

MUSEUM OF NEW MEXICO
OFFICE OF ARCHAEOLOGICAL STUDIES

**THE GLORIETA PROJECT: TEST EXCAVATIONS AT EIGHT
PREHISTORIC SITES BETWEEN GLORIETA AND PECOS,
NEW MEXICO**

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with a contribution by

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ADMINISTRATIVE SUMMARY

In 1985 and 1986, the Research Section of the Laboratory of Anthropology, Museum of New Mexico, tested ten sites within the limits of the proposed reconstruction on State Road 50 between Glorieta and Pecos, New Mexico (New Mexico State Highway and Transportation Department [NMSHTD] Project No. RS-1416[1]) and one site within the project limits at the Glorieta Interchange (NMSHTD Project No. IR-025-5[63]297). The purpose of the testing program was to evaluate the nature and extent of subsurface and surface remains on the sites and to determine their potential to yield significant information on the prehistory and history of the area.

Project sites included two historic residential sites, a Pueblo fieldhouse, three rock shelters, and four lithic or sherd artifact scatters. One historic site, Pigeon's Ranch (LA 49315), is on the *National Register of Historic Places*. It was the location of an 1850s stagestop on the Santa Fe Trail, a Civil War battle, and a trading post and tourist stop in the 1920s and 1930s. The other historic structure consists of a portion of a house foundation within the right-of-way. The two historic sites (LA 49265 and LA 49315) will be discussed in another volume.

Remains of a small Pueblo IV fieldhouse were uncovered during the testing program. Associated ceramics were used to date the site. A radiocarbon date proved too early for the ceramics that were present. Also located throughout the project area are four ceramic or lithic artifact scatters. The ceramic sites date from ca. A.D. 1300 to post-1600. One of these is associated with a small Pueblo site adjacent to the right-of-way. These sites, and the three rock shelters, which lack diagnostic artifacts or datable materials, all indicate regular use of the area, which lies 2.4 to 8.0 km to the north and west of Pecos Pueblo. While the prehistoric sites cannot definitely be associated with Pecos Pueblo, the majority likely represent land-use adaptations of the Pecos Indians.

Based on the results of the testing program, we consider that the sites do not contain features or deposits likely to yield significant information. We do not recommend any further archaeological studies at these sites.

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NMSHTD Projects No. RS-1416(1) and IR-025(63)297
U.S. Forest Service Special Use Permit (expires 12-31-86)

Submitted in fulfillment of a Joint Powers Agreement between the Museum of New Mexico and the NMSHTD.

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INTRODUCTION

At the request of William L. Taylor of the New Mexico State Highway and Transportation Department, the Research Section of the Museum of New Mexico conducted an archaeological testing program on ten sites along State Road 50 between Glorieta and Pecos, New Mexico (NMSHTD Projects RS-1416[1] and IR-025-5[63]297). The testing was conducted by Yvonne R. Oakes, project supervisor, Dorothy A. Zamora, assistant, and crew members Stephen Post, Abbie Farrally, Ignacio Ortiz, and Aedelaido Quintana. Analysis of lithic and ceramic material was performed by Dorothy Zamora and Daisy Levine, respectively. David A. Phillips, Jr. served as principal investigator, Robin Gould edited the manuscript, Scott Geister completed the graphics and prepared the report for publication. The testing was conducted periodically from March 1985 through October 1986.

Seven of the eight tested sites covered in this report are on private land to be acquired by the NMSHTD. One site, LA 49187, is on U.S. Forest Service land and was tested under a Special Use permit with an expiration date of December 31, 1986.

The proposed project area begins [redacted] Glorieta [redacted] N, Santa Fe County) and proceeds southeasterly for [redacted] Pecos (UTM Zone 13, [redacted]) (Fig. 1). Site locations are shown in Appendix 1 with detailed legal descriptions provided under the individual sites.

Survey for the project and the testing proposal were conducted and written by Research Section staff in August 1984 (Maxwell 1985). Yvonne Oakes (1985) prepared the testing proposal for the one historic site on the *National Register of Historic Places*, Pigeon's Ranch (LA 49315).

Findings from the project provide a limited data base from which various aspects of the prehistoric subsistence-settlement system of the Pecos area may be studied. Most of the prehistoric sites are believed to represent components of the larger Pecos settlement system dispersed over the landscape to take advantage of available subsistence commodities. The report includes comparisons between the sites and a discussion of their relationship within the larger cultural system.

Testing Goals

The initial survey by Research Section personnel (Maxwell 1985) located seven prehistoric archaeological sites within the proposed NMSHTD reconstruction of State Road 50. One other site was found at the start of work on the new Glorieta Overpass, which crosses I-25 at Glorieta. The types of sites recorded are listed in Table 1.

On the basis of the initial survey, portions of all sites within the proposed right-of-way were recommended for surface collection, testing, and mapping. We expected the prehistoric

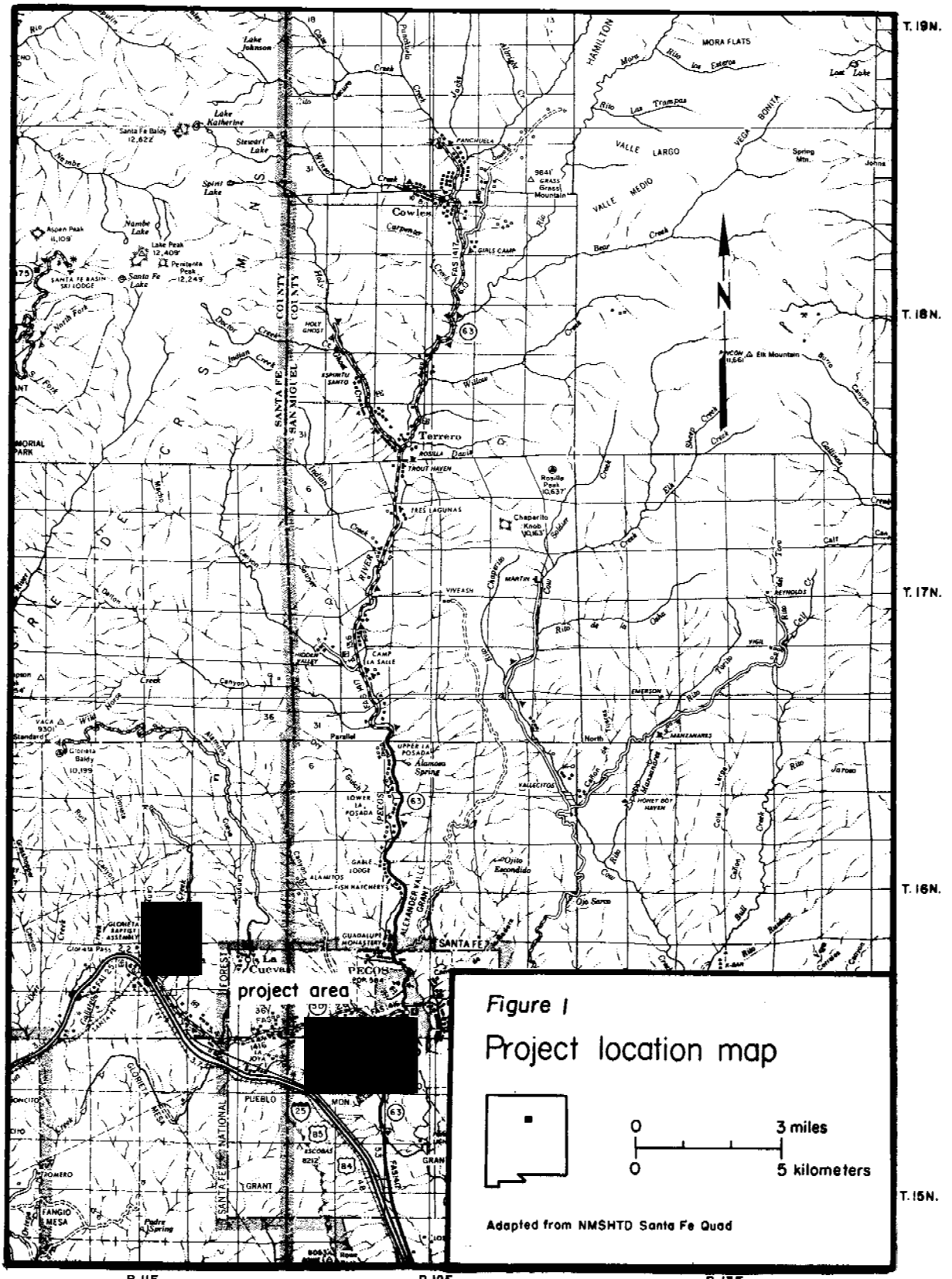
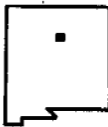


Figure 1
Project location map



0 3 miles
 0 5 kilometers

Adapted from NMSHTD Santa Fe Quad

R. 11E.

R. 12E

R. 13E.

Table 1. Site LA Numbers and Site Type

LA Number	Site Type
32455	Pueblo IV lithic and sherd artifact scatter
49184	Basketmaker II(?) lithic and Pueblo IV sherd scatter
49185	Pueblo IV lithic and sherd artifact scatter
49186	Pueblo IV fieldhouse
49187	Rock shelter of unknown date
49188	Pueblo IV and historic rock shelter
49189	Rock shelter of unknown date
50098	Lithic scatter of unknown date

sites to yield low artifact densities and a minimum of variability, representative of small hunting camps or outlying field stations for nearby pueblos.

Although all of the lithic and sherd scatters seem to fall into the PIV period, it was not known whether occupation of these sites occurred only during this time or if there may have been repeated use of the sites. Two of the sites with lithic materials (LA 49185 and LA 49186) also contain stone alignments. The three rock shelters are situated under natural bedrock overhangs and all reflect recent use. One, LA 49188, contains historic graffiti.

Testing goals, therefore, included extensive sampling of each site to determine the extent and the potential for subsurface cultural features. Specific environmental setting was also recorded. Resulting artifact collections were examined to determine the cultural association of each site and assigned a probable period of occupation. Although most sites are small surface scatters, this report correlates them with general prehistoric land-use patterns within the Pecos area. Specifically, we looked at the changing use of outlying subsistence resource areas through time for the several pueblo settlements in the region. However, we have not been able to identify specific resource utilization for each prehistoric site because of the limited nature of the artifact assemblages and data recovered.

Testing Procedures

Prior to testing, all surface features were photographed and the site area was mapped. Test units were added to the plan maps when completed. The crew established a main datum for each site from which an arbitrary baseline and a Cartesian coordinate system was established. All surface artifacts were then collected within the established grid system by provenience unit. On very small sites, surface artifacts were plotted by point provenience.

Testing consisted of sampling the sites through 2 by 1 m test trenches located on each site on the basis of surface artifact density, presence of cultural features, or soil staining. Within the rock shelters, smaller testing units were employed. Photographs and profile maps showing the stratigraphic context of subsurface soils were taken. A plan view map of individual cultural features was completed both prior to and after excavation. Auger tests augmented the trenching program to insure that no subsurface features were missed. Augering stopped when the sterile substrate was reached.

Testing proceeded using hand tools except for loose surface soil, which was first stripped from each test unit. All excavated soil was screened through ¼-inch mesh. Testing proceeded in arbitrary 10 cm levels, unless cultural features were encountered, until a sterile substrate was reached. Trenches reached an average depth of 15 cm before sterile soil was reached. Appropriate macrobotanical and pollen samples were taken if warranted.

All artifacts recovered during the testing program were analyzed at the Research Section. Each item received an individual curation number and is in permanent storage at the Archaeological Repository of the Laboratory of Anthropology. All data sheets, maps, and site information are stored in the Archeological Records Management System (ARMS) files of the New Mexico Historic Preservation Division.

PHYSICAL ENVIRONMENT

by James L. Moore

The study area is located in a long and sometimes narrow valley incised by Glorieta Creek, a tributary of the Pecos River. The valley separates Glorieta Mesa from the Santa Fe Mountains, and forms a natural highway through the north-central New Mexican highlands. This area is also a transitional zone between the southern Rocky Mountain Province and the Sacramento Section of the Basin-and-Range Province (Fenneman 1931). The Sangre de Cristo Mountains represent the former and Glorieta Mesa is the northeastern boundary of the latter (Fenneman 1931:393-394).

Geology

Structure

As a transitional zone between physiographic provinces, the geology of the study area is relatively complex. Though the region has a long history of faulting, uplift, and subsidence, only a few of the more pertinent events and structural features will be discussed.

Pennsylvanian and early Permian rocks unconformably overlie Precambrian basement rocks in the region. These strata were deposited in the Rowe-Mora Basin in the area now occupied by the central Sangre de Cristo Mountains (Baltz and Bachman 1956). Considerable deformation occurred during the late Cretaceous-early Tertiary periods. A block measuring 320 km long by up to 30 km wide was uplifted, forming the Sangre de Cristo Mountains (Woodward and Ingersoll 1979). At the same time, the Raton Basin was formed along the eastern edge of this uplifted zone.

Uplift in the Sangre de Cristos resulted in deformation of areas directly south of that feature (Goolsby 1965). The zone separating the Sangre de Cristo uplift from the Glorieta Mesa uplift was severely deformed into a complexly faulted and folded graben (Lisenbee et al. 1979:92-93). These orogenic forces were felt on the Glorieta uplift as well, and are represented by gentle folds. The Glorieta Mesa uplift is an uplifted arch trending slightly west of north (Griggs and Hendrickson 1951:34).

During the late Cenozoic period (and probably continuing to the present), movement along the Rio Grande Rift formed a series of northward trending graben, including the Española Basin (Woodward and Ingersoll 1979). The Española Basin forms part of the western boundaries of the Glorieta Mesa and Sangre de Cristo uplifts, and is separated from the former by the Glorieta Mesa boundary fault. Movement along this fault system has been recurrent since the Precambrian period.

Stratigraphy

Unless otherwise noted, stratigraphic descriptions are summarized from Baltz and Bachman (1956), Goolsby (1965), and Griggs and Hendrickson (1951).

Basement rocks consist of igneous, metasedimentary, and Precambrian granites, schists, gneisses, and quartzites (Baltz and Bachman 1956; Woodward and Ingersoll 1979). Precambrian rocks outcrop in places along the Pecos River and its tributaries, but are generally overlain by later sedimentary deposits.

The most commonly outcropping formations are Precambrian through Permian in age. In nearby areas, they are overlain by various other formations dating from Permian to Tertiary periods. They include (in ascending order) the Artesia sandstone and siltstone formation (Permian), the Entrada sandstone formation (Jurassic), the Todilto limestone formation (Jurassic), the Morrison formation of sandstone with some siltstones and shales (upper Jurassic), the Dakota sandstone formation (Cretaceous), the Mancos formation of shale, sandstone, and limestone (late Cretaceous), and the Galisteo formation of sandstone with occasional conglomeratic lenses (Tertiary).

Outcrops along Glorieta Creek consist of occasional igneous and metamorphosed Precambrian rocks, the Magdalena group, and the Sangre de Cristo, Yeso, and San Andres formations. Precambrian rocks occur as occasional exposures in the Pecos River valley and its tributaries. The Magdalena group outcrops in the lower portions of the valley. The Sangre de Cristo formation outcrops around the mountain edges and on the lower northern slope of Glorieta Mesa. Yeso formation exposures also occur along the northern mesa slope. The Glorieta sandstone member of the San Andres formation forms a resistant cap over the top of much of Glorieta Mesa, though in places it is overlain by younger rocks. A considerable portion of the mesa top is also covered by the middle member of the same formation, while the upper member outcrops along the east and west sides of the mesa.

Soils

Information on soils is summarized from Folks (1975:18-19, 21, 43-45). Several soil associations occur in the study area including Prewitt loam, Rednun loam, Capillo-Rock outcrop, and Cueva very strong clay. Prewitt loam occurs on terraces along Glorieta Creek at elevations of 1,890-2,012 m. Flanking the Prewitt loam association on the north side of the valley are soils of the Capillo-Rock outcrop complex, which occur at elevations up to 3,353 m. On the south side it is flanked by Rednun loam at elevations between 2,012 and 2,134 m, Cueva very strong clay between 2,134 and 2,438 m, and Capillo-Rock outcrop between 2,438 and 3,353 m.

The Prewitt loam association occurs on level to moderate slopes (0-5 percent) and consists of well-drained soils forming in alluvium weathered from sandstone and shale. Permeability is moderate, run-off speed is medium, and the potential for erosion is severe.

The Rednun loam association occurs on nearly level to moderate slopes (1-9 percent) and consists of well-drained soils forming in old alluvium and mixed eolian deposits. Permeability is slow, run-off speed is medium, and the potential for erosion is moderate.

The Capillo-Rock outcrop complex occurs on moderate to steep slopes (10-50 percent) and consists of 55 percent Capillo gravelly sandy loam, 25 percent rock outcrops, and 20 percent other soils. Capillo gravelly sandy loams are well-drained soils formed on mountain sides in materials derived from weathered sandstone and shale. Permeability is slow, runoff speed is medium to rapid, and the potential for erosion is moderate to severe.

The Cueva-very stony clay association occurs on hilly to very steep slopes (20-60 percent) and consists of well-drained mountain soils. Permeability is slow, run-off speed is rapid, and the potential for erosion is extreme.

Flora and Fauna

Flora

The vegetative community within the study area is dominated by juniper (*Juniperus* sp.) with oak (*Quercus* sp.) or piñon (*Pinus edulis*) (Morain 1979). However, vegetation varies with soil type and elevation. Prewitt loam supports mostly mixed grasses. Rednun loam supports piñon, juniper trees, and mixed grasses. Cueva-very stony clay supports growths of piñon, juniper, mixed shrubs, and grasses. The Capillo-Rock outcrop complex (and at lower elevations in places) supports ponderosa (*Pinus ponderosa*), Douglas fir (*Pseudotsuga menziesii*), and white fir (*Abies concolor*), as well as various shrubs and grasses.

