Testing and Data Recovery at Five Archaeological Sites along US 285 between Mileposts 372 and 379.32, South of Tres Piedras, Taos County, New Mexico

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Administrative Summary

Between July 13 and September 25, 2009, testing and data recovery were performed on five archaeological sites along US 285, south of Tres Piedras in Carson National Forest, USDA Forest Service. The project was performed by the Office of Archaeological Studies, New Mexico Department of Cultural Affairs, at the request of Mr. Blake Roxlau and Ms. Janet McVickar of the New Mexico Department of Transportation in preparation for shoulder widening, installation of new culverts, and right-of-way fence replacement between Mileposts 372 and 379.32 of US 285.

The initial field survey was conducted by archaeologists from Parametrix Inc. of Albuquerque, New Mexico, which resulted in the documentation of 21 archaeological sites within a 33.5 m (110 ft) corridor extending on both sides of US 285 (Parrish et al. 2008). NMDOT determined that five of these sites were within the area of potential effect (APE): LA 74879 (AR-03-02-06-637), LA 144951 (AR-03-02-06-1236), LA 160196 (AR-03-02-06-1307), LA 160201 (AR-03-02-06-1312), and LA 160203 (AR-03-02-06-1314). A testing and data recovery plan was developed for these sites (Moore 2009).

Archaeological work was conducted in two continuous phases. First, the sites were tested to evaluate the nature of archaeological deposits. Then, data recovery focused on answering the research questions in the data recovery plan and investigating other aspects of New Mexico's past. All work was limited to the APE. Specific treatments for archaeological resources followed standard OAS field methods discussed in the data recovery plan.

Based on testing and data recovery results, LA 144951 appears ineligible for the *National Register of Historic Places*. LA 74879, LA 160196, LA 160201, and LA 160203 may be eligible under Criterion D. However, their archaeological potential within the APE has been exhausted by testing and data recovery. OAS recommends that archaeological clearance be granted for highway improvements.

All archaeological work performed by the OAS complies with provisions set forth in Section 106 of the National Historic Preservation Act (36 CFR 800), Executive Order 11593 (1972), the National Environmental Policy Act of 1969 (91 Stat 852), and the State Cultural Properties Act of 1969 (as amended).

MNM Project No. 41.900 (Tres Piedras Testing and Data Recovery)
NMDOT Project No. NH-285-9(14)371, CN 3820
NMCRIS Activity No. 115511
Carson National Forest Special Use Permit No. FS-2700-32 (05/06)

Dedication

This report is dedicated to José Quezeda, backhoe operator and friend, of Ruiz Excavation Services. José passed away from a heart attack in Tres Piedras, New Mexico, September 26, 2009, no more than a day after completing archaeological investigations along US 285. He will be remembered for his contributions to archaeological projects at the Santa Fe Community Convention Center, Capitol Parking Structure, Santa Fe Judicial Complex, Gonzales Elementary School, and Tres Piedras, and sorely missed by all the loved ones he left behind.

Contents

Figures

1. Introduction

Between July 13 and September 25, 2009, testing and data recovery were performed on five archaeological sites along US 285, south of Tres Piedras, in Carson National Forest, USDA Forest Service (Fig. 1.1 and Appendix 2). The project was performed by the Office of Archaeological Studies (OAS), New Mexico Department of Cultural Affairs, at the request of Mr. Blake Roxlau and Ms. Janet McVickar of the New Mexico Department of Transportation (NMDOT) in preparation for shoulder widening, installation of new culverts, and right-of-way fence replacement between Mileposts 372 and 379.32 of US 285.

Archaeological sites directly affected by these road modification activities are LA 74879 (AR-03-02-06-637), LA 144951 (AR-03-02-06-1236), LA 160196 (AR-03-02-06-1307), LA 160201 (AR-03-02-06-1312), and LA 160203 (AR-03-02-06-1314), representing a range of prehistoric and historic components. To treat these resources, a testing and data recovery plan was developed (Moore 2009).

The archaeological field crew consisted of Isaiah Coan, Gerald Lujan, Susan Moga, and Virginia Prihoda. Matthew Barbour and Charles Hannaford were project directors; Donald Tatum was the geomorphologist; and Robert Dello-Russo, deputy director of OAS, was the principal investigator. A total of 134 person days were expended on fieldwork activities.

No properties listed in the *National Register of Historic Places* (October 15, 1966) or the *State Register of Cultural Properties* were within the project area. However, Parrish et al. (2008) had previously determined that all of the archaeological sites within the area of potential effect (LA 74879, LA 144951, LA 160196, LA 160201, and LA 160203) were eligible for the *National Register* under Criterion D, which states, "Properties are eligible for the National Register if they have yielded, or are likely to yield, information important to prehistory or history" (*National Register Bulletin* 1991:21).

All archaeological work performed by the OAS complies with provisions set forth in Section 106 of the National Historic Preservation Act (36 CFR 800), Executive Order 11593 (1972), the National Environmental Policy Act of 1969 (91 Stat 852), and the State Cultural Properties Act of 1969 (as amended).

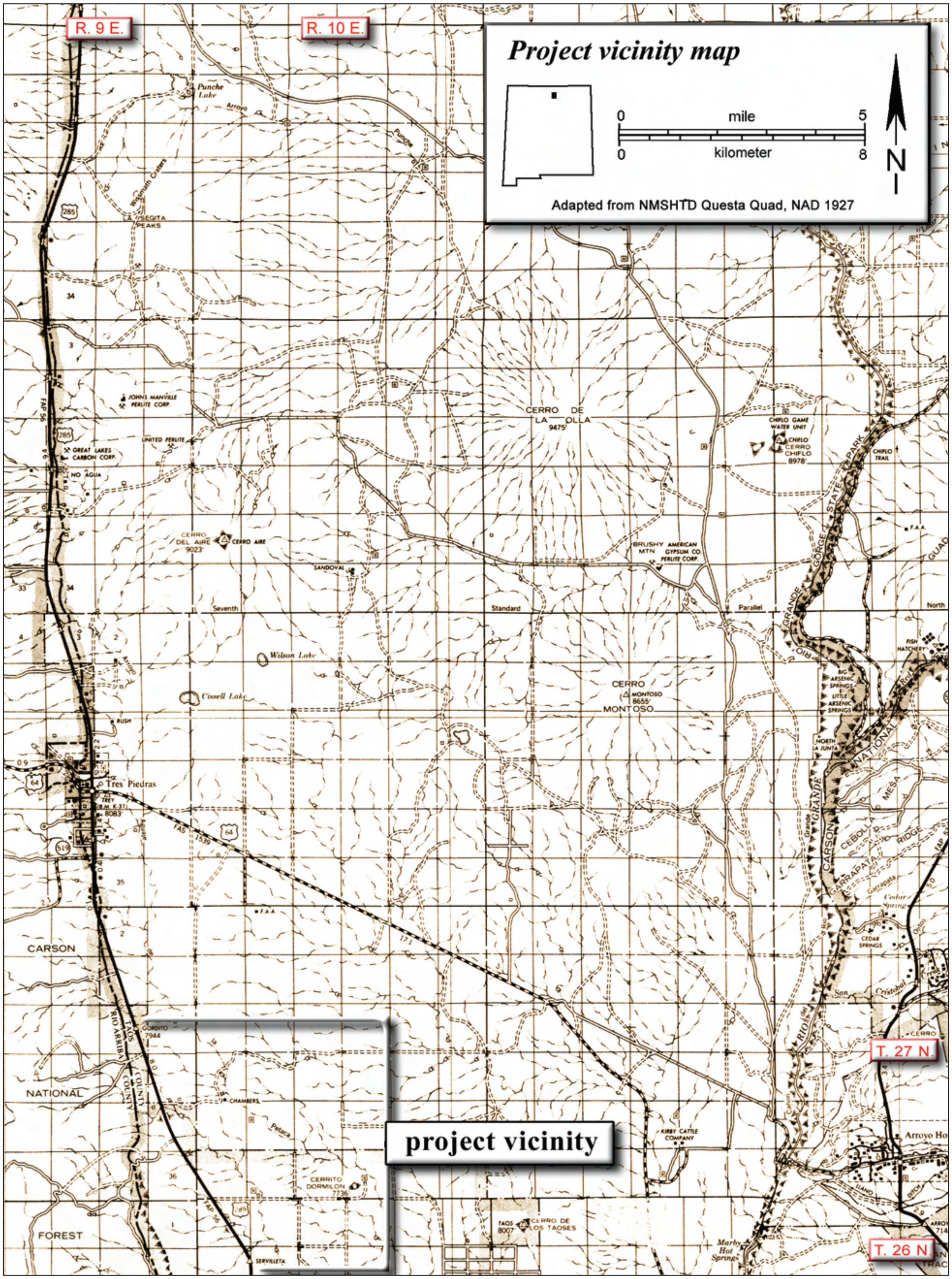

Figure 1.1. Project vicinity map.

2. *Environmental Setting*

Donald E. Tatum

The project area is in north-central New Mexico. The town of Tres Piedras is four miles to the north. Taos Junction is 10 miles to the south (USGS 7.5′ Servilleta Plaza quadrangle, 1961; and Petaca Peak quadrangle, 1963). The area is encompassed by the south-central highlands of the Southern Rocky Mountain Physiographic Province (McNab and Avers 1996), which extends from south-central Colorado into north-central New Mexico and includes the Taos Plateau of the Rio Grande Depression. The Rio Grande Depression is a block faulted, structural sub-basin of the Rio Grande Rift. It is bordered to the east by the Sangre de Cristo Mountains and to the west by the San Juan Uplift. The project area is along the western edge of the Taos Plateau and at the western margin of the Rio Grande drainage. It is bordered to the west by the Comanche Rim, a north-trending, near-vertical basalt parapet that is 400 to 600 ft high.

Most of the Rio Grande Depression is covered by thick basalt flows originating from nearby volcanic vents. The basalt outcrops intermittently cross the project area. Several volcanoes are in the vicinity of the project area, including San Antonio Peak, Cerro Mojino, Cerro de los Taoses, Cerro Dormilón, Tres Orejas, Cerro de la Olla, and Cerro Montoso (USGS 7.5′ Servilleta Plaza, Tres Orejas, Tres Piedras Northeast, and Cerro de los Taos quadrangles). The deposition of sedimentary and volcanic materials in the Rio Grande Depression resulted in the formation of the Santa Fe Group. Volcanic eruptions contributed deposits of volcanic ash, breccia, and tuff. Sedimentary materials contributed clay and alluvial/colluvial deposits comprised of many different types of igneous, metamorphic, and sedimentary gravels. The basalt flows, volcanoes, and deposits of the Santa Fe Group constitute an important part of the cultural landscape and identity of all human inhabitants of the area. They provide raw materials for lithic tool production and trade, and landmarks for travel. All of these materials and landforms are culturally significant (Boyer 1995).

Great Basin scrub and juniper savanna comprise the vegetation communities of the project area (Fig. 2.1). Great Basin scrub is the dominant plant community in the corridor, and the juniper savanna community interdigitates with it as a secondary biome. The Great Basin biome is believed to have originated 5,000 to 12,000 years ago, beginning in the early Holocene. In New Mexico the biome receives 50 to 60 percent of its precipitation during the fall, winter, and early spring months. Shrubs thriving in the Great Basin scrub community of the project area include big sagebrush (*Artemisia tridentata*), four-wing saltbush (*Atriplex canescens*), rabbitbrush (*Chrysothamnus* sp.), winterfat (*Ceratoides lanata*), and broom snakeweed (*Gutierrezia microcephala*). The Great Basin scrub vegetative community has sparse grass cover; blue grama (*Bouteloua gracilis*) grows in the project area. One-seed juniper (*Juniperus monosperma*) is the dominant tree species in the juniper savanna biome. In the project area, Colorado piñon (*Pinus edulis*) occurs with the juniper. Big sagebrush is also a member of the juniper savanna community.

Soils along the entire project corridor are classified as Montecito loam, a well-drained alluvial soil composed of alluvial, colluvial, and eolian materials derived from the weathering of basalt, shale, and sandstone. These soils occupy the gently sloping, east-facing terraces that comprise the terrain of the project corridor. The Montecito loam occupies an extensive area of northern New Mexico. It supports rangeland, timber, and wildlife habitat (USDA-NRCS 2009).

Many species of wildlife are at home in the juniper savanna and Great Basin scrub habitat of the corridor. Vertebrate mammal species living in the area include the grey fox (*Urocyon cinereoargenteus*), kit fox (*Vulpes macrotis*), coyote (*Canis latrans*), desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), golden-mantled ground squirrel (*Spermophilus lateralis*), rock squirrel (*Spermophilus variegatus*), southern red-backed vole (*Clethrionomys gapperi*), elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*), cougar (*Felix concolor*), and black bear (*Ursus americanus*). Bird species include wild turkey (*Meleagris gallopavo*), American crow (*Corvus*

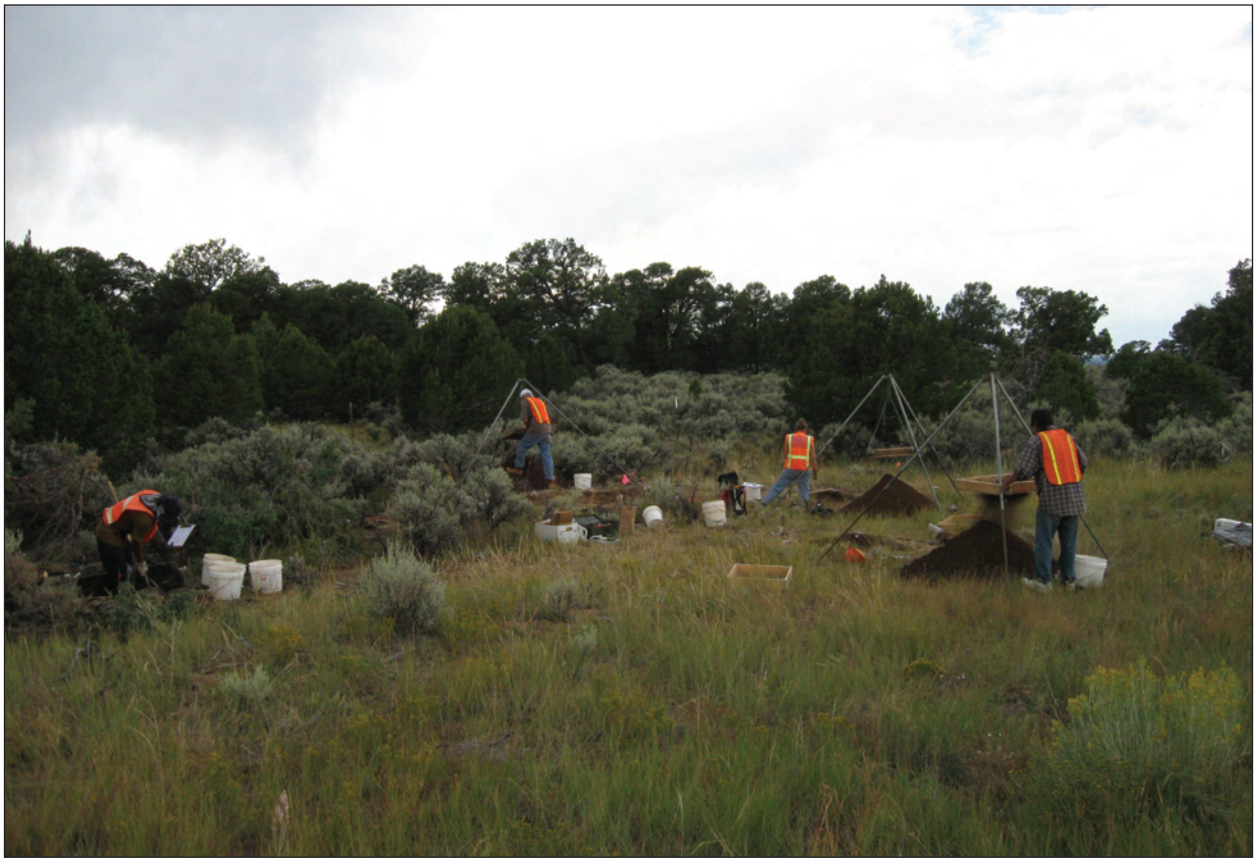

Figure 2.1. Environment of the project area.

brachyrhynchus), common raven (*Corvus corax*), black-capped chickadee (*Poecile atricapilla*), white-crowned sparrow (*Zonotrichia leucophrys*), juniper titmouse (*Baeolophus ridgwayi),* barred owl *(Strix varia),* spotted owl *(Strix occidentalis),* turkey vulture (*Cathartes aura*), golden eagle *(Aquila chrysaetos*), and Cooper's hawk (*Accipiter cooperii*). Butterfly species include painted lady *(Vanessa cardui*) and silvery checkerspot *(Chlosyne nycteis*) (NatureServe 2009; eNature 2000).

The elevation at the southern end of the project corridor is 7,400 feet; at the north end, the altitude is about 8,000 feet. The 600-foot difference in elevation is enough to cause significant variation in rainfall and temperature. For the region, annual precipitation ranges between 14 inches in lower areas to 20 inches at higher elevations. About 40 percent of annual precipitation falls between July and September, arriving with the summer monsoon thunderstorms. The higher-elevation parts of the corridor are considered cold desert, receiving 50 to 60 percent of annual precipitation during winter snowfall. The coldest months during the years 1905 to 1975 were December through March, with mean temperatures ranging from 22.6 to 32.3 degrees F. The area averages about 90 frost-free days per year, making for a short growing season (Bennett 1986; Gabin and Lesperance 1977; Tuan et al. 1973).

3. *Cultural Overview*

Virginia Prihoda and Matthew J. Barbour

(adapted from Lent 1991; Barbour 2009; Grebner 2009; Moore 2009)

Paleoindian Period (9,200–5,500 BC)

The Paleoindian period contains three broad temporal divisions from the Southern Plains: Clovis (9,200–8,900 BC), Folsom (8900–8000 BC), and Late Paleoindian (8000–7000 BC) (Holliday 1997:225). These dates are probably similar for northern New Mexico, though there, the end of the period is usually given as 5500 BC (Irwin-Williams 1973). The Late Paleoindian division consists of several complexes distinguished by variations in projectile points and tools. All Paleoindians were once classified as big-game hunters. However, recently some have argued that Clovis people were unspecialized hunter-gatherers, while Folsom and other later groups specialized in hunting migratory big game, especially bison (Stuart and Gauthier 1981). While some Paleoindians left New Mexico with the migratory big game, those that remained undoubtedly subsisted by hunting and gathering. The Early Archaic inhabitants of the region probably evolved out of this population. Evidence of Paleoindian occupation is rare in the Northern Rio Grande and typically consists of diagnostic projectile points and butchering tools found on the modern ground surface or in deflated settings (Acklen et al. 1990).

Several Paleoindian sites have been identified in the Tres Piedras and Chama–Ojo Caliente area. However, the majority of Paleoindian artifacts have been isolated finds (Anschuetz et al. 1985). In addition, isolated Paleoindian finds have also been found in the Taos area, but no definite sites have been recorded. The isolated finds include a late Paleoindian point from a Pueblo site near the mouth of the Rio Fernando de Taos Canyon (Alexander 1964). The bases of Belen or Plainview points were found on sites with later components at Guadalupe Mountain (Seaman 1983) and south of Carson (Boyer 1985a).

Archaic Period (5,500 BC–AD 600)

The term *Archaic* applies to the broad spectrum of foraging cultures that evolved out of the Paleoindian big-game-hunting populations in North America (5500 BC–600 AD). Southwest Archaic populations reflect adaptations to local topography and food sources, and like their Paleoindian predecessors, they are identified by distinctive projectile point types, scrapers, knives, and grinding stones. No pottery was manufactured during this period. Midway in the Archaic adaptation (ca. 3900 BP or 1900 BC), maize was added to the diet but seemingly with little initial disruption to the established subsistence strategy.

At an early date, archaeologists realized that the Archaic occupation of Northern New Mexico was distinct from that of its southern neighbor, the Cochise Tradition (Bryan and Toulouse 1943). The extent of this distinction covered north-central New Mexico, the Rio Grande Valley, the San Juan Basin, southern Colorado, and southeastern Utah. Cynthia Irwin-Williams (1973, 1979) defined the northern Archaic as the Oshara Tradition and tentatively formalized its developmental sequence. Today this sequence is represented by six distinguishable phases within the Northern Rio Grande: the Jay phase, the Bajada phase, the San Jose phase, the Armijo phase, the En Medio phase, and the Trujillo phase.

The Jay phase (5500 to 4800 BC) corresponds with a period of decreased effective moisture occurring at the end of the Pleistocene. Sites typically consist of small base camps occupied by microbands for short periods of time (Moore 1980; Vierra 1980). The population was probably grouped into small, mobile nuclear or extended families. The majority of the sites are in sheet sand deposits on cliff tops, in canyon-head complexes, near playas, and on low-sloping mesas. The Jay phase tool kit includes relatively large projectile points with small shoulders, usually made from basalt, and well-made bifacial knives and side scrapers.

The Bajada phase (4800 to 3000 BC) saw decreased effective moisture and a slightly higher population than in the Jay phase. Settlement patterns remained similar: sites occur in sheet sand deposits atop cliffs, in canyon-head complexes, on low-sloping mesas, and near ephemeral ponds. Site types include base camps, foraging camps (usually within 8 km, or 5 mi, of base camps), quarries, and isolated hunting sites occupied for short periods of time (Moore 1980; Vierra 1980). Family units appear to be unchanged from the Jay phase. Projectile points are slightly shouldered and basally thinned with basal indentations. Other flaked stone materials include bifacial knives, large chopping tools, and flaked side scrapers.

The San Jose phase (3000 to 1800 BC) saw an increase in effective moisture, dune stabilization, and soil formation. The phase is characterized by a settlement pattern similar to the Bajada phase, but with an increase in the number of sites. Temporary structures had large earth ovens filled with fire-cracked rock. Sites are larger and more common than those of earlier phases, which may signify population growth. Site types include base camps, specialized hunting sites, foraging sites, and quarries. The San Jose tool kit includes projectile points similar to those of the Bajada phase but with a shorter stem, concave base or basal notch, and marked serration. Shallow basin grinding slabs and simple cobble manos indicate an increase in the utilization of grass seeds and nuts (possibly pointing to population increase). Also included in the tool kit are side scrapers, heavy choppers, and an occasional biface. Maize first appears in the Middle Rio Grande at the close of this phase.

The Armijo phase (1800 to 800 BC) is characterized by a settlement pattern similar to those of preceding phases. Macroband base camps appeared by the late Armijo phase, providing the first evidence for a seasonal pattern of population aggregation and dispersal. There is also evidence of limited cultivation of domesticates near canyon-head springs. Effective moisture fluctuates during this period. However, the amount of rainfall is generally less than in the San Jose phase. Site types generally follow those of the preceding phases. The tool kit includes projectile points similar to the San Jose style, but with the addition of short, expanding stems with side or corner notching and concave or straight bases. Other artifacts include small bifaces, flake scrapers, drills, choppers, simple manos, and grinding slabs.

The En Medio phase (800 BC to 400 AD) is usually viewed as a local manifestation of Basketmaker II. The phase represents the transition from a nomadic hunter-gatherer pattern to a seasonally sedentary lifestyle combining hunting and gathering with some reliance on corn horticulture. The population seems to have increased during this period, and a strongly seasonal pattern of population aggregation and dispersal seem likely. It is characterized by a full range of residential aggregations, shallow pit structures and above-ground architecture, extended base camps, and logistical and special-use sites. While some corn was grown during this period, the population mostly ate foods obtained by hunting and gathering. An increase in maize cultivation seems to coincide with a massive drought (245 to 500 AD), leading to a more developed ground stone technology. A distinctive, palmate-shaped, corner-notched projectile point occurs along with other flaked stone artifacts.

The Trujillo phase (400 to 600 AD) is the local manifestation of early Basketmaker III within the Northern Rio Grande and is viewed as a transition from the Archaic to Ancestral Puebloan periods. Typically, Basketmaker III is associated with increased length of site occupation, reliance on agriculture, and use of ground stone. Large, triangular side-notched projectile points are found in association with a broad array of flaked stone artifacts. Smaller, triangular corner-notched points are assumed to represent the introduction of the bow and arrow.

The Northern Rio Grande Archaic's relationship to the Oshara Tradition is unclear. Projectile points from the Northern Rio Grande illustrated by Renaud (1942, 1946) resemble those of the Oshara Tradition. However, similar point styles occur over a vast region stretching from California to Texas and northern Mexico to the southern Great Plains, so stylistic resemblance is not always evidence of cultural affinity. Subsequent developments in the Northern Rio Grande suggest that the inhabitants differed culturally from those in northwest New Mexico. These differences likely had their basis in the makeup of the Archaic peoples who originally settled those regions. The similarity in projectile point styles does not imply that the Northern Rio Grande and Four Corner areas were occupied by groups of common cultural or even linguistic origin.

Archaic sites in the Northern Rio Grande run the gamut of phases, though Early and Middle Archaic sites are rare (Moore 2001). Several recent studies have been conducted in the Santa Fe area, where Early and Middle Archaic sites represent brief occupations with an emphasis on hunting, and associated materials are typically mixed with later deposits. Late Archaic sites are more common, and this is consistent with regional data (Acklen et al. 1997). This increase may be due to changes in settlement and subsistence patterns associated with the adoption of corn horticulture during the Armijo phase, including seasonal aggregation, longer periods of occupation, and use of a broader range of environmental settings. However, evidence for corn horticulture is mainly found in sites south of La Bajada, and its effect north of that area is questionable. The paucity of Early and Middle Archaic sites compared to those from the Late Archaic may be due to visibility. Earlier sites, along with most of those from the Paleoindian period, may be deeply buried in areas of soil accumulation, especially in river valleys and along streams tributaries.

Judging from excavations in the Santa Fe area, Late Archaic sites range from small foraging camps to larger base camps containing shallow structures (Post 1996, 2000; Schmader 1994). En Medio sites are the most common type of Archaic site in the Santa Fe area, and are widely distributed across riverine, piedmont, foothill, and montane settings (Acklen et al. 1997; Kennedy 1998; Lang 1993; Miller and Wendorf 1955; Post 1996, 1997, 2000; Scheick 1991; Schmader 1994; Viklund 1988). This phase is represented by isolated occurrences, limited-activity sites, and base camps containing structures and formal features. Increased diversity in settlement pattern and site types suggest an increase in population, longer site occupations or reduced time between occupations, and truncated foraging range.

In contrast, Middle and Late Archaic sites are common in the lower Rio Chama basin, but most of the Archaic sites investigated in the Chama–Ojo Caliente area are in and around Abiquiu Reservoir. Schaafsma (1976, 1978) completed the first systematic research on the Archaic occupation of that area, identifying 56 Archaic sites of which 13 were excavated. Most were simple scatters of chipped stone artifacts or isolated projectile points, but five were large base camps situated at the mouths of major drainages on the Rio Chama terrace. More recent work in this area was completed by Bertram et al. (1989), who examined Archaic components at eight sites. A Late Archaic occupation was suggested for four sites, all of which were reused at later times (Bertram 1989; Schutt et al. 1989). Middle to Late Archaic occupations were noted at five sites, and in some instances multiple occupations were suggested by diagnostic projectile points or obsidian hydration dates from varying time periods (Bertram 1989; Schutt et al. 1989).

Vierra's work (1998:144) on the Chama Alcove site, a cave near Abiquiu, is also relevant. Plant and animal resources in the cave suggest Archaic populations seasonally occupied the site during the late fall and winter. It has been suggested that the San Luis Valley and other places in southern Colorado were the summer residences of Archaic populations wintering along the Rio Chama (Martorano et al. 1999).

Anschuetz et al. (1985) note interesting regional variations in the distribution of Archaic sites in the lower Chama Valley. Tools associated with intensive food processing are rare or absent at sites near Abiquiu but common at sites near the confluence of the Rio Chama and Rio Grande. This occurrence demonstrates a differential pattern of seasonal use and exploitation from one end of the valley to the other. In addition to hunting and gathering, the Chama Valley also served as a source of Pedernal chert between the Paleoindian and Protohistoric periods. Though this material is abundant in Rio Chama and Rio Grande gravels, Pedernal chert was also quarried around Cerro Pedernal and Abiquiu Reservoir. Quarries in Cerro Pedernal were originally termed the Los Encinos Culture (Bryan 1939).

Pueblo Period (AD 600–1600)

Early Developmental Period (AD 600 to 900)

Early Developmental–period sites dating before AD 800 are rare in the Northern Rio Grande. While sites dating between AD 800 and 900 are more numerous, they are typically represented by limited-activity areas and small settlements (Wendorf and Reed 1955). Most reported Early Developmental–period sites are south of La Bajada Mesa in the Albuquerque area, with a few at higher elevations along the Tesuque, Nambe, and Santa Fe drainages (Lang 1995; McNutt 1969;

Peckham 1984; Skinner et al. 1980; Wendorf and Reed 1955). Sites of this period tend to be on low terraces overlooking tributaries of the Rio Grande. These locations may have chosen for their immediate access to water, farmland, and ecozones containing a wide range of resources (Anschuetz et al. 1997; Cordell 1978).

Late Developmental Period (AD 900 to 1200)

Sites from this period occur in the Taos Valley south to the Albuquerque area. The Late Developmental period is marked by an increase in the number and size of residential sites, occupation of a wider range of settings, and the appearance of Kwahe'e Black-on-white pottery (Cordell 1978; Mera 1935; Peckham 1984; Wendorf and Reed 1955; Wetherington 1968). Residential sites expanded into higher elevations along the Rio Grande, Tesuque, Nambe, and Santa Fe drainages during this period (Allen 1972; Ellis 1975; McNutt 1969; Peckham 1984; Skinner et al. 1980; Wendorf and Reed 1955). These sites commonly occur on low terraces above the tributaries of these rivers where water, farmland, and a variety of foraging resources were available (Anschuetz et al. 1997; Cordell 1978). The first residential sites were established in the Taos District toward the middle of the Late Developmental period (Boyer 1997).

Coalition Period (AD 1200 to 1325)

The Coalition period is marked by three major changes: an increase in the number and size of residential sites; use of surface rooms as domiciles rather than storage, which was common earlier; and a shift from mineral to vegetal paint on pottery (Cordell 1978; Peckham 1984; Stuart and Gauthier 1981; Wendorf and Reed 1955). Areas like the Pajarito Plateau, which had previously seen limited use, became a focus of occupation during this period, while areas like the Tewa Basin, which saw heavy Late Developmental–period use, may have lost some of their population by AD 1200. The apparent increase in number and size of residential sites suggests population increase and an extension of a village-level community organization that began during the Late Developmental period. However, this apparent population increase may be a function of where archaeologists have mainly looked and points to the amount of work that has been done on the Pajarito Plateau as opposed to elsewhere in the Northern Rio Grande.

While Coalition-period residence at higher elevations provided reliable water and arable land, innovative methods were needed to produce crops in these cooler settings, including intensification of water management and farming practices (Anschuetz 1998; Anschuetz et al. 1997; Maxwell and Anschuetz 1992; Moore 1981). In the Santa Fe area, several large villages were established early in the Coalition period. The Coalition period also saw the founding of farming villages on the Pajarito Plateau (Crown et al. 1996; Orcutt 1991), in the Galisteo Basin (Lang 1977), in the Chama–Ojo Caliente region, and in the Taos District.

Classic Period (AD 1325 to 1600)

Classic-period villages shifted away from the uplands and began to concentrate along the Rio Grande, Chama, Ojo Caliente, and Santa Cruz Rivers, and the Galisteo Basin. Large villages containing multiple plazas and roomblocks were built, and regional population peaked. The process of large-village formation and movement to areas along major streams continued through the Classic period. Eventually, population levels began to decline on the Pajarito Plateau, and most villages were abandoned by 1550, though some continued to be occupied until 1550–1600 (Orcutt 1991). This population moved into the Rio Grande Valley, and Keres villages claimed affinity with sites on the southern Pajarito Plateau, and Tewa villages with sites on the northern Pajarito Plateau. Taos and Picuris Pueblos were both occupied during the Classic period in the Taos District, and their occupation continues to the present.

Historic Period (1539 to Present)

Protohistoric Period (1539 to 1598)

Based on information gathered by Alvar Nuñez Cabeza de Vaca and his companions following the disastrous Narváez expedition to Florida (Covey 1990), the Spanish became interested in lands north of New Spain in the 1530s. Fray Marcos de Niza was dispatched into the Southwest on a scouting mission in 1539, and a major expedition under Francisco Vázquez de Coronado explored the region from 1540 to 1542. No other formal contact between New Spain and New Mexico occurred until 1581, when Father Agustín Rodríguez and Captain Francisco Sánchez Chamuscado led an expedition to the Pueblo country (Hammond and Rey 1966). Antonio de Espejo led the next expedition into New Mexico in 1582, ostensibly to rescue two priests left by Rodríguez-Chamuscado. Gaspar Castaño de Sosa attempted to illegally establish a colony in 1590–1591 but was arrested and returned to Mexico (Simmons 1979). A second illegal attempt at colonization was made by Francisco de Legua Bonilla and Antonio Gutiérrez de Humaña in 1593, but their party was nearly destroyed by conflict with Indians (Hammond and Rey 1953).

Early Spanish Colonial Period (1598 to 1680)

Juan de Oñate established the first legal colony in New Mexico at Ohkay Owingeh (San Juan Pueblo) in 1598. By 1600 the Spanish had moved into San Gabriel del Yunque, sister village to Ohkay Owingeh, which was abandoned for their use by its residents (Ellis 1987). The lack of wealth in the new province caused unrest among the Spaniards (Espinosa 1988:7), many of whom had accepted the challenge of establishing the colony because they thought they would become wealthy. This unrest, coupled with Oñate's neglect, eventually contributed to his loss of the governorship. Oñate was replaced as governor by Pedro de Peralta in 1607, who arrived in New Mexico in 1609 and moved the capital to Santa Fe around 1610 (Simmons 1979).

Oñate's colony was a disappointment because it failed to find the wealth that was expected to exist in New Mexico. Many wanted to abandon the colony, and the government was considering doing just that (Espinosa 1988:8–9). However, the baptism of 7,000 Pueblo Indians in 1608 and reports that many others were ready for conversion provided a viable alternative to an economically autonomous colony (Espinosa 1988:9). New Mexico was allowed to continue as a mission area, maintained by the royal treasury (Simmons 1979:181). This action made the Church very powerful and influential and caused considerable conflict with the secular government (Ellis 1971:30–31).

Rather than furnishing a permanent military garrison for New Mexico, a class of citizen-soldiers responsible for defense was created. As a reward for their services, the citizen-soldiers had the right to collect annual tribute from the pueblos. This was the *encomienda* system, and the number of *encomenderos* was set at 35 (Espinosa 1988). Pueblo Indians were also conscripted to serve as laborers on Spanish farms and haciendas, a system of forced labor called *repartimiento* (Simmons 1979:182).

Since New Mexico was viewed as a mission effort, the secular population received little official support. The Church was supplied by a notoriously inefficient caravan system (Moorhead 1958). While caravans were scheduled for every three years, as many as five or six years often passed between deliveries (Moorhead 1958; Scholes 1930). Irregular supply at fairly long intervals led to shortages of important goods and kept costs high. Supplies carried by the caravans were meant to support the missions, though at times goods were also carried north for profit (Hackett 1937; Moorhead 1958). Products shipped out of New Mexico by the missions provided income that enabled them to purchase luxury items that would not otherwise have been available (Ivey 1993:46). The seventeenth-century economy was based on a stable barter system rather than hard cash (Snow 1983:348). Goods like corn, wheat, piñon nuts, hides, and cotton blankets were used in lieu of coinage, but the accumulation and shipment to Mexico of these products by governors and mission personnel seem to have done little to stimulate the local economy (Snow 1983:348).

Trade with the Plains Apaches was also an important source of income. Slaves, an important commodity, were bought from the Apaches for resale to the mines of northern Mexico. The Spanish often supplemented this source by raiding Apache villages. These raids antagonized both the Apaches and their Pueblo trading partners, and caused the former to unleash a series of devastating raids during the 1660s and 1670s (Forbes 1960). Apache raiding, in turn, exacerbated Pueblo resentment of the Spanish, which sparked several rebellions that finally culminated in the general revolt of 1680.

Pueblo Revolt Period (1680 to 1693)

Religious intolerance, forced labor, extortion of tribute, and Apache raids led the Pueblo Indians to revolt in 1680, driving the Spaniards from New Mexico. The Pueblos resented attempts to supplant their traditional religion with Christianity, and numerous abuses of the encomienda and repartimiento systems fueled their unrest (Forbes 1960; Simmons 1979). These problems were exacerbated by nomadic Indian attacks, either in retaliation for Spanish slave raids or because of drought-induced famine (Ellis 1975:52; Sando 1979:195). The colonists who survived the revolt retreated to El Paso del Norte accompanied by the Pueblo Indians who remained loyal to them.

Attempts at reconquest were made by Antonio de Otermín in 1681 and Domingo Jironza Petriz de Cruzate in 1689, but both failed (Ellis 1975). In 1692 Don Diego de Vargas negotiated the Spanish return, exploiting factionalism that had again developed among the Pueblos (Ellis 1975:64; Simmons 1979:186). De Vargas returned to Santa Fe in 1693 and reestablished the colony. Hostilities continued until around 1700, but by the early years of the eighteenth century, the Spanish were firmly in control.

