DATA RECOVERY AT LA 84318

A Multicomponent Artifact Scatter along the Pecos River near El Cerrito, San Miguel County, New Mexico

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MUSEUM OF NEW MEXICO
OFFICE OF ARCHAEOLOGICAL STUDIES
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Archaeology Notes 202
2000

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DATA RECOVERY AT LA 84318, A MULTICOMPONENT ARTIFACT SCATTER ALONG THE PECOS RIVER, NEAR EL CERRITO, SAN MIGUEL COUNTY, NEW MEXICO

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ARCHAEOLOGY NOTES 202

SANTA FE 2000 NEW MEXICO

ADMINISTRATIVE SUMMARY

In December 1991 and January 1992, the Office of Archaeological Studies, Museum of New Mexico, completed a data recovery program near El Cerrito, San Miguel County, New Mexico. The project was completed at the request of the New Mexico State Highway and Transportation Department (NMSHTD) in conjunction with road construction on County Road B27A.

The data recovery program focused on a portion of LA 84318 that extended into the right-of-way, which has been acquired from private sources by NMSHTD. LA 84318 was identified by survey and testing as a multicomponent lithic artifact scatter with the potential for intact cultural deposits. The cultural deposits were indicative of a long but discontinuous occupation by groups practicing a hunting and gathering subsistence strategy.

A large amount of tool manufacture debris and discarded tools were recovered from a small excavation area. Some of these artifacts were spatially associated with three fire-cracked rock concentrations that were probably the deflated remains of hearths. The artifacts and features remain from 5,000 years of periodic occupation of the site by Archaic, Pueblo, Athabaskan, and Hispano populations.

NMSHTD Project No. BR-0-7547(2), CN 10015
MNM Project No. 41.507 (El Cerrito Bridge)

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INTRODUCTION

During December 1991 and January 1992, at the request of the New Mexico State Highway and Transportation Department (NMSHTD), the Office of Archaeological Studies (OAS), Museum of New Mexico, conducted a data recovery program north of the bridge at El Cerrito along County Road B27A, San Miguel County, New Mexico, on private land that has since been acquired by the NMSHTD (Fig. 1 and Appendix 1). The data recovery effort focused on a portion of LA 84318 that extended into the right-of-way for a road realignment project.

The field phase of the data recovery effort was directed by Regge Wiseman. He was assisted by Natasha Williamson and Guadalupe Martinez of OAS and local residents hired for the project. Timothy D. Maxwell served as the principal investigator.

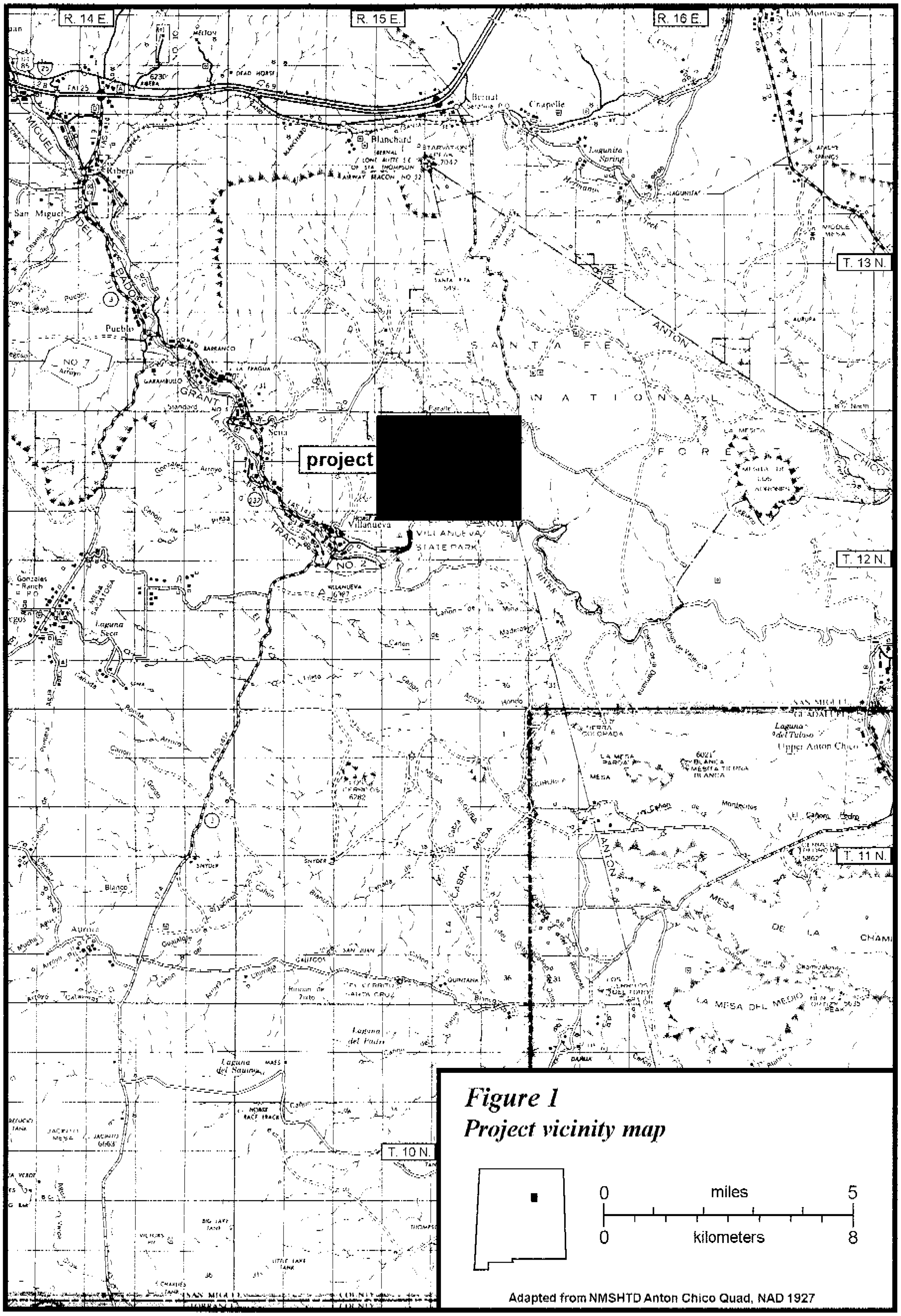

Figure 1
Project vicinity map

Adapted from NMSHTD Anton Chico Quad, NAD 1927

ENVIRONMENT

The project area in southwest San Miguel County is a transition zone between the Southern Rocky Mountain Province and the Pecos Valley section of the Great Plains Province. The immediate area is dominated by the Pecos River canyon and the surrounding mesas and broken lands (Maker et al. 1972:6).

The southwest San Miguel topography is described as "a relatively large upland area characterized by rolling hills and gently to strongly sloping mesa tops. The mesa area which grades indistinctly to the east into the Pecos Valley section of the Great Plains Province, is moderately dissected and locally entrenched by steep canyons" (Maker et al. 1972:6). The immediate project area fits the characterization of "locally entrenched by steep canyons." The Pecos River Canyon floor is at an elevation of 1,738 m (5,700 ft). The canyon rim, 63 m above the canyon floor, is 1,801 m (5,900 ft) in elevation. The canyon walls range from almost vertical to gentle just above the floodplain. At El Cerrito, the Pecos River is very sinuous, creating irregular patches of bottomland.

The soils in the project area consist of Tuloso-Sombordoro rock outcrops and Manzano clay loam. The first predominates on slopes, escarpments, mesas, ridges, and uplands and is formed in material weathered from sandstone, limestone, and shale. The second is the deep, well-drained soils of the Pecos River floodplain (Hilley et al. 1981).

The upland soils of the Tuloso-Sombordoro rock outcrops support a potential plant community of piñon, juniper, blue grama, hairy grama, and sideoats grama. Its modern agricultural potential is rated as low. Agricultural potential using prehistoric dry farming techniques is unknown (Hilley et al. 1981:37).

The floodplain plant community consists of western wheatgrass, blue grama, and alkali sacaton. The agricultural rating of the floodplain soils is good. Alfalfa, small grains, vegetables, and orchard fruits are the most common modern crops. Some corn, legumes, and sorghum are also grown. Rooting depth is 60 inches, with better than average soil permeability (Hilley et al. 1981:25).

Precipitation records for the project area come from Villanueva and cover 33 to 36 years (Gabin and Lesperance 1977:316). The mean annual precipitation ranges between 12.8 and 13.1 inches. As is typical of the arid American Southwest, summer thunderstorms account for more than 50 percent of the annual precipitation. Brief flooding may occur in July, August, and September.

Temperature data for the project area are unavailable. Ribera station in San Miguel County, which is 12 miles to the west and 1,000 ft higher in elevation, recorded an average temperature of 51.1 to 51.6 degrees F for a 3-year period. The temperature for El Cerrito can be extrapolated from the Ribera data using the elevation norm of 5 degrees for every 1,000 ft in elevation (Tuan et al. 1973:65) to yield a mean temperature of 56 degrees F.

In terms of climatic suitability for prehistoric agriculture, length of the growing season is more important than the mean temperature. Again no data are available from El Cerrito. An isopleth map of average growing season length in Tuan et al. (1973:87) indicates a range of 140 to 160 days, which should be suitable for most farming needs. The last killing frost occurs most commonly at the end of April, and the first killing frost in the fall in the middle of October (Tuan et al. 1973:88-89).

CULTURE HISTORY

The culture history of the El Cerrito area spans the prehistoric and historic periods within regional and local contexts. The regional prehistory is a compilation of data from highway salvage and dam projects completed in the last 30 years. The local prehistory is derived from archaeological survey of Santa Fe National Forest, Bureau of Land Management, state, and private lands close to El Cerrito and Villanueva. The historic occupation of El Cerrito prior to the twentieth century has been described by Heffington (1992) and is briefly recounted in this section.

Regional Prehistory

The regional prehistory includes the complete chronological sequence for northeastern New Mexico, defined in Stuart and Gauthier (1981:293, map 7.1) as the area between San Jon and the Texas border, south to Vaughn and north to the Colorado border, along the eastern crest of the Sangre de Cristo Mountains. The chronological sequences are derived from Wendorf (1960) and Thoms (1976) for northeastern New Mexico; Levine and Mobley (1976) for Los Esteros along the Pecos River, near Santa Rosa; Hammack (1965) for the Ute Dam Reservoir at the confluence of the Canadian River and Ute Creek, near Logan; Lang (1978) for the Conchas Dam Reservoir at the confluence of the Conchas and Canadian rivers, near Variadero, New Mexico; and Glassow (1980) for the area near Cimarron, New Mexico, on the eastern slope of the Sangre de Cristo Mountains. The reservoir projects represent long but discontinuous periods of occupation and use of riverine and mesa top environments. Glassow's study of the Cimarron area provides an occupational sequence for a lower montane environment (Table 1, taken from Stuart and Gauthier 1981:292).

As indicated by Stuart and Gauthier (1981:295), the occupation sequence for northeast New Mexico is very disjointed and incomplete. The picture is clouded by a paucity of absolute dates and a lack of spatial continuity between the studied areas. This spatial discontinuity has led to weakly supported definition of cultural boundaries and affiliations. One researcher's Archaic period manifestation is another researcher's protohistoric manifestation (Mobley 1979; Hammack 1965). Typically, for the period A.D. 1000 to 1500, researchers have tried, largely unsuccessfully, to determine if at different times northeastern New Mexico prehistoric populations were more similar to Plains Panhandle cultures or a far eastern derivation of the Rio Grande Anasazi. These problems will remain until there is an increase in systematic excavation and detailed survey recording of the archaeological sites.

The local prehistory is largely unsynthesized. Because most of the land in the area is private, few large-scale surveys have been conducted, and completed surveys are management rather than research oriented. Some research surveys of the surrounding area near Romeroville, Bernal, and San Miguel del Vado have been done, but only minimally reported. Parcels of Santa Fe National Forest land near the village of El Cerrito have been surveyed. The following discussion is derived from the Archeological Records Management Section files (ARMS) and Santa Fe National Forest, Las Vegas ranger district reports from about 4,000 acres of survey area (Smith 1979; Abel 1987, 1989a, 1989b, 1990a, 1990b).

Table 2 presents site type frequencies by period for nine 7.5' USGS quads surrounding El Cerrito. Artifact scatter refers to sites with sherds and lithic artifacts. *Fieldhouse* usually refers to a one- to three-room structure with a small amount of associated refuse. Residential sites have more than three rooms, some have kivas, and most have extensive trash deposits. *Stone enclosure* refers to one- or two-room cobble or slab collapsed structures that are similar to Panhandle focus structures or Pueblo period fieldhouses. They are not termed *Panhandle focus* because the term makes an untested assumption about the cultural affiliation of these site types. They are not called *fieldhouses* because of the very low number or absence of ceramics observed. Jicarilla sites include both structures and artifact scatters, but the number of structures is usually not reported. The sites are noted to emphasize that there was a Jicarilla occupation of the area. Most of the historic sites included residences, sheepherding camps, wells, and isolated structures.

Paleoindian Period

The Paleoindian period in northeastern New Mexico dates between 11,000 and 5000 B.C. Paleoindian artifacts include the whole range of Southern Plains diagnostic spear points and even a few examples of Northern Plains material. Paleoindian settlement and subsistence have been portrayed as dependent on the migratory behavior of large mammals of the late Pleistocene and early Altithermal periods. Typical Paleoindian manifestations are isolated spear points and kill and butchering sites. This bias toward meat procurement undoubtedly reflects only one facet of the Paleoindian diet (Stuart and Gauthier 1981:300). A broader subsistence base is more likely because large-game herds were probably only seasonally available and because Paleoindian populations could not have survived solely on an all-meat diet (Stuart and Gauthier 1981:300). This heavy bias in the literature illustrates how little we know about Paleoindian subsistence.

Stuart and Gauthier (1981:295) reviewed the spatial distribution of Paleoindian sites for northeastern New Mexico and suggested two settlement patterns that may have resulted from the movement of two bands. One band is represented by the occurrence of Clovis, Folsom, Plainview, and Cody period remains along the foothills of the eastern Sangre de Cristo Mountains. This pattern may reflect a higher elevation or partly montane adaptation. The other band may be represented by remains from the above periods and San Jon, Milnesand, and Meserve projectile points. These latter types are restricted in their occurrence to the lower elevations along the Canadian Escarpment. Stuart and Gauthier (1981:295) readily admit that these patterns are very tenuous, but they do suggest a variability in the Paleoindian settlement patterns.

No Paleoindian sites have been reported for the El Cerrito area. More than likely, Paleoindian sites exist outside the survey areas covered to date or are buried within them.

Archaic Period

The Archaic period is poorly represented in northeastern New Mexico. Most chronologies assign sites dating from 5000 to 500 B.C. to the Early Archaic period. The Late Archaic period spans from 500 B.C. to A.D. 200-1000 depending on the study area (Campbell 1969; Lang 1978; Thoms 1976; Glassow 1980). So little is known about the Archaic period in northeastern New Mexico that Gunnerson's (1987) overview of High Plains archaeology, which included northeastern New Mexico as far as Las Vegas, made no reference to sites in the area.

Unlike the Oshara tradition area to the west, Cochise tradition to the southwest, and the Archaic traditions of the High Plains, there is no sequential division of the Early Archaic period, nor are there settlement and subsistence data. A temporal overlap between late Paleoindian and Early Archaic occupations in northeastern New Mexico is suggested by the excavation at Pigeon Cliffs, near Clayton (Steen 1955). This overlap may represent an early change to a general hunting and gathering strategy by canyon-based Archaic groups, while the Eastern Plains continued to support the large mammals that supported the Paleoindian hunting adaptation (Campbell 1976:86). Other Early Archaic sites have been found near Mineral Hill, New Mexico, south of Las Vegas. These sites are associated with a lithic raw material quarry (Warren n.d.). A small number of Early Archaic period sites were recorded at Ute Dam (Hammack 1965) and Los Esteros by Levine and Mobley (1976).

The Late Archaic period is roughly dated between 500 B.C. and A.D. 1000 except for the Conchas Dam area (Lang 1978) and the Cimarron area (Glassow 1980). The Late Archaic period is a continuation of the smaller animal hunting and gathering subsistence pattern initiated during the Altithermal. This pattern was probably based on the seasonal availability of plant and animal resources.

At Los Esteros, a centrally based but wandering settlement and subsistence strategy was proposed for the Archaic period (Levine and Mobley 1976:69). This pattern is somewhat analogous to Binford's (1983a) foraging pattern. In this pattern, residential locations were placed near critical resources within a daily foraging radius of seasonally abundant plant and animal resources. Low periods of availability would have been ameliorated by storage facilities in Levine and Mobley's (1976:69) interpretation. Binford's (1983a:339-344) model suggests that foragers would move to another location when an existing resource base was exhausted or depleted. Levine and Mobley (1976:68) also suggest that the hunter-gatherer adaptation of the Archaic period extended until A.D. 1000 or possibly later. In other words, hunting and gathering, rather than a cultural adaptation, was a viable strategy that was applied to the Pecos River environs as long as practical.

For all researchers, the end of the Archaic period is signified by an increased reliance on agricultural products, the construction of masonry structures or pithouses, the introduction of pottery, and use of the bow and arrow. The Cimarron area exhibits the earliest change to a more sedentary and agricultural pattern, while the Los Esteros, Conchas, and Ute Dam areas show very limited change. The larger population concentration that is evident in Texas, to the south along the Rio Pecos (Jelinek 1967), and from the Rio Grande west, has only been documented for the Cimarron area (Glassow 1980).

The Archaic period for the El Cerrito area is represented by six sites, one of which has early and late components (Abel 1987, 1989a, 1989b, 1990a, 1990b). Site dates are based on projectile point styles similar to the Oshara tradition (Irwin-Williams 1973). The sites range in size from 500 to over 10,000 sq m. One of the sites includes a lithic raw material quarry that was probably used after the Archaic occupation, resulting in an inflated size estimate. Hill or mesa top and river bench locations were the most favored. The site has quarry, core reduction, and tool production debris, complete and broken bifaces, utilized flakes, and manos. In one case, more than eight hearths were observed. Many of the temporally nondiagnostic lithic artifact scatters probably have Archaic components, just as the larger Archaic period sites probably have later components mixed in. More sites need to be identified and stronger temporal control established before the Archaic period can be effectively studied in this area.

The Pueblo Period and Early Athabaskan Settlement

The Pueblo period is better understood than the Archaic period, but superimposing other regional cultural historical frameworks over the northeastern New Mexico settlement patterns causes problems. The Pueblo period begins between A.D. 400 and 1000, depending on the area, and continues into the early 1300s when it was replaced by the Plains Panhandle aspect or a rejuvenation of the hunting and gathering adaptation exemplified by the arrival of the Athabaskan populations from the north.

The Pueblo period occupation of northeastern New Mexico, and especially the southwestern quarter of that section, is not well documented. Occupations that would be termed Basketmaker III or Pueblo I under the Pecos Classification or Early to Middle Developmental under the Northern Rio Grande classification (Wendorf and Reed 1955) are unknown. Low areal survey coverage could account for the absence of sites for this period as much as an actual lack of settlement. A persistent hunting and gathering adaptation is suggested for the Los Esteros area (Mobley 1979). Lang (1978) indicates that in the Conchas area a Pueblo-type occupation was never established and that cultural historical developments followed a track more similar to a Plains Woodland trajectory.

A change to a more sedentary and agricultural pattern is documented for the Cimarron area (Glassow 1980). The period between A.D. 400 and 1100 is divided into three phases: Vermejo phase (A.D. 400-700), Pedregoso phase (A.D. 700-900), and Escritores phase (A.D. 900-1100). This chronological sequence is similar to those assigned to Anasazi settlement west of the Sangre de Cristo Mountains. This period is characterized by changes in architecture from single-room slab structures to shallow pithouses. Pottery, while never abundant, is similar to wares produced or available in the Santa Fe and Taos areas. Settlement moved from upper elevation mesa tops and canyon heads to canyon mouths and adjacent to floodplain locations. Subsistence shifted from an equal focus on wild and gathered foods in combination with agricultural products to a greater reliance on cultivated products.

In the El Cerrito area, the Early Developmental period (A.D. 500-900) is not represented in the surveyed sample. Very little evidence of Early Developmental period occupation has been reported for the Santa Fe area (Cordell 1979) and is missing from most inventories for northeastern New Mexico, with the exception of the Cimarron district (Glassow 1980). One hypothesis is that a hunting and gathering pattern persisted into the A.D. 900s (Cordell 1979:32-33). The riverine environments are cited for their diversity, which would have precluded an early reliance on agriculture for subsistence. Another typical hypothesis relates to visibility and surveyed space. Early Developmental period sites may exist, but they have not been identified.

From A.D. 1000 to 1300 along the Middle and Northern Rio Grande and on the tributaries of the Upper Pecos River, the settlement pattern of small scattered sites occupied by nuclear families changed to a more aggregated, small village pattern. The pottery of this period is widely distributed along the Pecos and Rio Grande Rivers and along the east slope of the Sangre de Cristo Mountains. Early evidence of a Plains-Pueblo connection is suggested from excavations at Pueblo Alamo (LA 8) south of Santa Fe (Allen 1973). Settlements are located along tributaries of major rivers. Instead of one or two structures, villages consist of multiple structures. Circular pit structures used for living or storage may have had ceremonial functions as well.

The A.D. 1000 to 1300 sites are the most numerous in the El Cerrito area. Fourteen residential sites have been identified. These sites range in size from 6 to more than 50 rooms. (The Tecolote Ruin, with ten house mounds, is an example of a larger village.) These villages are on the benches above the Pecos River and its tributaries, with the exception of a mesa-top pueblo near El Pueblo. These villages are roughly contemporaneous with villages established along Arroyo Hondo and Cañada de los Alamos, south of Santa Fe (Dickson 1979; Allen 1973), and villages in the eastern Galisteo Basin (Ware 1991). This expanded village settlement pattern coincides with a change in pottery decoration convention from mineral to carbon paint. The resulting types are similar in design style to McElmo and Mesa Verde Black-on-whites of the Mesa Verde region (Mera 1935; Breternitz et al. 1974). Pottery types that are common to these sites are Santa Fe, Wiyo, and Galisteo Black-on-whites, which were locally produced in the middle and northern Rio Grande (Mera 1935). Nonlocal ceramic types include Chupadero Black-on-white, which could have come from the Pintada Arroyo settlements in Guadalupe County to the south; Socorro Black-on-white from the Albuquerque and

Socorro districts to the southwest (Lang 1982); Wingate and St. Johns Black-on-red, and St. Johns Polychrome from the White Mountains in the Zuni area (Carlson 1970). Eight sites are listed as artifact scatters, reinforcing the pattern of increased use of the area. Greater coverage would likely yield more residential sites within the Tecolote Creek and Cañon Blanco drainages, as well as along the Pecos River.

From A.D. 1100 to 1300, during the Ponil and Cimarron phases, settlements in the Cimarron area clustered around creek mouths. The village locations and a change to more intensive farming strategies suggest that reliance on agriculture for subsistence had increased. Villages changed from multiroom, single-structure sites to multiroomblock settlements. The pottery industry was similar to that of the Taos area, suggesting greater contact between Cimarron and Taos area populations (Glassow 1980:73-75).

After A.D. 1300, the pattern of population aggregation continued with the establishment and growth of large villages in the Galisteo Basin, the middle Chama River, along the Rio Grande, in the Salinas area, and at Pecos and Rowe Pueblos (Stuart and Gauthier 1981; Cordell 1979). During this period no large Pueblo villages are reported for the southwestern part of northeastern New Mexico. Rowe and Pecos Pueblos may have acted as population magnets, and extensive land use is indicated by the small artifact scatters and probable fieldhouses. Evidence of large settlements has been reported for the Pintada Arroyo area southwest of Anton Chico (Stuart and Gauthier 1981). Our knowledge of post A.D. 1300 settlement patterns along the Upper Pecos River between San Jose and Santa Rosa is limited by the lack of survey coverage.

The Classic to Protohistoric period in the El Cerrito area (A.D. 1300-1600) is represented by seven sites that are definitely from this period and three additional sites that may have earlier components. In contrast to the preceding period, all but one of the sites are artifact scatters or fieldhouses. The exception is a petroglyph site. In the Middle and Northern Rio Grande at this time, the number of sites decreases but the villages grow to their largest size. Smaller residential sites are less common, with satellite fieldhouses more common (see Lang 1977 for an example from the eastern Galisteo Basin). Besides increased village size, pottery production changes to glaze-painted polychrome and bichrome styles and an organic-based black-on-white decorated pottery called Biscuit Ware. Kidder and Shepard (1936) indicate that both glaze- and organic-painted pottery were made at and traded in and out of Pecos Pueblo. The complete glaze ware series as defined by Mera (1933) for the Rio Grande occurs in the Pecos Pueblo assemblages (Kidder and Shepard 1936). Logistically organized use of the project area by inhabitants of Pecos Pueblo would be expected, though only a small number of contemporaneous sites have been identified. More settlement pattern information is needed to explain this apparent absence.

Around A.D. 1300, Pueblo settlement in northeastern New Mexico decreased, with an occupation hiatus suggested by Glassow (1980). North and east of Las Vegas, sites occur with structural and material cultural similarities to well-defined cultural sequences of southern Colorado, western Oklahoma, and west Texas (Lintz 1984; Harlan et al. 1986; Campbell 1969). This regional version of the Plains Woodland and Plains Village sequences is referred to as the Upper Canark variant (Lintz 1984:44). The geographic area includes the High Plains section in the Texas-Oklahoma panhandles and the Raton section of the Great Plains in southeastern Colorado and northeastern New Mexico, perhaps as far south as the Las Vegas Plateau. The Upper Canark variant is divided into two geographically and culturally distinct, but temporally overlapping phases: the Apishapa phase (A.D. 1100-1350) and the Antelope Creek phase (A.D. 1200-1450; Lintz 1984:48, 53).

The Apishapa phase, with only a few absolute dates, is best defined for the Chaquaqua Plateau of southern Colorado and northeastern New Mexico (Campbell 1969). Site locations include rock shelters, mesa tops along canyon rims, and more nucleated settlements on steep-sided buttes and vents. Structures are made from vertical or horizontal slabs and mortar and have circular, oval, semicircular, or D-shaped outlines. Definable entryways and interior hearths are rarely present. Subsistence was probably a combination of foraging and horticultural activities and hunting. The lithic tool industry reflects the inferred subsistence practices. Small, side-notched Harrell or Washita projectile points are the common form. The sites have very few ceramic trade wares from the surrounding area, suggesting that the inhabitants were relatively isolated from populations living in the eastern foothills of the Sangre de Cristo Mountains.

The Antelope Creek phase is better dated than the Apishapa phase by radiocarbon and archaeomagnetic dating and ceramic cross-dating. The Antelope Creek phase sites, unlike the more northern Apishapa sites, have a diverse inventory of black-on-white, polychrome, and glaze ware pottery that originated in the Pueblo villages to the west along the Pecos River and Rio Grande. Village sites are on high terraces within drainage basins, while other architectural sites occur on steep, sloping terraces, knolls within floodplains, and on isolated buttes (Lintz 1984:52-60). Site sizes range from artifact scatters to villages with 80 structures (Stuart and Gauthier 1981:310). Room sizes and shapes range from small (less than 5 sq m floor space) to large rectangular rooms (up to 60.5 sq m floor space). Wall construction is a combination of slabs, adobe, mortar, and cobbles. The lithic tool industry shows greater specialization and diversity than the Apishapa phase assemblages. Small, side-notched Harrell, Fresno, and Washita are typical projectile point styles. Extensive trade contacts are indicated by exotic lithic materials, shells, and painted ceramics from the Rio Grande and Pecos River pueblos (Lintz 1984:61-64).

In the southwest part of northeastern New Mexico there is a wide distribution of stone enclosures that resemble early Panhandle Apishapa phase structures (Campbell 1969). To date, only the Tinsley sites (Mishler n.d.) and Sitio Creston (LA 4939, Wiseman 1975), south of Las Vegas, have been excavated. The Tinsley site excavations revealed pit structures more characteristic of Pueblo occupation (personal communication, S. G. Townshend, 1996).

The Sitio Creston site is roughly dated to A.D. 1050-1150 (Wiseman 1975:102). It is one of the larger stone enclosure sites recorded for this area and has 12 rooms that constituted 9 structures. Excavation of seven structures yielded a diverse and substantial stone tool-making industry representing staged manufacture of projectile points and bifaces. Most of the tools were made from locally available Tecolote chert as identified by Warren (n.d). Grinding implements were recovered, but interestingly, more metates than manos were represented. Typically, on similar sites near El Cerrito, manos dominate, and few metates were reported. Of interest were the 612 sherds, possibly representing only a few vessels of unpainted utility pottery similar to Taos Plain or Incised pottery. No decorated pottery from the Rio Grande or Western Anasazi areas was recovered. The large number of sherds is unusual for this area, where there are rarely more than ten surface sherds at a site (Abel 1989b). Wiseman (1975:102) suggests that Sitio Creston fits Campbell's (1969:389-402) characterization of early Panhandle Culture sites, with the exception of the Taos Plain–like pottery and the corner-notched projectile points.

The Sitio Creston site presents an interesting problem with regard to cultural affiliation and sequences for the southwestern part of northern New Mexico. It is like an orphan in the Upper Pecos River Basin. No comparable work in the area preceded or followed the excavation from which a temporal/cultural sequence can be constructed. Based on the architectural traits and ceramics, it is not clearly Puebloan, nor are the proponents of the Panhandle focus (Lintz 1984:45) ready to accept it as a manifestation of the Upper Canark variant.

The limited descriptions of the Ponil phase architecture and material culture for the Cimarron area suggest a similarity to the Sitio Creston site (Glassow 1980:74). Ponil phase sites and Sitio Creston have Taos Plain or Incised. Ponil phase sites also may have Taos Black-on-white or Kwahe'e Black-on-white, suggesting cultural affiliation with Pueblo populations. Perhaps an important difference is the clear inference of horticulture for the Ponil phase sites and no evidence of horticulture at Sitio Creston. To further stretch the suggestion of similarity between the south Las Vegas area and the Cimarron district, the Tecolote Ruin may be analogous to the Cimarron phase sites, which are multiroom structures with Santa Fe and Galisteo Black-on-white. Therefore, are the single-room structures common to the Upper Pecos River and its tributaries suggestive of a Puebloan frontier occupation that preceded the full-scale village occupation of Tecolote Ruin? Is the Sitio Creston site an early expression of the Panhandle sequence, as Wiseman suggests? Is it analogous to the small farming communities of the Cimarron District?

Stone enclosures occur in the El Cerrito area, but their relationship to the Upper Canark variant and the adaptation represented by Sitio Creston is unknown. Stone enclosures as they occur around the project area may be the remains of collapsed masonry walls or unstacked rocks that served as walls. They occur in frequencies from one to as many as twelve to a site. Generally, they have fairly extensive lithic artifact assemblages including grinding implements and the debris and finished products of chipped stone tool production. Ceramics, if they occur at all, are present in very low numbers and cannot always be directly associated with the stone enclosure. Nine sites with stone enclosures near El Cerrito are on the canyon rim overlooking the Pecos River. Other sites are on mesa and ridge tops, hill slopes, grassy plains, and lower benches or terraces along the Pecos River or primary tributaries. Site size as measured by extent of the associated artifact scatter ranges from 200 sq m to 571,200 sq m. The largest sites are lithic material quarries, so size can reflect repeated use, in contrast to the short-term occupation of a stone enclosure. The low sherd frequency and the potential for considerable mixing of stone tool assemblages left by stone enclosure inhabitants and later site occupants make it difficult to compare these sites with Sitio Creston or Upper Canark variant sites. Until more sites of this nature have been excavated, their place in the El Cerrito area and regional settlement pattern will be unclear.

With the apparent abandonment of the Plains frontier by Puebloan groups after A.D. 1300, contact between the Pueblo and Plains groups may have been more formalized. Interaction between the Pueblo and Plains groups is evidenced in trade goods. Trading is inferred from the artifacts found in archaeological contexts and descriptions of trading parties in early Spanish documents. Goods exchanged from the Plains included buffalo robes, pipes, distinctive bone and stone tools, and probably an array of perishables like dried meat. In return, the Pueblos traded farm goods, pottery, turquoise, obsidian, and perhaps goods from other regions like shells. Lintz (1984:59) lists 18 ceramic types recovered from Antelope Creek phase sites that originated in the Acoma, Zuni, Hopi, Rio Grande pueblos, and Sierra Blanca regions. This array could result from direct long-distance trade or from exchange conducted at trade centers. By the 1500s the latter was a well-established practice. Reference to east-west trade routes from Acoma, Zuni, and Hopi to Plains gateway pueblos or onto the Plains are common in the literature (Scurlock 1988:35-38). Three sites date to the Classic period in the El Cerrito area, and five other multicomponent sites have pottery from the Classic period. These sites are on the lower benches of the Pecos River, the canyon rim, and the flat plains above the river canyon. Two have structures that may be fieldhouses, though temporal association between the sherds used to date the site and the structures is tentative.

The issue of a hiatus between A.D. 1350 and 1500 along the eastern slopes of the Sangre de

Cristos begs many questions. If it applies to the Upper Pecos River settlement, when did it occur, and how far into areas previously occupied by Pueblo groups did it extend? A question about the protohistoric period that many researchers are concerned with is when did Athabaskan groups begin to have an effect on Puebloan settlement patterns and land use? Were the "dog nomads" in the area before A.D. 1500 in sufficient numbers to affect settlement and land use? Or were the early buffalo hunters along the east Sangre de Cristo Mountains transformed agriculturalists forced to rely more on a hunting economy due to decreased success at farming (Stuart and Gauthier 1981:315)?

A commonly used date for the presence of established Athabaskan-speaking peoples in New Mexico is A.D. 1525 (Gunnerson 1974). This date is based on a reference to an attack by the Teyas on Pecos Pueblo 16 years before Coronado's arrival. The attack failed, peace was made between Pecos Pueblo and the Apache group, the Teyas left for the Plains, and the two groups maintained trade relationships. This date is probably a benchmark for when the Apaches were present on the western periphery of the Plains in sufficient numbers to affect Pueblo settlements by periodic raiding. Pecos Pueblo reportedly was the strongest of the pueblos, so it is likely that they would have been attacked last (Bolton 1964). The records do not state how early some of the villages in the Galisteo Basin and along the Rio Grande may have been raided. Apache migration south may have occurred steadily from about 500 years ago (Brugge 1983:489). One proposed hypothesis is a southward migration following buffalo herds, which eventually filled a niche abandoned by agriculturalists (Gunnerson 1974). Another suggests that the migration was triggered by environmental factors that led to food shortages, threatening a growing population (Gunnerson 1974).

Because the Apaches probably did not arrive along the east slope of the Sangre de Cristos and immediately raid Pecos, the strongest pueblo, there must have been a period when they would have been in and out of the area, following the buffalo herds or escaping severe Plains weather in the winter. Of course, the question is how long was that period, and how can we differentiate early Apache occupations from other hunting and gathering adaptations?

Six Jicarilla Apache sites have been identified in the El Cerrito area. They are dated between A.D. 1500 and 1860 and therefore do not help clarify the problem of when the Jicarillas first used the Upper Pecos River. These sites are listed as artifact scatters and were dated by the presence of micaceous paste pottery.

In the El Cerrito area, as is typical in the rest of northeastern New Mexico, nondiagnostic lithic artifact scatters are the most common site type. These lithic artifact scatters constitute almost 75 percent of the total site sample (64 sites). They have been found on mesa tops (16), ridges (13), hill slopes (12), canyon rims (10), river or drainage benches or terraces (9), and flat plains and gentle slopes (4). Four scatters were on a bench or terrace above the Pecos River. LA 84318 falls into the latter category, since it is on the first bench above the river. The site distribution reflects more survey work on the mesa and ridge tops and the fact that river terraces and benches are a less dominant landform. Proportionally, site densities with respect to landform may not be that different, although this needs to be demonstrated. Site sizes, when they are reported, range from 450 to 660,000 sq m, with 14 sites less than or equal to 1,162 sq m; 20 sites from 1,613 to 6,935 sq m; 17 sites from 6,935 to 12,149 sq m; and 11 sites from 12,150 to 660,000 sq m. The majority of the sites represent hunting and gathering activities, without lithic raw material procurement as a major focus. Thirty-one sites have manos, suggesting some plant processing, although manos are a common occurrence on sites from all periods.

The Historic Period

The historic period, as it is presented here, spans A.D. 1540 (Spanish contact with southwestern native peoples) to the close of World War II in 1945. Because the historic period may not be well represented at LA 84318, this overview will be very general. More detailed overviews and bibliographies of the historical period can be found in Jenkins and Schroeder (1974), Lamar (1966), Larson (1968), Bannon (1979), Kessell (1979), and Athearn (1989).

Spanish Exploration and Native American Contact

Prior to 1540, Native American contact with the Spaniards was restricted to the journeys of Cabeza de Vaca and his companions in 1528 and the expedition toward Hawikuh at Zuni by Fray Marcos de Niza in 1539 (Bannon 1979:16). Enough interest was generated by claims of golden cities by these expeditions to warrant further exploration by Francisco de Coronado in 1540.

Coronado arrived at Hawikuh in 1540 to find no gold and hostile Zunis, whom he defeated. From Zuni, Coronado sent out expeditions to Moki (Hopi), the Grand Canyon, and east to Tiguex, Taos, and Cicuye (Pecos Pueblo). No gold or precious metals were found at any of these places. From Pecos, Coronado traveled 77 days onto the Plains in search of the rich land of Quivira. Again no wealth was found, and the troops became restless to return home. In 1542, Coronado's army returned to Mexico with no reports of wealth and only the scars of battles with Indian villages and an extreme and inhospitable environment (Bannon 1979:17-27; Jenkins and Schroeder 1974:14-17; Bolton 1964).

The interaction between Coronado's forces and the Native Americans was either amiable or forced, depending on whether Coronado's forces stayed long and stretched the resources of the occupied villages, like Tiguex (Kuaua) or Hawikuh. Out of generosity or fear, the Native Americans often presented the Spaniards with supplies and gifts. The Native Americans also were aware of the consuming Spanish interest in gold and silver and fed this predilection with more tales of fantastic cities like Quivira. The Native Americans hoped that the Spaniards would be victimized by fierce Plains tribes or the harsh Plains environment. To some extent the stories worked, because the Spanish resources were exhausted by fruitless and difficult travels.

Important to the El Cerrito area are the accounts of travel out of Cicuye (Pecos) by Alvarado and Coronado. Both expeditions followed the Pecos River to the southeast passing through Villanueva and close to El Cerrito (Bolton 1964). Neither expedition reported the presence of outlying villages nor Apachean encampments. This indicates that the Pecos River was mainly uninhabited during the middle sixteenth century. However, the Spaniards were guided along well-established trails, suggesting that movement between the Plains and Pecos was a regular event. Regular winter trading between Pecos and Plains Indians may have been well established by 1540. There may have been a symbiotic relationship with Pecos supplying corn to the Plains Indians, who reciprocated with buffalo hides and meat (Spielmann 1989:103-104). Therefore, the remains of many years of camp sites should be present along the Pecos River. Some of the temporally nondiagnostic lithic artifact scatters that occur along the Pecos River may result from Plains-Pueblo interaction.

For forty years after Coronado, there were no expeditions into the far northern borderlands. Coronado's "failure" had cooled the monarch and vice-regal interest in further exploration. Between 1581 and 1590, there were four smaller expeditions, two sanctioned and two illegal. Antonio de Espejo's expedition in 1582 returned to Mexico along the Pecos River and commented on the rugged condition of the trail. The expeditions were mostly unsuccessful, except for establishing additional travel routes, and ascertained the ill-fate of priests who had remained behind in New Mexico after the 1542 and 1581 expeditions (Bannon 1979; Jenkins and Schroeder 1974; Kessell 1979).

Pre-Revolt Spanish Colonial Period (1598 to 1680)

Don Juan de Oñate established the first "permanent" settlement in New Mexico at San Gabriel in modern-day San Juan Pueblo. From here, Oñate and his lieutenants traveled to the pueblos extracting allegiance from village leaders or representatives. Harsh treatment by Oñate of Indians and discontent among the settlers, partly incurred by Oñate's penchant for long expeditions, resulted in his recall and replacement in 1609 by Don Pedro de Peralta, the founder of Santa Fe. Armed with specific instructions for establishing the settlement, Peralta, with the aid of Indian labor, constructed the seat of Spanish administration in Santa Fe (Bannon 1979:36-40; Kessell 1979:79-93).

Between 1610 and 1680 the records are scarce because of the wholesale destruction of Spanish civilization during the Pueblo Revolt. The economic system of *encomienda* was used by the Spaniards to exact tribute from pueblos in support of the military and administration of the colony. The *encomienda* abused Native American laborers and stressed the Pueblo economy beyond a comfortable carrying capacity (Jenkins and Schroeder 1974:20). Competition between the missions and the secular government for Native American labor and fealty resulted in constant fighting and unrest (Kessell 1979). The Spaniards raided Apache camps for slaves, and in turn the Apaches aggressively raided Pueblos and outlying Spanish haciendas (Kessell 1979:218-222).

Under Spanish rule, the economic suppression through the *encomienda* and the subjugation of native religious practices by the missions made the plight of the Indians untenable. Below-average spring and annual precipitation between 1645 and 1680 probably reduced farm productivity to the point where the Pueblos could not support themselves and the Spaniards (Rose et al. 1981). Finally in 1680, as a culmination of intervillage cooperation, the Pueblo Revolt started (Bannon 1979:82-83).