A riparian plant community occurs along Glorieta Creek. Various species are supported by the abundant moisture available in such an environment, including cottonwood (*Populus fremontii*), willow (*Salix* sp.), tamarisk (*Tamarix pentandra*), cattail (*Typha angustifolia*), and rushes. Grasses are common on the floodplain and adjacent slopes and include sand dropseed (*Sporobolus cryptandrus*), blue grama (*Bouteloua gracilis*), wheatgrass (*Agropyron smithii*), and ricegrass (*Oryzopsis* sp.). Various shrubs and cacti occur on the slopes bordering the stream, and include gooseberry (*Ribes* sp.), currant (*Ribes* sp.), yucca (*Yucca* sp.), mountain mahogany (*Cercocarpus* sp.), tansy mustard (*Descurainia pinnata*), cholla (*Opuntia* sp.), and prickly pear (*Opuntia* sp.).

Fauna

Some of the most common mammals found in the area include the cottontail (*Sylvilagus nuttalli*), jackrabbit (*Lepus californicus*), and rodents including the Colorado chipmunk (*Eutamias quadrivittatus*), pocket gopher (*Thomomys bottae*), western harvest mouse (*Reithrodontomys megalotis*), deer mouse (*Peromyscus*

maniculatus), and Mexican woodrat (*Neotoma mexicana*). Larger rodents include porcupines (*Erethizon dorsatum*) and, formerly, beaver (*Castor canadensis*).

Native artiodactyls include mule deer (*Odocoileus hemionus*) and, formerly, elk (*Cervus elaphus*). A number of carnivores also occur. Among them are coyotes (*Canis latrans*), black bears (*Ursus americanus*), raccoons (*Procyon lotor*), long-tailed weasels (*Mustela frenata*), mountain lions (*Felis concolor*), and bobcats (*Felis rufus*). The gray wolf (*Canis lupus*) and grizzly bear (*Ursus horribilus*) formerly ranged through the area, but are now extinct.

In the study area, relatively common raptors include the red-tailed hawk (*Buteo jamaicensis*), great horned owl (*Bubo virginianus*), and screech owl (*Otus asio*). Both the turkey vulture (*Cathartes aura*) and raven (*Corvus corax*) are common scavengers. Other birds found in relative abundance include gambel's quail (*Lophortyx gambelli*), mourning dove (*Zenaidura macroura*), red-shafted flicker (*Colaptes cafer*), piñon jay (*Gymnorhinus cyanocephalus*), robin (*Turdus migratorius*), mountain bluebird (*Siala currucoides*), and house sparrow (*Passer domesticus*). The turkey (*Meleagris gallopavo*) was probably once fairly common in the area as well (Robbins et al. 1966).

Climate

New Mexico is one of three areas in the United States that receives over 40 percent of its annual precipitation in the summer months (Tuan et al. 1973). The annual precipitation rate also greatly fluctuates around the mean, and there is a higher frequency of dry years than wet years (Tuan et al. 1973). Though these fluctuations are less severe than those occurring in humid regions, they are of greater significance because of the overall aridity of the area. With less precipitation to begin with, any drop in the annual rate can seriously impact the biotic environment.

Summer rainfall in the Southwest follows a true monsoon pattern (Martin 1963). Moisture-laden winds flowing north from the Gulf of Mexico are the main source of summer moisture, and their movement is controlled by a high pressure system situated over the Atlantic Ocean. The amount of summer precipitation in the Southwest depends on the positioning of this system. When it is in a northward position, moist tropical air flows into the Southwest and the summer is wet. When it is positioned southward the summer can be dry, a condition that may be caused by abnormally cold years in the north temperate latitudes (Martin 1963).

Winter precipitation is derived from air masses originating in the extratropical regions of the Pacific Ocean or in Canada. While summer storms are generally short and intense, winter precipitation usually falls as snow, which melts slowly and soaks into the soil rather than running off as does most summer rain. Though all precipitation is beneficial to local biota, winter precipitation is more effective because it soaks into the ground and recharges soil moisture reserves.

Table 2. Average Seasonal Precipitation Rates for the Years 1925-1954

Season	Mean Precipitation (cm)	Percentage
Winter	5.08	14.82
Spring	8.89	25.93
Summer	12.70	37.04
Fall	7.62	22.22
Total	34.29	

Mean annual precipitation in the general study area is 34.3 cm, of which nearly 40 percent falls during the summer months. Table 2 illustrates seasonal precipitation patterns for the region. As can be seen, summers receive the most precipitation and winters the least. The relative density of the vegetative mat probably helps prevent much erosion. Damage to the vegetative mat, however, can increase the potential for severe erosion. An overall change in precipitation patterns could adversely affect the vegetative community and, hence, help contribute to erosion.

The valley bottom zone (1,890-2,012 m) has a 160-170 day frost-free period. The date of the first killing frost in the fall is usually around September 30 and the last in the spring is generally around May 20 (Folks 1975; Williams and Morgan 1979). Mean annual temperature is around 48°-52° F. These variables differ with altitude. Between 2,012-2,134 m, mean annual temperature and precipitation rates remain much the same, but the number of frost free days drops to 150-160. Between 2,134-2,438 m, mean temperature drops to 48°-52° F while the mean precipitation rate increases to 36-41 cm. The average number of frost-free days falls to 120-130. Between 2,438-3,353 m altitude, induced climatic changes are even more extreme. Average annual precipitation increases to 46-51 cm, the mean annual air temperature drops to 43°-45° F, and there are only 50-100 frost-free days (Folks 1975).

PREHISTORIC OVERVIEW

Few places in New Mexico have more prehistory or historical events associated with them than the Glorieta/Pecos area. The region has been the residence of numerous Indian groups, including those at the large pueblo of Pecos; it served as an exploratory route for the Spanish conquistadors, was divided into Mexican land grants, used as a route for the Santa Fe Trail, and served as the scene of one of the few Civil War battles fought in New Mexico. Today, the area contains Hispanic and Anglo settlers clustered in the several communities along the Pecos River and Glorieta Creek.

The Paleoindian period (1300-5000 B.C.) marks the first occupation of the region by prehistoric peoples. Use of the area at this time seems sparse with only a single projectile point found to date (Nordby 1981:6). Several Paleoindian points have been recovered in the nearby Sangre de Cristo Mountains (Stuart and Gauthier 1981:295), on the Las Vegas Plateau, and in the Galisteo Basin highlands (Lang 1988:20).

The lack of Paleoindian sites in this region is not clearly understood. Nordby (1981:6) proposes that this may have been due to a lack of large game species, such as bison, in the area. Subsistence patterns of Paleoindian groups, while thought to be based on big-game hunting, are not completely understood and more data on economic adaptations during this time period are needed.

The Archaic period (5000 B.C.-A.D. 400) represents a change to a broader spectrum of utilized resources including the hunting of small game species such as rabbit, deer, and elk and the gathering of wild plant foods, especially seeds and nuts. Numerous Archaic sites have been found sporadically scattered throughout this area, on the high benches above waterways (McCrary 1983:5). Other Archaic sites have been recorded at high elevations in the Santa Fe National Forest and in the Pecos Wilderness (Wendorf and Miller 1959; Stuart and Farwell 1983), while some are found in caves and rock shelters near both water and potentially arable land.

During the Archaic period, the movement of small groups of people from one available resource to another was common. Shelter during this time is thought to be mostly temporary or seasonal at best. However, there are recent indications that pithouse structures were used in some areas of the Southwest. Milling tools, such as the mano and metate, were commonly used during this time.

By the beginning of the Pueblo period (ca. A.D. 400-1600), population increases led to the establishment of sedentary settlements. Pithouses, in the early Pueblo period, are documented in the Pecos area at approximately A.D. 800. Subsistence items included small-game species, wild plants, and maize. Agricultural fields of this period are found along the lower terraces of the Pecos River and Glorieta Creek.

Pueblo populations in the area experienced minimal growth until approximately A.D. 1200. At this time in the Rio Grande region, Pueblo groups lived in large multistoried structures with increasing reliance on agricultural crops. Small outlying settlements began to

appear in the Galisteo Basin, about 16 km southwest of Pecos Pueblo. Peckham (1988:29) attributes the influx of peoples to overcrowding in the Rio Grande Valley caused by earlier Anasazi migrations from the Four Corners area of New Mexico. Villages were established at Rowe, Dick's Ruin, Arrowhead Mesa, Forked Lightning, and other sites in the Pecos area.

Arrowhead Mesa (LA 251) is 1.2 km southeast of the project study area on a mesa overlooking the Galisteo Creek and several of the project sites. The pueblo was partly excavated by Texas Tech between 1933 and 1948 (Holden 1955:102). Tree-ring samples and ceramics date the site to probably A.D. 1370-1450, although there are small amounts of both earlier and later ceramics present. The pueblo has eight room blocks with at least 79 rooms and 2 kivas. Holden (1955:111) suggests that the occupants may possibly have originated from nearby Pecos Pueblo, which was already established by this time. There were six other sites in the Pecos Valley known to have been occupied at the same time as Arrowhead Mesa.

Forked Lightning Pueblo is .8 km southeast of Pecos Pueblo and was occupied primarily between A.D. 1225 and 1300. Hostile pressure from Plains Indians seems to have forced the occupants to move to Pecos (Kessell 1979:10). The ruin was partially excavated by Kidder in the early 1900s.

Numerous agricultural fields, fieldhouses, and hunting/gathering camps are present throughout the Pecos Valley and are probably associated with this period of development. Between A.D. 1300 and 1600, some of the pueblo communities reached several hundred rooms in size, with numerous kivas, large plaza areas, and extensive irrigation systems. Trade relations developed between the Plains Indian groups to the east and the local pueblos, particularly Pecos. Kidder recorded 18 different pottery types at Pecos with trade wares coming from Zuni, Zia, Hopi, the Pajarito Plateau, and the Texas Panhandle. For its own use, Pecos originally imported most of its decorated wares from Rio Grande pueblos, but by A.D. 1500-1600, it was trading its own polychrome pottery (Peckham 1988:38).

By A.D. 1450, all communities in the area except Pecos Pueblo had been abandoned. Kidder (1958) suggests that the cause for the abandonments may have been because of increased raiding by Plains Indians. However, as Nordby (1981:11) points out, A.D. 1450 may be too early for groups like Apaches to have been in the area. Alternative views, proposed by other archaeologists, are that many of the smaller pueblos consolidated to increase the work force necessary for expanded irrigation systems, or that there was endemic warfare in the region. Fliedner (1981:73) believes the population declined because the environment was overstressed.

The people of Pecos Pueblo were mostly agriculturalists dependent on corn, beans, and squash. Crops were planted in the flat valley bottoms; however, some crops were placed along intermittent streams and washes and others on higher, less watered areas. Fliedner (1981) recorded 1,200 probable fieldhouses, mostly within 1 km of the pueblo. Outside of this zone, hunting and gathering sites appear but decrease with distance from the pueblo. Fliedner also noticed that the extent and size of the field areas changed through time, with general increases noted up to A.D. 1300 and regular oscillations thereafter. Wild plants were also gathered, along with piñon nuts (Schroeder 1979:437). Hunting served as another means of obtaining food resources such as deer, elk, antelope, bison, rabbit, and other small game.

Trade with Plains Indians was a significant aspect of the pueblo's economic stability (Rasor 1988:32-35). The location of Pecos in the narrow corridor between the eastern plains of New Mexico and the Rio Grande Valley to the west made it an ideal trade center. Rasor records that the Plains Indians usually brought buffalo hides, meat, tallow, slaves, raw material for stone tools, and shells to trade. The Rio Grande area provided cotton clothing, pottery, obsidian, feathers, turquoise, and food staples.

In historic times, various Apache groups often camped outside the walls of Pecos during severe winter months. This indicates a usually peaceful coexistence between Apaches and Pueblos. The relationship lasted up to ca. 1675 when raiding by Plains groups became common. However, by 1690, these groups were again seen at Pecos and they were present until approximately the mid-1700s when Comanche raiding all but eliminated trading with other Plains groups (Gunnerson 1988:42-43). Archaeological evidence for trade with Plains peoples is found in Alibates flint artifacts from the Texas Panhandle (recovered in stratified trash mounds at Pecos dating post-A.D. 1500), and Pecos pottery found as far east as central Kansas, presumably traded by Plains Indians. Tipi-ring sites with Pecos pottery have also been recorded at nearby Anton Chico and to the north near Las Vegas, New Mexico. A burned jacal structure, excavated at Pecos, contained Pueblo and Jicarilla Apache wares, including Ocate Micaceous and Perdido Plain (Gunnerson 1988:43-44).

In the 1700s, parties of marauding Plains Indians sporadically raided Pecos Pueblo. Beginning in the 1740s, Comanches became a serious threat to Pecos security. Numerous residents of the pueblo were killed and Kidder (1962:86) reports that in 1750, most of the adult male population of Pecos had been victims of Plains attacks. The pueblo was further devastated by a smallpox epidemic in 1788; only 180 people survived. The population never recovered.

The harassment by hostile Plains groups does not imply that Pecos Pueblo was not strong defensively. For a time, it controlled all of the pueblos in the nearby Galisteo Basin. The pueblo was multistoried with no openings on the outside lower walls except for two narrow corridors into the plaza (Rasor 1988:35-37). Second floor rooms were reached by ladders that were pulled up in case of attack, making access almost impossible.

Captain Hernando de Alvarado, in command of the advance guard of the Coronado Expedition, was the first European to visit Pecos Pueblo in 1540 (Sanchez 1988:46). The Spanish conquistadors had come to explore New Mexico and Pecos Pueblo (then known as Cicuye) sent a delegation under the leadership of "Bigotes" to offer peace to Coronado, taking him hides of buffalo, shields, and feathered headdresses. Captain Alvarado returned with the Pecos delegation to the pueblo. Talk of supposed gold at Quivera to the east led the Spanish to continue relations with the pueblo. They went so far as to depart to the plains in search of the alleged gold. It was never found. The Rodriguez-Chamuscado expedition was the next Spanish expedition to visit Pecos in 1581 followed by the Espejo-Beltran expedition in 1582. Spanish attempts to conquer the pueblo for Spain were finally successful in 1590 through the efforts of Castaño de Sosa who fought briefly with the residents of Pecos. The pueblo was left in peace for the next eight years until Oñate occupied New Mexico in 1598. He sent Franciscan priests as missionaries to the pueblo. By the early 1620s, a small church was built at the pueblo and continued in operation until 1680, when all of the Spanish left the territory because of the Pueblo Rebellion (Kidder 1962:80-81). When Don Diego de Vargas

recaptured New Mexico in 1692, a new mission church was established at the pueblo. Spanish occupation of the pueblo continued from this time through 1828. By 1838, there were only 17 remaining inhabitants of Pecos Pueblo, due to the devastation of the earlier smallpox epidemic. No longer a viable community, the people moved to linguistically similar Jemez Pueblo.

Early archaeologists at Pecos included Adolph Bandelier in 1880 and Edgar Hewitt in 1904. In addition, Jesse Nusbaum, in 1915, examined the mission church south of the pueblo. Alfred Vincent Kidder, one of the Southwest's earliest archaeologists and the first to undertake in-depth studies at Pecos, excavated portions of the pueblo of Pecos from 1915 to 1929. His studies were the first to extensively examine a single Southwestern site. His use of stratigraphy in excavation was an important contribution to American archaeology. Later, Anna Shepard published an in-depth analysis of Pecos Pueblo pottery (Woodbury 1981:15-19).

In 1965, the pueblo and mission church at Pecos were designated as a national monument.

SITE DESCRIPTIONS

LA 32455

Site Description: LA 32455 lies on the steep slope of the [REDACTED] h [REDACTED] adjacent to [REDACTED] it overlooks the Pecos River Valley. It covers an area of 85 m (north-south) by 115 m (east-west), or 7,700 sq m. A total of 230 m or 3 percent of the site area was tested (Fig. 2). The principal vegetation on the site consists of piñon, juniper, and scrub oak. Large sandstone boulders outcrop on the site and a thin mantle of soil covers the sandstone bedrock at the base of the slope.

The site consists of a light scatter of ceramic, chipped, and ground stone debitage. All cultural material seems to have derived from a small pueblo site that sat on top of the slope and is now under a modern homesite. On the east edge of the site is a small rock shelter located outside of the right-of-way.

Ownership: Private and highway right-of-way acquired from private sources.

Testing Methods: Within the proposed right-of-way, large boulders and sandstone bedrock are exposed at the base of the steep slope. Most artifacts remain on the eroded and rocky slope, few lie within the right-of-way. A baseline was established parallel to the proposed right-of-way edge. Two 2 by 1 m test trenches were placed in the two locales that possessed soil depth. Soil was first stripped from the surface of the trenches and excavation proceeded in arbitrary 10 cm levels. Because of underlying bedrock, auger tests were not possible. Data are summarized in Table 3.

Table 3. Test Trench Data, LA 32455

Test Unit	#1	#2
Depth	17 cm	19 cm
Stratigraphy	1-3 cm, alluvium 3-4 cm, clay 4-14 cm, sterile	1-4 cm, alluvium 4-19 cm, clay 19-25 cm, sterile

A rock shelter was recorded outside of the right-of-way on the slope of the site. It utilized natural sandstone boulders on two sides and a 55 cm high dry-laid wall of sandstone rocks on the other two, leaving an interior usable space of 1.2 m east-west by 1.9 m north-south (Fig. 3). Two flakes were noted within the enclosure. They were clastic chert and chalcedony. The rock shelter may not be associated with the pueblo artifacts on the slope.

Twelve 10 by 15-20 m collection units were marked off in 10 m increments along the baseline and all surface artifacts within the right-of-way were collected within these units. With the permission of the landowner, a sample of diagnostic artifacts was gathered from the slope to establish a more accurate time frame for the site.

