited by James M. Barker, Barry S. Kues, George S. Austin, and Spencer G. Lucas, pp. 2-3. Forty-second Annual Field Conference, New Mexico Geological Society.

Neher, Ramond E.
1976 *Soil Survey of Mescalero-Apache Area, New Mexico, Northeastern Otero County*. U.S. Soil Conservation Service and Bureau of Indian Affairs.

OAS (Office of Archaeological Studies)
1994 *Standardized Lithic Artifact Analysis: Attributes and Variable Code Lists*. Archaeology Notes 24c. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Opler, Morris E.
1983 Mescalero Apache. *Handbook of North American Indians*, vol. 10, *Southwest*, edited by Alfonso Oritz, pp. 419-439. Smithsonian Institution, Washington, D.C.

Opler, Morris E., and Catherine H. Opler
1950 Mescalero Apache History in the Southwest. *New Mexico Historical Review* 25(1):1-36.

Pray, Lloyd D.
1961 *Geology of the Sacramento Mountains Escarpment, Otero County, New Mexico*. Bulletin 35. New Mexico Bureau of Mines and Mineral Resources.

Prince, Patricia A.
1980a Climate. In *A Cultural Resource Management Plan for Timber Sale and Forest Development Areas on the Mescalero Apache Indian Reservation*, edited by Bruce G. Harrill, pp. 9, 13, 16-18. Forestry Archeology Program, Bureau of Indian Affairs, Albuquerque Area Office, Albuquerque.

1980b Lithic Analysis. In *A Cultural Resource Management Plan for Timber Sale and Forest Development Areas on the Mescalero Apache Indian Reservation*, edited by Bruce G. Harrill, pp. 103-118. Forestry Archeology Program, Bureau of Indian Affairs, Albuquerque Area Office, Albuquerque.

1980c Mescalero Apache: An Ethnographic Summary. In *A Cultural Resource Management Plan for Timber Sale and Forest Development Areas on the Mescalero Apache Indian Reservation*, edited by Bruce G. Harrill, pp. 79-83. Forestry Archeology Program, Bureau of Indian Affairs, Albuquerque Area Office, Albuquerque.

Rautman, Alison Eunice
1990 *The Environmental Context of Decision-Making: Coping Strategies among Prehistoric Cultivators in Central New Mexico*. Ph.D. dissertation, Department of Anthropology, University of Michigan.

Schroeder, Albert H.
1973 The Mescalero Apaches. In *Technical Manual: 1973 Survey of the Tularosa Basin: The Research Design*, pp. 124-144. Human Systems Research, Albuquerque.

Schutt, Jeanne A.
1980 The Analysis of Wear Patterns Resulting from the Use of Flake Tools in Manufacturing and Processing Activities: A Preliminary Report. In *Human Adaptations in a Marginal Environment: The UII Mitigation Project*, edited by J. Moore and J. Winter, pp. 66-93. Office of Contract Archeology, University of New Mexico, Albuquerque.

Sebastian, Lynne
1989a The Paleoindian Period. In *Living on the Land: 11,000 Years of Human Adaptation in Southeastern New Mexico*, by Lynne Sebastian and Signa Larralde, pp. 19-39. Bureau of Land Management Cultural Resources Series No. 6.

1989b The Archaic Period. In *Living on the Land: 11,000 Years of Human Adaptation in Southeastern New Mexico*, by Lynne Sebastian and Signa Larralde, pp. 41-57. Bureau of Land Management Cultural Resources Series No. 6.

1989c The Ceramic Period. In *Living on the Land: 11,000 Years of Human Adaptation in Southeastern New Mexico*, by Lynne Sebastian and Signa Larralde, pp. 73-92. Bureau of Land Management Cultural Resources Series No. 6.

Sebastian, Lynne and Frances Levine
1989 The Protohistoric and Spanish Colonial Periods. In *Living on the Land: 11,000 Years of Human Adaptation in Southeastern New Mexico*, by Lynne Sebastian and Signa Larralde, pp. 93-103. Bureau of Land Management Cultural Resources Series No. 6.

Shepard, Anna O.
1956 *Ceramics for the Archaeologist*. Publication 609. Carnegie Institute of Washington, Washington, D.C.

Shott, Michael
1986 Technological Organization and Settlement Mobility: An Ethnographic Examination. *Journal of Anthropological Research* 42(1):15-51.

Sollberger, J. B.
1986 Lithic Fracture Analysis: A Better Way. *Lithic Technology* 15:101-105.

Sonnichsen, C. L.
1958 *The Mescalero Apaches*. University of Oklahoma Press, Norman.