In terms of the archaeological record, there would be little change in the site types generated by the Plains-Pueblo-Spanish interaction. Artifact scatters or camp sites would probably look Puebloan, since most pottery would be from Pecos or the Rio Grande pueblos. The lithic materials would be local or Rio Grande types because they were abundant, and small amounts of Plains lithic materials, like Alibates or Tecovas chert, could have been left by Plains or Pueblo travelers. Small amounts of metal might have been discarded, but would not be specifically diagnostic of a Spanish or Indian occupation without other culturally distinct materials.

The Pecos trade partner most frequently mentioned were the Faraon Apaches (Kessell 1979; Jenkins and Schroeder 1974), later called the Jicarilla Apaches (Gunnerson 1987:107.) The Jicarilla Apaches were semisedentary and farmed by the middle to late 1600s, but before that time were involved in the symbiotic relationship mentioned above. As nomads, the Jicarilla Apache camp remains would not have differed from other Plains groups or traders from Pecos. Since sedentary Jicarilla Apaches would have farmed, corn would not have been an important trade item, so it is unclear what would have been exchanged with Pecos. Ceramics, called Ocate Micaceous, are diagnostic artifacts of Jicarilla *rancherías*, or farmsteads (Gunnerson 1969:26). The largest numbers of these ceramic types have been recovered from excavations in the eastern foothills of the Sangre de Cristo Mountains in association with semipermanent residences. The association between a residential lifestyle and ceramics suggests that the occurrence of large numbers of micaceous ceramics at a camp site would be unlikely. Few dated Apachean sites from this period have been excavated, and there is no conclusive evidence of when the Apaches switched from a nomadic to a predominantly semisedentary lifestyle. In addition to few early dates, similarities in material culture and stone tool technologies between Apaches, mobile Pueblo groups, and other Plains groups make distinguishing between groups a difficult exercise.

Pueblo Revolt (1680 to 1693)

The Pueblo Revolt in 1680 drove the Spaniards from New Mexico, beginning a brief period of Pueblo rule. With the Spaniards gone from New Mexico, the quality of life for the Indian population probably improved minimally. Factionalism within and between pueblos surfaced, as old enmities between Tano, Keres, and Tewa were revived (Kessell 1979:240-1). Relief from the 35 years of below-average precipitation probably increased productivity and ameliorated food shortages. However, the protection offered by the Spaniards from raiding Apaches was gone, and peripheral pueblos like Galisteo were more vulnerable (Jenkins and Schroeder 1974:22).

After three unsuccessful attempts by Spanish governors to reclaim New Mexico, Don Diego de Vargas returned Spanish rule to New Mexico. From 1692 to 1696 de Vargas systematically vanquished rebel groups and reconciliated loyal pueblos, like Pecos (Kessell 1979:249). The second era of Spanish administration, missionization, and settlement began when de Vargas returned a second time with Franciscans and a large group of settlers in 1693 (Bannon 1979:88).

Spanish Colonial Period (1696-1821)

From 1696 to 1821, the Spanish settlement of New Mexico encompassed a larger area than in pre-Revolt times. Administration was expanded and restructured to accommodate the new areas. The Pueblo Indian populations continued to shift geographically and restabilize, while the Comanche and Ute tribes raided Spanish and Puebloan settlements. Secular parishes were established at the pueblos, and old conflicts between church and state persisted (Jenkins and Schroeder 1974:22-30).

The first settlers who came with de Vargas were quickly joined by more. To accommodate the new population influx, a formal land grant procedure was implemented. The system provided land to communities and heads of large families. These grants divided arable land among households and designated common lands for community subsistence. The grants extended as far from the administrative centers as the raiding Utes and Comanches would allow. Legally, the Spanish governors were to ensure that grants did not encroach on Pueblo lands, which were also considered as land grants. In reality, many small community and individual settlements extended onto Pueblo lands because they often incorporated some of the best farm land (Hall 1987; Westphall 1983; Bowden 1969).

The main administrative and military official remained the captain general/governor who was appointed by the viceroy of New Spain. However, New Mexico was divided into eight *alcaldias,* which were administered by an *alcalde* mayor. The villages within the *alcaldia* were administered by a *cabildo*, or town council (Jenkins and Schroeder 1974:26).

Puebloan populations reorganized during the attempted 1696 revolt, and Tewa and Tano villagers moved to Hopi and Acoma to escape retribution. In 1699 Laguna was established by refugee populations, and many of the Galisteo and middle Rio Grande pueblos were permanently abandoned. Inhabitants of San Cristobal and San Lazaro first moved to Santa Cruz de la Cañada but were later moved to San Juan, Santa Clara, and San Ildefonso with the establishment of the villa and Santa Cruz de la Cañada. Pueblo populations moved out of peripheral areas into more centrally located villages. This aggregation was sparked by increased Ute and Navajo raids and a depletion of the population by epidemics in the early eighteenth century (Jenkins and Schroeder 1974:23-26).

Between 1700 and 1780, the Comanches and Utes had pushed other nomadic groups, like the Jicarilla Apaches, farther south. The Comanches raided and traded with the Spaniards and Pueblo settlements (Jenkins and Schroeder 1974:23-26). Spanish and Pueblo traders made regular trips onto the Plains as *viageros*, or *comancheros* (Scurlock 1988; John 1987). The Jicarilla Apaches gradually moved closer to and into the Sangre de Cristo foothills, mingling more with the residents of Taos, Picuris, and Pecos Pueblos (Gunnerson 1987:136). As a result of increased interaction between Plains Indians and the Spaniards, a new ethnic class, the Genízaros, was formed. Genízaros were Indians without tribal affiliation. Their numbers were large enough during this period that the Spaniards encouraged them to settle on the frontiers as buffers against Comanche and Ute raids (Jenkins and Schroeder 1974:26; Levine 1987).

Soon after the establishment of the Provincias Internas in 1776, a new military governor was appointed, Juan de Anza. In eight years of military campaigning, de Anza made treaties with the raiding Comanches, Jicarilla Apaches, Navajos, and Utes (John 1987:544; Jenkins and Schroeder 1974:26-28). This tenuous peace allowed further expansion by Spanish settlers and set up the Comanches as preferred trade partners. The Spanish trade was vital to the Comanches, who accommodated Spanish traders in every way possible (John 1987:543). It is between 1786 and 1821 that the large northern community grants were made as settlement extended down the Pecos and Canadian rivers and north of Abiquiu (Jenkins and Schroeder 1974:29).

With the confirmation of the San Miguel del Vado Grant, a large segment of the Upper Pecos River could be settled. San Miguel del Vado, established in 1794, and San Jose del Vado, established in 1803, were small subsistence agricultural communities that invested heavily in the comanchero trade with the Plains Indians (Kessell 1979:415; Levine 1987; Bowden 1969:734-744). Various attempts by the Spanish and Mexican governments to quash the comanchero trade were met with open and armed resistance. Even with the trade relationship, the residents of San Miguel and San Jose were not excluded from occasional Indian depredation. Also, Jicarilla Apaches continued to live along the Pecos River into the 1860s, and they often stole livestock and other food items from the communities (Leonard and Loomis 1941:12-14; Gunnerson 1984:74).

Whether El Cerrito was established by the end of Spanish rule is not known. There are indications from oral histories that a few families may have settled there before 1821. However, no strong documentary or archaeological evidence has been found to support the oral accounts (Heffington 1992).

The Mexican Period (1821-1846)

The Pecos River grants below Pecos Pueblo continued to be settled after Mexican independence was won in 1821. The continued growth of the San Miguel area can be seen in the 1827 census, which listed 714 heads of household (Carroll and Haggard 1942:38). The Anton Chico Grant was confirmed in 1822, completing the settlement framework for the Upper Pecos River (Leonard and Loomis 1941:4). The subsistence pattern of agriculture coupled with a thriving comanchero trade continued and was joined by fairly successful stockraising (Levine 1987:562-564). Irrigated crops included corn, wheat, vegetables, cotton, and tobacco. Intervillage exchange helped to distribute goods and compensate for shortages caused by an inability to raise yearly surpluses.

An additional factor in settlement growth along the Pecos River was the opening of the Santa Fe Trail in 1821 (Jenkins and Schroeder 1974:34). San Miguel de Vado became the port-of-entry into the Mexican Territory from the United States. Although it is only briefly mentioned in the accounts, some of the goods probably detoured at the Pecos River and headed south to Chihuahua to avoid tariffs in Santa Fe. Undoubtedly some of these goods found their way into the local trade networks, marginally increasing the local standard of living.

El Cerrito History

When El Cerrito was first established is not known, though it occurred after the establishment of the Spanish land grant settlement at San Miguel del Vado in 1794. Prior to the establishment of San Miguel del Vado, the Pueblo of Pecos was the center of trade with Plains Indians until the end of the eighteenth century. From Pecos Pueblo, Comancheros traveled toward the plains along the Pecos River. This route probably passed by the present town site of El Cerrito. San Miguel del Vado soon replaced Pecos Pueblo as the base of operations for the Plains trade and the gateway to Mexico from the east. The way Pecos was replaced was a harbinger of what was to happen to the land grantees in the later part of the nineteenth century.

In 1794 a petition for a grant of land at the ford on the Pecos river, 20 miles downstream from Pecos Pueblo, was made to the governor in Santa Fe (Westphall 1983:23). San Miguel del Vado began to lure the trade business and the church away from Pecos as land was slowly being taken from the pueblo (Kessell 1979:410-418). Eventually the pueblo was abandoned, and the few remaining residents moved to other pueblos or nearby Spanish settlements (Kessell 1979: chapter 9). By 1821, when the Santa Fe Trail opened, the Pueblo of Pecos was almost completely abandoned.

The opening of the Santa Fe Trail coincided with the end of the War of Independence between Spain and Mexico. The newly established country of Mexico was eager to expand its trade business. San Miguel del Vado became the destination of travelers and merchants who journeyed along the Santa Fe Trail to obtain permission to enter the country of Mexico (Gregg 1926:100; James 1846:80; Connor and Skaggs 1977:3). The late nineteenth century commercial hub of Las Vegas was little more than a *rancho* at the time of early Santa Fe Trail trade (Gregg 1926:100;Magoffin 1962:91).

The earliest mention of El Cerrito is in a Mexican document. It was reported to be beleaguered by Kiowas, Comanches, and Pawnees between 1828 and 1831 (Levine and Winter 1987:556). This report is not surprising, because during the latter part of the eighteenth century and the early part of the nineteenth century, the middle Pecos River valley was the scene of raids by Comanche bands (Levine and Winter 1987:555). Hostilities were alleviated somewhat when Comanche genizaros became part of the original settlers of San Miguel de Vado. The earliest recorded date for El Cerrito is 1828; however, an establishment date of pre-1820 has been argued by Heffington (1992:58, 59).

Trading among the Plains Indians and the residents of the Pecos River Valley was common and probably included El Cerrito. Local lore has it that another name for El Cerrito was La Junta, a gathering place for trade; however, there is another village by the name of La Junta downstream (see map), and the name may reflect the entire Plains trade (Post 1991:19; Levine and Winter 1987:3). Before the opening of the Santa Fe Trail in 1822, trade was along the Camino Real, which came north from Mexico. This trade route paralleled the Rio Grande through New Mexico and would not have passed near El Cerrito. The possibility of direct trade with Santa Fe Trail merchants is slight since El Cerrito is over 12 miles downstream from San Miguel del Vado and on the west bank of the Pecos. Since El Cerrito was a farming and ranching community and not a trade center, it was also passed by when the railroad came to Las Vegas in 1879. El Cerrito once again was not on the trade route but could not help being affected.

The railroad was the stimulus for the creation of large mercantile businesses in Las Vegas. The records of the Charles Ilfeld Company reveal that the inhabitants of the villages along the Pecos River traded in Las Vegas, but the majority of the villagers were content to buy from their local store. Informal stores were established in El Cerrito and Villanueva that sold goods from the Las Vegas mercantile warehouses. These stores were located in family homes and were not very large (Heffington 1992:119-125). The reason for the indigenous buying behavior may have been the distance from the village to Las Vegas. Heffington (1992:127) suggests that xenophobia on the part of the villagers may also be responsible for the establishment of these informal stores. However, since the population was small it may have been more convenient to let just one person venture to Las Vegas and do the buying for the whole village.

Access to grazing land was an essential part of El Cerrito's economy and way of life. During the latter part of the nineteenth century, most of the male inhabitants of El Cerrito considered themselves to be stockmen (Leonard and Loomis 1941:23). The people either had their own herds or hired out to the larger cattle owners. However, the days of small independent cattle ranches were quickly ending through the manipulation of the 1862 Homestead Act requirements by larger ranchers and businessmen that effectively took over large parts of land that was once open range (Westphall 1965:42-65). As the local ranchers lost land to the federal land management agencies, El Cerrito began to wane even as a tiny village.

The San Miguel del Vado Land Grant was diminished to almost nothing by an 1896 Supreme Court decision; El Cerrito was at the south end of the Land Grant. The original grant was for 315,300 acres, and it was reduced to 5,024.3 acres (Westphall 1983:265). This also reduced the common lands of the communities on the grant (Westphall 1983:25). The residents of El Cerrito received approximately 118 acres as a result of this decision. The Homestead Act enabled some of the residents to obtain land. But by 1919, when the people of El Cerrito attempted to homestead, other landowners had already carved up the adjacent land, so the lands of El Cerrito residents were scattered about the valley (Leonard and Loomis 1941:21).

During the early twentieth century, subsistence farming was practiced by El Cerrito residents. Corn, beans, and alfalfa for livestock were the main crops. Some fruit was grown, but only in small family orchards. Sometimes there was enough surplus to sell (Leonard and Loomis 1941:24). Today El Cerrito residents graze livestock and practice subsistence farming on a very small scale. Many of the residents commute to Santa Fe or Las Vegas for wage work.

Population began to drop as people from El Cerrito took advantage of the jobs the railroad offered. The population of El Cerrito was never large. Census figures show that 1870 was one of its highest: 144, up from 121 in 1860 (Levine and Winter 1987:584, Table 13.1). The 1880 census has the population at 101 (Leonard and Loomis 1941:4; Levine and Winter 1987:584, Table 13.1).

The bridge across the Pecos River was built in 1916. The bridge construction enabled the land on the north side of the river to be homesteaded by local residents. According to a local informant, LA 84318 was homesteaded in 1916, which is consistent with the Leonard and Loomis report (1941:21). Bureau of Land Management records show that a Homestead patent was granted in 1926 to Casimiro Quintana, a direct relative of the current owner. The ten-year discrepancy between the homestead establishment and the patent is not unusual because it normally took from five to six years to qualify for a patent.

The population remained essentially the same (135) from 1916 to 1940, when the Depression had its effect on El Cerrito and residents left to obtain jobs with government work projects (Nostrand

1982:112-113; Leonard and Loomis 1941:32-36). At the outbreak of World War II, more residents were lured away to other parts of the Southwest. The steady exodus of the El Cerrito residents continued until the population of reached an all-time low of five in 1968-1969 (Nostrand 1982:113). Even though the residents had to leave, they frequently expressed the hope of returning. Through the seventies and eighties, a gradual increase in population occurred. The 1980 census recorded eleven people in El Cerrito: nine Hispanics and two Anglos (Nostrand 1982:115). One of the local workers for OAS estimated that El Cerrito had 26 inhabitants in 1991.

A RESTATEMENT OF THE DATA RECOVERY PLAN

The excavation and laboratory analyses were guided by the data recovery plan (Post 1991:43-59). In this chapter, the research questions are reiterated and assessed.

Research Questions

It has been demonstrated that from the middle Archaic period to the early 1800s, the El Cerrito area could have been used by various groups employing a hunting and gathering subsistence strategy. Based on the testing data, the cultural deposits at LA 84318 also were assumed to result from occupation by hunter-gatherers. El Cerrito sites include evidence of occupation by Archaic period hunter-gatherers, sedentary Puebloan populations living along the Pecos River and its tributaries, Apachean groups, and perhaps other non-Apachean Plains groups. LA 84318 was occupied by one or more of these prehistoric and protohistoric populations. The long time span and potential for occupation by different cultural groups provides the broadest context for the research effort at LA 84318. From this broad temporal and cultural context, specific questions about the material remains from LA 84318 can be asked. These questions focus on chronology, economic organization, subsistence strategy, and how LA 84318 fits into regional settlement and subsistence patterns.

Chronology

When was the site occupied? To address this question, samples providing chronometric or relative dates were collected. It was expected that the dates would provide a broad occupation span and that shorter spans would reflect occupation periodicity and its effect on site formation.

Three sources for dates were recovered from LA 84318: obsidian from all excavated levels, temporally diagnostic projectile points, and datable ceramic types. No absolute dating chronometric samples were obtained from LA 84318. All three sources provided relative dates with which to investigate the occupation history.

One factor that influences the reliability of obsidian hydration is the artifact use-history, in other words, how the artifacts moved in and out of systemic and archaeological contexts. Given the site distance from known obsidian sources in the Jemez Mountains and the high utility of obsidian, it is probable that reuse of material was common. Obsidian reuse may result in progressively smaller or more worn specimens that have more than one rim thickness that can be measured. To date an occupation level at LA 84318, the portion of the specimen exhibiting the most recent flake scars was sampled. Obsidian reuse was controlled for in selecting samples for hydration study. To assess if recycling occurred, the youngest and oldest flake scars, if they could be identified, were sampled. Close attention to recycling should have reduced the potential for ambiguous dates.

Relative dating by projectile point typologies provided a broad range of dates. Projectile points like obsidian debitage and tools may also be recycled. Projectile points may be curated from one site to another, so that Archaic period dart points may co-occur with Puebloan or Apachean projectile points. Just as the obsidian was examined for reuse, the projectile points were examined for evidence of reworking. Breakage due to manufacture or use provides information on discard processes.

Another problem with many of the projectile point styles associated with Puebloan and Plains groups is that they are not well dated. Projectile point types like Scallorn or Harrell have potential dates ranging from A.D. 1100 to 1500. These point types suggested that the occupation did not date to the Archaic period.

A few ceramics were recovered. They are very small sherds and may have limited contextual integrity. The small sherds and low frequency was minimally useful in refining the occupation history.

To summarize, the data recovery efforts retrieved several datable specimens. The obsidian artifacts, projectile points, and ceramics were expected, through prudent examination of associations and context, to provide some measure of the length of the site occupation.

Subsistence

Does LA 84318 reflect a hunting and gathering subsistence pattern, and did the subsistence pattern change through time? The data recovery plan predicted that the cultural deposits would reflect a hunting and gathering subsistence pattern. Because the cultural deposits were estimated to be 80 cm deep, time depth also was expected to be present. Therefore, it was important to determine if there was any change in the subsistence pattern through time.

Binford's (1983b) ethnographic hunter-gatherer models provide a baseline for analyzing subsistence strategies with artifact assemblage and site structure data. The hunter-gatherer strategy used, foraging, collecting, or both, would have depended on the spatial and temporal distribution of critical resources including but not limited to food, water, and shelter. Use of these strategies may have resulted in distinctive types of sites. Site types would be differentiated by the presence and type of shelter, processing and storage facilities, and content of the artifact assemblages. Identification of a site type can be conditioned by overlapping occupation episodes that result from different subsistence strategies. However, site structure, site formation, and lithic technology can be addressed with the excavation data.

Site type is addressed by using forager-collector distinctions suggested by Binford (1983a:5-12) and outlined in the data recovery plan (Post 1991:43-44, 51-54). Site formation and use is addressed using Camilli's occupational models for the Basketmaker II period sites on Cedar Mesa in Utah (Camilli 1989). Propositions relevant to this study are outlined in the data recovery plan (Post 1991:44-45). Technological organization is examined from the perspective presented by Kelly (1988) for the production and distribution of bifaces and biface manufacture debris relative to subsistence strategy and raw material availability (Post 1991:45-48, 52-54). Binford (1983c:264-267, 276-280) also provides propositions about the distribution of artifacts based on expedient and curated strategies that reflect a particular subsistence strategy.

These propositions are addressed with the data recovered from LA 84318. The primary data source is lithic artifacts and their distribution. Over 4,100 lithic artifacts were recovered, including core and tool manufacture debris and discarded tools that were broken in manufacture or during use. Distinct occupation levels were not encountered, so associations between artifacts are tenuous and condition the interpretations. However, the deposits have enough integrity to examine assemblages from different levels for differences that reflect changing subsistence strategies.

Regional Settlements and Land Use

How does LA 84318 fit into the existing knowledge of settlement patterns and subsistence strategies at local and regional scales? As discussed in the data recovery plan (Post 1991: 54-55), interpretations that extend to the local and regional levels depend on the quality of the temporal data.

The temporal data recovered from LA 84318 have been evaluated, and it is clear that fine-grained temporal resolution is not attainable. Therefore, it is not likely that LA 84318 will contribute significantly to the understanding of local or regional chronologies.

LA 84318 is compared with assemblage and site data that have been recorded by numerous government and private inventories within a 5 to 7 km range of the project area. These surveys provide information that can be used to identify a range of site types within temporal limits for purposes of comparison with LA 84318. The site data also are used to place LA 84318 and the El Cerrito area in a regional context while considering settlement patterns of the Archaic, Pueblo, and early historic periods.

FIELD METHODS

Regge N. Wiseman

The data recovery plan (Post 1991:56-58) called for the excavation of four separate locations, each 4 by 4 m (16 sq m) and near each of the four test pits dug during the testing phase of the project. Thus, two of the 4 by 4 m excavations were west of the road, and two were east of it. The goal was to examine approximately 32 percent of the known site area that was within the right-of-way. This plan was modified during the fieldwork for reasons summarized below.

The excavations were based on a grid of 1 by 1 m squares oriented with the right-of-way and laid out with 50 m tapes. Site or grid north was 45 degrees west of magnetic north. Datum was established within 1 m of the new west right-of-way line (approximated) and south of the areas to be excavated. Thus, all excavated squares had north and east designations. The northeast corner of each square was the designator for that square.

Before excavating the squares, twenty-eight auger holes, arranged in three north-south lines (two west of the road and one east of it), were excavated to more precisely determine the limits of the site and to gain more information about artifact densities and distributions. A three-inch bucket auger was used.

Excavations were by individual 1 by 1 m squares and 10 cm levels within recognized strata. Where a sharp stratum change occurred within a 10 cm level, the level designation terminated at the change, and the next level designation was applied to the new stratum down to the end of the original 10 cm depth. Thus, in Square 16N/4E, Level 4 was 30 to 38 cm, and Level 5 was 38 to 40 cm. Level 6 resumed the normal level of 40 to 50 cm.

Levels for each square were maintained from the four corners of that particular square (i.e., from the modern ground surface) rather than from a single assumed datum for the site. Thus, each level approximated the contours of the modern surface of its square and therefore, we assumed a priori, approximated the contours of cultural debris as it was deposited. The excavations later revealed at least one prehistoric ground surface, as suggested by a layer of burned rocks, with a slope slightly steeper than the modern surface and about 15 degrees from the horizontal.

Fill was loosened by small pick, shovel, or trowel (depending on circumstances), loaded into buckets, and carried to the screens located well away from the excavated areas. All fill was screened through one-quarter-inch wire mesh. Most of the time the fill was soft and easily screened, but the first levels dug each day were usually frozen, and it was necessary to crush small clods to get them through the screens. Artifacts were collected and provenienced by individual squares and levels.

The rocks in the burned rock layer were isolated by troweling, mapped in by square after the entire level was excavated, and then removed to permit excavation of the next level. Features were exposed by trowel and foxtail brush, photographed, mapped by square, and recorded on standard forms.

Three kinds of soil samples were taken: (1) The lower fill in and immediately under the three hearths was collected to examine for small chipping debris. (2) At the same time, the chipping debris samples were collected, and pollen samples were collected from beneath stones of each hearth. (3) Four soil columns were collected, three west of the road and one east of it. Each column was taken from the side of the excavation. The columns measured 20 cm by 10 cm by the depth of the adjacent excavation (70 to 90 cm) and were excavated in 10 cm levels by trowel. The fill of each level was bagged separately.

Charcoal and ash fills were lacking in the hearths, and no charcoal lenses were encountered in the excavations outside of features. Consequently, no flotation samples for the recovery of small plant and animal remains could be obtained.

Because the site grid was laid out with precision and the features were mapped relative to each square, the site map was complete by the cessation of excavations. Thus, the drawing of a final site map using a surveying instrument was not necessary.

Observations, descriptions, drawings (both plan views and stratigraphy), and work-progress notes were recorded on standard Office of Archaeological Studies forms. The one exception is the grid/level sheet designed specifically for this project.

The actual number of 1 by 1 m units excavated was 38: 35 west of the road and 3 east of the road, 27 units less than called for in the data recovery plan. The reasons are discussed in the following section.

Variances from the Original Excavation Plan

The actual excavations varied somewhat from the techniques proposed in the data recovery plan (Post 1991:56-58). The major changes (numbers 1 and 3 below) were made only after consultation with the NMSHTD and the Historic Preservation Office.

1. West of the road, the two 16 sq m units were united into a single large excavation. This was done because augering showed most of the subsurface cultural materials lay *between* the two testing-phase pits, and because of the need to obtain a single, long stratigraphic profile, rather than two shorter profiles separated by 2 m of unexcavated space. The unexcavated space fell at the critical juncture between the essentially intact northern stratigraphy and the disturbed southern stratigraphy.

2. Three additional squares were excavated west of the road, resulting in a total of 35 excavated squares on that side rather than the originally planned 32. Two of the squares were excavated to explore Hearth 3 and the overlying rock layer, and the third was excavated to square-off the excavation area.

3. The plan to excavate two 16 sq m areas east of the road was abandoned and replaced by the excavation of three 1 by 1 m squares. Midway through the field phase it became obvious that diagnostic artifacts and datable materials were not likely to be recovered by the excavations. None had been recovered at that time, and the proveniences most likely to produce datable materials (hearths, in this instance) lacked charcoal and charcoal staining. Additionally, the amount of project area east of the road was simply too small to physically permit the excavation of 32 sq m within the right-of-way.

4. Excavation in levels relative to a single, arbitrarily set datum was abandoned in favor of maintaining levels from the ground surface at each square. The logic behind this change is that, most of the time, the contours of the modern ground surface will approximate those of the prehistoric ground surface. As a corollary, cultural layers also tend to conform to the surfaces on which they are deposited, in this case, the prehistoric ground surface. Thus, contour-based levels are more likely to

be culturally meaningful.

The layer of burned rocks in the west-side excavations provides an independent check on the veracity of this technique. Although the rock layer sloped at a slightly different angle from the horizontal than did the modern surface (about 15 percent as opposed to 10 percent), the two were clearly more similar to each other than to absolute horizontal (0 percent). Thus, in a general sense, the artifactual contents of each level are temporally equivalent with those of each corresponding level in other squares, all other things being equal. Stated another way, and perhaps more accurately, the cultural deposits and items collected by the contour technique are less mixed than those collected by the horizontal-level technique, all other things being equal. This provided for more meaningful analytical results.

EXCAVATION RESULTS

Regge N. Wiseman

This section includes a pre-excavation description of LA 84318 and the augering and grid excavation results. The grid excavation results include stratigraphic and feature descriptions, and a discussion of potential conditions that may have contributed to the mixing of some of the deposits.

Pre-Excavation Site Description

LA 84318 is a sherd, lithic, and ground stone artifact scatter that covers about 4,000 sq m. Surface visibility of the artifacts is greatly affected by the amount of grassy ground cover. Areas with a thick coverage show a very sparse artifact distribution. Areas where the grass cover is sparse or missing exhibit dense artifact concentration. Besides the Native American artifacts, the surface is littered with historic Euroamerican trash and a single-room masonry structure, the Quintana homestead, which is outside of the right-of-way.

The site is along [redacted] San Miguel County, New Mexico. Artifacts were observed on both sides of the road and in the roadbed, which is built above the natural ground level. The source of the roadbed artifacts is unknown.

The [redacted] has two benches. The first bench is from the water level to the top of the prehistoric floodplain. This bench very gradually slopes up and away from the river and is covered with tall pasture grasses and cholla cactus along the road bed. The river has cut deep into the alluvial soils, which are fairly homogeneous. The second bench is 1.2 to 1.6 m high and appears as a low rise. This bench consists of redeposited, tabular sandstone blocks and has a sparse to medium cover of soil, grasses, cactus, and juniper. The rocky substratum continues to the north, terminating at the foot of the canyon slope. In general the soil depth is very shallow across the second bench.

The artifact scatter is about 100 m north to south by 40 m east to west. The surface artifact scatter is sparse on the first bench above the river, except where the plant cover is patchy, where the road meets the second bench, and to the south of the road, where there is no grass cover. In the latter area, the artifact density is high, 10 to 20 artifacts per sq m. The portion of the site north of the bend in the road is on top of the second bench with a surface artifact distribution higher than that of other parts of the site. In this area, however, the shallow soil depth indicates only a surface scatter. On the north side of the road on the first bench, the artifact scatter is very diffuse. Based on surface artifacts, one might suggest that the distribution is from redeposited road fill. However, the testing showed that substantial subsurface deposits occur in this area.

Surface artifacts probably number about 500 over the entire site, with 100 in the right-of-way. The main artifact type is stone tool production and core reduction debris. Mostly core flakes are visible, but some cores and biface flakes occur. Material types include fine- to medium-grained chert, chalcedony, quartzite, and siltstone. These materials are locally available from the terrace gravel in and on top of the canyon. Imported obsidian is common but in low numbers and occurs as biface flakes. No temporally or functionally diagnostic chipped stone tools were observed.

Potsherds occur in low numbers, with less than 20 observed on the surface. The potsherds include Red Mesa Black-on-white, Tewa Red, and micaceous utility wares. One very small and thin sherd may be an example of Ocate Micaceous as defined by Gunnerson (1969:26-27), although its small size makes identification difficult.

No surface features were observed. The extent of the scatter and the potential for subsurface remains, as shown by the testing results, indicate that LA 84318 is probably a repeatedly occupied camp site for Archaic period, Pueblo, or Plains groups until as late as the early 1800s. Historic refuse is lightly scattered across the site surface. It post-dates 1920 and may be redeposited sheet trash from the homestead northwest of the site or road trash.

Augering Results

The augering revealed that the primary cultural deposits were concentrated between the initial tests pits and that the first test pits essentially delineated the northern and southern limits of the site on both sides of the road (Figs. 2 and 3). The 28 holes averaged 1.34 m deep (range 0.25-1.52 m). The soil stratigraphy revealed in the augering followed that described in more detail below.

Fragments of chipped stone (N=19), glass (N=5), charcoal (N=4), burned rock (N=4), burned soil (N=3), cans (N=2), bone (N=1), plastic (N=1), and wire (N=1), totaling 41 cultural items, were recovered from 19 auger holes (67.9 percent). The average number of cultural items per artifact-producing hole was 2.21. Artifact recovery depths ranged from 5 to 142 cm, with a mean depth of 40.05 cm (SD=31.26).

Grid Excavation Results

Stratigraphy

The stratigraphy was essentially the same on both sides of the road. A basic material, clayey fine sand or fine sandy clay, comprised three strata that differed from one another primarily in minor constituents (Figs. 4 and 5). With rare, highly localized exceptions, the color of each stratum was subtle and homogeneous, and the texture was fine and homogeneous. Variations were due almost always to the relatively few river cobbles and pieces of sandstone ledge rock, concentrations of which varied across the excavated area.

Stratum 1

Parts of the site were covered by a thin mantel of eolian sand, but since this layer was discontinuous, it is included with Stratum 1. Stratum 1 was slightly loamy, as would be expected for a surface layer. The loamy character appeared to be entirely derived from the decay of natural vegetation and bioturbation, rather than from cultural materials. Soil color according to Munsell charts was 7.5 YR 5/4 (brown). Stratum thickness varied from 1 to 20 or 25 cm.

Small amounts of historic (fragments of glass, cans, china, wire, etc.) and prehistoric cultural materials (cores, flakes, burned rock fragments) were found throughout the stratum. Burned rock fragments were small (usually less than 10 cm in greatest dimension) and rare compared to those in lower strata.

Stratum 2

Stratum 2 was the primary prehistoric stratum at the site. It differed from Stratum 1 in being somewhat darker in color (7.5 YR 4/4; brown to dark brown) and in having the majority of burned

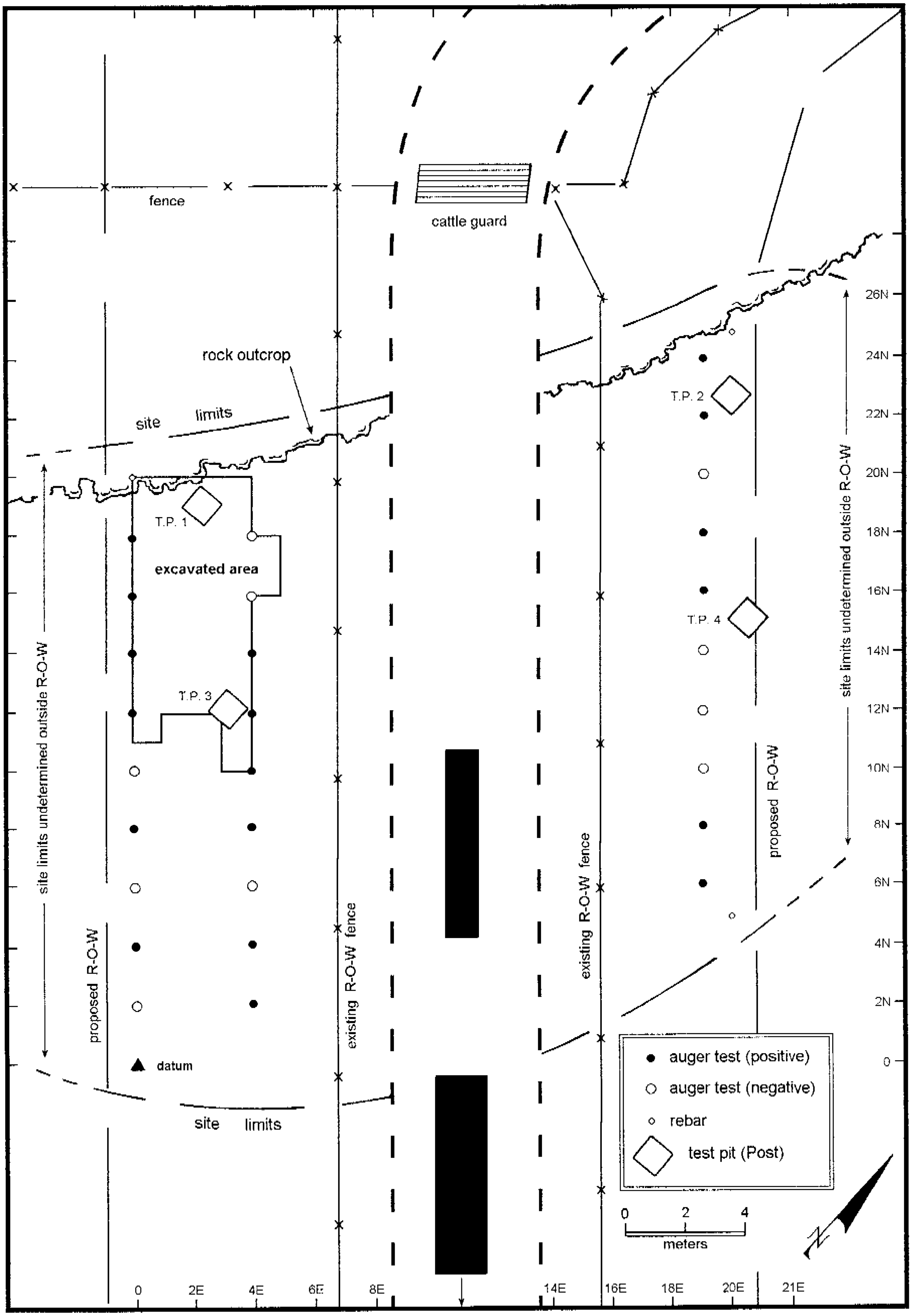

Figure 2. Location of auger holes.

rock. Although repeated comparisons with Munsell charts did not confirm it, observation of exposed profiles revealed the presence of a slight grayish tinge to this stratum. However, charcoal stains, charcoal flecks, and pieces of charcoal were virtually absent in the excavations. Stratum thickness varied from 30 to 60 cm in the 4E squares, where it is best defined, and was as thick as 90 cm in the southern 1E squares, where it was poorly defined.

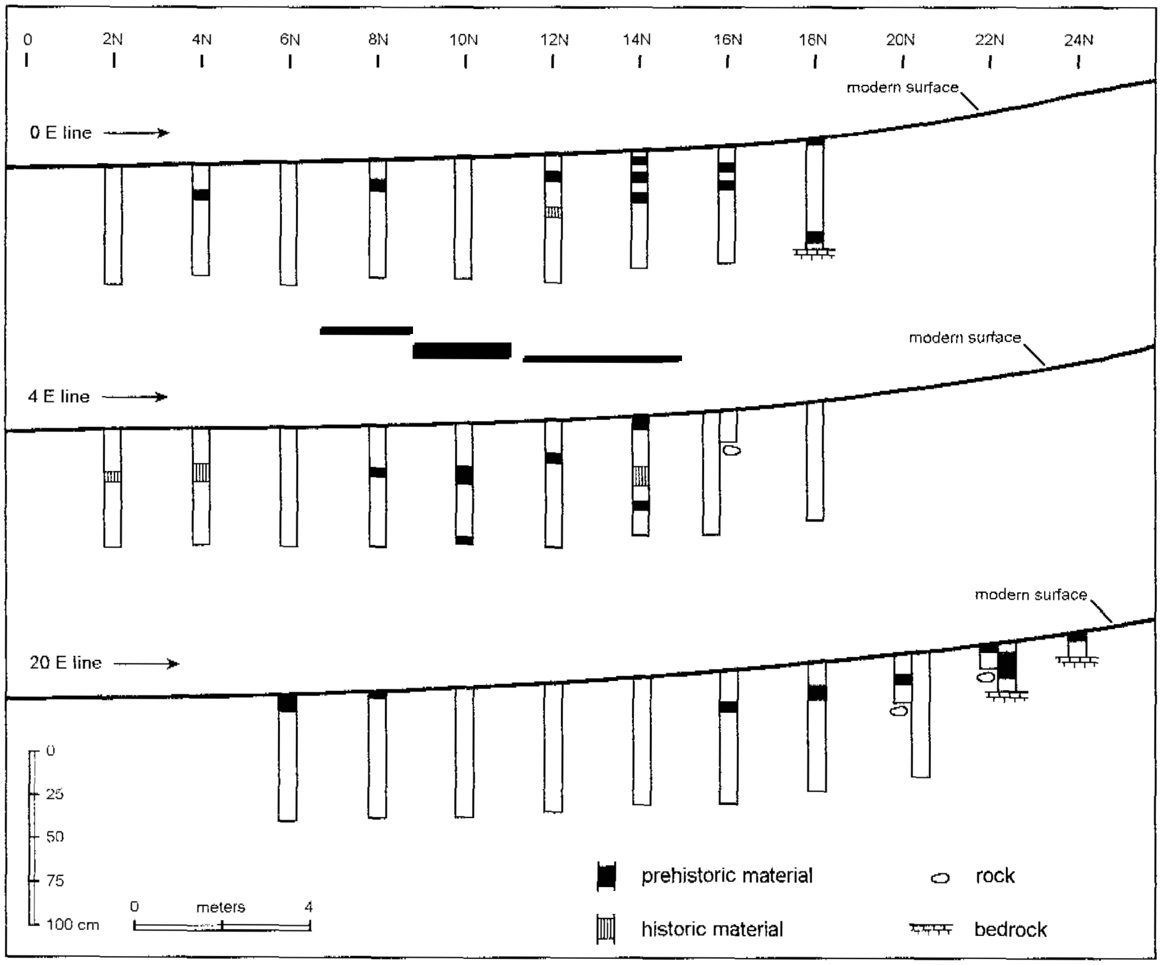

Figure 3. Depth of auger holes and location of artifacts.

The extent of Stratum 2 is uncertain because of color shifts in the southwestern part of the west side excavations and an anomaly in the southeastern part of the west side. The stratum simply disappears to the southwest, losing what little darker coloration it had in the northeastern portion where it was best defined. This color shift was accompanied by decreasing artifact and burned rock densities.

The one salient aspect of the stratigraphy exposed in the south half of the east profile (west side) was a sharp boundary that in part separated Stratum 2 and Stratum 3 and in part cut through Stratum 2 (15N, 16N, etc.). The distinctness of this boundary was reminiscent of the bottoms of plow zones, and the soil above was generally loamy all the way to the surface. The plow-zone explanation has two major problems: the boundary dipped toward the south (toward the river) at an angle steeper than the modern ground surface, and it was quite deep (40 cm at 15N/4E and 60 cm at 10N/4E). The

[redacted]

dip toward the river is contrary to the intended effects of land leveling, a procedure that had not been carried out on the land before 1939. The depth below modern surface was too deep for the plowing technology of the sort practiced in subsistence farming in early twentieth-century Cerrito (Leonard and Loomis 1941:25). Thus, the boundary does not seem to have been created by plowing or land leveling. We currently have no explanation for this phenomenon.