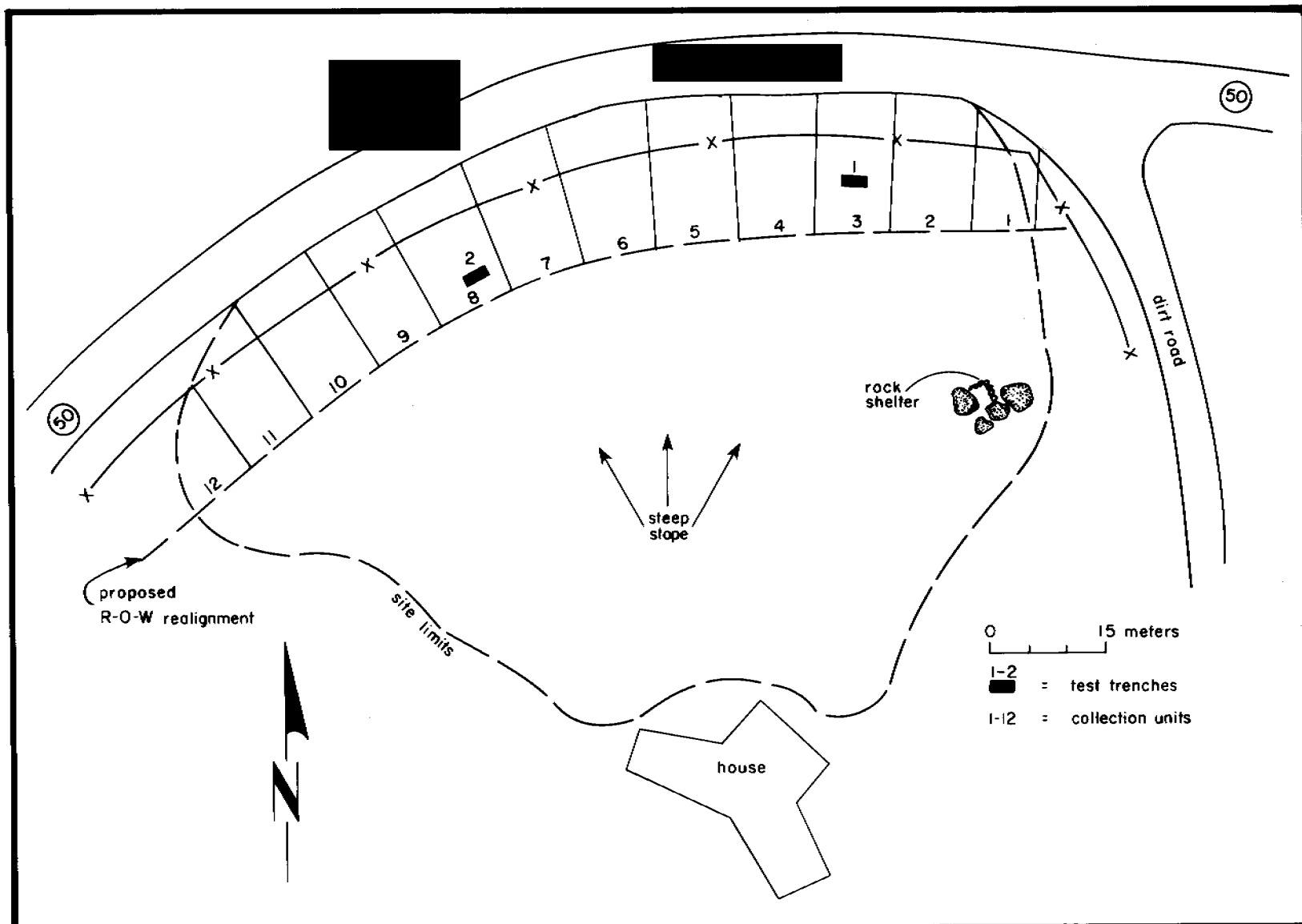


Figure 2. LA 32455, site plan.

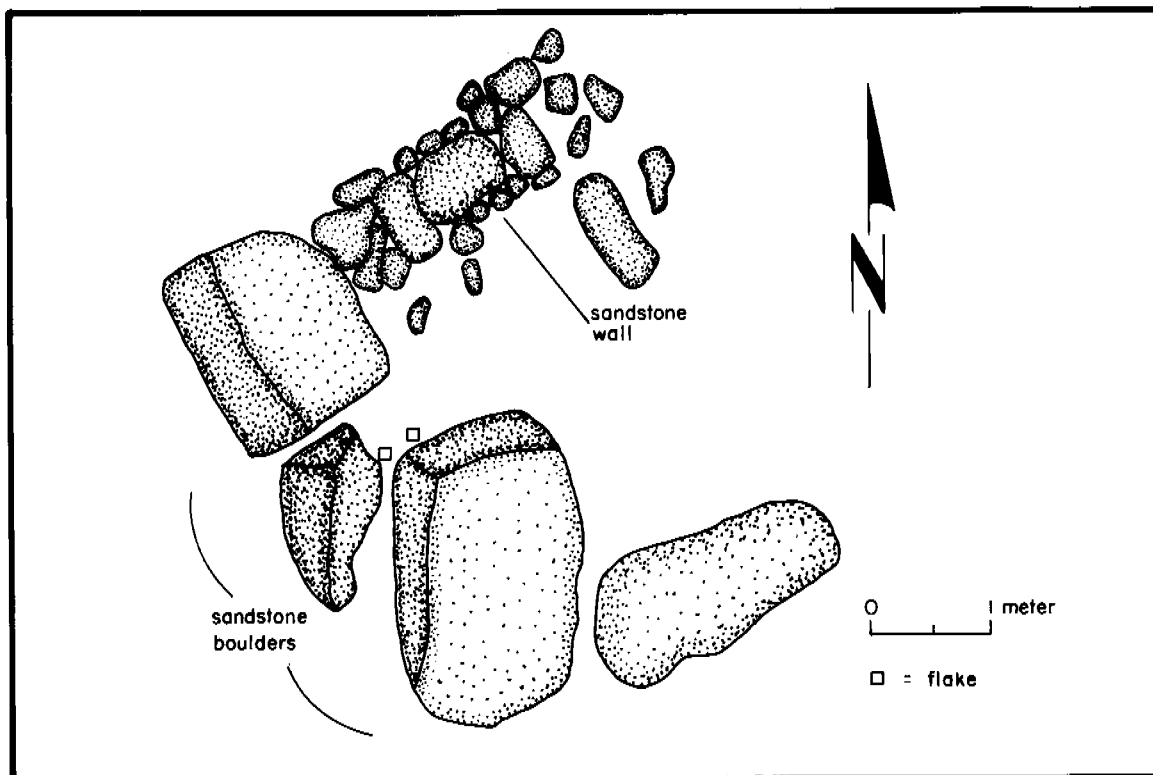


Figure 3. Rockshelter at LA 32455, plan view.

Material Culture: A total of 106 artifacts were recovered from the 12 collection units on the site and the slope adjoining the right-of-way. Table 4 presents the total artifact counts from each unit.

Table 4. Artifact Distribution, LA 32455

Unit	Ceramics	Chipped Stone	Ground Stone	Total
1	-	3	-	3
2	-	5	1	6
3	4	9	-	13
4	3	3	-	6
5	-	3	-	3
6	2	4	-	6
7	2	10	-	12
8	-	5	-	5

Unit	Ceramics	Chipped Stone	Ground Stone	Total
9	1	1	-	2
10	-	5	-	5
11	-	8	-	8
12	-	-	-	-
Slope	21	15	1	37
Total	33	71	2	106

Ceramics: A total of 33 sherds were recovered from the various collection units and the slope surface (Table 5).

Table 5. Ceramic Types, LA 32455

Type	Jar	Bowl	Ind.	Total	Percent
Galisteo B/w	1	-	-	1	3
St. John's Polychrome	-	1	-	1	3
Glaze A	-	3	-	3	9
Glaze E	-	1	-	1	3
Ind. Glaze	-	1	-	1	3
Plain Utility A	5	-	1	6	18
Plain Utility B	2	-	-	2	6
Red ware	1	-	-	-	3
Ind. historic red ware	-	10	-	10	30
Indeterminate	2	3	2	7	21
Totals	11	19	3	33	99

Within the assemblage, 33.3 percent of the ceramics are from jars, 57.5 percent are from bowls, and 9 percent from indeterminate vessel shapes. None of the sherds exhibited sooting or burning and most were very eroded from weathering processes.

The two plain utility wares differ in their temper constituents. Plain utility ware A has mostly quartz temper, while plain utility ware B contains quartz and feldspar temper. The red ware also has a quartz and feldspar temper but cannot be classified by type.

Table 6. Dates and References for the Identifiable Sherd Types

Type	Date	Reference
Galisteo B/w	A.D. 1250-1350	Warren et al. 1985
St. Johns Polychrome	A.D. 1175-1300	Warren et al. 1985
Glaze A	A.D. 1315-1325	Warren et al. 1985
Glaze E	A.D. 1515-1650	Warren et al. 1985
Historic Red Wares	A.D. 1650-Present	Harlow 1973

The St. Johns Polychrome may be a locally made Rio Grande variety of that ceramic type (R. Wiseman, personal communication, 10/1988). Because of the wide range in ceramic dates (A.D. 1175 to historic times) and the small quantity of ceramics, it is not possible to assign a specific date to the site and the associated small pueblo on the hilltop. Use of the site by Indian populations seems to be sporadic through time.

Lithic Artifacts: A total of 71 lithic artifacts were recovered during the testing program at LA 32455. These are broken down by artifact type in Table 7. All were recovered from the surface of the site. Debitage, including angular debris and unutilized flakes, comprises 87.3 percent of the assemblage, tools 9.9 percent, and cores 2.8 percent.

Table 7. Lithic Artifact Types, LA 32455

Type	Number	Percent	Group Percent
Debitage (n=62)			87.3
Small angular debris	20	28.2	
Large angular debris	2	2.8	
Cortical flakes	39	54.9	
Trimming flakes	1	1.4	
Tools (n=7)			9.9
Scrapers	1	1.4	
Hafted tools	1	1.4	
Projectile points	2	2.8	
Modified flakes	3	4.2	

Type	Number	Percent	Group Percent
Cores (n=2)			2.8
Cores	2	2.8	
TOTAL	71	99.9	100.0

The high percentage of debitage on the site (87.3 percent) suggests some amount of tool production or modification occurred on the site. The presence of only one trimming flake would seem to indicate very little tool retouch took place. The flake to angular debris ratio is slightly over 2:1. Primary core reduction for 4.6 percent of the assemblage is indicated by the presence of cortex on the platform and dorsal surfaces. Secondary reduction is indicated on 55.8 percent of the flakes, while 39.5 percent of the flakes have no cortex remaining and may be considered tertiary flakes. It appears that cores were initially reduced elsewhere before being brought to the site and further reduced.

Platforms on flakes were absent in 7 cases (29.1 percent), while one other was collapsed, 11 were cortical, and 23 faceted. This indicates expedient preparation of platforms before removal of flakes from cores.

Four of the flakes had modified edges. One flake had one modified edge, one had two modified edges, and one had three edges, one of which was denticulate. The angles of these edges were 25, 35 (3), 40 (2), and 60 degrees representing generally low to mid-range edge angles, possibly used for cutting or sawing activities. One modified flake is a probable scraper with usable edge angles of 60 and 70 degrees.

Lithic material types for the assemblage at LA 32455 are shown in Table 8. All materials were readily available to site inhabitants. Chalcedony is the most common material type on the site and accounts for 64.8 percent of the raw material and would therefore seem to be preferentially exploited. Reasons for this choice are unknown because degree of availability has not been assessed. All materials found are good for preparing formal tools or for expedient use. The obsidian is Polvadera type.

Table 8. Lithic Material Types, LA 32455

Material	Flakes	Debris	Tools	Cores	Total	Percent
Chalcedony	31	13	-	2	46	64.8
Chert	4	6	2	-	12	16.9
Fibrolite	-	-	1	-	1	1.4
Obsidian	4	-	1	-	5	7.0
Quartzite	4	3	-	-	7	9.9
Totals	43	22	4	2	71	100.0



Figure 4. Hafted tools from project sites; (a) LA 32455, (b) axe, LA 49186.

A hafted tool made of fibrolite (Fig. 4a) is the only item of this material type found on the entire project. Fibrolite was a common material used for axes at Pecos Pueblo (Kidder 1932:50). It is a very hard rock, resistant to breakage, and is an excellent material choice for axes. Kidder could not pinpoint the origin for this material; however, it can be obtained from the Santa Cruz area of Santa Fe County and from the Sandia Mountains (Northrup 1959:464-465). The tool has been pecked for hafting and is battered along one edge and on one end. Its function is unknown.

Midsections of two projectile points were recovered from the site surface (Fig. 5a, b). One is orange chert and is a small, corner-notched point (Fig. 5a) with the tangs, base, and tip snapped off. The other projectile point is obsidian (Fig. 5b) and is larger and thicker than the chert point. The edges are roughly serrated and it also has a snapped tip and base. The projectile was possibly corner-notched, similar to those from the Basketmaker period. Measurements for the points are given in Table 9.

Table 9. Projectile Point Data, LA 32455

Point	Material	Length	Width	Thickness	Notching
a	chert	1.9 cm	1.2 cm	.3 cm	corner
b	obsidian	2.3 cm	1.8 cm	.4 cm	corner

The single scraper, described above, is gray chert and is heavily patinated. The two cores are both composed of gray chalcedony. One weighs 27 g, the other 37 g. The smaller core is multifaceted and may be considered exhausted. The other core is bifacially flaked and is not exhausted. No cortex remains on either core.

Ground Stone: Two ground stone fragments of unknown type were recovered from LA 32455. One is a piece of sandstone, the other is schist. The sandstone piece measures 88 mm long by 54 mm wide by 19 mm thick and weighs 122 g. The schist example measures 65 by 40 by 23 mm and weighs 68 g. In both cases, the original shape is unknown; however, both exhibit grinding. The resultant wear surface is flat with transverse striations on the sandstone fragment, while the wear surface on the schist is convex.

Site Summary: LA 32455 consists primarily of slope wash from a small pueblo that is washing down a hillslope. The presence of numerous types of sherds with a broad temporal range, cores, flakes, debitage, projectile points, and a few fragments of ground stone, indicate that the site was used for a variety of activities over a long span of time between ca. A.D. 1175 and the Historic period. Most likely, the area was repeatedly used on a seasonal basis or as subsistence needs demanded. No further important information is likely to be gained from further study of this site.

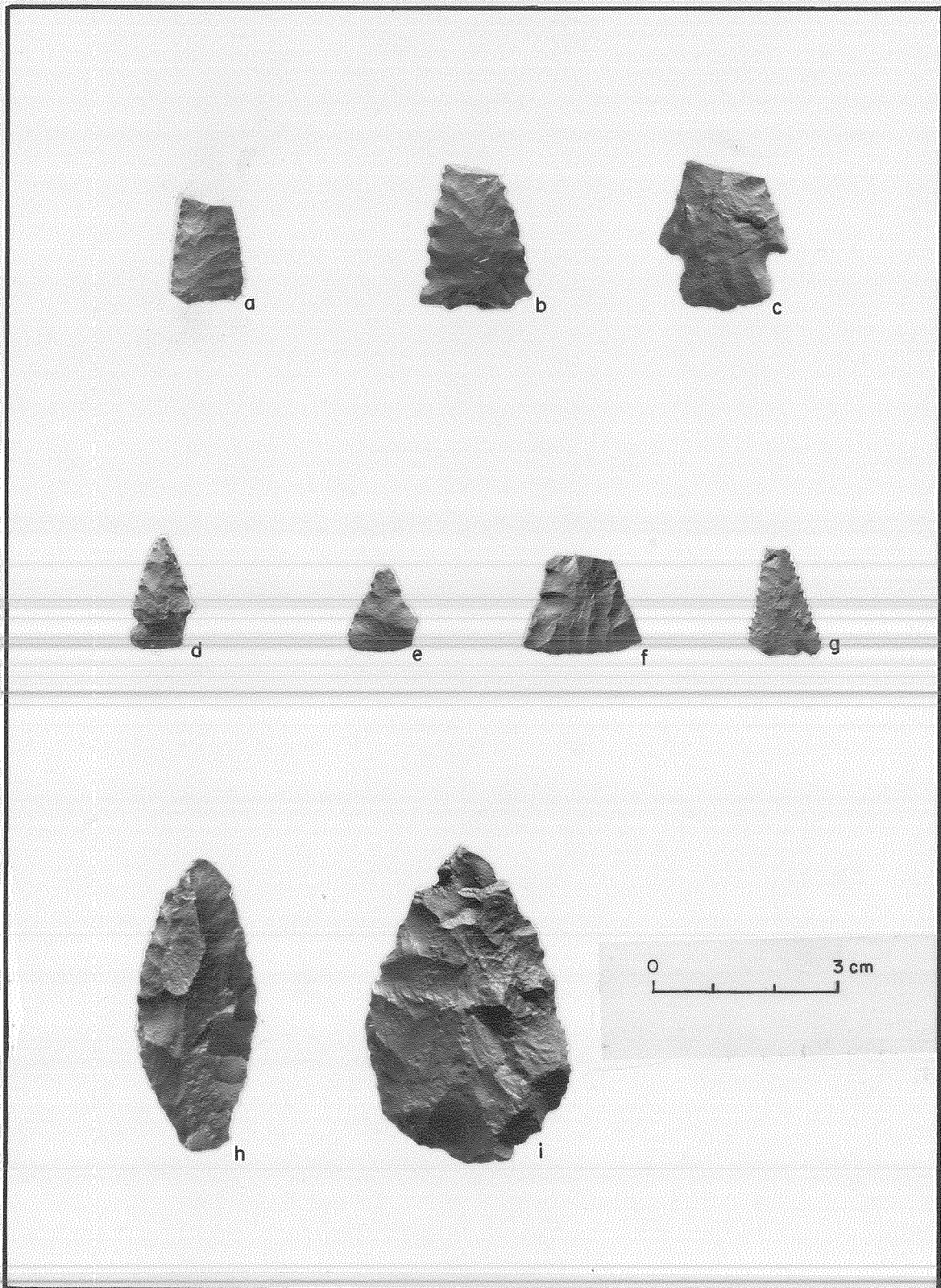


Figure 5. Projectile points from project sites; (a-b) LA 32455, (c-d) LA 49184, (e-h) LA 49185, (i) LA 50098.

LA 49184

Site Description: The site is primarily a lithic artifact scatter with occasional sherds and ground stone lightly interspersed. It sits on gently sloping terrain immediately [REDACTED]. Artifacts cover an area of 110 m east-west by 95 m north-south or 8,200 sq m. A total of 1,312 sq m, or approximately 15 percent of the site (Fig. 6) lay within the proposed right-of-way and was tested. Vegetation consists of a moderately heavy piñon-juniper stand interspersed with short grasses.