Late Spanish Colonial Period (1693 to 1821)

Failing in its attempt to throw off the Spanish yoke, the Pueblo Revolt caused many changes. The hated systems of tribute and forced labor were never reestablished, and the mission system was scaled back (Simmons 1979). The Crown continued to subsidize New Mexico, but it now served as a buffer against the enemies of New Spain and not as a mission field (Bannon 1963). New Mexico continually suffered from a shortage of supplies while shielding the rich inner provinces from Plains Indian raids and the ambitions of the French in Louisiana.

Relations between Spaniards and Pueblos became more cordial during this period, partly from changes in the structure of both groups. The Spanish population rapidly grew and surpassed that of the Pueblos by the late 1780s (Frank 1992). The increased number of Spaniards created demand for land in the Rio Grande core, and a drop in the Pueblo population caused a shortage of cheap labor. These trends resulted in a shift from large landholdings to smaller grants (Simmons 1969). Much of the earlier economic system was abandoned after the reconquest. The dominance of the church and its supply caravans ended. The military role of the encomenderos was filled by garrisons at Santa Fe and El Paso, and they were replaced as an economic force by families who prospered as merchants and/or by dealing sheep. However, most of the people who reoccupied New Mexico were poor farmers and herders.

By the middle of the eighteenth century considerable trade had developed between New Mexico and Chihuahua (Athearn 1974), mostly to the benefit of the Chihuahuan merchants, who sold goods at inflated prices. This was partly rectified by trading with local Indians for pottery, hides, and food, and some goods manufactured by cottage industries. Unfortunately, many products had no local substitutes.

Metal, especially iron, was in short supply in New Mexico (Simmons and Turley 1980). While imported iron was relatively cheap in Mexico, by the time it arrived in New Mexico it was quite costly. The availability of tools and weapons was limited by the lack of metal, and those that were produced were expensive. These deficits and the unreliable supply system hurt New Mexico in its role as a defensive buffer. Firearms and other weapons were scarce (Kinnaird 1958; Miller 1975; Reeve 1960; Thomas 1940), and only a few soldiers were stationed at the presidios, forcing local authorities to use militias and other auxiliary troops. Continued conflict with nomadic Indians caused many settlements to adopt a defensive posture, and even individual ranches were built like fortresses.

By the 1730s, attempts were being made to reestablish the sheep industry (Baxter 1987:26). One of the most important developments in this period was the *partido* system, in which the owners of large numbers of sheep apportioned parts of their flocks out to shepherds, receiving the original animals and a percentage of the lamb crop back at the end of the contract period. Economically, the partido system provided a way to spread the responsibility for the growing flocks and was a substitute for wage payments (Baxter 1987:29). It also was advantageous to merchants, who could accept sheep in exchange for goods (Baxter 1987:29). A few traders managed to manipulate this system and accumulated fortunes.

As Baxter (1987:44) notes, this group tended to control the economy and dominated political and religious affairs.

Between 1750 and 1785 New Mexico was hit by a defensive crisis caused by intense Plains Indian and Apache raids (Frank 1992, 2000). This conflict had a long history, with attacks by Utes and Comanches beginning as early as 1716 (Noyes 1993:11). In particular, the Comanches were bent upon driving the Apaches from the Plains and cutting their ties to French colonies in Louisiana, from whom they were indirectly receiving firearms (Noyes 1993). They also raided the Pueblo villages that were closely tied to the Apaches by trade. However, most of the Comanches' fury was directed against the Apaches until 1740.

By 1740 the Apaches were driven off the Plains, or south of the Canadian River, and the Comanches were at peace with the Spanish (Noyes 1993:24–25). The Jicarilla Apaches were among those driven from the Plains, and they reestablished themselves in the mountainous section of north-central New Mexico. Peace was short-lived, because by the mid-1740s the Comanches were mounting intensive raids against Pecos and Galisteo Pueblos, culminating in a series of devastating attacks against Spanish settlements east of the Rio Grande that caused the temporary abandonment of villages from Albuquerque north in the late 1740s (Carrillo 2004; Noyes 1993:25). While Governor Tomás Vélez Cachupín established short-lived periods of peace during his two terms of office (1749–1754 and 1762–1766), most of the years between 1750 and 1780 were marked by war with the Comanches (Noyes 1993).

Apaches also raided sporadically in the 1750s and 1760s; the latter period was aggravated by a severe drought in 1758 and 1759 (Frank 1992:39). Another drought in the 1770s led to a deterioration in the defensive abilities of the province and the resumption of Navajo raids (Frank 1992:39–40). By the late 1770s, southern New Mexico was under attack by numerous Apache groups (Thomas 1932:1). In alliance with the Navajos, Apaches even raided Zuni, Albuquerque, and other nearby settlements (Thomas 1932:1).

The Spanish government began rebuilding its power in New Spain during the early 1770s (Frank 1992, 2000). Solving the problem of Indian raids against the northern provinces was part of this process. The defenses of northern New Spain were reorganized beginning in 1772; by 1776 the Apaches were driven back by vigorous campaigning, and a line of presidios was established (Frank 1992; Thomas 1932). Despite these successes, Indian raids continued to be a major problem. With the reorganization of northern New Spain into the Provincias Internas in 1776 came the development of a plan that eventually proved successful. According to this plan, continual campaigns were to be undertaken against the Apaches by Nueva Vizcaya, Sonora, Coahuila, and New Mexico, and an alliance would be sought with the Comanches against the Apaches (Thomas 1932:18–19). Governor Juan Bautista de Anza concluded a peace treaty with the Comanches in 1786, which included an alliance against the Apaches (Noyes 1993:80; Thomas 1932:75). Later that year, Anza broke up an alliance between the Gila Apaches and Navajos, who had been plaguing settlements in southern Arizona, and concluded a peace with the Navajos (Thomas 1932:52). These events brought relative peace to New Mexico for the first time since midcentury (Frank 1992:95), and the alliances lasted until the end of Spanish rule, sparing New Mexicans the relentless attacks that had proceeded this period of relative peace.

Frank (1992:166) suggests that this period of peace with the Spanish population finally surpassing that of the Pueblos. At the same time the Spanish were expanding outward and moving into areas that had previously been closed because of the danger of Indian attack (Frank 1992:199). The improving economy undoubtedly fueled this drive, since new lands were required to graze the continually increasing flocks of sheep that were the basis of wealth.

Despite the improving economy, New Mexico still depended on shipments from the south for manufactured goods. Caravans on the Camino Real initially continued to follow an irregular schedule, but by the middle of the eighteenth century they operated almost annually (Connor and Skaggs 1977:21). Since the ox-drawn wagons of the seventeenth century were soon replaced by mule trains, fewer goods were probably carried by these caravans (Connor and Skaggs 1977:21). There were only a few New Mexican merchants, and they were exploited by suppliers in Chihuahua who kept them in almost perpetual debt. Isolation and dependence on Chihuahua caused goods sold in Santa Fe to cost several times their original value (Connor and Skaggs 1977:21–22; Frank 1992:237–239).

Mexican and Early American Territorial Periods: The Santa Fe Trail Era (1821 to 1846; 1846 to 1880)

Mexico gained it's independence from Spain in 1821, and New Mexico became part of the Mexican nation. This independence brought two major changes to New Mexico: a more lenient land grant policy and expansion of the trade network (Levine et al. 1985). Mexican land law and custom were applied to New Mexico, resulting in conflict over the ownership of Pueblo lands. Trade between Missouri and Santa Fe began soon after independence and dominated the economy for the next quarter century (Connor and Skaggs 1977). This trade brought ample and comparatively inexpensive goods to New Mexico and broke the Chihuahuan monopoly. Trade began in earnest after 1825, when the United States completed a survey of the Santa Fe Trail to mark its route and secure safe passage through Indian Territory. The trade network expanded in the volume of consumer goods transported until 1828, when Indian raids, a need for military escorts, and Mexican trade regulations caused notable fluctuations in the flow of commerce (Connor and Skaggs 1977; Pratt and Snow 1988:296).

Trade was again disrupted in the three years preceding the Mexican War of 1846–1847 because of a Mexican embargo against American goods (Connor and Skaggs 1977:203). New Mexico was annexed by the United States in 1846, and the following years were characterized by growing interest in commerce and a market economy that demanded more dependable means of transportation (Pratt and Snow 1988). Trade declined during the American Civil War, and a resurgence of trade following the end of the war sealed the doom of the Santa Fe Trail (Connor and Skaggs 1977:204). Railroad promoters saw the possibilities of overland routes to the West and began developing their finances and laying track. The railroad reached the Santa Fe area by 1880, effectively ending trade over the trail, since it was more cost-effective to ship goods by rail.

This period saw profound changes in the economic and ethnic structure of New Mexico. Many goods that were difficult to obtain during the Spanish periods were now available. Initially, there was not enough currency in New Mexico and Chihuahua to support the Santa Fe trade (Connor and Skaggs 1977). However, large amounts of raw materials were bartered in New Mexico and Chihuahua for American goods, and without the barter system it is doubtful that the Santa Fe trade would have survived (Connor and Skaggs 1977:200). In addition to material goods, the Santa Fe trade also brought people from the United States to New Mexico. Most remained only a short while, but some settled for good. This trickle became a flood when New Mexico was annexed by the United States.

Later American Territorial Period: The Railroad Era (1880 to 1912)

The arrival of the railroad significantly altered supply patterns throughout New Mexico. Rail lines reached Raton Pass by 1878, Las Vegas by 1879, and Lamy by early 1880 (Glover and McCall 1988). With this link to the eastern United States, New Mexico entered a period of economic growth and development (Pratt and Snow 1988:441) and finally ended New Mexico's position as a frontier territory, firmly tying the territory to the economy of the United States as a whole.

The narrow gauge branch of the Denver and Rio Grande Railroad called the "Chili Line" was in operation in New Mexico between 1880 and 1941 (Lent 1991). A section of the track was within the project area and ran parallel to US 285. Fleming (1941:24) provides the following description:

> In its heyday, the Chili Line moved out whole forests in lumber, thousands of tons of ore and concentrates, millions of sheep and many thousand cattle. Pinyon nuts gathered along the route by Indians and Spanish-American families went by carloads to the markets in the east. The name "Chili Line" was bestowed because there was often as much chili moved as people.

The Chili Line's northernmost terminus was at Antonito, Colorado. From there it crossed over the Colorado–New Mexico border with stops in Palmilla, Volcano (highest elevation), Skarda, No Agua, and Tres Piedras, where a water tower still stands. The line continued south with nine stops before reaching its southernmost terminus in Santa Fe.

In addition to increasing ease of supply, the railroad also made New Mexico more accessible to tourism, which soon became an important facet of the economy. Several industries boomed with the availability of rapid and inexpensive transport. As sheep production expanded, cattle ranching was also stimulated and soon dominated the ranching industry. Mining expanded, and coal became an important export.

New Mexico Statehood Period: The Automobile Era (1912–present)

New Mexico was delayed in its quest for statehood by eastern politicians who viewed the small population, the arid climate, and a Spanish-speaking majority as liabilities. Most New Mexicans favored statehood but named different conditions under which they would accept it. Some citizens feared statehood because of the potential for increased taxation, domination by one ethnic group over another, and the loss of federal jobs under a state-run system. These factors, combined with political factionalism in New Mexico, resulted in the struggle (Larson 1968:302–304).

On January 6, 1912, New Mexico was admitted into the Union as a state. After statehood the patterns that were established in the Territorial period continued. New Mexico experienced only slow population growth, with most settlement concentrated along the Rio Grande corridor and in the southeast around Roswell. More than half the state land had a population density of fewer than five people per square mile (Williams 1986:135), partly because of the large area that was part of the National Trust and could not be settled. The major industries continued to be mining, ranching, lumber, farming within the Pecos and Rio Grande irrigation districts, and tourism (Jenkins and Schroeder 1974:77).

However, beginning in the 1910s, auto trail organizations began to spring up throughout the United States, ushering in the era of the automobile. By the 1920s, major road construction was under way in the newly created state of New Mexico.

Portions of US 285 between MP 372 and 379.32 scheduled for shoulder-widening, installation of new culverts, and right-of-way fence replacement were originally designated NM 74 by he State Highway Commission in July 1926. At that time of designation it was described as follows:

> The road leading from Santa Fe from Santa Fe County, following the present highway to San Juan Pueblo in Rio Arriba County, thence crossing the bridge at San Juan Pueblo in Rio Arriba County to Chamita, and thence northerly over the mesa to Taos Junction and Tres Piedras to the Colorado State Line and the road leading from this road south of Taos Junction westerly to Ojo Caliente; a distance of approximately 84 miles. (Grebner 2009:1)

Before this time, an unnamed bladed road, dirt in some sections and oiled in others, connected Taos Junction and Tres Piedras. It is unclear from archival information when this road was first created. It may have served as a wagon trail in the late nineteenth century.

In May 1942, NM 74 from Española to Ojo Caliente and Tres Piedras was renamed US 285 (Grebner 2009:2). Prior to this time, US 285 departed from Española and proceeded northwest to Abiquiu, Tierra Amarilla, and Chama. In 1953 the State Highway Commission made US 285 part of the Blue Star Memorial Highway System (New Mexico State Transportation Commission 2009:85)—a tribute to the armed forces of the United States.

Native American Tribal Histories and Use of the Project Area

The project area is organized as Game Management Units 50 and 51 by the New Mexico Department of Game and Fish. Its juniper savanna and Great Basin scrub habitat, along the eastern flanks of the Tusas Mountains, are known today as elk and deer habitat and are popular with hunters. Not surprisingly, this area appears to have served a similar function for prehistoric and historic Native American groups, including Tewas of Ohkay Owingeh (formerly San Juan Pueblo), Santa Clara, San Ildefonso, and Nambe; Tiwas of Picuris and Taos; Jicarilla Apaches, Comanches, Navajos, and Southern Utes, among others.

High altitudes and snowfall prohibited agricultural use and permanent year-round habitation. However, these tribes are believed to have exploited the area at least seasonally for its concentrations of large game and possibly for gathering piñon nuts. Four tribes—the Jicarilla Apache Tribe, Ohkay Owingeh Pueblo, Taos Pueblo, and the Southern Ute Indian Tribe—are most likely to have used the project area at one time or another.

The Jicarilla Apache Tribe

The Southern Athabaskan tribes, including the Jicarilla Apaches, are believed to have migrated out of Canada to settle the American Southwest and Southern Plains between AD 1300 and 1500. Harrington (1940) divided the Southern Athabaskans into two groups: the western, or "Apachean"; and the plains, or "Lipanan." The Apachean Athabaskans included the Navajos and the White River, Chiricahua, and Mescalero Apaches (Harrington 1940:512-520). The Lipanan Athabaskans included the Jicarillas, Palomas, Cuartelejos, Kiowa-Apaches, Querechos, and Teyas (Harington 1940:510–512).

As noted by several archaeologists and historians (Broster and Ireland 1984:21), the attempt to relate modern Southern Athabaskan groups to the archaeological record and groups mentioned in early historical accounts is a difficult, if not impossible, task. The authors of early accounts often met various groups but were unaware of what others were calling these peoples and gave them different names. Because the Athabaskan groups were extremely mobile, the same people might have been found in different places at different times and, therefore, be called by yet another name (Broster and Ireland 1984:21).

The first encounter between Spaniards and the Plains Apaches was in 1540–42, when the Coronado expedition met nomads on the eastern plains of New Mexico near the Canadian River. Coronado's chronicler, Castañeda, described them as Querechos: "After seventeen days of travel, I came upon a ranchería of the Indians who were following these cattle [buffalo]. These natives are called Querechos" (Hammond and Rey 1940:186).

A Jicarilla informant indicated to Opler (1934–1935; 1971:310):

> There were only the two bands. The customs, dress, and speech of the Llanero and Ollero [bands] were the same. The western boundary of the Jicarilla was Tierra Amarilla and Chama. The Jicarilla didn't extend much farther west than Tierra Amarilla, not to Navaho country. The Utes were in between. The Jicarilla wouldn't go past the Chama and Tierra Amarilla in the mountains. They were afraid of the Navaho then. The Jicarilla went north as far as Alamosa; also as far as Salida and Pueblo, Colorado. The Arkansas River was the northern boundary. To the east they went as far as Sierra Grande, east of the Canadian River. They lived south of Ocate in those days but not many lived south of Mora. A Ute band called Kapodi was at Pagosa Springs and west of Tierra Amarilla. They [the Kapodis] were enemies of the Navaho. They were between the Navaho and the Jicarilla. Where the Jicarilla reservation is now used to be Ute country, the country of the Kapodi.

If this description is taken at face value, the Querechos described by Castañeda would indeed be Jicarilla Apaches. Furthermore, our current project area, south of Tres Piedras, would be well within their ancestral domain.

Girad (1986:11–14) notes that Apache groups from the Plains (Querechos, Vaqueros) regularly visited Taos Pueblo to trade at the time of initial Spanish contact, and there is some indication that the Apaches de Quinia had rancherías in the Taos Valley and points west by the early seventeenth century. Gunnerson and Gunnerson (1988) identify these Quinia Apaches as antecedents of the modern-day Jicarilla Apache Tribe. However, it is an oversimplification to conclude that the late nineteenth- and early twentieth-century Llanero and Ollero bands derived exclusively from the Quinia and Querecho Apache groups. Numerous Apache bands are mentioned in literature pertaining to the early historic period. It is likely that an aggregation of many of these bands formed the modern-day Jicarilla Apaches.

Much of this consolidation appears to have occurred as a result of Comanche attacks, which drove the ancestral Jicarilla bands from much of their eastern territory in the 1720s. At the encouragement of Fray Mirabel of Taos, many Apache bands came to reside in the mountain valleys between Taos and Picuris during this time (Girad 1988:11). Gunnerson and Gunnerson (1988:6) insist that the focus of this resettlement was in the Las Trampas area, now known as Ranchos de Taos, where a mission was established for the Apaches in 1727 or 1733.

By the mid-nineteenth century, the Ollero band (the name means "potter") was the westernmost of the two recognized Jicarilla Apache bands (Opler 1971:311). Influenced by Pueblo Indian traditions, this band adopted limited agriculture and micaceous pottery manufacture. It is this group which likely exploited the project area south of Tres Piedras. However, as previously noted, high altitudes and cold temperatures made the juniper savanna and Great Basin scrub habitat along the eastern flanks of the Tusas Mountains unsuitable for agriculture. It is likely that members of this band journeyed into the project area only seasonally to hunt large game and gather wild plant resources.

From the Spanish Colonial period (AD 1598–1821) to the Mexican period (AD 1821–1846), conditions for the Jicarilla Apache progressed from relatively good to relatively poor. This trend continued during the early American Territorial period (AD 1846-1912), when several armed conflicts between Anglo-American settlers and Jicarilla Apaches occurred. Perhaps the most notable of these conflicts was the White Massacre of 1849, a key event in the pop-history novel *Blood and Thunder* by Hampton Sides (2006). Jicarillas attacked the White party in October. The following month Captain William Grier, guided by famed mountain man Christopher "Kit" Carson, tried to rescue Mrs. White by attacking the same band of Jicarillas. Carson found Mrs. White dead, having been shot with an arrow only moments before. Clutched in her hands was a pulp fiction novel depicting Carson as "the hero of the west."

Violence with the Jicarilla Apache tribe waned after the establishment of a peace treaty between them and Governor Meriwether in September 1855 (Broster and Ireland 1984:43). Under the provisions of the Meriwether Treaty, the Jicarillas were to receive a reserve in Rio Arriba County on the Rio Chama up to the Continental Divide, near the Colorado state line. However, the treaty was never ratified. Instead the Jicarillas were forced to establish themselves around Indian agencies at Abiquiu, Taos, and Cimarron. Later they were forced onto the Mescalero Indian Reservation, a move that was protested by the Jicarillas and Mescaleros alike.

On February 11, 1887, President Grover Cleveland authorized the creation of the Jicarilla Apache Reservation. Interestingly, this new reservation was remarkably similar both in size and location to the initial reserve promised in 1855 (Broster and Ireland 1984:51). Despite problems in administration and health, the Jicarillas survived the late nineteenth century and became successful sheep and cattle raisers in the first half of the twentieth century. Since then, the fortuitous location of the Jicarillas' reservation over a portion of the San Juan Basin Oil and Natural Gas Field is providing a livelihood for the tribe. While reservation land does not extend into the current project area, members of the Jicarilla Apache Tribe still visit the area today for ceremonial and recreational purposes.

Ohkay Owingeh

The Tewa-speaking Native Americans of present day Ohkay Owingeh trace their ancestry to the San Luis Valley of Colorado. Many believe their ancestors once occupied the Mesa Verde area (Ortman 2010). However, this assertion is the subject of academic debate.

Ohkay Owingeh narrative traditions do refer to early migrations from Colorado down both sides of the Rio Grande, where at least ten villages were established (Ortiz 1979:280). This would have brought Tewa migrant groups through the current project area before settling to the south along the Rio Grande and Rio Chama, near Ojo Caliente, and in the foothills of the Jemez Mountains. Large-scale Tewa Pueblo sites in the Ojo Caliente drainage basin are closest to the current project area; they include Howiri, Hupobi, La Madera, Nute, Posi, and Ponsipa'akeri.

Santa Fe Black-on-white ceramics have been recovered during past archaeological projects in the vicinity of Ohkay Owingeh (Ellis 1989; Lent 1991). These artifacts suggest that the earliest occupation of the pueblo dates to between AD 1275 and 1350. This interval is consistent with the post–Mesa Verde abandonment period postulated by Ortiz (1979:280).

Limited excavations at archaeological sites in the Ojo Caliente and Lower Rio Chama areas suggest that many if not all of the northern Tewa Pueblos, with the exception of Ohkay Owingeh, were abandoned by the late sixteenth or early seventeenth century. Fallon and Wening (1987:146) argue that the relatively high altitudes of the area may have increased the Pueblos' susceptibility to even minimal environmental fluctuations. Moving south to a lower elevation would have the advantage of increasing the growing season, and the river was a reliable source of water. Hence Tewa populations may have been gradually abandoning the higher elevations and aggregating to the confluence of Rio Chama and Rio Grande, the current location of Ohkay Owingeh, since their exodus from the Colorado area in ca. AD 1300.

By the sixteenth century, Ohkay Owingeh had developed into a large trading center from which many, if not all, Tewa-produced glaze ware vessels originated. The first European contact with Ohkay Owingeh occurred in the late winter or early spring of 1541, when a foraging party of Coronado's men set up camp near the pueblo (Hammond and Rey 1940:244, 259). Hearing of Coronado's plundering to the south in Tiguex Province, the occupants of Ohkay Owingeh hastily abandoned the pueblo. The Spaniards then looted the deserted pueblo. The Castañeda account of the pueblo, recorded several months after his return to New Spain, suggested pots of silver were to be found at the pueblo. Given that Castañeda was not trained in metallurgy, it has been suggested that these pots were likely filled with mica or galena, a lead ore with small quantities of silver, used in pottery manufacture (Ramenofsky and Vaughn 2003). These accounts may have spurred additional interest in the pueblo by the Spaniards.

At the time of Spanish contact, Ohkay Owingeh consisted of six separate pueblos along the east and west banks of the Rio Grande and Rio Chama. The Spaniards grouped all six pueblos together as a "province," which they called Yuque-Yunque. The two largest communities were Ohkay Owingeh (Place of the Strong People) and Yungue Owingeh (Mockingbird Place), adjacent to one another on the east and west banks of the Rio Grande.

With the goals of territorial expansion and the accumulation of mineral wealth, the colonizing expedition of Don Juan de Oñate arrived at Ohkay Owingeh on July 11, 1598. Oñate and his captains were joined five weeks later by a cumbersome provision train of 83 oxcarts and wagons containing household goods, food and equipment, 7,000 head of horses, cattle, sheep, goats, pigs, and barnyard fowl. Spanish personnel consisted of 400 soldiers, various men and women colonists, Mexican Indian servants, and 10 friars (Hammond and Rey 1953:16).

Proclaiming Ohkay Owingeh the capital of the province, the Spaniards changed the name to San Juan de los Caballeros and immediately began to construct a church. During the winter of 1600–1601, the Spaniards moved across the river to Yungue Owingeh and renamed the 400-room pueblo San Gabriel. In 1606, a second church, dedicated to San Miguel, was under construction at the south end of the village. This was reputedly torn down and burned during the Pueblo Revolt of 1680 (Domínguez 1956).

The Spanish colony at San Gabriel did not last out the first decade of the seventeenth century. In 1601 Oñate took half of his force on an expedition out into the eastern plains. When he returned, he discovered that most of the troops and all but one of the friars had deserted and returned to Mexico (Ellis 1989:81–82). The remaining churchman, Fray Francisco de Zamora, wrote to his superior in Mexico:

> They took away from [the Tewas] by force the food they had gathered for many years . . . [and] robbed them of the scanty clothing they had to protect themselves. . . . This brought great discredit to our teaching, for they said that if we who are Christians caused so much harm and violence, why should they become Christians. (Hammond and Rey 1953:675)

The capital was moved to the current site of Santa Fe in 1610 by Oñate's successor, Don Pedro de Peralta (Ortiz 1979:281; Pearce 1965:146). Between 1610 and 1680, Ohkay Owingeh suffered under a series of Spanish ecclesiastical and civil administrations. During this period, many churches were built by the Franciscan friars using forced labor from the pueblos in an attempt to convert the Indians to Christianity. The churches were frequently built over the rubble of the pueblo's own ceremonial kivas. In 1676, 47 Pueblo religious leaders were jailed and flogged in Santa Fe for their adherence to traditional pueblo beliefs, among them Popé of Ohkay Owingeh, under whose leadership the Pueblo Revolt was subsequently planned and executed.

During the Pueblo Revolt, Santa Fe was besieged by an alliance of Pueblo forces, and on August 21, 1680, Governor Antonio de Otermín was forced to surrender and evacuate the city. As one of the largest Tewa villages, Ohkay Owingeh played a leading role in the revolt and contributed numerous warriors. At Ohkay Owingeh, the Franciscan priest Juan de Morales was slain. In all, 21 of the 33 Franciscan friars in the territory were killed, along with 400 Spaniards and numerous Pueblo Indians.

The Pueblos held firm to their independence for 12 years. However, taking advantage of inter-Pueblo factionalism, the definitive reconquest was initiated in 1692 by Don Diego de Vargas (Dozier 1970:61; Simmons 1979:186). In response, many Tewas of Ohkay Owingeh fled to a large mesa, sometimes referred to as Black Mesa, northwest of the pueblo. It is possible that Ojo Caliente was also reoccupied during this time. If so, Tewa Indians of Ohkay Owingeh may have visited the current project area often to obtain animal and plant resources.

By 1696 northern New Mexico had again come under the suzerainty of the Spanish Crown, and the land was divided into 140 land grants for Hispanic colonists. Ohkay Owingeh was accorded its own land grant (Simmons 1979:183), which was frequently encroached upon by Spanish colonists and, later, Anglo-American settlers. While the land grant ensured that the tribe had lands suitable for agricultural use, it also constrained members of the tribe to a small area within the Rio Grande Valley, and it is likely that members of Ohkay Owingeh ceased to use the current project area after that time.

The Southern Ute Indian Tribe

By at least the beginning of the protohistoric period (AD 1539), the Utes were the primary occupants of central and western Colorado, far northern New Mexico, and eastern Utah (Martorano 1999:139). However, questions about when and where they came from are still under discussion (Madsen and Rhode 1994). Ute sites are characterized by the presence of desert side-notched and cottonwood triangular projectile points, Shoshonean knives, wickiups, culturally peeled trees, and brown ware ceramics (Martorano 1999:139). Reed (1995:120–128) and Madsen and Rhode (1994:188) suggest that brown ware sherds may be the most reliable archaeological indicator of the Ute or other Numic group.

With the Southern Paiutes and the Chemehuevis, the Utes speak one of the two languages of the Southern Numic branch of Uto-Aztecan (Callaway et al. 1986:336). There were regional differences in Ute speech, but all dialects are mutually intelligible (Miller 1966:78; Smith 1974:23; Warner 1976:60). It is difficult to pin down how many Ute bands existed during protohistoric and historic times. As in the case of the Jicarilla Apaches, high mobility and inconsistencies in the names used to refer to them limit accurate measures. Callaway et al. (1986:339) distinguish 11 bands: 6 eastern bands (Muache, Capote, Weeminuche, Uncompahgre, Parusnuch, and Yampa) live mainly in the Colorado and New Mexico, and 5 western bands (Uintah, Timpangots, Pahvant, Sanpits, and Moanunts) in Utah.

The Southern Ute Indian Tribe consists of the Capote and Muache bands, who now reside on the Southern Ute reservation surrounding Ignacio, Colorado. Both bands used the project area at one time or another. However, the project area is within territory claimed specifically by the Capote band:

> [The Capote band] ranged east of the Continental Divide (and in the mid-nineteenth century west of the Divide near the Animas River), south of the Conejos River, and east of the Rio Grande to the west side of the Sangre de Cristo Mountains. They occupied areas in the San Luis Valley in Colorado and around what are now the towns of Chama and Tierra Amarilla, New Mexico. (Callaway et al. 1986:339)

The Muache band originally resided at the headwaters of the Delores River in southwestern Colorado (Callaway et al. 1986:336), but after adoption of the horse in the eighteenth century, they migrated to the area around Trinidad and roamed as far north as Denver and as far south as Santa Fe (Crum 1996:138). Callaway et al. (1986:336–337) hypothesize that both groups wintered in New Mexico and then retreated north to Colorado in the summer.

By the mid-eighteenth century, the Capote and Muache bands were embroiled in territorial disputes with Plains tribes such as the Arapahos, Sioux, Cheyennes, and Comanches, who had by this time acquired horses in sufficient quantities to begin exploiting Ute hunting territories. Other traditional enemies included the Navajos, Hopis, Shoshones, and Paiutes. The Shoshones and Paiutes were raided heavily by the Utes for women and children, whom they then sold to Spaniards in New Mexico for use as shepherds and household servants (Malouf 1966:11; Fowler 1971:181).

Much of land used by the Capote and Muache Ute bands overlapped with the territories of the Llanero and Ollero Jicarilla Apache bands. This led both to armed aggression and alliances between the two tribes against what were perceived as foreigners. For example, the Utes and Apaches apparently joined forces in 1779 to help Juan Bautista de Anza fight the Comanches, who had come into the area from the south (Meyers 1950:26). However, unlike the Jicarilla Apaches, the Utes did not adopt agriculture until the late nineteenth century. Instead, the bands focused exclusively on the exploitation of large-game and wild-plant resources. Piñon nuts are a prized food among the Utes (Smith 1974:47). It is possible that the Capotes and Muache bands used the current project area to collect this nut, which is often found in abundance along the juniper savanna and Great Basin scrub transitional zone.

The Jicarilla and Ute tribes continued to work as allies during and after the Mexican American War (1846–1848). On Christmas Day in 1854, the two tribes sacked Pueblo, Colorado (Utley 1967:146). This sparked a large punitive effort by the US Army, and as a result, several Ute bands signing a peace treaty in 1855. The treaty declared that all Utes were to leave New Mexico immediately and settle on a reserve encompassing 2,000 square miles north of the San Juan River and east of the Animas. However, this treaty was never ratified, and it was largely ignored by the Capote and Muache bands (Callaway et al. 1986:355).

It was not until 1868 that lands were set aside for the Utes of Colorado. This reservation initially covered roughly 15 million acres in western Colorado and the very northern portions of New Mexico, but it did not include the current project area, and it is unlikely that the Utes continued to use the eastern flanks of the Tusas Mountains. Unfortunately for them, mineral wealth was soon found on their newly appointed reservation, and the US government reneged on its obligations to preserve Ute territory. By 1934 the Southern Ute Tribe resided on only 40,600 acres. The Southern Ute Tribe reclaimed some of those lands (about 260,000 acres) in legal settlements with the US government in 1937 and 1938. Since the mid-twentieth century, oil and gas speculation on current Ute lands have made the tribe a financial success and provided jobs for many living on the reservation.

Taos Pueblo

The Northern Tiwa inhabitants of Taos Pueblo are thought to have migrated into the Taos Valley between AD 1050 and 1225, during the Valdez phase (Boyer 1997). Unlike the Tewas of Ohkay Owingeh, the Tiwas appear to have migrated into the area from the south, possibly the Albuquerque-Bernalillo region. However, Patricia Crown (1990) noted that only three Valdez-phase sites had yielded tree-ring or archaeomagnetic dates prior to 1100. Indeed, it seems more likely that at least large-scale, in situ population growth and settlement expansion did not occur in the Taos Valley until the twelfth and thirteenth centuries, during the last half of the Valdez phase, and continuing into the Pot Creek (AD 1225–1270) and Talpa (AD 1250–1350) phases.

The final phase in the prehistoric Puebloan occupation of the Taos Valley is unnamed but corresponds roughly to Dick's (1965) Vadito phase, dated AD 1375–1500 from excavations at Old Picuris. These years are similar to those given by Ellis and Brody (1964) for the occupation of Cornfield Taos. Several other sites in the Taos area apparently date to this phase on the basis of polychrome and glazed ceramics. Like those of the preceding phase, the sites are generally large, although some smaller sites are known. A site near Llano Quemado (LA 1892) may be ancestral to one kiva group at Taos Pueblo, while the very

El Pueblito site (LA 12741) in Arroyo Hondo is considered ancestral by another kiva, as is Pot Creek Pueblo. Cornfield Taos is evidently directly ancestral to Taos Pueblo. On the basis of ceramics, Ellis and Brody (1964) contend that Cornfield Taos was first occupied about A.D. 1300 or 1350 and abandoned about A.D. 1450, when Taos Pueblo was occupied.

Greiser et al. (1990:51-53) disagree. Citing Taos oral tradition and descriptions of the village as first seen by the Spaniards, particularly the Castañeda chronicle of the Coronado expedition (Winship 1990:137), they side with Bandelier (1890), Miller (1898), Harrington (1906), and Hodge (1912) in suggesting that Cornfield Taos was occupied until the time of the entradas in the late 1500s. They do not suggest a date when the Indians moved from Cornfield to Taos and admit that "unless more data could be collected from Cornfield Taos and the modem pueblo, the issue of residency at the time of contact will remain unsolved" (Greiser et al. 1990:53). Taos Pueblo is, of course, still occupied (Boyer 1986; Greiser et al. 1990).

It is unclear based on archaeological evidence if the Tiwa of Taos used the current project area prehistorically. Certainly the Rio Grande Gorge provided a formidable geographic barrier hindering access to the eastern slopes of the Tusas Mountains. Large-game and piñon resources could also be more easily obtained in the adjacent Taos Mountains, making the trek west across the gorge unnecessary. This changed with the increasing presence of Spanish culture in northern New Mexico (Cordell 1979:150-151).

First seen by the Spaniards in 1540, the Pueblo of Taos became the location of a Franciscan mission in the early 1600s, and a community of Spanish settlers began to grow in the valley. These settlers first lived just outside the pueblo walls for security but soon moved out into the valley (Jenkins 1966). These Spaniards brought to the area a different religion, social organization, and economy, including domestic animals and new plant foods.

A sheepherding industry, participated in by Spaniard and Natives alike, was quickly established around Taos. Sheep camps have been recorded in Taos and Moreno Valleys, in the Tusas Mountains west of the valley between Tres Piedras and Tierra Amarilla, and in the hills of Tres Ritos. Nineteenth-century camps tend to be represented by small scatters of artifacts, primarily steel food and tobacco cans, and occasionally by small clearings in brush or rock structures, which may have been pens (Boyer 1983, 1984, 1985b, 1988, 2002; Lentz and Barbour 2007). Since the herders used wagons or tents, habitation structures are not known (Boyer 2005).

Earlier seventeenth- and eighteenth-century sheep camps may exist, but they are difficult to identify based on archaeological remains and have not been documented near the current project area. Lentz and Barbour (2007:8) argue that New Mexico did not become a leader in the sheep industry until the introduction of the fine-wooled merino sheep and new wool markets that opened as a result of the expanding railroad system in the nineteenth century. It is possible that the Tusas Mountains were not used by sheepherders from Taos Pueblo until this time.

Sheepherding in New Mexico was based on the *partido* system, which consisted of a contract between an owner (*rico*) and a herdsman (*partidario*). Sheep were put out on shares to partidarios in flocks (or *partidas*) of several hundred to two or three thousand head, mostly ewes, and a few breeding rams. A partidario's contract with a rico essentially required him to give the rico a 10–20 percent share of each year's increase in the number of sheep and the same amount of wool. In addition, the original number of sheep had to be repaid to the owner. This traditional form of economy continued into the early twentieth century, when the disintegration of large land grants forced the sheepherding industry of northern New Mexico to be absorbed into the larger national economy (Carlson 1969:29).

4. Previous Archaeological Work

Susan M. Moga and Matthew J. Barbour

In anticipation of road modification activities, an initial field survey was conducted by archaeologists from Parametrix Inc. of Albuquerque (Parrish et al. 2008). Parametrix performed a 7.32 mi long pedestrian survey of a 33.5 m (110 ft) corridor extending from US 285 in both directions between Mileposts 372 and 379.32. This survey resulted in the documentation of 21 archaeological sites within the right-of-way, 19 of which were recommended for the *National Register of Historic Places* under Criterion D for their information potential (Parrish et al. 2008). Sites ranged in age from the Archaic period to the early Statehood period. However, the vast majority of sites were undiagnostic or Archaic-period flaked stone scatters. NMDOT determined that five of these sites were within the proposed area of potential effect (APE): LA 74879, LA 144951, LA 160196, LA 160201, and LA 160203.