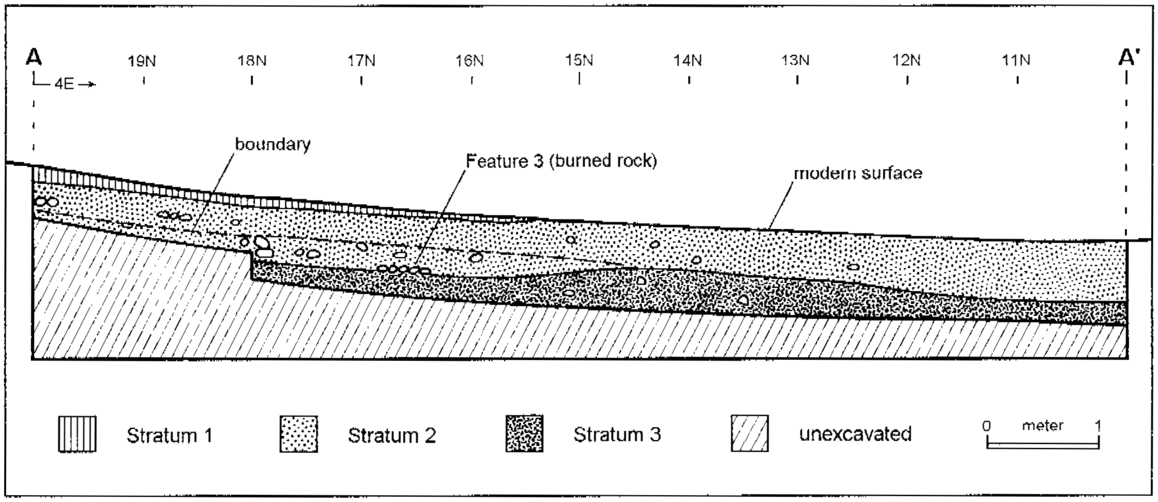

Figure 4. Stratigraphic profile along the 4E line between 10N and 20N.

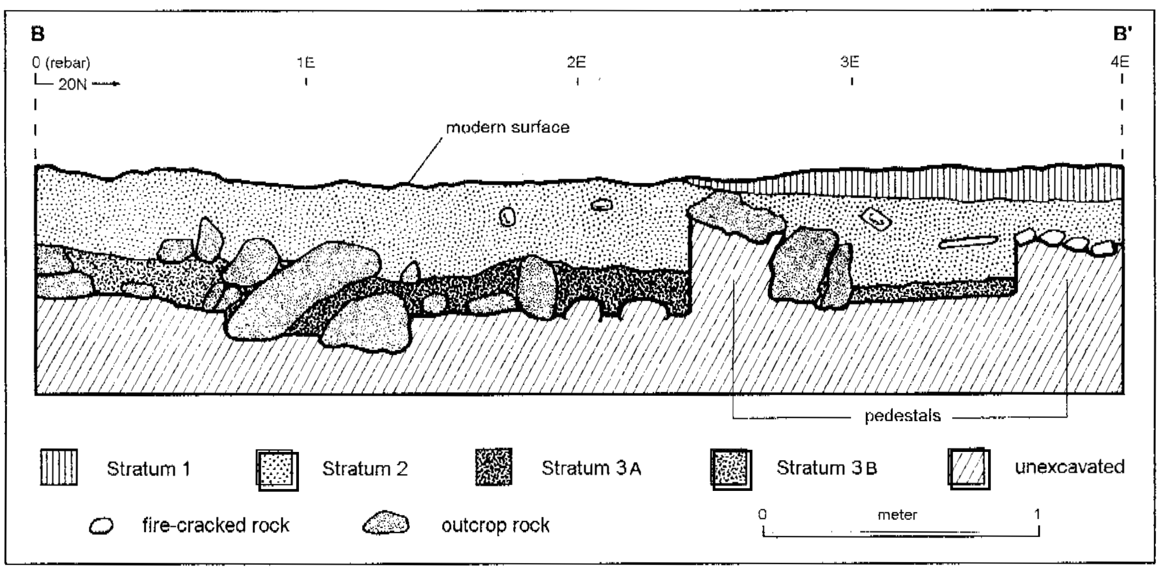

Figure 5. Stratigraphic profile along the 20N line between 0E and 4E.

Small amounts of historic (fragments of glass and cans) and comparatively large numbers of prehistoric materials (cores, flakes, formal artifacts, burned rock, hearths) characterized this stratum. The historic materials were probably all introduced from Stratum 1 by bioturbation and farming. The majority of burned rocks lay in a single plane that sloped from north to south (northeast to southwest according to the excavation grid). This plane of rock clearly demarcated a prehistoric ground surface and is described elsewhere. Two of the three hearths (Features 2 and 3) were definitely in this stratum, and the third (Feature 1) probably was.

Stratum 3

This stratum was similar to Stratum 1 in color, texture, and content, with the following exceptions. Stratum 3 lacked loam, had the beginnings of calcification (around roots and rocks, and in soil cracks and other natural voids), and, in different places, contained more naturally deposited clay, sand lenses, and large gravels (natural). Most or all of this stratum was originally devoid of cultural materials (i.e., it was sterile), but bioturbation (especially rodent burrowing) appears to have introduced cultural items. A number of flakes and larger cultural items were recovered from this stratum, probably through bioturbation.

Cultural Features

Three hearths are the only cultural features located by the excavations. Also, the presence of a prehistoric ground surface was detected through the distribution of burned rock.

Hearth 1 (Feature 1)

This group of large (greatest mean dimension of 15 to 20 cm) burned rocks formed a horizontal cluster measuring 100 cm north-south by 85 cm east-west by 19 cm (vertical) (Figs. 6, 7). No evidence of a pit was noted, indicating that the rocks had been set on the ground. No charcoal stain, flecks, or pieces were noted in the hearth, though charcoal flecks were noted in the surrounding fill, especially in the overlying fill.

Because the rocks were clustered and burned, there seems to be little reason to doubt that they represent a hearth. The absence of charcoal among the rocks is perplexing. Evidence associated with Hearth 3 suggests that the ash and charcoal from that hearth was blown away by the prevailing winds, a condition that also may apply to Hearth 1.

Hearth 1 was in Grid 16N/1E, Level 4 (30-40 cm). Although the stratigraphy in this part of the site was poorly developed, the hearth was in the upper-middle part of Stratum 2.

Hearth 2 (Feature 2)

This group of medium-size (greatest mean dimension of 10 to 15 cm) burned rocks formed a cluster measuring 40 cm north-south by 40 cm east-west by 15 cm (vertical) (Figs. 8 and 9). Although no direct evidence of a pit was noted, the rocks were clustered on a plane that sloped downward to the east at an angle of 10 degrees from the horizontal, suggesting that the rocks lined the west side of a shallow pit. No charcoal stain, flecks, or pieces were noted in the hearth, though charcoal flecks were noted in the surrounding fill, especially in the overlying fill.

Because the rocks were clustered and burned, there *seems* to be little reason to doubt that they represent a hearth. The absence of charcoal among the rocks is perplexing. Evidence associated with Hearth 3 suggests that the ash and charcoal from that hearth was blown away by the prevailing winds, a condition that also may apply to Hearth 2 as well.

A group of burned rocks lay immediately south of Hearth 2. Their jumbled disposition and proximity to the hearth suggest that they were once part of the hearth but had been pulled out previous to abandonment.

Hearth 2 was located in Grid 17N/2E in the upper part of Level 7 (60-70 cm). The hearth rested

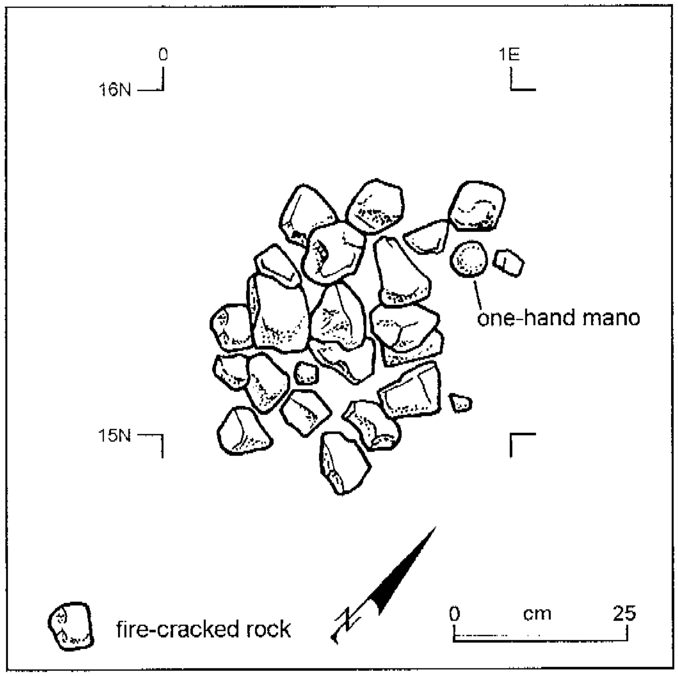

Figure 6. Plan of Feature 1.

Figure 7. Feature 1, excavated.

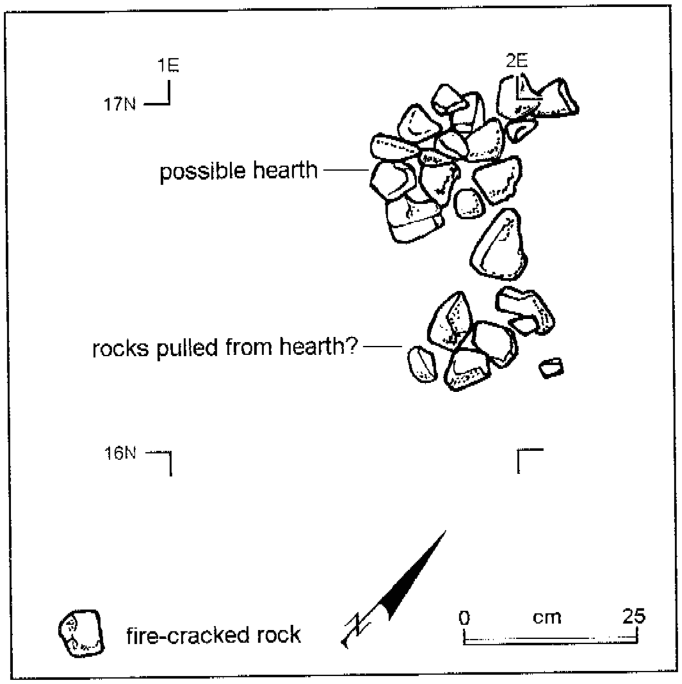

Figure 8. Plan of Feature 2.

Figure 9. Feature 2, excavated.

on Stratum 3.

Hearth 3 (Feature 3)

This group of small (greatest mean dimension of 10 cm) burned rocks formed a horizontal cluster measuring 46 cm north-south by 40 cm east-west by 7 cm (vertical) (Figs. 10 and 11). Judging by the positions of the rocks, each rock was individually placed. No evidence of a pit was noted, indicating that the rocks had been set on the ground. No charcoal stain, flecks, or pieces were noted in the hearth, though a thin spread of charcoal flecks was noted in a horizontal plane stretching northward from the hearth.

Because the rocks were purposely placed and burned, there seems to be little reason to doubt that they represent a hearth. The absence of charcoal among the rocks is somewhat perplexing, but the spread of charcoal flecks to the north and northeast suggests that the hearth contents were blown out of the hearth by prevailing winds after abandonment.

Hearth 3 was in Grid 17N/4E at the top of Level 6 (50-60 cm). The stratigraphy in this part of the site was fairly well developed. The hearth clearly rested in the lower part of Stratum 2 and several centimeters above the boundary with Stratum 3.

Burned Rock Scatter/Aboriginal Ground Surface

A loose cluster of burned rocks rested on a more or less single plane in the northeastern part of the excavations west of the road (Figs. 12 and 13): 17N/4E, 17N/5E, 18N/4E, 18N/5E, 19N/4E, and 20N/4E. In Grids 20N/4E and 19N/4E, this plane started at the bottom of Level 3 (25 to 30 cm). The rock-impregnated surface sloped down to the south to the bottom of Level 4 (35 to 40 cm) in Grid 17N/4E. Some burned rocks were found both above and below the rock level, but the majority of rocks were clearly in a plane, indirectly suggesting a prehistoric ground surface. An independently identifiable use-surface in the form of color and hardness changes was not associated with this rock layer. The occurrence of the rock layer at a stratigraphically higher position than at Hearth 3, the only nearby hearth, suggests at least two different prehistoric occupations in the excavated area.

Evidence of Post-Occupational Mixing of Deposits

Stephen S. Post

Field observations on the integrity of the cultural deposits suggest that the upper cultural levels were mixed. Probable causes of the mixed deposits were rodent burrowing and field plowing. The depth and intensity of the disturbance may be assessed using three lines of evidence: the frequency and distribution of breakage patterns of the lithic artifacts, calcium carbonate on lithic artifacts, and the vertical distribution of historic artifacts. Common sense assumptions can be applied in each case to aid in interpreting the frequency and distribution patterns.

What is the frequency and distribution of lithic artifact breakage patterns? In the lithic artifact analysis two types of breakage patterns were monitored: cultural and natural. Cultural breakage occurred during the production or use of an artifact. Natural breakage results from nonuse or production events such as trampling or field plowing. A series of diagnostic breakage patterns have been compiled by James L. Moore (1989). This list of patterns is derived from lithic technology literature and replication studies. While the list may not be exhaustive, it provides a baseline for interpreting breakage patterns and their relevance to deposit integrity.

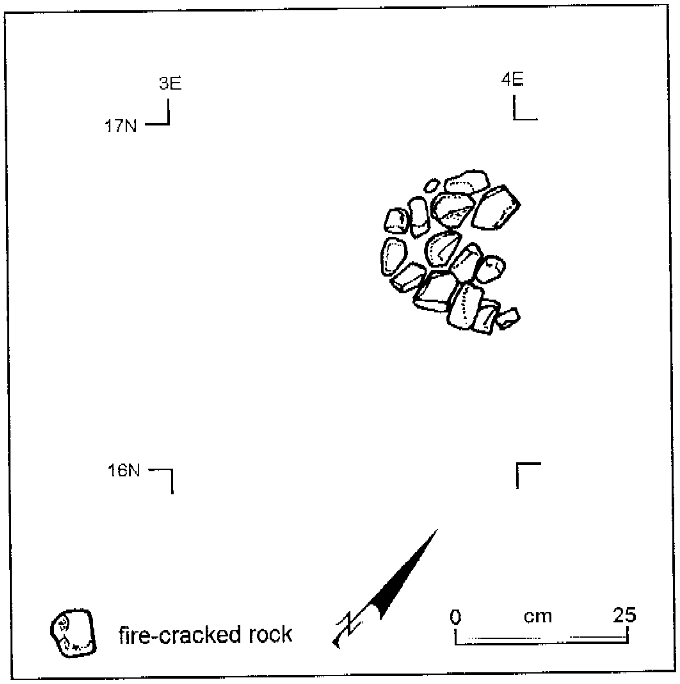

Figure 10. Plan of Feature 3.

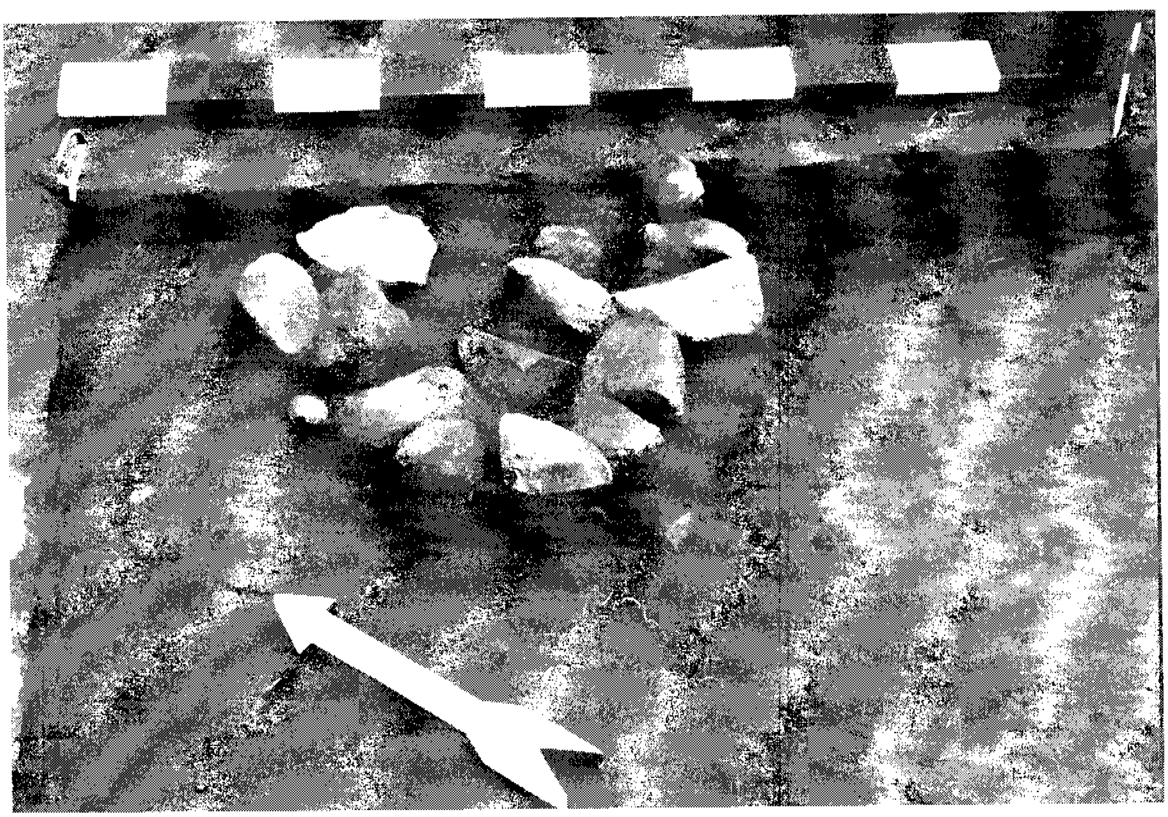

Figure 11. Feature 3, excavated.

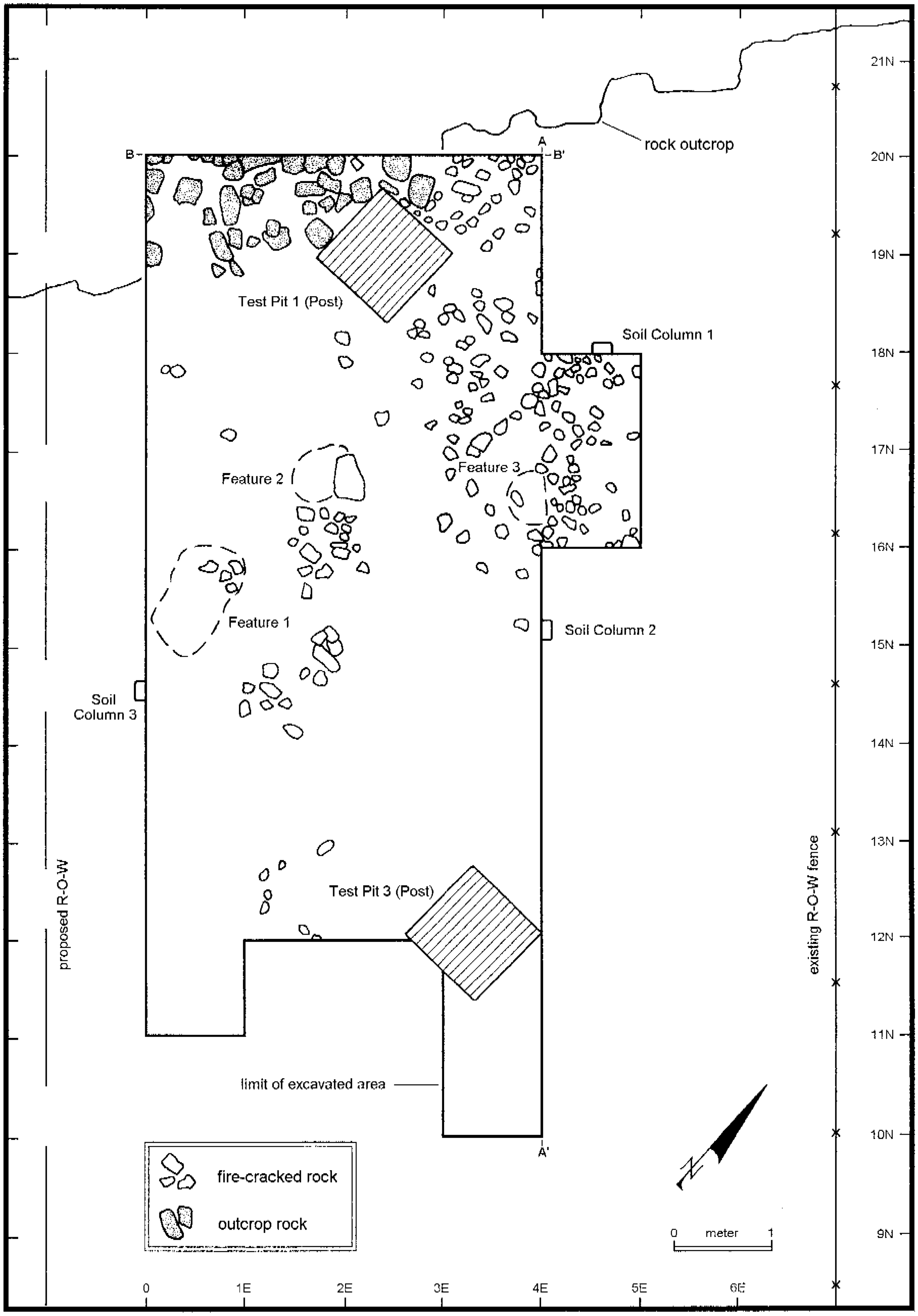

Figure 12. Plan of excavation area along the west side of the road.

Figure 13. Fire-cracked rock scatter (right) and natural rock outcrop.

Figure 14 is a bar graph of core and biface flake breaks that result from nonmanufacture activities. The percentages are calculated by dividing the number of broken flakes into the total number of flakes for each level. The frequencies fluctuate according to total number of flakes from each level. Levels 1 through 4 had the most flakes and therefore have the highest frequency of nonmanufacture breaks. The percentages show only a 4 percent range from Level 1 to 6. This indicates that nonmanufacture breaks occurred at a constant rate during the site occupation. This suggests that differences in human or animal traffic on the site had little effect on the frequency of nonmanufacture breaks. Upper levels that were plowed do not have significantly higher percentages of nonmanufacture breaks on flakes.

Levels 7 and 8 deviate from this pattern. Level 7 had 34 percent, and Level 8 had 33 percent nonmanufacture breaks or almost double the highest percentage from the upper levels. Three possibilities may combine to explain the higher percentage of nonmanufacture breaks: (1) Level 7 and 8 flakes may have been exposed on the surface longer, resulting in a greater accumulation of nonmanufacture breaks; (2) there was more traffic, resulting in more nonmanufacture breaks; or (3) the tendency for flakes to be longer in Level 7 and 8 may have may have increased the chance of breakage from traffic.

Nonmanufacturing breaks are not as strong an indicators of postdepositional disturbances as expected. The occurrence of nonmanufacture breaks on 14 to 19 percent of the flakes indicates that trampling was constant, but at a low level throughout the site history.

Calcium carbonate deposits were present on artifacts recovered from all excavated levels. Calcium carbonate was expected to be an indicator of deposit integrity because its formation depends on artifacts remaining stationary, and depending on soil mineral content, greater artifact depth may

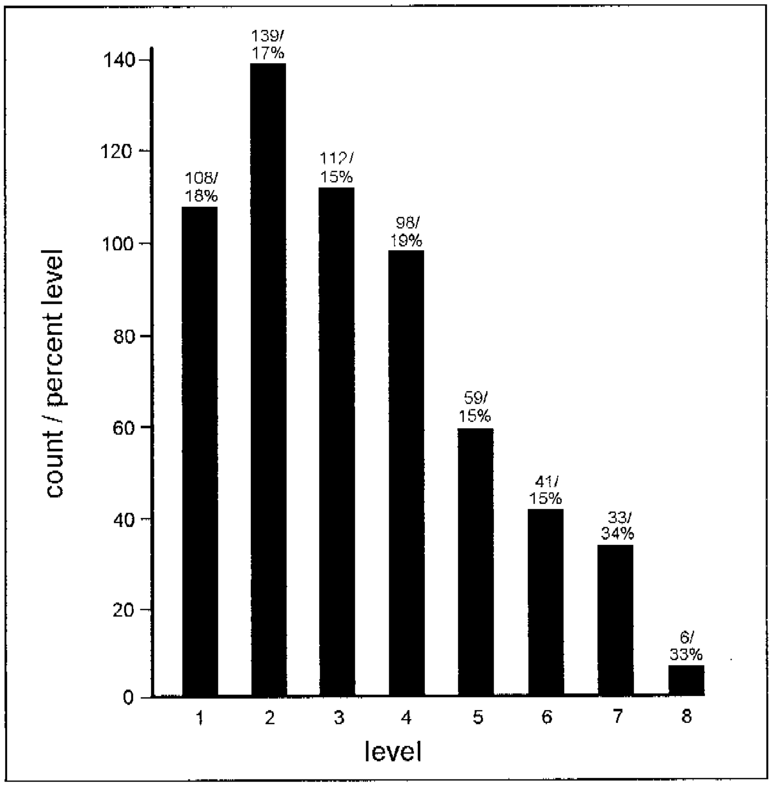

Figure 14. Nonmanufacture flake breaks (excluding testing phase).

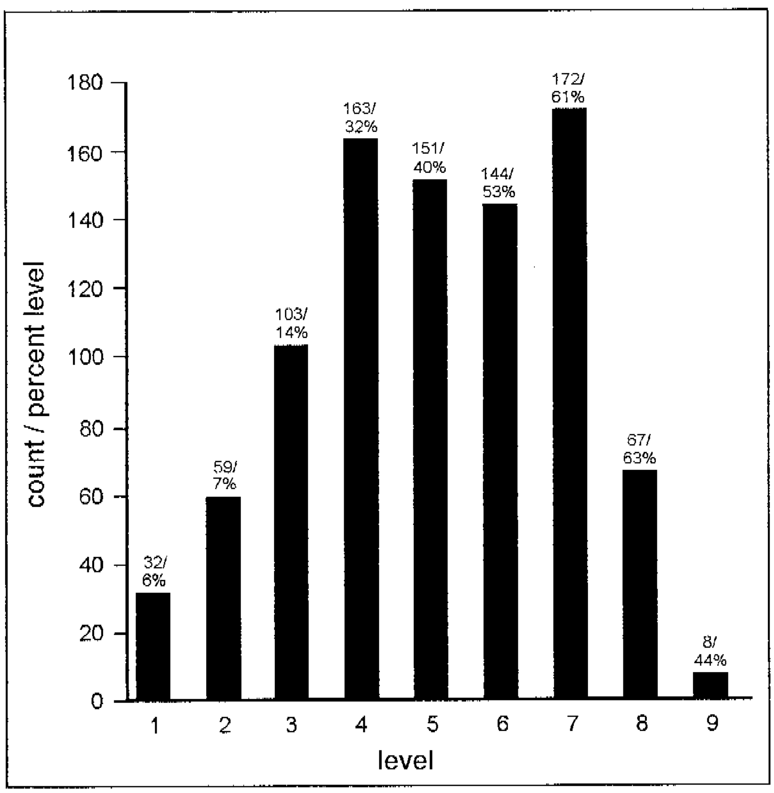

Figure 15. Calcium carbonate by level.

be necessary to allow sufficient percolation to form a deposit on the stones. The soil chemistry was not objectively determined, but the excavated soil profiles indicated that calcium carbonate content increased with depth.

Calcium carbonate was expected to occur more frequently on artifacts from lower, potentially more stable deposits, mixed with nonencrusted artifacts in the middle levels, if plowing had occurred, and in the lowest percentage in the upper levels, if deposit depth influenced the formation of calcium carbonate deposit on artifact surfaces. Figure 15 shows that these expectations are met by the distribution of calcium carbonate encrusted artifacts by level. Figure 15 shows the frequency distribution of calcium carbonate encrusting by excavation level. Levels 1 through 3 have 6 to 14 percent encrusted artifacts, which would be expected if soil depth influenced the rate and extent of calcium carbonate deposits. Levels 4 and 5 range from 32 to 40 percent calcium carbonate encrusted artifacts, which is an increase over Levels 1 through 3. This may reflect the mixing of artifacts from lower levels, which should have a higher percentage of calcium carbonate, and upper level artifacts, which have lower percentages of calcium carbonate. Levels 6 through 8 have a range of 53 to 63 percent calcium carbonate encrusted artifacts. This increase in percentage suggests that soil depth and calcium carbonate are correlated. However, at least 37 percent of the artifacts from the lower levels lack calcium carbonate, indicating that other factors besides depth influence its accumulation on artifact surfaces.

Is the presence of calcium carbonate a good indicator of deposit integrity? The answer is maybe. While the generally expected trend of increased presence of calcium carbonate can be demonstrated, there are still enough artifacts in the lower deposits lacking calcium carbonate to suggest that the process of accumulation is haphazard. The almost 30 percent increase from Level 3 to Level 6 does indicate that a greater percentage of artifacts were lying undisturbed, thereby permitting calcium carbonate to form. These deeper artifacts probably are older and are from deposits that are intact relative to the upper levels.

The vertical distribution of historic artifacts also may reflect deposit integrity. The historic artifacts probably accumulated over a period of 150 years, mostly after 1900. If the historic artifacts were deposited before and during the time that the site was plowed, then they would be expected to be most common in the upper levels with a rapid fall-off between Levels 3 and 5, which would include the greatest plow depth. Figure 16 shows the frequency distribution of historic artifacts by level. The greatest number of historic artifacts occurred in Level 1. There is a very rapid fall-off in Level 2 and another decrease in Levels 4 and 5. The high frequency of historic artifacts in Level 1 reflects the discard of containers by occupants of passing vehicles. Artifacts from Level 2 to 7 reflect more domestic or homestead-related activities. These artifacts may have been deposited on the edge of the field and plowed under.

The decrease in historic artifacts with increased depth supports the increase of the occurrence of calcium carbonate. This pattern suggests that the upper levels are extremely disturbed and mixed. The middle levels (4 and 5) are less mixed and may be better-preserved deposits. The lowest levels are only disturbed by bioturbation. Therefore, the condition of the middle and lower deposits suggests that they have the best potential for yielding information on site structure.

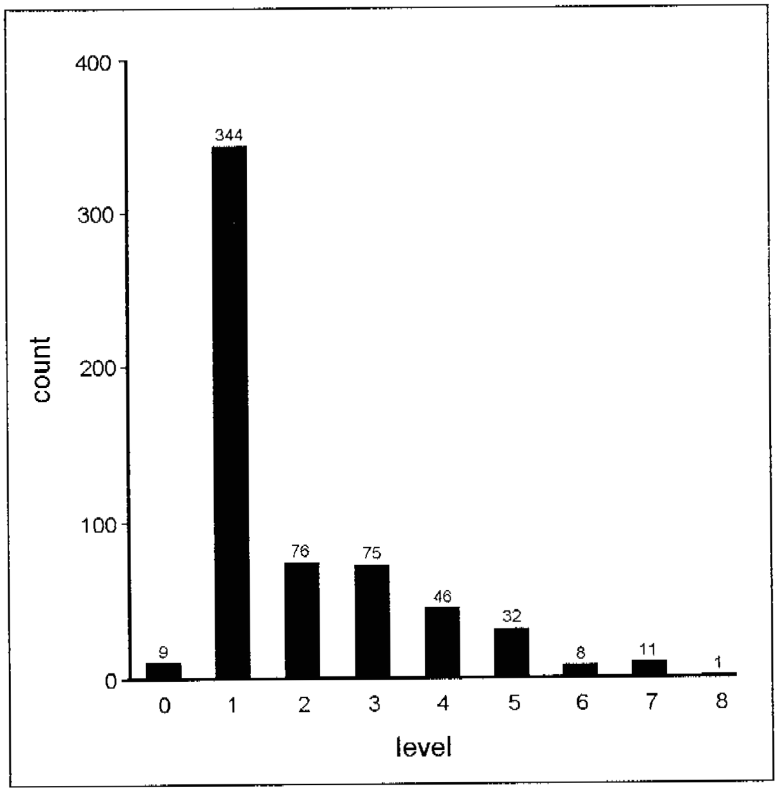

Figure 16. Historic artifact distribution by level.

PREHISTORIC MATERIAL CULTURE

The prehistoric occupation is represented by chipped stone, ground stone, and pottery sherds. Chipped stone was found in all levels of excavation. The ground stone artifacts and pottery sherds were much less common. This artifact type distribution mirrored the testing results that showed a preponderance of chipped stone artifacts. Because the chipped stone artifacts are the dominant artifact class, they will be the main focus of the analysis and interpretation. Before directly addressing the problems of chronology, subsistence, and regional perspective, morphological and technological variables of the artifact classes will be described. The descriptions will emphasize variables that are most appropriate for addressing the research questions.

The Chipped Stone Assemblage

Chipped stone is the most abundant artifact class recovered from the excavations. The analysis of the chipped stone focused on variables that were chronologically and functionally (magnetic) sensitive. Chronologically sensitive variables are important for determining the site history and occupation periodicity. Functionally sensitive variables are used to examine patterns that may reflect different hunting and gathering strategies. Combining the temporal and functional data, the analysis may begin to address changing hunting and gathering strategies along the Upper Pecos River.

The chipped stone assemblage was initially divided into general technological classes: debitage, cores, hammerstones, utilized debitage, and formal tools. The chipped stone analysis followed standard OAS procedures (OAS 1994a). Attribute definitions and significance are outlined in the procedural manual. This information will be restated as needed to support or demonstrate analysis results.

Debitage

Debitage is the most abundant chipped stone artifact class. A total of 4,077 pieces of debitage was recovered from testing and data recovery (Table 3). Debitage is 98.8 percent of the chipped stone assemblage. Obviously, core reduction, tool production, and maintenance were important activities throughout the prehistoric period. Debitage artifact types that are identified in the analysis include indeterminate, angular debris, core flake, biface flake, bipolar flake, and hammerstone flake.

Variables were monitored that provide morphological and technological data. These attributes provide information on chipped stone use that can be used to examine hunting and gathering strategies along the Pecos River. The variables that apply to all debitage include material type and texture, percentage of dorsal cortex, calcium carbonate deposit, heat treatment, and size (length, width, and thickness). Additional variables reflect reduction sequences and relate to differences in expedient and planned technologies used in the production of flakes or formal tools. These variables were monitored for the different flake types and include portion, platform type, and distal termination. Debitage that exhibited evidence of use is included in this assemblage, but the tool use will be described in a following section. Attribute data that apply to all debitage will be presented first, followed by the flake-specific attribute data.

Table 4 shows the distribution of debitage classes by material type and excavated level. Core flakes were the most numerous, followed by angular debris and biface flakes, which occurred in similar percentages. The other flake types occurred in small numbers and do not contribute significantly to the analysis and interpretation. Core flakes occur as 52.2 to 70 percent of the debitage assemblage. The lowest percentages occur in Levels 8 and 9, which had the lowest debitage frequencies except for the surface artifacts (Fig. 17). Angular debris fluctuates between 15.2 and 31.5 percent, and biface flakes range between 10 and 21.7 percent. The range extremes occur in levels with the lowest artifact frequencies. The general picture is that throughout the occupation represented by the excavated sample, lithic reduction included core reduction and biface production, with core reduction the primary activity and biface production a minor, but consistent contributor.

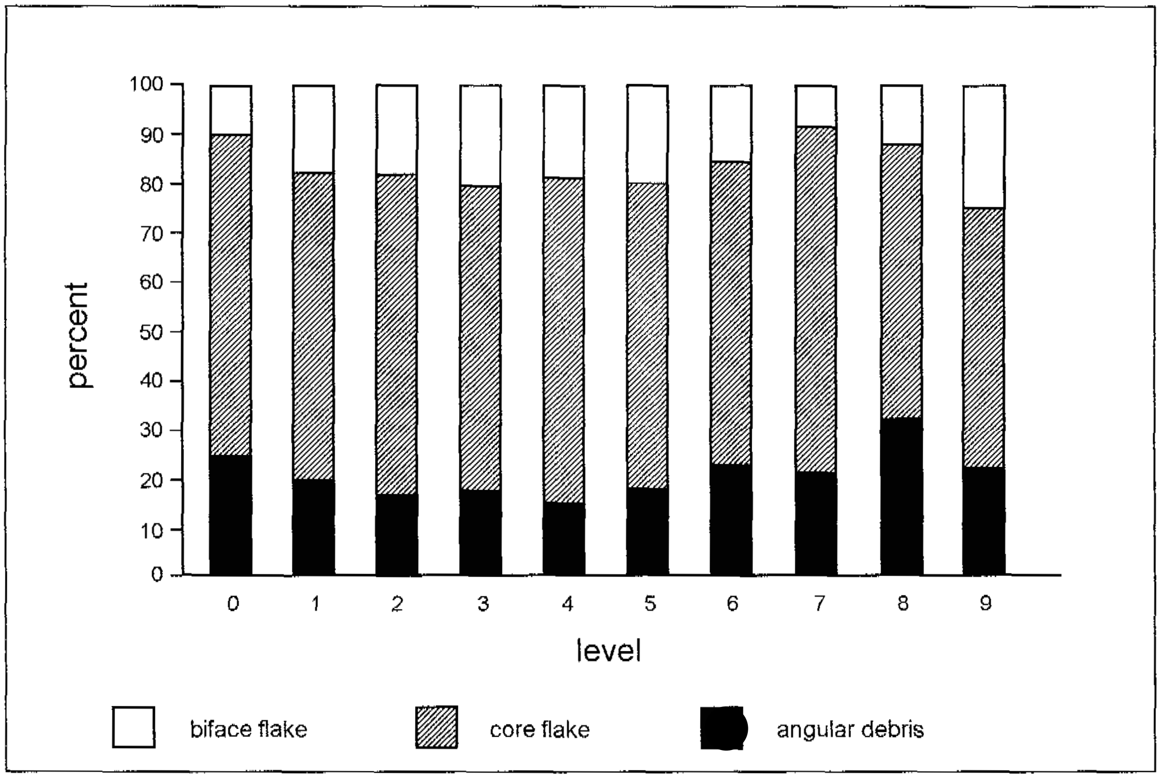

Figure 17. Debitage type percentages by excavation level.

Material Type and Texture

Lithic raw material type and texture were recorded for all chipped stone artifacts. Identifications were made using comparative collections available at the Office of Archaeological Studies and from archaeological studies from the surrounding area (Wiseman 1975; Abel 1987, 1989a, 1989b, 1990a, 1990b). The previous studies provide an indication of local material availability that might be reflected in the LA 84318 assemblage. These reports also provide information on nonlocal lithic materials that one could expect to find.

Based on the material variability reported by Abel (1989b, 1990a, 1990b), all of the raw material classes, except for obsidian and Washington Pass, Brushy Basin, Tecovas, Alibates, and San Andres chert, Table 4), occur in the local terrace gravel deposits on top of and on the talus slopes of the Pecos River canyon. Chert/chalcedony are the most common, followed by quartzite, siltstone, and igneous materials. Obsidian is the most common nonlocal material reported by Abel (1987, 1989a, 1989b, 1990a, 1990b) for the El Cerrito area sites. At Sitio Creston, which is the best-reported site in the immediate area (Wiseman 1975), obsidian occurs in very low numbers, reflecting the heavy reliance on and suitability of local raw materials.

The chert/chalcedony class from LA 84318 corresponds well with the material types referred to as Tecolote gray and Tecolote jasper, reported by Wiseman (1975). This material has been identified in carboniferous limestone beds northwest of Sitio Creston and in the pediment and fan gravels of drainages near the Sitio Creston site. It may originate in the Sangre de Cristo formation or the lower Madera or Sandia limestone. LA 6008 has been identified as a quarry site and primary source of Tecolote chert (Wiseman 1975:83). The chert beds near Agua Zarca range in color from colorless, white and cream, to orange and crimson. The material may be mottled or banded and commonly has chalcedonic and quartz inclusions (Wiseman 1975:83).

Wiseman (1975:90) characterizes the knapping quality of the chert and local quartzite/siltstone as "generally fair to poor. The poorest grades of both are quite grainy. Such coarse flakes frequently lack clear flake characteristics (defined cones, bulbs, etc.). In addition to graininess, internal cross-cutting fractures and inconsistencies (inclusions and differing textures) compound knapping difficulties. Such difficulties are demonstrated by the high number of characterless flakes and pieces of shatter. . . . The better quality Tecolote chert flakes usually have fairly well defined flake characters. They also commonly display marked bulbar carinas caused by excessively strong blows necessary for working difficult material."

Fifteen artifacts were subjected to dispersive x-ray fluorescence by Biosystems Analysis Inc. of Santa Cruz, California (Appendix 2; letter from Thomas L. Jackson and Charles H. Miksicek, 1993; on file in project file, Archeological Records Management Section, Santa Fe). Analysis of these samples revealed that the majority of the obsidian was from Cerro Toledo sources within the Tewa Group of the Jemez Source Subsystem (Baugh and Nelson 1987). These sources include Cerro del Medio and Obsidian Ridge subsources that are commonly found in the northern Rio Grande. These sources are along the southwestern periphery of the Valles Caldera. Source location suggests that materials could have originated from the Cochiti/Frijole Canyon area and reached the Pecos River sites by trade or long distance hunting. Only one sample was identified from the Polvadera group. This low frequency further emphasizes the more southerly connection between source areas and the Pecos River sites.

Table 5 shows the material texture variability for local materials and other chert. Obsidian is excluded because it is glassy by definition. A full range of texture variability is found in the chert/chalcedony class. The other material types generally are fine and medium-grained. The variability in the chert/chalcedony class corresponds with Wiseman's observations on the Sitio Creston lithic material. Besides the material texture variability in the LA 84318, the amount of angular debris and blocky flakes supports Wiseman's observation that the material was difficult to work. However, in the LA 84318 assemblage there are enough biface flakes to suggest that raw material suitable for soft-hammer percussion could be obtained from local sources (Table 4).