Ownership: Private and highway right-of-way acquired from private sources.

Testing Methods: Most artifacts lay south of the proposed right-of-way. An east-west baseline was first placed along the south right-of-way edge of the site. Two 2 by 1 m test trenches were then placed in areas of highest artifact concentration. Trenches were dug in arbitrary 10 cm levels until the caliche substrate was reached (Table 10). An auger was then used to confirm the presence of sterile soil.

Table 10. Test Trench Data, LA 49184

Test	#1	#2
Depth	20cm	27cm
Stratigraphy	0-5 cm, gravelly/sandy 5-15 cm, sandy 15-20 cm, sterile	0-7 cm, small rocks/sandy 7-22 cm, sandy 22-27 cm, sterile
Artifacts	0	1

Eight 10 by 12-16 m collection units were marked in 10 m increments along the south right-of-way edge and all surface artifacts were collected within these units.

Material Culture: A total of 240 artifacts were recovered from the site. Table 11 gives the artifact totals from each unit of collection.

Table 11. Artifact Distribution, LA 49184

Unit	Ceramics	Chipped Stone	Ground Stone	Total
1	-	7	-	7
2	-	10	-	10
3	-	24	-	24
4	2	76	-	78
5	-	32	-	32

Unit	Ceramics	Chipped Stone	Ground Stone	Total
6	1	36	1	38
7	4	14	-	18
8	-	19	-	19
TT1	-	7	-	7
TT2	-	1	-	1
Diagnostic	2	1	1	4
Survey	2	-	-	2
TOTAL	11	227	2	240

Ceramics: A total of 11 sherds were collected from the surface of the site. The various types are presented in Table 12.

Table 12. Ceramic Types, LA 49184

Type	Jar	Bowl	Total
Glaze A	-	1	1
Glaze C	-	1	1
Tewa Buff	4	-	4
Tewa Red	1	2	3
Plain Utility	2	-	2
TOTAL	7	4	11

The ceramics cover several periods, from ca. A.D. 1300 to the historic present; however, 7 of the 11 sherds post-date A.D. 1650, indicating a late component to the site. Dates for the various types are taken from Warren et al. (1985) and include: Glaze A, A.D. 1315-1425; Glaze C, A.D. 1425-1490; Tewa Red, A.D. 1650-present; and Tewa Buff, A.D. 1650-present.

The plain utility ware has a quartz temper that corresponds to the utility ware A at LA 32455.

Lithic Artifacts: There were 227 pieces of chipped stone recovered at LA 49184. Table 13 presents these by artifact type. All but one artifact were recovered from the surface of the site. Debitage comprises 92.5 percent of the assemblage, tools 6.2 percent, and cores 1.3 percent.

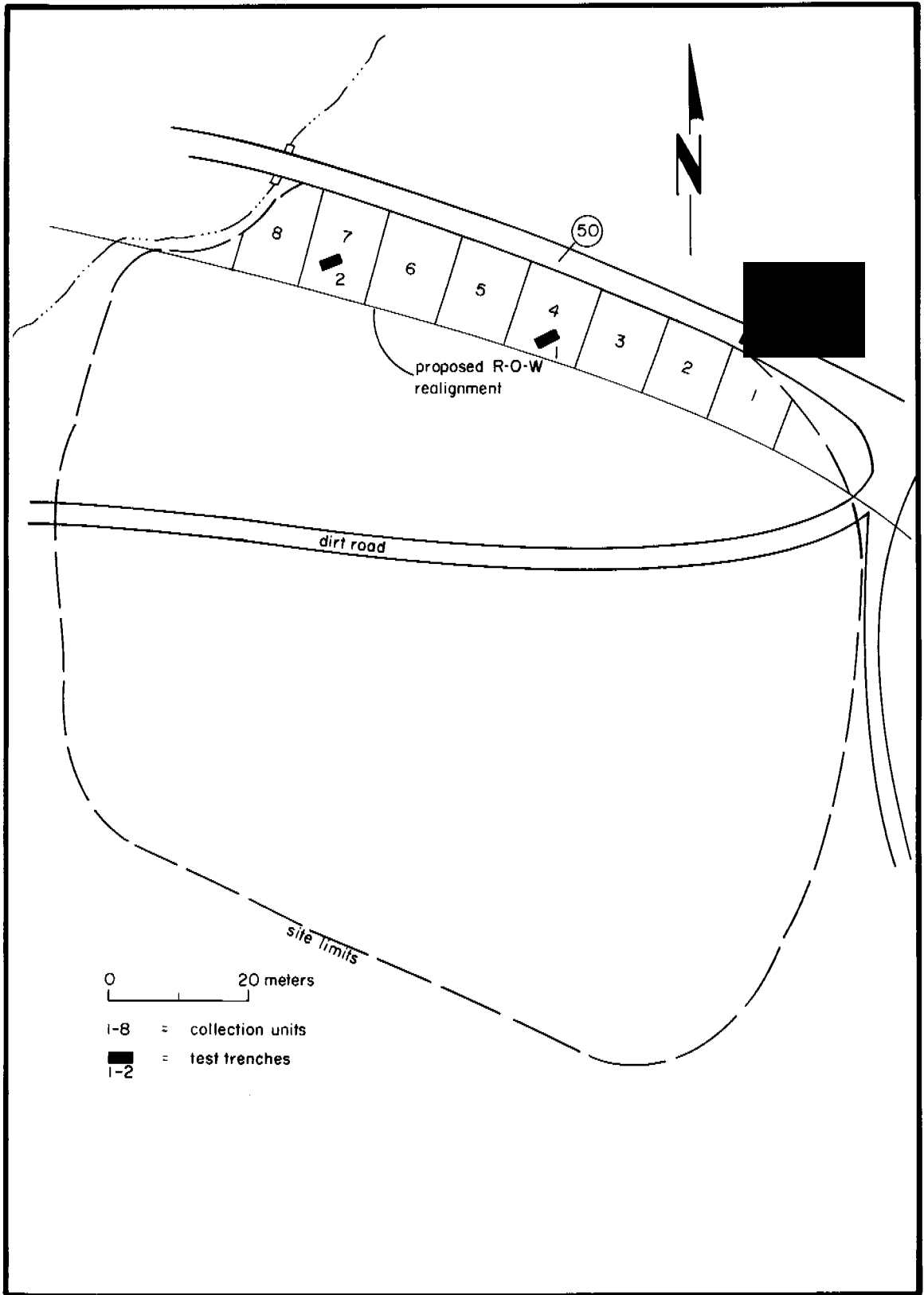


Figure 6. LA 49184, site plan.

Table 13. Lithic Artifact Types, LA 49184

Type	Number	Percent	Group Percent
Debitage (n=210)			92.5
Small angular debris	38	16.7	
Cortical flakes	145	63.9	
Trimming flakes	27	11.9	
Tools (n=14)			6.2
Modified flakes	7	3.1	
Projectile points	5	2.2	
Spokeshaves	1	.4	
Bifaces	1	.4	
Cores (n=3)			1.3
Cores	3	1.3	
TOTAL	227	99.9	100.0

From the high percentage ofdebitage on the site, it is apparent that a substantial amount of lithic reduction or modification took place. The fairly high percentage of trimming flakes (11.9 percent) indicates tool retouching was a part of site activities. Most of the site assemblage consists of flakes, with a flake to angular debris ratio of almost 9:2. It would appear that there was little regard for retaining flakes for later use. Eight modified flakes were present in the assemblage with one being a probable spokeshave. All others indicate expedient use.

Of the 179 flakes, including trimming flakes and those that have been modified, 63.1 percent do not possess any cortex on their surfaces. This indicates that these are tertiary reduction flakes usually associated with retouching or modification of tools. The secondary reduction flakes account for 27.4 percent of the assemblage, while primary decortication is represented by only 9.5 percent of the flakes. The data suggest that initial core reduction occurred away from the site.

The three cores from the site include two multifaceted and one unidirectional core, all with faceted platforms, suggesting an expedient core reduction technique. None of them were exhausted. Weights ranged from 24 to 97 g.

Most flake platforms were faceted (58.3 percent), with 22.8 percent being cortical, 3.3 percent collapsed, and .5 percent unidirectionally retouched. The cortical and faceted platforms represent expedient core reduction. One flake with a unidirectionally retouched platform would have come from a unifacially flaked artifact (Vierra 1985:58).

Five projectile points and one biface fragment were recovered from the site. The biface fragment is a straight-sided midsection piece of white chalcedony. Of the five projectile points, three are obsidian and two are chalcedony. All have at least a portion of the body missing. Two points are represented by bases only and one exhibits corner notching (Fig. 5c). One white chalcedony point (Fig. 5d) has a missing basal portion, and is a very small Pueblo point, characteristic of the most common point type found by Kidder at Pecos Pueblo (Kidder 1932:20). The other chalcedony point is gray with the upper body and tip missing (Fig. 5d) and is similar to the BM II points from Pecos and illustrated in Kidder (1932:19y). The two obsidian basal fragments are also probably BM II type points. The remaining obsidian point has been spalled and only half of the body portion remains (Table 14).

Table 14. Projectile Point Data, LA 49184

Material	Length	Width	Thickness	Notched
Ind. Obsidian	.9 cm	1.8 cm	.4 cm	-
Chalcedony	2.3 cm	2.0 cm	.5 cm	corner
Grants Obsidian	1.9 cm	1.2 cm	.3	corner
Chalcedony	1.9 cm	1.0 cm	.2 cm	side
Jemez Obsidian	1.4 cm	1.5 cm	.4 cm	corner

Lithic material types from LA 49184 are presented in Table 15.

Table 15. Lithic Material Types, LA 49184

Material	Flakes	Debris	Tools	Cores	Total	Percent
Chalcedony	116	20	7	1	144	63.4
Chert	37	14	1	2	54	23.8
Obsidian	11	3	6	-	20	8.8
Quartzite	6	1	-	-	7	3.1
Rhyolite	1	-	-	-	1	.4
Siltstone	1	-	-	-	1	.4
TOTAL	172	38	14	3	227	99.9

Like LA 32455, all raw material is available in the general region. All but one piece of obsidian is of Jemez derivation. The single dark black piece may come from Grants. This would represent the most distant source for the lithic artifact material.

Ground Stone: Two ground stone artifacts were recovered from LA 49184. Both are sandstone; one is a one-hand mano, the other is an fragment of indeterminate use. The mano exhibits both flat grinding and battering. It measures 168 mm in length, 106 mm in width, 23 mm in thickness, and weighs 772 g. The other ground stone fragment is large, weighing 944 g and is 117 mm long, 94 mm wide, and 76 mm thick. It displays one ground surface.

Site Summary: LA 49184 is primarily a lithic artifact scatter with a few sherds and ground stone possibly in association. Because of the broad temporal range of the ceramic types, it is apparent that the location was used periodically, perhaps seasonally, through time. The large number of tertiary flakes and the presence of five BM II type projectile points tends to suggest that the site was used as a hunting camp or "gearing up" locale for hunting parties by pre-Pueblo peoples. We believe that the information potential of the site has been exhausted by the testing program.

LA 49185

Site Description: The site is a sherd and lithic artifact scatter located on a gentle hill slope directly [REDACTED]. An anomalous stone alignment was recorded on the initial survey by Maxwell (1985) as a possible water control device. We mapped and recorded this area and placed a shallow trench across the alignment; however, it is outside of the proposed right-of-way. Therefore, no further action was taken on the possible feature. Excavation would be necessary to determine if this was indeed a water control device.

Cultural material extends for 43 m north-south and 65 m east-west, covering 2,236 sq m. A total of 900 sq m, or approximately 40 percent of the site, was within the proposed right-of-way (Fig. 7). Large, flat sandstone boulders protrude from the ground surface at the south end of the site. Two small intermittent drainages flow through the area. Artifacts are mostly clustered along these drainages. One projectile point lay 20 m east of the site.

Vegetation on the site consists of piñon, juniper, and occasional ponderosa pine. The site overlooks the valley of Glorieta Creek to the south.

Ownership: Private and highway right-of-way acquired from private sources.

Testing Methods: Artifacts were plotted by point provenience because a few concentrations of artifacts were observed on the site surface. Two 2 by 1 m test trenches were then placed in an area of artifact concentration and overlying the potential water control device (Fig. 8). It was confirmed that most of the site lies on a thin mantle of soil with sandstone bedrock immediately below the ground surface. An auger test encountered sterile soil in Test Trench 2 and hit bedrock in Test Trench 1 (Table 16).

Table 16. Test Trench Data, LA 49185

Test	#1	#2
Depth	14 cm	18 cm
Stratigraphy	0-5 cm, loamy 5-10 cm, sandy with some clay 10-14 cm, clay with some sand 14 cm, bedrock	0-4 cm, loamy 4-10 cm, sandy 10-15 cm, sandy with some clay 15-18 cm, sterile
Artifacts	0	1

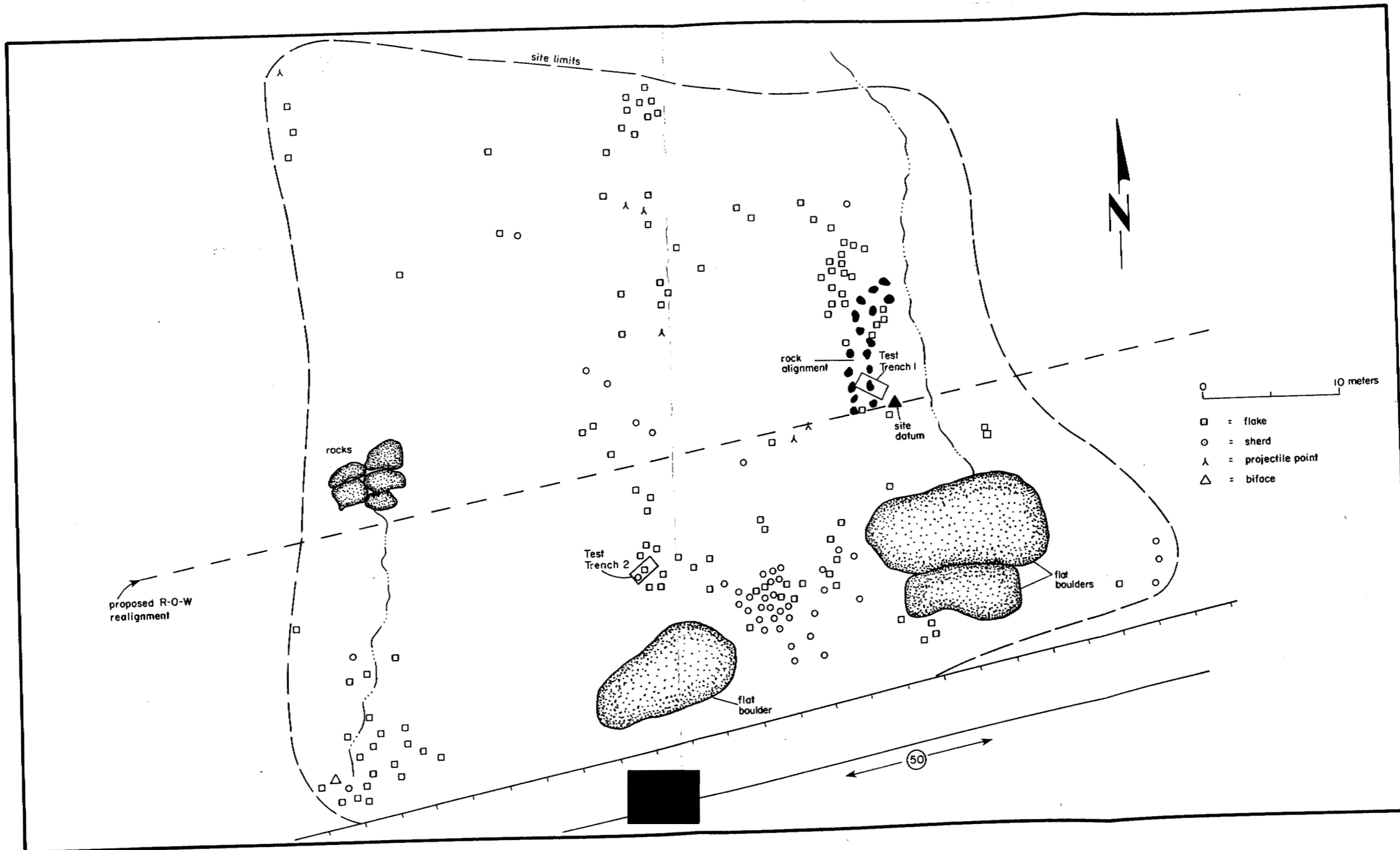


Figure 7. LA 49185, site plan.



Figure 8. Possible water control device, LA 49185.

Material Culture: A total of 145 artifacts were recorded from the site. Cultural material from within the proposed right-of-way was collected as well as additional diagnostic projectile points. Table 16 presents the artifact distribution on the site.

Table 17. Artifact Distribution, LA 49185

Locus	Ceramics	Lithics	Total
Surface	39	105	144
Surface stripping	-	1	1
TOTAL	39	106	145

Ceramics: All ceramics were collected from the surface of the proposed right-of-way. The various types are shown in Table 18.

Table 18. Ceramic Types, LA 49185

Type	Jar	Bowl	Ind.	Total	Percent
Glaze A	-	3*	-	3	7.7
Glaze E	-	3	-	3	7.7
Puname Polychrome	-	1	1	2	5.1
Tewa Red	3	-	-	3	7.7
Ind. Polychrome	-	3	2	5	12.8
Ind. Glaze	-	2	-	2	5.1
Plain Utility	15	-	3	18	46.2
Indeterminate	-	-	3	3	7.7
TOTAL	18	12	9	39	100.0

* includes one worked sherd

The ceramics exhibit a temporal range similar to LA 49194 with types extending from Glaze A to Tewa Red. This would suggest long-term use of the area, but evidently on a limited basis. Known dates for the assemblage ceramics range from A.D. 1315 to the early historic period. Dates include: Glaze A, A.D. 1315-1425; Glaze E, A.D. 1515-1650; Puname Polychrome, A.D. 1650-present; Tewa Red, A.D. 1650-present.