A review of the New Mexico Cultural Resource Information System on July 13, 2008, revealed that 11 pedestrian surveys had been completed within a 500 m radius of the current project area prior to the 2008 Parametrix inventory (Table 4.1). Most of these surveys had been conducted by Carson National Forest in advance of fuelwood sales. These surveys resulted in the documentation of 296 sites, 197 of which are within the 500 m buffer. Table 4.2 presents a brief description of each site.

The majority of the sites were prehistoric, many of which were classified as unspecified prehistoric or Archaic-period lithic scatters (n [number] = 159). Polvadera obsidian and Pedernal chert biface flakes are common on these sites, suggesting movement of materials from the Jemez Mountains onto the Taos Plateau through trade or population movements. In addition, two lithic scatters were described as Paleoindian in origin (LA 138201 and LA 138211), and several Ancestral Puebloan component sites (n = 16) were identified within the project area. The identification of Ancestral Puebloan sites was based on the presence of black-on-white ceramics. Presumably, these sites were associated with Tewa occupation of the Ojo Caliente River Basin.

Historic components (n = 20) primarily dated to the American Territorial (AD 1846–1912) and Statehood (AD 1912+) periods. Artifacts assemblages from these sites were limited, but evidence of glass and aluminum beverage containers suggest much of the historic occupation of the area is tied to the arrival of the railroad and automobiles (Parrish et al. 2008:66–68). However, LA 69195 and LA 160196 appear to possess evidence of earlier Apache occupation, and other sites, such as LA 138209, which do not explicitly state Athabaskan affiliation, may also be representative of protohistoric and historic mobile groups.

Table 4.1. Previous cultural resource surveys within 500 m of the project area

NMCRIS No.	Agency	No. of Sites	Acres	Year
23278	Carson National Forest	49	135	1988
23465	Carson National Forest	45	145	1988
24240	Carson National Forest	63	218	1988
24248	Carson National Forest	40	370	1988
25464	NMDOT	1	78	1989
26096	Jicarilla Archaeological Services	33	120	1989
26175	Navajo Nation Archaeology Department	0	14	1984
29559	Jicarilla Archaeological Services	27	85	1989
44154	Carson National Forest	0	0.05	1993
45839	Archaeology Research and Technology	28	819	1996
53378	Carson National Forest	1	22	1996
111002	Parametrix	9	207	2008
Total		296	2213.05	

Table 4.2. Previously recorded sites within 500 m of the project corridor

LA No.	Site Type	Site Description	Cultural/Temporal Affiliation
12062	nonstructural/unknown	artifact scatter	9500 BC–AD 1998
12064	nonstructural/prehistoric	artifact scatter	Ancestral Puebloan, Basketmaker II–Pueblo I (AD 1–900)
69142	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69143	nonstructural/unknown	repr	9500 BC–AD 1994
69144	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69145	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69146	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69147	nonstructural/prehistoric	artifact scatter	Late Archaic (1800 BC–AD 500)
69148	nonstructural/prehistoric	artifact scatter	Late Archaic (1800 BC–AD 500)
69149	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69150	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69151	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69152	nonstructural/prehistoric	artifact scatter	Ancestral Puebloan, unspecified (AD 1–1600)
69153	nonstructural/prehistoric	artifact scatter	Ancestral Puebloan, unspecified (AD 1–1600)
69154	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
69155	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69184	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69185	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
69186	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
69187	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69188	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
69195	nonstructural/prehistoric and historic	artifact scatter	Ancestral Puebloan, unspecified (AD 1–1600); Apache, unspecified (AD 1539–1994)
69197	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69216	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69217	nonstructural/prehistoric	artifact scatter	Late Archaic (1800 BC–AD 500)
69218	nonstructural/prehistoric	artifact scatter	Ancestral Puebloan, unspecified (AD 1–1600)
69219	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69220	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69223	nonstructural/prehistoric	artifact scatter	Ancestral Puebloan, unspecified (AD 1–1600)
69231	nonstructural/prehistoric	artifact scatter	Late Archaic (1800 BC–AD 500)
69232	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69235	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69236	nonstructural/prehistoric	artifact scatter	Ancestral Puebloan, unspecified (AD 1–1600)
69236	nonstructural/prehistoric	artifact scatter	Ancestral Puebloan, unspecified (AD 1–1600)
69237	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69238	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69239	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69240	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69241	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
69242	nonstructural/prehistoric	artifact scatter	Ancestral Puebloan, unspecified (AD 1–1600)
69243	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (5500 BC–AD 200)
69244	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74875	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74876	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74877	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74878	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74880	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74882	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74884	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74885	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74886	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74887	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74888	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74889	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74890	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74891	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74892	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74893	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74895	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74896	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74897	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74898	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74899	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74903	structural/unknown	artifact scatter with hearth features	9500 BC–AD 1994
74904	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74905	structural/unknown	artifact scatter with hearth features	9500 BC–AD l994
74906	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74908	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74909	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74910	nonstructural/unknown	artifact scatter	9500 BC–AD l994
74912	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74914	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
74916	structural/prehistoric	artifact scatter with hearth feature	Archaic, unspecified (1800 BC–AD 200)
74918	nonstructural/unknown	artifact scatter	9500 BC–AD 1994

Table 4.2 (continued)

LA No.	Site Type	Site Description	Cultural/Temporal Affiliation
74919	nonstructural/prehistoric	artifact scatter	Ancestral Puebloan, unspecified (AD 1–1600)
74920	nonstructural/unknown	artifact scatter	9500 BC–AD l994
74923	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
74924	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74925	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74926	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74927	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
74928	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74928	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74930	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74933	nonstructural/prehistoric	artifact scatter	Ancestral Puebloan, unspecified (AD 1–1600)
74934	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74935	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74937	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
74938	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74939	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74940	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
74941	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
74942	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74943	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
74944	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74945	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74946	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
74947	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74948	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74949	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74950	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74951	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74952	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74953	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74954	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74955	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74956	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74957	structural/prehistoric	artifact scatter with hearth features	Archaic, unspecified (1800 BC–AD 200)
74958	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
74959	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74961	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74962	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74963	nonstructural/unknown	artifact scatter	9500 BC–AD l994
74964	nonstructural/unknown	artifact scatter	9500 BC–AD l994
74965	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74966	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74967	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74968	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74969	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74975	nonstructural/unknown	artifact scatter	9500 BC–AD l994
74976	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74977	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74980	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
74981	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
74984	structural/historic	Chili Line, Denver & Rio Grande Railroad (Ebudo Spur)	Anglo/Euroamerican, US Territorial, New Mexico Statehood, World War II (AD 1890–1935)
76581	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
76582	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
76584	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
76585	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
76586	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
76587	structural/unknown	artifact scatter with unknown feature	9500 BC–AD 1994
76588	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
76589	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
76590	historic/unknown	artifact scatter with petroglyph	9500 BC–AD 1994
76598	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
76599	nonstructural/prehistoric	artifact scatter	Late Archaic (1800 BC–AD 500)
76601	structural/unknown	artifact scatter	9500 BC–AD 1994
76602	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
76613	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
76614	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
76615	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
76616	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
76618	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
76619	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
76620	nonstructural/unknown	artifact scatter	9500 BC–AD 1994
76621	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
76623	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
76624	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)

Table 4.2 (continued)

LA No.	Site Type	Site Description	Cultural/Temporal Affiliation
76627	nonstructural/prehistoric	artifact scatter	Archaic, unspecified (1800 BC–AD 200)
104612	structural/historic	Chili Line, Denver & Rio Grande Railroad	Anglo/Euroamerican, US Territorial, New Mexico Statehood, World War II (AD 1887–1941)
104613	structural/prehistoric and historic	artifact scatter with possible burials	unspecified Prehistoric (pre–AD 1550), Anglo/Euroamerican, US Territorial, New Mexico Statehood, World War II (AD 1880–1945)
104614	structural/prehistoric and historic	artifact scatter with simple features	Ancestral Puebloan, Pueblo I–Pueblo IV (AD 700–1600), Anglo/Euroamerican, New Mexico Statehood, World War II–recent (AD 1912–1994)
104615	nonstructural/prehistoric and historic	artifact scatter	unspecified prehistoric (pre–AD 1550) and Anglo/Euroamerican
104617	nonstructural/prehistoric	artifact scatter	unspecified (pre–AD 1500)
104618	nonstructural/prehistoric	artifact scatter	unspecified (pre–AD 1500)
104619	nonstructural/prehistoric	artifact scatter	Late Archaic (1800 BC–AD 500)
104620	nonstructural/prehistoric	artifact scatter	unspecified (pre–AD 1500)
104622	nonstructural/prehistoric and historic	artifact scatter	Late Archaic (1880 BC–AD 500), Anglo/Euroamerican, unspecified (AD 1550–1994)
104623	structural/prehistoric	artifact scatter with hearth features	Late Archaic (1800 BC–AD 500)
104624	structural/prehistoric and historic	artifact scatter and features associated with railroad	Late Archaic (1800 BC–AD 500), Ancestral Puebloan, unspecified (AD 1–1600), Anglo/Euroamerican, US Territorial–recent (AD 1836–1994)
104625	structural/prehistoric and historic	artifact scatter with historic trash dump	Ancestral Puebloan, Basketmaker II (AD 1–500), Anglo/Euroamerican, US Territorial–recent (AD 1912–1945)
105358	structural/historic	dump	Anglo/Euroamerican. New Mexico Statehood, World War II (AD 1912–1945)
105369	nonstructural/prehistoric	artifact scatter	Late Archaic (1800 BC–AD 500)
105370	nonstructural/prehistoric	artifact scatter	Ancestral Puebloan, Basketmaker III–Pueblo IV (AD 500–1450)
105371	nonstructural/prehistoric	artifact scatter	unspecified (pre–AD 1500)
105372	structural/prehistoric	artifact scatter with simple features	Late Archaic (1800 BC–AD 500) and Anglo/Euroamerican (AD 1920–1949)
105373	structural/prehistoric	artifact scatter with grinding stick	Late Archaic (1800 BC–AD 500); Ancestral Puebloan, Basketmaker II–Pueblo IV (AD 1–1600)
105374	nonstructural/prehistoric	artifact scatter	Ancestral Puebloan, Pueblo IV (AD 1300–1600)
132674	structural/historic	Chili Line, Denver & Rio Grande Railroad, town of Servilleta	Anglo/Euroamerican, US Territorial, New Mexico Statehood, World War II (AD 1846–1945)
132675	structural/historic	artifact scatter with associated features	Anglo/Euroamerican, New Mexico Statehood, World War II (AD 1912–1945)
138196	nonstructural/prehistoric	artifact scatter	Ancestral Puebloan, Basketmaker III–Pueblo (AD 400–1200)
138200	structural/unknown	artifact scatter with hearth feature	9500 BC–AD 2002
138201	nonstructural/prehistoric	artifact scatter	Paleoindian, Clovis (9500 BC–9000 BC)
138202	structural/prehistoric	artifact scatter	Late Archaic (1000 BC–AD 400)
138203	structural/historic	house foundation	unspecified (AD 1550–2001)
138206	nonstructural/prehistoric	artifact scatter	unspecified (pre–AD 1550)
138207	nonstructural/prehistoric	artifact scatter	unspecified (pre–AD 1550)
138209	nonstructural/prehistoric and historic	artifact scatter	unspecified prehistoric (AD 1550) and unspecified historic (AD 1550–2001)
138210	nonstructural/prehistoric	artifact scatter	unspecified (AD 1550)
138211	nonstructural/prehistoric	artifact scatter	Paleoindian, Clovis (9500–9000 BC)
138212	nonstructural/prehistoric	artifact scatter	unspecified (pre–AD 1500)
138213	structural/historic	artifact scatter	Anglo/Euroamerican, New Mexico Statehood, World War II (AD 1890–1935)
138215	structural/historic	artifact scatter with house foundation	Anglo/Euroamerican, US Territorial–New Mexico Statehood, World War II (AD 1912–1945)
138456	structural/historic	artifact scatter with segment of historic trail	Anglo/Euroamerican, US Territorial, New Mexico Statehood, World War II (AD 1880–1940)
138457	structural/historic	trail segment	Anglo/Euroamerican, US Territorial, New Mexico Statehood, World War II (AD 1880–1940)
160196	structural/prehistoric and historic	artifact scatter with cobble features	Early Archaic (3500–1800 BC), post–Pueblo Revolt, US Territorial (1750–1900 AD), Hispanic, Anglo/Euroamerican, New Mexico Statehood, World War II (AD 1912–2008)
160197	nonstructural	artifact scatter	post–Pueblo Revolt, US Territorial (AD 1750–1900), New Mexico Statehood, World War II (AD l935–2008)
160198	nonstructural/prehistoric	artifact scatter	unspecified prehistoric (9500 BC–AD 1550), New Mexico Statehood–present (AD 1935–2008)
160199	nonstructural/prehistoric	artifact scatter	unspecific prehistoric (9500 BC–AD 1500)
160200	nonstructural/prehistoric	artifact scatter	unspecified prehistoric (pre–AD 1550)
160201	nonstructural/prehistoric and historic	prehistoric and historic artifact scatter	Late Archaic (1800–800 BC)
160202	nonstructural/unknown	artifact scatter	unspecified prehistoric (pre–AD 1550)
160203	nonstructural/prehistoric	artifact scatter	unspecified prehistoric (pre–AD 1550)
160204	nonstructural/prehistoric	artifact scatter	unspecified prehistoric (pre–AD 1550)
182208	nonstructural/prehistoric	artifact scatter	unspecified (pre–AD 1550)

5. Research Orientation and Questions

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Based on the survey findings by Parametrix Inc. (Parrish et al. 2008), the project area has the potential to contribute to our understanding of hunter-gatherer organizational and resource acquisition systems in northern New Mexico. However, only small portions of five sites are located inside the APE. This limits the types of questions which can be asked of the archaeological resources. This chapter discusses the research orientation of the project and questions asked in the data recovery plan (Moore 2009:23–28).

Research Orientation

Hunter-gatherers use different site types and occupational strategies to exploit the landscape through which they range. Two basic hunter-gatherer subsistence strategies have been identified, and each probably employed somewhat different types of sites. Binford (1980) defines these two basic hunter-gatherer organizational systems as one in which consumers move to resources (foragers), and a second in which resources are moved to consumers (collectors). Data presented by Irwin-Williams (1973) suggests that Early Archaic hunter-gatherers were foragers, with the transition to a collector organized system beginning during the Middle Archaic and becoming fully operational by the Late Archaic. However, neither this sequence nor a division into foragers and collectors are necessarily clear-cut in northern New Mexico. For example, Vierra (1990:63) feels that Southwestern Archaic hunter-gatherers "may have implemented a foraging strategy from spring to fall, and a collector organized strategy during the winter. That is, groups were residentially mobile from spring to fall, mapping onto exploitable resources; while during the winter they utilized stored foods making logistical trips to food caches and for hunting."

With this in mind, it is possible that there was a seasonal fluctuation between foraging and collecting, even during the Late Archaic. The structure of an Archaic site, the range of artifacts found there, and the activities reflected by the assemblage can provide information on the type of use-pattern represented. If sufficient data are available we may be able to distinguish between forager and collector functions for these sites.

Site types can be broken down into two basic categories, though there may be considerable variety within each category. Residential sites (base camps) tend to be the most common type of Archaic site found and represent locales where a band lived for a period ranging from a single night to a season. Resource-extractive locales are places where materials were gathered for transport to a base camp. Since most activities that extract resources from the environment leave few material remains behind, most resource-extractive locales are archaeologically invisible. Exceptions to this include quarries, where debris was generated during the extractive process. Locations where floral or faunal foods were collected may only be marked by a low-density scatter of chipped stone artifacts accumulating over a long period as the area was periodically harvested.

Fuller (1989:18) feels that field camps comprise a third type of site used by hunter-gatherers. Field camps are essentially short-term residential locales used by task-specific groups while collecting resources that will be returned to the base camp for storage. Resources are sometimes cached at field camps for later recovery and movement to the base camp. However, this type of site may be very difficult or impossible to distinguish from short-term base camps used by foragers.

In general, foragers inhabit base camps for a short period of time, ranging out from them to exploit resources on an encounter basis. Collectors inhabit base camps for longer time periods, exploiting surrounding resources through day trips and sometimes through the use of short-term field camps. Collectors use storage features to cache resources at their base camp in preparation for seasons of limited food availability, a strategy that is not employed by foragers (who simply move on). Thus, small Archaic sites containing few or no thermal features, no evidence of structural remains, and a small array of chipped and/or ground stone artifacts may be indicative of a foraging focus. More extensive sites containing an array of thermal and storage features, and small temporary structures, and a comparatively large amount of debris may be indicative of a collector strategy.

There are exceptions to these very general expectations. The earliest component at LA 65006 near San Ildefonso Pueblo fit several of the characteristics for a collector camp but lacked some of the more critical criteria (Moore 2001). Though that site contained multiple thermal features and thousands of artifacts, there was no evidence of a structure or storage features, and our analysis suggested a short-term, special-purpose use. In some ways this component was logistical in nature, with obsidian obtained in the Jemez Mountains being processed into large bifaces for ease of transport. However, in other ways it was a simple foraging camp, with evidence of some local hunting and gathering but no storage of resources. Thus, each component at a site must be carefully evaluated to determine how it fits or deviates from the model.

Three theoretical forager and collector site types were identified above—residential base camps, field camps, and resource-extractive locales. The last of these is presumed to be archaeologically invisible except under certain rare circumstances. A foraging residential base camp should reflect a wide range of maintenance, production, and food processing activities without a heavy investment in habitation or storage features. Structural remains, if present, should be ephemeral and indicative of short-term use. Collector residential base camps, on the other hand, should contain evidence of a wide range of activities and demonstrate a corresponding investment in habitation and storage structures, indicative of a comparatively lengthy occupation. Field camps associated with a collector adaptation should reflect temporary occupancy by a small group engaged in specialized activities. Therefore, a few specialized activities should be represented, storage features should be absent (unless the site was used as a cache), and structures (if present) should be ephemeral.

A potential problem in applying this model involves separating foraging camps occupied for short periods from field camps used by collectors. Both should exhibit evidence of short-term occupation; the range of activities visible in the artifact assemblage might be quite limited for both. In many cases, these types of sites may be indistinguishable. This problem can potentially be dealt with through analysis of the chipped stone assemblage.

The manufacture of general-purpose bifaces reflects a mobile lifestyle and more commonly occurs at residential base camps than at field camps or resource-extractive locales. Kelly (1988:731) defines three types of bifaces: (1) those used as cores as well as tools; (2) long use-life tools that can be resharpened; and (3) tools with specific shapes and functions. Each type of biface may be curated, but for different reasons and in different ways. Use of bifaces as cores is conditioned by the type and distribution of raw materials. An expedient flake technology can be expected when suitable raw materials are abundant and tools are used in the same location as the raw materials from which they are made were procured. This pattern minimizes the need for the use of bifaces as cores (Kelly 1988:719). When local raw materials are scarce or of poor quality, bifaces can help overcome the difficulties involved in using materials that are obtained at a distance from the location in which they are used (Kelly 1988:719). When raw material scarcity is extreme, mobility is low, or a specific bifacial tool is required for activities performed away from the residential base camp, there may be some use of bifaces as cores as well as extensive rejuvenation of bifacial tools (Kelly 1988:720).

Bifaces with long use lives may be manufactured under a variety of conditions: "In particular, tools designed for use on long search-and-encounter (as opposed to target specific) logistical forays will be under greater pressure to be designed to meet a variety of needs and tasks (e.g., cutting or scraping tools) and thus will need to be bifacial. This requirement can be relaxed for the equipment of target-specific forays" (Kelly 1988:721).

Bifaces may also be manufactured as byproducts of the shaping process and illustrate the importance of the haft to which the tool was attached (Kelly 1988:721). This type of biface might be more frequently maintained or replaced at residential rather than logistical sites (Kelly 1988:721).

Using these concepts, Kelly developed a model to aid in distinguishing between residential and logistical or field camp sites (Fig. 5.1). The model has not been rigorously tested, but it does provide a series of predictions that can be applied to a chipped stone artifact assemblage. When combined with other data sets such as feature type and placement, the number and diversity of activities represented, and the types of resources being exploited, the applicability of the model to a site can be assessed. For example, if residential features are present but chipped stone analysis suggests that the site served as a logistical site or field camp, the model may be incorrect. However, if the residential pattern predicted by both Kelly's model and site structure are in agreement, the model may be tentatively accepted as valid.

The types of research questions are limited by the types of features and artifacts that occur within and adjacent to the proposed construction zone. Thus, these questions are aimed at eliciting very basic information concerning when sites were occupied, the cultural affiliation of site occupants, and the types of use the artifacts and features represent. Depending on whether or not these very basic questions can be answered, more complicated questions might be asked for some components, especially those that represent prehistoric or early historic Native American use.

Research Questions

The main occupations at four of the five sites appear to reflect use by mobile groups of hunter-gatherers. Possible Archaic components were identified at two sites, and one of these also contained a possible Jicarilla Apache component. Two sites contain scatters of chipped stone artifacts that cannot currently be assigned temporal or cultural affiliations. However, the total lack of pottery at these sites suggests that an Archaic affiliation is possible for them as well, especially since biface flakes were commonly defined at each during survey analysis. The fifth site contains recent historic features and artifacts, reflecting a completely different type of use. However, except for the historic site, dates and cultural affiliation for these sites are certainly not well established. Thus, the main questions that are to be addressed concern when and how these sites were used.

Research Question 1: Are Potentially Significant Cultural Remains Present?

The first, and most basic, question that must be addressed for all five sites is whether or not the parts of the sites that will be examined in detail contain potentially significant cultural remains. Cultural remains that are potentially significant include intact subsurface cultural deposits, features, or structures. The standard that will be used to determine whether deposits of potentially significant cultural remains are present is the recovery of an average of 50 artifacts per cubic meter of fill within a single unit or stratum. The occurrence of an intact cultural feature or structure, with or without associated artifacts, shall also be considered evidence for the presence of potentially significant cultural remains. In both of these cases, the site will immediately go to data recovery following the conclusion of testing activities. If testing within the sections of sites included in this study does not reveal the presence of potentially significant cultural deposits, structures, or features, no further work will be considered necessary within that area following the conclusion of testing activities. Since only small parts of each site will be examined, a lack of potentially significant cultural remains within project limits does not necessarily mean that such do not occur elsewhere at the site. Thus, this study only constitutes an assessment of the sections of sites within project limits, and the results of this study should not necessarily be extended to parts of the sites that were not examined.

Research Question 2: When Were These Sites Used?

Defining the temporal affiliation of the sites in this sample is critical to any attempt to define the cultural affiliation of site occupants and the function of each site in the settlement system to which it belongs. However, dates can only be obtained if relatively or chronometrically datable materials are present and can be recovered. For the sites that will be examined by this study, the types of datable materials that might be encountered will probably be restricted to three categories: radiocarbon samples, archaeomagnetic samples, and diagnostic artifacts. Charcoal that can be used for radiocarbon analysis is sometimes ubiquitous in

A1. The production and use of bifaces as cores in residential sites should result in:

1) a positive correlation between measures of the frequency of bifacial-flaking debris, utilized biface flakes, or biface fragments and measures of the total amount of lithic debris;
2) a high percentage of utilized biface flakes relative to unretouched flake tools;
3) a low incidence of simple percussion cores, especially unprepared or "casual" cores; and
4) evidence of "gearing up" at quarries: a low incidence of flakes with much cortex on their dorsal surfaces in residential sites and use of high-quality raw material, such as fine-grained cryptocrystallines, possibly from distant sources.

A2. The production of bifaces in residential sites which are then used as cores in logistical sites should result in:

1) a division of sites into two basic categories, one in which there is a high, and another in which there is a low incidence of utilized biface-reduction flakes, the former being logistical and the latter residential sites; bifacial tools would be produced and maintained in residential sites, whereas they would be used as tools or cores in logistical sites;
2) likewise, residential sites should display a higher rate of increase (i.e., a higher slope of a regression curve) than logistical sites between biface fragments and measures of the frequency of biface knapping as a function of tool maintenance and replacement; and
3) residential sites should contain a higher frequency of utilized simple flake tools as opposed to utilized flakes removed from a biface.

B. The use of bifaces as long use-life tools should result in:

1) infrequent unifacial examples of the tool type (e.g., projectile points); these rare unifacial examples may be instances of expedient tool production;
2) a pattern of tool production in residential sites similar to C (below), with a high correlation between bifacial debris and tool fragments, but these fragments should show evidence of rejuvenation and resharpening;
3) a high frequency of resharpened or recycled instances of the tool type relative to (a) other tool types or (b) the same tool type from other areas or time periods.
4) evidence in logistical sites of the tool having been resharpened, resulting in a low rate of increase in biface fragments relative to biface flaking debris, as in A2.3, but with few of the biface-reduction flakes having been utilized; and
5) possibly evidence of haft manufacture and maintenance in residential sites as in C.4 (below).

C. The manufacture of bifaces as a by-product of the shaping process should result in:

1) a concentration of bifacial-flaking debris in residential sites, especially very small bifacial-retouch flakes, and a positive correlation between biface fragments and bifacial-flaking debris;
2) a low incidence of the use of biface-reduction flakes as tools;
3) a relatively high incidence of unifacial instances of a normally bifacial tool type (contrast with B.1 above); and
4) an archaeological record at residential sites indicating the maintenance of hafted tools, including stone tools used for the manufacture of organic items, e.g., flake tools, burins, gravers, spokeshaves, and scrapers.

Figure 5.1. Kelly's (1988:721–723) model predicting the hypothetical association between site type and lithic artifact assemblage character.

the soil, and can be of either cultural or noncultural derivation. A cultural origin for charcoal scattered through a stratigraphic unit cannot always be assumed, because natural brush and forest fires also create charcoal and deposit it on the landscape. The preferred locus of recovery for radiocarbon samples is from within features of distinct cultural affiliation such as hearths, storage pits, and middens. Archaeomagnetic samples will only be available from well-fired thermal features, should any be encountered. Temporally diagnostic artifacts will probably be the best source of dates in this study, and will not necessarily occur within project limits. Thus, the surface examination of these sites should be extended to the entire area within the highway right-of-way in order to locate any artifacts that can be used to provide an idea of when the sites were occupied. The types of temporally diagnostic artifacts that might be found include Native pottery, projectile points, and Euroamerican artifacts. However, since several of the sites were initially defined as multicomponent, the distribution of temporally sensitive artifacts in relation to the rest of the assemblage, especially clusters of artifacts, must also be assessed in order to determine whether those components are discrete and definable or are inextricably mixed together.

Research Question 3: How Do These Sites Fit into the Settlement Systems to Which They Belong?

By examining the types of artifacts and features present at a site, it may be possible to determine how that locale functioned within the overall settlement system to which it belonged. Especially critical to this type of examination is the range of tool types present, because they can be clues to the types of activities that were performed there. Thus, an inventory of surface artifacts will be a necessary supplement to any data recovered from subsurface contexts. This is especially true for the prehistoric and early historic components represented by scatters of chipped stone artifacts, with or without pottery, since no associated structures or features have currently been identified at any of them.

Different procedures will be used to help determine how the historic component at LA 144951 was used, because the types of data available there vary from those that we anticipate recovering from other components. Several features at this site fall within project limits, and their excavation may help in determining site function and perhaps age. All of the features recorded at this location consist of concentrations of basalt cobbles and gravels. The presence of caliche adhesions on visible surfaces of many of these rocks indicates that they were moved from their original locations, presumably for use in constructing the features in which they occur. By excavating these features we may be able to determine their original function, which could provide important clues as to how the site was used. These data will be augmented by analysis of associated surface artifacts, which can provide important temporal as well as functional information when combined with other types of data. Should any of the features investigated at LA 144951 turn out to be a hearth, information on seasonality might be available in the types and parts of plants burned as fuel. From surface examination, LA 144951 appears to represent a historic camp site of fairly limited duration, possibly associated with the collection of piñon nuts or firewood. This possibility can be tested with data collected during excavation.

Archaic components are suggested for components at two of the remaining sites, one of which also may contain an early historic period Jicarilla Apache or Pueblo component. Artifacts diagnostic of the period of occupation were not observed at the last two sites, but certain characteristics suggest that they may also represent Archaic occupations. Both of these sites are aceramic, and both contain a number of “biface thinning flakes” in association with “pressure flakes.” Both of these flake categories imply the manufacture of bifacial tools. “Biface thinning flakes,” as the term is used by Parrish et al. (2008), usually indicates the reduction of large, general-purpose bifaces typical of Archaic assemblages. “Pressure flakes” are usually thought to be indicative of small biface manufacture, but since this type of flake is also habitually removed from large bifaces during final shaping and sharpening, they are actually only indicative of the manufacture of bifaces of all sizes. Thus, we assume that LA 74879 and LA 160203 represent Archaic use locales, as do LA 160201 and part of LA 160196.

The presence of rather thin scatters of chipped stone artifacts coupled with an apparent lack of substantial residential structures suitable for cold season occupancy at the sites in our sample suggests that all four components either functioned as short-term forager base camps or as collector field camps. If they represent a foraging focus, we would expect to find evidence for warm-season use. This may include ephemeral shelters lacking internal heating features. There should be no evidence of storage features, and a wide range of activities should be reflected in a fairly small assemblage. The types of floral and faunal materials, if any such are recovered, should also reflect warm season use. If storage features are present and a limited range of activities is represented in the artifact assemblage, we would have to consider the possibility that field camps associated with a collecting strategy are represented.

A possible Jicarilla Apache component was defined at LA 160196, though we note that there is also a high probability that this component actually represents an early historic Pueblo occupation by residents of Taos or Picuris Pueblos. Since the single Archaic projectile point identified at this site might actually be a somewhat large Apache arrow point, the possibility that only a single early historic-period occupation is represented must also be considered. Since this component probably represents a short-term forager base camp or a collector field camp, as proposed for the Archaic components, Kelly's model can be applied to it as well. However, the possibility that metal tools were used as replacements for large generalized bifaces may skew the data somewhat, and must be taken into consideration. If this is the case, large generalized bifaces may not have been used in the same way as at similar Archaic sites, so the chipped stone assemblage may have quite a different character. Thus, while the archaeological materials at LA 160196 probably represent an occupation that is considerably later than those of the other three sites in this sample, it can be compared to those other sites to determine whether or not a similar functional focus is represented.

Summary

Research Questions 1 and 2 can be addressed for all five of the sites in this sample. Indeed, Research Question 1 *must* be addressed for each site. Research Question 2 also can be potentially addressed for each site, depending on whether temporally sensitive materials are encountered during their examination. Even if no potentially significant cultural features or deposits are encountered at a site, the presence of temporally diagnostic artifacts in its surface expression would still allow us to assign a tentative date.

Except for LA 144951, Research Question 3 can only be addressed in any depth if subsurface cultural deposits and/or features are encountered and sites go to the data recovery phase. While some information can be derived from surface artifacts that can be applied to this question, realistically, any detailed discussion of site function is only possible for components that go to data recovery. Thus, Research Question 3 probably cannot be satisfactorily addressed for sites that are only tested.

6. Field Methods

Testing and data recovery were conducted under a data recovery plan approved by NMDOT and Carson National Forest (Moore 2009). Each site was required to undergo testing through the excavation of test pits and backhoe trenches to determine the nature of subsurface deposits. The number of test pits and the length of backhoe trenches were site specific based on site size. Testing transitioned into data recovery only when deposits of potentially significant cultural remains (features or concentrations of 50 artifacts per cubic meter of fill) were present.

The treatment of archaeological resources followed standard OAS field methods as described in Moore (2009) and quoted below. A Cartesian grid system was established for each site, with a main site datum placed outside the construction zone. Each test pit measured 1 by 1 m and was excavated in 10 cm levels. Fill was sifted through 1/4-inch screen. An auger test was placed at the base of each 1 by 1 m test pit, and an attempt was made to excavate each auger test to a depth of 1 m below the base each test pit. The auger fill was also screened through 1/4-inch screen.

Testing and data recovery investigations were limited to the APE. Testing and data recovery ceased when the archaeological potential within the APE had been exhausted. In addition, all cultural materials located on the surface within the right-of-way (both inside and outside the APE) were subjected to in-field analysis, and a metal-detector sweep was conducted at each site to determine if culturally significant metallic objects, specifically Apache-modified materials, were present.

Following are the general and specific excavation procedures that were followed during the project as quoted from Moore (2009). Specific site treatments and investigation results are discussed in subsequent chapters.

General Excavation Procedures

Horizontal Proveniencing: The Grid System

A Cartesian grid system will be established for each site, allowing the precise placement of all excavation units and features on site plans, and a 1 by 1 m grid system originating at the main site datum will be imposed over each site to facilitate horizontal referencing. All horizontal referencing will be from a main site datum placed outside the construction zone, which will be assigned an arbitrary designation of 500N/500E. The exact location of each main datum will be determined using a GPS unit and tied to the NAD 27 projection, if possible. Grid lines will be established at even-meter intervals, and individual grid units will be referenced by the grid lines that cross at their southwest corners. Thus, a grid unit whose southwest corner is the intersection of the 501N and 510E grid lines will be labeled 501N/510E.

Grids may not be used for excavation under all circumstances, because they are not always the most efficient unit of excavation. This is particularly true when dealing with structures. Except when on or just above floors, excavation by grid units may provide a higher level of horizontal control than is needed or desired. It is also very time consuming, which is an important consideration. When a series of strata reflecting a sequence of depositional episodes over time is present, vertical control is often more important than horizontal control. While it is necessary to know what soil stratum is represented, the grid location may not be as meaningful. Of course, both horizontal and vertical controls are important when deposits reflect specific cultural activities. Thus, excavation units will differ in size and shape depending on the nature of the deposits being investigated.

It must also be remembered that grids are artificially imposed over sites. They are a construct used to provenience cultural materials and features so that their original relationship can be preserved for later study. Rarely do features conform to a grid system. When features are large it may be desirable to excavate by grid to provide detailed information on the placement of materials within them. However, excavation in grids is often awkward in small features, especially when they extend into one or more grids. Thus, features, rather than the grids in which they occur, may be treated as independent excavation units.

Vertical Proveniencing: Strata and Levels

Just as the grid system is tied to a main datum, so are all vertical measurements; thus, the main site datum is also used to reference all vertical measurements. Rather than establishing an exact elevation above sea level for the main datum, it is assigned an arbitrary elevation of 10 m below datum. Since it is often difficult to use one datum to provide vertical control for an entire site, subdatums will be established when needed. Horizontal and vertical coordinates will be measured for each subdatum so that their locations relative to the main datum can be plotted.

The vertical treatment of deposits will vary according to their nature. Cultural deposits will be carefully excavated to preserve as much of the vertical relationship between materials as possible. Such care will not be taken with noncultural deposits, since the relationship between artifacts in deposits that built up naturally or as artificial fill is rarely meaningful. For example, trash can be discarded in one area and used as artificial fill in another, and both deposits will have completely different meanings. Artifacts can be plentiful in both cases, yet they represent different processes. Trash consists of materials that were purposely discarded in a location and can often be separated by strata to determine the sequence of deposition and allow researchers to look for minute changes in artifact assemblages. Artifacts in artificially or nonculturally deposited strata rarely have any similar meaning. Trash deposits require careful excavation to preserve the relationship between artifacts discarded at different times. Noncultural deposits, including artificial fill, tend to be jumbled and mixed, and the relationship between artifacts is almost always obscured because they were moved from their original contexts and redeposited.

Two methods will be used to track vertical excavation units: strata and levels. Soil strata will be assigned unique numeric designations as they are encountered, and descriptions of each will be recorded on individual forms. In order to track the sequence of strata from one area to another, each vertical excavation unit will also be assigned a level number. The first vertical excavation unit to be dug will be labeled Level 1, the second Level 2, and so on. Since stratum and level numbers represent two completely different series, stratum numbers may not be in sequence as excavation proceeds downward, but level numbers will always be in numeric order.

Recording Excavation Units

The excavation of a grid or other unit will begin by filling out a form that provides starting depths and other pertinent data. Ending depths for each succeeding level will be recorded on relevant forms, providing a record of all excavations. Recording forms completed for each level will describe soils and inventory cultural materials recovered and provide other observations considered relevant by the excavator or site supervisor including stratum and level. The description of soil matrix should include information on cultural and rock inclusions, evidence of disturbance, and how artifacts are distributed if variations are noticed.

Recovery of Cultural Materials

Most artifacts will be recovered in two ways: visual inspection of levels as they are excavated and screening though hardware cloth with variably sized mesh. Other materials will be collected in bulk samples that can be processed in the laboratory rather than the field. Regardless of how cultural materials are collected, they will all be inventoried and recorded in the same way. Collected materials will be assigned a field specimen (FS) number, which will be listed in a catalog and noted on all related excavation forms and bags of artifacts. This will allow the relationship between recovered materials and where they were found to be maintained. All materials collected from an excavation unit will receive the same FS number. For example, if metal, ceramic, and bone artifacts are recovered from the same level, they will all be designated by the same FS number, as would be any samples taken from that level. Architectural or other samples that are not associated with specific excavation units will receive unique FS numbers.