One difference between the Sitio Creston site and LA 84318 is that obsidian is the second most common material type at LA 84318. In the 1724 Sitio Creston artifact assemblage, only 20 pieces of obsidian debitage were recovered. Though the Sitio Creston assemblage is 2.5 times smaller than the LA 84318 assemblage, proportionally it has seven times less obsidian. Obviously, obsidian was more available to the LA 84318 occupants than to the residents of Sitio Creston. Differences in obsidian frequencies between LA 84318 and Sitio Creston may reflect settlement or use by groups with different regional origins. LA 84318 may have been used more frequently by groups from the upper Pecos or northern Rio Grande, where obsidian could have been acquired directly or through change. Wiseman (1975) suggested that Sitio Creston inhabitants originated in the Plains or on the eastern slope of the Sangre de Cristo Mountains.

To summarize, from all levels the debitage consists of 85 to 95 percent local lithic materials. Obsidian is the only obvious nonlocal material that occurs at greater than 5 percent of the total in all levels. Compared to the Sitio Creston assemblage, the amount of obsidian is much higher. Nonlocal Tecovas, Alibates, and San Andres chert, which were present in low counts, occur to the south and east of the project area. These types are commonly associated with sites of the Western Plains in west Texas and eastern New Mexico. Their presence suggests movement between the Plains and the Pecos River, but limited long-distance transport of Plains-provenance materials.

Dorsal Cortex

Dorsal cortex is the outer layer of lithic materials that is formed by natural weathering. The percent of cortex that is present on debitage is used an indicator of raw material source, distance, and extent of raw material reduction. Higher percentages of dorsal cortex are expected in assemblages where raw material is locally available and the raw material reduction has not proceeded beyond the early stages. Decreasing amounts of dorsal cortex are expected as distance from a source increases or the extent of core reduction has continued to the production of flakes, tool blanks, or tools.

For LA 84318 debitage, local material dorsal cortex would be expected in percentages that reflect all stages of material procurement, core reduction, and tool production. Figure 18 shows the distribution of dorsal cortex by level for local material. The most striking aspect at all levels is the predominance of noncortical debitage. Clearly, core reduction continued well into the middle and late stages. The high frequency of noncortical debitage corresponds with the occurrence of biface flakes. Biface flakes result from tool or late-stage core reduction and should have a low percentage of dorsal cortex. The low number of cortical flakes in the 10 to 50 percent coverage, 60 to 90 percent coverage, and 100 percent coverage classes indicates that some early core reduction or material testing occurred, but it is overshadowed by the late-stage reduction debris. Obviously the local material was brought to the site in both unreduced and reduced states, but with a greater emphasis on cores or blanks that had little or no cortex remaining. Obsidian derived from Obsidian Ridge and Cerro del Medio, in or near the Jemez Mountains, should occur in site assemblages along the Upper Pecos River as artifacts exhibiting little or no cortex. This is based on the assumption that as distance from the source increases, the form in which raw materials are moved across the landscape will change. The form in which a raw material is transported also may be affected by its intended use. Since obsidian is superior to the local material for biface production, it would be expected to be used more for formal tool manufacture than for other purposes. Since formal tool manufacture required more complete raw material reduction, the ratio of noncortical to cortical debitage should be very high.

Figure 19 shows the distribution of percentage of dorsal cortex for obsidian debitage by level. As would be expected, the noncortical debitage is far more common than any other class of dorsal cortex percentage. This fits the expectation that distance and intended use may strongly influence the amount of cortex that may occur on exotic material. Curiously, there are three pieces of debitage with 100 percent dorsal cortex. These flakes probably came from small obsidian nodules that could be easily transported or from large flakes that were removed from obsidian nodules or cobbles. In other words, obsidian was not always transported in the form of tools or bifacial cores.

Thermal Alteration

Thermal alteration is defined as the alteration of the surface or internal structure of the lithic raw material by heat. Thermal alteration can result from intentional heat treatment of lithic material, or it may result from exposure to heat after the artifact has been discarded. Heat-treated raw materials

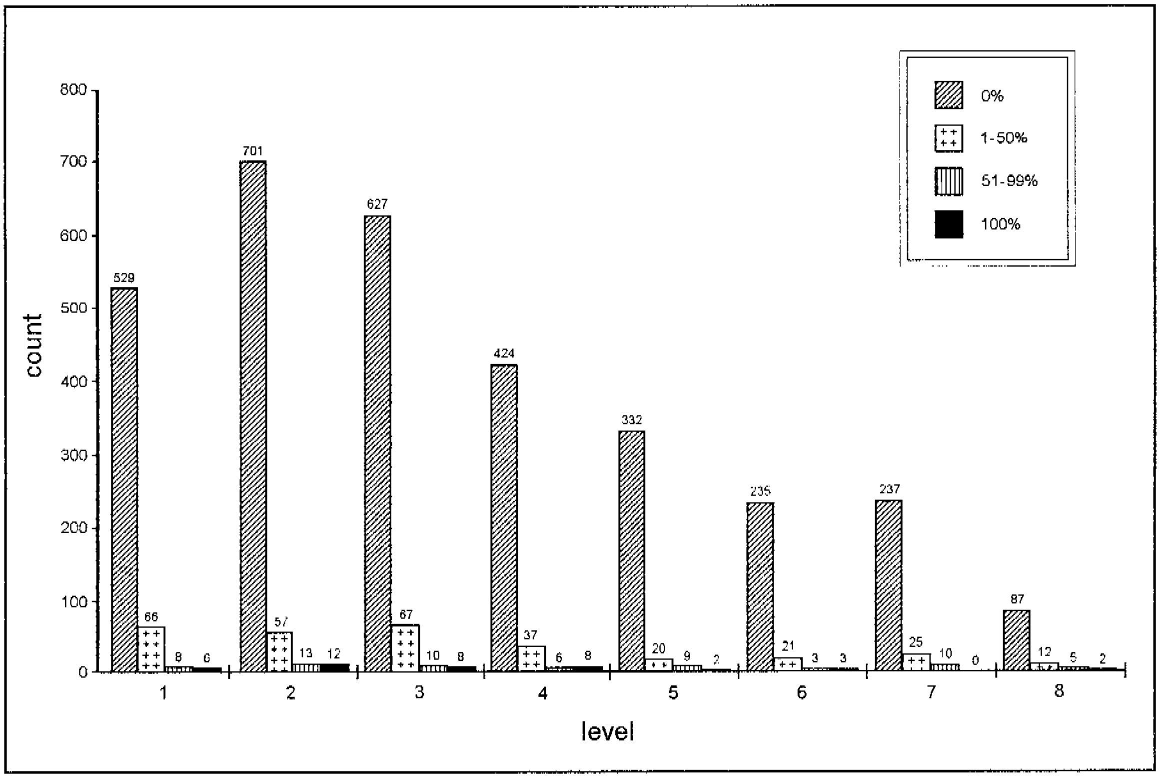

Figure 18. Dorsal cortex, local lithic material, by excavation level.

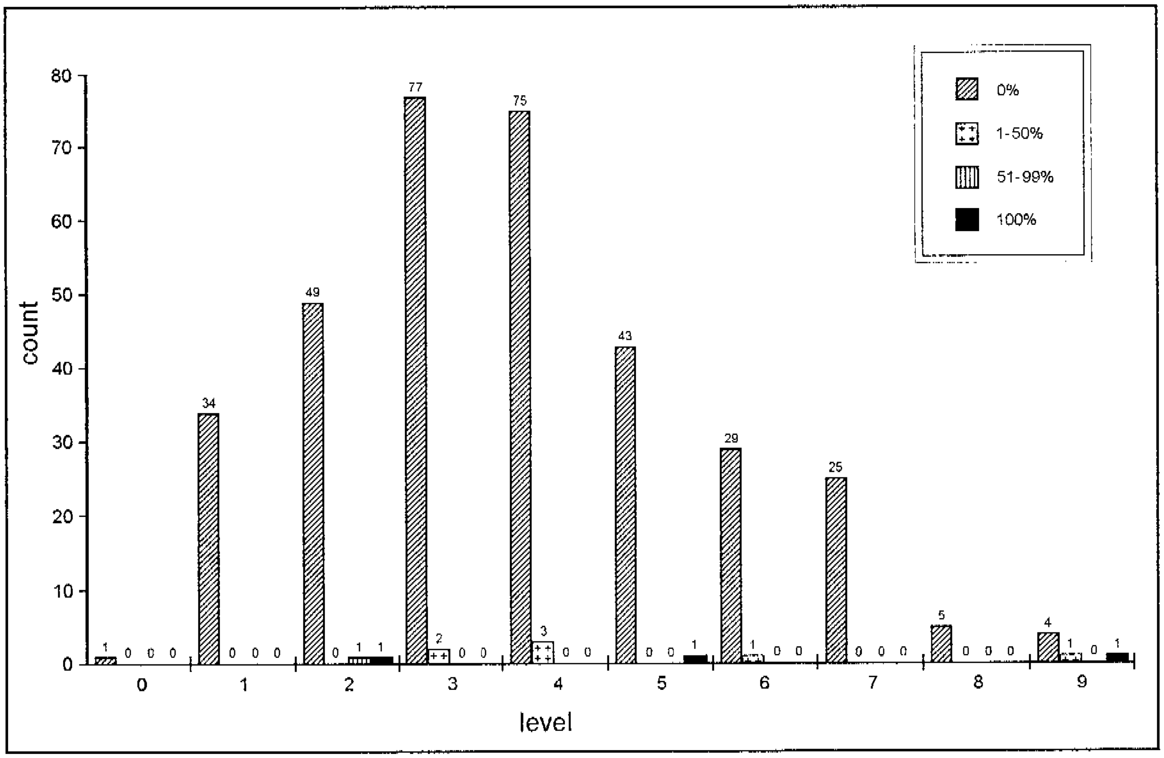

Figure 19. Obsidian debitage cortex by excavation level.

are often associated with tool manufacture. Heat treating tends to make material easier to knap, but it also makes it more brittle, which can lead to more production failures (Crabtree 1970). Heat treating is recognized by crazing or potlids on artifact surfaces. Since LA 84318 was cultivated and probably burned in historic times, evidence of heat treatment cannot be attributed solely to prehistoric raw material processing. Since the cultural deposit below Level 14 was demonstrated to be unaffected by historic farming, heat treatment on artifacts from lower levels most likely resulted from core reduction or tool production.

Figure 20 shows the distribution of thermally altered debitage by level. Thermal alteration occurred on a minority of the debitage. Within this minority, the majority of the thermally altered material occurs in the upper three levels, where the alteration could be intentional or a by-product of field burning. Crazing is the most common evidence of thermal alteration on debitage from Levels 6 through 8. Crazing may result from intentional heat treatment that enhanced material quality for flintknapping. Heat treatment and other thermal alteration were present on less than 1 percent of the debitage, indicating that it was a poor indicator of postdepositional field burning and was not a common component of flintknapping.

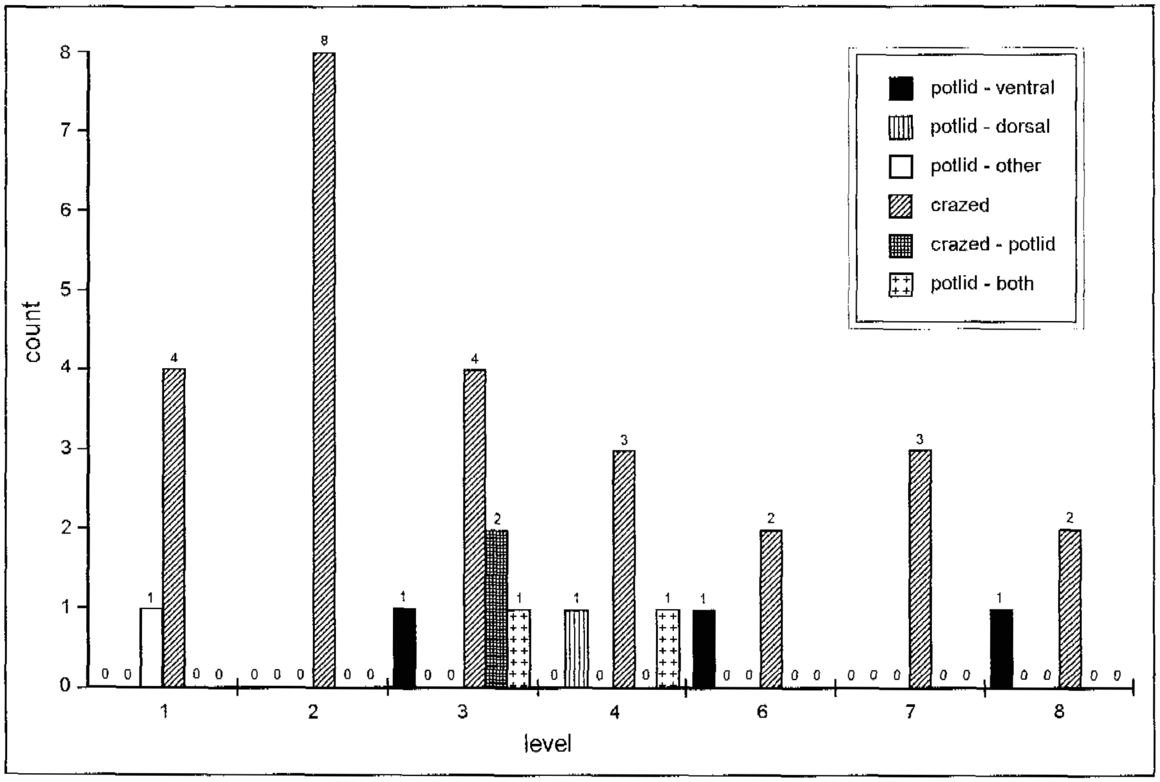

Figure 20. Distribution of thermally altered debitage by excavation level.

Dimensions

Length, width, and thickness were measured for all debitage. Debitage dimensions may reflect the size of the raw material, the extent of the raw material reduction, and preferred tool or flake sizes with respect to material type. Raw material that has been reduced to flakes or tools should exhibit a wide range of artifact sizes. Small raw material size will result in small debitage, which may be difficult to distinguish from large parent rock of the same raw material that has been extensively reduced. Some reduction techniques may yield a large amount of very small debris that cannot be recovered with 1/4 in mesh, which will tend to skew the size distribution toward larger sizes. Other reduction strategies that were geared to testing material suitability may have a high number of large debitage with very low numbers of small debitage. It is expected that an assemblage that reflects all stages of lithic reduction will have a large number of small (less than 19 mm) to medium (20 to 39 mm) debitage with proportionately less large or very large (40 mm or greater) debitage.

Three variables will be compared for debitage dimensions: material type, debitage type, and excavation level. These comparisons will focus on artifact length and thickness. Whole core and biface flakes and all angular debris (length only) will be examined. Measures of central tendency and box-plots will be used to examine the distributions.

Angular Debris

Sufficient sample size for examining angular debris is only available for chert/chalcedony. The other materials have less than 10 artifacts per group for any level. Table 6 shows mean length by level for chert/chalcedony.

Mean angular debris lengths range between small (1-19 mm) and medium (20-39 mm), and a mean of 18-27 mm by level. This is similar to the core flake lengths, which are mainly small and medium. However, the extreme values of angular debris length range between 40 and 150 mm. These large values reflect material procurement and the testing of cobbles for suitability. Figure 21 shows box-plots by level for angular debris. The distributions are tight, with fairly similar spread within the 25 to 75 quartile range. The surface and Level 8 have the greatest spread, reflecting low sample size. The median value remains almost constant across all levels with only slight fluctuations. Basically, angular debris lengths reflect a similar reduction strategy and technology across all levels for chert/chalcedony. Generally speaking, the other material type lengths fall within the 25 to 75 quartile range exhibited for chert/chalcedony.

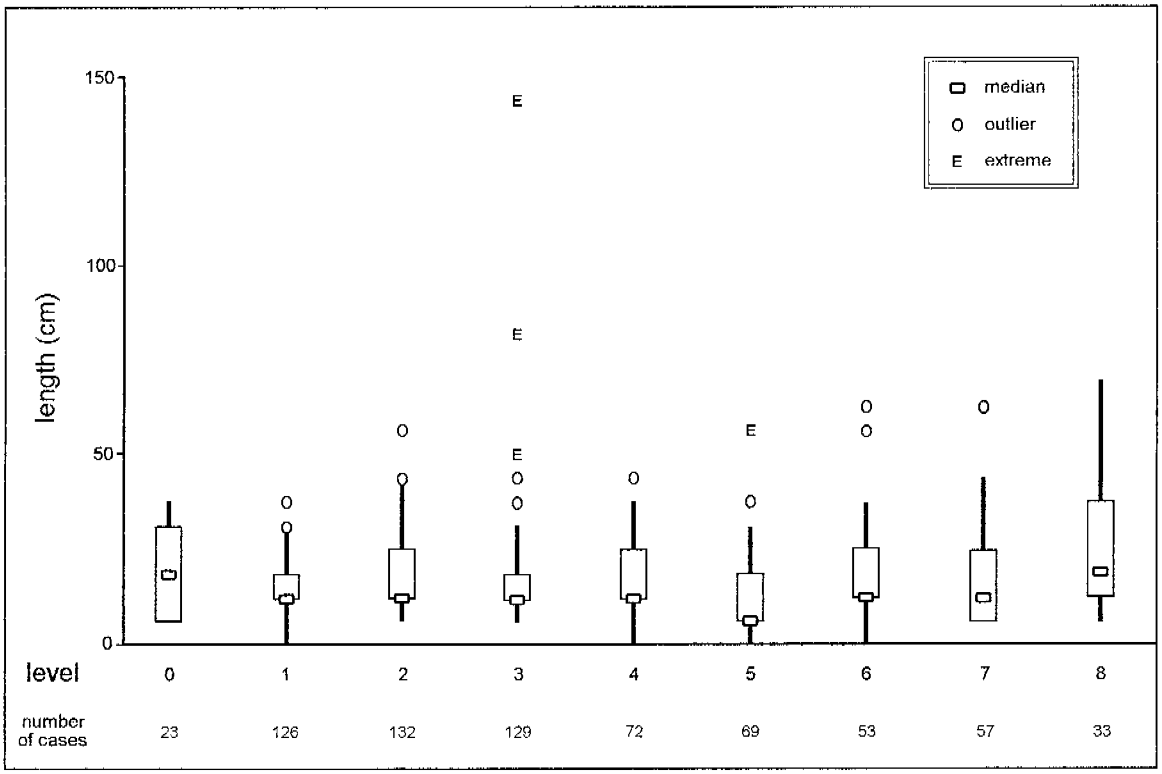

Figure 21. Chert/chalcedony angular debris length by excavation level.

Core Flakes

Chert/chalcedony and siltstone core flakes can be statistically compared. Core flakes of other material types can be compared to chert/chalcedony and siltstone in a general way. Comparisons will focus on length and thickness for whole flakes.

Average whole core flake length and thickness by chert/chalcedony and siltstone for the whole assemblage are shown in Tables 7 and 8. The mean length and thickness for chert/chalcedony and siltstone are significantly different at the .01 level (Student's T, pooled variance, two-tailed test). These significant differences can be examined for each material type with respect to excavation levels.

Average chert/chalcedony core flake lengths range between 16 and 24 mm for Levels 1 through 9, which is within the small to medium range. Individual chert/chalcedony core flake length ranges between 5 and 80 mm. Large (>40 mm) chert/chalcedony core flakes occur in small numbers and reflect early reduction or testing of cobbles. Figure 22 shows box-plots of whole chert/chalcedony core flakes by excavated level. In all cases the median length (as indicated by the asterisk) is lower than the mean. This suggests that there are more small to medium flakes, with the average length skewed to the right by the few medium to large size flakes. The median values are very close for Levels 1 through 5, with only a slight size increase in Levels 6 to 8, indicating fairly consistent flake lengths through time. This is further supported by the occurrence of twice as many core flakes in the 25 to 75 quartile box length, which is smaller than or nearly equal to the 75 to 100 quartile stem. In other words, the longer flakes, which make up the 75 to 100 quartile range, are more spread in their distribution, but they are less numerous than the smaller flakes.

The average siltstone core flake length ranges between 31 and 48 mm. Individual core flake lengths range between 8 and 74 mm, which is slightly lower than the chert/chalcedony core flake range. Figure 22 shows box-plots of siltstone core flake lengths by level. Median values fluctuate considerably, with an increase in median length occurring with increased excavated depth. Some fluctuation is due to small sample size, though the long box lengths suggest a wide range within the 25 to 75 quartile. Some of the variability may result from a more expedient treatment of less common or miscellaneous material.

The distribution of chert/chalcedony core flake thickness is shown as box-plots by level in Figure 23. The average chert/chalcedony core flake thickness ranges between 4 and 6 mm. Individual core flake thickness ranges between 1 and 29 mm, reflecting a much wider range than the average. The box-plots show that the 25 to 75 quartile is consistently below 7 mm, so that a majority of the core flakes reflect middle and late stages of core reduction. The relatively tight distribution reflects the preponderance of small to medium core flakes as suggested by the flake lengths. It also reflects a focus on middle and late stages of core reduction. Early-stage reduction or material testing, indicated by 75 to 100 quartile stems and outliers, was an occasional activity.

Average siltstone core flake thickness ranges between 6 and 44 mm, though there is no intermediate flake thickness between 15 and 44 mm. The 6 to 15 mm range is a substantial size increase over the chert/chalcedony core flakes. Just as siltstone core flake length was highly variable, so are the flake thicknesses. This variable distribution is reflected in median values that exhibit a sinuous pattern for Levels 1 through 7 (Fig. 24). Core flake thickness combines with length to indicate more expedient core reduction, a greater focus on early- and middle-stage core reduction, and early-stage reduction, indicated by the long 75 to 100 quartile stems and outliers.

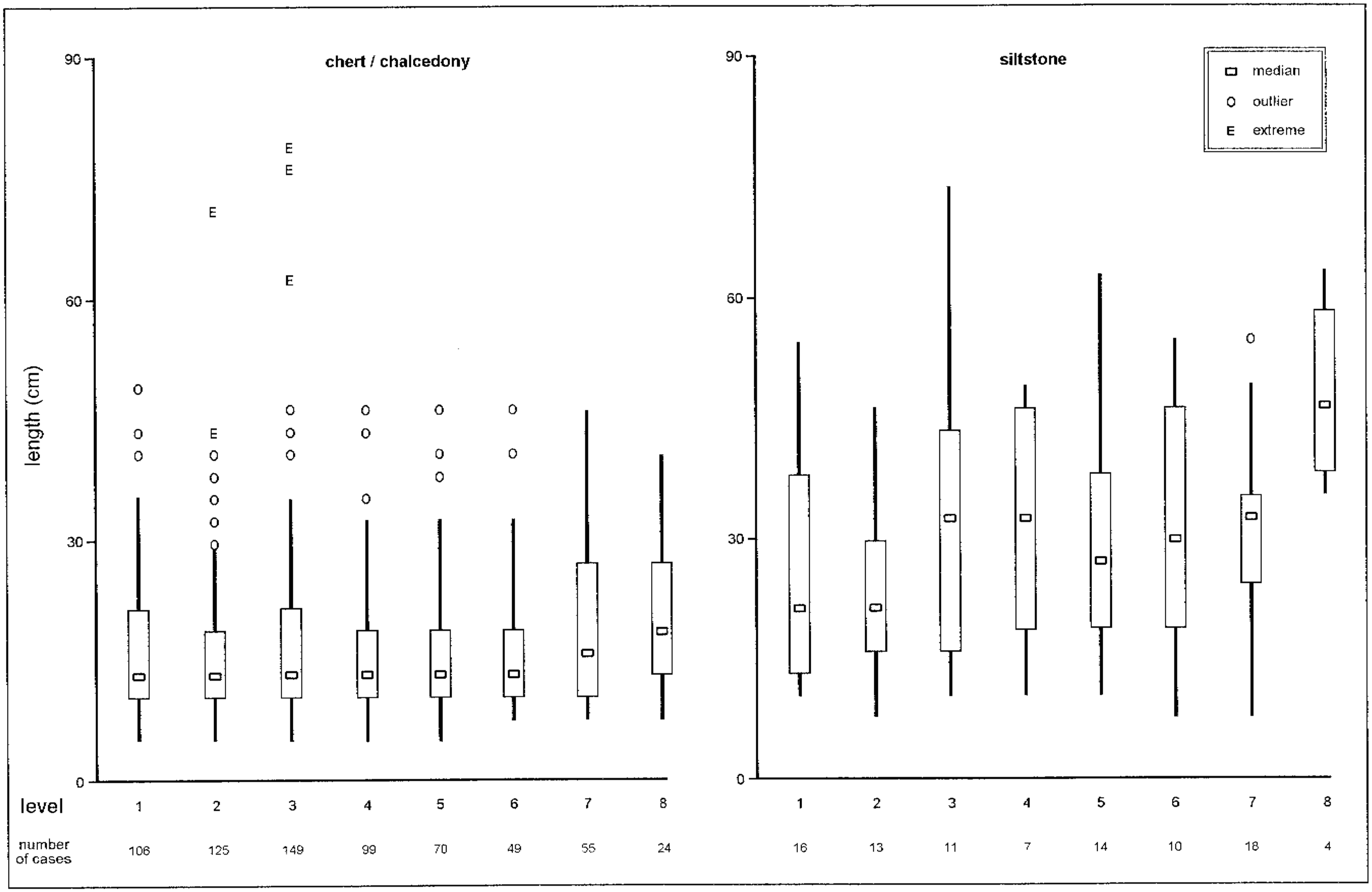

Figure 22. Chert/chalcedony and siltstone core flake length by excavation level.

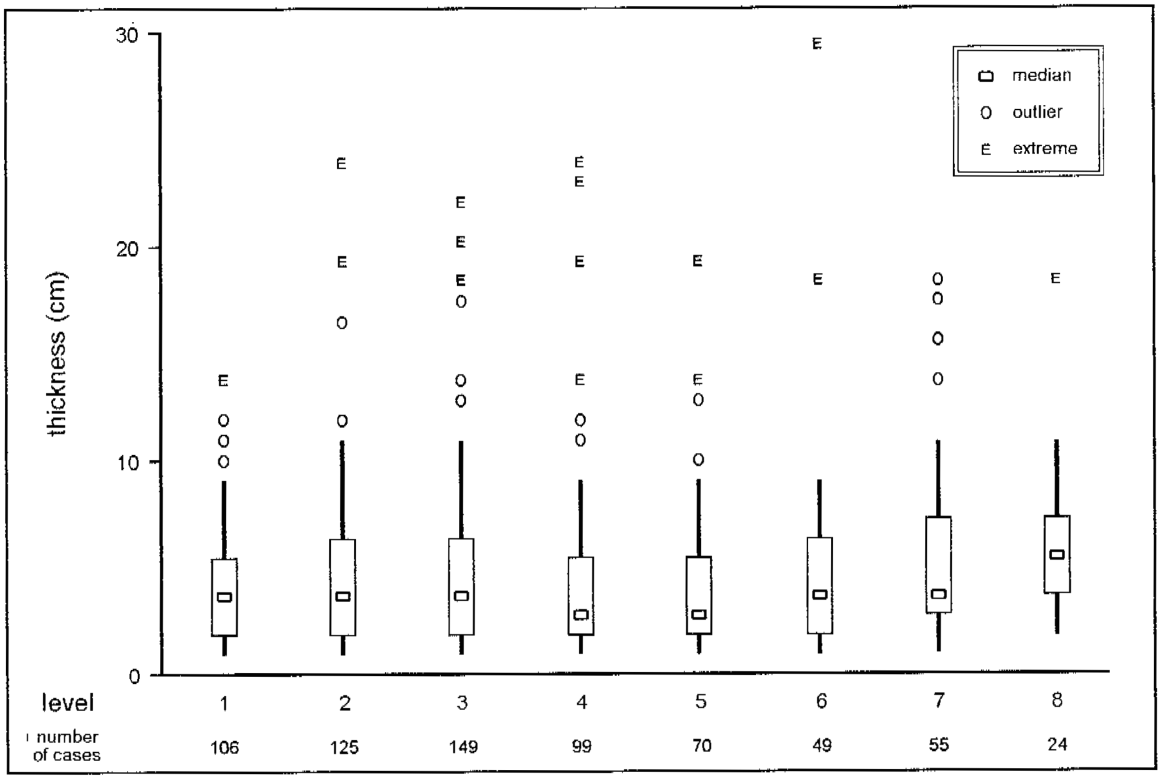

Figure 23. Chert/chalcedony core flake thickness by excavation level.

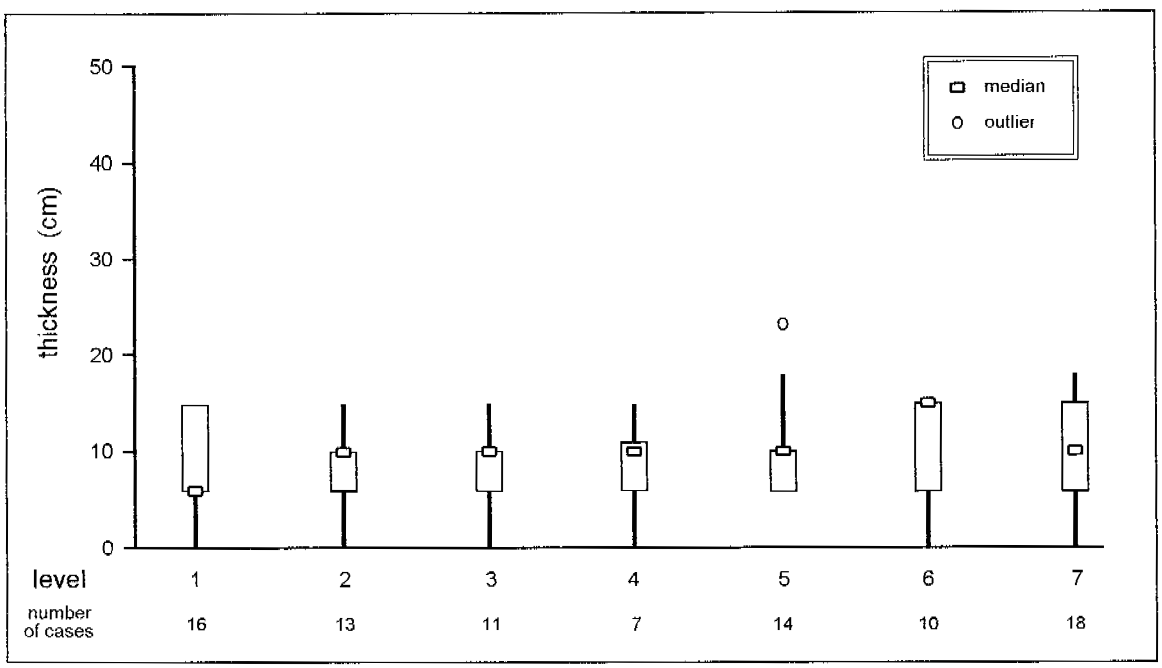

Figure 24. Siltstone core flake thickness by excavation level.

These data preliminarily indicate that chert/chalcedony and other materials as represented by siltstone were used differently. This is reflected in the erratic flake length distribution of siltstone core flakes and the much tighter and more consistent distribution of chert/chalcedony core flake lengths.

Biface Flakes

Whole biface flake lengths were examined for chert/chalcedony and obsidian. Other materials had no or very few biface flakes. The chert/chalcedony and obsidian biface flakes were analyzed using the same measures of central tendency and box-plots that were used for the core flakes.

The average chert/chalcedony biface flake length ranges between 11 and 16 mm for Levels 1 through 8. Individual biface lengths range between 7 and 36 mm. The variance for all levels is similarly low for all levels, except Level 7, which has a 36 mm long biface flake. Generally, the biface flake lengths range from small to medium, with most of the lengths below 19 mm. This is clearly shown in Figure 25, a box-plot of chert/chalcedony core flakes by level. The top of the 25 to 75 quartile box is lower than 16 mm for all levels, except for surface. The 75 to 100 quartile stem shows variability between levels. The stems for surface and Levels 2, 4, 5, and 7 are short, suggesting a tight distribution of small flakes. The 75 to 100 quartile stem lengths for Levels 1, 3, and 6 are longer. The shorter stems indicate that smaller bifaces may have been reduced. The median value for Levels 6 and 7 are slightly higher than other levels, suggesting that during the early part of the site occupation, slightly larger bifaces were produced, or that bifacial cores were brought to the site for reduction or tool production.

The average chert/chalcedony biface thickness ranges between 2 and 3 mm. The individual chert/chalcedony biface range is between 1 and 9 mm. This a very restricted range, suggesting that biface production occurred on small cores or preforms. Exceptions to the 2 to 3 mm range biface flake thickness are found in Levels 2 through 6, but in low numbers. This suggests that early-stage biface production occurred, but it was rare.

The average obsidian biface flake length ranges between 8 and 13 mm, and individual biface flake length range between 4 and 29 mm. In general, obsidian biface flakes are shorter than chert biface flakes. This reflects the transport of obsidian to LA 84318 in a reduced form. It also may reflect a difference in the size of biface that could be produced using obsidian or chert/chalcedony. Unfortunately, there are very few obsidian or chert bifaces from LA 84318 with which to test this hypothesis. Obsidian biface flake length variance tends to be lower than for chert/chalcedony biface flakes. Again this reflects the smaller size range for obsidian, but it may also reflect a consistency in biface production than can be maintained with obsidian. The obsidian biface flake length box-plot shows less variability in box and stem lengths and median location than chert/chalcedony (Fig. 26). However, there is enough variability to suggest that the size of the obsidian brought to the site did occasionally vary. This is reflected especially in the longer stem lengths shown for Levels 3 and 4 and outliers from Level 4 and 5.

Average obsidian biface flake thickness ranges between 1 and 2 mm. The individual obsidian biface flake range is between 1 and 5 mm. These ranges indicate that obsidian biface were made from well-thinned preforms or bifacial cores. This more restricted distribution is similar to the pattern observed for chert/chalcedony biface flake thickness and obsidian biface length.

In summary, it appears that there are differences in the biface flake length and thickness for obsidian and chert/chalcedony that cannot be solely attributed to sample size. The overall tighter

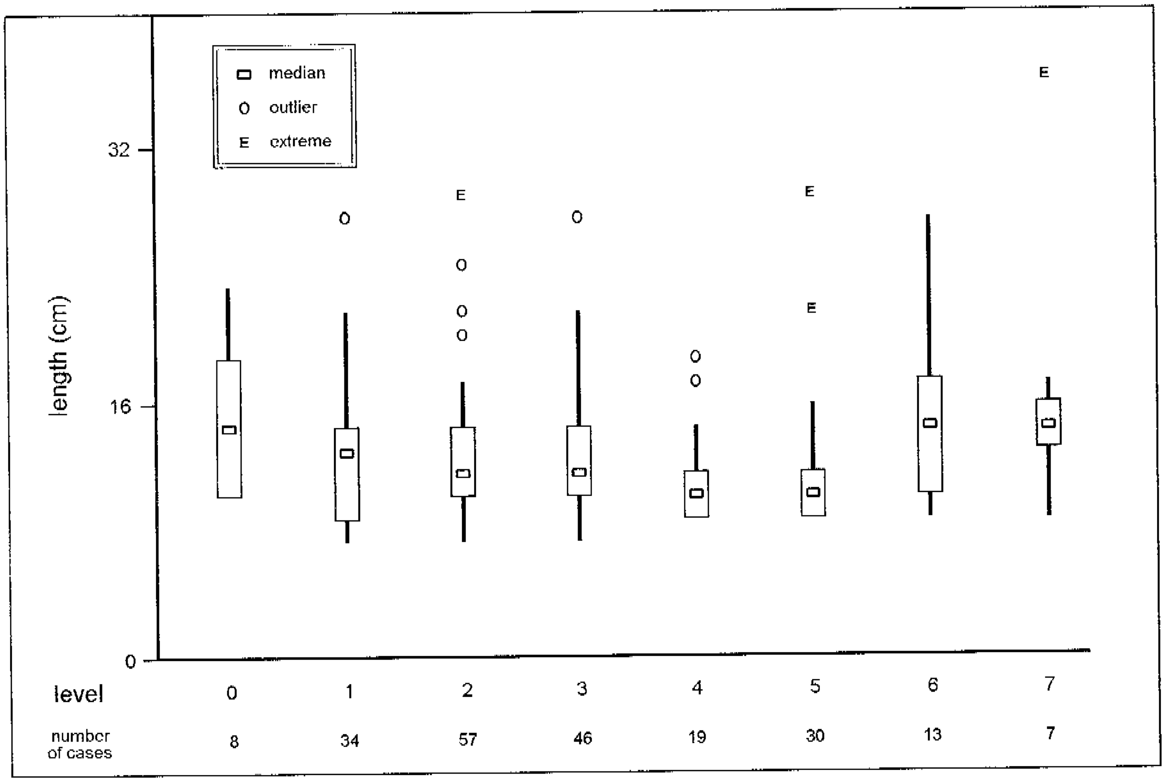

Figure 25. Chert/chalcedony biface flake length by excavation level.

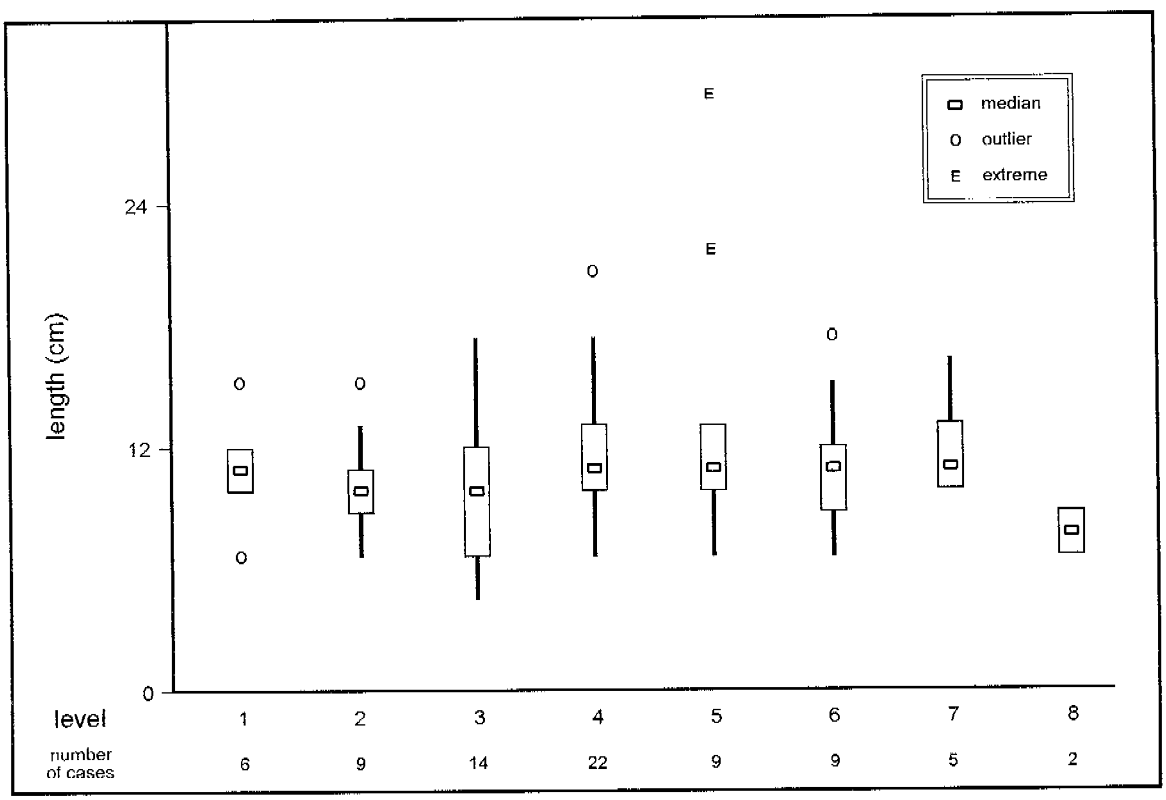

Figure 26. Obsidian biface flake length by excavation level.

distributions shown for obsidian suggest that it was brought to the site in a reduced and more formal shape, perhaps as middle- or larger, late-stage bifaces. The few outliers seem to support this hypothesis. The chert/chalcedony biface flakes are more variable and tend to be larger. This distribution may represent a more complete reduction sequence of early-, middle-, and late-stage biface reduction. A more complete reduction sequence would be expected when raw material was locally available, abundant, and of suitable knapping quality.

Portion

Portion was monitored on all core and biface flakes. Portion refers to the part of a flake remaining after detachment. The proportion of whole to broken flakes and the percentage of broken flake portions may indicate reduction stage, knapping technique, and the integrity of the assemblage.

A preliminary examination of core flake portion frequencies suggested that there were significant patterns. Chert/chalcedony and related materials and obsidian had higher percentages of broken flakes, and siltstone, igneous, quartzite, etc. had higher percentages of whole core flakes. This patterning may support the observations made from the core flake dimensions about differences in reduction intensity for different materials.

To examine variability, core flake portions were divided into three material classes: chert/chalcedony and related materials, obsidian, and nonchert. These three classes were compared for significant differences in portion distributions. The null hypothesis was that all material classes would exhibit similar portion distributions. Table 9 shows the results with a chi-square value of 104.93, which is significant at the .01 level. Therefore, the null hypothesis is rejected, and the differences are statistically significant. The adjusted residuals (evaluated at the1.96 or .05 level) clarify the statistical differences. Chert/chalcedony has significantly less than expected whole flakes and significantly more than expected distal fragments. Obsidian is similar to chert/chalcedony, except that it has much higher than expected medial fragments. Nonchert/chalcedony have significantly more than expected whole core flakes and less than expected medial and distal portions.

The chi-square analysis shows a different breakage pattern for each material class. The lower than expected whole flake values for chert and obsidian reflect more intensive core reduction, with progressively thinner flakes subject to impact shock and abnormal flake termination. The dimension data for these materials support this observation, as indicated by the high frequency of small to medium flakes. Higher than expected distal fragments for chert/chalcedony also reflect late-stage reduction, because platforms on thinner flakes were obliterated by hard hammer percussion.