The plain utility ware has quartz temper similar to that at LA 32455 and LA 49184.

Lithic Artifacts: Table 19 presents the breakdown of lithic artifact types on the site.

Table 19. Lithic Artifact Types, LA 49185

Type	Number	Percent	Group Percent
Debitage (n=95)			89.7
Small angular debris	19	17.9	
Cortical flakes	73	68.9	
Trimming flakes	2	1.9	
Tools (n=10)			9.4

Type	Number	Percent	Group Percent
Projectile points	7	6.6	
Cutting tools	2	1.9	
Knife	1	.9	
Cores (n=1)	1	.9	
TOTAL	105	100.0	

The site has a high percentage of lithic debitage (89.7 percent) comparable to the figures for LA 32455 and LA 49184. Various stages of lithic reduction practices are evident for the site. Only three primary core reduction flakes were recovered from the site compared to 22 secondary reduction and 48 tertiary flakes. A single chert core, weighing 574 g, further suggests that minimal initial reduction of cores took place. Raw material was brought to the site already reduced. The high frequency of tertiary flakes and the several trimming flakes indicate that tool preparation or resharpening was a part of the activities that occurred on the site.

Most flakes have prepared faceted platforms (75.3 percent), while the remainder have unprepared cortical platforms (16.4 percent), or the platform is missing (8.2 percent). The various types of platform preparations may be the result of different occupations of the site area as represented by the ceramic assemblage. Both types represented in the assemblage reflect expedient core reduction techniques.

Marginal retouch is present on only six flakes, all of which are unidirectional. The high edge angles (>50 degrees) associated with the retouch may reflect scraping use for these flakes.

Seven projectile points, one knife, and two flakes, probably used for cutting, were recovered from the site. Three of the projectile points are obsidian (from Jemez and Polvadera), three are chert, and one is chalcedony. All have at least a portion of the body missing. Three of the points are triangular, without notches, but with slightly convex bases (Fig. 5e, f), and different sizes. One exhibits poor workmanship, while the other two are better made. A single gray chert projectile point is missing two tangs and the base and may have been corner-notched (Fig. 5a). It is serrated along both edges, which Kidder (1932:23) states is an exceedingly rare form at Pecos Pueblo. The remaining three points are badly fragmented with two of them probably representing small corner-notched projectiles and the other a triangular point with a straight base. Projectile point data is shown in Table 20.

A single leaf-shaped knife of chert was recovered from LA 49185 (Fig. 5h). Duplicates of this type were found at Pecos by Kidder (1932:16); however, they are rare. The knife is pointed at both ends, but as Kidder observes, one end is more acute than the other. The artifact measures 4.8 cm in length, 2.0 cm wide, and 1.0 cm thick.

Table 20. Projectile Point Data, LA 49185

Point	Material	Length	Width	Thick-ness	Notched	Serrated
g	Polvadera obsidian	1.4 cm	1.2 cm	.3 cm	-	-
h	chert	1.6 cm	2.0 cm	.3 cm	-	-
i	chert	1.9 cm	1.3 cm	.3 cm	-	-
j	chert	1.8 cm	1.2 cm	.3 cm	corner	yes
l	chalcedony	1.3 cm	1.2 cm	.3 cm	corner	-
m	Jemez obsidian	1.3 cm	1.3 cm	.2 cm	-	-
n	Jemez obsidian	1.5 cm	1.3 cm	.3 cm	corner	-

Two flakes used as cutting implements are chert and Jemez obsidian. Both are bimarginally flaked with edge angles of 55 and 40 degrees respectively. They both exhibit bidirectional rounding on the straight edged sides of the flake.

The breakdown of lithic material types from LA 49185 is presented in Table 21.

Table 21. Lithic Material Types, LA 49185

Material	Flakes	Debris	Tools	Proj. Pts.	Cores	Total	%
Chalcedony	25	5	-	1	-	31	29.5
Chert	41	12	2	3	1	59	56.2
Obsidian	4	2	1	3	-	10	9.5
Quartzite	5	-	-	-	-	5	4.8
TOTAL	75	19	3	7	1	105	99.0

Chipped stone raw material is available locally and is similar to that used at LA 32455 and LA 49184.

Site Summary: LA 49185 is represented by a ceramic and lithic artifact scatter and a single rock alignment that may possibly indicate the use of water control techniques. The temporally varied site ceramics and differing flake production methods suggest a repeated use of the area

beginning in approximately A.D. 1315 up to the early Historic period. The presence of projectile points and cutting tools indicates that the site was geared to hunting activities and perhaps served as a location for field crops because of the possible diversion channel present on the site. We believe that no further important information can be gained from continued study of the site.

LA 49186

Site Description: The site consists of an eroded alignment of sandstone slabs, representing a probable fieldhouse, surrounded by sparse ceramic and lithic artifacts (Fig. 9). The site sits on the [REDACTED] by [REDACTED] [REDACTED] overlooks Glorieta Creek and Valley immediately to the south. Surrounding vegetation includes piñon, juniper, and ponderosa pine at an elevation of 2,182 m. Site dimensions are 18 m east-west by 9 m north-south, covering an area of 130 sq m within the proposed right-of-way.

Ownership: Private and highway right-of-way acquired from private sources.

Testing Methods: An L-shaped alignment appeared to represent a possible structure on the site. Therefore a 2 by 1 m test trench was placed in the corner of the alignment. Soil was removed in 2 cm levels to a depth of 27 cm by trowel to preserve any floor or use surface that may have remained. Charcoal was present in the fill within the alignment, concentrating in the south end of the trench as excavation proceeded. Further examination of the area yielded no definition to the charcoal; however, small patches of ash did show up. Radiocarbon samples were taken from within this alignment and submitted to Beta Analytic, Inc. for dating.

A compact surface was found at 6 cm below the present ground surface. The loose 5 cm of alluvial soil was swept off in an attempt to locate the remaining two walls. None were found. The two existing walls are closely placed dry-laid sandstone. The greatest height is 30 cm on the northwest wall. The structure sits on the crest of the ridge and the ground slopes away quickly to the east, south, and southeast probably causing the remainder of the feature to erode away.

Material Culture: A total of 15 artifacts were recovered from LA 49186. These include six sherds, eight lithic artifacts, and one ground stone fragment.

Ceramics: The six sherds include: one plain utility ware with quartz temper; one Glaze A bowl sherd; three indeterminate glaze ware bowl sherds; and one indeterminate red ware bowl sherd.

The Glaze A sherd can be dated between A.D. 1315 and 1425. The three indeterminate glaze sherds would likewise post-date A.D. 1300. The plain utility ware with quartz temper is comparable to several found on other sites on this project.

Lithic Artifacts: The eight chipped stone artifacts are categorized by artifact type in Table 22. The material types of these artifacts are shown in Table 23.

The chipped stone artifact assemblage is too small to make any determination of core reduction or modification strategies. The presence of a projectile point and an axe suggest hunting and agricultural pursuits took place in the locale. The projectile point is the midsection of a small white chalcedony point. The basal portion and the tip are missing. The fragmentary length is 1.1 cm, width is 1.0 cm, and thickness is 2.0 cm. It is characteristic of the small projectile points used by Pueblo Indians of the area.

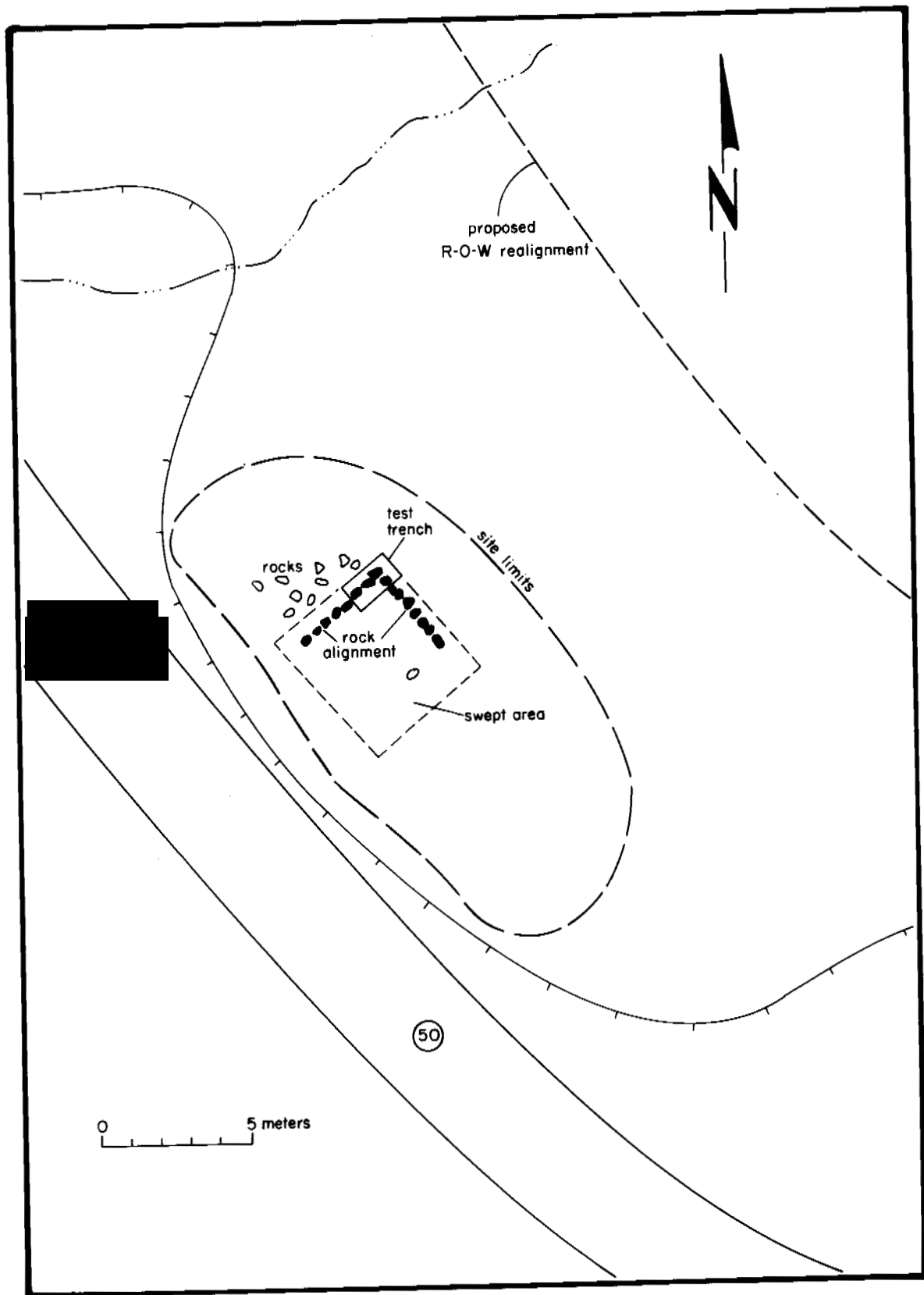


Figure 9. LA 49186, site plan.

Site Summary: LA 49186 is thought to represent the eroded remains of a small fieldhouse overlooking potential agricultural fields, now plowed, along Glorieta Creek to the south. The small size of the structure, the few artifacts, and the presence of an axe within the structure support this possibility. The radiocarbon dates from the interior of the structure and the glaze ware sherds from the surface of the site are not compatible. Based on the well-established chronologies for ceramic glaze wares, we lean toward a post-A.D. 1315 date for the site. Because of the eroded nature of the fieldwork, no further work is considered necessary for the site.

Site Description: The site consists of several large sandstone boulders forming a small natural overhang that may have been used as a rockshelter (Figs. 10, 11). A small opening in the back of the overhang has been loosely blocked with sandstone rubble 35 cm high. The boulders sit at the base of a steep hilly area with the front of the shelter sloping away steeply to the south and overlooking the valley of Glorieta Creek. The overhang measures .75 m by 1.35 m with an overhead space of .69 m. The ground surface of the overhang is loose, alluvial fill. The site may be located on USGS 7.5' Pecos Quadrangle at an elevation of 2,194 m.

Ownership: U.S. Forest Service.

Testing Methods: A 50 cm by 50 cm test pit was placed at the entrance to the small overhang. Soil was excavated and screened in arbitrary 10 cm levels to a depth of 30-36 cm before reaching sandstone bedrock. Results of the test pit excavation are summarized: Level 1, 0-10 cm, no artifacts, no charcoal, no ash; Level 2, 11-20 cm, piece of clear glass (post-1930), two flecks of charcoal; Level 3, 20-36 cm, no artifacts, no charcoal, no ash.

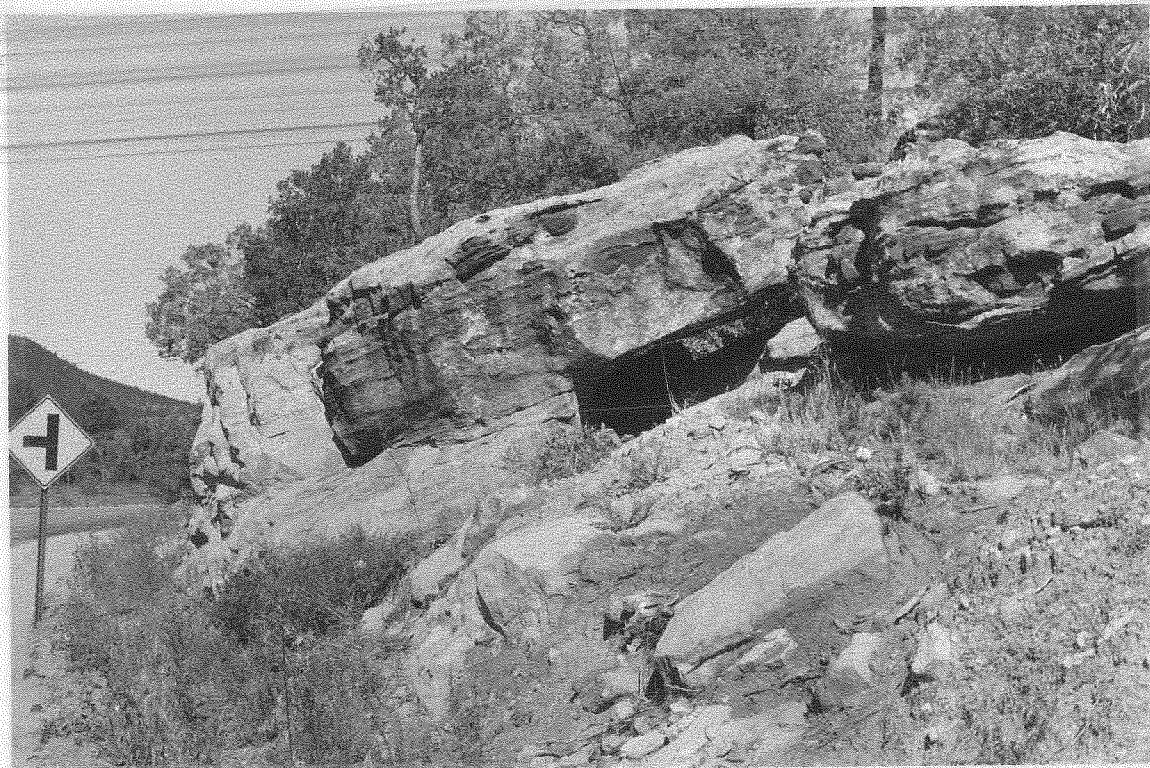


Figure 10. Rock overhang at LA 49187.

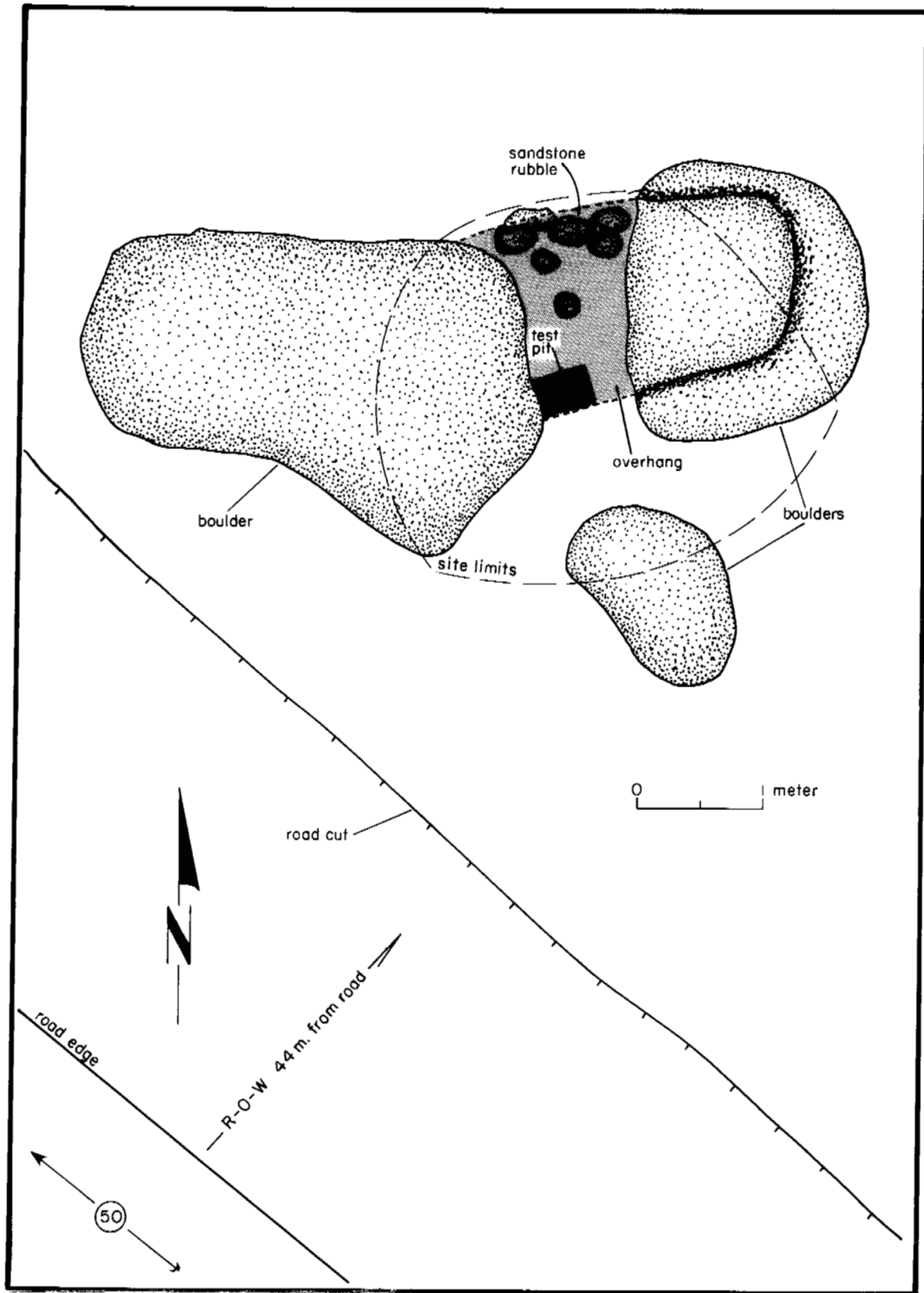


Figure 11. LA 49187, site plan.