Most artifacts will be recovered by systematically screening soil strata. All sediments from excavation units will be passed through screens. Two sizes of screen will be used. Most fill will be passed through 1/4-inch mesh hardware cloth, but 1/8-inch mesh hardware cloth may be used in certain circumstances. While most artifacts are usually large enough to be recovered by 1/4-inch mesh hardware cloth, some that are to small to be retrieved by that size screen can also provide important clues to the activities that occurred at a site. However, there is a trade-off in gaining this additional information. As the size of mesh decreases, the amount of time required to process soil and recover artifacts increases. Sampling is a way to balance these concerns; thus, smaller mesh will only be used under certain circumstances. Rather than establishing specific guidelines for sampling by 1/8-inch mesh screens, it is considered better to leave this up to the discretion of the site supervisor. Artifacts from noncultural strata will usually only be recovered by visual inspection, especially if they appear to be temporally diagnostic, complete, or otherwise have potential to expand the data base in a meaningful way. While this will not be a statistically valid sample, it will expand the number of artifacts recovered and provide more detailed data.

Other cultural materials, primarily botanical, will be recovered from bulk soil samples. Sampling methods for these materials are detailed later. In general, however, sediments for flotation analysis will only be collected from culturally deposited strata and features. Macrobotanical materials like corn cobs, piñon shells, etc. will be collected as individual samples whenever found. Botanical samples will receive the same FS number as other materials recovered from that excavation unit and will be cataloged on pertinent excavation forms.

Mechanical Excavation

Mechanical excavation using a backhoe or blade may be used to provide initial stratigraphic cuts or to demonstrate that noncultural levels have been reached by excavation and that no further hand excavation is necessary at a site. Decisions concerning the applicability of mechanical excavation to a specific site or circumstance will be made by the site supervisor in conference with the project director and/or principal investigator.

Preliminary trenching at a site using a backhoe can speed and augment hand excavation by providing a quick and efficient means of exposing subsurface strata for examination and description. Mechanical excavation allows the rapid opening of a deep trench to expose subsurface deposits, saving much time and labor that would otherwise be expended in hand excavation. The trade-off is that artifact recovery by stratum is not possible using this method. Thus, mechanical trenching will only be used to provide long and deep exposures of subsurface soils to permit the accurate definition and description of individual soil strata as an augment to, rather than replacing, hand-excavated grid units. Mechanically excavated trenches will be limited to depths of 1.30 m before they must be stepped back to allow safe access. Depending on soil conditions, trench walls may be stepped back at shallower depths if they seem unstable. This may be especially necessary of layers of sand are encountered.

Following the completion of hand excavation and at the discretion of the project director and/or principal investigator, parts of sites within project limits may be bladed to ensure that all cultural features within the affected area have been located and excavated. Any cultural features encountered during blading will be excavated using the methods described in this document.

Specific Excavation Procedures

Specific excavation procedures will be tailored to examine and assess the various configurations of topography and cultural features at these sites and to meet the needs of highway construction. The specifics of excavation will vary from site to site, and most can only be defined in the field after details of soils and the locations of potential cultural features and strata are determined through testing. Thus, the only site-specific aspects that are defined in this document involve the areas that will be examined at each site, as defined by construction needs, and the amount of effort that will be expended in testing. Excavation will be limited to the area that will be affected by construction activities, with the addition of a 10 ft (3.05 m) wide buffer zone to the area of direct effect. The buffer zones will be added in order to prevent inadvertent damage to adjacent parts of sites by highway construction activities. This should mitigate in advance any inadvertent damage to areas directly outside the proposed construction zone, provided that construction activities remain restricted to the limits examined by this study.

While we cannot predict in advance the specifics of excavation at the five sites that will be examined, we can discuss the application of the general procedures presented in the last section in more detail. Thus, the rest of this chapter also discusses how these techniques will be applied to any features and structures that might be encountered, and details some of the parameters involved in the selection of areas for testing and data recovery, the collection of certain types of samples, and the scale of effort to be expended in testing to determine whether or not potentially significant cultural deposits or features are present.

Site-Specific Testing Procedures

The section(s) of each site that fall within the current highway right-of-way will be mapped and described, and the locations and types of all related artifacts noted on the surface within that zone will be recorded. All artifacts within project limits as defined below will be collected for analysis. Temporally diagnostic artifacts that occur outside project limits will be analyzed in the field and photographed if appropriate but will not be collected.

LA 74879. Examination of this site suggests that most cultural materials are outside a zone that was affected by earlier highway construction activities, and that zone contains most of the area that will be included in this archaeological effort. The current episode of highway reconstruction will include the addition of an 8 ft (2.44 m) wide shoulder and a 7.1 ft (2.16 m) wide slope to the existing ground level on each side of the highway. With the addition of a buffer zone, the archaeological examination of LA 74879 will be conducted within an 8 m wide strip of the site extending out from the existing pavement on both sides of US 285. Testing will include the hand excavation of two to four test pits on both sides of the highway, and up to 50 m of mechanically excavated trenches may be used to help examine deposits on each side of the right-of-way within this zone. Auger tests may also be used to examine subsurface deposits if needed and soil conditions are appropriate.

LA 144951. Examination of this site suggests that most cultural materials are outside a zone that was affected by earlier highway construction activities, and that zone contains much of the area that will be included in this archaeological effort. The current episode of highway reconstruction will include the addition of an 8 ft (2.44 m) wide shoulder and a 7.1 ft (2.16 m) wide slope to the existing ground surface on each side of the highway, and a culvert that extends across the entire width of the right-of-way (Fig. 3). With the addition of a buffer zone, archaeological examination of the section of LA 144951 that includes the shoulder construction will be conducted within an 8 m wide strip of the site extending out from the existing pavement on the west side of US 285. An area extending 10 m to both the north and south of the centerline of the culvert will also be examined on the west side of US 285. The latter area may contain several of the features identified during survey (Features 3–6), which would necessitate the implementation of data recovery procedures. Testing will include the hand excavation of 4 to 8 test pits, and up to 50 m of mechanically excavated trenches may be used to help examine subsurface deposits on the west side of US 285 in this zone. Auger tests may also be used to examine subsurface deposits if needed and soil conditions are appropriate.

LA 160196. Examination of this site suggests that most cultural materials are outside a zone that was affected by earlier highway construction activities, and that zone contains most of the area that will be included in this archaeological effort. The current episode of highway reconstruction will include the addition of an 8 ft (2.44 m) wide shoulder and a 7.1 ft (2.16 m) wide slope to the existing ground surface on each side of the highway. With the addition of a buffer zone, the archaeological examination of LA 160196 will be conducted within an 8 m wide strip of the site extending out from the existing pavement on both sides of US 285. The outer edge of the buffer zone on the east side of the highway may encounter an intact A soil horizon that has the potential to contain undisturbed cultural materials. Testing will include the hand excavation of two to four test pits on both sides of the highway, and up to 50 m of mechanically excavated trenches may be used to help examine deposits on each side of the right-of-way within this zone. Auger tests may also be used to examine subsurface deposits if needed and soil conditions are appropriate.

LA 160201. Examination of this site suggests that most cultural materials are outside a zone that was affected by earlier highway construction activities, and that zone contains most of the area that will be included in this archaeological effort. The current episode of highway reconstruction will include the addition of an 8 ft (2.44 m) wide shoulder and a 7.1 ft (2.16 m) wide slope to the existing ground surface on each side of the highway. With the addition of a buffer zone, the archaeological examination of LA 160201 will be conducted within an 8 m wide strip of the site extending out from the existing pavement on both sides of US 285. The outer edge of the buffer zone may encounter moderately intact soils on the west side of the right-of-way that could contain undisturbed cultural deposits or features. Similarly, the outer edge of the buffer zone may encounter an undisturbed A soil horizon on the east side of the highway, again with the potential to contain intact subsurface cultural materials. Testing will include the hand excavation of two to four test pits on each side of the highway, and up to 50 m of mechanically excavated trenches may be used to help examine subsurface deposits on each side of the highway right-of-way within this zone. Auger tests may also be used to examine subsurface deposits if needed and soil conditions are appropriate.

LA 160203. Examination of this site suggests that most cultural materials are outside a zone that was affected by earlier highway construction activities, and that zone contains some of the area that will be included in this archaeological effort. Besides the addition of shoulders and slopes to the existing ground surface on both sides of the highway, this episode of highway improvements will include construction of a detour that will extend 50 ft (15.24 m) east of the current edge of pavement into the area occupied by LA 160203. With the addition of a buffer zone, the archaeological examination of this site will be conducted within a 19 m wide strip of the site extending out from the existing pavement on the east side of US 285. The outer edge of this strip may encounter intact soils that could contain undisturbed cultural deposits or features. Testing will include the hand excavation of 5 to 10 test pits on the east side of the highway right-of-way, and up to 50 m of mechanically excavated trenches may be used to help examine deposits within this zone. Auger tests may also be used to examine subsurface deposits if needed and soil conditions are appropriate.

Site Plans

Plans will be produced for all sites, focusing on the areas within the construction/buffer zone, unless the USDA Carson National Forest specifies that entire sites shall be remapped. Mapping will be accomplished using a total station or optical transit and will show all relevant topographic features, cultural features, excavation areas, and point-provenienced surface artifacts. Sufficient detail will be presented to allow plans related to this study to be accurately compared to those created during earlier studies.

Features

Features will constitute individual units of excavation. As they are encountered at a site, features will be assigned a unique number. Small features (less than 2 m in diameter) may be excavated differently than large features (greater than 2 m in diameter). Materials removed from small features will be screened through 1/8-inch mesh hardware cloth. After defining the horizontal extent of small features, they will be divided in half. One half will be excavated in 10 cm arbitrary levels to define internal stratigraphy, and a profile will be drawn showing the exposed layers of fill. The second half will then be removed by strata. Plans showing the locations and sizes of excavation units will be drawn. A second cross section illustrating the feature's vertical form perpendicular to the profile will be drawn, and a form that describes and details its shape, contents, depths at top and bottom, and any other pertinent observations made during excavation will be completed.

Large features, like trash middens, will be excavated by grid unit and screened through 1/4-inch mesh hardware cloth, though 1/8-inch mesh may be more appropriate in some circumstances and can be used at the discretion of the site supervisor. The number of exploratory grids excavated into large features will be kept to a minimum, and as much of these features as possible will be excavated by natural soil strata. At least two perpendicular profiles will be drawn if feasible, and forms and plans that describe and detail the shape and contents of these features will be completed. A series of 35 mm black-and-white, 35 mm color slide, and digital photographs will be taken during and after excavation of all features, when possible. Other photographs showing construction or excavation details may be taken at the discretion of the excavator.

Residential Structures

No residential structures were defined at these sites during their initial recording or rerecording. While we do not anticipate finding any structural remains in the parts of these sites that will be examined, the possibility remains that residential structures could exist in subsurface contexts. For this reason, a set of standard procedures for excavating structural remains is presented.

Unique numeric designations will be assigned to any structures identified at a site, as well as to the rooms they contain. Excavation will begin by placing an exploratory trench from one wall to the center of large rooms, and completely across small rooms. Exploratory trenches will be excavated by grid units to provide a cross section of deposits. When the nature of fill is defined, the rest of the room will be excavated by quadrants. Quadrant boundaries will be determined by the locations of the grid lines that cross the room; thus, quadrants will rarely be the same size.

A sample of fill from each room will be screened through 1/4-inch mesh hardware cloth. This sample will usually consist of the exploratory trench(es) and at least one quadrant, no matter whether the fill is of cultural or noncultural derivation. The quadrant selected for sampling is left to the discretion of the site supervisor, but in most cases it will be the last quadrant excavated because that will provide two visible profiles for determining the extent of strata. More than one quadrant might be sampled if a structure contains cultural deposits. Fill in the other three quadrants will be removed by stratum without screening, though visible artifacts may be collected for analysis. At least one of each quadrant will be profiled to provide a record of the extent of strata in both north-to-south and east-to-west directions. Standard forms detailing information derived during the excavation of strata within quadrants and referencing any cultural materials recovered will be filled out at the completion of each excavational unit.

Because of safety concerns, exploratory trenches will be excavated no deeper than 1.30 m before they are expanded by removing at least one quadrant (after the exposed wall is profiled). Excavation should halt 5–10 cm above floors to prevent damage to their surfaces, and to permit a more systematic sampling of materials found in contact with or just above floors. Materials from the last 5–10 cm above floors will be removed by grid and screened through 1/8-inch mesh hardware cloth, unless they are determined to be of noncultural origin.

Architectural details will be recorded on a series of forms following the completion of excavation in a structure. When building elements are encountered in fill they will be recorded on the pertinent excavation form. If wooden roof elements are found they will be mapped and described, and samples will be collected for species identification and potential tree-ring dating. Samples of building materials may also be collected for more detailed analysis. Descriptions of individual rooms will include information on wall dimensions, construction materials and techniques, and associated features. Structure descriptions will include information on size and dimensions, a general description, and a sketch plan. In addition to profiles, plans of each structure will be drawn, detailing the locations of rooms and internal features, artifacts found in direct contact with floors, and any other aspects considered important. A series of 35 mm black-and-white and digital photographs will be completed for each structure showing its overall form, individual rooms, construction details, and the relationship of features with other architectural elements.

Selection of Excavation Units

Hand-excavated test grids. Hand-excavated 1 by 1 m test grids will be placed in areas containing clusters of surface artifacts to help determine whether they represent the surface expression of buried cultural deposits. If artifact clusters are lacking within construction/buffer zones, test units will be placed in areas selected by the site supervisor that are thought to have the best potential for providing information on subsurface deposits. Should intact subsurface cultural deposits and/or features be encountered in test units, the site will go to data recovery, though testing in other areas may continue until the part of site within the construction/buffer zone has been fully assessed. Test grids will be excavated in 10 cm arbitrary vertical levels unless distinct stratigraphic breaks are defined. In that case, individual strata will become the vertical units of excavation. Forms detailing pertinent information will be completed for each level in a test grid, as discussed earlier.

Depending on individual site circumstances and scheduling, mechanical excavation may be used to examine subsurface deposits either before or after completion of test grid excavation. However, even in cases where no intact subsurface cultural deposits or features are encountered in mechanically excavated trenches before any hand excavated units are dug, a series of hand-excavated units is still needed to verify conclusions based on the results of mechanical excavation.

Auger tests. Small test units excavated through the use of a soil auger often permit a rapid and accurate assessment of subsurface deposits and can aid in the definition of subsurface cultural deposits and features. However, the utility of this excavation method is severely limited in soils that contain abundant gravel and/or cobble inclusions. Thus, auger tests are only an effective means of assessing subsurface deposits when the rock content is low enough that the ability of this method to penetrate subsurface soils is not hindered. Auger tests will only be used to augment other forms of subsurface investigation when soil conditions permit.

All materials removed from auger tests will be screened through 1/8-inch mesh hardware cloth to recover any cultural materials that might be encountered. Forms describing and detailing subsurface deposits and possible breaks in strata, as well as the approximate depths at which any potential cultural materials were encountered, will be completed. Auger tests will be placed where they have the best potential to help assess the nature of subsurface deposits, at the discretion of the site supervisor.

Extramural excavation areas. The locations of most grid units excavated during data recovery will be determined by the distribution of cultural deposits and features defined during testing. These are considered extramural excavation areas and will consist of series of adjacent grid units used to explore the subsurface distribution of cultural materials in areas containing clusters of artifacts and around cultural features. Extramural excavation units will only be necessary when potentially important subsurface deposits or features were located during the testing phase. For the most part, this will consist of surface stripping the uppermost 10 cm or so of soil away and screening it to recover artifacts buried at shallow depths. However, if cultural materials occur at greater depths, excavation will continue until the sterile preoccupational substrate is reached. The size of extramural excavation areas will be determined by the site supervisor and will be aimed at recovering as large a sample of the materials contained by these zones as is feasible.

Mechanically excavated trenches and blading. Mechanically excavated trenches may be used for subsurface studies. Their placement will depend on site characteristics and the excavational needs of the site supervisor. For example, mechanically excavated trenches might be placed adjacent to cultural features or surface artifact clusters to help define the character of subsurface deposits in those areas and to aid in locating potential cultural strata and/or features. Mechanically excavated trenches can also be used to examine subsurface deposits in more detail when testing fails to locate evidence of potentially significant buried cultural deposits and/or features. Finally, mechanically excavated trenches can be used to provide long exposures of subsurface soils for analysis and determination of age, depositional history, and other characteristics that might be necessary to site interpretation. Blading can be used in situations where the results of testing are considered tentative, or the presence of unlocated cultural deposits or features is suspected but not confirmed.

Mechanical excavation will be restricted to areas within construction/buffer zones. Artifacts noted in backdirt will be collected for analysis and will be referenced to the trench or bladed area in which they originated. Otherwise, no attempt to collect artifacts from mechanical excavation will be attempted. Upon completion of a mechanically excavated trench, a form detailing its location, the strata encountered, and any other pertinent details noted during excavation will be completed. Bladed areas will be fully documented and described. The locations of all mechanically excavated trenches and bladed areas will be plotted on the site plan.

Collection of Botanical Samples

Botanical samples will only be obtained from contexts with the potential to yield information relevant to this study. For the most part, they will consist of 2-liter soil samples collected from cultural strata and features; at least one sample will be taken from each of these contexts that is encountered. Multiple samples from cultural strata may be obtained, but no more than one sample per stratum from each grid. If any residential structures or storage features are encountered, one or more samples will be obtained from floor fill. Noncultural strata will not be sampled for botanical remains. Macrobotanical samples, if observed, will be collected for analysis and identification and will be provenienced according to the stratum and level from which they were removed.

Pollen samples will only be collected from certain contexts. In cultural contexts, pollen samples should be obtained from individual strata or within storage features or structures to aid in determining details of diet and plant use. Single samples will be collected from each cultural stratum, structure, or storage feature unless the site supervisor determines that multiple samples have the ability to provide more detailed and useful information. Pollen samples will not be collected from thermal features, because heat tends to destroy pollen grains. Noncultural strata may be sampled as well in an effort to examine the depositional and environmental history of a particular location. This can be accomplished by collecting a pollen sample from each stratum defined or at standard intervals from a profile wall. The collection of noncultural pollen samples will only be done in consultation with the project director and/or principal investigator, and only when relevant to the archaeological interpretation of a site.

Sensitive Situations

Human remains. Since the sites being examined by this study appear to represent prehistoric and historic temporary use locales that were occupied for very short periods of time, the presence of any formal on-site human burials at any of these sites is considered unlikely. Any finds of human bone or burials while in the field or during laboratory analysis will be completely inadvertent and unexpected. If remains of this type are discovered in the field, standard archaeological excavation techniques will be employed to remove them after all appropriate consultations have been completed. The consultation procedure is discussed in Appendix 2, along with specific excavation techniques and analytic standards and procedures. Consultations will include informing the appropriate law enforcement and review authorities, the Carson National Forest, and the NMDOT. The excavation methods used will include definition of the burial pit, use of hand tools to expose skeletal materials, mapping and photographing of the position of the skeleton and any grave goods, and retrieval of soil for pollen analysis. Field and laboratory treatment of human remains and other sensitive cultural discoveries will be based on the Museum of New Mexico policy adopted March 20, 1986: "Collection and Display of Sensitive Materials" (SRC Rule 11; Appendix 2). If human remains or other sensitive materials are uncovered, no person will be allowed to handle or photograph them except as part of data recovery efforts. Data recovery related photographs of sensitive materials will not be released to the media or the general public.

Unexpected discoveries. There is always a risk of finding unexpected deposits or features during an archaeological excavation. The procedure that will be followed in the event of an unexpected discovery will vary with the nature and extent of the find. Should human remains be found, appropriate consultations will be completed, and they will be treated according to the procedures outlined above and in Appendix 2. Deeply buried or more extensive deposits that will require more excavation than is anticipated by this plan will require consultations with the NMDOT, Carson National Forest, and any other regulatory agencies involved in issuing excavation permits. While we do not anticipate encountering extensive or deeply buried cultural remains, this is always a possibility and may require alterations to this plan or to construction scheduling.

7. LA 74879 (AR-03-02-06-637)

LA 74879 was originally recorded by Carson National Forest personnel in preparation for the Servilleta fuelwood sale (NMCRIS No. 24240). As described by Parrish et al. (2008:34), the site was a nondiagnostic scatter of flaked stone artifacts occurring on both sides of US 285, suggesting the center was removed by earlier highway construction (Fig. 7.1). Other disturbances that have affected the site include fuelwood gathering and livestock trails. The latter run along the outside of the right-of-way fence on the west side of the highway and have caused erosion to occur, exposing artifacts that presumably originated in subsurface contexts. This suggests that LA 74879 is not entirely surficial, and there is some potential for subsurface cultural deposits. As currently defined, the scatter measures roughly 63 m north-south by 93 m east-west and encompasses an area of roughly 4,701 sq m. An estimated 51 to 75 percent of the site is intact. About 60 percent of the site and 41 percent of the surface artifacts fall within the existing highway right-of-way.

Environment

LA 74879 is on a north-facing slope of a volcanic ridge that defines the south edge of Servilleta Canyon. Soils on the site are classified as Montecito loam, an alluvial soil derived from the weathering of basalt. These soils occupy landforms with slopes up to 15 percent. The Montecito grades into gravelly, sandy loam with depth. The soil association of the area is of the Torriorthents-Haplargids-Calciorthids Land. Typically, these calcic soils are shallow to somewhat deep, cobbly and stony. They occur with basalt outcrops and bedrock (USDA-NRCS 2009; Maker et al. 1974). About 40 percent of the site surface is obscured by vegetation and piñon/juniper duff (Fig. 7.2). The vegetative overstory includes ponderosa pine, juniper, and piñon, while the understory is dominated by sage, various grasses, rabbitbrush, and prickly pear.

Treatment

Prior to testing, all artifacts within the highway right-of-way were mapped in and subjected to in-field analysis. The majority of these artifacts are preserved outside of the APE and will not be effected by the proposed construction project. The few artifacts within the APE consisted of three flaked stone artifacts and two Euroamerican artifacts. Next, six test pits were judgmentally placed to evaluate subsurface fill within the APE. These hand-excavated units were excavated into sterile soil to a depth of at least 50 cm below the ground surface or until bedrock was encountered. An auger test was additionally placed in each pit to examine soil characteristics below depths reached by hand excavation. An attempt was made to extend each auger test 1 m below the base of each test pit, but this was often not possible in the rocky soil. No artifacts or subsurface cultural deposits were found in the six test pits of the auger tests. The APE is characterized by bladed maintenance activities along the highway, and disturbed soil with asphalt and modern glass was consistently found to a depth of 30 cm below the surface. The lower 20 cm of undisturbed A-horizon soils contained no cultural material. The same soil profiles were found in each test unit, and these are best exemplified by the backhoe profiles. Failing to find any intact subsurface deposits by test pit or auger, a backhoe was then used to create two northwest-southeast backhoe trenches to look for more deeply buried deposits and create profiles from which soil-formation processes could be evaluated. Both measured approximately 25 m long and were excavated to a depth of 1.4 m below the present-day ground surface or until bedrock was encountered. No buried surfaces or cultural deposits were encountered by the backhoe trenches. The locations of artifacts, test pits, and backhoe trenches are depicted in Figure 7.1.

Backhoe Trenches

Two backhoe trenches (BHT) were excavated at LA 74879 in the US 285 right-of-way between the

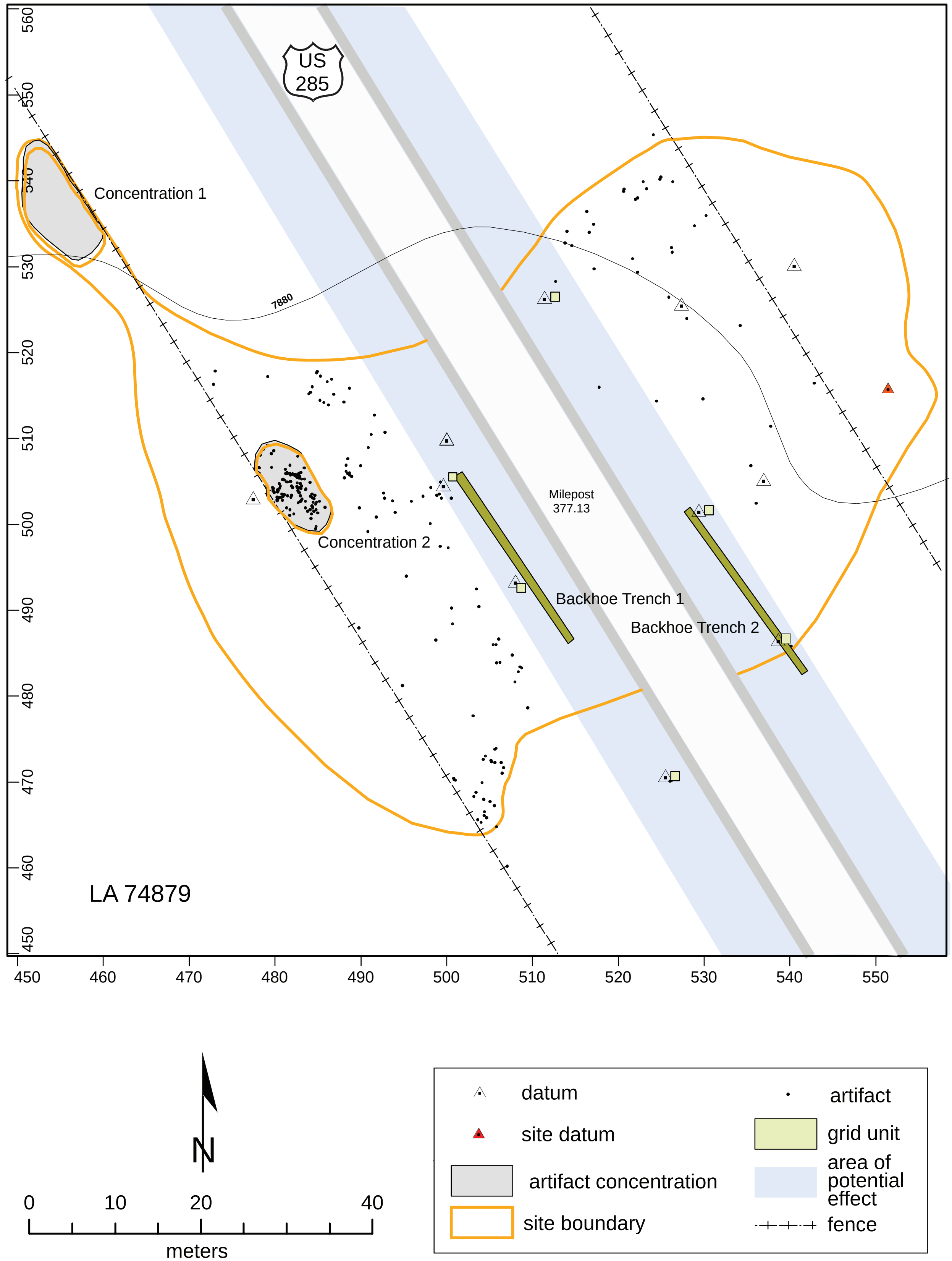


Figure 7.1. Site plan, LA 74879.

Figure 7.2. Environment of LA 74879.

road shoulder and the fenceline. BHT 1 (Fig. 7.3; hereafter abbreviated as BHT) was on the west side of the highway; BHT 2 (Fig. 7.4) was on the east side.

The surface layer in the area of the trenches consisted of disrupted A-horizon material originating from ground-disturbing road and ditch construction. Inclusions of roadside debris were common to 30 cm below the surface (cmbs).

Beneath the disturbed surface layer, a relatively intact A horizon persisted to 50 cmbs. The fine to medium, granular and subangular-blocky peds consisted of dark yellowish-brown silt and fine sand with weak clay development. Fine to coarse root inclusions accompanied by root and rodent turbation were abundant down to the smooth, gradual boundary between the A and underlying B/Bk horizons.

The B-horizon soil was laterally discontinuous, pale brown silt with very fine sand and moderate clay development. It had many fine to medium roots and root pores with A-horizon infills and sparsely distributed caliche and basalt pebbles. When present, the B horizon extended as deep as 90 cmbs. The boundary with the underlying Bk horizon was smooth and diffuse.

The Bk horizon displayed horizontally variable concentrations of carbonate development along with plentiful fine to coarse root pores and ped faces. Granule and pebble caliche inclusions were plentiful; inclusions of basalt cobbles were not as numerous. The Bk matrix extended to 100 cmbs. The boundary was wavy and irregular; the Bk horizon was discontinuously underlain by K-horizon deposits, basalt bedrock, and isolated pockets of C-horizon material derived from weathered basalt.

No cultural deposits, artifacts, or features were discovered in the backhoe trenches at LA 74879.

Features

No archaeological features were encountered at LA 74879.

Cultural Materials

During initial mapping of the site, two flaked stone artifact concentrations, AC 1 and AC 2, were

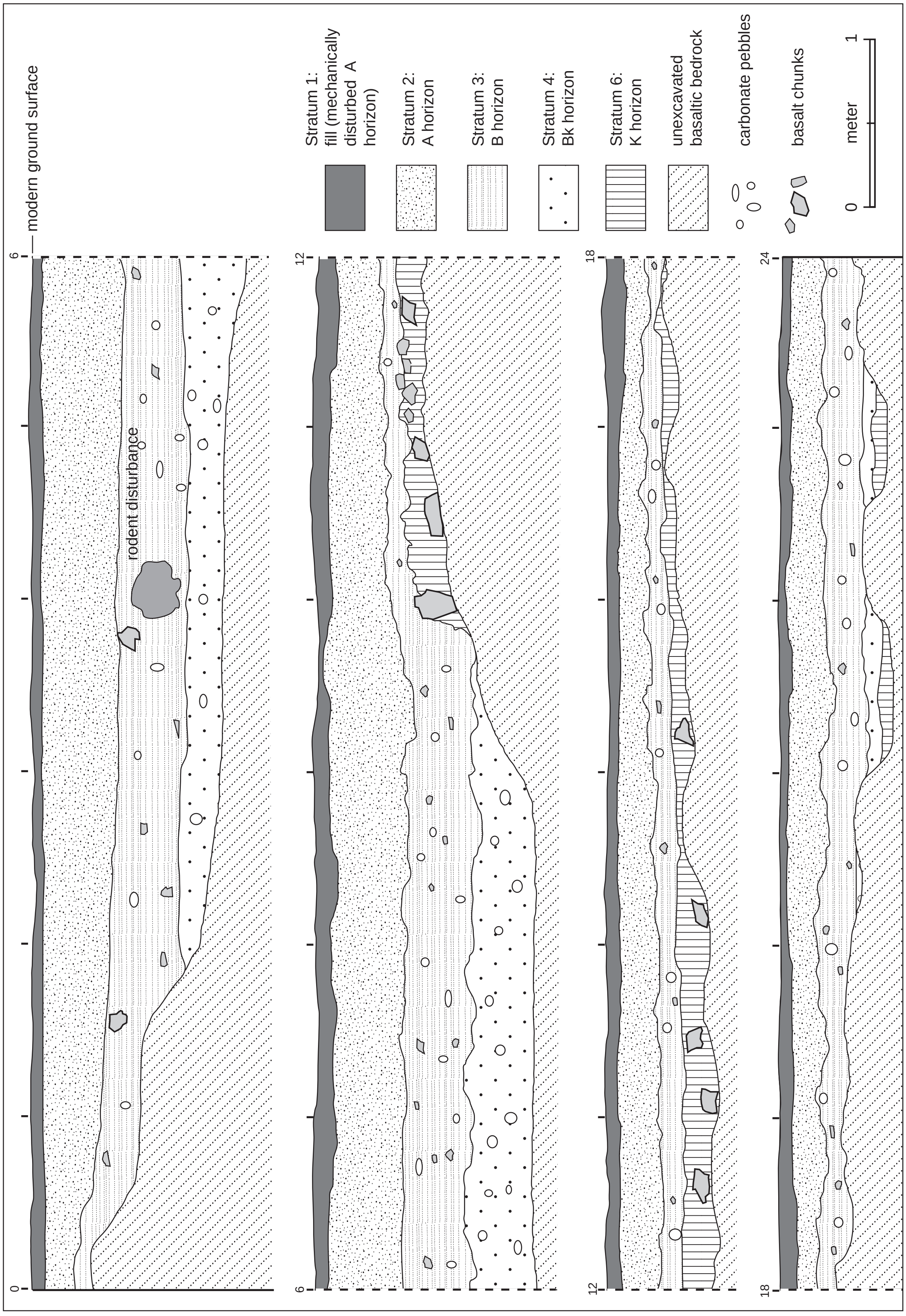


Figure 7.3. East wall profile, Backhoe Trench 1, LA 74879.

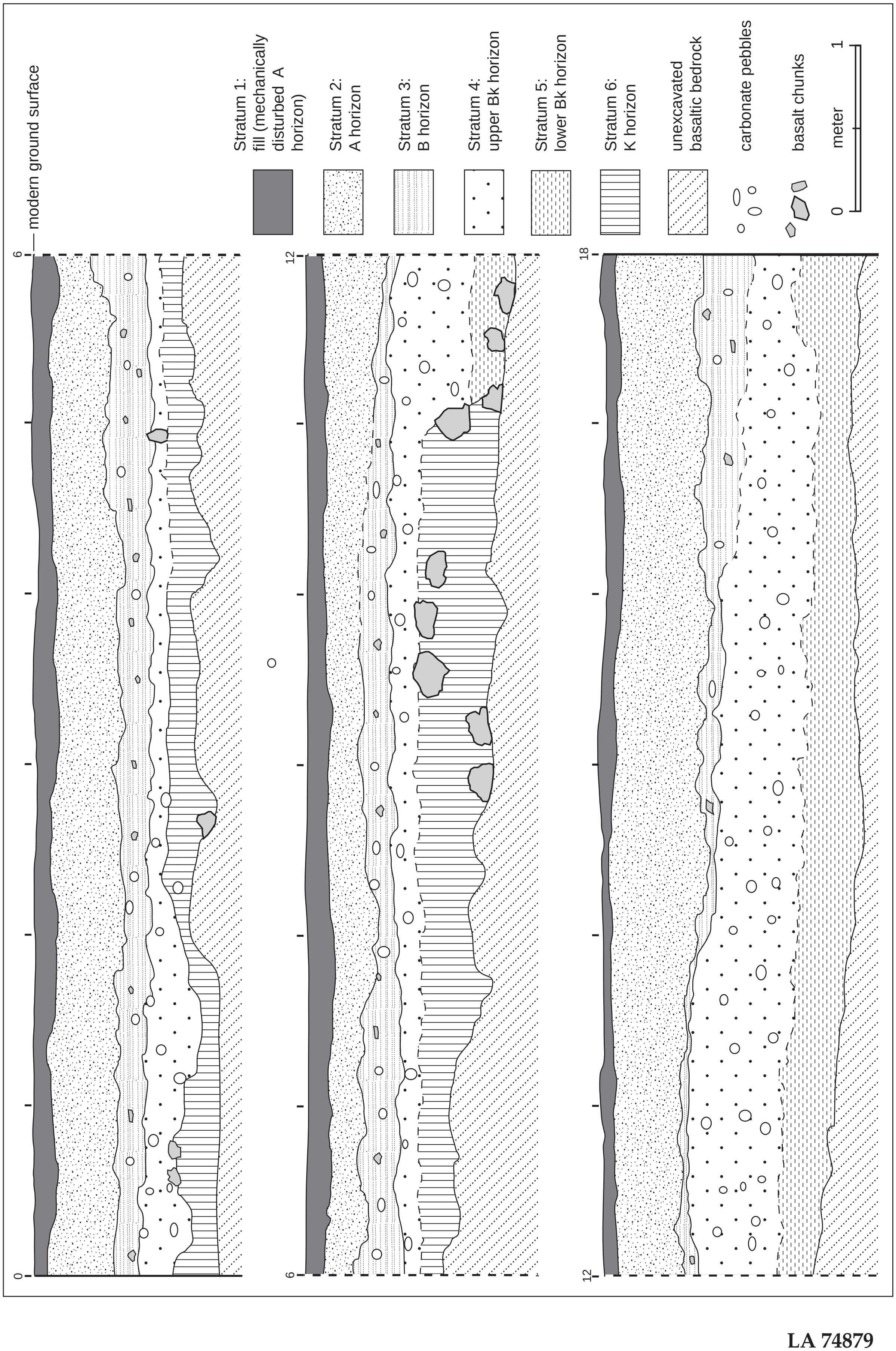


Figure 7.4. East wall profile, Backhoe Trench 2, LA 74879.

visible on the west side of US 285. AC 1 measured 6.6 m in diameter and was identified outside the right-of-way. No artifact analysis was performed on artifacts within the concentration (Fig. 7.5). AC 2, consisting primarily of fine-grained basalt biface flakes, was identified within the right-of-way on the west side of US 285, but outside the APE. It measured 12 m north-south by 6 m east-west.

A total of 189 flaked stone artifacts and 148 Euroamerican artifacts were analyzed within the highway right-of-way. Five of these artifacts—three flaked stone and two Euroamerican—were collected within the APE. No artifacts were found as a result of subsurface investigations.