The higher than expected medial fragments for obsidian are unusual. A high frequency of medial flakes could result from a bipolar reduction method employed on small nodules. However, the low cortex frequency for obsidian indicates that it was brought to the site in a substantially reduced form, which would negate reliance on a bipolar technique. Another contributor to the high frequency of obsidian core flake medial portions may be the material procurement strategy. All obsidian was nonlocal and from the Jemez Mountains. Direct procurement was possible but not likely for all groups during all periods. Therefore, most material probably was secondarily obtained through trade, scavenging, or reuse of materials left from previous occupations. This expedient or indirect procurement strategy would incorporate raw material that had previously been worked or used and potentially discarded due to unsuitability. Preexisting fracture lines may have decreased material integrity, resulting in higher frequencies of medial fragments. The higher frequency also may result from flakes breaking into two pieces, with the platform obliterated by the impact of hard hammer percussion. Equal frequencies of medial and distal fragments, as in the LA 84318 assemblage, would be an indication of this circumstance.

Siltstone and other nonchert materials have higher than expected whole flakes and less than expected medial and distal fragments. Higher frequencies of whole flakes occur during early- and middle-stage reduction, when flakes are thicker and more consistently withstand impact. As demonstrated before, siltstone core flakes were significantly longer and thicker than chert/chalcedony core flakes, indicating early or middle-stage reduction and less intensive reduction. Also, siltstone is coarser grained than chert/chalcedony, allowing for more rapid dispersion of the striking force and making it less susceptible to manufacture breakage.

Portion can be examined by excavation level as a measure of change through occupation time. Previous assessment of mixing and integrity of levels suggested that excavation levels could be collapsed into three units: Surface and Levels 1 through 3, Levels 4 through 6, and Levels 7 through 9. These vertical units can be used to compare core flake portions. A 3 by 5 contingency table of portion by vertical unit for chert/chalcedony was used to test the null hypothesis of no significant difference in portion distribution (Table 10). The result was a chi-square value that was significant at the .09 level, which fails to reject the null hypothesis at the .05 significance level. Therefore, for chert/chalcedony no statistically significant difference exists. Similar tests were run for obsidian and nonchert materials with the same result. This indicates that core flake portion did not change through stratigraphic time, suggesting temporal continuity in reduction strategy and material selection.

Biface flake portions are shown in Table 11 for the three material classes. Whole and proximal fragments dominate in all material classes. A chi-square test was conducted with a null hypothesis of no significant difference in portion by material class. The result was a chi-square value that was significant at the .43 level, failing to reject the null hypothesis at the .05 significance level. Portion distribution is statistically similar for all three material classes, which reflects the systematic and planned nature of biface reduction.

Biface flake portions display a similar distribution regardless of vertical unit. A chi-square test of biface portion by level yielded a chi-square value of .48, which fails to reject the null hypothesis of statistical similarity at the .05 significance level. This result reflects the strong similarity displayed for portions across material type.

Flake Platform

Flake platforms were recorded for all core and biface flakes. Flake platform frequency and distribution patterns can be examined for whole and proximal flakes. Flake platforms will be compared across material types and vertical distribution.

Core flake platforms include cortical, single faceted, multifaceted, retouch, collapsed, crushed, and missing. The first four platform categories may also exhibit abrading or other modification. Cortical platforms are most commonly associated with early-stage reduction, single-faceted platforms with early- and middle-stage reduction, and multifaceted platforms associated with late-stage core reduction. Retouched platforms and collapsed, or crushed, platforms are associated with late-stage reduction and tool production. Table 12 shows platform distributions by material class. The majority of chert/chalcedony platforms are single faceted indicating early to middle-stage reduction with fewer, but relatively abundant, collapsed and crushed platforms. Obsidian core flakes have a majority of retouched, collapsed, or crushed platforms, which are indicators of late-stage reduction. Cortical and single-faceted platforms are present and indicate limited early-stage reduction of obsidian. Nonchert materials have the 70 percent cortical and single-faceted platforms reflecting early-stage reduction and the most expedient use of raw material.

A chi-square test with a null hypothesis of no significant difference in platform distribution by material class was conducted (Table 12). The resultant chi-square value of 150.26 was significant at more than the .01 level, rejecting the null hypothesis. Adjusted residuals reinforce the conclusion that chert/chalcedony had significantly less than expected cortical platforms and more than expected of the other three platform types. This reflects the intensive reduction of chert/chalcedony strongly indicated by other flake attributes. Obsidian has significantly more than expected retouch and collapsed or crushed platforms and less than expected single-faceted platforms. Nonchert displays the reverse of chert/chalcedony, with much higher than expected cortical and less than expected multifaceted, retouched, and collapsed or crushed platforms. Core flake platforms continued to reinforce the observation that raw materials were reduced differentially. This pattern remains unchanged when platform distributions are examined by vertical units, suggesting there was no change in reduction pattern through time.

Biface flake platform counts are as expected. Multifaceted, retouched, and collapsed or crushed platforms indicate late-stage core reduction or tool production. Chert/chalcedony and obsidian have more than 74 and 86 percent late-stage platforms (Table 13). The 25 percent single-faceted chert/chalcedony platforms indicate that early stages of biface production occurred. This would be expected for a reduction strategy that focused on partly reduced or modified cores. Large bifaces used as cores would produce biface flakes that exhibit attribute distributions similar to core reduction, though the early-stage attributes should occur as a minority.

Cores

Twenty-four cores were recovered from the excavation. Core types included undifferentiated cores (4), unidirectional cores (4), bidirectional cores (3), and multidirectional cores (13). Sixteen cores were chert or chalcedony, and 7 were siltstone, igneous, and basalt. Fourteen cores were fine-grained, including 6 medium-grained and 1 coarse-grained. Cores had predominantly 10 to 50 percent cortex remaining, with roughly equal amounts of noncortical and 60 to 90 percent cortex items. Core sizes range from small (less than 40 mm length) to large (80 mm or longer maximum length). The majority of the cores were medium size, reflecting reduction strategy and raw material size. Cores were recovered from all levels from surface to Level 1, and the majority were recovered from the upper three levels (13 of 24).

Meaningful statistical comparisons of core attributes are weakened by the small sample size. Observations about the core assemblage can be made from a series of scatterplots displaying length-by-width comparisons. Figure 27 shows dimensions by material class. Core length and width display a strong linear pattern, indicating that similar raw material shapes, such as cobbles, were used. Unidirectional, bidirectional, and undifferentiated cores tend to be the largest, indicating less complete reduction (Fig. 28). Multidirectional cores occur in all sizes, but there is a group of five small to medium cores that may have been exhausted and discarded. Chert/chalcedony cores are distributed across all sizes, though the majority are in the 45 to 70 mm length range (Fig. 28). The majority of nonchert cores are longer than 65 mm, indicating less reduction, and perhaps, larger initial raw material size. Exhausted or nearly exhausted small to medium cores display 50 percent or less dorsal cortex, though only one small core was noncortical (Fig. 29). Most cores retain at least 10 percent cortex, suggesting that all cortex was not removed as a core was exhausted. Basically, cores reflect an expedient but intensive reduction strategy focused on fine-grained materials with limited use of less desirable or suitable materials. While cores do not display typical characteristics of exhaustion, it appears that cores in the 40 to 60 mm range were too small for further reduction.

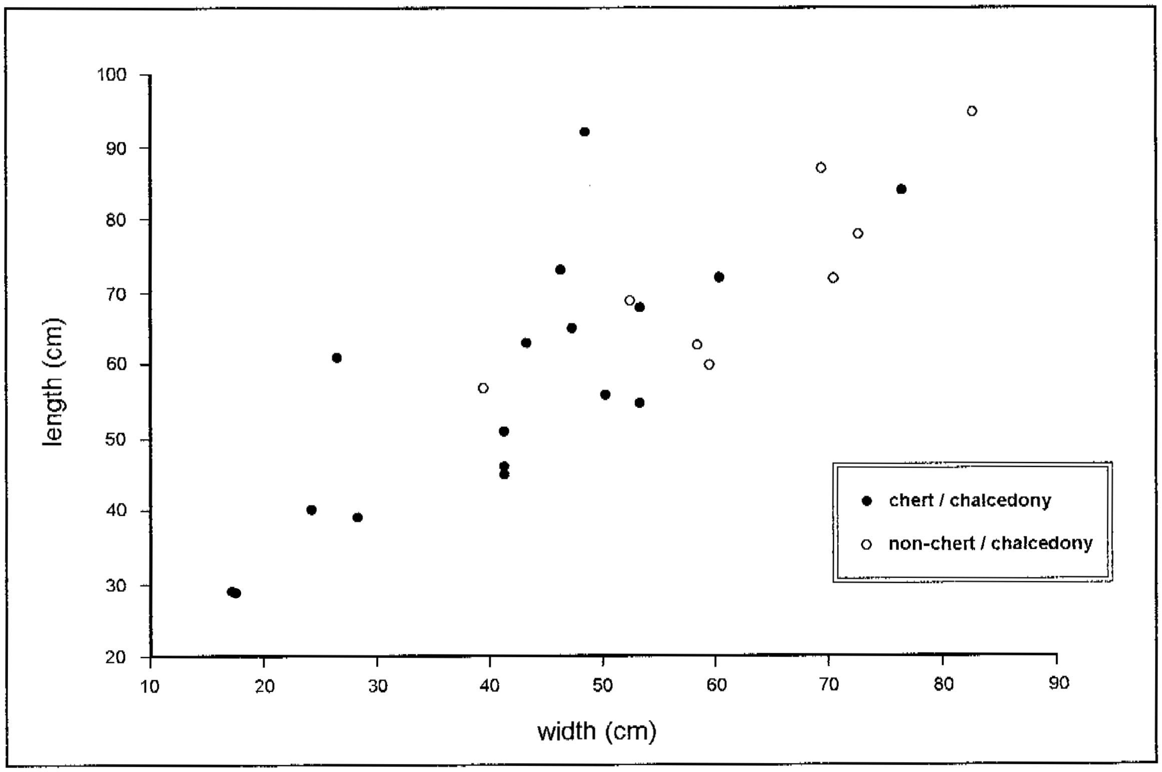

Figure 27. Core length and width by material class.

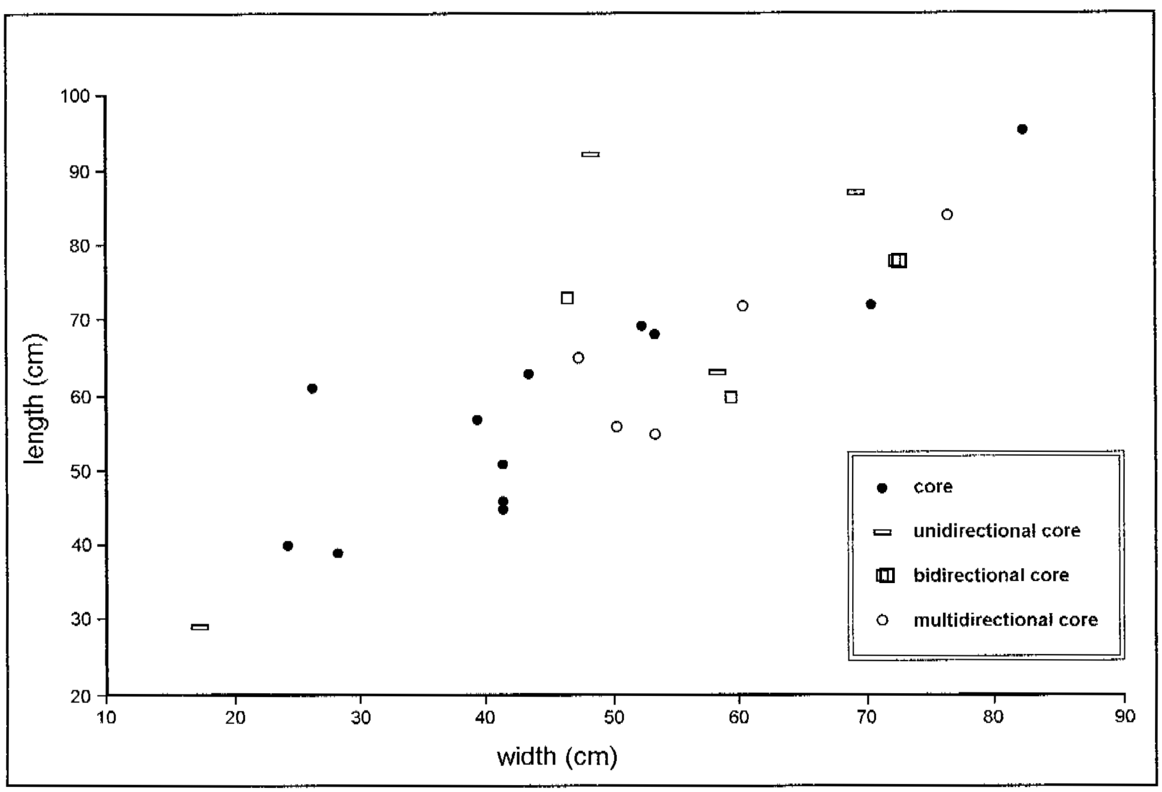

Figure 28. Core types by length and width.

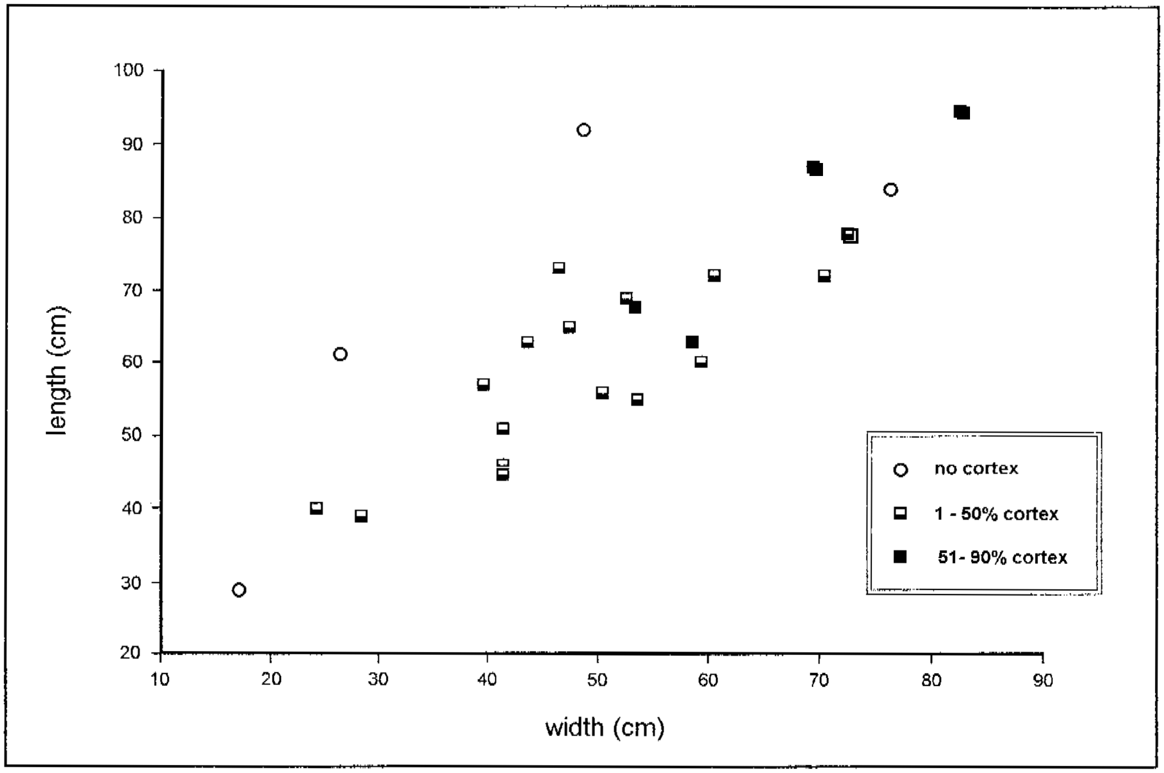

Figure 29. Core cortex by length and width.

Utilized Debitage and Formal Tools

Thirteen pieces of utilized debitage and 30 formal tools and fragments were recovered. Utilized debitage consists mostly of core flakes. The formal tools included a wide range of bifacially modified artifacts. Both tool classes will be described according to form and function. Spatial distribution of tools will be addressed later in this report.

Utilized Debitage. Thirteen pieces of utilized debitage were recovered from 13 different proveniences. Table 14 shows utilized debitage attributes. Most utilized debitage are chert core flakes with unidirectional wear. The core flakes included whole and fragmentary artifacts, some of which were probably broken during use. Whole flakes tend to be medium to large with smaller flake fragments of obsidian and chert, indicating discard during breakage. Edge angles range between 40 and 70 degrees and are evenly distributed within this range by 10 degree increments. These tools were probably used as scrapers, and the wide range of edge angles suggests general utility. The low frequency of utilized debitage is unexpected. It may be attributed to material properties that hindered identification or a general resistance to damage of the material.

Formal Tools. Thirty bifacially modified tools or tool blanks were recovered. Descriptions are provided in Table 15. Bifacial tools included projectile points, drills, early-, middle-, and late-stage bifaces, and undifferentiated bifaces. The tools are made from chert (12), chalcedony (8), obsidian (7), andesite (2), and quartzitic sandstone (1). Only three bifaces were whole. The remaining bifaces were indeterminate or medial fragments or basal, tip, or tang fragments of projectile points. The highly fragmentary condition of the bifaces suggests that tools were discarded on site and toolkits refurbished from the local chert/chalcedony and nonlocal obsidian. Formal tool production was common, judging from the 729 biface flakes identified.

Projectile point fragments dating to the Archaic and Pueblo periods were recovered (Fig. 30). Three Archaic period projectile points were basal fragments and made from obsidian. They were brought to the site broken but kept as part of the toolkit until suitable replacements could be made. This would be typical of a logistically mobile strategy where base camps were frequently moved. Two small Pueblo-style points were identified, and some of the small late-stage bifaces may also be fragmentary points. One of these points exhibited postbreakage wear, emphasizing the importance of formal tools and the extent of their use before discard.

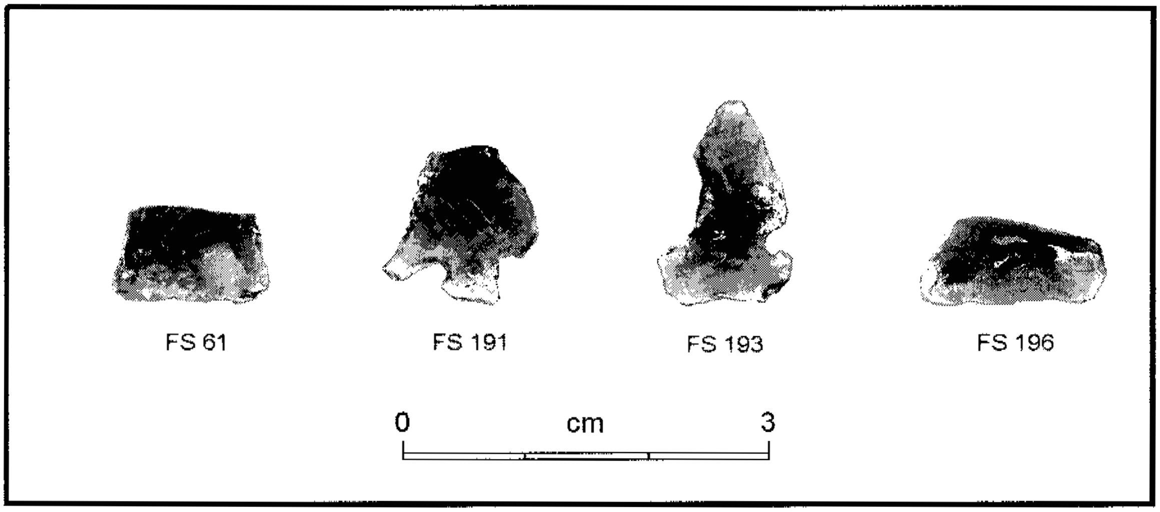

Figure 30. Projectile points.

The presence of bifaces representing all stages of manufacture combined with biface flakes indicates that tool production or refurbishment was an important activity. Large middle- and early-stage bifaces indicate planned reduction with cores formed to obtain the maximum number of tool flakes or to ensure successful tool production. Tools broken in manufacture combined with tools discarded after a long use-life indicate periodic base camp occupation by highly mobile groups that took advantage of the abundant raw material available along the Pecos River to refurbish toolkits and produce tools for immediate use.

Ground Stone Artifacts

Eight ground stone artifacts were recovered. Seven artifacts were whole or fragmentary manos, and one artifact was a ground slab metate fragment. Descriptive information is presented in Table 16.

The manos were made mostly from locally available round sandstone cobbles. They were pecked into the desired form or used without shape modification. All manos exhibit limited to heavy pecking and grinding wear on one or both surfaces. Manos occurred in Levels 1, 3, 4, 6, and 7. The distribution suggests that they were associated with three main, broad occupation periods. One-hand manos are most commonly associated with seed or nut processing and not corn grinding. The occurrence of similar mano forms throughout the cultural deposit suggests a similar range of activities occurred through time.

A single, small ground slab metate fragment was recovered from Level 6. Slab metates were most commonly used for seed and nut processing. The fragment is too small to determine the extent of use and wear. Metates were part of site furniture and were likely reused throughout an occupation span as long as it was exposed on the surface (Nelson and Lippmeier 1993). The infrequent occurrence of metates could reflect a limited emphasis on plant processing or a limited excavation sample.

Aboriginal Pottery

Twenty-two sherds were recovered by excavation. The sherds represent Late Developmental and historic periods (Table 17). Twenty-one were historic period, native-made or Pueblo pottery. The single prehistoric period sherd was a Kwahe'e Black-on-white bowl rim. This small sherd exhibited characteristic fine gray paste and hatchured design. Kwahe'e Black-on-white was the main decorated pottery in the northern Rio Grande between A.D. 1050 and 1200 (Breternitz 1966).

The 21 historic period ceramics included 18 jar sherds of micaceous paste utility ware, two sherds of Powhoge Polychrome, and a single sherd of undifferentiated red-slipped pottery. Seventeen of the micaceous utility wares are similar to Petaca Micaceous (Carrillo 1989:300) and have a quartz/mica temper. One sherd was similar to Picuris Pueblo pottery with a predominantly micaceous paste. Both types could have been used by Hispano or Athabaskan inhabitants of the El Cerrito area. The two small Powhoge Polychrome sherds could have been made between A.D. 1760 and 1900. As is true of the utility ware, Powhoge Polychrome was used by Native American and Hispano populations throughout northern New Mexico.

All pottery was recovered from Levels 1 through 5, and the majority of the sherds were recovered from Levels 3 and 4. The presence of historic period sherds in these levels conforms with other evidence for postdepositional disturbance from agriculture. The small size of the sherds suggest they were subjected to trampling after exiting the systemic context. The near absence of pottery below Level 4 lends support to the hypothesis. Levels 5 through 8 may represent early Pueblo or Archaic period occupation.

HISTORIC ARTIFACT ANALYSIS

Guadalupe A. Martinez

Analysis of the artifacts from LA 84318 focused on chronology and function. The historic analysis was done according to the Office of Archaeological Studies standardized guidelines (OAS 1994b). The analysis grouped artifacts into eight functional categories:

Unidentifiable refers to any artifact that cannot be associated with a particular activity or behavior.

Economy/Production is a category for artifacts associated with subsistence, industrial, and commercial endeavors.

Food refers to edible products that could be found at a historic site. The majority of the types in this category are differentiated by their container (for instance, can or bottle) or by their particular function in food consumption (condiment, jam, jelly).

Indulgences are artifacts that are consumed or used for purely pleasurable experiences and are not a necessity for life. They include alcoholic beverages, tobacco products, and candies.

Domestic artifacts are used in serving, preparing, and preserving food. Also, items used for child care and the care of furnishings are in this category.

Furnishings refers to durable or reusable equipment found in a dwelling or other structure.

Construction/Maintenance refers to artifacts that deal with the building and maintenance of structures and machinery.

Personal effects refers to artifacts that would ordinarily belong to an individual living or working at a site, rather than a group of people.

Within the functional categories, other attributes were noted and recorded. *Material type* refers to the material or materials that comprise an artifact. *Manufacturing techniques* are the method or methods used to make an artifact. *Finish* and *seal* refer to the shape of the container and the means of sealing it. *Decoration* is the technique used to decorate an artifact, such as painting, embossing, etching, and stamping. *Condition* refers to whether the artifact has been burned, broken, bent, punched, cut, etc.

Artifact Dating Methods and Site Dates

Artifact dates were based on attributes such as glass color, sealing and closure methods for bottles and cans, invention dates, or stylistic changes in ceramic designs and manufacturing techniques that have known dates (Ward et al. 1977:236-239). The begin date for an attribute is the earliest possible date that can be documented for its existence. These dates are from patents, factory inventories, newspapers, and company records. An end date is the last documented date of attribute or artifact production. These dates can be determined through newspaper or magazine reports of the introduction of new manufacturing techniques or inventions. Sometimes a change in production materials or the end of a certain pattern (as in a company's glassware) will establish an end date. A combination of attributes sometimes produced a "tighter" date range than if only one attribute was monitored. In instances when a beginning date was known but the attribute still exists in the present, an end date of 1992 was assigned. In these cases, the beginning date can denote the earliest time an attribute could have existed or when an artifact could have been deposited at LA 84318. Using a combination of the earliest and the last known date, a "bracketed" time range is obtained.

Figure 31 shows that the bracketed range for LA 84318 is 1848 to 1930. This is the range that can account for all the dated artifacts. However, the majority of the artifacts cluster in the range of 1880 to 1920. The end date for either of these ranges fits well with the known occupation dates of the site (whether you follow the BLM homestead date or the local informant date). The earliest artifact date is 1810, which pertains to two artifacts. One is a ceramic sherd with black transfer decoration, a type of decoration produced from 1810 to 1848 (Haecker 1990). The other 1810 date, also bracketed, is for a rusted cut nail (Fontana 1962:54). The ceramic date may not be indicative of the occupation time span for LA 84318. Pottery can outlast its manufacturing end date for decades because people collect and recycle ceramics, and use them for daily domestic purposes.

There were 43 pieces of purple or amethyst glass in the assemblage. The discoloration of the glass is caused by the action of ultraviolet rays on the manganese used to clarify the glass. Manganese was imported from Germany, and the importation ended with the outbreak of WW I. This particular glass has a dated span of forty years, 1880 to 1920. This date matches the best-date cluster mentioned previously. Another datable characteristic of glass is *patination*. Patination results from water and heat leaching sodium out of the glass over time. It has a rainbow color (similar to oil on a street) and forms a flaky white layer on the glass. The end date for this effect is 1930, since an improved refining process for the materials used in glass during the 1920s greatly reduced patination.

Tin can fragments were rusted and fragmentary; however, the dates of cans can be tentatively determined from small pieces as long as there is a remnant of their shape or seals (Rock 1984a, 1984b). Based on shape and type of seal, a few fragments were recognized as condensed milk cans. Condensed milk cans have been in use since 1885 (Fontana 1962:74).

Historic Artifact Assemblage

The 602 artifacts in the assemblage were mostly fragments. Probable reasons for the fragmentary nature of the assemblage were proximity to a thoroughfare where refuse was commonly tossed from passing cars or wagons, and cultivation. The few whole artifacts included nails, bottle caps, and one unidentified knob.

Glass shards made up 72 percent of the artifacts. The largest number of glass shards were from unidentified bottles (256). These were in the unassignable category, since their contents and function were not obvious. Other broken glass artifacts functioned as kerosene lamp chimneys, window glass, domestic glassware, jars, and indulgence bottles (Table 18). The indulgence bottles were almost certainly from road toss.

With the exception of Casimiro Quintana's homestead building, the area near LA 84318 is on the uninhabited bank of the river. This is probably the reason for the low domestic artifact count (29). The artifacts in construction/maintenance--nails, window glass, and wire--may have come from the Quintana homestead. Most of the artifacts were fragments, but even with the homestead nearby, the artifact count is low (31). The five ceramic sherds in the domestic category could also be associated with the homestead. Artifacts typical of homesteading were poorly represented, suggesting limited domestic occupation or discard of homestead refuse outside the LA 84318

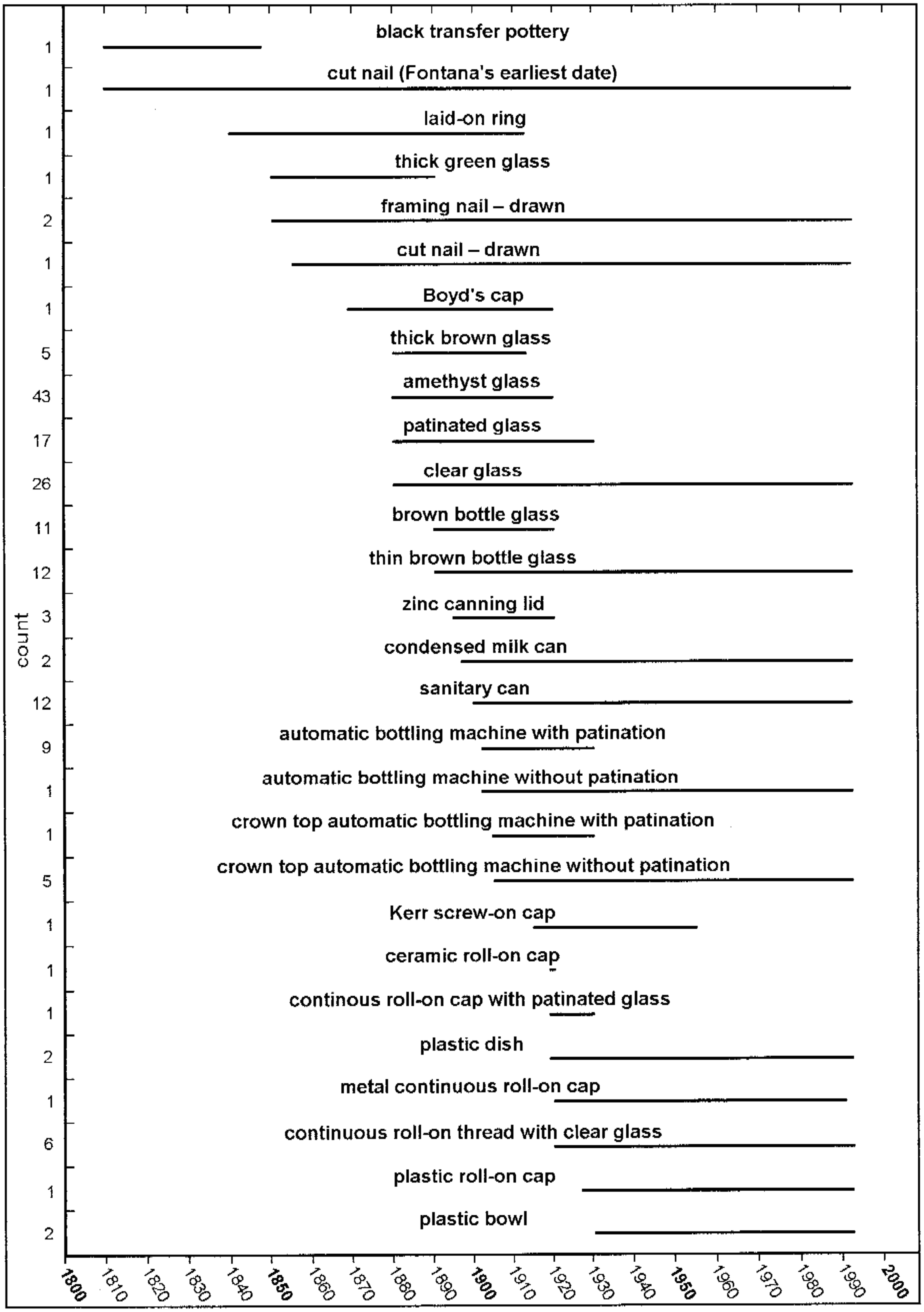

Figure 31. Dates of historic artifacts.

excavation area.

County Road B27A, which is adjacent to LA 84318, used to lead to an old ford across the river and was a main route out of town to Las Vegas. When the bridge is open, the road is the most direct route to Las Vegas for the inhabitants of El Cerrito. Undoubtedly, road debris is the source of most of the surface artifacts and a strong influence on the fragmentary nature of the assemblage. Most of the debris probably was deposited after 1916, when the bridge first opened.

Summary

The fragmentary nature of the assemblage and the large unidentified category count make it difficult to identify specific activities that resulted in the discard of the artifacts. The artifact manufacture dates that were used for the bracketed time range coincide with homestead dates. It can be assumed that some of the artifacts on LA 84318 were generated by the inhabitants of the homestead; however, it is not possible to say that the assemblage reflects homestead activities.

Because there are hardly any artifacts in the personal effects category (clothing, buttons, toys, etc.), it is difficult to identify the gender of the person or persons using LA 84318. The absence of toys in such a small assemblage cannot verify either the presence or absence of children.

The cans are too fragmentary to determine diet and consumer status or to compare them with those from other homestead sites. There are no artifacts that would indicate the existence of a kitchen. The indulgences category is large, probably because the artifacts are road debris from automobile drivers traveling between El Cerrito and Las Vegas.

Most of the historic artifacts date to 1880 to 1920. The earliest date range, 1810 to 1848, is reasonable according to historic documents, but so few artifacts are not conclusive of site use or El Cerrito settlement. A small sample of artifacts relates to homestead occupation at the turn-of-the-century. The majority of the artifacts postdate the 1916 bridge construction and are probably from travel-related activities.

FAUNAL REMAINS

Linda S. Mick-O'Hara

Part of LA 84318, a ceramic and lithic scatter on the north bank of the Pecos River, contained historic trash and features from a homestead within the limits of the village of El Cerrito mixed with other prehistoric remains. The surface of the site and the upper 50 cm. of the cultural deposits have been mixed by road construction and cultivation in the area. The excavations at El Cerrito isolated only 70 bone fragments and the majority of them (N=66) could only be assigned to general mammalian categories through the thickness of cortical tissue (compact bone) and estimated diaphysis circumference. Only three pieces of bone could be assigned to genus or species. A single fragment from a gastropod shell was also identified.

The mixture of the deposits and the lack of more specifically identifiable remains decreases the number of inferences that can be made about the sample, but the faunal remains recovered are evaluated for the whole site and by division into strata noted during excavation. This is a mixed and predominately historic assemblage. Thermal alteration (burning), weathering, and butchering noted on these remains are also evaluated to shed light on processing, cooking, and discard patterns.

Methodology

All faunal remains recovered during the excavation phase of the El Cerrito Project were returned to the Office of Archaeological Studies for processing and analysis. The faunal materials were dry brushed to remove dirt from all surfaces so that muscle attachments, other identifiable surface features, and processing marks would be visible if present.

The remains were then identified to the most specific level possible using the comparative faunal materials housed at the Office of Archaeological Studies and the Museum of Southwestern Biology, University of New Mexico, Albuquerque. Identifications were also aided by using guides to the taxonomic and element identification of mammals and birds (Olsen 1964, 1968; Gilbert et al.1985; Gilbert 1990). Guides were used only for preliminary identification, and all specimens were specifically compared to osteological specimens for final identification.

Identification of all specimens included taxonomic level, element, portion, completeness, laterality, age, and developmental stage. In addition, each specimen was assessed for any environmental, animal, or thermal alteration which may have been present. Finally, any butchering marks (cuts, impacts, etc.; Olsen and Shipman 1988) were noted along with any apparent modification for tool manufacture or use (Semenov 1964; Kidder 1932). The data recorded for these variables were then entered in an SPSS database and used in the analysis of the faunal remains.

Overview of the Faunal Remains

Excavations at LA 84318 isolated 70 bone fragments from two of the cultural strata identified at the site. Table 19 presents a summary of the bone identifications by NISP (N) and percent of the entire assemblage. The majority of the bone fragments could only be assigned to the general class of mammals and to the categories of small, medium, and large mammals (N=66, 94.3 percent of the sample). This indicates a high rate of fragmentation for the faunal remains, which may have been caused by postdepositional trampling and cultivation of the site area investigated, as part of animal carcass processing at the site, or both. The mixing of deposits at the site prevents a clear view of the pattern of bone deposition and thus any evidence that would suggest one mechanism of fragmentation over another.

The generally identified bone was predominately the remains of medium and large mammals (N=26 and N=26, respectively). They could be the result of prehistoric or historic use of the area. Burning was observed on 35 of the bone fragments assigned to these categories (53.0 percent of the generally identified sample and 50.0 percent of the total sample). The intensity of the thermal alteration was categorized for each specimen (Table 20). Though burned remains fall into a number of the thermal alteration categories, the majority (N=20) were graded light tan to heavy black. This suggests that burning was the result of roasting meats on the bone, and the most intense burning occurred where bone was exposed directly to the fire (Buikstra and Swegle 1989:252; Lyman 1994: 336). In this small faunal assemblage, this type of processing was probably responsible for the majority of the burning noted.

Processing and cooking may also be evaluated through breakage patterns apparent on the bone recovered. This is, as mentioned above, a heavily fragmented sample. Splitting was noted on 78.6 percent of the faunal materials (N=55). As shown in Table 21, all but one specimen exhibited longitudinal splitting, which is consistent with a reduction of long bones to extract marrow and bone grease (Binford 1978). The single specimen that exhibited transverse splitting was identified as *Odocoileus* sp. (deer). This wild taxon may have been processed differently from the domestic forms that the longitudinally split bone probably represents. There was no sawn bone recovered at LA 84318, but the use of saws for animal butchering was uncommon in Hispanic communities until after 1900 and in more rural areas until much later (ca.1930; Weigle 1975).

The other three specimens that could be identified beyond the class level include a fragment of shell that might be from a gastropod and a single humerus from a porcupine (see Table 19). These specimens are probably intrusive to site context, but an astragalus assigned to *Bos taurus* (cattle) was part of the historic component at LA 84318 and is probably the taxon responsible for the bone fragments classified only as large mammal. Though no sheep remains were identified, this taxon would be the most likely contributor to the medium mammal category. Sheep were the most commonly used domestic animals in New Mexico until after 1900, when the railroad provided transportation needed to bring beef to the eastern market (Williams 1986:120; Beck 1962).

Distribution of Faunal Remains

The distribution of the faunal remains suggests that most remains were from rather mixed historic context. The horizontal distribution of the faunal remains from LA 84318 was uninformative. Faunal remains appear to have been moved across the site by plowing, and no clear association with features was noted during excavation. An evaluation of the distribution of burned bone also suggests that faunal remains had been affected by cultivation in the site area.

The vertical distribution of faunal remains appears to have maintained some integrity. All faunal remains were recovered from Stratum 1 and 2, and the majority of the remains were isolated during the excavation of Stratum 2. Table 22 shows the assignment of faunal remains by stratum. Stratum 1 was clearly disturbed by plowing, and faunal remains recovered from this stratum were horizontally and may have been vertically redeposited. Stratum 2 was the largest cultural stratum at the site but was also apparently disturbed by plowing in the area. The remains recovered from Stratum 1 appear to be similar to those from Stratum 2 and suggest that some vertical mixing probably occurred, but that Stratum 2 contained the major part of the cultural materials. The single porcupine humerus was recovered from the surface and, as mentioned earlier, was probably intrusive.

Conclusions

The 70 bones recovered from the excavations at El Cerrito appear to be from historic context mixed more horizontally than vertically. The majority of the remains were fragments that were only generally identifiable to class and body-size. These remains exhibited evidence of thermal alteration from roasting, and many had been split longitudinally, which would be consistent with the extraction of marrow and bone grease. Though only one bone could be clearly assigned to cattle, and no sheep were identified, the medium and large mammal fragments suggest that these common domestic forms had both been used at the site. This site seems typical of the villages of northern New Mexico, where, after home butchering on the homestead or ranchero, heavily fragmented bone remained after all nutritional value had been extracted for use.

RESEARCH QUESTIONS AND CONCLUSIONS

LA 84318 was occupied by prehistoric and protohistoric populations over a span of perhaps 4,800 years. This long span and potential for occupation by different cultural groups provides a broad context for the investigations at LA 84318. Within this broad temporal and cultural context, specific questions about the material remains from LA 84318 were addressed. These questions focus on chronology, economic organization, subsistence strategy, and LA 84318's place in regional settlement and subsistence framework.

Chronology

Site chronology can be addressed using four sources of information: stratigraphy, obsidian hydration, projectile point typology, and pottery typology. The purpose of examining these sources is to refine the dating of excavation levels and construct an occupation sequence that can be used to address the subsistence strategy and regional context of LA 84318.

Stratigraphy and Site Dating

Excavation revealed two main strata containing abundant cultural materials, three features, and different amounts of fire-cracked rock. These materials accumulated from multiple occupations spread over a long period. Examination of stratigraphy suggests that discrete occupation episodes are indiscernible. However, the vertical placement and internal spatial coherence of the deflated hearths suggest that some integrity remains in the lower 40 to 50 cm of deposit, including the lower part of Stratum 2 and all of Stratum 3.

Artifact distribution maps were generated for Levels 1 to 8 for the main excavation area. These maps (Figs. 32-39) show debitage at two or four artifact count contours. They are used to examine artifact spatial patterns that may reflect different occupation episodes.

Levels 1 to 3 show a continuous, moderate-to-high-density distribution across the main excavation area. These three levels yielded more than one-half of the total chipped stone artifacts and the highest counts of historic artifacts. High artifact counts suggest that intensive occupation occurred late in the soil deposition sequence. No features were encountered, which, along with the numerous historic artifacts, reflects considerable recent or historic-period mixing. So, the greatest potential source of occupation information exhibits the most disturbance.