Testing revealed no stratigraphic layering present within the pit. The presence of post-1930 glass in Level 2 indicates the mixing of any cultural deposits that may once have been in place. A steep slope southward from the overhang to the road edge was also examined for artifacts or burned material that may be eroding out of the overhang. A small fragment of burned bone, a chert flake, and a smudged sherd noted on the initial survey (Maxwell 1985) were no longer present and are presumed to have been washed away. Several pieces of recently manufactured glass fragments were present on the slope.

Material Culture: No artifacts were recovered from the testing program.

Site Summary: LA 49187 is a small overhang that shows evidence of minimum human use. It is too small to have been used as a shelter, but may have served as a storage, or cache, location. The presence of modern glass at 20 cm depth indicates some form of disturbance, human or animal, may have erased any evidence of former prehistoric use. No further archaeological work is recommended for the site.

LA 49188

Site Description: LA 49188 is a formation of sandstone boulders that has created a natural overhang (Figs. 12 and 13). The rocks sit 8.45 m from the north edge of State Road 50 at an elevation of 2,194 m in a piñon-juniper woodland zone. The overhang measures 5.05 m north-south by 2.75 m east-west by 1.25 m high at the opening. A natural opening between boulders is located in the roof of the possible shelter in the northeast corner. Soil inside the shelter was compacted and hard, suggesting repeated wetting over time. The roof of the overhang near the front of the shelter exhibits some blackening from fire. Fragments of glass and a few sherds and lithic artifacts were found on the slope to the south of the shelter. On the east wall of the shelter, in black paint, is written a name and some graphics:

L.O. WILEY
MAY, 16
W----- A.D. 1875

An arrow is painted on the wall to the left of the inscription.

Ownership: Private and highway right-of-way acquired from private sources.

Testing Methods: One 50 by 50 cm test pit was placed near the front of the rock shelter and another downslope outside of the shelter (Fig. 14). Both were excavated in 10 cm levels until sandstone bedrock was reached. In Test Pit 1, inside the shelter, patches of ashy soil were encountered at 24 cm depth and by 30 cm, a small area (10 by 4 cm) of white ash with reddened soil was found. Artifacts from the test pit include one indeterminate glaze sherd, four fragments of glass, and one kernel of corn, all located between 15 and 45 cm below the surface. The trench was excavated to a depth of 50 cm. Mixing of historic with prehistoric artifacts is evident throughout the test pit.

Test Pit 2 was located downslope from the mouth of the shelter and was excavated to a depth of 80 cm below ground surface. No cultural material was found in this test pit.

Six trowel tests were used in the remaining shelter area under the overhang to confirm the presence of mixed deposits. The tests consisted of parting the soil with a trowel so that a profile of the soil could be seen.

Material Culture: There were six prehistoric artifacts recovered from LA 49188. Locations of these materials are shown in Table 24.

Ceramics: The four ceramic artifacts are shown in Table 25. Only the Glaze C sherd can be temporally placed between A.D. 1425 and A.D. 1490. The plain utility ware has the quartz temper in similar sherds found on this project.

Lithic Artifacts: The two lithic pieces consist of a single gray chert flake and a piece of red chert angular debris. The flake is a secondary core flake with cortex present only on the faceted platform. It does not exhibit wear. The angular debris likewise shows no use.

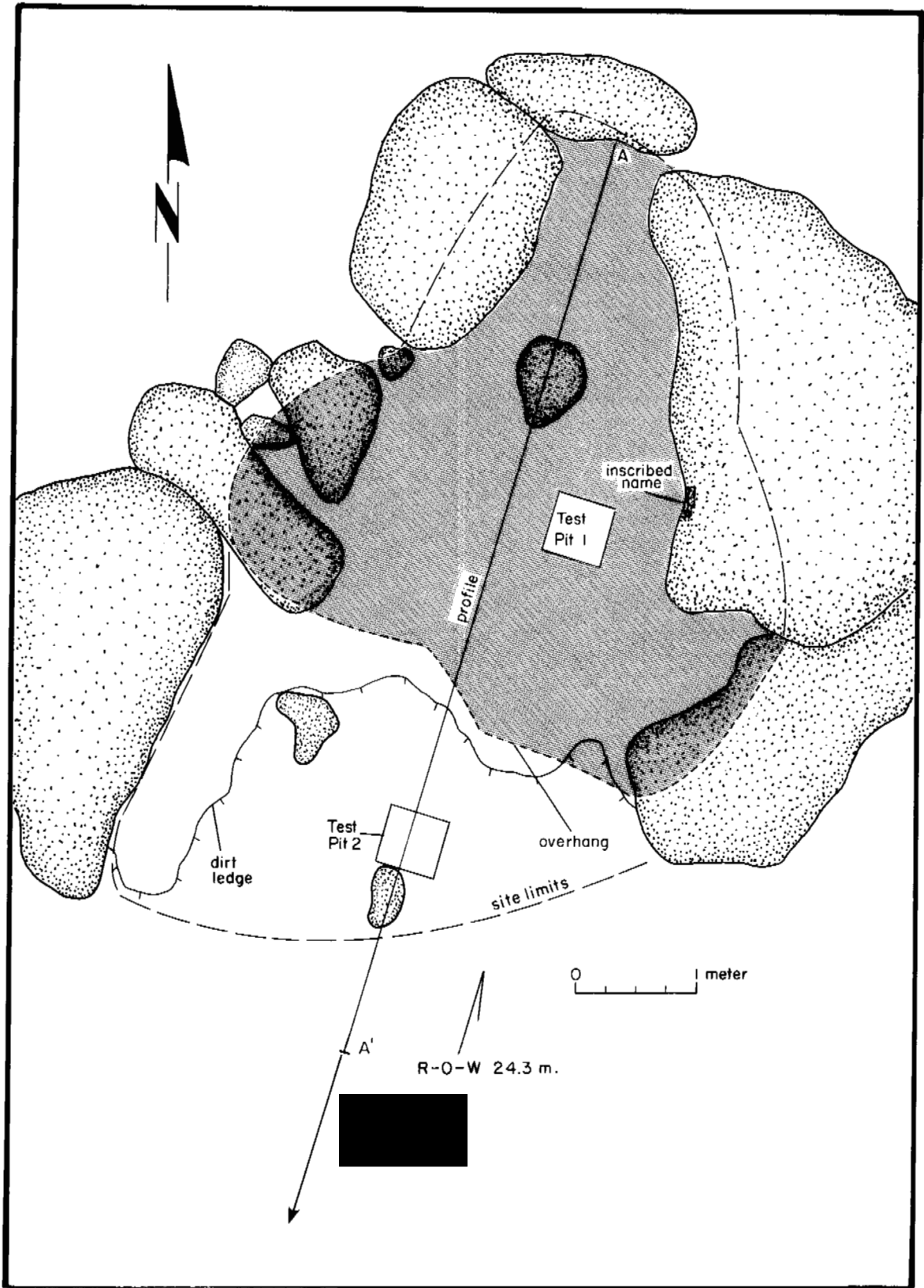
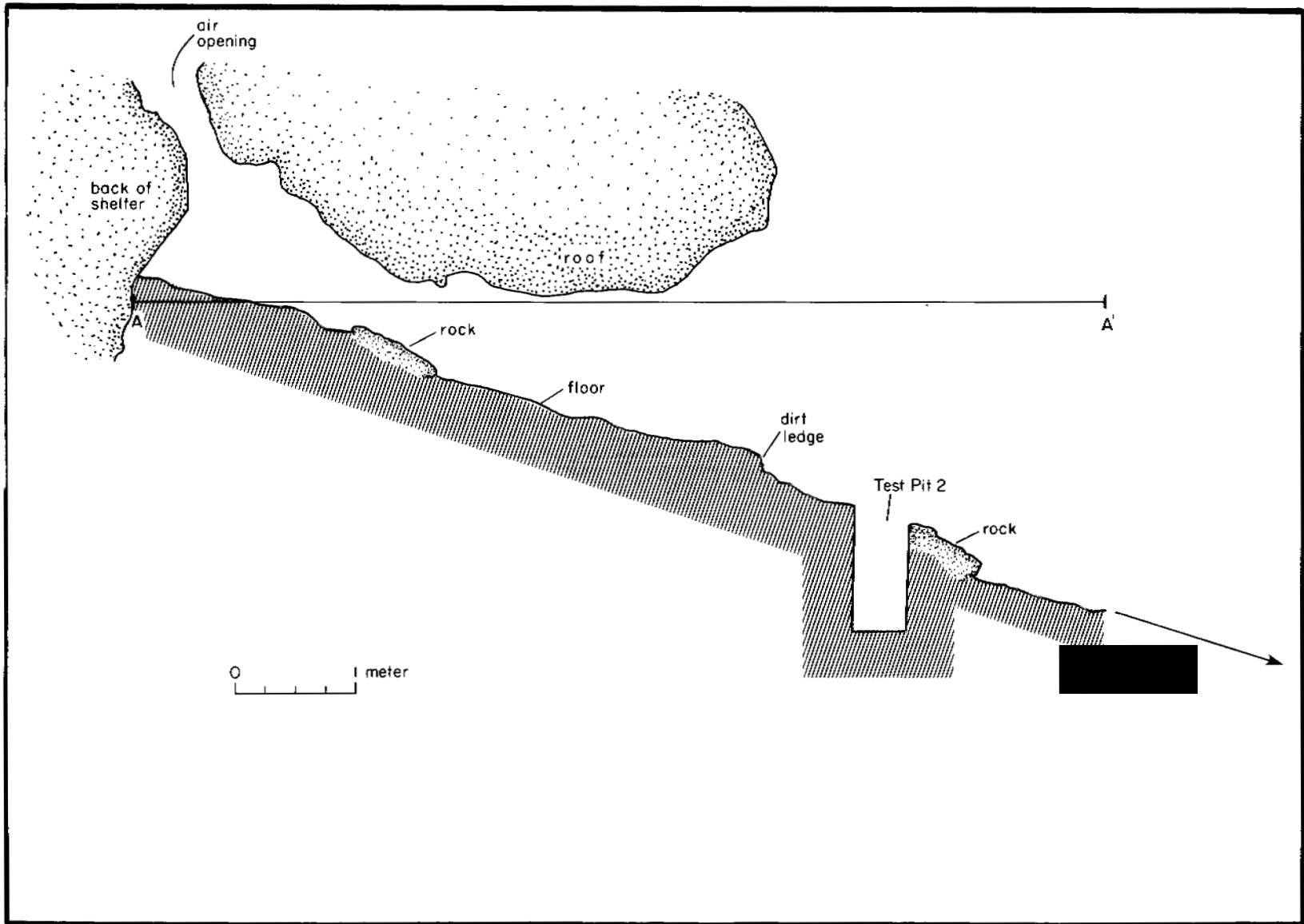


Figure 12. LA 49188, site plan.

Figure 13. Profile of rockshelter, LA 49188.



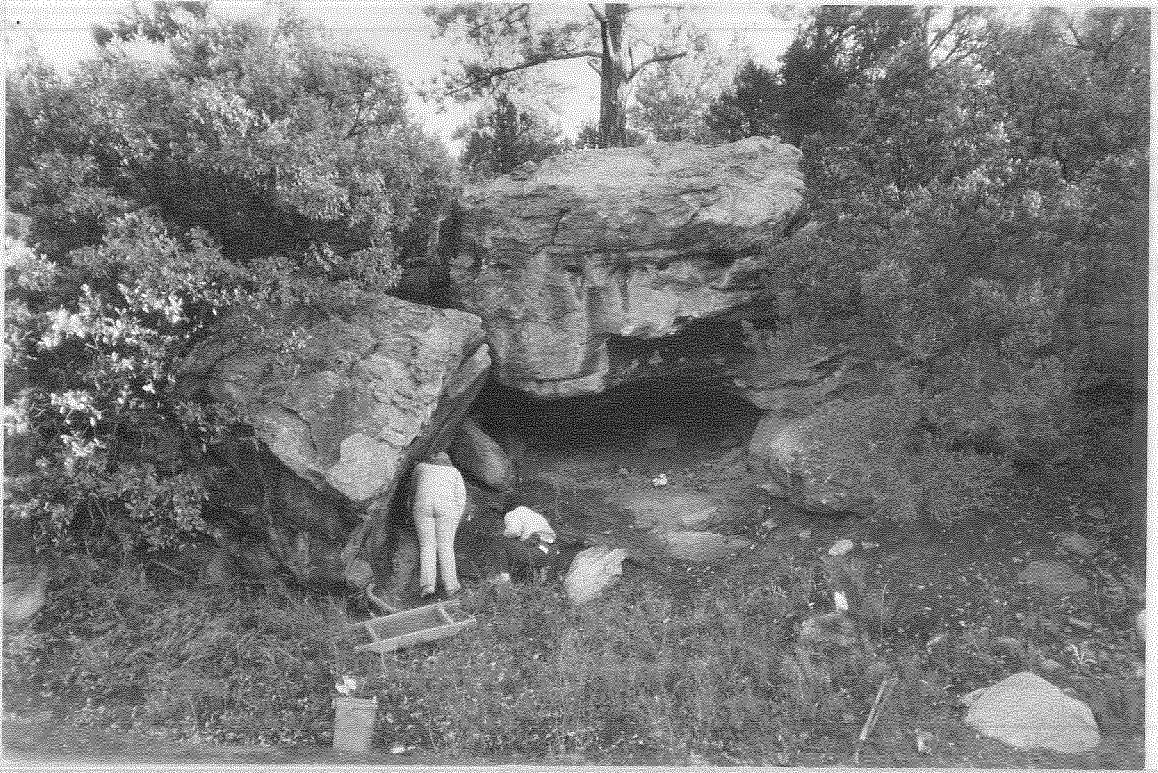


Figure 14. Rockshelter, LA 49188.

Table 24. Artifact Distribution, LA 49188

Locus	Ceramics	Lithics	Total
Test Pit 1	1	-	1
Down slope	2	1	3
Behind shelter	1	1	2
Total	4	2	6

Table 25. Ceramic Types, LA 49188

Types	Jar	Bowl	Total	Percent
Glaze C	-	1	1	25
Indeter. Glaze	-	1	1	25
Plain utility	2	-	2	50
Total	2	2	4	100

Vegetal Material: One kernel of corn was recovered from Test Pit 1 at 15 cm depth along with several pieces of glass. The kernel was examined by an ethnobotanist and determined to be of the dent type. It is wide, flat, and only partially complete. Based on its good preservation and association with historic artifacts, it is likely that the corn is of modern origin.

Site Summary: LA 49188 is a sandstone rock shelter that probably saw limited prehistoric and historic use. Soil within the shelter is badly disturbed, evidencing mixing of cultural material. Its proximity to State Road 50 has made it extremely accessible to dogs and children in recent times. We believe that the information potential of the rock shelter has been exhausted and no further work is recommended.

Site Description: The site consists of a natural overhang of sandstone boulders which form a low shelter. It sits in a piñon, juniper, and ponderosa pine environment a [REDACTED] (Figs. 15 and 16). The shelter measures 3.45 m east-west by 7.4 m north-south at its maximum length and has an average height of 92 cm. The roof of the overhang is blackened above some existing burned wood fragments. The dark soil is very loose and silty. Flecks of charcoal are visible in the soil. The front of the shelter slopes gently down to State Road 50. Pieces of broken glass lay on the surface within the shelter. Several pieces of sandstone protrude from the soil within the shelter. Two sherds were observed on survey downslope from the shelter.

Ownership: Private and highway right-of-way acquired from private sources.