Flaked Stone

Parrish et al. (2008:35) originally recorded 160 flaked stone artifacts at the site. Artifacts were dispersed across the site as a general scatter, and artifacts were recorded on both sides of the highway. An artifact concentration was recorded on the northwestern edge of the site, just west of the right-of-way fence. This artifact concentration measured 10 by 5 m and contained 42 artifacts. However, the artifact content of the concentration was not tabulated in the report. The general flaked stone assemblage included 155 pieces of debitage and five tools. The debitage included core reduction flakes (n = 86), biface thinning flakes (n = 4), pressure flakes (n = 19), indeterminate flakes (n = 43), and angular debris (n = 3). Material types included nonlocal Pedernal chert (n = 10), nonlocal Polvadera obsidian (n = 5), semilocal No Agua obsidian (n = 3), rhyolite (n = 3), and nonlocal Jemez obsidian (n = 2). Local basalt probably accounted for the remaining bulk of the material, but this was not stated in the report. Tools included a rhyolite core, a basalt core, a Polvadera obsidian thumbnail scraper fragment, a Polvadera obsidian utilized flake with unidirectional retouch, and a tested cobble of rhyolite. No temporally diagnostic artifacts were recorded. The site was interpreted as a short-term or seasonal camp centered on flaked stone tool production in support of subsistence practices. The site was assigned a further unspecified prehistoric cultural and temporal affiliation.

A total of 189 flaked stone artifacts were mapped and analyzed within the highway right-

Figure 7.5. Artifact Concentration 1, LA 74879.

of-way during the current project (Fig. 7.1). Artifacts were scattered on both sides of the highway; however, the largest portion (n = 107, 57 percent) were mapped within Artifact Concentration 2 on the west side of the highway. This artifact concentration had apparently not been identified during the original site recording, although a smaller concentration west of the right-of-way fence had been recorded (Parrish et al. 2008:35).

Material types and textures are presented in Tables 7.1 and 7.2. The flaked stone assemblage is represented by seven material types, but local basalt accounted for 75 percent (n = 141) of the material. Intrusive nonlocal material included Polvadera obsidian (n = 19), Pedernal chert (n = 13), and undifferentiated Jemez obsidian (n = 9). Together the intrusive material types make up 21 percent (n = 41) of the material types. The remaining undifferentiated chert (n = 4), No Agua obsidian (n = 2), and undifferentiated quartzite are potentially available in the site vicinity. The majority of the materials have fine-grained textures, with basalt dominating this category (n = 139 of 156). The obsidians have glassy textures; the No Agua obsidian displays flawed texture. Two of the four pieces of undifferentiated chert trend toward medium-grained and flawed texture. The flaked stone assemblage is composed primarily of locally found materials, with a secondary occurrence of three imported material types from the Jemez Mountain area.

The flaked stone assemblage is composed primarily of debitage: angular debris (n = 18), core flakes (n = 79), biface flakes (n = 83), and a single bipolar flake. The debitage is derived from core reduction and biface reduction. The local basalt was the most heavily utilized material type, with similar frequencies of core flakes (n = 62) and biface flakes (n = 67). Basalt also had the highest frequency of angular debris (n = 9), which is often generated during the initial stages of reduction and probably reflects the proximity of the material type. Of interest is the presence of a few pieces of angular debris for each of the three imported materials, even though the materials originated in the Jemez Mountain area. A single bipolar flake of No Agua obsidian shows the simple reduction strategy for deriving flakes from the small nodules characterizing the material. The small nodules are simply smashed open, resulting in angular debris and bipolar flakes.

The majority (n = 167, 88 percent) of the various material types lack cortex and were derived from the later stages of core and biface reduction (Table 7.3). The local basalt (n = 9) exhibits most of the material from the primary stage of cortex removal, but one intrusive Pedernal chert flake is also from this category. Both pieces of No Agua obsidian have higher cortex percentages. The debitage derived from the various material types is consistently small and characteristic of the later stages of reduction (Table 7.4). Both core and biface are similarly sized across the material types. Basalt, the dominant material type, shows the widest size range, but the largest core flake is only 34 mm long. The local basalt is prevalent in the site area, but material on the site does not appear to have been directly quarried. The basalt outcrops as massive boulders, but the absence of cores, low frequency of primary flakes, and small debitage sizes demonstrate that the material was initially procured and processed off-site.

The majority (n = 182, 96 percent) of the flaked stone assemblage is represented by unutilized debitage derived from core and biface reduction activities. Although biface reduction and tool production was an important site activity, the end product of the reduction activities is poorly represented. Only seven tools were mapped and recorded, and all of the tools were fragmentary. A single basalt uniface that functioned as a side scraper was found on the east side of the highway. The medial fragment measured 39 by 19 by 4 mm. The remaining six tools were found on the west side of the highway in or near Artifact Concentration 2. Another basalt uniface functioned as a sidescraper and was mapped within the artifact concentration. The proximal fragment measured 21 by 15 by 2 mm. A Polvadera obsidian biface fragment also functioned as a side scraper and was mapped within Artifact Concentration 2. The medial fragment measured 16 by 16 by 5 mm. A basalt uniface functioned as a sidescraper and was mapped just north of the artifact concentration. The distal fragment measured 37 by 31 by 8 mm. An undifferentiated late-stage biface fragment was manufactured from undifferentiated Jemez obsidian and was mapped just east of the concentration. The medial fragment measured 11 by 7 by 3 mm. It may be a biface/preform transported to the site for further reduction or an item broken during bifacial reduction. A small late-

Table 7.1. Flaked stone artifact morphology and function by material type, LA 74879

Artifact Morphology	Artifact Function	Chert Undifferentiated	Pedernal Chert	Obsidian Undifferentiated	Polvadera Obsidian	No Agua Obsidian	Nonvesicular Basalt	Quartzite Undifferentiated	Total
Angular debris	unutilized angular debris	2	4	1	1	1	9	–	18
Core flake	unutilized flake	2	2	3	9	–	62	1	79
Biface flake	unutilized flake	–	5	3	8	–	67	–	83
Bipolar flake	unutilized flake	–	–	–	–	1	–	–	1
Uniface, early stage	end scrapper	–	–	–	–	–	1	–	1
	side scraper	–	–	–	–	–	2	–	2
Uniface, middle stage	end scrapper	–	1	–	–	–	–	–	1
Biface, early stage	side scraper	–	–	–	1	–	–	–	1
Biface, middle stage	unidentified stemmed projectile	–	1	–	–	–	–	–	1
Biface, late stage	biface, undifferentiated	–	–	1	–	–	–	–	1
	unidentified projectile point	–	–	1	–	–	–	–	1
Total		4	13	9	19	2	141	1	189

Table 7.2. Flaked stone material type by texture, LA 74879

Material Type	Glassy	Glassy and Flawed	Fine-grained	Fine-grained and Flawed	Medium-grained and Flawed	Total
Chert, undifferentiated	–	–	2	–	2	4
Pedernal chert	–	–	13	–	–	13
Obsidian, undifferentiated	9	–	–	–	–	9
Polvadera obsidian	18	–	1	–	–	19
No Agua obsidian	–	2	–	–	–	2
Nonvesicular basalt	–	–	140	1	–	141
Quartzite, undifferentiated	–	–	1	–	–	1
Total	27	2	157	1	2	189

Table 7.3. Flaked stone material type by dorsal cortex, LA 74879

Material Type	0%	1–49%	50–100%	Total
Chert, undifferentiated	2	1	1	4
Pedernal chert	10	2	1	13
Obsidian, undifferentiated	9	–	–	9
Polvadera obsidian	19	–	–	19
No Agua obsidian	–	–	2	2
Nonvesicular basalt	126	6	9	141
Quartzite, undifferentiated	1	–	–	1
Total	167	9	13	189

Table 7.4. Flaked stone measurements by material type and artifact morphology, LA 74879

Artifact Morphology		Length (mm)	Width (mm)	Thickness (mm)
		Chert, Undifferentiated		
Angular debris	Mean	25.5	12	9
	Number	2	2	2
	Standard Deviation	4.95	5.66	1.41
	Minimum	22	8	8
	Maximum	29	16	10
Core flake	Mean	29	27	12.5
	Number	2	2	2
	Standard Deviation	0	12.73	2.12
	Minimum	29	18	11
	Maximum	29	36	14
		Pedernal Chert		
Angular debris	Mean	12.75	8.25	4.25
	Number	4	4	4
	Standard Deviation	8.34	3.86	3.4
	Minimum	7	4	1
	Maximum	25	12	9
Biface flake	Mean	16	13.5	3.5
	Number	2	2	2
	Standard Deviation	7.07	3.54	2.12
	Minimum	11	11	2
	Maximum	21	16	5
		Obsidian, Undifferentiated		
Angular debris	Mean	14	6	5
	Number	1	1	1
	Standard Deviation	–	–	–
	Minimum	14	6	5
	Maximum	14	6	5
Core flake	Mean	15	13	4
	Number	1	1	1
	Standard Deviation	–	–	–
	Minimum	15	13	4
	Maximum	15	13	4
Biface flake	Mean	11	10	2
	Number	1	1	1
	Standard Deviation	–	–	–
	Minimum	11	10	2
	Maximum	11	10	2

Table 7.4 (continued)

Artifact Morphology		Length (mm)	Width (mm)	Thickness (mm)
		Polvadera Obsidian		
Angular debris	Mean	8	5	2
	Number	1	1	1
	Standard Deviation	–	–	–
	Minimum	8	5	2
	Maximum	8	5	2
Biface flake	Mean	7.67	6.67	1.67
	Number	3	3	3
	Standard Deviation	0.58	0.58	0.58
	Minimum	7	6	1
	Maximum	8	7	2
	Maximum	8	7	2
		No Agua Obsidian		
Angular debris	Mean	16	10	9
	Number	1	1	1
	Standard Deviation	–	–	–
	Minimum	16	10	9
	Maximum	16	10	9
Bipolar flake	Mean	30	22	13
	Number	1	1	1
	Standard Deviation	–	–	–
	Minimum	30	22	13
	Maximum	30	22	13
		Nonvesicular Basalt		
Angular debris	Mean	15.875	9	5.125
	Number	8	8	8
	Standard Deviation	7.75	5.1	5
	Minimum	8	5	1
	Maximum	31	20	17
Core flake	Mean	23.33	22.5	7.17
	Number	6	6	6
	Standard Deviation	8.52	7.15	5.91
	Minimum	11	12	3
	Maximum	34	29	19
Biface flake	Mean	11.39	9.96	2.13
	Number	23	23	23
	Standard Deviation	5.22	3.3	1.01
	Minimum	4	6	1
	Maximum	27	18	6

Note: angular debris and whole flakes only

stage biface manufactured from undifferentiated Jemez obsidian was probably an undifferentiated style probable projectile point tip (Fig. 7.6). The tip measured 12 by 8 by 2 mm and was mapped just north of the artifact concentration. Last, a middle-stage biface of Pedernal chert is an unidentifiable concave-stemmed projectile point fragment (Fig. 7.7). The proximal fragment measured 9 by 14 by 4 mm and was found east of the artifact concentration. It is too small to assign it to a definite projectile point style.

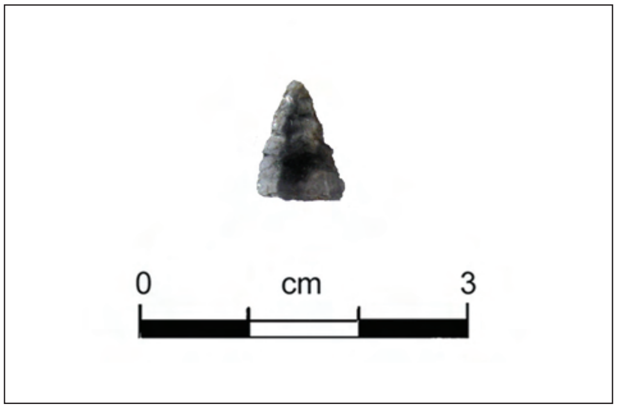


Figure 7.6. Jemez obsidian projectile point tip from LA 74879.

The larger portion of the flaked stone debitage and two tools were associated with Artifact Concentration 2, on the west side of the highway (Fig. 7.1, Table 7.5). This assemblage accounted for 62 percent (n = 118) of the artifacts mapped within the highway right-of-way. An additional four tools were found in the vicinity of the concentration. Artifact Concentration 2 was a major activity area measuring about 12 by 6 m. The area was a major locus for core and biface reduction strategies employing both the local basalt and all three of the imported material types. Late-stage core reduction and biface or tool production/ maintenance activities may have centered on refurbishing hunting equipment, as suggested by the broken projectile points. The various side and end scrapers denote a wide range of activities from woodworking to subsistence-related activities. Unfortunately, no diagnostic projectile points or tools were recovered that associated the activity area with a specific cultural and temporal affiliation.

Three artifacts were collected from the 8 m wide construction zone: an undifferentiated Jemez obsidian biface flake, a piece of basalt angular debris, and a Polvadera obsidian late-stage biface projectile point preform fragment (Table 7.6). The medial point fragment was found in the initial surface strip of grid unit 470N/528E at the southwest edge of the construction zone. No additional cultural material was found in the test unit, and backhoe trenches and hand-dug test units found no subsurface cultural material in the construction zone.

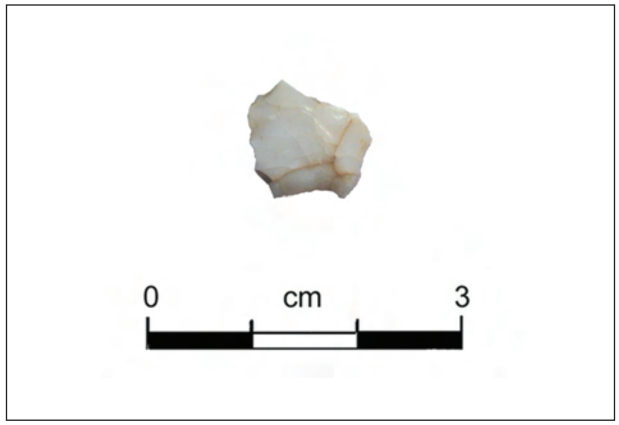


Figure 7.7. Pedernal chert concave-stemmed projectile point base from LA 74879.

Parrish et al. (2008:35) concluded that LA 78479 served as a short-term or seasonal locus of flaked stone tool production in support of subsistence activities. The in-field analysis and the three artifacts collected from the construction zone during the current project support this conclusion. The flaked stone assemblage was dominated by local basalt with smaller frequencies of imported Pedernal chert, Polvadera obsidian, and undifferentiated Jemez obsidian from the Jemez mountain area. All of the materials were involved with late-stage core and biface reduction. Tools were limited to undifferentiated projectile point fragments and scrapers. The projectile point fragments suggest that hunting was probably the basis of the occupation, but no additional diagnostic artifacts were recorded. The site may have had several reuse episodes, suggested by the two artifact concentrations, but occupations were probably of short duration.

Euroamerican Artifacts

A total of 148 Euroamerican artifacts were subjected to in-field analysis at LA 74879 (Table 7.7); only two were collected. The remaining artifacts

Table 7.5. Flaked stone artifact assemblage, Artifact Concentration 2, LA 74879

Morphology	Artifact Concentration 2
Polvadera Obsidian	
Biface flake	3
Core flake	3
Biface/side scraper	1
Subtotal	7
Obsidian Undifferentiated	
Core flake	1
Pedernal Chert	
Biface flake	2
Core flake	1
Subtotal	3
Basalt	
Biface flake	58
Core flake	41
Angular debris	7
Uniface/sidescraper	13
Subtotal	119
Total	130

Table 7.6. Flaked stone artifacts from the construction zone, LA 74879

FS No.	Material	Quality	Morphology	Function	Cortex	Portion	Platform Type	Wear Pattern	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
3	obsidian	glassy and flawed	biface flake	unutilized flake	0%	proximal	multifaceted and abraded	–	10	12	3	0.4
4	basalt	fine-grained	angular debris	unutilized angular debris	0%	whole	–	–	29	26	9	7.4
5	Polvadera obsidian	glassy	late-stage biface	projectile point preform	0%	indeterminate fragment	single faceted and abraded	projectile point blade edge	18	19	4	1.8

Table 7.7. Euroamerican artifacts, LA 74879

Type	Function	Count	% of Total
	Unassignable		
Unidentifiable	bottle	32	21.6%
	can	5	3.4%
	Food		
Canned goods	unidentifiable, canned goods	2	1.4%
	coffee can	1	0.7%
	condensed milk, evaporated milk	1	0.7%
	meat can	4	2.7%
Bottled goods	soy sauce bottle with Oriental markings	1	0.7%
	Indulgences		
Miscellaneous, beverage	beverage can	9	6.1%
	crown cap	2	1.4%
	beverage bottle	24	16.2%
Soda/carbonated beverage	soda bottle	25	16.9%
	soda can	3	2.0%
Beer	beer bottle	5	3.4%
	beer can	11	7.4%
Liquor	brandy bottle	10	6.8%
	liquor flask	1	0.7%
	whiskey bottle	9	6.1%
	Construction/Maintenance		
Fencing	barbed wire	1	0.7%
	Transportation		
Lubricants/fluids/fuel	motor oil can	2	1.4%
Total		148	100.0%

were either outside or inside the APE but displayed distinguishable characteristics indicating the materials were less than 50 years old.

Distribution of the artifacts included four functional categories: indulgences (n = 99, mnv = 41), food (n = 9, mnv = 8), transportation (n = 2), and construction/maintenance (n = 1) items. The remaining artifacts (n = 37, mnv = 8) consisted of nondiagnostic bottle and can fragments. Common artifact types within the indulgences category were fragments of soda (n = 28, mnv = 4) and liquor (n = 36, mnv = 20) bottles. Food containers were typified by canned (n = 6) and bottled (n = 1) goods, including a soy sauce bottle with Oriental markings (n = 1, mnv = 1). A fragment of barbed wire and two motor oil cans were identified with the construction/maintenance and transportation categories, respectively.

Based on diagnostic attributes, the majority of Euroamerican artifacts are materials associated with use of the area after the establishment of NM 74 in 1926. Many of these artifacts date to the late 1960s and early 1970s. However, three artifacts represent a minimum of two meat cans produced with technologies dating to the late nineteenth or early twentieth century.

LA 74879 is immediately north of the rest area along NM 74/US 285. The presence of high quantities of indulgences and food containers presumably represents picnicking activities at the benches and window discard from vehicles travelling along US 285 during the middle-to-late twentieth century. The presence of two oil cans may indicate the use of chainsaws and the additional use of the area for fuel gathering during this period. The two meat cans dating prior to NM 74 cannot be linked to a specific activity but could represent use of the site by any number of different ethnic affiliations during the late nineteenth century.

Recommendations

Parrish et al. (2008:35) concluded that the prehistoric component of LA 78479 served as a short-term or seasonal locus of flaked stone tool production in support of subsistence activities. This conclusion was maintained by the results of the OAS investigations. Unspecified projectile point fragments indicate hunting was most likely carried out from this small site. The assignment of an unspecified prehistoric cultural and temporal affiliation still applies, because no additional diagnostic artifacts were found. The majority of the Euroamerican artifacts represent materials associated with use of the area after the establishment of NM 74 in 1926. Many of these artifacts date to the late 1960s and early 1970s. However, three artifacts represent a minimum of two meat cans produced with technologies dating to the late nineteenth or early twentieth century. LA 74879 is immediately north of the rest area along NM 74/US 285, and the presence of high quantities of indulgences and food containers presumably represents picnicking activities at the benches and window discard from vehicles travelling along US 285 during the middle-to-late twentieth century.

Archaeological testing within the APE indicates that cultural material is limited to three flaked stone artifacts and two Euroamerican artifacts. These artifacts were confined to the surface, and no subsurface deposits were encountered in the six test units and two backhoe trenches excavated within the APE. The few surface artifacts are essentially identical to the bulk of the artifacts preserved outside of the APE. No additional cultural deposits or features were discovered that might enhance the dating or interpretation of the simple artifact scatters beyond what has been recorded and described.

The testing program determined that, beyond what has been documented, the portion of LA 78479 extending into the APE is not likely to yield additional information important to the understanding of local or regional history or prehistory. The portion of the site within the APE therefore is not considered eligible for nomination to the *National Register of Historic Places*, and no further archaeological investigations are recommended. However, the larger portion of the site preserved outside of the current APE may contain significant buried deposits. The portions of LA 74879 preserved outside of the tested APE should still be considered eligible for nomination to the NRHP under Criterion D. This site area should be avoided and preserved in place.

8. LA 144951 (AR-03-02-06-1236)

Initially described by Townsend (2005), LA 144951 was reexamined by Parrish et al. (2008). The site consisted of six stone clusters on the west side of US 285 and an associated Euroamerican artifact scatter dating to after 1945 (Fig. 8.1). Approximately 80 percent of these cultural materials are within the right-of-way. LA 144951 measures 76 m north-south by 21 m east-west and encompasses an area of 1,432 sq m. It contains six features.

Environment

LA 144951 is on a gradual, east-facing alluvial slope about 1.6 mi (2.57 km) east of Comanche Canyon. Soils on the site are classified as Montecito loam, an alluvial soil derived from the weathering of basalt. These soils occupy landforms with slopes up to 15 percent. The Montecito grades into gravelly, sandy loam with depth. The soil association of the area is of the Torriorthents-Haplargids-Calciorthids Land. Typically, these calcic soils are shallow to somewhat deep, cobbly, and stony. They occur with basalt outcrops and bedrock (USDA-NRCS 2009; Maker et al. 1974).

About 30 percent of the site surface is obscured by vegetation and juniper/piñon duff (Fig. 8.2). The vegetative overstory consists of juniper and piñon, with the density of trees varying across the site. The understory is dominated by sage, rabbitbrush, various grasses, and forbs.

Treatment

Prior to testing, all artifacts within the highway right-of-way were mapped and subjected to in-field analysis. The majority of these artifacts are preserved outside of the APE and will not be effected by the proposed construction project. A single soda bottle in the APE was collected. The six previously recorded features were photographed and mapped to provide baseline data regarding construction techniques. Feature 5 and parts of Feature 6 were located within the APE and excavated to determine the nature of their deposits. Four test pits were judgmentally placed to evaluate subsurface fill near the proposed features and the area of the APE designated for additional drainage work. These hand-dug test units were excavated into sterile soil to a depth of 50 cm below the current ground surface. An auger test was additionally placed in the base of each pit to explore depths below those reached by hand excavation. No artifacts or cultural deposits were encountered in either the test pits or auger tests. The APE in this area has been previously bladed during maintenance activities along both the shoulders and in a wider area around the drainage ditch at this locality. At least the upper 20 cm of each test pit contained disturbed soil originating from these maintenance activities. The lower 30 cm of undisturbed A-horizon soils were sterile. The same soil profiles were found in each test pit, and these are best exemplified by the larger backhoe profile.

Failing to find any intact subsurface deposits during the hand excavations, a backhoe was used to create a 12 m long east-west backhoe trench to look for more deeply buried deposits and to create a profile from which soil formation processes could be examined. The trench was positioned across the widest portion of the APE in the vicinity of the previously recorded features. This trench extended 1.4 m below the present ground surface. No buried surfaces or cultural deposits were encountered. The locations of features, artifacts, test pits, and backhoe trenches are shown in Figure 8.1.

Backhoe Trenches

One backhoe trench was excavated on LA 144951 along the US 285 right-of-way between the road shoulder and the fenceline. BHT 1 was an east-trending trench in the west highway right-of-way (Fig. 8.3). The surface layer in the vicinity of the trench consisted of disrupted A-horizon material

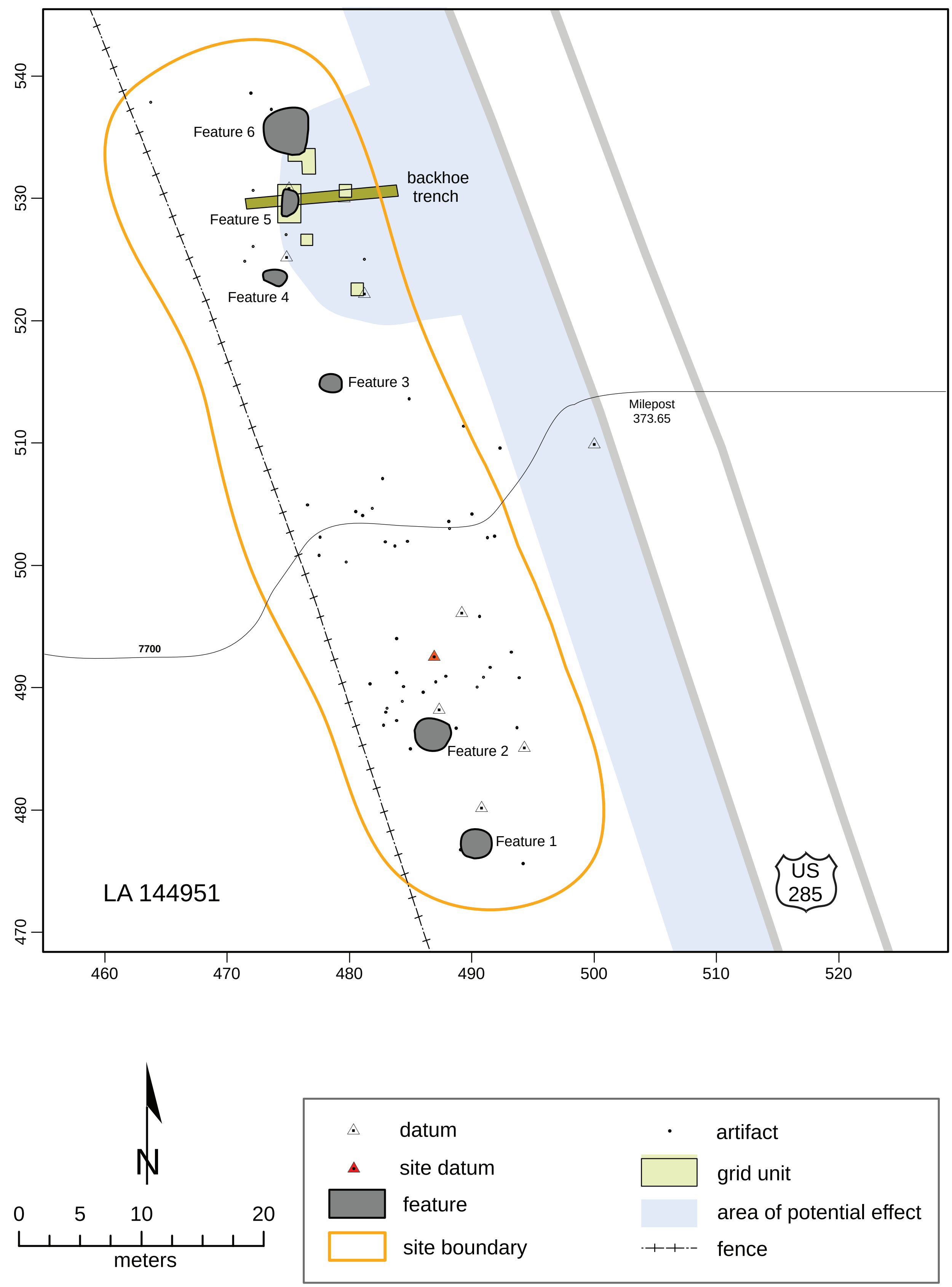


Figure 8.1. Site plan, LA 144951.

Figure 8.2. Environment of LA 144951.

extending 20 cmbs. This material originated from ground-disturbing road and ditch construction. Beneath the disturbed surface layer, a comparatively intact A horizon persisted to 50 cmbs. The soil matrix was weakly structured, consisting of dark brown silt and fine sand with fine to medium, subangular to blocky peds. Fine to medium-sized roots, associated bioturbation, and basalt pebble and cobble inclusions were common. The A-horizon boundary with the underlying B horizon was wavy and gradual.

The B-horizon soil consisted of weakly structured, prismatic and blocky brown silt with fine sand and moderate clay development. Fine roots and root pores were plentiful in the B horizon, which extended as deep as 70 cmbs.

The B-horizon boundary was wavy and clear; it was immediately underlain by an intermittent Bk/Ck soil. Partially defined by carbonate development along soil pores and ped faces, the Bk horizon was intermittent, diffuse, and weakly expressed. It was immediately underlain by Ck- and K-horizon soils extending as deep as 125 cmbs, terminating on basalt bedrock. The Ck horizon consisted of indurated and fragmented caliche with highly fractured and weathered basalt cobbles and pebbles derived from bedrock. The trench terminated on basalt bedrock

No cultural deposits, artifacts, or features were discovered in the backhoe trench on LA 144951.

Features

Six features were identified by Parrish et al. (2008). All features appear similar in form and material. These features consist of piles of vesicular basalt, some covered in caliche. Archaeological excavation of Features 5 and 6 (both in the APE) uncovered asphalt pavement fragments within their soil matrixes. Based on morphological similarities, it appears likely that all six features described by Parrish et al. (2008) at LA 144951 are constructed by pushing piles of stone and earth away from US 285 during road maintenance and culvert installation. Similar push piles were created while backfilling the backhoe trench. It is felt that each of the six “features” are actually maintenance remnants rather than cultural features.

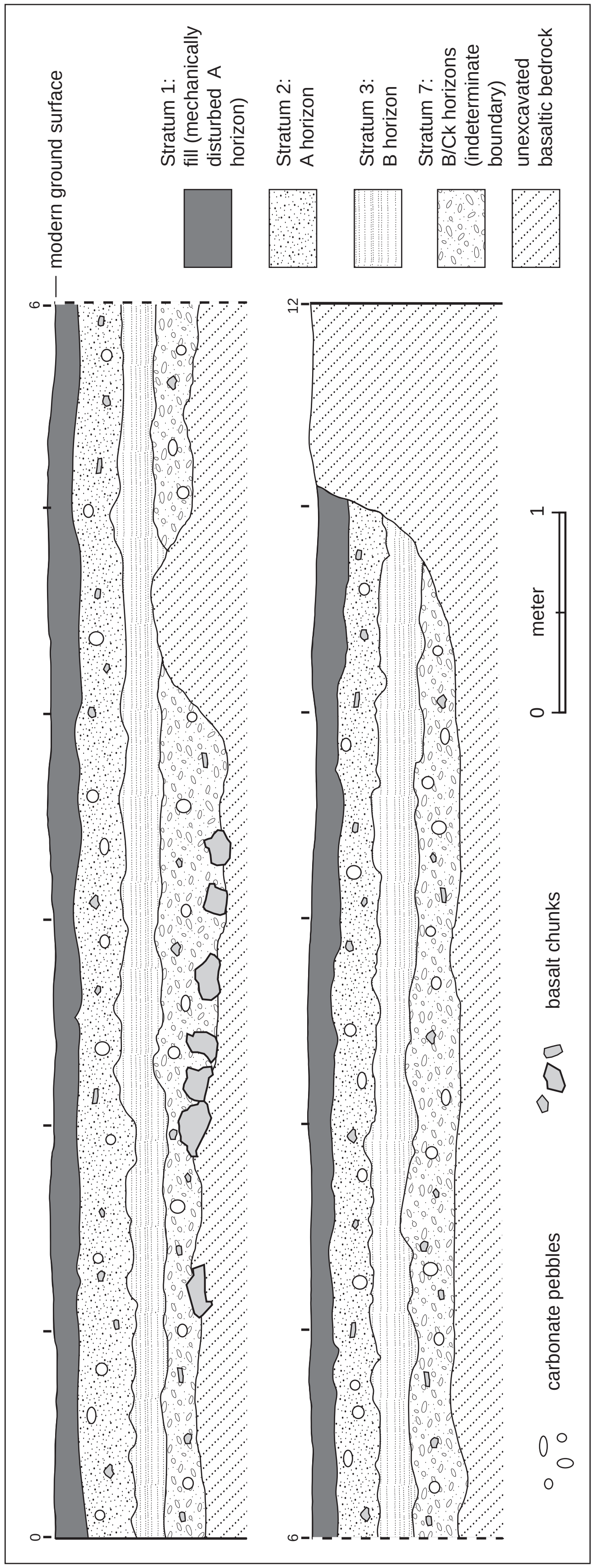


Figure 8.3. North wall profile of Backhoe Trench 1, LA 144951.

Feature 1

Feature 1, a vesicular basalt cobble scatter, presumably represents a push pile associated with US 285. The scatter measured 2.00 m (north-south) by 1.40 m (east-west) (Figs. 8.4 and 8.5).

Feature 2

Feature 2 is a vesicular basalt cobble and caliche-covered rock scatter. The caliche coating suggests these rocks were obtained from a subsurface context and likely represent a push pile created during the addition of a culvert to US 285. Feature 2 measured 1.90 m (north-south) by 1.50 m (east-west) (Figs. 8.6 and 8.7).

Feature 3

Feature 3 is a vesicular basalt cobble scatter. The few cobbles were strewn in a somewhat linear fashion measuring 1.70 m (east-west) by 0.80 m (north-south). The arrangement appears to be associated with maintenance along US 285 (Figs. 8.8 and 8.9).

Feature 4

Feature 4, a vesicular basalt scatter, consisted of only seven cobbles. Again, this is viewed as a blading remnant beside the drainage ditch rather than a cultural feature. The cobbles appeared in a 2.10 m (east-west) linear arrangement that was 90 cm (north-south) wide (Figs. 8.10 and 8.11).

Feature 5

Feature 5 was a concentration of vesicular basalt measuring 3.00 m (north-south) by 2.00 m (east-west) (Figs. 8.12 and 8.13). Grid units surface-stripped of about 10 cm of loose surface fill around the rock included abundant asphalt and recent glass. The rock sat on the surface with no subsurface depth. No charcoal, oxidation, or other artifact types were exposed. This basalt rock concentration was created by mechanical blading and is not a cultural feature.

Feature 6

Feature 6 was a vesicular basalt concentration measuring 4.20 m (north-south) by 3.30 m (east-west) (Figs. 8.14 and 8.15). The edge of the concentration extends into the APE in the area of the proposed culvert maintenance activities. The grid unit surface-stripped adjacent to the concentration contained abundant asphalt and recent glass. Again, the rock sat on the surface with no lower depth. No charcoal, oxidation, or other artifact types were encountered. Feature 6 was probably created by previous mechanical balding associated with culvert maintenance and is not a cultural feature.

Cultural Materials

A total of 142 Euroamerican artifacts were identified and analyzed within the right-of-way of US 285 (Table 8.1). One artifact, a soda bottle with the words "please do not litter," was found within the APE and collected.

Euroamerican artifact distribution included three functional categories: indulgences (n = 71, mnv = 31), food (n = 9, mnv = 9), and construction/maintenance (n = 1). Indulgence items included soda (n = 10), beer (n = 25, mnv = 6), and whiskey (n = 8, mnv = 3) bottle fragments. Food artifacts were tapered meat cans (n = 2), sardine cans (n = 1), and No. 303 vegetable or fruit cans (n = 3). A barbed wire fragment used in the installation of the right-of-way fence was placed in the construction/maintenance category. The remaining 61 artifacts could not be assigned to a specific function.

Parrish et al. (2008:49) recorded one solder-seam can potentially dating to the nineteenth century, but the can could not be found during the OAS archaeological investigations. All diagnostic Euroamerican artifacts displayed manufacturing attributes produced with automated machine technologies. None of the artifacts definitively date prior to 1960, and they are assumed to be associated with vehicle-window discard, picnicking, and fuelwood gathering after the establishment of NM 74.

Recommendations

The features documented by Townsend (2005) and Parrish et al. (2008:47–49) at LA 144951 are

Figure 8.4. Feature 1, LA 144951.

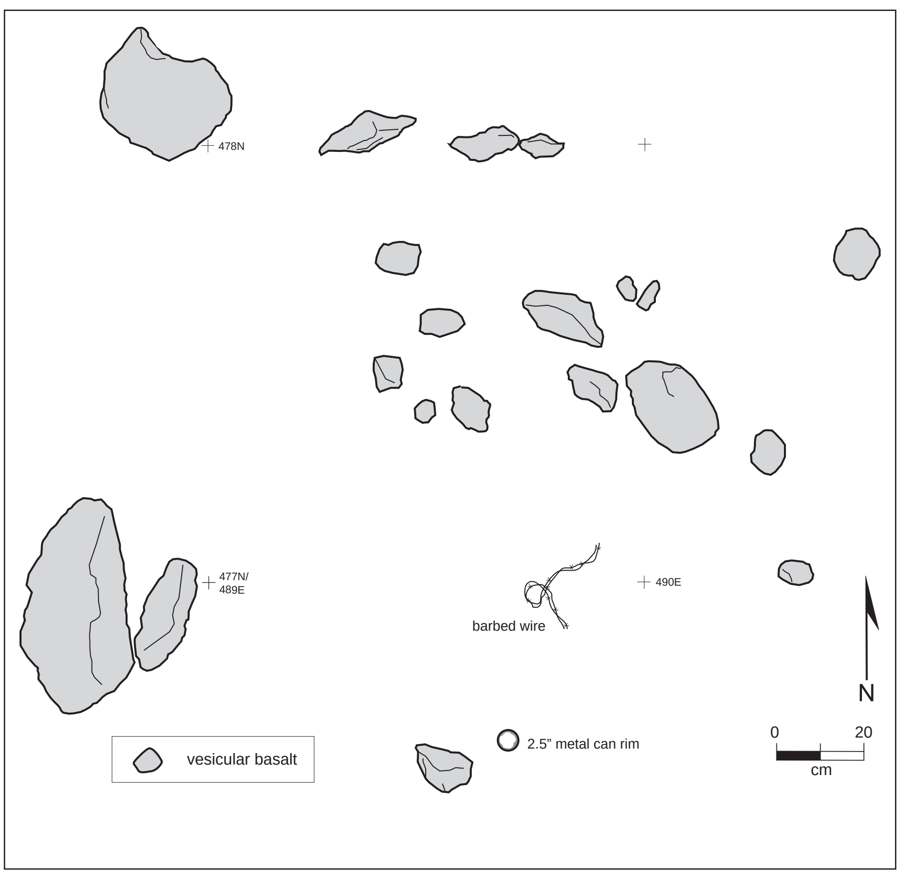


Figure 8.5. Plan of Feature 1, LA 144951.