Speth, John D., and Susan L. Scott
1992 Late Prehistoric Subsistence Change in Southeastern New Mexico: The Faunal Evidence From Angus. In *Investigations into the Prehistory and History of the Upper Rio Bonito, Lincoln County, Southeastern New Mexico*, by Robin E. Farwell, Yvonne R. Oakes, and Regge N. Wiseman, pp. 259-319. Laboratory of Anthropology Notes 297. Museum of New Mexico, Santa Fe.

Spoerl, Patricia M.
1985 Mogollon Utilization of the Sacramento Mountains of Southcentral New Mexico. In *Views of the Jornada Mogollon*, edited by Colleen M. Beck, pp. 33-40. Contributions in Anthropology 12. Eastern New Mexico University, Portales.

Stallings, W.S.
1931 *El Paso Polychrome*. Laboratory of Anthropology Technical Series, Bulletin no. 3. Museum of New Mexico, Santa Fe.

Tainter, Joseph A.
1984 Foragers in the Southwestern Forests. In *Stage 1 Site Locational Modeling in the Southwestern Region*, edited by Linda S. Cordell and Dee F. Green, pp. 21-28. Cultural Resources Management Report No. 5. USDA Forest Service, Southwestern Region.

USDI (U.S. Department of the Interior)
1933 *Annual Report of the Secretary of Interior for the Fiscal year Ending June 30, 1933*. U.S. Department of the Interior, Washington, D.C.

Vaughan, Patrick C.
1985 *Use-Wear Analysis of Flaked Stone Tools*. University of Arizona Press, Tucson.

Walt, Henry J.
1980 Geology. In *A Cultural Resource Management Plan for Timber Sale and Forest Development Areas on the Mescalero Apache Indian Reservation*, edited by Bruce G. Harrill, pp. 5-9, 10-12, 14-15. Forestry Archeology Program, Bureau of Indian Affairs, Albuquerque Area Office, Albuquerque.

Whalen, Michael E.
1981 The Origin and Evolution of Ceramics in Western Texas. *Bulletin of the Texas Archaeological Society* 52:215-229.

1994 *Turquoise Ridge and Late Prehistoric Residential Mobility in the Desert Mogollon Region*. University of Utah Anthropological Papers No. 118. University of Utah Press, Salt Lake City.

Whittaker, John C.
1994 *Flintknapping: Making and Understanding Stone Tools*. University of Texas Press, Austin.

Wimberly, Mark L., and Peter L. Eidenbach
1981 Preliminary Analysis of Faunal Remains from Fresnal Shelter, New Mexico: Evidence of Differential Butchering Practices during the Archaic Period. In *Archaeological Essays in Honor of Mark Wimberly*, edited by Michael S. Foster. *The Artifact* 19(3, 4):20-68.

Wiseman, Regge N.
1982 The Intervening Years: New Information on Chupadero Black-on-white and Corona Corrugated. *Pottery Southwest* 9(4) 5-7.

APPENDIX 2: POLICY ON COLLECTION, DISPLAY, AND REPATRIATION OF CULTURALLY SENSITIVE MATERIALS

Office of Cultural Affairs
Museum Division
(Museum of New Mexico)
P.O. Box 2087, 113 Lincoln Ave.
Santa Fe, New Mexico 87504

Rule No. 11 **POLICY ON COLLECTION, DISPLAY AND REPATRIATION OF CULTURALLY SENSITIVE MATERIALS** Adopted: 01/17/91

I. INTRODUCTION

The policy of the Museum of New Mexico is to collect, care for, and interpret materials in a manner that respects the diversity of human cultures and religions.

Culturally sensitive materials include material culture as well as the broader ethical issues which surround their use, care, and interpretation by the Museum. The Museum's responsibility and obligation are to recognize and respond to ethical concerns.

II. DEFINITIONS;

A. "Culturally sensitive materials" are objects or materials whose treatment or use is a matter of profound concern to living peoples; they may include, but are not limited to:

1. "Human remains and their associated funerary objects" shall mean objects that, as a part of the death rite or ceremony of a culture, are reasonably believed to have been placed with individual human remains either at the time of death or later;

2. "Sacred objects" shall mean specific items which are needed by traditional religious leaders for the practice of an ongoing religion by present-day adherents;

3. Photographs, art works, and other depictions of human remains or religious objects, and sacred or religious events; and

4. Museum records, including notes, books, drawings, and photographic and other images relating to such culturally sensitive materials, objects, and remains.

B. "Concerned party" is a museum-recognized representative of a tribe, community, or an organization linked to culturally sensitive materials by ties of culture, descent, and/or geography. In the case of a federally recognized indian tribe, the representative shall be tribally-authorized.