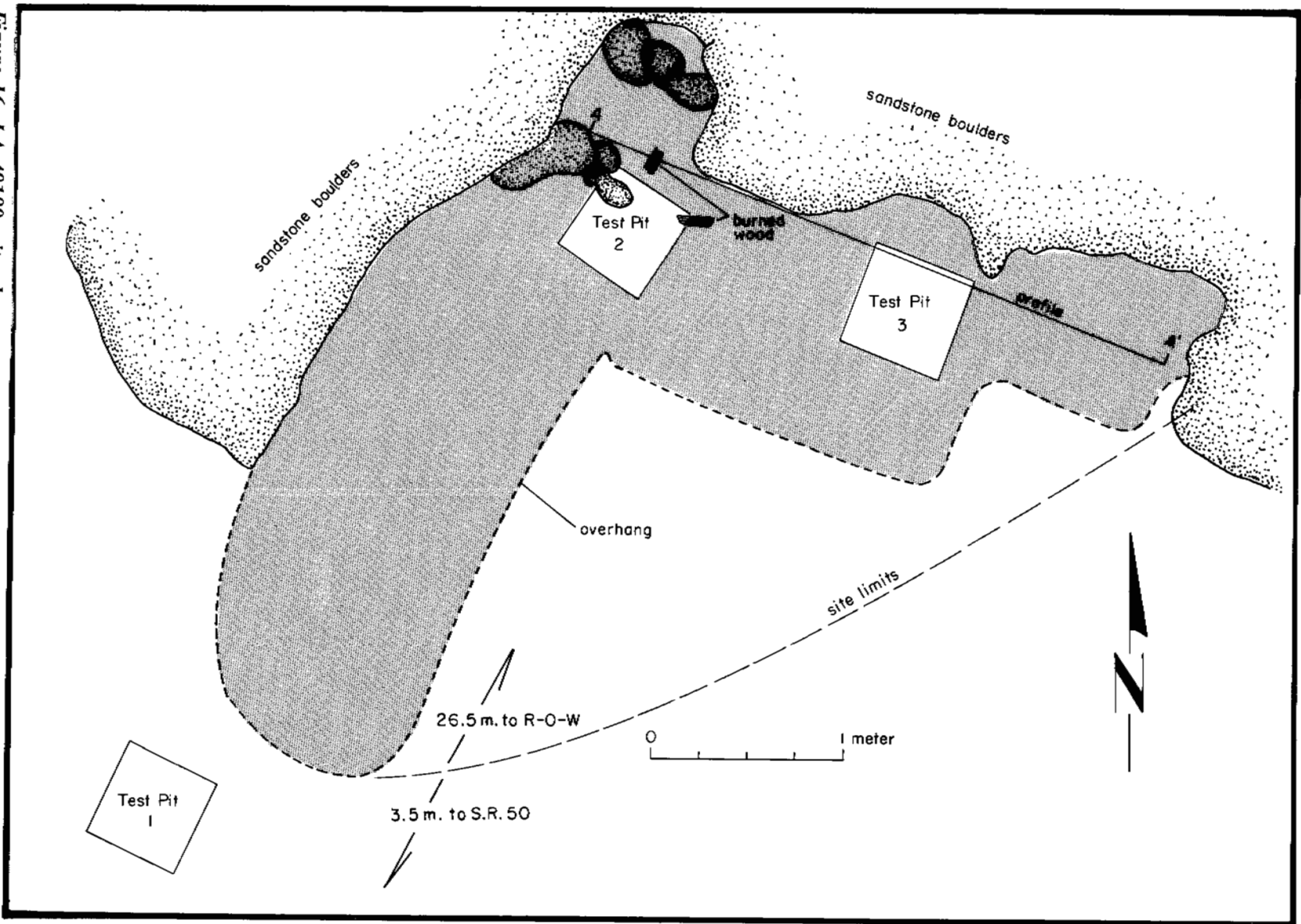
Testing Methods: Two 50 by 50 cm test pits were placed inside of the overhang and one downslope from it. Excavations were conducted in 3 cm levels and profiles were drawn of each test pit and the interior of the shelter (Fig. 17).

Test Pit 1 was located outside of the shelter where soil appears to be a dark alluvium. Charcoal flecks were noted down to 51 cm below the surface throughout the pit, which was excavated to 81 cm depth. Nine sherds were recovered at depths between 3 and 27 cm. Two lithic artifacts were found between 3 and 9 cm depth. No lensing of soil was apparent.



Figure 15. Interior of rockshelter, LA 49189.

Figure 16. LA 49189, site plan.



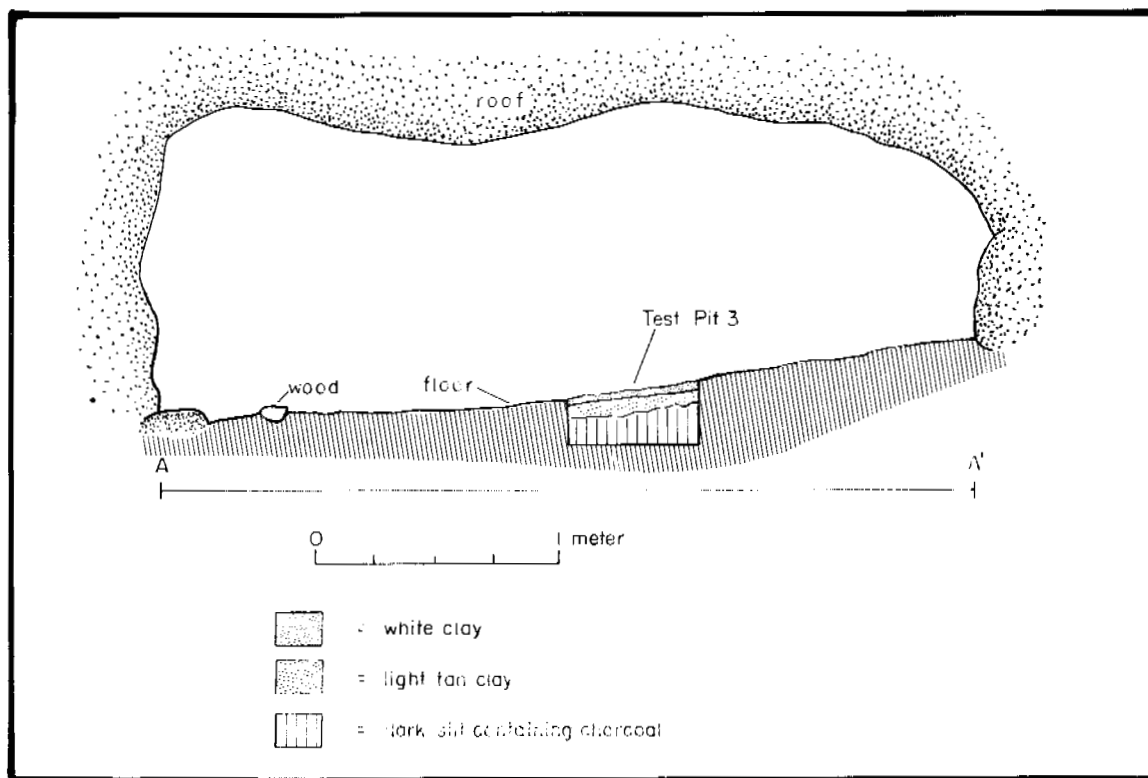


Figure 17. Profile of rockshelter, LA 49189.

Test Pit 2 was placed inside of the shelter at the locus of some burned wood fragments and underneath the blackened portion of the roof. Soil here was very silty. Bedrock was encountered at a depth of 10 cm in the northwest corner sloping to 19 cm in the southwest corner. One lithic artifact was recovered at 12 cm depth and one sherd at 6 cm. Glass fragments were mixed throughout. Patches of ashy soil were also encountered; however, the lack of stratigraphy and mixing of historic and prehistoric artifacts indicates that the soil has been disturbed.

Test Pit 3 was placed in the center of the overhang. The loose, silty soil was excavated to a depth of 21 cm before encountering sandstone bedrock. A few charcoal flecks were present in the pit but no other cultural material was present.

Material Culture: A total of 13 artifacts were recovered from LA 49189. Table 26 shows the distribution of these materials.

Table 26. Artifact Distribution, LA 49189

Locus	Ceramics	Lithics	Total
Test Pit 1	9	2	11
Test Pit 2	1	1	2
Total	10	3	13

Ceramics: The majority of sherds were recovered from Test Pit 1 downslope from the overhang. The breakdown of sherds by type is shown in Table 27. All sherds represented utility wares and most were too small to assign to types. No dates for the ceramic assemblage are posited because of the long temporal range of utility wares and the lack of large pieces.

Table 27. Ceramic Types, LA 49189

Type	Jar	Bowl	Indeter.	Total	Percent
Plain utility	-	1	3	4	40
Indet. smudged	-	-	3	3	30
Indeter.	2	1	-	3	30
Total	2	2	6	10	100

Lithic Artifacts: Three lithic artifacts were recovered from LA 49189. Two chert core flakes from Test Pit 1 exhibited no wear or retouch. One exhibited a faceted platform, the other had no platform. A chert thinning flake from Test Pit 2 comes from an indeterminate core or tool. It has a faceted platform.

Site Summary: The sandstone boulders display evidence of both prehistoric and historic use, probably as a shelter. However, mixing of cultural lenses was apparent in the test pits. Like LA 49188, the site is [REDACTED] se [REDACTED] [REDACTED] [REDACTED] It is believed that no further potential for important information exists on the site.

LA 50098

Site Description: The site is located within the [redacted] ng [redacted]. It is a lithic artifact scatter measuring 42 m north-south by 16 m east-west covering 540 square m and sitting on the remnant of a bench overlooking Glorieta Creek (Fig. 18). The site has obviously been cut to the west by earlier [redacted] highway construction activities. A few artifacts extend to the [redacted] e [redacted]

The soil is a dark loam, loose and aerated; the entire site may have been seeded in the past. Pieces of sandstone and micaceous schist are found throughout the soil. In the northeast portion of the site the soil has been disturbed by heavy equipment. The artifact distribution may be partially a result of modern scraping of the right-of-way surface. It is found on USGS 7.5' Glorieta Quadrangle at an elevation of 2,258 m.

Ownership: Highway right-of-way acquired from private sources.

Testing Methods: This site was tested about six months prior to the start of work at the other sites on the Glorieta project. Testing methods are somewhat different than for the other sites. A site datum was established and the area was divided into 2 by 2 m grids for surface collecting and for subsequent test excavations. A total of 43 collection units and 4 test grids were selected on the basis of highest artifact count. Excavation proceeded until sterile soil was reached. Augers were used to insure that the soil was sterile. Table 28 gives the results of the test excavations.

Table 28. Test Trench Data, LA 50098

Test	Depth	Auger	Stratigraphy	Artifacts
13N/10W	10 cm	35 cm	dark clay, loam	-
16N/12W	25 cm	55 cm	dark, loose loam	-
22N/10W	13 cm	40 cm	reddish clay, worms	1
25N/12W	10 cm	27 cm	reddish clay, charcoal flecks	6

In general, the soil on the site was a dark, loose loamy soil with the frequent recovery of worms. Between 5 to 10 cm depth, the soil gradually changed to a reddish clay over most of the site. Augering indicated that this was a sterile substrate.

Material Culture: A total of 142 lithic artifacts were recovered during the testing program at LA 50098. No ceramics were found. Distribution of these materials is shown in Fig. 19.

Lithic Artifacts: The composition of the lithic artifact assemblage is indicated in Table 29. This site is notably different from the other sites on the Glorieta project, particularly in the high percentage of tool flakes and tools compared to debitage with a ratio of 1.4 to 1. The lack of cores and no cortical flakes with platforms or 100 percent dorsal cortex indicates that primary core reduction probably did not occur on the site. A total of 40 of 45 cortical flakes

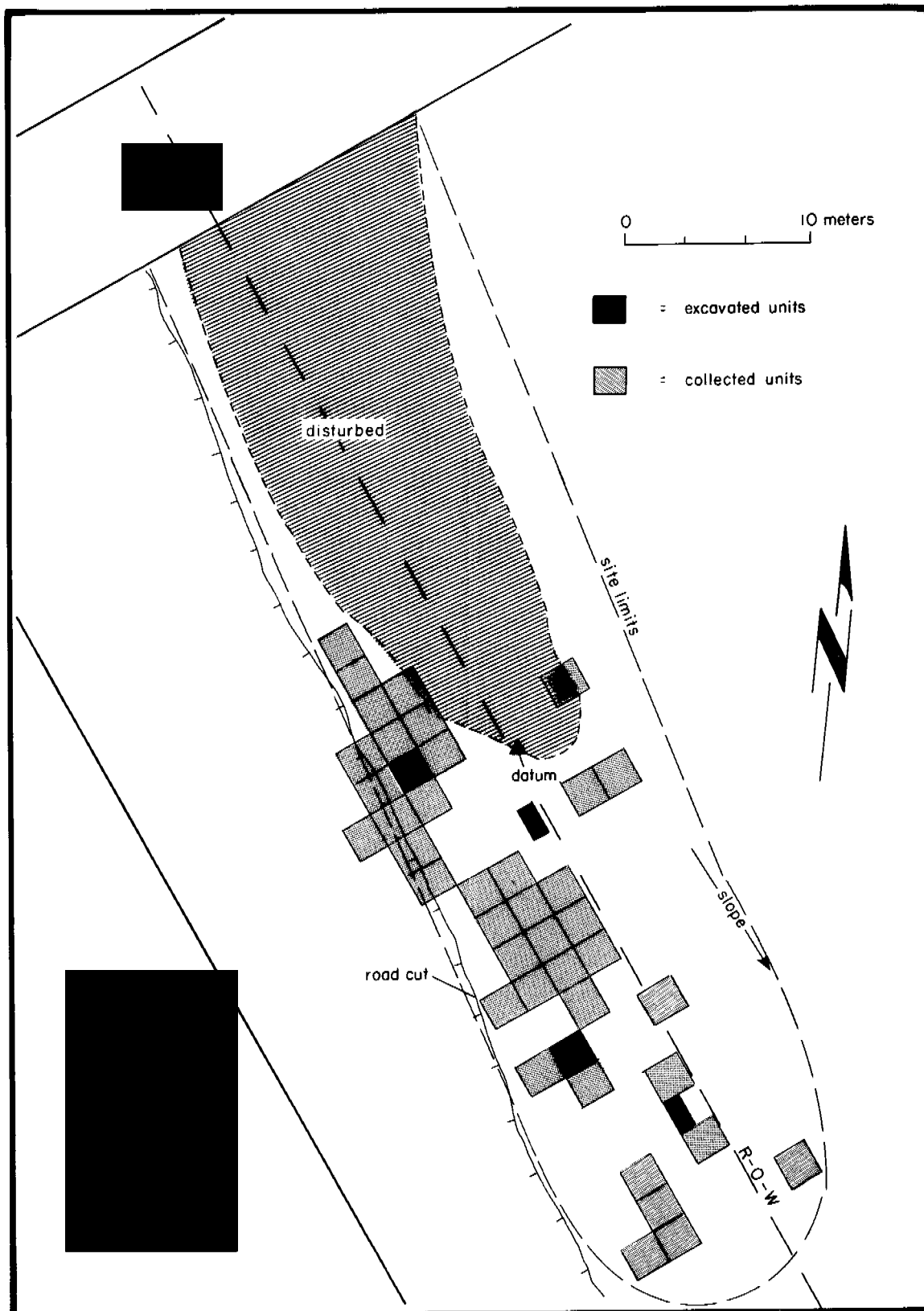


Figure 18. LA 50098, site plan.

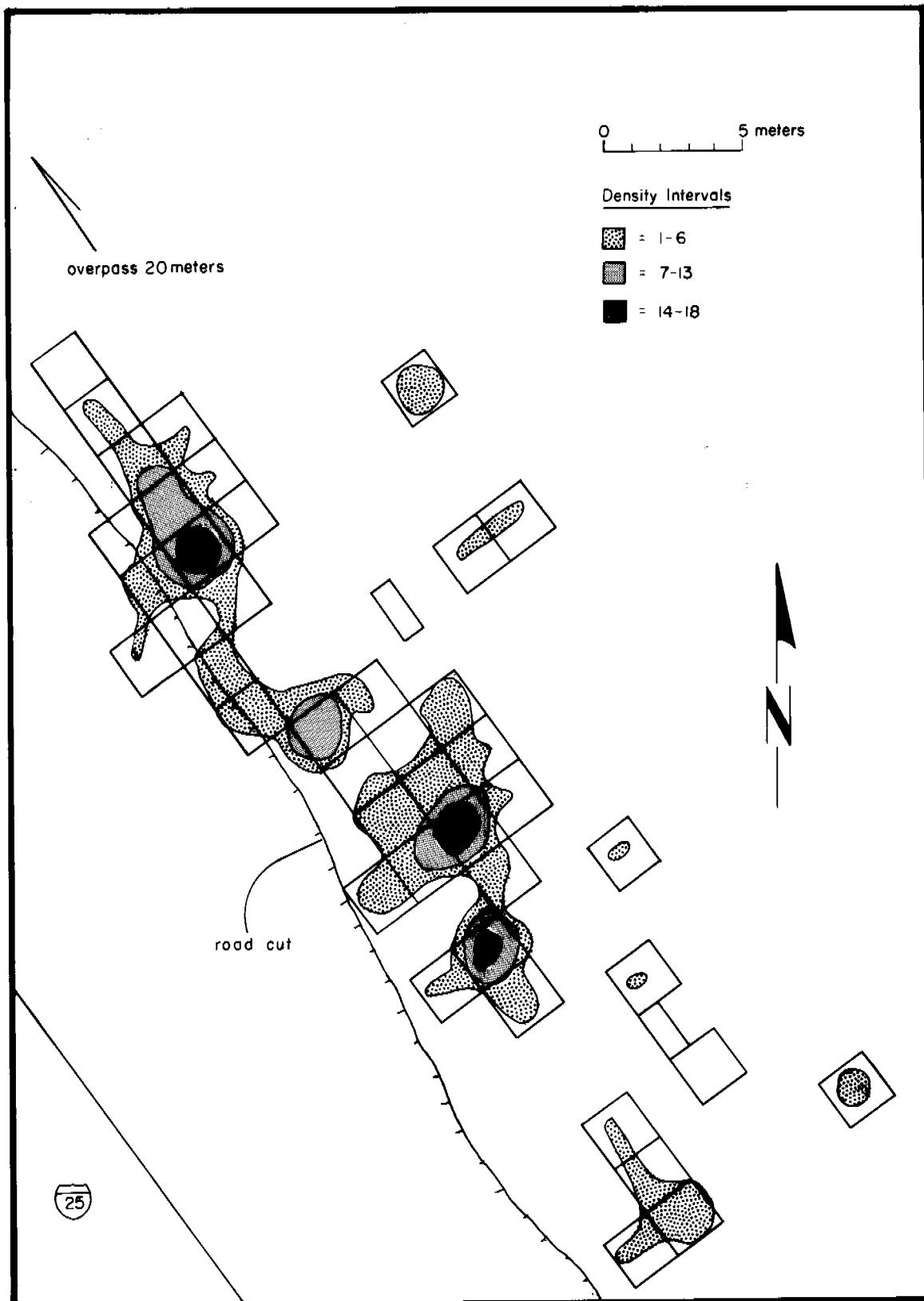


Figure 19. Distribution of artifacts, LA 50098.