Figure 8.6. Feature 2, LA 144951.

Figure 8.7. Plan of Feature 2, LA 144951.

Figure 8.8. Feature 3, LA 144951.

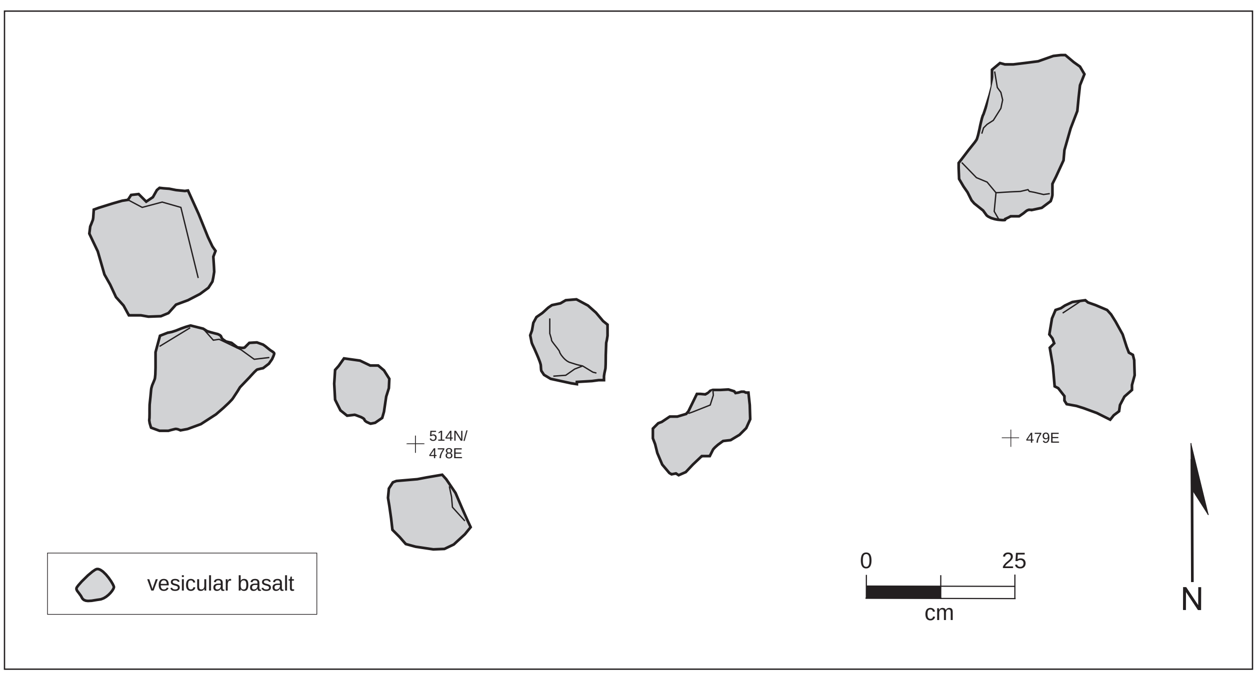


Figure 8.9. Plan of Feature 3, LA 144951.

Figure 8.10. Feature 4, LA 144951.

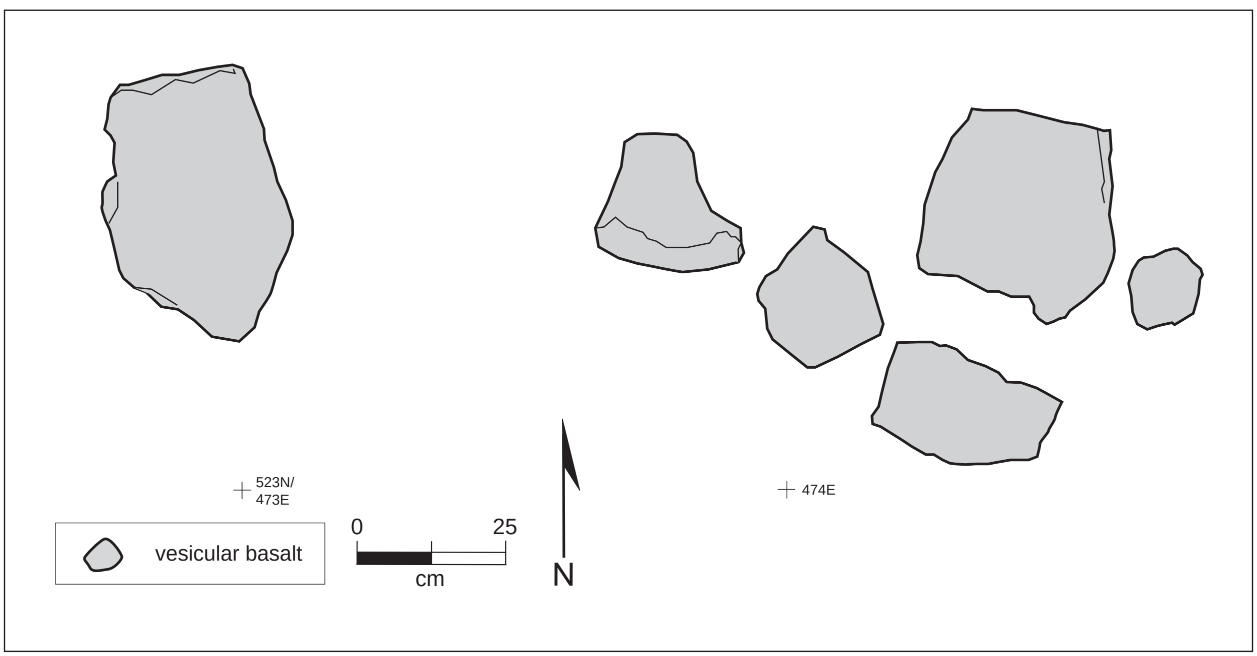


Figure 8.11. Plan of Feature 4, LA 144951.

Figure 8.12. Feature 5, LA 144951.

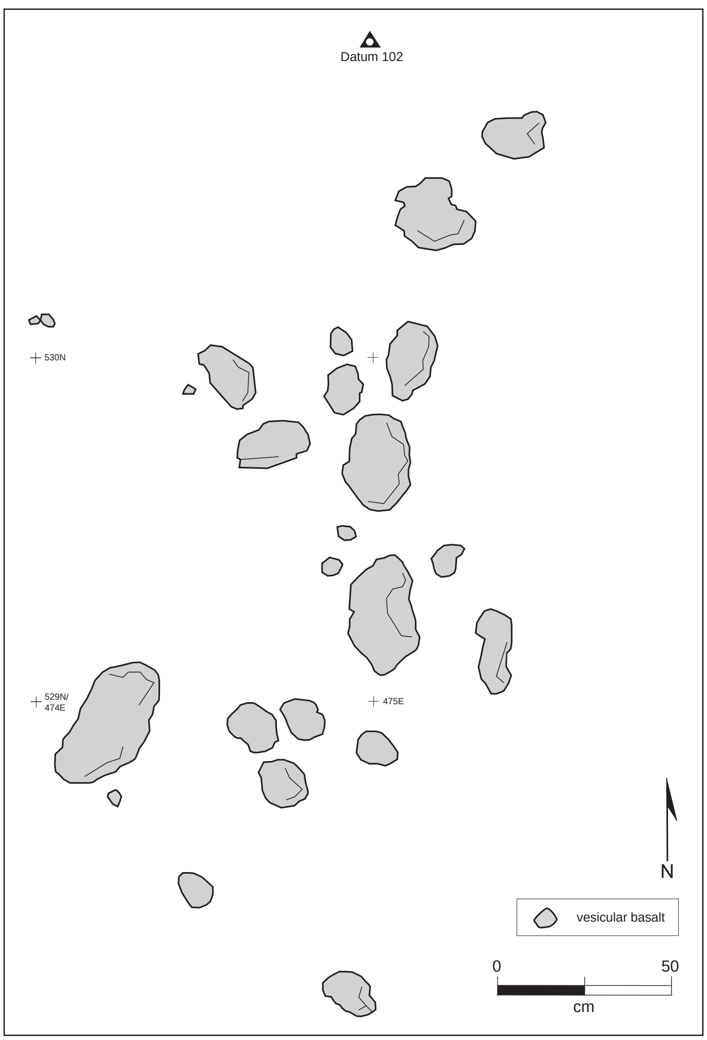
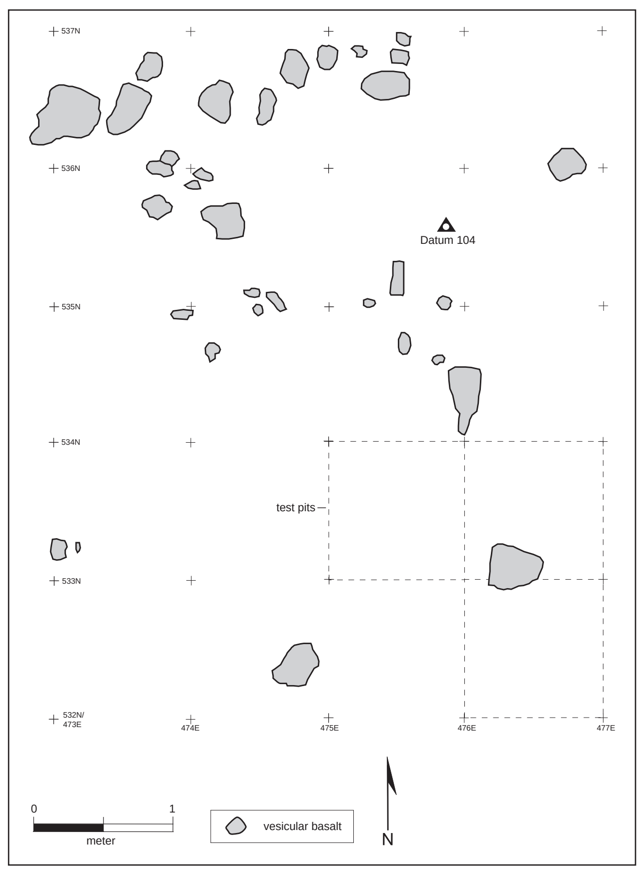


Figure 8.13. Plan of Feature 5, LA 144951.

Figure 8.14. Feature 6, LA 144951.

Figure 8.15. Plan of Feature 6, LA 144951.



considered modern remnants of mechanical blading along the highway and culvert—not cultural features. Most of the recorded Euroamerican artifacts date to the later half of the twentieth century, and only a few may date to before 1960. Most of the Euroamerican artifacts probably originated as discard from vehicular traffic. A single Nesbitt bottle was collected from the APE. The four test pits and one backhoe trench revealed no subsurface artifacts or cultural deposits. Features 5 and 6, within the APE, were found to be products of mechanical blading along the culvert and highway and not cultural features. The other features, similar in appearance, are also considered mechanical push piles rather than cultural features. The mapping and photography of these "features" effectively exhausts their potential for contributing to regional history. The in-field analysis has exhausted the potential of the recent Euroamerican artifacts to inform upon past consumption and discard patterns. The portion of LA 144951 overlapping the APE and the site as a whole are not considered eligible for nomination to the *National Register of Historic Places*, and no further archaeological investigations are recommended.

Table 8.1. Euroamerican artifacts, LA 144951

Type	Function	Count	Column %
	Unassignable		
Unidentifiable	bottle	50	35.2%
	can	10	7.0%
	bucket/pail	1	0.7%
	Food		
Canned goods	unidentifiable, canned goods	2	1.4%
	meat can	2	1.4%
	sardine can	1	0.7%
	vegetable or fruit can	3	2.1%
Bottled goods	vinegar bottle	1	0.7%
	Indulgences		
Miscellaneous, beverage	beverage can	11	7.7%
	beverage bottle	15	10.6%
Soda/carbonated beverage	soda bottle	2	1.4%
	soda can	8	5.6%
Beer	beer bottle	23	16.2%
	beer can	2	1.4%
Liquor	unidentifiable, liquor	1	0.7%
	liquor flask	1	0.7%
	whiskey bottle	8	5.6%
	Construction/Maintenance		
Fencing	barbed wire	1	0.7%
Total		142	100.0%

9. LA 160196 (AR-03-02-06-1307)

Located on both the east and west sides of US 285, LA 160196 was recorded by Parrish et al. (2008:51–53) during a survey conducted to prepare for the current phase of highway construction. It was described as a multicomponent site with occupation during the Early to Middle Archaic periods (ca. 3500–1800 BC) by mobile hunters and gatherers, the late eighteenth or nineteenth century by Jicarilla Apaches (ca. AD 1750–1900), and the mid-twentieth century by road construction and maintenance crews (AD 1950+). Since LA 160196 is on both sides of US 285, the central portion of the site was evidently removed during initial highway construction (Fig. 9.1). The site measures 102 m north-south by 119 m east-west and encompasses and area of roughly 8,628 sq m. It is thought to be between 51 and 75 percent intact. Approximately 50 percent of the site area and artifacts are within the current highway right-of-way.

Environment

LA 160196 is at the crest of a northwest-trending ridge, about 1.1 miles east of Comanche Canyon (Parrish et al. 2008:51). Soils on the site are classified as Montecito loam, an alluvial soil derived from the weathering of basalt. These soils occupy landforms with slopes up to 15 percent. The Montecito grades into gravelly, sandy loam with depth. The soil association of the area is of the Torriorthents-Haplargids-Calciorthids Land. Typically, these calcic soils are shallow to somewhat deep, cobbly and stony. They occur with basalt outcrops and bedrock (USDA-NRCS 2009; Maker et al. 1974).

About 60 percent of the site surface is obscured by vegetation and juniper-piñon duff, which has stabilized those areas (Fig. 9.2). The vegetative overstory contains mature piñon and juniper trees, and the understory is dominated by sage and grasses.

Treatment

Prior to testing, all artifacts within the highway right-of-way were mapped and subjected to in-field analysis. The majority of these artifacts are preserved outside of the APE and will not be effected by the proposed construction zone. Five flaked stone artifacts and no Euroamerican artifacts were collected from the APE. Six test pits were judgmentally placed to evaluate subsurface fill within the APE. Three test pits were spaced equidistantly across the site on each side of the road. The entire 8 m APE had been heavily bladed during mechanical shoulder work, and massive basalt commonly outcropped, suggesting shallow deposits. The test pits were excavated into sterile soil to a depth of 50 cmbs or until the excavator hit bedrock. In most cases bedrock was encountered between 30 to 40 cmbs, and the initial 30 cm of fill contained abundant asphalt and recent glass.

Cultural material was limited to a single Polvadera obsidian flake in the initial 5 cm of fill in Test Unit 510N/494E at the northwest edge of the site. No additional cultural material was found in the five surrounding surface-stripped grid units. The same soil profiles were found in each test pit, and these are best exemplified in the larger backhoe trench profiles. Backhoe trenches were then placed in roughly the center of the site area on each side of the highway. The 25 m long northwest-southeast backhoe trenches were placed to potentially expose more deeply buried deposits and to create profiles from which soil formation processes could be evaluated. Each trench was excavated to a depth of roughly 1.4 m below the present day ground surface or until bedrock was encountered. Cultural material was limited to a single ephemeral pit designated Feature 7 exposed in the west wall of BHT 2. No other artifacts or subsurface cultural deposits were exposed in the backhoe trenches. A 5 by 9 m area adjacent to the feature and the west edge of the backhoe trench was surface-stripped to search for additional cultural manifestations within the APE. The bucket of the backhoe was used to remove the soil in 5

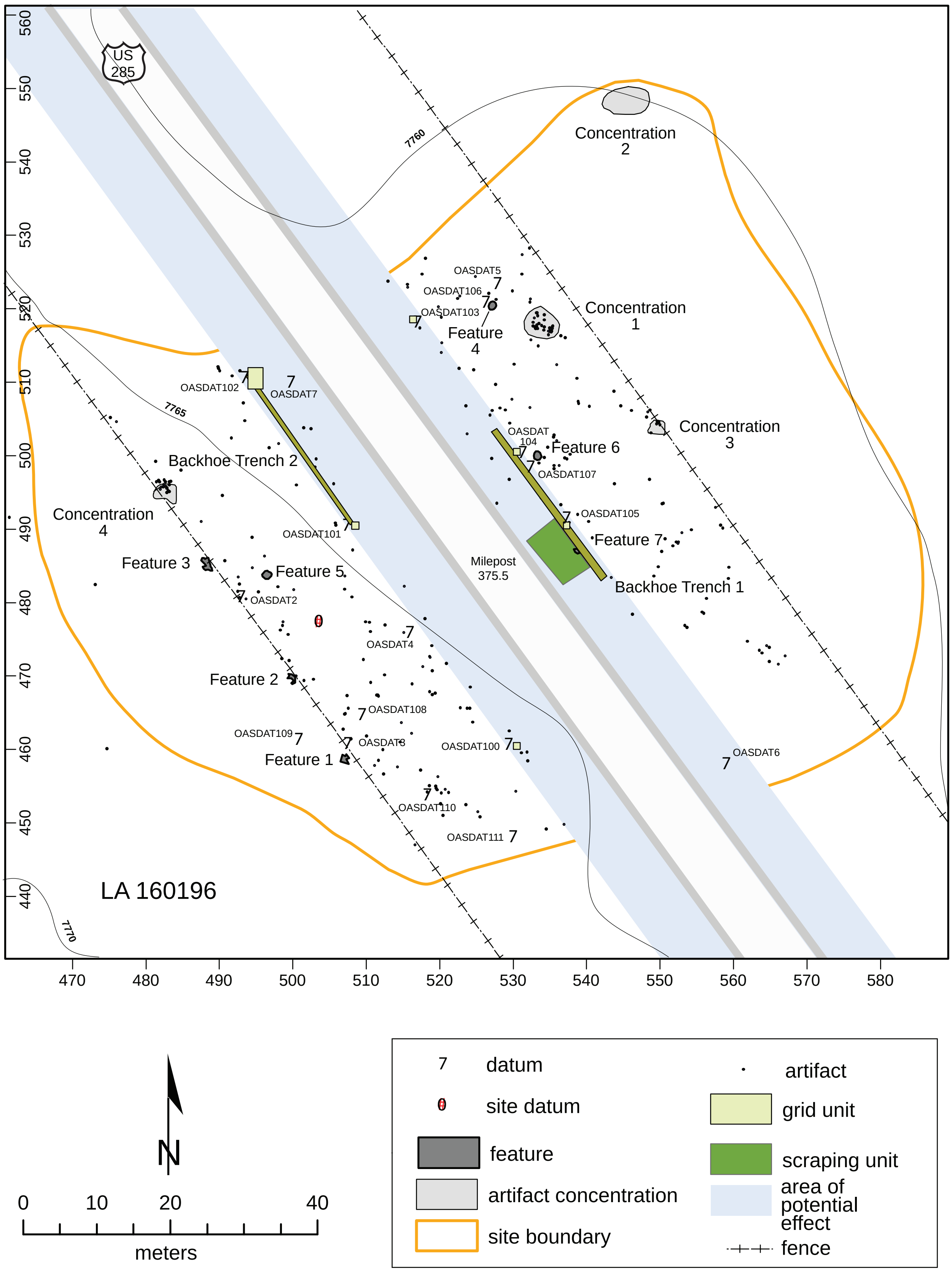


Figure 9.1. Site map, LA 160196.

Figure 9.2. Environment of LA 160196.

cm levels to a depth of 20 cmbs. The truncated mouth of the feature exposed this level in the profile. The surface-stripping was monitored closely, but fill was not screened because of the abundant mechanical disturbance along the shoulder. Asphalt and modern glass was commonly observed in the narrow swipes across the scraping unit, but no prehistoric artifacts, charcoal, or additional cultural manifestations were uncovered. The remaining fill in Feature 7 was removed as a whole.

Backhoe Trenches

Two backhoe trenches were excavated at LA 160196 along the US 285 right-of-way between the road shoulder and the fenceline. BHT 1 (Fig. 9.3) was in the west highway right-of-way; BHT 2 (Fig. 9.4) was along the east side of the highway.

BHT 1 exposed a shallow, poorly developed soil profile. A thin, laterally discontinuous A horizon comprised of silt, very fine sand, plentiful fine to medium-sized roots, and numerous basalt pebbles extended to 25 cmbs. Inclusions of roadside debris were common in this layer. Basalt boulders and bedrock also appeared within 25 cm of the surface along most of the trench. The A horizon was abrupt and irregular. It was immediately underlain by Bk- and Ck-horizon soils with carbonate slips developing along root pores and ped faces. Decomposing, poorly sorted, and poorly rounded basalt pebbles and cobbles derived from weathered bedrock were characteristic in these layers. The backhoe trench excavation was terminated at the basalt bedrock.

BHT 2 revealed a stratigraphic profile similar to that of BHT 1; however, the soil profile was deeper along the middle portion of the trench, revealing massive, earthy-textured caliche.

Feature 7, an ephemeral, roughly basin-shaped pit feature with a charcoal-infused matrix, was exposed in the west wall near the south end of BHT 2. The basin was intrusive through the A horizon and into the underlying A/B transition. The top of the feature was truncated by road construction–related earthmoving. No other cultural materials or artifacts were discovered in the backhoe trenches.

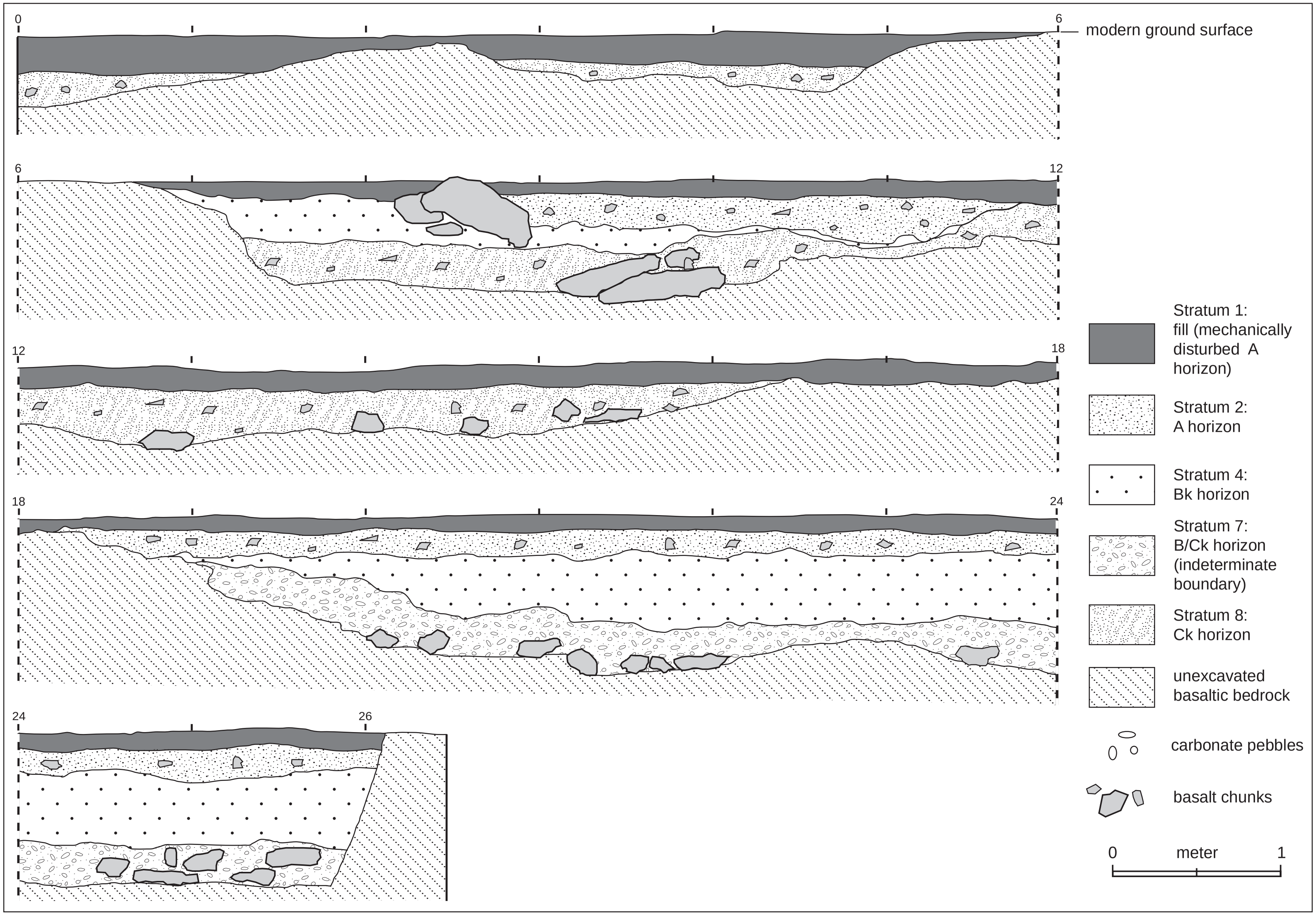


Figure 9.3. East wall profile, Backhoe Trench 1, LA 160196.

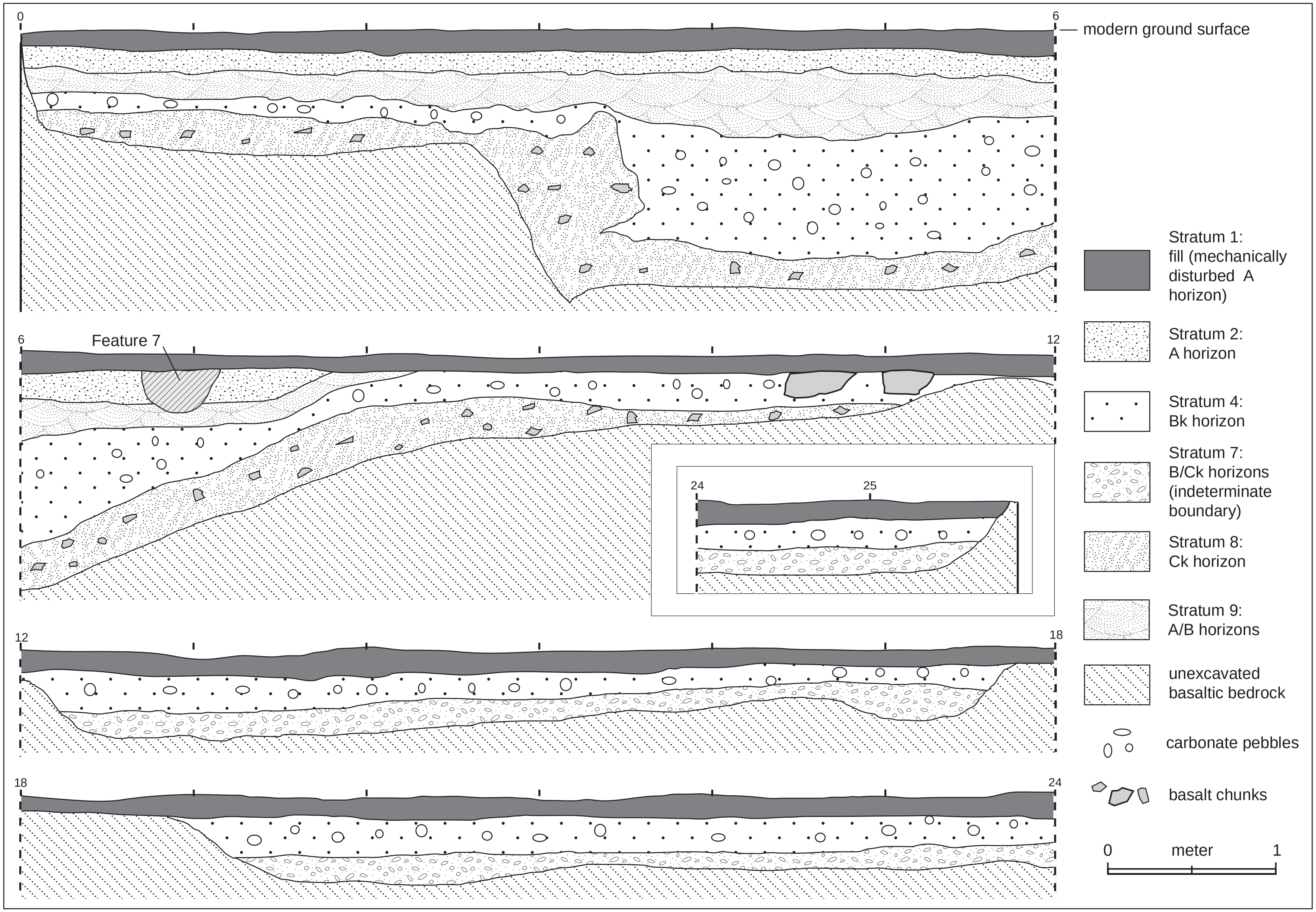


Figure 9.4. West wall profile, Backhoe Trench 2, LA 160196.

Features

Six features were originally recorded at LA 160196: three rock clusters adjacent to the west side of US 285 outside the right-of-way fence, two modern hearths on the east side of US 285 within the right-of-way fence, and a possible hearth on the west side of US 285 within the right-of-way fence. These features were mapped and photographed but will not be affected by the planned construction project. Feature 7 was found in BHT 2 during this project.

Feature 1

Feature 1 is a cobble concentration measuring 1.40 m (north-south) by 1.50 m (east-west) (Figs. 9.5 and 9.6). Features 1, 2, and 3 were lined up on the west side of US 285 along the current right-of way wire fenceline, spaced roughly 20 m apart. Given their location along the fenceline, these concentrations may have functioned as stacked rock supports for wooden fenceposts where the rocky soil prevented digging postholes. They have since been replaced by the metal fenceline.

Feature 2

Feature 2 is a cobble concentration measuring 1.40 m (north-south) by 1.20 m (east-west) (Figs. 9.7 and 9.8).

Feature 3

Feature 3 is a cobble concentration measuring 1.40 m (north-south) by 1.20 m (east-west) (Figs. 9.9 and 9.10).

Feature 4

Feature 4, a circular formation of mostly vesicular basalt cobbles, presumably represents a hearth (Figs. 9.11 and 9.12). A few very large flat vesicular basalt cobbles were arranged around the exterior of the hearth and may have been used as chairs. The hearth is in relatively good condition and measures 1.20 m (north-south) by 1.30 m (east-west), with an interior of 60 by 60 cm. There was no evidence of charcoal inside or outside the hearth. A rusted metal sanitary can with no solder was found northwest of the hearth and may indicate use as recent as the mid to late twentieth century.

Feature 5

Feature 5 is an oblong shaped vesicular basalt cobble concentration (Figs. 9.13 and 9.14). It has the appearance of a deflated hearth but consists of only seven cobbles, which are flush to the ground. Feature 5 has no evidence of charcoal. It measures 1.20 m (north-south) by 0.90 cm (east-west). Its date could not be determined.

Feature 6

Feature 6 is a modern circular hearth, partially deflated, with charcoal particles (Figs. 9.15 and 9.16). The southern edge is washed out, but the existing arrangement consists of vesicular basalt cobbles. It measures 1.20 m (north-south) by 1.00 m (east-west). Since the feature was not excavated, charcoal was visible only on the surface, along with numerous glass fragments and a beer can, suggesting use after 1980. The hearth was probably used by hunters or campers.

Feature 7

Feature 7 was a small ephemeral pit dug into the native soil (Figs. 9.17–9.19). By the time of discovery, the pit had been partially destroyed by shoulder blading, a backhoe trench, and a large root penetrating the base of the pit (Fig. 9.4). Feature 7 was found at a depth of 20 cmbs. It measured 60 cm east-west by 28 cm north-south with a depth of 28 cm (20 to 48 cmbs). Existing dimensions suggest the original pit measured roughly 60 cm in diameter and 50 cm deep. No artifacts were encountered within the feature. The darker soil was charcoal stained and contained sparse tiny charcoal flecks. Charred plant fragments included several common seed taxa (see botanical analysis). Feature fill was collected as a flotation sample and has been processed to gather enough charcoal for radiocarbon dating. This material produced a calibrated AMS date of BC 2470 to 2200 (Beta No. 273549; see Appendix 1). No oxidation was present around the edges of the feature, preventing archaeomagnetic dating methods. The function of Feature 7 is unknown, and the flotation sample failed to yield botani-

Figure 9.5. Feature 1, LA 160196.

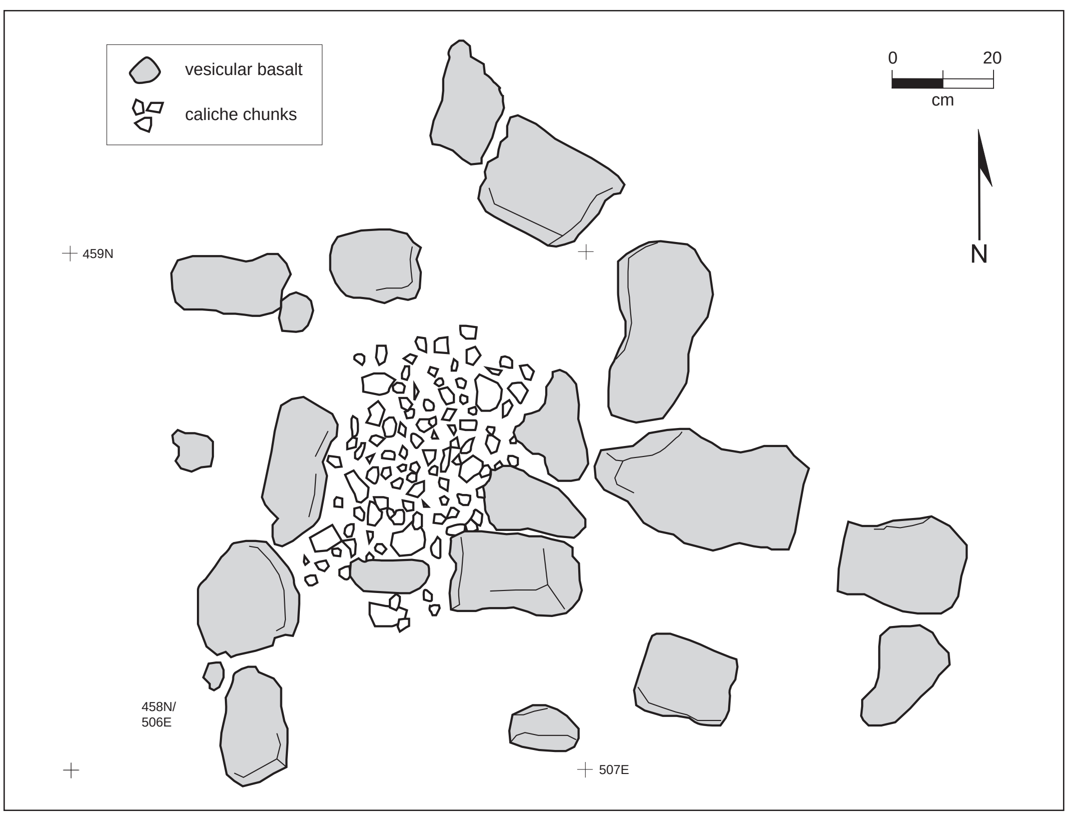


Figure 9.6. Plan of Feature 1, LA 160196.

Figure 9.7. Feature 2, LA 160196.