At Level 4 (31 to 40), the first evidence of a discrete deposit is the deflated remnant of Feature 1, associated with an increase in fire-cracked rock, and an arc-shaped artifact distribution to the east of the hearth. The relatively intact but deflated condition of the hearth suggests it was near the bottom of the most active part of the plow zone. Association of the hearth with the arc-shaped artifact distribution suggests a single occupation episode within a more diffuse, but relatively abundant artifact scatter.

At Level 5 (41 to 50) the artifact distribution becomes less distinct. The most clustered artifact distribution reinforces the arc-pattern displayed in Level 4, suggesting temporal association between the two levels. A break in occupation intensity is indicated by the more homogeneous, moderate-density distribution covering most of the excavation area.

Level 6 (51 to 60) displays a decrease in the overall artifact count, but there is a distribution

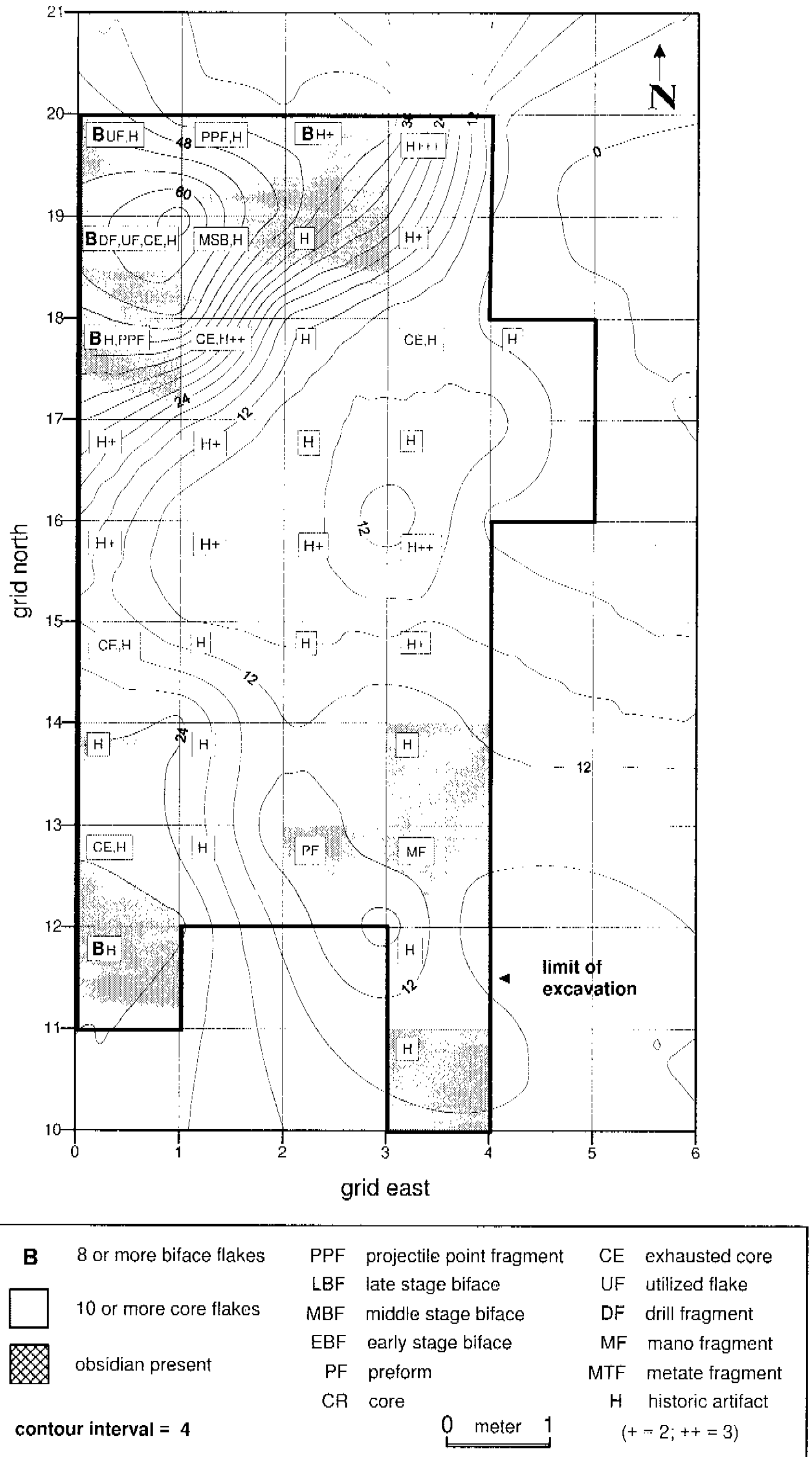

Figure 32. Chipped stone density plot, Level 1.

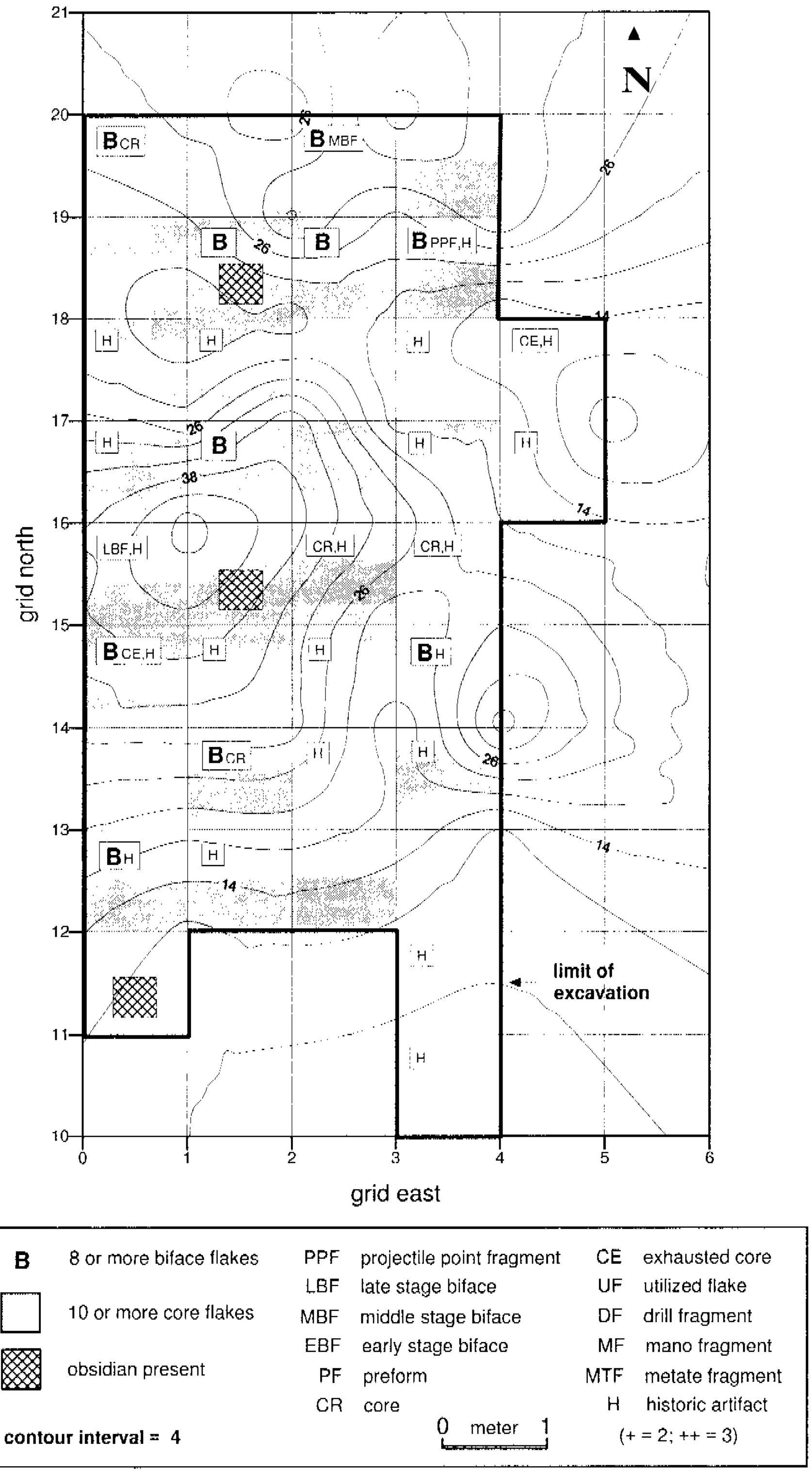

Figure 33. Chipped stone density plot, Level 2.

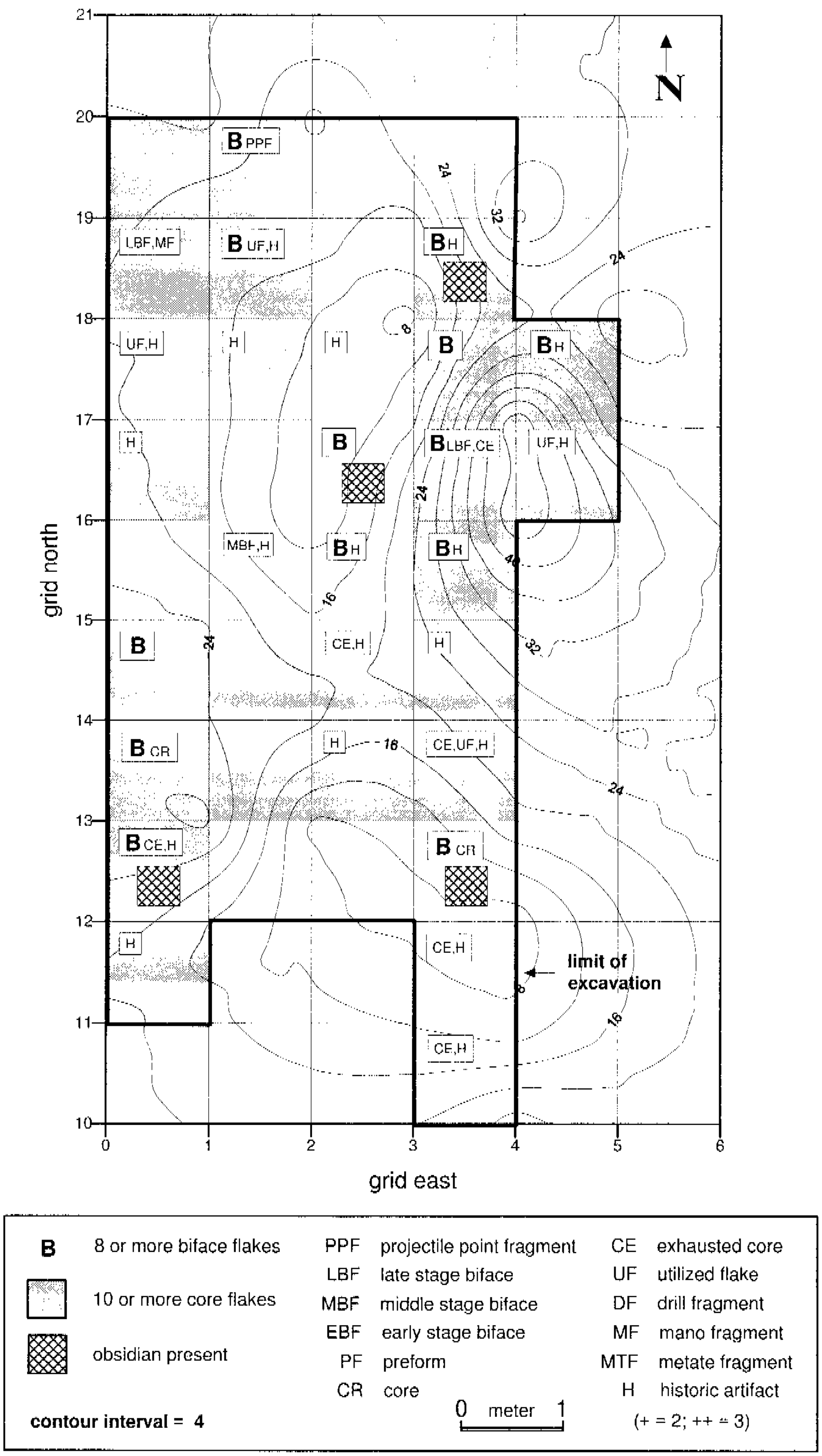

Figure 34. Chipped stone density plot, Level 3.

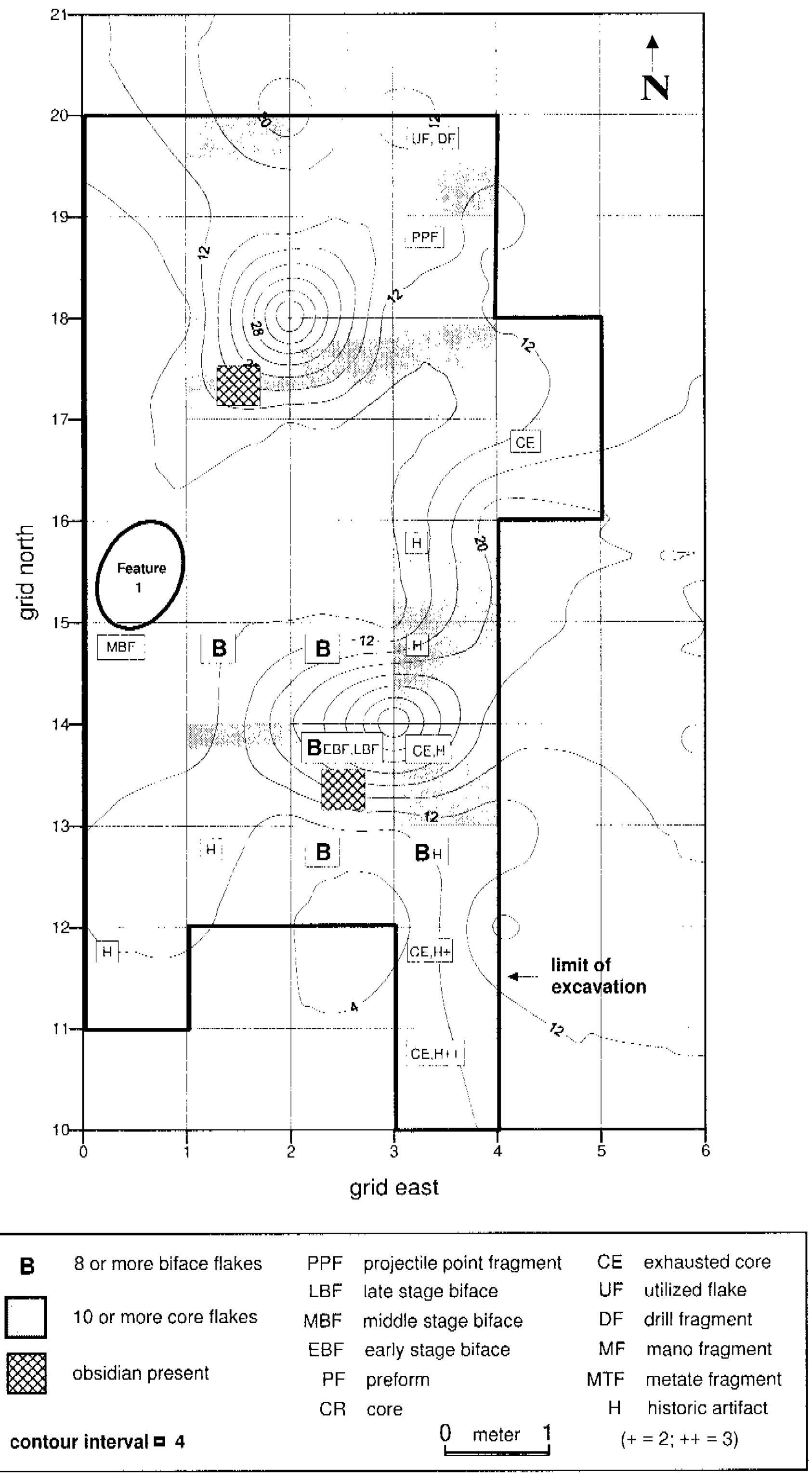

Figure 35. Chipped stone density plot, Level 4.

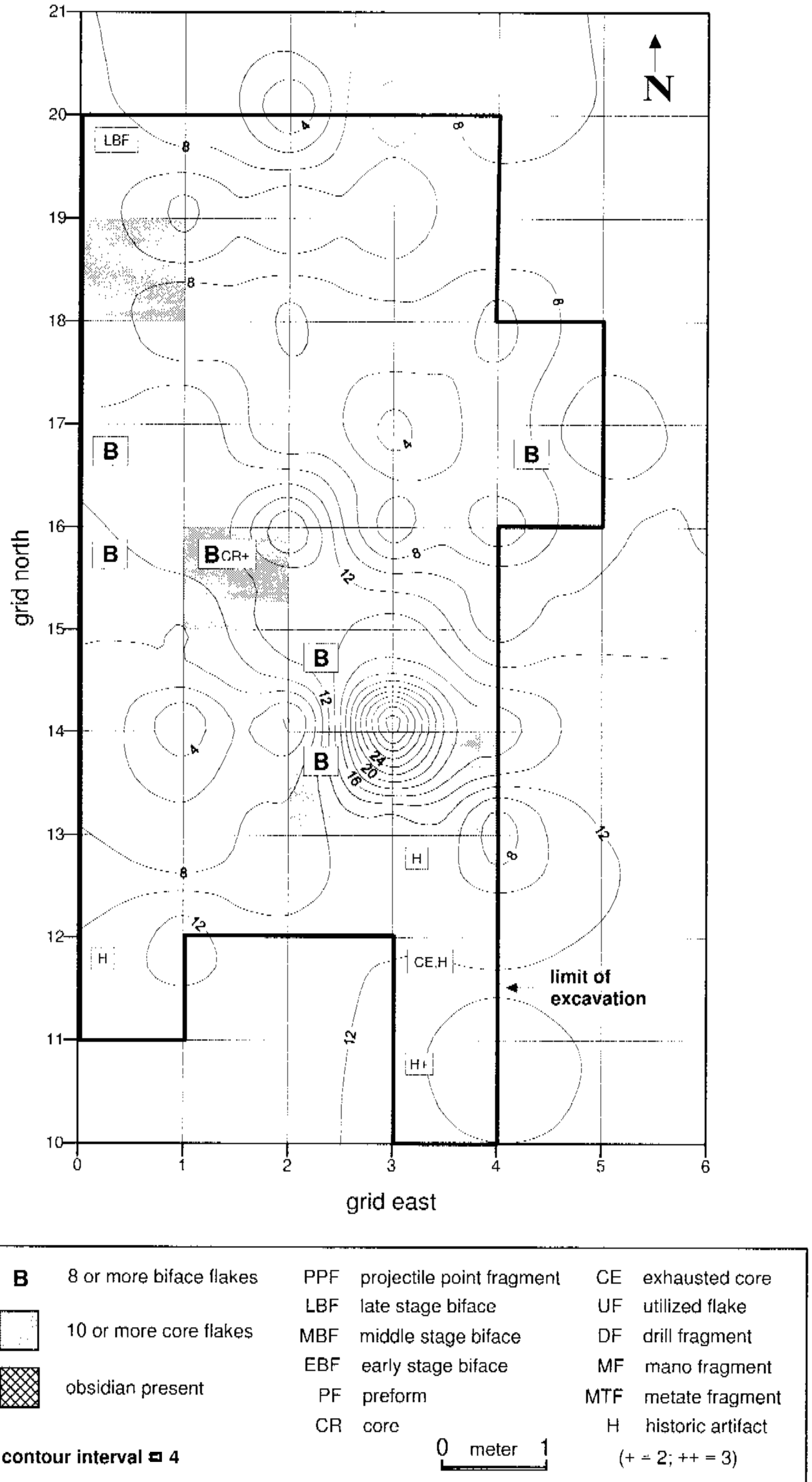

Figure 36. Chipped stone density plot, Level 5.

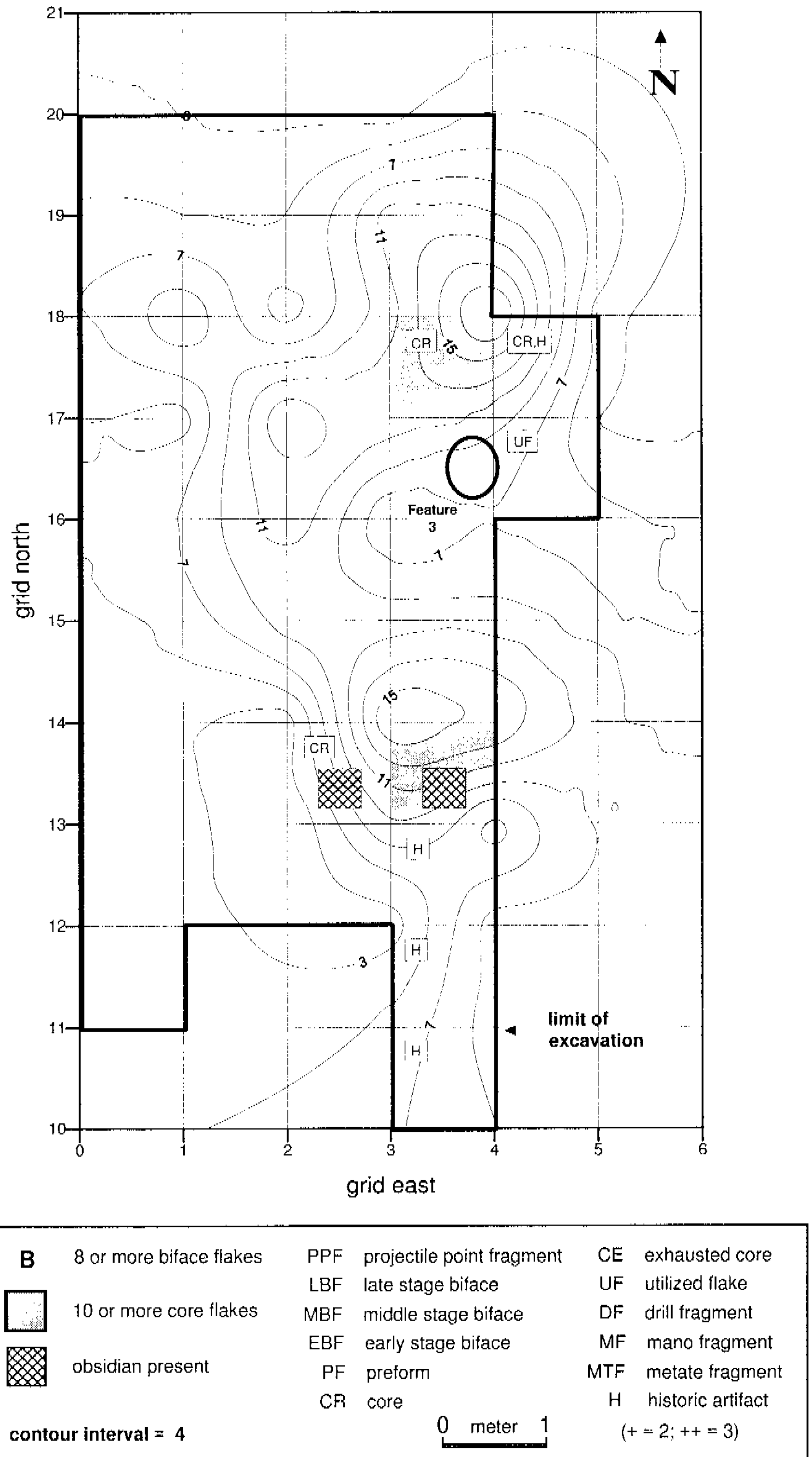

Figure 37. Chipped stone density plot, Level 6.

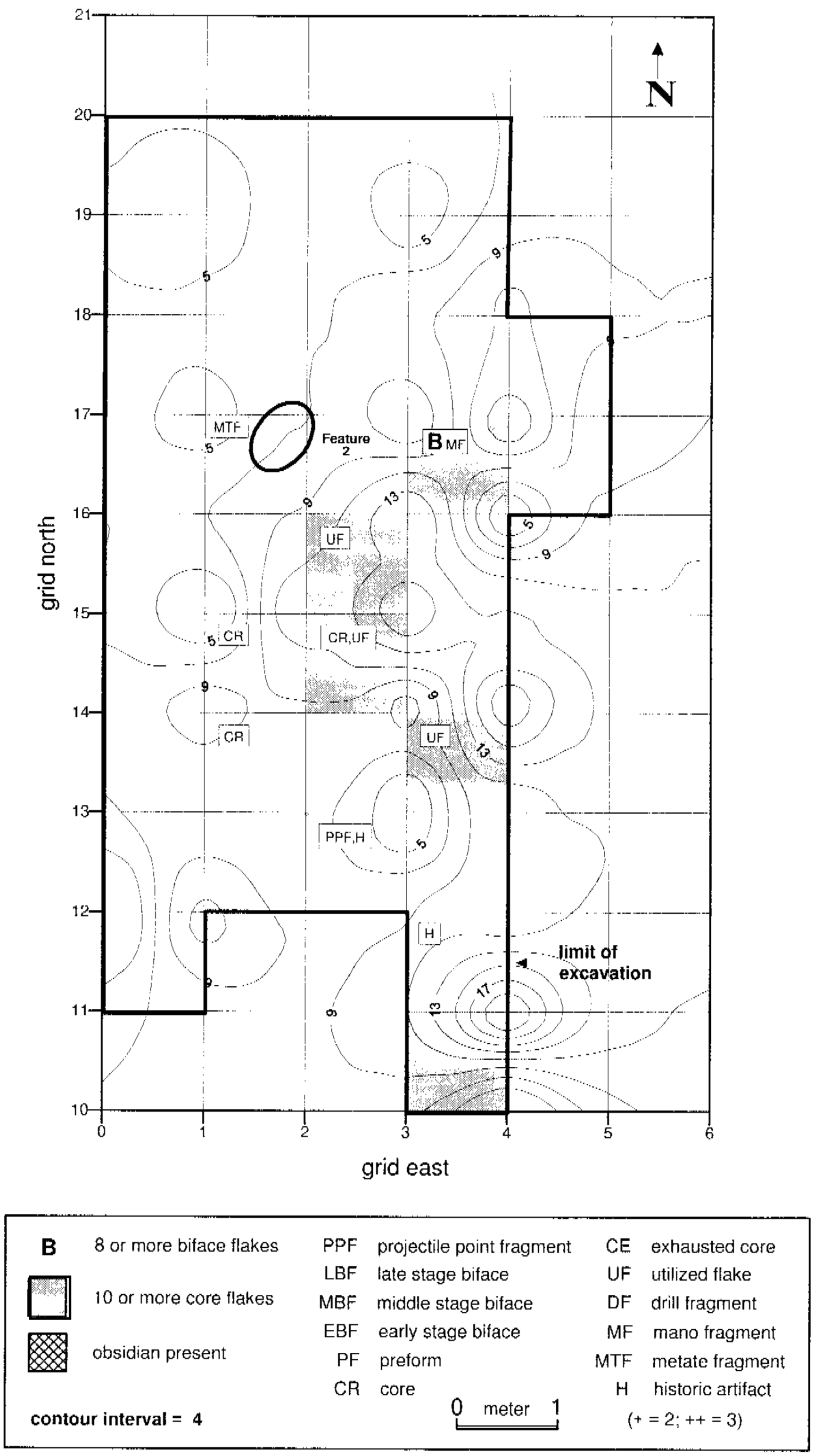

Figure 38. Chipped stone density plot, Level 7.

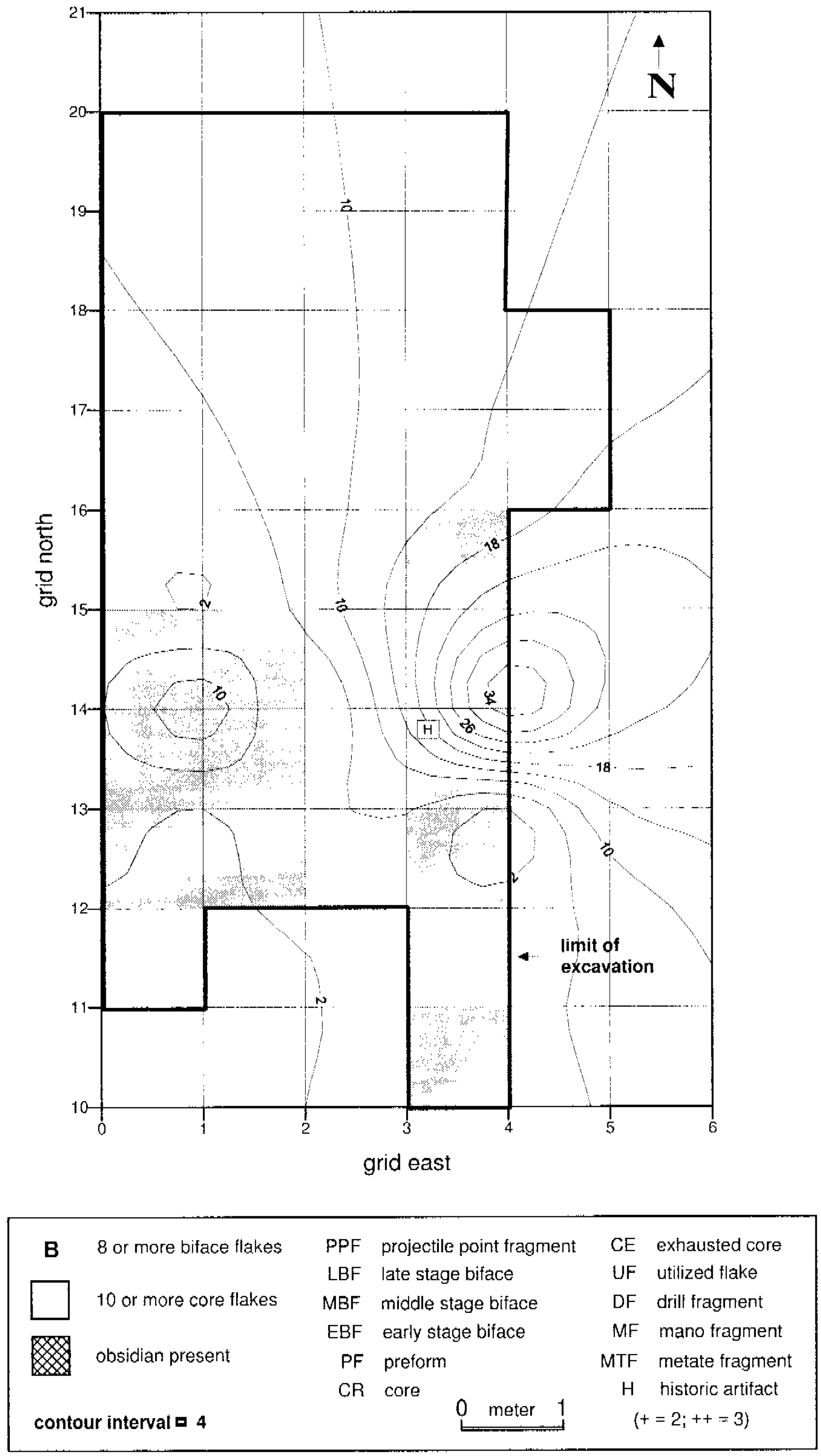

Figure 39. Chipped stone density plot, Level 8.

pattern similar to Level 4. A deflated hearth, Feature 3, is flanked by two high-density artifact concentrations that resemble a toss zone. The area surrounding the hearth displays decreased artifact density. This arc-shaped pattern associated with the hearth suggests another discrete occupation episode against the backdrop of a more diffuse artifact scatter. The stratigraphic placement of Feature 3 below Feature 1 indicates they are not contemporaneous and suggests that there was an occupation hiatus, at least as evidenced by the excavation area distribution.

Level 7 (61-70) displays distribution characteristics that reflect three occupations. Feature 2, a deflated hearth remnant, was 10 cm lower and 2 m west of Feature 3. The associated artifact distribution is less distinct than that of Feature 3, Level 6. The blurred distribution suggests that occupation debris from Features 2 and 3 is mixed. Additionally, a high-density area to the south of Feature 2 suggests that a third occupation extends into the excavation area. This illustrates the overlapping nature of the artifact distribution.

In Level 8 (71 to 80) a high-density area is north of the south concentration in Level 7 (61 to 70). Together these two concentrations form an arc-shaped distribution that suggests there is a hearth to the east of the excavation area.

Stratigraphic and distribution data allow four occupations to be segregated from the over-arching distribution pattern. Obviously, these feature and artifact clusters are not totally discrete, but they do indicate that small campsites established along the edge of the floodplain can be distinguished. The vertical location of these different occupation levels reflects considerable time depth for the prehistoric or early historic occupations. These occupation episodes can be examined further through the obsidian hydration dating and the distribution of temporally diagnostic projectile points and pottery types.

Obsidian Hydration

Sixteen obsidian artifacts were submitted to Archaeological Services Consultants, Columbus, Ohio, for obsidian source identification and hydration dating. Multiple samples were selected from Levels 3 through 9 in different grids. Samples selection was spread out within a level to look for patterning in the dates that might suggest occupation episodes or possible sources of error in assigning occupation episodes to periods. Two pieces were cut on two different edges to assess the potential effects of material recycling. Table 23 shows the sample proveniences and estimated date ranges. Many of the samples yielded a range of dates resulting from radical differences in rim thickness along the same edge. As is seen in Table 23, these differences were considerable, rendering the obsidian hydration dating results tenuous for site or component dating.

The obsidian hydration dates exhibit a wide temporal range on individual artifacts, within excavation levels, and between excavation levels. The broadest date range based on all dates is 11,547 B.C. to A.D. 1480, or over 13,000 years of occupation. Based on the identification of a Paleoindian site in the Mineral Hill, New Mexico, area to the east and the common presence of mobile, hunting and gathering bands along the Pecos River into the nineteenth century, this date range is not impossible. However, this range should not be accepted at face value, but it does suggest some interesting factors that may condition obsidian use and discard at 112 km (70 mi) from the source.

Generally the obsidian hydration date ranges reflect stratigraphic position. Levels 3 and 4 have more dates in the A.D. 800-1500 range than earlier dates. The early range for the Pueblo period dates and the low frequency of post A.D. 1100 dates may reflect churning of the surface by historic plowing and flooding of the Pecos River. Changes in soil temperature and moisture may have increased hydration rates, resulting in earlier dates as the hydration rim was artificially thickened. The wide date ranges and the potential for inconsistent soil moisture and temperature preclude refining the late level dating beyond the mid to late Pueblo period.

Levels 5 to 9 have more dates from the A.D. 200 to 300 and earlier period. These date ranges are comparable to the Basketmaker II—early Archaic periods (5500 B.C. to A.D. 300). The pre-2000 B.C. dates come from edges that required multiple readings because of the wide variation in rim thickness. Most early dates cluster between 1450 B.C. and A.D. 300, solid Archaic or early Basketmaker II period dates. One sample, FS 40-2, was identified as a middle Archaic period point base. However, the obsidian hydration dates were tightly clustered in the A.D. 140-340 range, suggesting a late Archaic or early Basketmaker II date.

The obsidian hydration dates indicate a possible 6,600-year occupation period for LA 84318. The earliest dates, ranging between 5000 and 11,500 B.C., suggest that obsidian along the Pecos River had a long use-life. This is further supported by the seven samples that had more than one significant rim width. These multiple measurements and very early dates suggest that obsidian was collected from sites distant from the source and moved to new sites as part of a curated tool or raw material procurement strategy. In an economy that was heavily dependent on hunting and meat processing, obsidian may have been a valued material. Conservation and curation of obsidian would spread a thin veneer over a wide area. Obsidian would finally exit the systemic context (Schiffer 1987:99) and rest in the archaeological context when it was too small to see or use or it was rapidly buried. Given such a potentially dynamic series of systemic and archaeological transformations, the utility of obsidian for dating at great distances from the source is minimal, but its potential as an indicator of cultural process in the river drainages of New Mexico may be poorly understood.

Projectile Points

Projectile point fragments recovered from the excavation resemble Archaic and Pueblo period points. Of the six late-stage biface fragments that could be identified as projectile points, three appeared to be Archaic period styles, two were Pueblo period styles, and one lacked temporally diagnostic morphology.

The three Archaic period style projectile points were FS 40-2, FS 61-1, and FS 196-11. All three fragments were basal fragments. FS 40-2 and FS 61-1 resembled middle Archaic or San Jose style bases (3300 to 1800 B.C.). Obsidian hydration of FS 61-1 yielded A.D. 237 and 255 middates. This date contradicts the initial middle Archaic period identification. The fact that two cuts from opposite edges yielded similar dates strongly supports the late Archaic period or early Basketmaker II date. The obsidian hydration dates also indicate that Archaic period styles may be difficult to date for sites along the middle Pecos River.

The two Pueblo style projectile points represent dates ranging from A.D. 1100 to 1500. Their vertical distribution in Levels 1 and 3 corresponds well to the obsidian hydration dating. Unfortunately, their long-term diagnostic traits make further temporal refinement impossible.

Pottery Types

The pottery assemblage is not particularly useful for addressing chronology because of the low sherd count, the long span of manufacture assigned to the temporally diagnostic types, and the scattered distribution within the upper five excavated levels. The pottery distribution does weakly support the temporal patterns exhibited by the obsidian hydration dates and the projectile point distribution.

Obsidian hydration dates and projectile point dates suggest that Levels 1 through 4 primarily date to the Pueblo and early historic periods, A.D. 800 to 1500. All pottery, except for one Petaca Micaceous-like sherd, were recovered from the upper levels. Therefore, the upper deposit dates to a period when Pueblo agriculturists and mobile Athabaskan groups could have occupied the site.

The lack of pottery below Level 5 corresponds with the predominance of Archaic to Basketmaker II dates from obsidian hydration. Pottery distribution supports the observation that upper levels are very mixed and that lower levels are less mixed and actually exhibit identifiable activity areas and site structure.

Summary

Temporal resolution for LA 84318 is relatively poor. The various date sources combine to define two broad occupation periods within two thick and somewhat mixed strata. Levels 1 to 4 clearly date to the Pueblo or early historic period. The co-occurrence of Kwahe'e Black-on-white with the micaceous and Tewa series polychrome pottery demonstrate that the high-density upper levels result from occupation over a long period. Based on artifact counts, upper-level occupation was more intensive and occurred more frequently when compared with lower-level distributions. Levels 5 through 8 are less mixed and appear to represent Archaic or Basketmaker II period occupations. The lower level cultural deposit possibly accumulated over a 3,000 to 5,000 year period as indicated by the obsidian date ranges.

Economic Organization and Subsistence Strategy

LA 84318 and much of the middle Pecos River during prehistoric period until the late Spanish Colonial period was occupied by mobile hunting and gathering groups who made short-lived attempts at permanent settlement by agriculturally dependent populations of the late Pueblo II and Pueblo III periods (A.D. 1100 to 1300). Testing results from LA 84318 revealed an artifact assemblage that suggested repeated, short-term, and perhaps seasonal occupations throughout the occupation sequence. Evidence of occupations based on mobility were expected to predominate regardless of period. To examine the implications of Archaic, Pueblo, and early historic period group mobility, the analysis was designed to examine artifact type and attribute distributions, feature content and associations, and site or component formation in terms of different aspects of technological organization and site structure, and, by inference, site function.

The data recovery plan presented a hunter-gatherer model based on the dichotomy between foraging and collecting strategies or residentially or logistically mobile settlement and subsistence patterns. Expectations were formulated for site formation and use, tool manufacture use and discard, and relationships between chipped stone raw material procurement, tool production and maintenance, and manufacture debris and final product discard. These expectations were expressed in terms of foraging and collecting strategies and expected site types. For LA 84318, site type is reduced to recognition of a portion of the range of activities that occurred during the rather broad temporal periods identified in the preceding analysis.

Site Formation and Use

Site formation and use are examined through artifact-density patterns, artifact type distributions, and the relationship between artifacts and the three thermal features. Much of the analysis is based on spatial patterns of artifact densities and types relative to features and their intrasite vertical and horizontal distributions. Expectations for the analysis are based on Camilli's (1989) definitions of single occupation, multiple occupation, and reuse. Briefly stated,

> Artifact density on a site that has been reused many times may reflect two different occupation patterns. First, it can reflect a multiple occupation defined as occupations resulting in overlapping distributions of features and artifacts resulting in increased site size and lower artifact frequencies. Second, a reoccupation is where facilities and space are reused within the same spatial limits. One measure is the artifact density per unit area (DPUA), which is simply the number of items divided by the spatial unit divided by the spatial unit again (Camilli 1989:21). If a single occupation site can be identified, then probable reuse sites can be compared against it.
>
> Expectations. (1) Reoccupied sites should have a higher DPUA than single occupation sites because the artifact numbers increase without a concomitant increase in site size. (2) Multiple occupation sites have a lower DPUA than single and reoccupation sites because the artifact density remains constant, but the site size increases. This measure assumes that other factors influencing artifact density and site size are held relatively constant. For LA 84318, changes in artifact density may relate to multiple occupation or reoccupation providing some understanding of site formation. (Post 1991:45)

For LA 84318, DPUA may not be a good measure, because only a portion of the site area was excavated. High-density areas at the periphery of the excavation area suggest that considerable buried cultural deposits existed outside the excavation limits. Even though DPUA may not be applicable, the density plots introduced in the previous section exhibit evidence of different occupation patterns.

The density plot of Level 1 (0-10 cm bmgs) (Fig. 32) shows a high-density concentration in the northwest grids near the foot of the natural ledge rock. This area may be at the edge of a reoccupied location that used the ledge rock as a natural shelter or windbreak. The remaining area is of moderate density, reflecting overlapping occupations or mixing of deposits by plowing.

Level 2 (11 to 20 cm bmgs) density plot (Fig. 33) displays an extension of the Level 1 concentration to the southeast. There is no specific patterning that would suggest toss zones or non–chipped stone producing activity areas. This expanded concentration lacks distinct structure that may be masked by the sheer number of occupations or historic plowing. Intensity or numerous occupations are indicated by the high artifact count and the 30 grids that yielded 10 or more artifacts. The Level 3 (21-30 bmgs) density plot (Fig. 34) reinforces this pattern, but with decreasing quantity and slightly lower density. The artifact distribution is relatively homogeneous, reflecting reoccupation and mixing.