Table 29. Lithic Artifact Types, LA 50098

Type	Number	Percent	Group %
Debitage (n = 59)			41.5
Small angular debris	9	6.3	
Cortical flakes	45	31.6	
Biface flakes	5	3.5	
Tools (n = 83)			58.5
Uniface scraper	26	18.3	
Modified flakes	50	35.2	
Utilized flakes	2	1.4	
Projectile points	3	2.1	
Bifaces	2	1.4	
TOTALS	142	100.1	

(88.9 percent) had no cortex present at all. The high number of this type of cortical flake along with biface, and unifacial scraper flakes indicates that tertiary flake reduction was a major activity on the site. This reduction strategy is used for retouching tools or flakes that have been previously produced.

Modification occurs on 34.5 percent of the assemblage material with no wear apparent. Only two flakes show wear, both bidirectional. Platforms found on the flake types are varied. Three different platform types found mostly on the site include faceted (34.9 percent), unidirectional retouch (24.4 percent), and collapsed (24.4 percent). The faceted platforms, prepared by removing one or more flakes to create a scar, which then serves as a striking platform, is found mostly on the cortical flakes. The unidirectionally retouched platforms indicate remnant edge margins of unidirectionally retouched artifacts. This type of artifact on the site suggests the use of many of the tools for scraping activities.

Bidirectional tool use is also evident in the artifact assemblage as indicated by five biface flakes, two utilized flakes with bidirectional scarring, two bifaces, and four projectile points. One complete biface tool was recovered (Fig. 5i). It is leaf-shaped with both edge angles at 40 degrees. No notches or grinding of edges is evident, nor is there any use-wear visible on the margins. This type of biface was recovered by Kidder at Pecos Pueblo and he terms it a knife (Kidder 1932:16). The other artifact is the lateral portion of a biface that probably was broken in manufacture. No wear was present.

The three recovered projectile points include one basally and side-notched obsidian point (probably from Jemez) with a snapped tip. It is very small, measuring 14 mm by 9 mm by 3

Table 30. Lithic Material Types, LA 50098

Material	Artifacts	Points/Bifaces	Total	Percent
Basalt	1	-	1	.2
Chalcedony	53	1	54	38.0
Chert	39	2	41	29.9
Igneous	2	-	2	1.4
Obsidian	40	3	43	30.3
Silicified wood	1	-	1	.2
Total	36	6	142	100.0

mm and is crudely produced. This form of projectile point is not recorded at Pecos by Kidder (1932). The two other projectile points are both tip fragments with no wear visible on the margins. Lithic material types from LA 50098 are presented in Table 30.

At LA 50098, the minor presence of basalt, silicified wood, and igneous material is not significant numerically, but it does represent the only occurrence of these material types found on the Glorieta project. Also, the incidence of obsidian (30.3 percent) on the site is much higher than recovered from the other sites. The obsidian appears to all be of the Jemez type, while the source of the single piece of silicified wood is unknown. All other materials are locally available.

Site Summary: Based on the high tool and tool flake to debitage ratio of 1.4 to 1, the lack of cores and lack of cortex on flake debitage, the lithic assemblage at LA 50098 may be indicative of tool retouching and reduction strategies associated with hunting and processing activities. Material is present on the site in an already reduced state indicating transport from the initial locus of production. Both scraping and cutting activities are evidenced for the site in the high numbers of flakes from both types of tools.

Because of the different percentages of material types found on the site from those on the other Glorieta sites and the high comparative frequency of tool flakes, LA 50098 appears to differ significantly from these sites. Comparisons between all sites will be made in the following chapter. Because of the testing and collection procedures on the site, it is believed that the information potential of the site has been exhausted.

SITE COMPARISONS

Ceramics

The total number of recovered ceramic material from six sites totals only 103 sherds. Little other than variations in time frames can be discussed given the small number of artifacts. An examination of functional comparisons for the sites, ceramic distribution studies, and measurement data are not statistically valid for the project assemblage.

The ceramic artifacts from the various sites display a wide range of dates from ca. A.D. 1200 to post-1650. No two sites possess similar ceramic assemblages (Fig. 20); however, four of the five ceramic sites contain Glaze A sherds, which date between A.D. 1315 and 1425. The assemblages on most sites indicate repeated occupation over time rather than use at a single time. A strong indication for historic use is also suggested for three of the sites as shown by the presence of Tewa reds and buffs that post-date 1650.

Chipped Stone

A total of 559 pieces of chipped stone were recovered on the project. All raw material used on the Glorieta sites are locally available except for obsidian. Bezy (1988:17) notes that igneous and metamorphic cobbles can be acquired from Glorieta Creek and its adjacent terraces, schists and quartzites from Glorieta Creek, and sandstone from surrounding mesas. He states that silicified wood, fibrolite axes, and obsidian are imported trade items, although as noted earlier, fibrolite and silicified wood may be locally available.

Table 31 lists the varying percentages of raw material types found on project sites. Three material types seem to be consistently selected by the various site occupants--chalcedony, chert, and to a lesser degree, obsidian. These apparent preferences were statistically examined through the use of the Student's t-distribution. First, sites employing similar percentages of chert and chalcedony were grouped, LA 32455 and LA 49184 versus LA 49185 and LA 49186 (LA 50098 was omitted because of its aforementioned lack of fit with either group). A mean percentage and standard deviation for the two groups was then formulated (Table 32).

The two means were then compared with a two-tailed t-test with infinite degrees of freedom and a 0.05 level of confidence. Results indicate that there are significant differences between the two site groups in the percentages of chalcedony and chert used on the sites. The reasons for this variation in raw material use between sites are not clear. It may be the result of preferential selection for one or the other, or it may be a factor of proximity to a raw material source. The two site groups are separated by a distance of over 3 km and local availability may change within that distance. A determination of known lithic sources in the project area could account for the difference but was beyond the scope of this study.

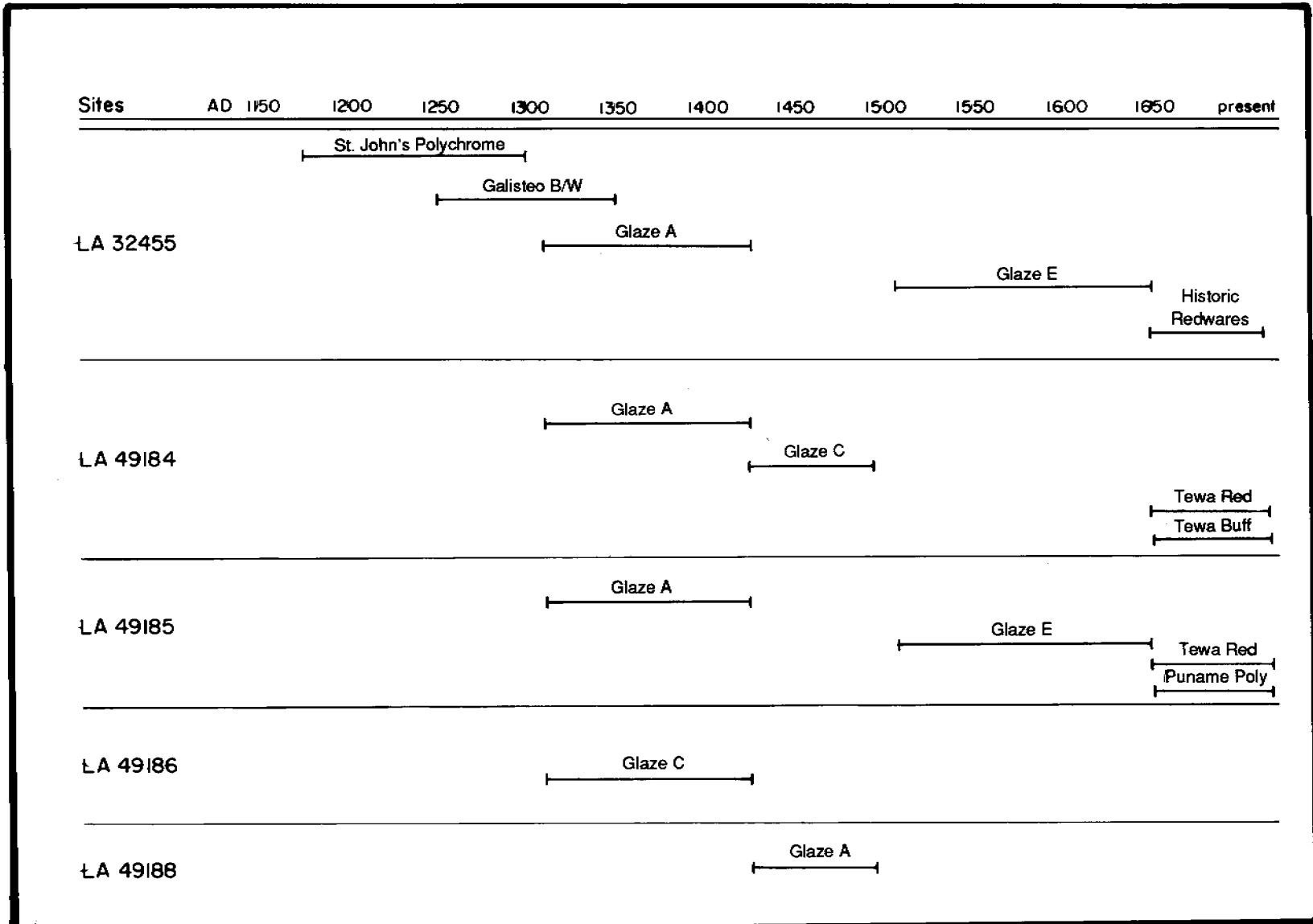


Figure 20. Comparison of ceramic dates from sites.

Table 31. Comparison of Raw Material Types

Material	32455	49184	49185	49186	49188	49189	50098
Basalt	-	-	-	-	-	-	.2
Chalcedony	64.6	63.4	29.5	25.0	-	-	38.0
Chert	16.9	23.8	56.2	50.0	100.0	100.0	29.9
Fibrolite	1.4	-	-	-	-	-	-
Granite	-	-	-	12.5	-	-	-
Igneous	-	-	-	-	-	-	1.4
Obsidian	7.0	8.8	9.5	-	-	-	30.3
Quartzite	9.9	3.1	4.8	-	-	-	-
Rhyolite	-	.4	-	-	-	-	-
Sil. wood	-	-	-	-	-	-	.2
Siltstone	-	.4	-	12.5	-	-	-

Table 32. Grouping of Sites by Mean Percentages of Material

Material	LA 32455/LA 49184	LA 49185/LA 49186
Chalcedony	63.7%	29.2%
Chert	22.5%	56.7%

Table 33. Comparison of Lithic Reduction Debris

Artifact	32455	49184	49185	49186	50098
Angular debris	31.0	16.7	17.9	25.0	6.3
Cortical flake	54.9	63.9	68.9	50.0	31.6
Trimming flake	1.4	11.9	1.9	-	3.5
Modified flake	4.2	3.1	-	-	35.2
Utilized flake	2.8	.8	2.8	12.5	21.0
Proj. pts.	2.8	2.2	6.6	12.5	2.1
Cores	2.8	1.3	.9	-	-

If preferential selection was operative in the use of raw materials, then we might expect the two sets of sites to perhaps be distinctive in other ways. We wanted to know if the two sites within each group could be related to the same settlement system. Therefore, we compared the lithic reduction debris recovered from all of the sites (Table 33).

Again, LA 50098 differs considerably from the other site assemblages. The remaining sites indicate a general congruence among the types of debris found on them. There is somewhat more angular debris present on LA 32455 and a slightly higher percentage of trimming flakes at LA 49184. Similar activities on these sites could have produced these generally comparable site assemblages.

The percentage of tools found on the sites is not high. A comparison of tool types left on the sites by prehistoric occupants is shown in Table 34.

Projectile points are the most common tool types found followed by bifaces and bidirectionally modified flakes while scraping tools, axes, and spokeshaves are single occurrences. The frequency of projectile points, bifacial, and bidirectional tools are an indication that hunting activities occurred or were being directed from the sites in Table 32. The axe and hafted tool suggest agricultural pursuits were also followed at LA 32455 and LA 49186.

Table 34. Comparison of Tool Types by Site

Tools	32455	49184	49185	49186	50098
Proj. pts.	2.8	2.2	6.6	12.5	2.1
Bifaces	-	.4	.9	-	1.4
Scraper/uniface	1.4	-	-	-	-
Bidirectional	-	-	1.9	-	1.4
Hafted	1.4	-	-	-	-
Spokeshave	-	.4	-	-	-
Axe	-	-	-	12.5	-

Site Types

Because of the small number of artifacts on each of the eight project sites, site functions are difficult to assess. Several types of sites are present on the project, however.

Aceramic Lithic Scatter (LA 50098)

This is the only site without ceramic material in combination with a number of lithic artifacts. The lack of congruence in the types of raw materials used and in the variety of artifact types

suggest that LA 50098 is dissimilar culturally to the other project sites. The artifact types, i.e., the projectile point and biface tools, suggest a hunting camp of unknown date. The lack of ceramics could place this site into the Archaic or the Plains cultures, but lack of diagnostic or datable material make this assessment difficult. The small size of the projectile point would tend to argue against an Archaic interpretation of the site, however.

Ceramic and Lithic Scatters (LA 32455, LA 49184, LA 49185)

LA 32455 is eroding downslope into the proposed right-of-way. No features were found within the tested area; however, a small pueblo habitation site is situated at the top of the slope. The hafted tool found on the site suggests agricultural pursuits were followed. Sherds on this site are widely varied temporally indicating repeated use from ca. A.D. 1200 to post-1650.

The artifact assemblage from LA 49184, specifically projectile points and bifaces, and the lack of structural features suggest that this was a resource procurement locale, probably for hunting. The site was used sparingly at various occasions over a long period of time from approximately A.D. 1350 to post-1650, based on the ceramic assemblage.

LA 49185 is also eroding downslope into the proposed right-of-way. An amorphous stone alignment was present on the site; however, it could not be confirmed to be a cultural manifestation. The site may represent a seasonal hunting camp used variously over time. Ceramic artifacts on the site indicate a time span from ca. A.D. 1300 to post-1650.

Fieldhouse (LA 49186)

This site is extremely eroded but seems to represent the remains of a small fieldhouse. The site sits on the first bench above Glorieta Creek and overlooks potential agricultural fields. The small but varied number of artifacts, the single room structure, the presence of an axe, and site location all tend to confirm this assessment. Only one datable Glaze A sherd, A.D. 1315-1450, can be assigned to the site. A corrected and calibrated radiocarbon date of A.D. 994 to 1192 does not fit with the ceramic date and seems too early.

Rock Shelters (LA 49187, LA 49188, LA 49189)

Each of these sites may have been used prehistorically as a short-term shelter or as a storage area for material goods. No artifacts were recovered from LA 49187 while the other two sites were greatly disturbed and produced a minimum number of artifacts. LA 49188 can be possibly dated to ca. A.D. 1425-1490 by the presence of a single Glaze C sherd, but this date is very tenuous.

CONCLUSIONS

All of these sites--hunting camps, rock shelters, fieldhouse, and possible small habitation unit--are compatible with the expected land-use patterns of the region during the Pueblo period. The large pueblo of Pecos dominated the area from approximately A.D. 1300 to its decline in the 1800s. Prior to this time, pithouse sites were prevalent around A.D. 800 (Nordby 1981:7) and small pueblo ruins were scattered throughout the valley by A.D. 1100. Consolidation into larger dwellings with associated kivas occurred by A.D. 1200s at such places as Forked Lightning and Arrowhead Mesa sites. However, by A.D. 1400, all smaller communities had joined together at Pecos, possibly because of harassment and raiding by nomadic Plains Indian groups (Kessell 1979:11). Another opinion, expressed by Nordby (1981:11), is that consolidation could have occurred because of the need for intensive maintenance of the irrigation system at Pecos. Pecos Pueblo agricultural subsistence of corn, beans, squash, and greens relied heavily on a dependable irrigation system.

For the project sites, very little recovered ceramic material dates prior to A.D. 1200. Use of most sites begins around A.D. 1300. This is the time of consolidation of villages and is in fact called the Coalition period. As the population grew during this time, the use of fieldhouses for attending to agricultural fields along streams and washes is first noted.

To summarize, Fliedner (1981) conducted an in-depth study of land-use patterns through time at Pecos Pueblo. Through field survey, he located and mapped 1,200 single-room structures that he interprets as fieldhouses. He shows that, as distance from the pueblo increases, the use of these fieldhouses changes. Within a 1 km radius from Pecos Pueblo, extensive ceramic debris was found on the sites. As distance from the pueblo exceeds 1 km, the use of fieldhouses expands to include hunting and gathering stations, based on the types of artifacts found at these distances.

Fliedner also notes that between A.D. 1250 and A.D. 1320, the cultivated land of the pueblo expanded considerably from about 80 ha to 550 ha and increased in extent up to at least 10 km from the pueblo. After the fourteenth century, the extent of agricultural area used by Pecos Pueblo oscillated several times as populations increased and waned. Fliedner (1981:73) believes that the final drop-off in site population occurred because the Pecos physical environment had been excessively stressed through time.

The presence of Glaze A sherds on nearly every project site corresponds with the initial expansion of fieldhouses and agricultural fields from Pecos Pueblo into outlying areas at ca. A.D. 1325. This is also the time when seven other pueblos, including nearby Arrowhead Mesa, were first settled, supposedly with people who would later move into Pecos Pueblo.

The presence of historic Tewa sherds (post-A.D. 1650) on project sites coincides with a strong decline in the use of outlying areas (Fliedner 1981:72). Why this occurred is somewhat of a mystery. There is a possibility that these late historic ceramics were left not by Pecos Pueblo or outlying village peoples, but by any number of other Pueblo or Plains groups traveling to or near Pecos for various purposes such as trade or resource procurement. For example, Gunnerson (1988:42) notes that by 1622, Apaches congregated at Pecos each

year by the hundreds to barter and trade. By the first half of the eighteenth century, Apaches were living near Pecos.

Management Recommendations

The Glorieta sites (LA 32455, 49184, 49185, 49186, 49187, 49188, 49189, and 50098) yielded no subsurface features and a limited range of artifact types, suggesting they were used intermittently over long periods of time. Based on the results of the testing program, we consider that the sites do not contain features or deposits likely to yield significant information. We do not recommend any further archaeological studies at these sites.

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