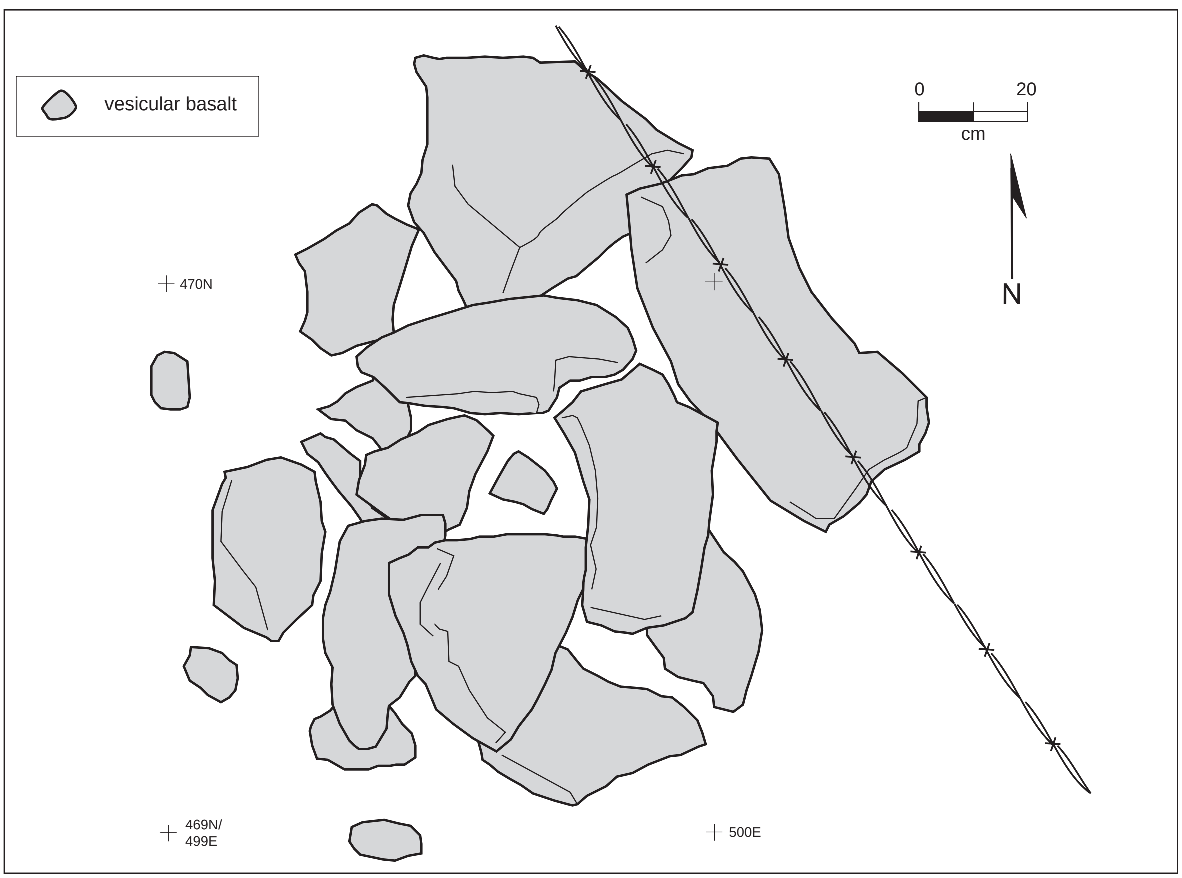


Figure 9.8. Plan of Feature 2, LA 160196.

Figure 9.9. Feature 3, LA 160196.

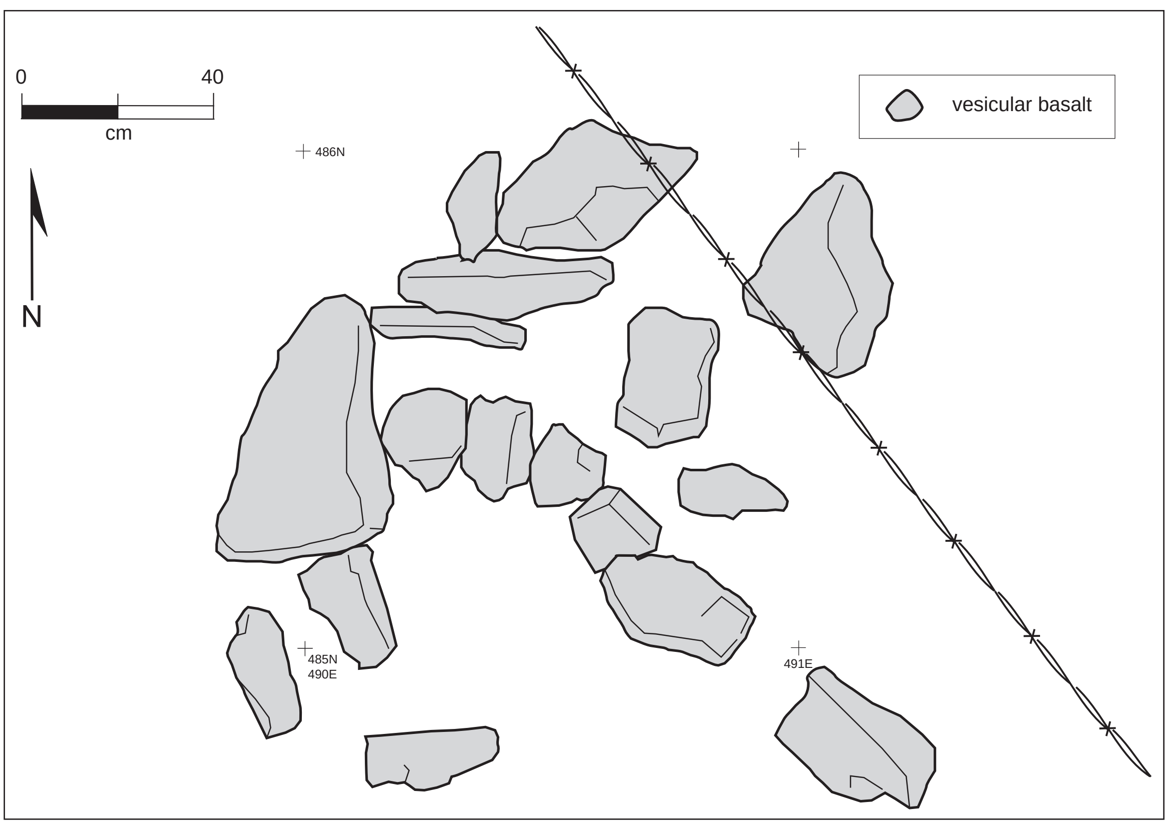


Figure 9.10. Plan of Feature 3, LA 160196.

Figure 9.11. Feature 4, LA 160196.

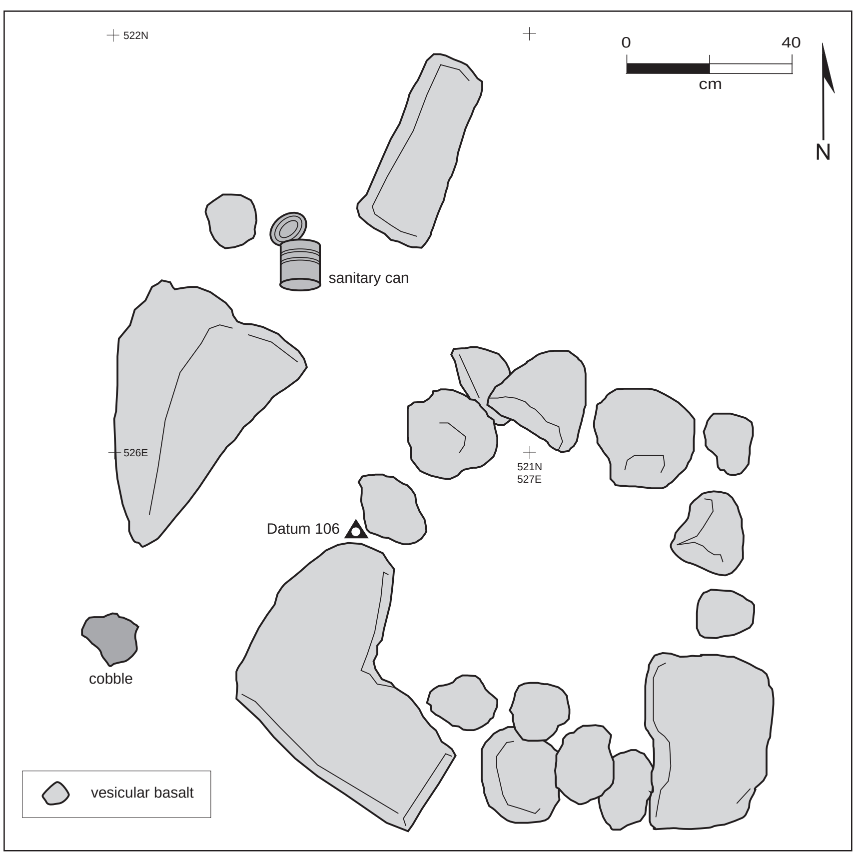


Figure 9.12. Plan of Feature 4, LA 160196.

Figure 9.13. Feature 5, LA 160196.

Figure 9.14. Plan of Feature 5, LA 160196.

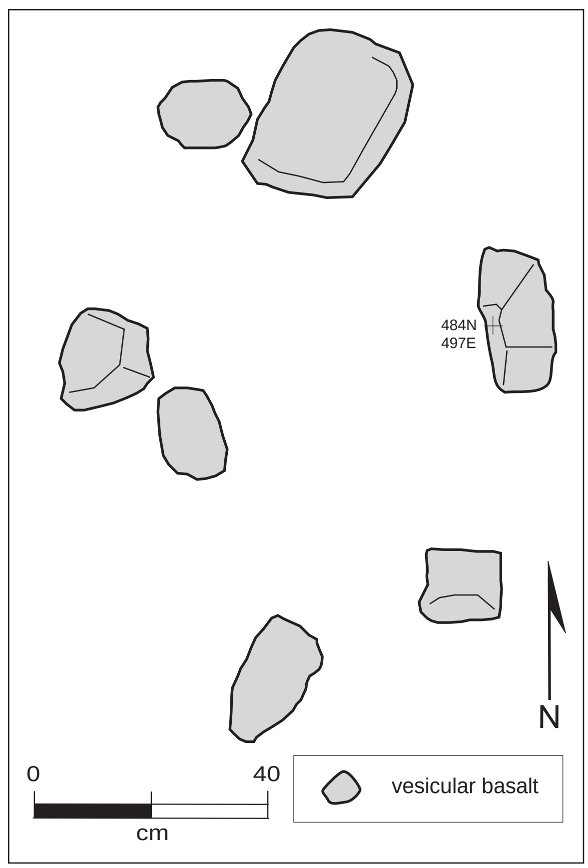


Figure 9.15. Feature 6, LA 160196.

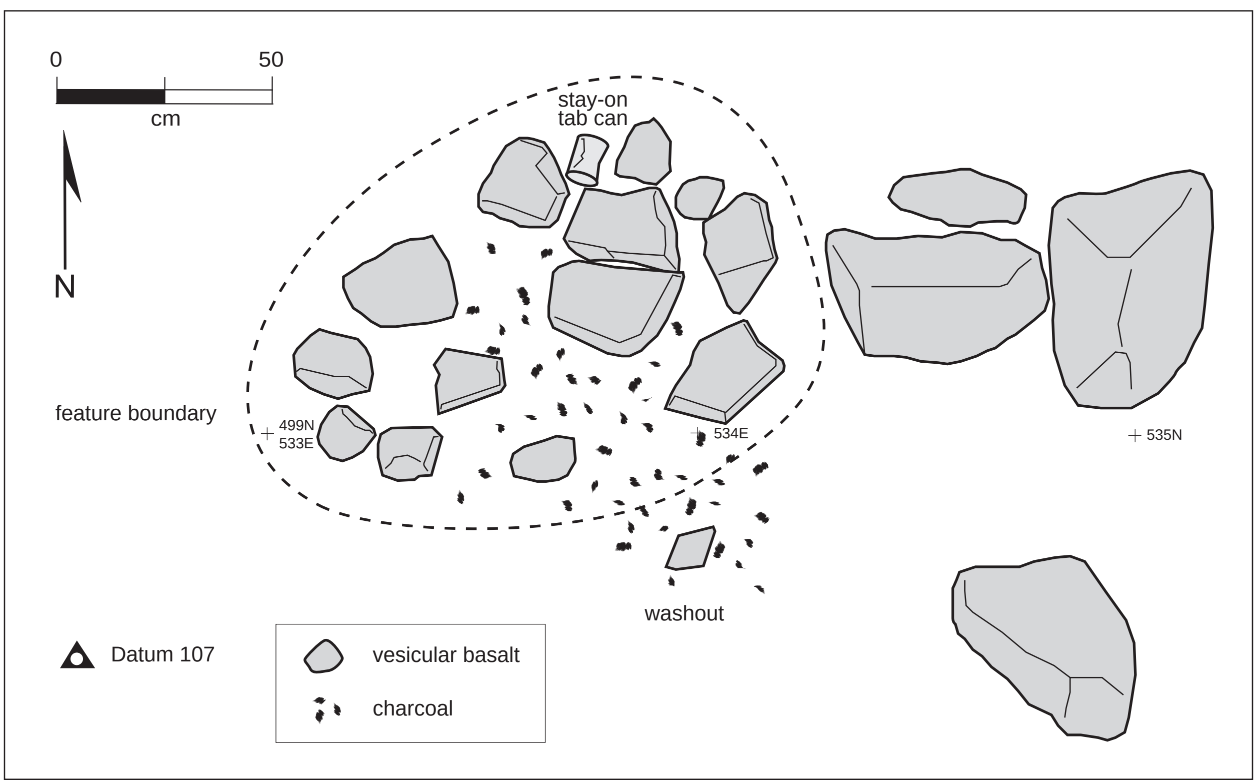


Figure 9.16. Plan of Feature 6, LA 160196.

Figure 9.17. Profile of Feature 7, LA 160196.

Figure 9.18. Feature 7 after excavation, LA 160196.

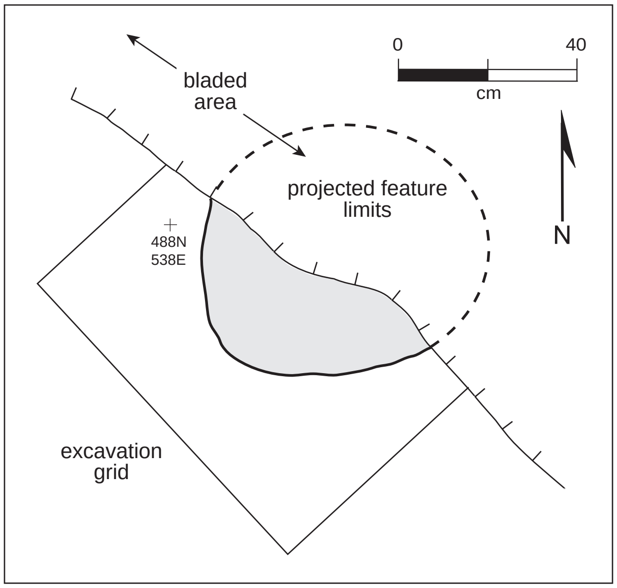


Figure 9.19. Plan of Feature 7, LA 160196.

cal materials associated with cultivated plants. The absence of oxidation and fire-cracked rock, and the minimal charcoal content argue against a thermal feature or hearth. The radiocarbon date overlaps the Middle Archaic occupation of the site suggested by the previously recorded projectile point, which, however, was found on the west side of the highway, away from the feature.

Cultural Materials

A total of 64 flaked stone artifacts, 24 micaceous pottery sherds, and 1,468 Euroamerican artifacts were analyzed within the highway right-of-way. Four of the flaked stone artifacts were collected within the APE, and one flaked stone artifact was found as a result of subsurface investigations. No micaceous pottery or Euroamerican artifacts were removed from the site.

Four large artifact concentrations exist. AC 1 (Fig. 9.20) and AC 2 (Fig. 9.21) are on the east side of US 285, one within the right-of-way, the other outside the right-of-way. Both consist of flaked stone and micaceous pottery sherds, possibly associated with Jicarilla Apache occupation (Parrish et al. 2008:52–53). AC 1 measures 4.4 m north-south by 5 m east-west; AC 2 measures 6.8 m east-west by 4 north-south. Neither of the concentrations was within the APE.

AC 3 (Fig. 9.22) and AC 4 (Fig. 9.23), bottle-glass concentrations inside the right-of-way, date to the twentieth century. AC 3, on the east side of US 285, measured 2.2 m east-west by 2 m north-south. The scatter consisted of 123 glass shards representing a minimum four liquor bottles, all manufactured with an automatic bottling machine (1904+). AC 4, on the west side of US 285, was similar, measuring 3 m east-west by 2.6 m north-south, and comprised of beer, liquor, and wine bottle fragments. Both concentrations are along the right-of-way fence. Presumably, the bottles were used for target practice.

Flaked Stone

Parrish et al. (2008:52) recorded 101 flaked stone artifacts, including 90 pieces of debitage, eight tools, and three tested cobbles. Artifacts were generally scattered across the ground surface on both sides of the highway. Material types included fine to coarse basalt (n = 53), Polvadera obsidian (n = 14), No Agua obsidian (n = 9), rhyolite (n = 5), Pedernal chert (n = 4), quartzite (n = 2), Jemez obsidian (n = 2), chalcedony (n = 1), and banded gneiss (n = 1). The Polvadera obsidian, Jemez obsidian, and rhyolite were considered nonlocal materials, while the other material types could potentially be found locally or in the near vicinity. Flaked stone debitage included core reduction flakes (n = 27), biface thinning flakes (n = 29), pressure flakes (n = 10), indeterminate flakes (n = 19), and angular debris (n = 5). The association of debitage types with specific material types was not tabulated. The tested cobbles were of No Agua obsidian (n = 2) and rhyolite (n = 1). The tool category included a single Ventana side-notched dart point fragment (ca. 3500 to 1800 BC) manufactured from Polvadera obsidian. Other tool types included a rhyolite core and scraper, a Polvadera obsidian biface and retouched flake, a No Agua obsidian retouched flake, and a chalcedony side scraper. The flaked stone assemblage suggested hunting and tool production. The site occupation was represented by three temporal components: Early Archaic to Middle Archaic (ca. 3500 to 1800 BC, based on the projectile point), Jicarilla Apache (1750? to 1900? based on micaceous ceramics), and Statehood to World War II (post–AD 1912, based on twentieth-century artifacts).

A total of 64 flaked stone artifacts were mapped and analyzed within the highway right-of-way

Figure 9.20. Artifact Concentration 1, LA 160196.

Figure 9.21. Artifact Concentration 2, LA 160196.

Figure 9.22. Artifact Concentration 3, LA 160196.

Figure 9.23. Artifact Concentration 4, LA 160196.

during the current project (Fig. 9.1). Flaked stone artifacts were scattered across the ground surface on both sides of the highway. Artifact frequency is about the same on both sides of the highway, and the four recorded tools were mapped on the west side of the site. A total of 15 flaked stone artifacts were associated with AC 1, on the east side of the road (Table 9.1). This 4 by 4 m concentration also contained micaceous ceramics, which represented the possible Jicarilla Apache component (Parrish et al. 2008:52–53). These flaked stone artifacts may be related to the Jicarilla Apache component, but there are essentially no differences between the small assemblage and the larger flaked stone assemblage as a whole.

Table 9.1. Flaked stone artifact assemblage, AC 1, LA 160196

Morphology	AC 1
Polvadera Obsidian	
Core flake	1
Angular debris	1
Subtotal	2
Basalt	
Biface flake	2
Core flake	9
Subtotal	11
No Agua Obsidian	
Core flake	1
Angular debris	1
Subtotal	2
Total	15

Material types and textures are presented in Tables 9.2 and 9.3. The assemblage is represented by five material types. Local basalt (n = 41) represented the bulk of the materials, followed by Polvadera obsidian (n = 11), No Agua obsidian (n = 8), undifferentiated chert (n = 3), and Pedernal chert (n = 1). All of the basalt had a fine-grained texture, and the Polvadera obsidian had a glassy texture. The No Agua obsidian had a glassy but very flawed texture. Three pieces of undifferentiated chert had a coarser, medium-grained texture. Polvadera obsidian and Pedernal chert are the primary nonlocal materials, originating in the Jemez Mountains to the south. Basalt, the primary lithic material, is potentially available in the immediate site vicinity. As mentioned by Parrish et al. (2008:52), No Agua obsidian is a semilocal material that outcrops as small nodules just north of the project area. Material utilization was mainly of local materials, with smaller frequencies of intrusive Polvadera obsidian and Pedernal chert from the Jemez Mountains.

Core-reduction debitage in the form of angular debris, core flakes, and biface flakes accounted for 92 percent (n = 59) of the artifacts (Table 9.2). The reduction strategy centered mainly around simple core-reduction activities, but lower frequencies of biface flakes suggesting tool production or maintenance are represented by four of the five material types. Parrish et al. (2008) found more biface and pressure flakes than core flakes during the initial site recording. Basalt and Polvadera obsidian, the dominant material types, accounted for most of the core and biface flakes. Cores are one of the by-products of lithic reduction as flakes are removed from pieces of raw material. Cores are noticeably absent on the site; one rhyolite core was found during the original site recording. Similarly, angular debris is another unintentional by-product of reduction commonly generated during the initial stages of reduction and often denoting the quality of the material. Low numbers of angular debris were associated with four of the five material types, but angular debris represented half (n = 4) of the No Agua obsidian. This poor-quality material typically appears as small, highly flawed nodules that tend to produce abundant angular debris during reduction.

Material type by cortex percentage is presented in Table 9.4. Debitage with greater than 50 percent cortex is representative of the primary stage of reduction and cortex removal. This is followed by the secondary stage of cortex, represented by cortex percentages in the 1 to 49 percent category. Finally, the complete absence of cortex reflects the last stages of reduction. Most of the debitage from all of the five material categories lacks cortex, indicating that the material was not initially processed on the site. Material was most likely procured at other nearby localities, and selected pieces of debitage were then transported to the site for further reduction or use. It is again interesting that No Agua obsidian, with the higher percentages of cortex coverage, has few pieces

Table 9.2. Flaked stone artifact morphology and function by material type, LA 160196

Morphology	Function	Chert, Undifferentiated	Pedernal Chert	Polvadera Obsidian	No Agua Obsidian	Nonvesicular Basalt	Total
Angular debris	unutilized angular debris	1	–	1	4	5	11
Core flake	unutilized flake	–	–	5	3	31	39
Biface flake	unutilized flake	–	1	4	1	3	9
Uniface, early stage	chopper	1	–	–	–	–	1
	side scraper	–	–	–	–	1	1
Biface, early stage	side scraper	1	–	–	–	–	1
Biface, middle stage	chopper	–	–	–	–	1	1
Biface, late stage	biface, undifferentiated	–	–	1	–	–	1
Total		3	1	11	8	41	64

Table 9.3. Flaked stone material type by texture, LA 160196

Material Type	Glassy	Glassy and Flawed	Fine-grained	Medium-grained	Total
Chert, undifferentiated	–	–	–	3	3
Pedernal chert	–	–	1	–	1
Polvadera obsidian	11	–	–	–	11
No Agua obsidian	–	8	–	–	8
Nonvesicular basalt	–	–	41	–	41
Total	11	8	42	3	64

Table 9.4. Flaked stone material by dorsal cortex percentage, LA 160196

Material	0%	1–49%	50–100%	Total
Chert, undifferentiated	3	–	–	3
Pedernal chert	1	–	–	1
Polvadera obsidian	11	–	–	11
No Agua obsidian	5	1	2	8
Nonvesicular basalt	37	2	2	41
Total	57	3	4	64

of debitage. Although the material does not occur directly on the site, various analytical attributes such as the flawed nature of the texture, the presence of angular debris, and higher cortex percentages consistently manifest characteristics of a local material type. In turn, although basalt outcrops on the site, the local material was not quarried, and material was initially processed somewhere off-site.

The various artifact types trend toward the lower end of the various size categories (Table 9.5). The lower size measurements of the various debitage types emphasize reduction activities and biface production occurring during the last stages of reduction. A large portion of the core and biface flakes are under 20 mm long. Basalt occurs naturally in massive outcrops, and flakes and core flakes are larger, extending up to 45 mm long. However, flakes are generally in the smaller size categories. The small sizes and absence of cortex consistently show material processing in the last stages of reduction. The two complete basalt tools are larger than the reduction debitage.

The majority of the flaked stone artifacts were represented by unutilized debitage. Only four actual tools were recorded during the in-field analysis (Table 9.2). A late-stage biface fragment of Polvadera obsidian was the distal portion of an undifferentiated biface. The fragment measured 15 by 14 mm and may have been a preform transported to the site for further reduction. Basalt was represented by two tools. A complete middle-stage biface that functioned as a chopper measured 150 by 105 by 36 mm (Fig. 9.24). A basalt core flake with early unifacial retouch that functioned as a scraper measured 51 by 28 by 10 mm (Fig. 9.25). Undifferentiated chert was also represented by two tools. An early-stage uniface fragment functioned as a chopper and measured 53 by 46 by 21 mm. Finally, the medial fragment of an early-stage biface functioned as a side scraper and measured 29 by 28 by 13 mm. The tools range from heavy chopping activities to light scraping activities, but the activities cannot be assigned to a specific temporal component.

Only five flaked stone artifacts were collected from the 8 m wide construction zone (Table 9.6). A single Polvadera obsidian flake was found in the initial 5 cm of fill in Test Unit 510N/494E at the northwest edge of the site. No additional artifacts were recovered from the five surrounding grid units. The five collected artifacts included core flakes (n = 4) and angular debris (n = 1). Material types were represented by Polvadera obsidian (n = 2), No Agua obsidian (n = 1), undifferentiated chert (n = 1), and basalt (n = 1). The flaked stone artifacts consisted of debitage in the form of core flakes (n = 4) and angular debris (n = 1) generated during core reduction. None of the reduction debitage had been utilized.

In summary, the flaked stone assemblage analyzed in the field and collected from the construction zone is considered a subset of the material originally recorded by Parrish et al. (2008:52) and adds little new information about the site occupation. The current project verified the trend that the flaked stone assemblage was composed mainly of local basalt and nonlocal Polvadera obsidian, along with lower numbers of essentially locally available materials. The flaked stone assemblage showed core reduction and biface reduction, but all of the materials were originally processed away from the site. Reduction activities centered around the later stages of reduction. Heavy chopping activities are represented by choppers, and scraping activities by a few scrapers. However, we found no temporally diagnostic flaked stone artifacts, and the Ventana side-notched dart point originally recorded by Parrish was not relocated. The site may have been initially occupied during the Early Archaic to Middle Archaic (ca. 3500 to 1800 BC), and the projectile point suggests a briefly occupied camp centering on hunting activities. A second reoccupation based on micaceous ceramics suggests a Jicarilla Apache (1750? to 1900?) component (Parrish et al. 2008:52–53). Basalt, Polvadera obsidian, and No Agua obsidian core flakes, biface flakes, and angular debris are mixed with the sherds in AC 1 (Table 9.1). The small flaked stone assemblage is identical to surrounding flaked stone debitage scattered across the site. It remains unknown how flaked stone artifacts are related to Apache reuse of the site. An Archaic-period radiocarbon date obtained from an indeterminate pit overlaps with the general Archaic occupation, but no flaked stone artifacts were associated with the feature. The multiple site components introduce problems of assemblage mixture and reuse, and subsequent interpretations of how any given flaked stone tool was utilized.

Table 9.5. Flaked stone measurements by material type and artifact morphology, LA 160196

Morphology		Length (mm)	Width (mm)	Thickness (mm)
		Chert, Undifferentiated		
Angular debris	mean	14	8	3
	N	1	1	1
	SD	–	–	–
	minimum	14	8	3
	maximum	14	8	3
		Polvadera Obsidian		
Angular debris	mean	14	8	3
	N	1	1	1
	SD	–	–	–
	minimum	14	8	3
	maximum	14	8	3
Core flake	mean	21	12	4
	N	1	1	1
	SD	–	–	–
	minimum	21	12	4
	maximum	21	12	4
Biface flake	mean	10	9.5	1.5
	N	2	2	2
	SD	1.41	0.71	0.71
	minimum	9	9	1
	maximum	11	10	2
		No Agua Obsidian		
Angular debris	mean	19.75	12	8
	N	4	4	4
	SD	7.63	8.04	7.35
	minimum	13	7	4
	maximum	29	24	19
		Nonvesicular Basalt		
Angular debris	mean	16.2	13.2	4.8
	N	5	5	5
	SD	8.70	4.32	2.49
	minimum	9	8	3
	maximum	28	18	9
Core flake	mean	29.67	32.33	7.33
	N	3	3	3
	SD	13.28	12.42	1.53
	minimum	22	18	6
	maximum	45	40	9
Biface flake	mean	18	16.5	2.5
	N	2	2	2
	SD	8.49	7.78	0.71
	minimum	12	11	2
	maximum	24	22	3
Uniface, early stage	mean	51	28	10
	N	1	1	1
	SD	–	–	–
	minimum	51	28	10
	maximum	51	28	10
Biface, middle stage	mean	150	105	36
	N	1	1	1
	SD	–	–	–
	minimum	150	105	36
	maximum	150	105	36

Note: angular debris and whole flakes only

Figure 9.24. Basalt chopper from LA 160196.

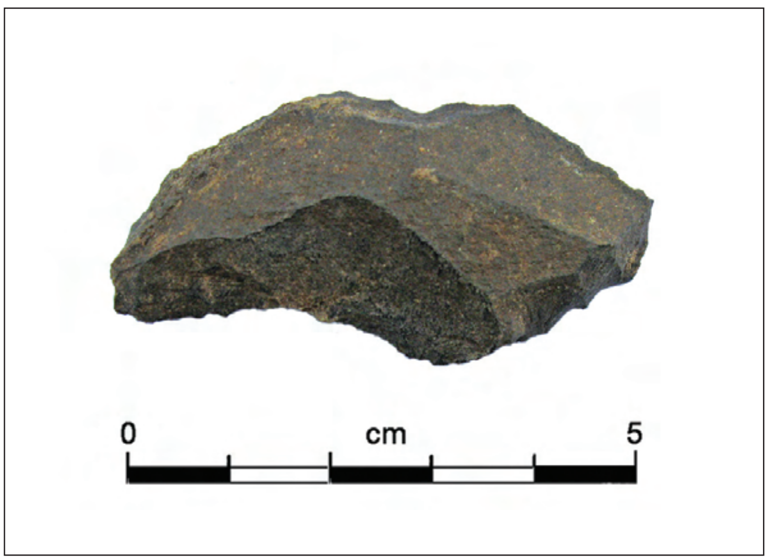


Figure 9.25. Basalt side scraper from LA 160196.

Table 9.6. Flaked stone artifacts collected from the construction zone, LA 160196

FS No.	Material	Quality	Morphology	Function	Cortex %	Portion	Platform Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
1	Polvadera obsidian	glassy	core flake	unutilized flake	0%	distal	broken in manufacture	30	16	6	2.7
2	No Agua obsidian	glassy and flawed	core flake	unutilized flake	0%	proximal	multifaceted	15	17	4	1
3	Chert	fine-grained and flawed	angular debris	unutilized angular	0%	whole	–	15	15	7	1.5
4	Polvadera obsidian	glassy	core flake	unutilized flake	0%	distal	absent	44	33	7	5.2
5	basalt	fine-grained	core flake	unutilized flake	0%	proximal	multifaceted	19	25	4	2.6

Indigenous Ceramics

Micaceous sherds (n = 24) were confined mainly to a concentration on the east side of the highway. No sherds were found within the APE. As discussed by Parrish et al. (2008:52), these sherds may represent Cimarron Micaceous based on their relatively thick vessel walls and micaceous rock temper (Warren 1981). However, Petaca Micaceous is similar to Cimarron Micaceous, sharing thick vessel walls and large aplastics. Differences between the two types are in rim characteristics, but no rim fragments were encountered.

Euroamerican Artifacts

A total of 1,468 Euroamerican artifacts discovered within the highway right-of-way at LA 160196 were subjected to in-field analysis (Table 9.7). All the artifacts dating prior to 1960 were outside the APE and were not collected.

Distribution of Euroamerican artifacts included eight functional categories: indulgences (n = 1,355, mnv = 129), food (n = 26), transportation (n = 5, mnv = 4), construction/maintenance (n = 3), economy/production (n = 2), domestic (n = 2), personal effects (n = 1), and entertainment/leisure (n = 1). The remainder of artifacts (n = 73, mnv = 34) consisted primarily of nondiagnostic bottle and can fragments.

Based on diagnostic attributes, the majority of Euroamerican artifacts represent materials associated with use of the area after the commission of US 285 in 1936. Many artifacts are associated with site use after 1960. Six solder-seamed food cans, including two meat containers, a beverage can, and three other cans of indeterminate function, were produced with technologies dating to the late nineteenth or early twentieth century.

In addition, two nondiagnostic Euroamerican white ware ceramic dish fragments were also found at LA 160196. Such objects are usually not found outside a residential setting. In conjunction with the solder-seamed cans, these artifacts could be associated with an Apache occupation. Indian-modified Euroamerican artifacts were not encountered at LA 160196. Later twentieth-century artifacts reflect vehicle-window discard, fuelwood gathering, and picnicking along US 285.

Recommendations

LA 160196 consists of three temporal components. The prehistoric component consists of a Middle Archaic occupation, suggested by flaked stone artifacts and a previously recorded Ventana-style projectile point. This component was probably a small, briefly occupied hunting site associated with the late-stage reduction of local and imported material types. A second occupation, based on micaceous ceramics, suggests a Jicarilla Apache (1750? to 1900?) component—probably a brief, task-specific occupation, but the function of the occupation is unclear, along with how the occupants utilized and/or reutilized the flaked stone artifacts. Last, Euroamerican artifacts represent primarily twentieth-century artifacts originating from vehicle-window discard, fuelwood gathering, and picnicking along US 285. Only a few solder-seamed cans could overlap the later end of the Jicarilla Apache component, but these associations remain unclear. No Indian-modified Euroamerican artifacts were encountered at LA 160196.

Archaeological testing within the APE indicates that cultural material is limited to five flaked stone artifacts, and no Euroamerican artifacts. These scattered artifacts were confined mainly to the surface, or in one case, the initial 5 cm of disturbed soil in the APE. The few surface artifacts are essentially identical to the bulk of the artifacts preserved outside of the immediate construction zone. No additional subsurface artifacts were encountered during the excavation of six test units and two backhoe trenches within the APE.

A single subsurface pit with an Archaic affiliation was encountered near the south end of BHT 2 on the east side of the highway. This ephemeral pit has an indeterminate function but appears to be associated with the Middle Archaic occupation suggested by a previously recorded Ventana-style projectile point. No artifacts were associated with the feature, and no other subsurface features, charcoal, surfaces, or cultural manifestations were found in the test pits and backhoe trenches. No additional cultural deposits or features were discovered that might enhance the dating or interpretation of the single ephemeral pit beyond what has been recorded and described. The testing program has determined that the portion of LA 160196 extending into the APE is not likely

Table 9.7. Euroamerican artifacts, LA 160196

Type	Function	Count	Column %
	Unassignable		
Unidentifiable	bottle	36	2.5%
	can	26	1.8%
	can, aerosol	1	0.1%
	wire	1	0.1%
	sheet	1	0.1%
	rope/cording	7	0.5%
	tube (toothpaste, ointments, glue, etc.)	1	0.1%
	Economy/Production		
Machinery	machinery parts	2	0.1%
	Food		
Canned goods	unidentifiable canned goods	7	0.5%
	juice can	1	0.1%
	meat can	13	0.9%
	sardine can	1	0.1%
	spice can	1	0.1%
Bottled goods	unidentifiable bottled goods	1	0.1%
	condiment bottle	2	0.1%
	Indulgences		
Miscellaneous beverage	beverage can	59	4.0%
	beverage bottle	310	21.1%
Soda/carbonated beverage	soda bottle	1	0.1%
	soda can	5	0.3%
Wine	sine bottle	220	15.0%
Beer	beer bottle	583	39.7%
	beer can	9	0.6%
	ale bottle	22	1.5%
Liquor	unidentifiable liquor	93	6.3%
	brandy bottle	7	0.5%
	whiskey bottle	45	3.1%
Tobacco, chewing	chewing tobacco can	1	0.1%
	Domestic		
Dishes	unidentifiable dishes	2	0.1%
	Construction/Maintenance		
Hardware	nail, common	1	0.1%
Fencing	barbed wire	2	0.1%
	Personal Effects		
Medicine/health	medicine bottle, indeterminate	1	0.1%
	Entertainment/Leisure		
Outdoor sports and recreation	camping stove fuel canister	1	0.1%
	Transportation		
Cars and trucks	headlight	2	0.1%
Lubricants/fluids/fuel	motor oil can	1	0.1%
	antifreeze can	1	0.1%
	gas can	1	0.1%
Total		1468	100.0%

to yield additional information important to the understanding of local or regional history or prehistory, beyond what has been documented. The portion of the site within the APE therefore is not considered eligible for nomination to the *National Register of Historic Places*, and no further archaeological investigations are recommended. However, the larger portion of the site preserved outside of the current APE may contain buried significant deposits. The portions of LA 160196 preserved outside of the tested APE should still be considered eligible for nomination to the *National Register* under Criterion D. This site area should be avoided and preserved in place.

10. LA 160201 (AR-03-02-06-1312)

Located on both the east and west sides of US 285, LA 160201 was recorded by Parrish et al. (2008:59–61) during a survey conducted to prepare for the current planned phase of highway construction. This site was described as a scatter of Middle to Late Archaic artifacts containing no visible cultural features. Since LA 160201 is on both sides of US 285, the central portion of the site was evidently removed during initial highway construction (Fig. 10.1). LA 160201 measures approximately 69 m north-south by 78 m east-west and encompasses an area of 3,776 sq m. It is thought to be between 26 and 50 percent intact. About 80 percent of the site area and roughly 50 percent of the artifacts are within the current highway right-of-way.

Environment

LA 160201 is situated on a broad, east-trending ridge about 1.1 mi northeast of the head of Comanche Canyon. Soils on the site are classified as Montecito loam, an alluvial soil derived from the weathering of basalt. These soils occupy landforms with slopes up to 15 percent. The Montecito grades into gravelly, sandy loam with depth. The soil association of the area is of the Torriorthents-Haplargids-Calciorthids Land. Typically, these calcic soils are shallow to somewhat deep, cobbly, and stony. They occur with basalt outcrops and bedrock (USDA-NRCS 2009; Maker et al. 1974).