The first distribution pattern that may reflect a single occupation episode is displayed in Figure 35 from Level 4 (31-49 cm bmgs). The hearth, Feature 1, is bordered by a high-density, arc-shaped distribution, with the area immediately surrounding the hearth exhibiting the lowest density. There remains a background artifact scatter that suggests the occupation is mixed with lower-density scatter from other occupations that are better represented outside the excavation area. The Level 5 (41-50 bmgs) density plot (Fig. 36) shows a high-density cluster southeast of Feature 1 that may be associated. Otherwise, the Level 5 plot shows a homogeneous distribution that reflects multiple occupation or overlapping distributions with no apparent spatial structure.

Another arc-shaped distribution is associated with Feature 3 in Level 6 (51 to 60 cm bmgs) (Fig. 37). The hearth is bounded by two high-density concentrations within a low-density scatter that decreases in density to the east. This distribution appears to represent a single occupation camp site that is older than the Feature 1 occupation. The Level 7 (61-70 cm bmgs) density plot (Fig. 38) is more ambiguous. Feature 2 has a high-density arc to the east, but it overlaps with the Level 6, Feature 3 distribution, suggesting that the elongated distribution is a mix from two occupations. The clustered distribution resembles reoccupation with discard areas closely overlapping and facilities not reused, but activity space reoccupied. At the south end of the excavation area in Level 6, there is a high-density area that suggests another campsite. This campsite was located to the south of the excavation area, but the artifact distribution overlaps with the Feature 2 and 3 concentration. This pattern reflects multiple occupations.

The lower levels, 8 and 9, combine to form an artifact concentration in the southeast portion of the excavation area. A high-density area in 15-16N/2-4E radiates to the southeast. This tight distribution resembles a single-occupation episode and suggests that more occupation debris existed to the east, outside the excavation area. This pattern suggests that early site formation consisted of short occupations that left small, dense concentrations. Repeated short occupations would result in the pattern exhibited in the upper three levels, where no specific activity space could be recognized.

Artifact distributions within the excavation area reflect single, multiple, and reoccupation patterns. Granted the excavated space represents a small sample of the total site area, but the patterns shown do seem to have integrity. Typical small-campsite, single-occupation patterns are evidenced by the arc-shaped Feature 1, 2, and 3 distributions. The clustering of Feature 2 and 3 and the resultant elongated distribution reflects reuse of activity space. The homogeneous distribution that is apparent in all levels, either throughout the excavation area or as a background for more discrete distributions, reflects discontinuous multiple occupations spread over a long period. The latest occupations appear to have had the greatest intensity based on artifact density and count, but the distributions have been mixed by occupation or historic plowing. With depth, use of the area and modern disturbance decreases, and patterns are more distinct. As might be expected for a long-lived site, all occupation patterns are represented by intensity of occupation resulting in some mixing of artifacts from different occupations.

Technological Organization

Technological organization should be conditioned by the settlement and subsistence strategy and should also reflect the range of activities that occurred. Foraging and collecting subsistence strategies can be characterized as residentially or logistically mobile. Foraging camps may be occupied for shorter periods, but house a full range of activities. Collector camps will be occupied for longer period and should house a full range of activities but also have evidence of gearing up for long-distance hunting, gathering and procurement forays.

From LA 84318, chipped stone debris from core reduction and evidence of tool production and use, including discarded tools broken in manufacture or exhausted by use, are the strongest evidence from which inferences can be made about technological organization. Core reduction and tool production can be examined in terms of expedient and planned or curated strategies as outlined in the data recovery plan (Post 1991:48-49, 52-54). Strong conditioners of technological organization and reduction strategy were raw material suitability and availability, distance between resource areas and base camps, and the range of activities supported by stone tool production.

Raw Material Variability. In terms of tool production and use, the availability of suitable raw material may be one of the strongest conditioners of reduction strategy (Andrefsky 1994). Camps or resource extraction or procurement sites with convenient access to suitable raw material may have no evidence of bifacial tool production. Expedient or unmodified flakes would have been suitable for most tasks, and specialized tools mostly unnecessary. In situations of abundant suitable raw material, evidence of biface manufacture may have focused on replacing tools before moving the camp to a location that lacks suitable raw material. In this scenario, early- and middle-stage biface debris and failures would predominate and be associated with a high proportion of broken or exhausted formal tools.

For all levels and occupation periods, local raw material dominates. All stages of core reduction are represented, though low frequencies of cortical debris indicate a focus on the intensive reduction of fine-and medium-grained materials. Biface manufacture involves local materials, as does the production and use of expedient flake tools. Obsidian, the main nonlocal material, is used primarily for biface production, though the majority of discarded bifaces are made from local material.

Expedient vs. Planned Tool Production. One of the implied questions guiding this study is, did the subsistence strategy of site occupants change through time? This question can be addressed by looking at the technological organization of expedient and planned tool production. As explained in the chronology section, temporal control of cultural deposits from LA 84318 is relatively weak and coarse-grained. However, temporal patterning was assigned for two levels: Levels 1 through 4, which represent Pueblo and historic period occupation; and Levels 5 through 9, which represent Middle Archaic period to Basketmaker II (3300 B.C. to A.D. 900). Basically, the comparison is between the late levels, which could be a mix of Pueblo farmers and Athabaskan hunter-gatherers and Archaic period hunter-gatherers.

Examination of the assemblage for differences in reduction strategy was conducted in terms of frequencies of different chipped stone artifact classes. In Table 24, individual artifact types are combined into groups that reflect core reduction, tool production, core discard, and tool use and discard by occupation level. A chi-square test was conducted to test the null hypothesis that there is no significant difference between upper and lower occupation levels. The test with 3 degrees of freedom yielded a chi-square value that was significant at greater than .003. Adjusted residuals show significant values at the .05 level of 1.96 or greater for six of eight cells. Late levels have significantly greater than expected tool production debris and discarded tools. Early levels have more than expected core reduction debris and more than expected, but not significantly more, cores. This test shows that tool production and discard was emphasized more in later occupations, while core reduction was emphasized in earlier levels. The differences are statistically significant, but they are not dramatic and do not represent a clear bias toward one class or another. Instead, the results suggest that later occupations may have been more logistically organized, with tools produced to replace exhausted items because replacements were not readily available from a home base. The earlier levels suggest that expedient core reduction and flake tool production was slightly more common, though quantities of utilized flakes were not recovered. This suggests a more residentially mobile strategy, such as would be expected for seasonally mobile hunting and gathering groups.

Expectations of a clear emphasis on biface production or core reduction that would reflect extreme instances of logistical or residential populations were not clearly met. Core reduction was the most common technological activity, if frequency and percentage of artifacts and their attributes are meaningful measures of occupation intensity or activity focus. Biface reduction debris and tool discard occurred at a rate commensurate with opportunistic replacement of curated tools when suitable raw material was available. The later-level assemblage exhibits replacement of chert/chalcedony and obsidian tools with late-stage reduction or tool production more strongly associated with the nonlocal obsidian. Large bifaces were recovered from late levels, suggesting that local material blanks or manuports were produced in anticipation of travel to areas that lacked raw material. This is a reduction strategy associated with logistical mobility, and in this case it may reflect Pueblo or Athabaskan use of the Pecos River.

Biface Production. An important conditioner of biface production would have been the intended use of the bifaces. Different biface reduction strategies may reflect logistically or residentially mobile settlement patterns. The research addressed the question of whether biface or formal tool production focused on finishing tools or producing blanks for transport. Previous discussion of biface flake dimensions indicated that there were differences in biface flake size that corresponded to raw material type. Obsidian biface flakes tended to exhibit a more restricted size range, and chert/chalcedony biface flakes were larger with a greater size range. The significance of these differences can be evaluated by looking at biface flake dimensions by level. Four Student's T-tests were conducted by material type and occupation level. Comparison within chert/chalcedony or obsidian by Levels 1 through 4 and Levels 5 through 9 showed no significant difference in length and thickness. There was no difference in the variances for material types by level. When chert/chalcedony and obsidian were compared by level, there were statistically significant differences in their variances. From Levels 1 through 4, length and thickness were different for chert/chalcedony and obsidian. Thickness was significantly different for Levels 5 through 9. These results suggest that thickness was influenced by material type independent of reduction strategy, and that obsidian biface flakes were thinner because of natural properties. The difference in biface flake length for Levels 1 through 4 may reflect production of larger or earlier-stage bifaces from local material. The difference in length is not great (12 mm for obsidian and 14 mm for chert/chalcedony), which may reflect a more complete range of reduction using local material. Results of this analysis suggest that obsidian and chert/chalcedony were not used to produce tools that were part of gearing up for a move to a location lacking raw material or that they were reduced differentially for on-site use--a conclusion that contradicts conclusions drawn from the artifact type frequencies.

Summary

LA 84318 was occupied over a long period. The occupation pattern was short-term, and the excavation area distributions indicate periodic reuse of the same portion of the site by contemporaneous populations as well as the accretional, spatial growth of the site as previously unoccupied areas were used. Distribution of hearths at three different levels suggests that there was periodic but substantial soil deposition that occurred between occupations. Discrete occupations as evidenced by features were partly supported by artifact-density patterns that exhibited characteristics of systematic discard resulting from the interplay between productive activities and the need to maintain clear space for other activities, such as food consumption or sleeping.

Technological organization reflects aspects of expedient and curated or planned strategies. Use of local lithic raw material predominates throughout the site occupation. Local materials were used to produce expedient and formal tools and show evidence of incorporation into a curated strategy. Nonlocal lithic raw materials, such as obsidian, show a greater focus on formal tool production, with finished products discarded at the site in broken or exhausted condition. Discard of tools made from distant raw material sources is a strong indicator of logistically organized strategies (Kelly 1988; Andrefsky 1994; Binford 1983b). Small formal tools were retained in the toolkit until replacements were made. The consistent occurrence of biface reduction debris from local lithic raw material indicate that replacements were commonly produced.

Other aspects of the assemblage suggest that technological organization might have changed through time. The early occupation level had smaller biface flakes, suggesting that projectile points or other formal tools were produced for immediate use. The late level had slightly longer biface flakes, which might reflect production of bifacial tools or cores that could be used for multiple purposes (Kelly 1988). This pattern suggests that the Pueblo or early historic site occupants periodically exploited the resources of the middle Pecos River using a logistically organized strategy. The earlier Archaic period occupants probably moved their base camps along the Pecos in response to resource availability as well as floodplain conditions. The occurrence of hearths in the lower levels reflects more common construction and use of facilities during the early occupations. Construction and use of formal facilities is another indication of longer occupation. It should be noted that differences in reduction strategies between early and late levels are relatively small, and the pattern suggests similarity and continuity in settlement and subsistence.

LA 84318 and the Middle Pecos River

LA 84318 is in the southeast corner of the region that Stuart and Gauthier (1981) defined as northeastern New Mexico. This region exhibits a diverse and confusing occupation history because of its geographic situation along the east slope of the southern Rocky Mountains and the western edge of the High Plains. For all periods, Paleoindian to Territorial, different economic adaptations can be viewed as intermingling as part of settlement, hiatus, replacement, trade, and coexistence (McGuire et al. 1994). Did late Paleoindian and Early Archaic period populations chronologically, but not geographically, overlap as the former continued to follow dwindling megafauna and the latter retreated from the Plains into the more diverse riverine and montane environments? Does the low-frequency occurrence of Oshara or Cochise culture projectile point styles along the Pecos reflect survey bias or a more eastern identity for hunting and gathering groups? Did early Pueblo populations move into an area inhabited by small, mobile hunting-gathering groups that moved between the river canyons, mountain slopes, and open plains into the late A.D. 900s or 1000s? Did these mobile bands ever completely disappear from the Plains periphery of the Rio Grande Pueblo world? Did established Pueblo populations living along the Pecos and Tecolote Rivers trade with Plains-Panhandle groups, and did mutually beneficial relationships encourage Plains-Panhandle settlements peripheral to Pueblo villages? Were Plains-Panhandle populations more attracted to the Upper Pecos River and Sangre de Cristo foothills as Pueblo settlements nucleated at Picuris/Taos and Pecos and Rowe Pueblos? Where did the Plains-Panhandle groups go when the Jicarilla Apaches or Teyas began to inhabit the Western Plains and east montane foothills? What part did riverways play in the movement of people and goods between the Plains Indians and Pecos Pueblo and later the late eighteenth and nineteenth century settlements of San Jose del Bado and San Miguel del Vado? These are a few of the questions that arise when considering the complex interplay between divergent peoples that inhabited and negotiated their existence from diverse and potentially harsh environments.

Many of the questions begin with the simple need to establish chronologies that can be tied to changing settlement patterns as inferred from site distributions. Other questions require continued careful and detailed examination of material culture patterns that reflect different or changing economic orientation. More systematic and extensive inventory is needed to define the nature and temporal extent of the full-scale hunting and gathering adaptation along the Pecos River. Critical examination of artifact provenance and technological innovation may expand our understanding of the geographic limits of Pueblo forays into the Plains-Panhandle territories and better define the westernmost limits of the Plains-Panhandle settlement systems. During the A.D. 1400s, Pueblo-Plains interaction acquired new conventions as Athabaskan groups from the north moved into gaps left by population aggregation along the Pecos River and Rio Grande. Perhaps, long-standing rules of trade and travel were interrupted, and new alliances or arrangements had to be made (Spielmann 1989).

Excavation of LA 84318 provided few answers to the problems of Paleoindian, Archaic, and Pueblo period settlement patterns and Plains-Pueblo interaction. Excavation did demonstrate that sites on the low benches along the Pecos River may have been highly favored as seasonal camps through all periods, resulting in extensive and complicated site structure. Taken at face value, the obsidian hydration dating suggests 12,000 years of potential occupation, though a more conservative estimate would suggest only 5,000 years.

What do the local site data offer for addressing the complex temporal and spatial relationships of human occupation along the Pecos River? A site database was compiled from the six quads surrounding the project area. Data on site size, setting, and artifact assemblage composition and quantity were compiled from available site reports. These data were all from inventories by private contractors working on federal land or federal land-managing-agency archaeologists (Abel 1987, 1989a, 1989b, 1989c, 1990a, 1990b, 1991, 1992a, 1992b, 1994a, 1994b, 1995; Boyer 1994; Higgins 1986; Kneebone 1994, 1995; Seymour and Orozco 1994; Smith 1979). Without excavation and detailed examination and reporting on the sites, some determinations are low-confidence estimates. Strength of interpretations are diluted by the effects of multicomponent occupations and long site histories, as well as the potential for surface collection of temporal diagnostics before survey recording.

The five Archaic period sites represent the earliest datable occupation along the Pecos River and adjacent land. The sites are primarily on the canyon rim and low benches above a primary drainage. Their size, ranging from 7,200 to 21,020 sq m, combined with artifact counts ranging from 51 to 64 artifacts, suggest they are repeatedly occupied special activity or logistical hunting camps. More permanent evidence of seasonal occupation may be mixed within two of the large multicomponent sites that had Archaic-period-style projectile points. Two sites had grinding implements, suggesting base camp activities, and three sites exhibit relatively high percentages of tertiary flakes (30 to 63 percent). As suggested by logistical subsistence model (Binford 1983a; Kelly 1988), there is a focus on specialized or formal tools combined with core reduction. Use of local raw material prevails in core reduction and biface manufacture, the pattern for all excavation levels from LA 84318. The low number of Archaic period sites identified along this small portion of the Pecos River suggests that long-term or intensive occupation was rare or cannot be recognized by surface indicators. Along the Pecos River, as in other areas of northeastern New Mexico, Archaic period occupation is poorly understood because of limited inventories of large areas and intensive site recording. Privately owned ranches along the Pecos River in San Miguel County may hold the key to Archaic period settlement. These ranches comprise thousands of acres, cutting across a wide variety of topographic and environmental settings. Evidence of longer seasonal settlement may exist in sheltered piñon-juniper woodlands near permanent water supplies.

Pueblo settlement and use of the Pecos River drainage and adjacent lands includes Coalition and Classic period sites, as well as sites that are multicomponent. The small sample of sites exhibits variability in setting, size, and assemblage characteristics. This lack of distinctive patterning indicates that peripheral areas such as the Pecos River canyon were used for a broad spectrum of activities. The Pecos river drainage and lands were used for hunting, gathering, and farming. At least one agricultural fieldhouse is represented by LA 66323, which had abundant lithic debris, decorated and utility pottery, and a two-room structure. Another site, LA 66324, had 21 manos and 10 cores, with abundant chipped stone debris, but no structure, and only 10 decorated sherds. This site resembles a repeatedly occupied foraging or hunting and gathering site, where plant processing was at least partly completed in the field. Pueblo populations consistently exploited the environmental zones at the edge of the Plains, but occupation was short-lived, which could reflect limited productivity of farm land or the necessity of a flexible settlement strategy in light of potential occupation by groups from the western edge of the Plains.

Multicomponent sites reflect the patterns displayed by the Archaic and Pueblo period sites. Most of the multicomponent sites date between A.D. 1000 and 1700, and LA 81929 represents 3,300 years of occupation from the Late Archaic to the late Pueblo period. Six of the seven sites cover less than 30,000 sq m. However, LA 106311 has six potential aboriginal structures, and LA 81929 has 16 manos. Both reflect intensive reoccupation of a relatively small area. LA 75981 is one of the large Pecos River canyon rim sites covering 383,600 sq m. LA 75981 was reoccupied many times for hunting and gathering as indicated by the 16 manos, 10 metates, and 29 projectile points observed on the surface. Two structures appear to be Plains-Panhandle style enclosures. Another large canyon rim site is LA 90016, which exhibited Early Archaic to historic period components across a 595,200 sq m area. Seven structures, micaceous and decorated pottery, and thousands of pieces of chipped stone remain from many occupations. It is from the complex and sprawling distributions of the canyon rim sites that interaction between Pueblo and Plains populations may someday be addressed. To date, temporal and spatial control within these large sites is poor, but their presence strongly emphasizes the magnetic quality of the Pecos River canyon for seasonal, but not permanent, occupation, until after the eighteenth century.

Temporal unknown sites are the largest component of the site assemblage, and they exhibit the widest distribution and greatest attribute variability. These 63 sites display characteristics of all periods as well as remnants of Athabaskan and early Spanish use of the Pecos River canyon and adjacent lands.

Chipped stone assemblages from 40 sites were recorded according to general lithic reduction stage. Debitage types included primary, secondary, and tertiary core flakes, and angular debris. High percentages of primary flakes indicate raw material procurement and early core reduction. Secondary flakes indicate core reduction beyond the initial stage, and tertiary flakes are associated with late-stage core reduction or tool production. With sites that have been repeatedly occupied, the debitage percentages represent an amalgamation of debris from a range of activities. To use these data as indicators of general differences in site activities, dominant percentages of one or more artifact classes must be assumed to correspond to the main activity. This assumption is recognized as an adequate though not strong proxy for better spatial and temporal control of a site's use-history. This investigation of temporally unknown sites looks at relationships between primary, secondary, and tertiary flakes from the perspective of site size and setting. Site size may result from occupation behavior or location relative to natural resources. Site setting reflects settlement behavior relative to natural resources.

Figures 40 and 41 are scatterplots of secondary and tertiary flake percentages by site size classes as defined by the quartile distribution and site setting. Figure 40 shows that sites with greater than 50 percent secondary flakes tend to fall within the smallest size classes (10 of 13 sites). Of these, two sites have more than 30 percent tertiary flakes, suggesting a focus on flake and tool production and only limited early-stage core reduction. These two sites are on a ridge or hill slope set back from the canyon rim and may represent hunting camps (Fig. 41).

The largest sites (greater than 15,150 sq m) tend to have low (less than 50 percent) secondary flakes and fewer than 20 percent tertiary flakes. Five of these sites are on the canyon rim. Sites with more than 40 percent tertiary flakes are mainly of the second and third size classes. These sites are

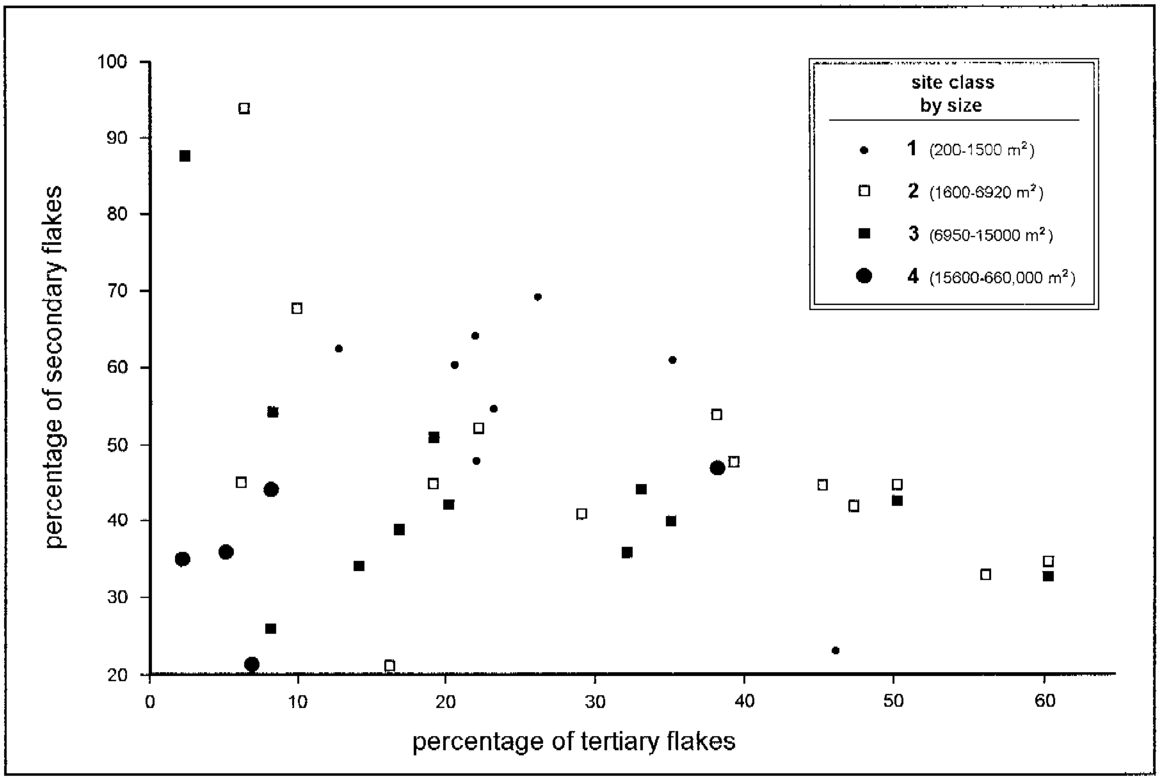

Figure 40. Secondary and tertiary flake percentages by site size, temporal unknown.

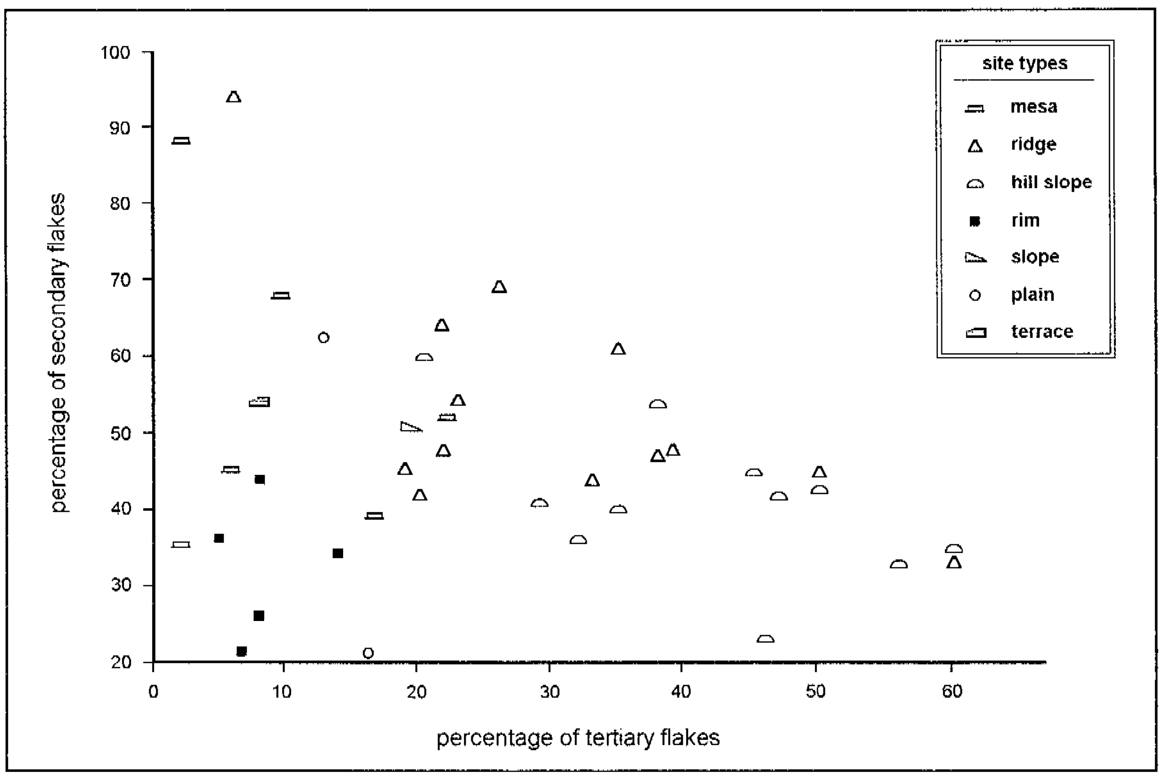

Figure 41. Secondary and tertiary flake percentages by site setting, temporal unknown.

on hillslopes and ridges set back from the canyon rim or above primary drainages. They may be repeatedly occupied hunting camps as indicated by the only site that has ground stone artifacts.

Figures 42 and 43 are scatterplots that show the relationship between primary and tertiary flakes by site size class and setting. The general expectation is that sites with abundant primary flakes will have low tertiary flake counts and vice versa. Sites with 35 to 75 percent primary flakes tend to be large; 8 of 10 sites are within the two largest size classes (Fig. 42). These sites, which are mainly along the canyon rim, appear to be repeatedly used procurement sites. However, these sites appear to have numerous functions, as indicated by the presence of structures on five sites and ground stone on seven sites. Clearly, canyon rims were used for many purposes, with high percentages of primary flakes resulting from material procurement and less intensive reduction of raw material because it was abundant (Andrefsky 1994).

Sites with more than 30 percent tertiary flakes always have less than 20 percent primary flakes (Fig. 42). These sites are medium size (site size classes 2 and 3) and occur on hill slopes or ridges set back from the canyon rim. The artifact class distribution for these sites coincides with the secondary/tertiary flake pattern, suggesting specialized activities such as might be expected with more logistical or seasonal exploitation of the El Cerrito area environments. These woodland areas would have supported most of the game mammals.

LA 84318 and the surrounding site data suggest that regardless of time, favored locations such as canyon rim and river bench or terrace were repeatedly occupied. Within these favored environmental zones, a full range of activities relating to seasonal base camp or logistically organized foraging and hunting expeditions occurred. As a natural route between the Rio Grande and the Plains, the Pecos River was used intensively, but seasonally and transiently. The abundance of local lithic raw material precluded the necessity of transporting quantities of nonlocal raw material to the Pecos River sites. This raw material abundance masks patterning that might reflect directionality of movement and relate to cultural intrusion or interaction between Plains, Pueblo, or Athabaskan groups. The deep deposits with considerable time depth (though of low resolution) at LA 84318 suggest that occupations may have been more intensive in some locations than indicated by surface artifacts. Highly dispersed, large sites, such as those along the canyon rim, reflect daily or ephemeral activities that would support the longer, more intensive occupations at sites similar to LA 84318. Location of seasonal camps or structural sites on canyon rim or mesa tops may reflect habitation during high-water periods such as would occur in late spring and early summer. Bench locations may reflect low-water occupations during fall and winter. This site distribution may reflect a biseasonal settlement pattern that is an important indicator of Pueblo-Plains movement between adjacent cultural, geographic, and economic peripheries.

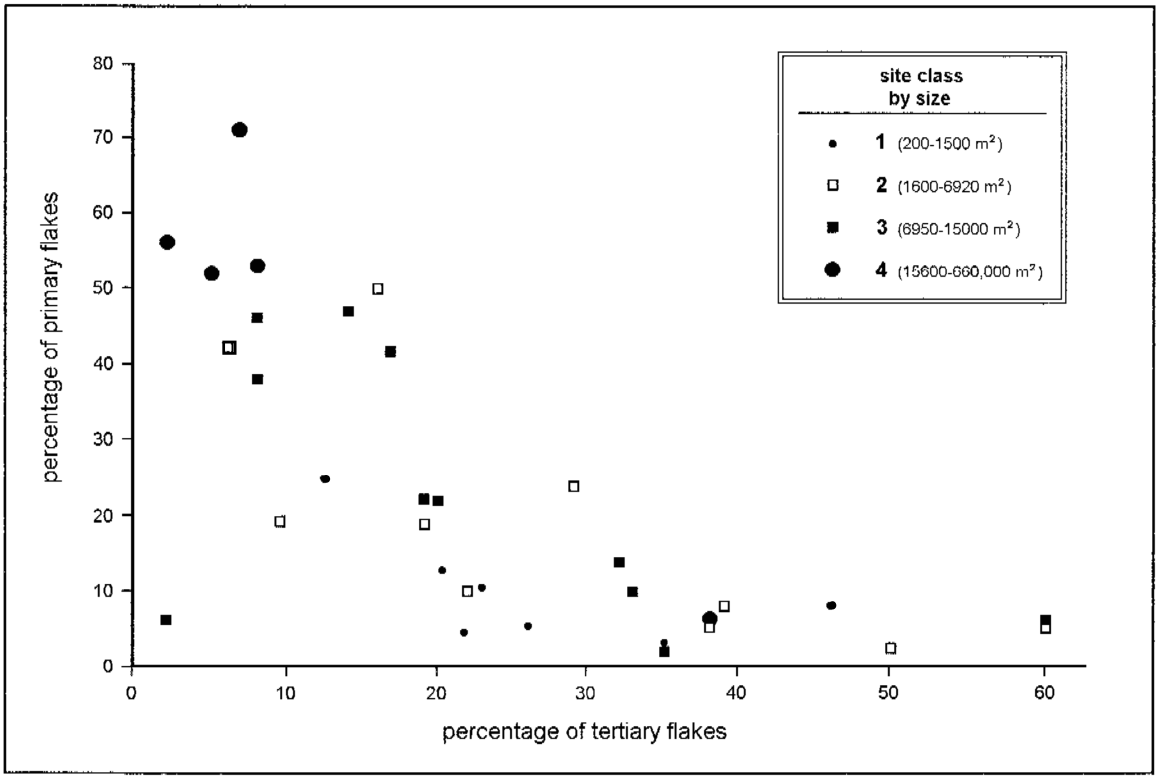

Figure 42. Primary and tertiary flake percentages by site size, temporal unknown.

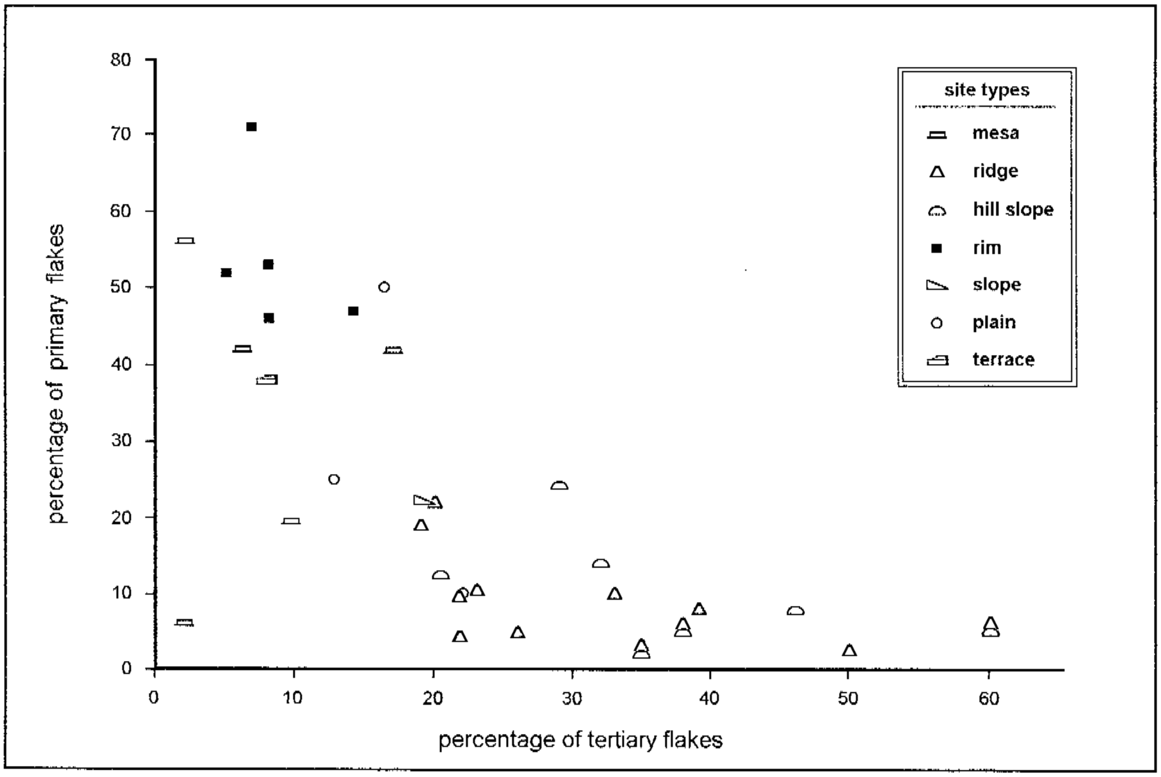

Figure 43. Primary and tertiary flake percentages by site setting, temporal unknown.

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APPENDIX 2. TRACE ELEMENT CONCENTRATION VALUES (ppm)

Lab #	Catalogue #	+/-	Zn	Pb	Rb	Sr	Y	Zr	Nb	Fe/Mn ratio	Source
40	40-2		99.4	37.7	203.4	0.0	59.3	171.7	95.9	21.8	Obsidian Ridge
		+/-	5.1	2.5	2.6	0.0	1.6	5.5	1.4		
57	57-1		44.9	25.7	104.7	34.4	20.0	90.7	44.3	15.2	Unknown
		+/-	5.1	2.5	2.5	7.3	1.6	5.6	1.5		
73	73-1		68.9	30.6	176.4	7.3	48.6	178.2	55.7	27.5	Cerro del Medio
		+/-	4.6	2.2	2.5	7.3	1.5	5.5	1.2		
141	141-2		97.5	43.3	219.3	2.6	66.5	190.0	105.4	21.5	Obsidian Ridge
		+/-	5.2	2.4	2.8	8.2	1.7	5.6	1.5		
181	181-10		59.6	23.1	154.8	7.9	43.2	169.3	55.1	28.2	Cerro del Medio
		+/-	4.4	2.0	2.4	7.3	1.4	5.5	1.1		
206	206-1		80.8	22.6	156.3	8.2	41.0	158.6	54.8	28.7	Cerro del Medio
		+/-	5.1	2.4	2.6	7.3	1.6	5.5	1.4		
231	231-7		75.0	25.2	154.3	5.9	42.4	161.5	51.2	28.5	Cerro del Medio
		+/-	4.7	2.2	2.5	7.3	1.5	5.5	1.2		
239	239-7		86.4	31.9	188.2	4.8	57.5	165.3	91.5	21.9	Obsidian Ridge
		+/-	5.1	2.5	2.7	7.3	1.7	5.6	1.5		
260	260-6		96.9	36.0	204.9	3.5	62.4	173.1	94.4	20.9	Obsidian Ridge
		+/-	4.8	2.3	2.6	7.4	1.6	5.5	1.3		
261	261-1		86.7	35.8	198.4	3.2	62.3	169.9	96.0	20.7	Obsidian Ridge
		+/-	4.5	2.1	2.5	7.4	1.5	5.5	1.2		
284	284-1		72.7	28.7	175.7	8.7	45.5	183.9	59.3	29.2	Cerro del Medio
		+/-	4.5	2.1	2.5	7.3	1.5	5.5	1.2		
285	285-1		66.9	27.3	163.6	7.5	45.7	169.3	59.2	27.5	Cerro del Medio
		+/-	5.2	2.5	2.7	7.3	1.7	5.6	1.5		
305	305-1		85.4	37.2	216.3	3.4	68.4	186.0	99.1	22.0	Obsidian Ridge
		+/-	4.7	2.2	2.6	7.4	1.5	5.5	1.3		
309	309-11		35.8	26.6	160.1	8.6	26.1	77.9	45.8	14.2	Polvadera Peak
		+/-	4.4	2.1	2.4	7.3	1.4	5.5	1.1		
317	317		57.8	27.4	151.9	6.3	41.5	157.4	54.0	28.6	Cerro del Medio
		+/-	4.2	1.9	2.3	7.3	1.4	5.5	1.0		
321	321-3		98.5	42.2	216.2	0.0	68.3	182.9	99.6	20.0	Obsidian Ridge
		+/-	4.5	2.0	2.4	0.0	1.4	5.5	1.2		
						Reference Standard					
			81.0	31.1	69.0	646.1	19.8	227.7	14.5	91.2	AGV-1 Reference Standard
		+/-	4.6	2.1	2.2	7.7	1.3	5.6	1.0		

APPENDIX 3: TABLES

Table 1. Chronological sequences for northeastern New Mexico
(after Stuart and Gauthier 1981:292)

Date	Wendorf (1960) NE New Mexico	Thoms (1976) NE New Mexico	Levine and Mobley (1976) Los Esteros	Hammack (1965) Ute Dam	Land (1978) Conchas Reservoir	Glassow (1980) Cimarron Area
A.D. 1800	Historic Nomads	Apaches	Plains Period	Plains Nomads	Plains Nomads	Jicarilla 1750-1900
1700						
1600						Cojo 1550-1750
1500	Hiatus?			Panhandle	Plains Village	Hiatus ?
1400	Panhandle	Panhandle	Pueblo			
1300	Pueblo			Pueblo		Cimarron 1200-1300 Ponil 1100-1250
1000		Pueblo	Archaic	Archaic	Plains Woodland	Escritores 900-100 Pedregoso 700-900 Vermejo 400-700
A.D. 200	Archaic	Archaic			Archaic	Archaic
1000 B.C.						
2000						
3000						
5000	Plano	Paleoindian	Paleoindian	Paleoindian	Paleoindian	
7000	Folsom					Folsom?
10,000						
11,000	Clovis					

Table 2. Site types by period for nine quads surrounding El Cerrito

Site Type/ Period	Lithic Scatter	Artifact Scatter	Fieldhouse	Residential	Stone Enclosure	Other
Archaic	2/2.0					
Early Archaic	1/1.0					
Late Archaic	4/3.0					
Pueblo 700-900						
Pueblo 900-1100		1/1.0		1/1.0		
Pueblo 900-1300		4/3.0		4/3.0		
Pueblo 1100-1300		3/2.0		9/7.0		
Pueblo 1100-1600		2/2.0	1/1.0			
Pueblo 1300-1600		4/3.0	2/2.0			1/1.0
Jicarilla 1500-1860?		6/5.0				
Historic						5/4.0
Pre-1900						12/9.0
Post 1900						4/3.0
Unknown	50/39.0				1/9.02	1/1.0
Total (n=129)	57/44.0	20/16.0	3/2.0	14/11.0	12/9.0	23/18.0

Includes the following USGS quads: San Juan, Villanueva, Tecolote, Aurora, Laguna Ortiz, Leyba, Rencona, Sena, San Jose

Table 3. LA 84318, artifact type by material type

Count Row Pct Col Pct	Chert/ Chal-cedony	Washington Pass Chert	Brushy Basin	Alibates	Tecovas	San Andres	Obsidian	Igneous	Sandstone	Siltstone	Metamorphic	Quartzite	Quartzitic Sandstone	Total
Indeterminate	8 72.7 .2						2 18.2 .6			1 9.1 .5				11 .3
Angular debris	696 91.9 20.5				1 .1 100.0		22 2.9 6.1	12 1.6 16.0		19 2.5 8.9		5 .7 9.1	2 .3 9.5	757 18.3
Core flake	2142 83.2 63.2	1 .0 100.0	2 .1 100.0	1 .0 50.0			129 5.0 35.7	56 2.2 74.8	5 .2 100.0	177 6.9 83.1	1 .0 100.0	43 1.7 78.2	18 .7 85.2	2575 62.4
Biface flake	504 69.0 14.9			1 .1 50.0		1 .1 100.0	202 27.7 56.0	4 .5 5.2		9 1.2 4.2		7 1.0 12.4	1 .1 4.8	729 17.7
Resharpening flake	1 50.0 .0						1 50.0 .3							2 .0
Bipolar flake	1 100.0 .0													1 .0
Hammerstone flake	2 100.0 .0													2 .0
Core	1 25.0 .0							1 25.0 1.3		2 50.0 .9				4 .1
Unidirectional core	2 50.0 .1									2 50.0 .9				4 .1
Bidirectional core	1 33.3 .0							1 33.3 1.3		1 33.3 .5				3 .1
Multidirectional core	12 92.3 .4									1 7.1 .5				13 .3
Cobble tool	1 50.0 .0									1 50.0 .5				2 .0
Uniface, middle	1 100.0 .0													1 .0