C. "Repatriation" is the return of culturally sensitive materials to concerned parties. Repatriation is a collaborative process that empowers people and removes the stigma of cultural paternalism which hinders museums in their attempts to interpret people and cultures with respect, dignity, and accuracy. Repatriation is a partnership created through dialogue based upon cooperation and mutual trust between the Museum and the concerned party.

D. The Museum of New Mexico's Committee on Sensitive Materials is the committee, appointed by the Director of the Museum of New Mexico, that shall serve as the Museum of New Mexico's advisory body on issues relating to the care and treatment of sensitive materials.

III. IDENTIFICATION OF CONCERNED PARTIES

A. The Museum shall initiate action to identify potentially concerned parties who may have an interest in culturally sensitive material in the museum's collections.

B. The Museum encourages concerned parties to identify themselves and shall seek out those individuals or groups whom the Museum believes to be concerned parties.

C. The Museum's sensitive materials committee shall review all disputed individual claims of concerned-party status in consultation with the tribe, community, or organization which the individual(s) claims to represent. The Museum's sensitive materials committee shall assist, when necessary, in designating concerned parties who have an interest in culturally sensitive materials contained in the collections of the Museum of New Mexico.

D. The Museum shall provide an inventory of pertinent culturally sensitive materials to recognized concerned parties.

E. The Museum shall work with concerned parties to determine the appropriate use, care and procedures for culturally sensitive materials which best balance the needs of all parties involved.

IV. IDENTIFICATION AND TREATMENT OF CULTURALLY SENSITIVE MATERIALS

A. Within five years of the date of adoption of this policy, each Museum unit shall survey to the extent possible (in consultation with concerned parties, if appropriate) its collections to determine items or material which may be culturally sensitive materials. The Museum unit shall submit to the Director of the Museum of New Mexico an inventory of all potentially culturally sensitive materials. The inventory shall include to the extent possible the object's name, date and type of accession, catalogue number, and cultural identification. Within six months of submission of its inventory to the Director of the Museum of New Mexico, each Museum unit shall then develop and submit, a plan to establish a dialogue with concerned parties to determine appropriate treatment of culturally sensitive items or materials held by the unit.

B. As part of its treatment plans for culturally sensitive materials, the Museum reserves the right to restrict access to, or use of, those materials to the general public. The Museum staff shall allow identified concerned parties access to culturally sensitive materials.

C. Conservation treatment shall not be performed on identified culturally sensitive materials without consulting concerned parties.

D. The Museum shall not place human remains on exhibition. The Museum may continue to retain culturally sensitive materials. If culturally sensitive materials, other than human remains, are exhibited, then a good-faith effort to obtain the advice and counsel of the proper concerned party shall be made.

E. All human skeletal remains held by the Museum shall be treated as human remains and are _de facto_ sensitive materials. The Museum shall discourage the further collection of human remains; however, it will accept human remains as part of its mandated responsibilities as the State Archaeological Repository. At its own initiation or at the request of a concerned party, the Museum may accept human remains to retrieve them from the private sector and furthermore, may accept human remains with the explicit purpose of returning them to a concerned party.

IV. REPATRIATION OF CULTURALLY SENSITIVE MATERIALS

A. On a case-by-case basis, the Museum shall seek guidance from recognized, concerned parties regarding the identification, proper care, and possible disposition of culturally sensitive materials.

B. Negotiations concerning culturally sensitive materials shall be conducted with professional discretion. Collaboration and openness with concerned parties are the goals of these dialogues, not publicity. If concerned parties desire publicity, then it will be carried out in collaboration with them.

C. The Museum shall have the final responsibility of making a determination of culturally sensitive materials subject to the appeal process as outlined under section VII A.

D. The Museum of New Mexico accepts repatriation as one of several appropriate actions for culturally sensitive materials only if such a course of action results from consultation with designated concerned parties as described in Section III of this policy.

E. The Museum may accept or hold culturally sensitive materials for inclusion in its permanent collections.

F. The Museum may temporarily accept culturally sensitive materials to assist efforts to repatriate them to the proper concerned party.

G. To initiate repatriation of culturally sensitive materials, the Museum of New Mexico's current deaccession policy shall be followed. The curator working with the concerned party shall complete all preparations for deaccession through the Museum Collections Committee and Director before negotiations begin.

H. Repatriation negotiations may also result in, but are not limited to, the retention of objects with no restrictions on use, care, and/or exhibition; the retention of objects with restrictions on use, care and/or exhibition; the lending of objects either permanently or temporarily for use to a community; and the holding in trust of culturally sensitive materials for the concerned party.

I. When repatriation of culturally sensitive materials occurs, the Museum reserves the right to retain associated museum records but shall consider each request for such records on an individual basis.

VI. ONGOING RECOVERY OR ACCEPTANCE OF ARCHAEOLOGICAL MATERIALS

A. In providing sponsored archaeological research or repository functions, the Museum shall work with agencies that regulate the inventory, scientific study, collection, curation, and/or disposition of archaeological materials to ensure, to the extent possible under the law, that these mandated functions are provided in a manner that respects the religious and cultural beliefs of concerned parties.

B. When entering into agreements for the acceptance of, or continued care for, archaeological repository collections, the Museum may issue such stipulations as are necessary to ensure that the collection, treatment, and disposition of the collections include adequate consultation with concerned parties and are otherwise consistent with this Policy.

C. In addition to the mandated treatment of research sites and remains and in those actions where treatment is not mandated, defined, or regulated by laws, regulations, or permit stipulations, the Museum shall use the following independent guidelines in recovering or accepting archaeological materials:

1. Prior to undertaking any archaeological studies at sites with an apparent relationship to concerned parties, the Museum shall ensure that proper consultation with the concerned parties has taken place.

2. When so requested by concerned parties, the Museum shall include an observer, chosen by the concerned party, in the crew of an archaeological study.

3. The Museum shall not remove human remains and their associated funerary objects or materials from their original context nor conduct any destructive studies on such remains, objects, and materials, except as part of procedures determined to be appropriate through consultation with concerned parties, if any.

4. The Museum reserves the right to restrict general public viewing of in situ human remains and associated funerary objects or items of a sacred nature and further shall not allow the public to take or prepare images or records of such objects, materials, or items, except as part of procedures determined to be appropriate through consultation with concerned parties. Photographic and other images of human remains shall be created and used for scientific records only.

5. The Museum reserves the absolute right to limit or deny access to archaeological remains being excavated, analyzed, or curated if access to these remains would violate religious practices.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS Permit No. BIA/AAO-96-003
FEDERAL ARCHEOLOGICAL RESOURCES
PROTECTION ACT PERMIT

To conduct work upon public lands owned or controlled by the United States under the Archaeological Resource Protection Act (93 Stat. 721, 16 U.S.C. 470AA-11) approved October 31, 1979, and the regulations thereunder (43 CFR 7, 32 CFR 229).

1. PERMIT ISSUED TO: DATE:
Office of Archaeological Studies, Museum of New Mexico 9/6/96

2. NAME, ADDRESS AND OFFICIAL STATUS OF PERSON:
a. In general charge: Nancy Akins, Museum of New Mexico, Office of Archaeological Studies, P.O. Box 2087, Santa Fe, NM 87504-2087

b. In actual direct charge: Yvonne Oakes, Macy R. Mensel

3. UNDER APPLICATION DATED: July 15, 1996

4. AUTHORIZES: Archeological testing and collection at six sites to be impacted by construction activities on NMSHTD Project NH-070-4(30)254, CN 2514, NMN 41.625, US 70.

5. ON LANDS DESCRIBED AS FOLLOWS: Six sites, LA20620, LA20622, LA110335, LA110336, LA110339, and LA110340, in Section 9 & 10, T12S, R13E, on Mescalero Apache Tribal Lands in Otero County, New Mexico.

6. FOR PERIOD: September 6, 1996 TO: September 6, 1997

7. MATERIALS COLLECTED UNDER THIS PERMIT WILL BE DEPOSITED FOR PERMANENT PRESERVATION IN THE: Museum of New Mexico, if the Mescalero Apache Tribe does not wish to take possession, OR IN OTHER ACCREDITED INSTITUTIONS UNDER SUITABLE LOAN AGREEMENTS. **A COPY OF A CURRENT VALID CURATION AGREEMENT MUST BE KEPT ON FILE WITH THE LAND MANAGING AGENCY(S).**

8. SPECIAL CONDITIONS: This permit is subject to the provisions of the Archeological Resources Protection Act approved October 1979, and the regulations thereunder, including 25 CFR 261.1 as to Indian lands, as well as special conditions (copies attached).

9. PRELIMINARY REPORT: Within approximately 6 weeks of the conclusion of field work a preliminary report of work performed under this permit, illustrated with representative photographs and listing new and significant collected materials should be furnished the **Area Archeologist** of the issuing Area Office.
(see attached address list(s)

AUTHORIZING OFFICIAL (Signature)

R D Barrick [signature]
Area Director

9/10/96
Date