Count Row Pct Col Pct	Chert/ Chal- cedony	Washington Pass Chert	Brushy Basin	Alibates	Tecovas	San Andres	Obsidian	Igneous	Sandstone	Siltstone	Metamorphic	Quartzite	Quartzitic Sandstone	Total
Uniface, late	1 100.0 .0													1 .0
Biface	5 100.0 .1													5 .1
Biface, early	2 100.0 .1													2 .0
Biface, middle	3 60.0 .1						2 40.0 .6	1 16.7 1.3						6 .1
Biface, late	9 56.3 .3						4 25.0 1.1	2 12.5 2.6						16 .4
Column Total	3392 82.1	1 .0	2 .0	2 .0	1 .0	1 .0	362 8.8	77 1.9	5 .1	213 5.2	1 .0			4134 100. 0

Table 3. LA 84318, artifact type by material type

Count Row Pct Col Pct	Chert/ Chal- cedony	Washington Pass Chert	Brushy Basin	Alibates	Tecovas	San Andres	Obsidian	Igneous	Sandstone	Siltstone	Metamorphic	Quartzite	Quartzitic Sandstone	Total
Indeterminate	8 72.7 .2						2 18.2 .6			1 9.1 .5				11 .3
Angular debris	696 91.9 20.5				1 .1 100.0		22 2.9 6.1	12 1.6 16.0		19 2.5 8.9		5 .7 9.1	2 .3 9.5	757 18.3
Core flake	2142 83.2 63.2	1 .0 100.0	2 .1 100.0	1 .0 50.0			129 5.0 35.7	56 2.2 74.8	5 .2 100.0	177 6.9 83.1	1 .0 100.0	43 1.7 78.2	18 .7 85.2	2575 62.4
Biface flake	504 69.0 14.9			1 .1 50.0		1 .1 100.0	202 27.7 56.0	4 .5 5.2		9 1.2 4.2		7 1.0 12.4	1 .1 4.8	729 17.7
Resharpening flake	1 50.0 .0						1 50.0 .3							2 .0
Bipolar flake	1 100.0 .0													1 .0
Hammerstone flake	2 100.0 .0													2 .0
Core	1 25.0 .0							1 25.0 1.3		2 50.0 .9				4 .1
Unidirectional core	2 50.0 .1									2 50.0 .9				4 .1
Bidirectional core	1 33.3 .0							1 33.3 1.3		1 33.3 .5				3 .1
Multidirectional core	12 92.3 .4									1 7.1 .5				13 .3
Cobble tool	1 50.0 .0									1 50.0 .5				2 .0
Uniface, middle	1 100.0 .0													1 .0

Count Row Pct Col Pct	Chert/ Chal- cedony	Washington Pass Chert	Brushy Basin	Alibates	Tecovas	San Andres	Obsidian	Igneous	Sandstone	Siltstone	Metamorphic	Quartzite	Quartzitic Sandstone	Total
Uniface, late	1 100.0 .0													1 .0
Biface	5 100.0 .1													5 .1
Biface, early	2 100.0 .1													2 .0
Biface, middle	3 60.0 .1						2 40.0 .6	1 16.7 1.3						6 .1
Biface, late	9 56.3 .3						4 25.0 1.1	2 12.5 2.6						16 .4
Column Total	3392 82.1	1 .0	2 .0	2 .0	1 .0	1 .0	362 8.8	77 1.9	5 .1	213 5.2	1 .0			4134 100. 0

Table 4. LA 84318, artifact type by material type by level

	Indeterminate	Angular Debris	Core Flake	Biface Flake	Resharpening Flake	Bipolar Flake	Hammerstone Flake	Row Total
				Surface				
Chert/ Chalcedony		23 85.2% 23.0%	66 91.7% 66.0%	11 100.0% 11.0%				100 90.9% 100.0%
Obsidian			1 1.4% 100.0%					1 .9% 100.0%
Igneous		2 7.4% 66.7%	1 1.4% 33.3%					3 2.7% 100.0%
Siltstone		1 3.7% 33.3%	2 2.8% 66.7%					3 2.7% 100.0%
Quartzitic Sandstone		1 3.7% 33.3%	2 2.8% 66.7%					3 2.7% 100.0%
Column total		27 24.5%	72 65.5%	11 10.0%				110 100.0%
				Level 1				
Chert/ Chalcedony	6 66.7% 1.0%	126 97.7% 21.7%	355 89.0% 61.1%	93 80.9% 16.0%	1 100.0% .2%			581 89.0% 100.0%
Washington Pass			1 .3% 100.0%					1 .2% 100.0%
Tecovas		1 .8% 100.0%						1 .2% 100.0%
Obsidian	2 22.2% 5.6%	1 .8% 2.8%	13 3.3% 36.1%	20 17.4% 55.6%				36 5.5% 100.0%
Igneous			2 .5% 100.0%					2 .3% 100.0%
Sandstone			1 .3% 100.0%					1 .2% 100.0%
Siltstone	1 11.1% 3.8%	1 .8% 3.8%	22 5.5% 84.6%	2 1.7% 7.7%				26 4.0% 100.0%
Quartzite			5 1.3% 100.0%					5 .8% 100.0%
Column Total	9 1.4%	129 19.8%	399 61.1%	115 17.6%	1 .2%			653 100.0%
				Level 2				
Chert/ Chalcedony	3 100.0% .4%	132 93.6% 18.3%	462 85.7% 64.2%	123 79.9% 17.1%				720 86.0% 100.0%
Brushy Basin			1 .2% 100.0%					1 .1% 100.0%

	Indeterminate	Angular Debris	Core Flake	Biface Flake	Resharpening Flake	Bipolar Flake	Hammerstone Flake	Row Total
Obsidian		3 2.1% 5.9%	21 3.9% 41.2%	27 17.5% 52.9%				51 6.1% 100.0%
Igneous		1 .7% 6.3%	14 2.6% 87.5%	1 .6% 6.3%				16 1.9% 100.0%
Sandstone			2 .4% 100.0%					2 .2% 100.0%
Siltstone		3 2.1% 10.7%	24 4.5% 85.7%	1 .6% 3.6%				28 3.3% 100.0%
Metamorphic			1 .2% 100.0%					1 .1% 100.0%
Quartzite		2 1.4% 18.2%	7 1.3% 63.6%	2 1.3% 18.2%				11 1.3% 100.0%
Quartzitic Sandstone			7 1.3% 100.0%					7 .8% 100.0%
Column Total	3 .4%	141 16.8%	539 64.4%	154 18.4%				837 100.0%
Level 3								
Chert/ Chalcedony		129 94.2% 19.4%	419 85.9% 63.1%	115 69.3% 17.3%			1 100.0% .2%	664 83.8% 100.0%
Alibates				1 .6% 100.0%				1 .1% 100.0%
Obsidian		5 3.6% 6.3%	29 5.9% 36.7%	45 27.1% 57.0%				79 10.0% 100.0%
Igneous		1 .7% 7.7%	11 2.3% 84.6%	1 .6% 7.7%				13 1.6% 100.0%
Siltstone		1 .7% 3.7%	26 5.3% 96.3%					27 3.4% 100.0%
Quartzite		1 .7% 14.3%	2 .4% 28.6%	4 2.4% 57.1%				7 .9% 100.0%
Quartzitic Sandstone			1 .2% 100.0%					1 .1% 100.0%
Column Total		137 17.3%	488 61.6%	166 21.0%			1 .1%	792 100.0%
Level 4								
Chert/ Chalcedony		72 85.7% 16.5%	304 84.0% 69.6%	59 55.1% 13.5%		1 100.0% .2%	1 100.0% .2%	437 78.7% 100.0%
Obsidian		3 3.6% 3.8%	28 7.7% 35.9%	47 43.9% 60.3%				78 14.1% 100.0%

	Indeterminate	Angular Debris	Core Flake	Biface Flake	Resharpening Flake	Bipolar Flake	Hammerstone Flake	Row Total
Igneous		3 3.6% 37.5%	4 1.1% 50.0%	1 .9% 12.5%				8 1.4% 100.0%
Siltstone		3 3.6% 15.0%	17 4.7% 85.0%					20 3.6% 100.0%
Quartzite		2 2.4% 20.0%	8 2.2% 80.0%					10 1.8% 100.0%
Quartzitic Sandstone		1 1.2% 50.0%	1 .3% 50.0%					2 .4% 100.0%
Column Total		84 15.1%	362 65.2%	107 19.3%		1 .2%	1 .2%	555 100.0%
Level 5								
Chert/ Chalcedony		68 97.1% 21.5%	195 77.1% 61.7%	53 63.9% 16.8%				316 77.6% 100.0%
Obsidian		1 1.4% 2.2%	17 6.7% 37.8%	26 31.3% 57.8%	1 100.0% 2.2%			45 11.1% 100.0%
Igneous		1 1.4% 10.0%	8 3.2% 80.0%	1 1.2% 10.0%				10 2.5% 100.0%
Sandstone			1 .4% 100.0%					1 .2% 100.0%
Siltstone			27 10.7% 90.0%	3 3.6% 10.0%				30 7.4% 100.0%
Quartzite			5 2.0% 100.0%					5 1.2% 100.0%
Column Total		70 17.2%	253 62.2%	83 20.4%	1 .2%			407 100.0%
Level 6								
Chert/ Chalcedony		53 80.3% 25.6%	127 70.9% 61.4%	27 57.4% 13.0%				207 70.9% 100.0%
Brushy Basin			1 .6% 100.0%					1 .3% 100.0%
Obsidian		4 6.1% 13.3%	8 4.5% 26.7%	18 38.3% 60.0%				30 10.3% 100.0%
Igneous		2 3.0% 16.7%	10 5.6% 83.3%					12 4.1% 100.0%
Siltstone		7 10.6% 22.6%	23 12.8% 74.2%	1 2.1% 3.2%				31 10.6% 100.0%
Quartzite			5 2.8% 100.0%					5 1.7% 100.0%

	Indeterminate	Angular Debris	Core Flake	Biface Flake	Resharpening Flake	Bipolar Flake	Hammerstone Flake	Row Total
Quartzitic Sandstone			5 2.8% 83.3%	1 2.1% 16.7%				6 2.1% 100.0%
Column Total		66 22.6%	179 61.3%	47 16.1%				292 100.0%
Level 7								
Chert/ Chalcedony		57 91.9% 25.4%	154 74.0% 68.8%	13 48.1% 5.8%				224 75.4% 100.0%
Alibates			1 .5% 100.0%					1 .3% 100.0%
SanAndres				1 3.7% 100.0%				1 .3% 100.0%
Obsidian		4 6.5% 16.0%	10 4.8% 40.0%	11 40.7% 44.0%				25 8.4% 100.0%
Igneous			2 1.0% 100.0%					2 .7% 100.0%
Sandstone			1 .5% 100.0%					1 .3% 100.0%
Siltstone		1 1.6% 3.0%	31 14.9% 93.9%	1 3.7% 3.0%				33 11.1% 100.0%
Quartzite			7 3.4% 87.5%	1 3.7% 12.5%				8 2.7% 100.0%
Quartzitic Sandstone			2 1.0% 100.0%					2 .7% 100.0%
Column Total		62 20.9%	208 70.0%	27 9.1%				297 100.0%
Level 8								
Chert/ Chalcedony		33 94.3% 35.9%	51 82.3% 55.4%	8 57.1% 8.7%				92 82.9% 100.0%
Obsidian			1 1.6% 20.0%	4 28.6% 80.0%				5 4.5% 100.0%
Igneous		1 2.9% 20.0%	4 12.9% 6.0%					5 4.5% 100.0%
Siltstone		1 2.9% 14.3%	5 8.1% 71.4%	1 7.1% 14.3%				7 6.3% 100.0%
Quartzite			2 3.2% 100.0%					2 1.8% 100.0%
Column Total		35 31.5%	63 56.8%	13 11.7%				111 100.0%
Level 9 and beyond								

	Indeterminate	Angular Debris	Core Flake	Biface Flake	Resharpening Flake	Bipolar Flake	Hammerstone Flake	Row Total
Chert/ Chalcedony		2 40.0% 15.4%	9 75.0% 69.2%	2 33.3% 15.4%				13 56.5% 100.0%
Obsidian		1 20.0% 16.7%	1 8.3% 16.7%	4 66.7% 66.7%				6 26.1% 100.0%
Igneous		1 20.0% 100.0%						1 4.3% 100.0%
Siltstone		1 20.0% 100.0%						1 4.3% 100.0%
Quartzite			2 16.7% 100.0%					2 8.7% 100.0%
Column Total		5 21.7%	12 52.2%	6 26.1%				23 100.0%
Site Total	12 .3%	756 18.5%	2575 63.1%	729 17.9%	2 .0%	1 .0%	2 .0%	4077 100.0%

Table 5. Material type by texture, debitage, LA 84318

Count Row Pct Column Pct	Glassy	Glassy and flawed	Fine	Fine-flawed	Medium	Medium flawed	Coarse	Coarse-flawed	Row
Chert/Chalcedony	4 .1 100.0	48 1.5 96.0	1790 54.1 91.7	68 2.1 95.8	1300 39.3 87.0	23 .7 100.0	71 2.1 97.3	3 .1 75.0	3307 90.1
Washington Pass					1 100.0 .1				1 .0
Brushy Basin					2 100.0 .1				2 .1
Alibates			2 100.0 .1						2 .1
Tecovas			1 100.0 .1						1 .0
San Andres			1 100.0 .1						1 .0
Igneous		2 2.8 4.0	40 55.6 2.0		28 38.9 1.9		2 2.8 2.7		72 2.0
Sandstone			4 80.0 .2		1 20.0 .1				5 .1
Siltstone			81 39.7 4.1	3 1.5 4.2	120 58.8 8.0				204 5.6
Metamorphic			1 100.0 .1						1 .0

Quartzite			22 40.0 1.1		32 58.2 2.1			1 1.8 25.0	55 1.5
Quartzitic Sandstone			10 47.6 .5		11 52.4 .7				21 .6
Column Total	4 .1	50 1.4	1952 53.2	71 1.9	1495 40.7	23 .6	73 2.0	4 .1	3672 100.0

Table 6. Chert/chalcedony angular debris length by level, LA 84318 (mm)

Level	Count	Mean	Deviation	Error	Minimum	Maximum
1	129	18.2659	7.7339	.6809	.3000	40.0000
2	141	20.4043	9.2149	.7760	7.0000	59.0000
3	137	21.0365	15.2274	1.3010	8.0000	144.0000
4	84	20.4167	9.8301	1.0726	6.0000	48.0000
5	71	18.4930	9.1899	1.0906	5.0000	59.0000
6	66	21.2155	12.5267	1.5419	.2200	63.0000
7	62	20.8710	12.2173	1.5516	8.0000	67.0000
8	35	27.2857	14.9992	2.5353	8.0000	70.0000
All	725	20.4035	11.4298	.4245	.2200	144.0000

Table 7. Chert/chalcedony and siltstone whole core flake length (mm)

Material	Count	Mean	Deviation	Error	Minimum	Maximum
Chert/Chalcedony	718	17.5	10.1	.376	5	80
Siltstone	94	30.7	15.2	1.56	8	74
Total	812	19.1	11.6	.4063	5	80

Table 8. Chert/chalcedony and siltstone whole core flake thickness (mm)

Material	Count	Mean	Deviation	Error	Minimum	Maximum
Chert/Chalcedony	718	4.8	3.7	.138	1	29
Siltstone	94	8.5	4.7	.483	1	21
Total	812	5.2	4.0	.14	1	29

Table 9. Core flake portion by three material classes, LA 84318

Count Expected Value Row Pct Column Pct Adjusted Residual	Indeterminate	Whole	Proximal	Medial	Distal	Lateral	Row Total
Chert/chalcedony	80 75.4 3.9% 87.9% 1.3	719 751.6 35.1% 79.3% -3.6	366 353.0 17.9% 85.9% 1.8	236 234.5 11.5% 83.4% .2	475 455.8 23.2% 86.4% 2.5	170 175.7 8.3% 80.2% -1.1	2046 82.9%
Obsidian	4 4.7 3.1% 4.4% -.3	27 47.0 21.1% 3.0% -3.8	17 22.1 13.3% 4.0% -1.2	37 14.7 28.9% 13.1% 6.4	34 28.5 26.6% 6.2% 1.2	9 11.0 7.0% 4.2% -.6	128 5.2%
Nonchert	7 10.9 2.4% 7.7% -1.3	161 108.4 54.6% 17.8% 6.8	43 50.9 14.6% 10.1% -1.3	10 33.8 3.4% 3.5% -4.6	41 65.7 13.9% 7.5% -3.7	33 25.3 11.2% 15.6% 1.7	295 11.9%
Column Total	91 3.7%	907 36.7%	426 17.3%	283 11.5%	550 22.3%	212 8.6%	2469 100.0%

Table 10. Chert/chalcedony core flake portions by level

Count Expected Value Adjusted Residual	Surface and Levels 1 to 3	Levels 4 to 6	Levels 7 to 9	Row Total
Whole	417 435.6 -1.8	218 210.7 .8	84 72.8 1.7	719 36.6%
Proximal	228 221.7 .7	107 107.2 .0	31 37.0 -1.2	366 18.6%
Medial	157 143.0 2.0	60 69.1 -1.4	19 23.9 -1.1	236 12.0%
Distal	296 287.8 .9	139 139.2 .0	40 48.1 -1.4	475 24.2%
Lateral	93 103.0 -1.6	52 49.8 .4	25 17.2 2.1	170 8.6%
Column Total	1191 60.6%	576 29.3%	199 10.1%	1966 100.0%

Table 11. Biface flake portions by material class, LA 84318

Count Expected Value Row Pct Column Pct Adjusted Residual	Whole	Proximal	Medial	Distal	Lateral	Row Total
Chert/chalcedony	218 209.9 43.1% 72.2% 1.3	171 177.2 33.8% 67.1% -1.1	50 52.8 9.9% 65.8% -.7	56 58.4 11.1% 66.7% -.6	11 7.6 2.2% 100.0% 2.2	506 69.5%
Obsidian	77 83.4 38.3% 25.5% -1.1	75 70.4 37.3% 29.4% .8	23 21.0 11.4% 30.3% .5	26 23.2 12.9% 31.0% .7	0 3.0 .0% .0% -2.1	201 27.6%
Nonchert/chalcedony	7 8.7 33.3% 2.3% -.8	9 7.4 42.9% 3.5% .8	3 2.2 14.3% 3.9% .6	2 2.4 9.5% 2.4% -.3	0 .3 .0% .0% -.6	21 2.9%
Column Total	302 41.5	255 35.0	76 10.4	84 11.5	11 1.5	728 100.0

Table 12. Core flake platform types by material class, LA 84318

Count Expected value Row Pct Column Pct Adjusted Residual	Chert/ Chalcedony	Obsidian	Nonchert	Row Total
Cortical	74 119.7 50.3% 6.8% -10.3	4 4.9 2.7% 9.1% -.4	69 22.5 46.9% 33.8% 11.3	147 11.0%
Single	565 544.5 84.5% 52.1% 2.9	11 22.1 1.6% 25.0% -3.4	93 102.4 13.9% 45.6% -1.4	669 50.2%
Multifaceted	111 100.1 90.2% 10.2% 2.6	5 4.1 4.1% 11.4% .5	7 18.8 5.7% 3.4% -3.1	123 9.2%
Biface, collapsed/crushed	335 320.7 85.0% 30.9% 2.2	24 13.0 6.1% 54.5% 3.7	35 60.3 8.9% 17.2% -4.2	394 29.6%
Column Total	1085 81.4%	44 3.3%	204 15.3%	1333 100.0%

Table 13. Biface flake platforms by material class, LA 84318

Count Row Pct Column Pct	Chert/ Chalcedony	Obsidian	Nonchert	Row Total
Cortical	1 33.3 .3		2 66.7 12.5	3 .5
Single	97 80.8 24.9	21 17.5 13.8	2 1.7 12.5	120 21.5
Multifaceted	159 75.7 40.9	42 20.0 27.6	9 4.3 56.3	210 37.7
Retouch, collapsed, or crushed	132 58.9 33.9	89 39.7 58.6	3 1.3 18.8	224 40.2
Column Total	389 69.8	152 27.3	16 2.9	557 100.0

Table 14. Utilized debitage, LA 84318 (mm)

FS	Material	Type	Portion	Length	Width	Thickness	Edge Wear 1	Edge Angle 1	Edge Wear 2	Edge Angle 2
42	chert	angular debris		14	9	5	unidirectional	60	.	.
47	chert	core flake	distal	16	10	5	unidirectional	60	.	.
54	chert	core flake	proximal	10	18	5	rounding	45	.	.
58	chert	core flake	lateral	26	41	8	unidirectional	75	.	.
63	igneous	core flake	whole	32	26	9	unidirectional	55	.	.
190	siltstone	core flake	whole	54	52	14	unidirectional	54	.	.
200	obsidian	core flake	indeterminate	16	13	3	unidirectional	48	.	.
208	chert	core flake	whole	28	24	4	unidirectional	40	.	.
215	chert	core flake	distal	19	17	5	unidirectional	70	.	.
265	chert	core flake	distal	29	12	6	unidirectional	40	unidirectional	65
304	chert	core flake	whole	33	22	9	unidirectional	70	.	.
321	obsidian	core flake	whole	35	26	6	unidirectional	50	.	.
231	obsidian	core flake	distal	12	13	4	unidirectional	50	.	.

Table 15. Formal tools

Field Sample	Artifact	Material	Morphology	Portion	Distal Break	Proximal Break	Blade Shape	Notching	Length (mm)	Width (mm)	Thickness (mm)	Width (mm)	Comments
47	1	White chert	Drill	Tip	Impact		Convex		16+	6	5	5	Impact fracture suggests breakage during use; extremely rounded tip and flake scars.
188	40	Clear chalcedony	Middle-stage biface	Unknown	Perverse		Convex		49+	18+	7	70+	Indeterminate portion; probable middle-stage biface; step fractures from use on one lateral edge; possibly broken during reworking.
248	1	Chalcedony	Preform	Whole			Convex	None	18	10	2	6	Flake projectile point preform; facial and marginal retouch on dorsal surface; irregular marginal retouch on the ventral surface; base shows unidirectional wear, possible reuse as a scraper.
61	1	Obsidian	Projectile point	Base	Snap		Unknown	Unknown	8+	11	4	6	Point base, slightly expanding lateral edges, straight base; appears to be a finished product; breakage cause unknown; lateral abrasion; possible Middle Archaic period.
191	1	Obsidian	Projectile point	Base/ blade	Impact		Concave/ convex	Corner	13+	13+	2	6	Tip missing form breakage during use; one tang broken by trampling; finished product; scallorn-like, A.D. 1100 to 1500.
140	9	Chalcedony	Projectile point	Medial	Impact	Snap, cultural	Unknown	Unknown	9+	10	3	5+	Nondiagnostic portion of a projectile point; tip broken in use, base broken by trampling.
143	1	White chert	Middle-stage biface	Medial	Impact	Crenated	Sinuous	Unknown	23+	21	6	44+	Tip broken in use, base fractured by fire; does not appear finished.
258	1	Tan chert	Middle-stage biface	Blade/ tip		Impact	Convex	Unknown	34+	23	11	51	Tip and blade, tip broken in manufacture; extreme step termination of facial flakes resulted in production failure.
95	1	Mottled chert	Late-stage biface	Medial	Impact	Crenated	Convex/ concave	Unknown	9+	10+	3	4+	Probable projectile point fragment; burned with surface discoloration and cracks; distal break from use; proximal after discard.
49	1	Quartzitic sandstone	Late-stage biface	Medial	Unknown	Lateral	Convex	Unknown	29+	27+	4	30+	Proximal break from manufacture, although the blade looks finished; tip may have been broken in manufacture.
125	35	Andesite	Late-stage biface	Medial	Impact	Snap	Convex	Unknown	15+	14+	4	9+	Numerous hinged dorsal scars and irregular flaking pattern; tip and base may have been broken in use.
193	1	Obsidian	Projectile point	Missing tang			Convex	Side	18	11	3	6+	Small side-notched point; missing tang may have been broken by trampling; tip is crushed, but not broken; one lateral edge is ground flat; one basal edge is very rounded. This point was used before being discarded.
125	1	Chert	Late stage biface	Whole			Straight	None	32	21	5	30	Slightly skewed, triangular biface; made from a core flake; fine grained material, possibly nonlocal; no use-wear.
196	11	Obsidian	Late-stage biface	Base	Hinge		Unknown	Unknown	8+	16+	3+	5+	Expanding base; possible Late Archaic Period.

Field Sample	Artifact	Material	Morphology	Portion	Distal Break	Proximal Break	Blade Shape	Notching	Length (mm)	Width (mm)	Thickness (mm)	Width (mm)	Comments
239	1	Chert	Early-stage biface	Proximal	Impact		Ovoid	None	38+	38	15	344+	Heavy hinge and step fracture scars on both surfaces; no use-wear; probably broken in manufacture.
239	2	Chert	Late-stage biface	Distal		Perverse	Convex	None	25+	15	8	20+	Tip and blade from a narrow biface; curved in plan view; probably made from a core flake; no use-wear.
317	1	Obsidian	Late-stage biface	Medial	Perverse	Snap	Unknown	Unknown	14+	22+	5	18+	Both sides heavily scratched, probably from trampling; no use-wear.
200	10	Chert	Drill	Medial	Impact	Snap	Straight	Unknown	17+	12	8	18+	Drill fragment; fractured at a material inclusion; probably broken in manufacture; no use-wear.
93	1	Andesite	Middle-stage biface	Medial	Impact	Impact	Sinuous	Unknown	29+	26	9	103+	Multiple hinge scar terminations on both faces; very irregular flaking pattern; probable production failure; no use-wear.
46	1	Chert	Late-stage biface	Tip and blade		Perverse	Convex	Unknown	28+	18	5	25+	Base is missing; heat treated; no use-wear; probable production failure.
148	6	Chalcedony	Biface	Indeterminate	Snap		Unknown	Unknown	11	8	6	6	Small fragment, unknown portion or function; may be part of a drill.
89	1	Obsidian	Late-stage biface	Base		Impact	Unknown	Unknown	14	9	6	8	Patinated basal fragment; may be base from Middle Archaic point.
TP1		Chalcedony	Middle-stage biface	Whole			Convex	Unnotched	86	58	18	822	Whole, middle-stage biface; numerous hinge fractures on both faces may have hampered flake removal; could be bifacial core or unfinished tool.
129	15	Chalcedony	Biface	Medial	Snap	Perverse	Unknown	Unknown	36	22	6	81	Medial fragment of an undifferentiated biface; appears to be broken in manufacture; potlid from heat treatment on one surface.
129	16	Chert	Early-stage biface	Whole			Sinous	None	59	48	26	725	Thick, bifacial core or early-stage biface. Numerous hinge and step fracture scars on both faces may have hampered flake removal.
125	43	Chalcedony	Biface, undiff.	Lateral			Sinuous	Unknown	38	12	7	28	Lateral fragment of a biface; hinge fracture indicates that flake was removed from edge by excessive force; edge removal may have forced discard of the biface, although the other portion was not recovered.
236	37	Chert	Biface, undiff.	Tang	Snap		Unknown	Unknown	12	8	4	3	Tang from a nearly complete projectile point; appears the break is from cultural disturbance, possibly trampling. Material is waxy and may have been heat-treated.
98	10	Chalcedony	Biface, undiff.	Unknown	Snap		Unknown	Unknown	13	15	2	7	Small indeterminate fragment; heated after it was deposited; natural fractures from trampling or plowing.
194	20	Chert	Early-stage biface	Distal		Impact	Sinuous	Unknown	36	30	13	162	Small early-stage biface fragment; impact fracture suggests that it broke in manufacture.

Field Sample	Artifact	Material	Morphology	Portion	Distal Break	Proximal Break	Blade Shape	Notching	Length (mm)	Width (mm)	Thickness (mm)	Width (mm)	Comments
40	2	Obsidian	Projectile point	Base	Snap		Unknown	Unknown	10+	18	6	9+	Slightly expanding, concave base; abrasion on the basal margins; probably Middle Archaic period.

Table 16. Ground stone artifact descriptions and locations

FS	Provenience	Artifact Type	Material and Form	Texture	Manufacture	Wear	Weight (g)	Comments
20	18n/0e, Level 1	undiff-erentiated mano	quartzitic sandstone, rounded cobble	fine-grained	none	grinding	52	small fragment
34	13n/4e, Level 1	one-hand mano	sandstone, rounded cobble	medium-grained	pecked	grinding	117	metal adhesions from plow
49	19n/1e, Level 3	one-hand mano	sandstone, flattened cobble	large-grained	none	grinding	655	encrusted with caliche
37	13n/4e, Level 4	one-hand mano	sandstone, rounded cobble	fine-grained	pecked	grinding	981	metal adhesions
96	16n/1e, Level 4	one-hand mano	sandstone, rounded cobble	fine-grained	pecked	grinding	752	fire-reddened
320	17n/20e. Level 6	ground slab fragment	Sandstone, very thin slab	medium-grained	pecked	grinding	215	fire-reddened
247	17n/2e, Level 7	one-hand mano	sandstone, rounded cobble	fine-grained	none	grinding	507	
302	17n/4e, Level 7	one-hand mano	sandstone, round cobble	fine-grained	none	grinding	355	

Table 17. Pottery type attributes and descriptions, LA 84318

FS	Provenience	Description
130	13N/1E, Level 1	Indeterminate red slipped body sherd with angular quartz temper
47	19N/1E, Level 1	Brown paste jar body, quartz/mica, similar to Petaca Micaceous
226	18N/5E, Level 2	Black paste jar body, quartz/mica, similar to Petaca Micaceous
91	15N/1E, Level 2	Same as above
211	15N/3E, Level 3	Gray paste, bowl sherd, fine sherd/quartz temper, Kwahe'e Black-on-white
69	12N/4E, Level 3	Black paste, jar body, quartz/mica, similar to Petaca Micaceous
54	14N/4E, Level 3	Black paste, 2 jar bodies, quartz/mica, similar to Petaca Micaceous
85	11N/4E, Level 3	Black paste, 5 jar bodies, quartz/mica, similar to Petaca Micaceous
		Gray paste, 1 jar body, crystal tuff, Powhoge Polychrome
125	17N/4E, Level 3	Brown paste, 1 jar body, rounded sand/mica, plain utility ware
86	11N/4E, Level 4	Black paste, 2 jar bodies, quartz/mica, similar to Petaca Micaceous
		Buff paste, 1 bowl rim, crystal tuff, Powhoge Polychrome
55	14N/4E, Level 4	Black paste, 1 jar body, quartz/mica, similar to Petaca Micaceous
266	17N/5E, Level 4	Black paste, 1 jar body, quartz/mica, similar to Petaca Micaceous
70	12N/4E, Level 4	Gray paste, 1 jar body, mica temper, Taos/Picuris micaceous
72	12N/4E, Level 5	Black paste, 1 jar body, quartz/mica, similar to Petaca Micaceous

Table 18. Historic artifacts by level, category, and function

Level	0	1	2	3	4	5	6	7	8	Row Total
					Unassignable					
Unidentifiable		26 10.0 31.7	17 38.6 20.7	20 33.9 24.4	2 6.9 2.4	11 47.8 13.4	5 71.4 6.1	1 12.5 1.2		82 18.6
Bottle	8 100.0 3.1	195 74.7 76.2	18 40.9 7.0	22 37.3 8.6	9 31.0 3.5		2 28.6 .8	1 12.5 .4	1 100.0 .4	256 58.2
Can		24 9.2 32.4	7 15.9 9.5	17 28.8 23.0	14 48.3 18.9	12 52.2 16.2				74 16.8
Plug/Cap		9 3.4 90.0			1 3.4 10.0					10 2.3
Cap:roll on		1 .4 50.0			1 3.4 50.0					2 .5
Jar		1 .4 100.0								1 .2
Strap/Strip		4 1.5 100.0								4 .9
Knob			1 2.3 100.0							1 .2
Wire			1 2.3 14.3					6 75.0 85.7		7 1.6
Can with handle					2 6.9 100.0					2 .5
Plate/metal		1 .4 100.0								1 .2
Column Total	8 1.8	261 59.3	44 10.0	59 13.4	29 6.6	23 5.2	7 1.6	8 1.8	1 .2	440 100.0
					Economy/Production					
Jacket/bullet		1 100.0 100.0								1 100.0
Column Total		1 100.0								1 100.0
					Food					
Condensed milk		3 100.0 100.0								3 75.0

Level	0	1	2	3	4	5	6	7	8	Row Total
Peach pit			1 100.0 100.0							1 25.0
Column Total		3 75.0	1 25.0							4 100.0
Indulgences										
Crowncap		1 2.1 100.0								1 1.2
Bottle		2 4.3 50.0				2 40.0 50.0				4 4.9
Soda bottle		9 19.1 100.0								9 11.1
Bottle		1 2.1 100.0								1 1.2
Bottle		26 55.3 45.6	17 100.0 29.8	6 100.0 10.5	4 100.0 7.0	3 60.0 5.3	1 100.0 1.8			57 70.4
Flask	1 100.0 100.0									1 1.2
Snuff can lid		8 17.0 100.0								8 9.9
Column Total	1 1.2	47 58.0	17 21.0	6 7.4	4 4.9	5 6.2	1 1.2			81 100.0
Domestic										
Unidentifiable		1 9.1 100.0								1 3.4
Unidentifiable		6 54.5 35.3	5 100.0 29.4	3 50.0 17.6	1 50.0 5.9	2 100.0 11.8				17 58.6
Bowl		2 18.2 100.0								2 6.9
Cup				1 16.7 100.0						1 3.4
Indeterminate vessel				2 33.3 66.7	1 50.0 33.3					3 10.3
Tumbler		1 9.1 100.0								1 3.4
Screw-on jar cap		1 9.1 100.0								1 3.4

Level	0	1	2	3	4	5	6	7	8	Row Total
Zinc screw-on lid								3 100.0		3 10.3
Column Total		11 37.9	5 17.2	6 20.7	2 6.9	2 6.9		3 10.3		29 100.0
Furnishings										
Kerosene lamp /Hurricane		10 100.0 76.9	2 100.0 15.4	1 100.0 7.7						13 100.0
Column Total		10 76.9	2 15.4	1 7.7						13 100.0
Construction/Maintenance										
Nail: box		1 10.0 14.3			5 45.5 71.4	1 50.0 14.3				7 22.6
Nail: frame					2 18.2 100.0					2 6.5
Window glass		5 50.0 38.5	4 66.7 30.8	1 50.0 7.7	2 18.2 15.4	1 50.0 7.7				13 41.9
Baling wire		3 30.0 42.9	1 16.7 14.3	1 50.0 14.3	2 18.2 28.6					7 22.6
Barb wire		1 10.0 50.0	1 16.7 50.0							2 6.5
Column Total		10 32.3 100.0	6 19.4	2 6.5	11 35.5	2 6.5				31 100.0
Personal Effects										
Indeterminate buckle		1 100.0 100.0								1 33.3
Unindentifiable			1 100.0 50.0	1 100.0 50.0						2 66.7
Column Total		1 33.0	1 33.0	1 33.0						3 100.0
Grand Total	9 1.5	344 57.1	76 12.6	75 12.5	46 7.6	32 5.3	8 1.3	11 1.8	1 0.2	602 100.0

Table 19. Summary of faunal remains by taxonomic frequency, LA 84318

Taxon	N	%
Mammal (indeterminate)	13	18.6
Mammal		
Small mammal	1	1.4
Medium mammal	26	37.1
Large mammal	26	37.1
Erethizon dorsatum Porcupine	1	1.4
Odocoileus sp. Deer	1	1.4
Bos taurus Cattle	1	1.4
Shell (Indeterminate)	1	1.4
Total	70	100.0

Table 20. Thermal alteration on faunal remains from LA 84318

Taxon	Thermal Alteration								Total	
	Light (tan/brown)		Graded (light to heavy)		Heavy (black)		Graded (heavy to calcined)		N	%
	N	%	N	%	N	%	N	%		
Indeterminate mammal			3	15.0					3	8.6
Indeterminate			3	15.0			1	33.3	4	11.4
Indeterminate small mammal			1	5.0					1	2.9
Medium mammal	1	20.0	13	65.0	4	57.1	1	33.3	19	54.3
Indeterminate large mammal	4	80.0			3	42.9	1	33.3	8	22.9
Total	5	100.0	20	100.0	7	100.0	3	100.0	35	100.0

Table 21. Cutmarks on faunal remains from LA 84318

Taxon/Element	Processing				Total	
	Split, long		Split, transversal		N	%
	N	%	N	%		
Indeterminate mammal fragment	8	14.3	.	.	8	14.0
Indeterminate small mammal fragment	1	1.8	.	.	1	1.8
Indeterminate medium mammal fragment	25	44.6	.	.	25	43.9
Indeterminate large mammal	20	35.7	.	.	20	35.1
Indeterminate tooth	2	3.6	.	.	2	3.5
Odocoileus sp., humerus	.	.	1	100.0	1	1.8
Total	56	100.0	1	100.0	57	100.0

Table 22. Faunal remains by stratigraphic association, LA 84318

Taxon/Element	Stratum				Total	
	1		2			
	NISP	%	NISP	%	NISP	%
Indeterminate mammal	3	12.5	1	2.2	4	5.7
Indeterminate fragment	3	12.5	5	10.9	8	11.4
Long bone fragment	.	.	1	2.2	1	1.4
Indeterminate small mammal fragment	.	.	1	2.2	1	1.4
Indeterminate medium mammal fragment	11	45.8	14	30.4	25	35.7
Tibia	.	.	1	2.2	1	1.4
Large mammal	3	12.5	18	39.1	21	30.0
Indeterminate tooth	3	12.5	2	4.3	5	7.1
Erethizon dorsatum Humerus	1	4.2	.	.	1	1.4
Odocoileus sp. Humerus	.	.	1	2.2	1	1.4
Bos taurus Astrag/tibial tarsus	.	.	1	2.2	1	1.4
Shell Shell, general	.	.	1	2.2	1	1.4
Total	24	100.0	46	100.0	70	100.0

Table 23. Obsidian hydration rim measurements and dates, LA 84318

Lab No.	Provenience	Artifact Type	Source	Rim Width (um)	SD	Date	SD
DL-93-443	FS 141-1 19N/4E, Level 3 (21-30)	Core Flake	OR	3.00	0.05	A.D. 905	71
DL-93-442	FS 181-10 17N/3E, Level 3 (21-30)	Biface Flake	MEDIO	3.72	0.06	A.D. 82	102
DL-93-452	FS 217 19N/2E, Level 4 (31-40)	Biface Midsection	MEDIO	3.32 1.97	0.07 0.07	A.D. 462 A.D. 1426	91 54
DL-93-451	FS 309-11 19N/20E, Level 4 (31-40)	Biface Flake	POLVA	3.23	0.06	A.D. 872	67
DL-93-446	FS 239-7 14N/3E, Level 4 (31-40)	Core Flake	OR	3.01	0.05	A.D. 898	71
DL-93-445	FS 231-7 18N/2E, Level 4 (31-40)	Core Flake	MEDIO	4.44 2.41	0.05 0.05	710 B.C. A.D. 1166	121 66
DL-93-447	FS 260-6 16N/2E, Level 5 (41-50)	Core Flake	OR	5.04 3.92	0.05 0.08	1000 B.C. A.D. 165	118 92
DL-93-444	FS 206-1 16N/3E, Level 5 (41-50)	Core Flake	MEDIO	3.58	0.08	A.D. 220	98
DL-93-448	FS 261-1 16N/3E, Level 6 (51-60)	Angular Debris	OR	3.04	0.08	A.D. 877	72
DL-93-453	FS 57-1 14N/4E, Level 6 (51-60)	Core Flake	UNKNOWN	2.69	0.05		
DL-93-441	FS 73-1 12N/4E, Level 6 (51-60)	Biface Flake	MEDIO	4.94	0.05	1343 B.C.	135
DL-93-454	FS 40-2 (CUT #1) 13N/4E, Level 7 (61-70)	Middle Archaic Point Base (2 cuts, see diagram)	OR	3.82	0.08	A.D. 255	90
DL-93-455	FS 40-2 (CUT #2)		OR	3.84	0.08	A.D. 237	89
DL-93-450	FS 305-1 17N/5E, Level 7 (61-70)	Biface Flake	OR	10.68 9.11 7.80	0.08 0.06 0.05	11298 B.C. 7689 B.C. 5116 B.C.	249 213 182
DL-93-440	FS 321-3 17N/20E, Level 7 (61-70)	Core Flake	OR	3.37 2.34	0.05 0.07	A.D. 631 A.D. 1314	79 56
DL-93-456	FS 284-1 (CUT #1) 15N/2E, Level 8 (71-80)	Core Flake (2 cuts, see diagram)	MEDIO	7.28 5.25	0.07 0.05	5202 B.C. 1770 B.C.	198 143
DL-93-457	FS 284-1 (CUT #2)		MEDIO	3.77	0.05	A.D. 31	103
DL-93-449	FS 285-1 15N/2E, Level 9 (81-90)	Biface Flake	MEDIO	6.06 4.30	0.04 0.07	3005 B.C. 545 B.C.	165 117

* Standard deviations represent precision error. An instrument error of 0.01 um was used to calculate the uncertainty factor for the sample.

Table 24. Core reduction, tool production, cores, and tools by level

Count Expected Row Pct Adjusted Residual	Core Reduction	Tool Production	Cores	Tools	Row Total
Levels 1 through 4	2379 2407.8 79.9% -2.5	554 528.1 18.6% 2.4	14 17.3 .5% -1.5	30 23.8 1.0% 2.4	2977 72.2%
Levels 5 through 9	954 925.2 83.4% 2.5	177 202.9 15.5% -2.4	10 6.7 .9% 1.5	3 9.2 .3% -2.4	1144 27.8%
Column Total	3333 80.9%	731 17.7%	24 .6%	33 .8%	4121 100.0%