About 40 percent of the surface is obscured by vegetation and juniper-piñon duff, which have stabilized the sections of site on which they occur (Fig. 10.2). The vegetative overstory is of variable density and consists mainly of piñon and juniper, while the understory is dominated by sage, various grasses, and prickly pear.

Treatment

Prior to testing, all artifacts within the highway right-of-way were mapped and subjected to in-field analysis. All but one of these artifacts are preserved outside of the APE and will not be effected by the proposed construction project. A single Polvadera obsidian flake was collected within the APE on the west side of the highway. Six test pits were judgmentally placed to evaluate subsurface fill within the APE. Three test pits were spaced across the APE on each side of the highway. These hand-excavated units were excavated into sterile soil to a depth of at least 50 cmbs or until bedrock was encountered. An auger test was also placed in each pit to examine soil characteristics below depths reached by hand excavation. An attempt was made to extend each auger test 1 m below the base of each test pit, but this was often not possible in the rocky soil. No artifacts or subsurface cultural deposits were found in the six test pits or the auger tests. The APE is characterized by mechanical blading along the highway and disturbed soil. Asphalt and modern glass were consistently found to a depth of at least 30 cm below the surface. The lower 20 cm of undisturbed A-horizon soils contained no cultural material. The same soil profiles were found in each test unit and are best exemplified by the larger backhoe profiles. After we failed to find any intact subsurface deposits by test pit or auger, a backhoe dug three northwest-southeast-trending trenches to look for more deeply buried deposits and create profiles from which soil formation processes could be evaluated. BHT 1 measured 42 m long; BHT 2, 13 m; and BHT 3, 11 m. Each was excavated up to 1.4 m below the present day ground surface or the depth at which bedrock was encountered. No buried surfaces or cultural deposits were encountered within the APE. The locations of artifacts, test pits, and backhoe trenches are shown in Figure 10.1.

Backhoe Trenches

Three backhoe trenches were excavated at LA 160201 along the US 285 right-of-way between the road shoulder and the fenceline. BHT 1 (Fig. 10.3) was in the west highway right-of-way; BHTs

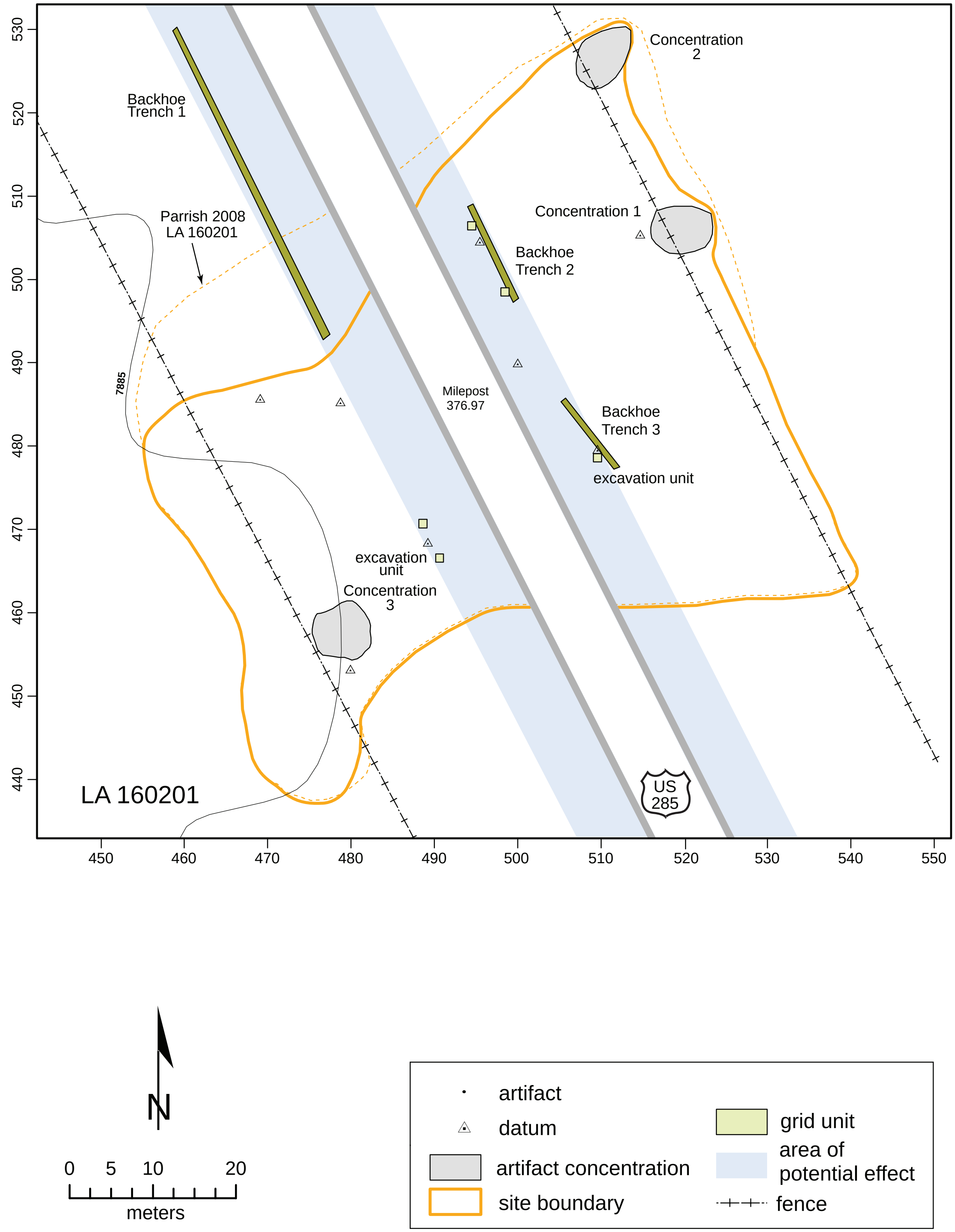


Figure 10.1. Site map, LA 160201.

Figure 10.2. Environment of LA 160201

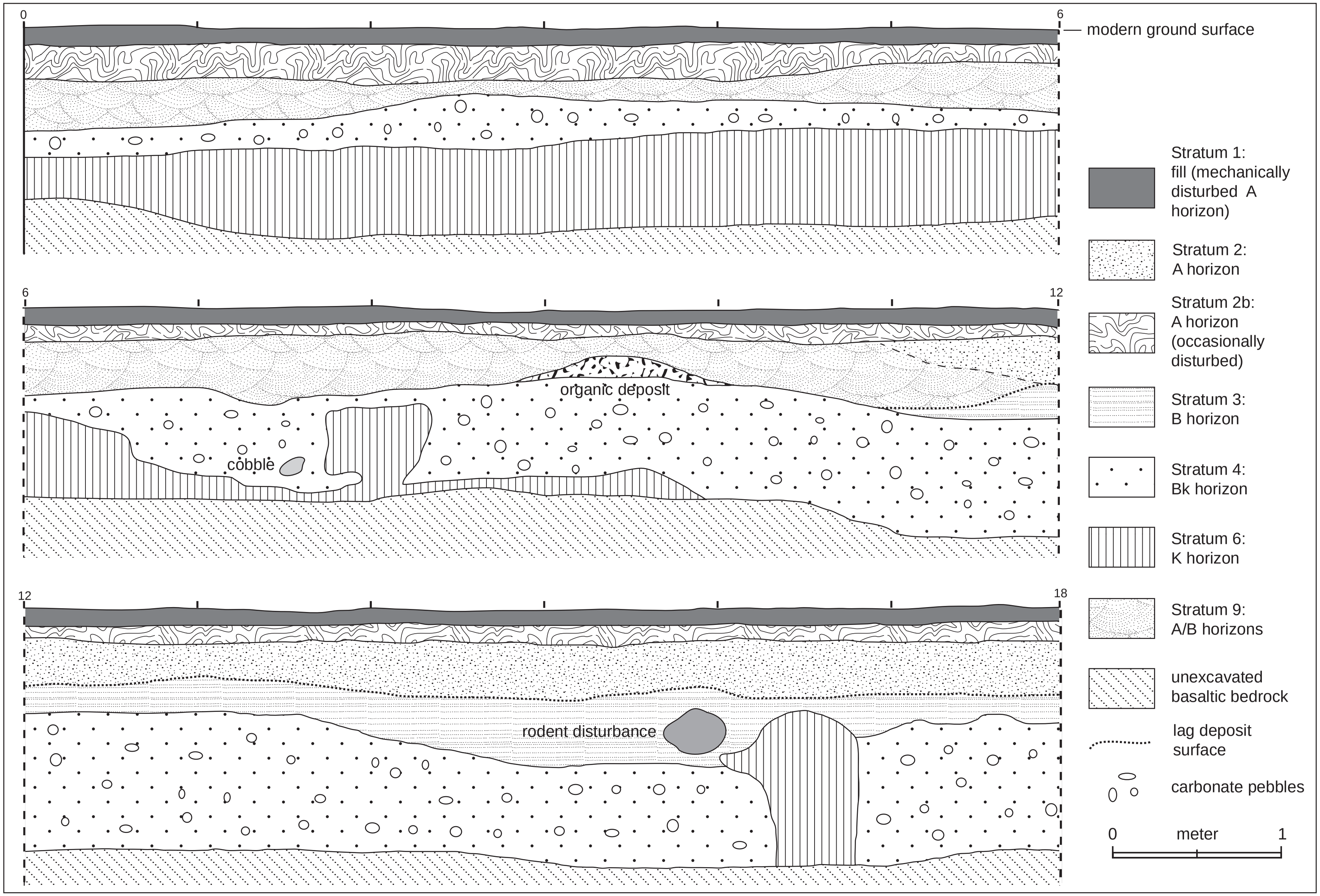


Figure 10.3. East wall profile, Backhoe Trench 1, LA 160201.

2 and 3 (Fig. 10.4) were along the east side of the highway.

The surface layer in the area of the three trenches consisted of disrupted A-horizon material originating from ground-disturbing road and ditch construction. To 30 cmbs, inclusions of roadside debris were common.

Beneath the disturbed surface layer, a comparatively intact A horizon persisted to 50 cmbs. The soil matrix was well developed, consisting of organically darkened silt and fine sand with some clay development. Evidence of bioturbation from roots and rodents was abundant, especially within the diffuse, gradual boundary between the A and Bk horizons.

The A/Bk soil was strongly formed silty clay with carbonate development in soil pores and ped faces extended as deep as 50 to 80 cmbs. The boundary with the underlying Bk horizon was wavy and smooth. It was partially defined in BHT 1 (west right-of-way) by a horizontal continuum of intermittently dispersed basalt pebbles representing a buried, erosional ground surface along which a lag deposit of pebbly debris accumulated.

The Bk matrix existed between 50 and 130 cmbs. It consisted of silt and silty clay with inclusions of fine-grained sand, threadlike and filmlike carbonate precipitate along soil pores and ped faces, and carbonate granules. Many large root pores and insect burrows extended into the underlying caliche. The boundary was wavy or irregular and gradual because of the extensive bioturbation. The caliche layer consisted of laterally intermittent indurate and earthy-textured, massive carbonate precipitate extending to the maximum depth of the backhoe trench.

No cultural deposits, artifacts, or features were discovered in the backhoe trenches at LA 160201.

Features

No archaeological features were encountered at LA 160201.

Cultural Materials

A total of 95 flaked stone artifacts and 139 Euroamerican artifacts were analyzed within the highway right-of-way. A single flaked stone artifact, an unutilized Polvadera obsidian flake, was identified and collected within the APE.

The majority of artifacts were encountered in large concentrations (AC 1–AC 3) of Polvadera obsidian and fine-grained basalt biface flakes outside the APE (Fig. 10.1). AC 1 measures 7.4 m east-west by 5.8 m north-south and is on the east side of US 285 along the right-of-way fenceline (Fig. 10.5). AC 2 measures 8 m northeast-southwest by 5.8 m northwest-southeast and like AC 1 is along the east right-of-way fenceline (Fig. 10.6). AC 3 is on the west side of US 285 within the right-of-way and measures 7 m in diameter.

Flaked Stone

Parrish et al. (2008:59–61) originally recorded 116 flaked stone artifacts at this prehistoric artifact scatter. The identified assemblage included 111 pieces of flaked stone debitage, four tools, and one tested basalt cobble. Artifacts were scattered on both sides of the highway, and two artifact concentrations were identified on the east side of the highway. AC 1 measured 12 by 6 m and contained 42 artifacts. AC 2 measured 5 by 3 m and contained 21 artifacts. Material and artifact types were not tabulated with respect to the artifact concentrations. The debitage consisted of core reduction flakes (n = 17), biface thinning flakes (n = 44), pressure flakes (n = 26), indeterminate flakes (n = 16), and angular debris (n = 8). Material types included nonlocal Polvadera obsidian (n = 56), local basalt (n = 27), nonlocal Pedernal chert (n = 18), nonlocal Jemez obsidian (n = 6), semilocal No Agua obsidian (n = 3), and local rhyolite (n = 1). Recorded tools included a basalt scraper fragment, a Jemez obsidian flake with bidirectional retouch, and two projectile point bases. A San Jose point fragment was made from Polvadera obsidian, and an Armijo point was manufactured from Jemez obsidian. The site was interpreted as a locus of flaked stone tool production in association with subsistence hunting and gathering dating to the Armijo phase (1800 to 800 BC) of the Late Archaic period.

A total of 95 flaked stone artifacts were mapped and analyzed within the highway right-of-way during the current project (Fig. 10.1). Artifacts were scattered on both sides of the highway

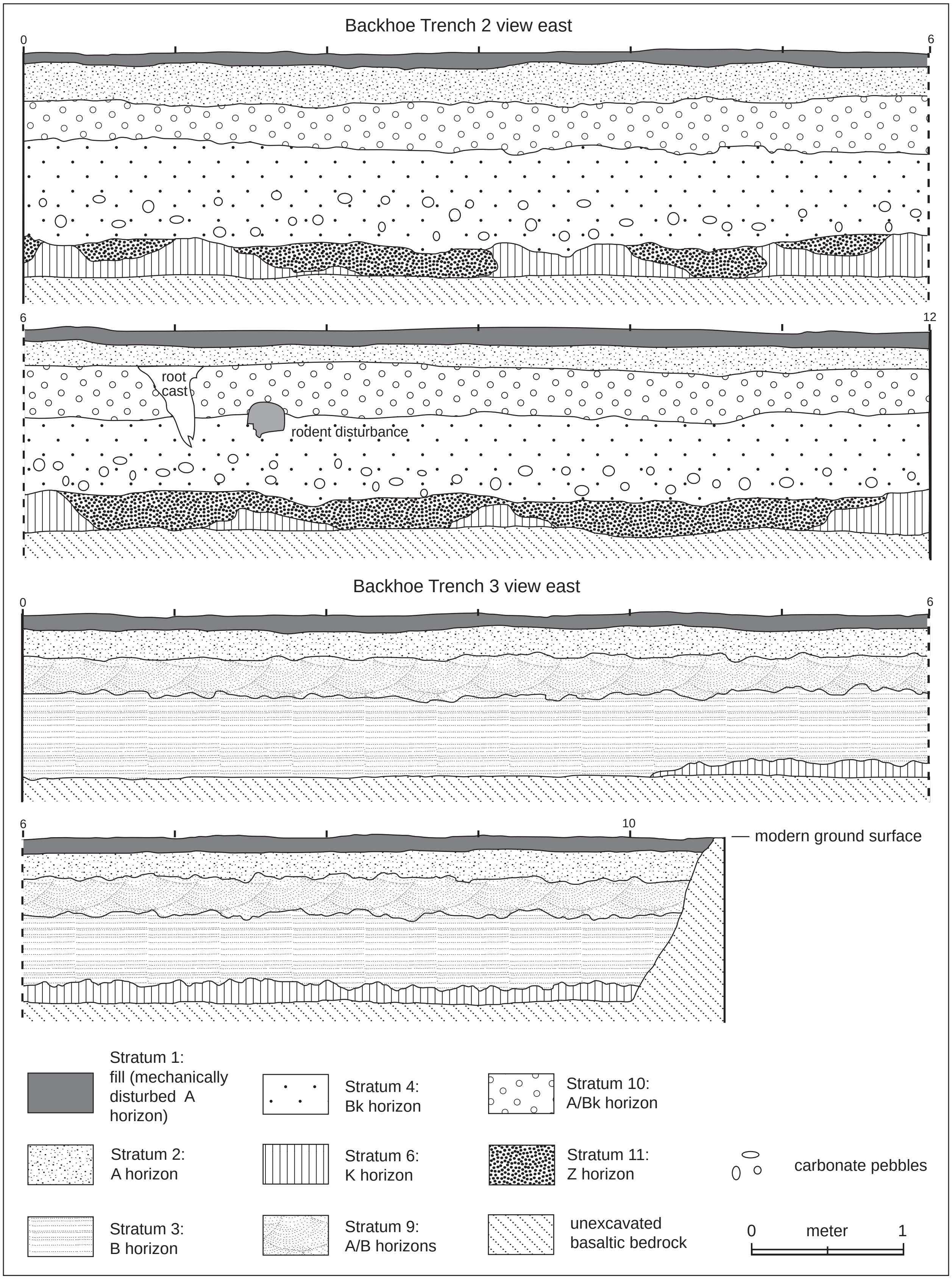


Figure 10.4. East wall profiles, Backhoe Trenches 2 and 3, LA 160201.

Figure 10.5. Artifact Concentration 1, LA 160201.

Figure 10.6. Artifact Concentration 2, LA 160201.

and associated with three artifact concentrations. AC 1 and 2, on the east side of the highway, were identified by Parrish et al. during the original site recording. AC 3, on the west side of the highway, was identified during OAS mapping and in-field analysis. The projectile points originally described by Parrish were not relocated.

Material types and textures are presented in Tables 10.1 and 10.2. The assemblage is represented by six material types, with Polvadera obsidian accounting for 58 percent (n = 55) of the material. Intrusive materials are represented by Polvadera obsidian (n = 55), undifferentiated obsidian (n = 11), and Pedernal chert (n = 7). The undifferentiated Jemez is considered miscellaneous Jemez obsidian. The intrusive material types actually occur in greater numbers than local material, and all of the intrusive types originated in the Jemez Mountain area to the south. The remaining four material types are locally available, with basalt accounting for the largest portion (n = 18) of local materials. No Agua obsidian occurs as nodules north of the project area; it is represented by three pieces of debitage. Material textures are generally glassy. However, the No Agua obsidian is typically very flawed. Both the basalt and the Pedernal chert tended toward fine-grained texture. Only three pieces of basalt and the single undifferentiated chert flake had medium-grained textures. The material type frequencies essentially match those initially recorded by Parrish et al. (2008).

The flaked stone assemblage is composed almost entirely of debitage in the form of angular debris (n = 18), core flakes (n = 31), and biface flakes (n = 44). The debitage depicts reduction strategies centered on simple core reduction activities and biface manufacture. As with Parrish's initial observations, biface flakes are the most common flake type and are especially associated with the intrusive Polvadera obsidian (n = 31). Cortex percentages (Table 10.3) and small flakes sizes (Table 10.4) consistently portray the final stages of lithic reduction activities. The vast majority (84 percent, n = 80) of the various material types lack cortex. Polvadera obsidian, the dominant intrusive material type, has a few flakes in the primary (n = 3) and secondary (n = 5) stages of reduction. This local basalt shows a similar pattern of primary (n = 3) and secondary flakes (n = 1). A No Agua obsidian core flake also has primary cortex coverage suggestive of its semilocal origins. The majority of debitage types is in the smaller categories and tends to be smaller than 20 mm long and wide. Local basalt core flakes range somewhat larger as a result of the larger natural size of this material type. In general, however, the core and biface flakes of the various material types tend to overlap in size. The single piece of angular debris representing the undifferentiated chert stands out as being larger. This piece of angular debris has just under 49 percent dorsal cortex coverage and is 41 mm long.

Although the numerous biface flakes indicate that biface production and tool manufacture were important site activities, very few actual tools remain on the site. Most of the artifacts (n = 93) are represented by unutilized debitage, and only two tools were identified during the in-field analysis. The base fragment of a corner-notched projectile point was mapped just outside of the right-of-way fence at the southeast corner of the site (Fig. 10.1). This projectile point was not identified during Parrish's original site recording. The point was manufactured from Pedernal chert; the fragment measured 16 mm long by 19 mm wide by 8 mm thick (Fig. 10.7). The corner-notched fragment resembles the general En Medio style that dates from 800 BC to AD 400. This is also a Late Archaic projectile point, but the corner-notched style dates later than the Armijo phase (1800 to 800 BC) noted during Parrish's original site recording. The only other tool was a medial flake fragment of basalt with unifacial flaking showing use as a scraper. The fragment measured 44 mm long by 39 mm wide by 18 mm thick. The scraper was found on the east side of the highway.

The majority of the debitage was found in relation to three artifact concentrations on the site (Table 10.5), which most likely represent discrete activity areas for core and biface reduction (Fig. 10.1). ACs 2 and 3 are represented by the largest frequency of artifacts; they are similar in the range of material types and reduction debris. None of the activity areas can be associated with a specific temporal component, and no tools are associated with the concentrations.

AC 1 is at the northeast corner of the site. It measured about 6 by 6 m, and Parrish et al. (2008: 60) recorded 21 artifacts, but the material and artifact types were not tabulated. Only two core flakes, one each of Pedernal chert and No Agua obsidian, were mapped on the small portion of

Table 10.1. Flaked stone artifact morphology and function by material type, LA 160201

Morphology	Function	Chert, Undifferentiated	Pedernal Chert	Obsidian, Undifferentiated	Polvadera Obsidian	No Agua Obsidian	Nonvesicular Basalt	Total
Angular debris	unutilized angular debris	1	–	3	9	1	4	18
Core flake	unutilized flake	–	2	4	15	2	8	31
Biface flake	unutilized flake	–	4	4	31	–	5	44
Uniface, middle stage	side scraper	–	–	–	–	–	1	1
Biface, late stage	unidentified large corner-notched	–	1	–	–	–	–	1
Total		1	7	11	55	3	18	95

Table 10.2. Flaked stone material type by texture, LA 160201

Material	Glassy	Glassy and Flawed	Fine-grained	Medium-grained	Total
Chert, undifferentiated	–	–	–	1	1
Pedernal chert	–	–	7	–	7
Obsidian, undifferentiated	11	–	–	–	11
Polvadera obsidian	55	–	–	–	55
No Agua obsidian	–	3	–	–	3
Nonvesicular basalt	1	–	14	3	18
Total	67	3	21	4	95

Table 10.3. Flaked stone material type by cortex percentage, LA 160201

Material	0%	1–49%	50–100%	Total
Chert, undifferentiated	–	1	–	1
Pedernal chert	7	–	–	7
Obsidian, undifferentiated	10	1	–	11
Polvadera obsidian	47	5	3	55
No Agua obsidian	2	–	1	3
Nonvesicular basalt	14	1	3	18
Total	80	8	7	95

Table 10.4. Flaked stone measurements by material type and artifact morphology, LA 160201

Morphology		Length (mm)	Width (mm)	Thickness (mm)
Chert, Undifferentiated				
Angular debris	mean	41	31	19
	number	1	1	1
	standard deviation	–	–	–
	minimum	41	31	19
	maximum	41	31	19
Pedernal Chert				
Biface flake	mean	10	8	2
	number	1	1	1
	standard deviation	–	–	–
	minimum	10	8	2
	maximum	10	8	2
Obsidian, Undifferentiated				
Angular debris	mean	10	5	3
	number	1	1	1
	standard deviation	–	–	–
	minimum	10	5	3
	maximum	10	5	3
Biface flake	mean	10	8	1
	number	1	1	1
	standard deviation	–	–	–
	minimum	10	8	1
	maximum	10	8	1
Polvadera Obsidian				
Angular debris	mean	10.8	6.8	2.6
	number	9	9	9
	standard deviation	2.6	2.5	1.7
	minimum	7	4	1
	maximum	15	11	6
Core flake	mean	12	12.8	16.6
	number	5	5	5
	standard deviation	5.7	4.9	29.9
	minimum	9	7	2
	maximum	22	20	70
Biface flake	mean	9.4	7.1	1.6
	number	14	14	14
	standard deviation	3.1	1.8	0.7
	minimum	5	5	1
	maximum	17	10	3
No Agua Obsidian				
Angular debris	mean	16	8	7
	number	1	1	1
	standard deviation	–	–	–
	minimum	16	8	7
	maximum	16	8	7
Nonvesicular Basalt				
Angular debris	mean	13.8	9.3	3.8
	number	4	4	4
	standard deviation	3.6	2.8	1.7
	minimum	11	6	2
	maximum	19	12	6
Core flake	mean	26	31.8	5.5
	number	4	4	4
	standard deviation	11.2	25.6	4
	minimum	11	7	2
	maximum	38	61	11
Biface flake	mean	8	6	1
	number	2	2	2
	standard deviation	2.8	0	0
	minimum	6	6	1
	maximum	10	6	1

Note: angular debris and whole flakes only

Figure 10.7. Base of En Medio projectile point, LA 160201.

Table 10.5. Flaked stone assemblages from artifact concentrations, LA 160201

Morphology	AC 1	AC 2	AC 3
Polvadera Obsidian			
Biface flake	21	12	–
Core flake	7	2	–
Angular debris	6	3	–
Subtotal	34	17	–
Obsidian, Undifferentiated			
Biface flake	1	1	–
Core flake	1	–	–
Angular debris	2	–	–
Subtotal	4	1	–
Pedernal Chert			
Biface flake	–	1	–
Core flake	2	–	1
Subtotal	2	1	1
Basalt			
Biface flake	–	1	–
Core flake	2	4	–
Angular debris	3	3	–
Subtotal	5	8	–
No Agua Obsidian			
Core flake	–	–	1
Subtotal	–	–	1
Total	45	27	2

the concentration that extended into the right-of-way. Neither of the flakes had been utilized.

AC 2 overlaps the right-of-way fence on the east side of the highway. It measured about 7 by 7 m, and Parrish et al. (2008:60) recorded 42 artifacts, but the material and artifact types were not tabulated. The roughly 2 m area that extended into the right-of-way contained 27 artifacts consisting primarily of Polvadera obsidian and basalt core and biface flakes. No tools were recorded.

AC 3, at the southwest corner of the site, was defined and mapped during the present project. It contained 45 artifacts, but Polvadera obsidian accounted for 76 percent (n = 34) of the debitage. Smaller frequencies of undifferentiated obsidian (n = 4), Pedernal chert (n = 2), and basalt (n = 5) were also present. The debitage characterizes late-stage core and biface reduction represented by small core and biface flakes lacking cortex. Tool production obviously occurred at this activity area, but no tools were found indicating the results of the activity. None of the small debitage had been utilized.

Last, only one unutilized core flake of Polvadera obsidian was collected from the 8 m wide construction zone: the lateral portion of an unutilized, glassy core flake, collapsed platform, measuring 22 by 22 by 7 m and weighing 2.6 g. The flake was from the west side of the highway, and surrounding test grid units showed that there was no subsurface cultural material in the construction zone.

Parrish et al. (2008:60) originally defined the site as a locus of flaked stone tool production in association with subsistence hunting and gathering activities. The in-field analysis and the single artifact collected from the construction zone reinforce these original site conclusions. The flaked stone assemblage is composed mainly of imported materials from the Jemez Mountains in the form of Polvadera obsidian, general Jemez obsidian, and Pedernal chert. A range of local materials were utilized on secondary bases, including basalt, undifferentiated chert, and the semilocal poor-quality No Agua obsidian. The various materials types were similarly exploited, with reduction activities centered on late-stage core and biface reduction. The near absence of cortex and small artifact dimensions indicate that the various materials were originally obtained and processed away from the site and selected material was transported to the site for further late-stage reduction. Cores are noticeably absent from the site. Although bifacial reduction was an important site activity, very few formal tools were found. Projectile points indicate that hunting was probably the primary activity, probably along with production and maintenance of hunting gear. A few scrapers were the only other tools found on the site. Projectile points suggest site use during the Late Archaic period. Specific point styles suggest possible San Jose (3200 to 1800 BC), Armijo 1800 to 800 BC), and En Medio (800 B.C. to A.D. 400) occupations. In general, the high frequency of biface flakes tends to typify the efficient manufacturing strategies characterizing mobile Archaic groups, but the absence of diagnostic artifacts precludes assignment of other than an "unspecified" cultural and temporal affiliation. Although three discrete activity areas are preserved on the site, they are similar in material and artifact content, and multiple occupations introduce problems of assemblage mixture and artifact reuse.

Euroamerican Artifacts

A total of 139 Euroamerican artifacts were analyzed within the highway right-of-way of LA 160201 (Table 10.6). Euroamerican artifacts were not collected within the APE. All artifacts dating prior to 1960 were outside the APE (Fig. 10.8).

Distribution of the artifacts included four functional categories: indulgences (n = 109, mnv = 21), food (n = 15), construction/maintenance (n = 2), and transportation (n = 2). The remaining eleven artifacts consisted of nondiagnostic bottle and can fragments. Artifact types within the indulgences category included soda (n = 5), wine (n = 20, mnv = 1), beer (n = 28, mnv = 8), and liquor (n = 50, mnv = 1) bottle fragments. In the food category, meat cans (n = 6, mnv = 6) were the most common items. A fence staple and a barbed wire fragment (n = 2) were placed within the construction/maintenance category. Two motor oil cans (n = 2) were recorded within the transportation category.

Identifiable manufacture technologies, like pull-tab cans, suggest the majority of Euroamerican artifacts date well after the construction of US 285 in 1936. Two solder-seamed cans were identified and represent technologies used prior to the mid-twentieth century. Both items were indeter-

Table 10.6. Euroamerican artifacts, LA 160201

Type	Function	Count	Column %
	Unassignable		
Unidentifiable	bottle	1	0.7%
	can	10	7.2%
	Food		
Canned goods	unidentifiable, canned goods	8	5.8%
	meat can	6	4.3%
Bottled goods	unidentifiable, bottled goods	1	0.7%
	Indulgences		
Miscellaneous, beverage	beverage can	2	1.4%
	beverage bottle	4	2.9%
Soda/carbonated beverage	soda can	5	3.6%
Wine	wine bottle	20	14.4%
Beer	beer bottle	8	5.8%
	beer can	4	2.9%
	ale bottle	16	11.5%
Liquor	liquor flask	50	36.0%
	Construction/Maintenance		
Fencing	barbed wire	1	0.7%
	fence staple	1	0.7%
	Transportation		
Lubricants/fluids/fuel	motor oil can	2	1.4%
Total		139	100.0%

Figure 10.8. Hole-in-top can found outside the APE at LA 160201.

minate food cans, and one can was modified after its initial use. The modified can was perforated at regular intervals with a square-cut nail creating an improvised sieve (Fig. 10.9).

In an ethnographic account describing construction of the Theodore Roosevelt Dam, Rogge et al. (1995) suggested that objects comparable to the perforated can were used by the Western Apaches for brewing *tiswin* (corn beer) in the early twentieth century. Goddard (1911) also indicates the use of a can in brewing tiswin among the Jicarilla Apaches but does not mention that the can was perforated. Conversations with Charles Haecker (personal communication, 2009) at the National Park Service and Deni Seymour (personal communication, 2009), president of the New Mexico Archaeological Council, concurred with the notion that the modified can may be associated with brewing. In archaeological review publications (Gunnerson 1969; Opler 1971; Winter 1983) specifically relating to the material culture of Jicarilla Apaches, no mention of such objects was made.

LA 160201 is immediately south of roadside picnic tables, and many of the indulgence items and food containers are assumed to be associated with picnicking from the middle-to-late twentieth century. The two oil cans suggest additional use of the area for fuelwood gathering during the same time period. The two soldered cans indicate

Figure 10.9. Can for brewing tiswin (?) at LA 160201.

site use during the nineteenth or early twentieth century and predate construction of NM 74/ US 285. If these artifacts are associated with an Apache group, the site may have functioned as a short-term camp site for a transient group of Athabaskans.

Recommendations

The prehistoric component of LA 160201 is a small, task-specific flaked stone scatter dating to the Archaic period. Specific point styles suggest possible San Jose (3200 to 1800 BC), Armijo (1800 to 800 BC), and En Medio (800 BC to AD 400) occupations. The current project added the En Medio component, based on a corner-notched point style. However, little additional information was derived from the small flaked stone assemblage. The projectile points suggest hunting-related task groups. Three discrete activity areas are preserved on the site, but they are similar in material and artifact content, and the multiple occupations introduce problems of assemblage mixture and artifact reuse.

The presence of a possible tiswin can suggests an ephemeral Apache component (ca. AD 1860–1930). This was also probably a short-term camp. The bulk of the remaining historic artifacts are represented by general discard from twentieth-century Euroamerican populations.

Archaeological testing within the APE indicates that cultural material is limited to a single Polvadera obsidian flake and no Euroamerican artifacts. The single flake was confined to the surface, and no subsurface artifacts or cultural deposits were encountered in the six test units and two backhoe trenches excavated within the APE. The single flake adds essentially no interpretive information to the simple artifact scatters beyond what has been recorded and described. All of the other material mapped on the site is preserved outside of the APE and will not be effected by the construction project. The testing program has determined that the portion of LA 160201 extending into the APE has been exhausted and is not likely to yield additional information important to the understanding of local or regional history or prehistory beyond what has been documented. The portion of the site within the APE therefore is not considered eligible for nomination to the *National Register of Historic Places*, and no further archaeological investigations are recommended. However, the larger portion of the site preserved outside of the current APE may still contain buried significant deposits and may be eligible for nomination under Criterion D. This site area should be avoided and preserved in place.

11. LA 160203 (AR-03-02-06-1314)

LA 160203 was recorded by Parrish et al. (2008:62–64) during a survey conducted to prepare for the current phase of highway construction. It was described as a prehistoric artifact scatter of indeterminate temporal or cultural affinity, which contained no visible features. LA 160203 occurs only on the east side of US 285 (Fig. 11.1). The site measures 59 m north-south by 49 m east-west, and encompasses an area of roughly 1,902 sq m. Between 51 and 75 percent is thought to be intact. An estimated 50 percent of the site area and artifacts are within the US 285 right-of-way.

Environment

LA 160203 is on the gradual south-facing slope of a low ridge 2.3 miles east of Red Mesa (Parrish et al. 2008:62). Soils on the site are classified as Montecito loam, an alluvial soil derived from the weathering of basalt. These soils occupy landforms with slopes up to 15 percent. The Montecito grades into gravelly, sandy loam with depth. The soil association of the area is of the Torriorthents-Haplargids-Calciorthids Land. Typically, these calcic soils are shallow to somewhat deep, cobbly, and stony. They occur with basalt outcrops and bedrock (USDA-NRCS 2009; Maker et al. 1974).

About 45 percent of the surface is obscured by vegetation and juniper-piñon duff, which have stabilized the parts of the site it where they occur (Fig. 11.2). The vegetative overstory consists mainly of small, scattered piñon and juniper trees, and the understory is dominated by sage, various grasses, and snakeweed.

Treatment

Prior to testing, all artifacts within the highway right-of-way were mapped and subjected to in-field analysis. This included 92 flaked stone artifacts and 58 Euroamerican artifacts. A total of 60 flaked stone artifacts were collected from the 19 m wide APE, but no Euroamerican artifacts extended into the construction zone. The majority of the flaked stone artifacts were associated with a 9 m north-south by 6 m east-west artifact concentration that partially overlapped the APE.

Next, ten 1 by 1 m test pits were judgmentally placed to evaluate subsurface fill within the APE. Test pits were placed to evaluate the subsurface fill around AC 1, which contained the bulk of the surface artifacts, and the general length of the site. The ten test pits were excavated into sterile soil to a depth of 50 cmbs, or until bedrock was encountered. An auger test was also placed at the base of each test pit

To examine soil characteristics below depths reached by hand excavation, an attempt was made to extend each auger test 1 m below the base of each test pit, but this was often not possible in the rocky soil. The APE at this site is wider and therefore less disturbed than the narrow 8 m wide strips along most of the sites. The test pits were excavated into sterile A-horizon soils, which generally extended to depths of 40 to 50 cmbs. The same soil profiles were found in each of the ten test pits, and these are best exemplified by the longer backhoe profile.

Higher artifact concentrations of artifacts were found in test pits near the center of the artifact concentration overlapping the APE, but artifacts were confined to the initial 5 cm of loose surface fill. No lower artifacts, features, charcoal, or cultural staining were found in these hand-dug test pits.

Further data recovery efforts were initiated to examine the horizontal extent of artifacts in the APE. An additional series of 1 by 1 m units (n = 95) were surface-stripped of the 5 cm of loose surface fill. These surface-stripped units effectively delineated the extent of AC 1 overlapping the APE and other areas of interest across the site (Figs. 11.1 and 11.3). Grids were surface-stripped in areas of artifact yield until those areas were exhausted of cultural materials or until the edge of the APE was encountered. No grid units were surface-stripped outside of the APE. All fill was screened through 1/4-inch mesh.

A backhoe was then used to dig a 42 m long

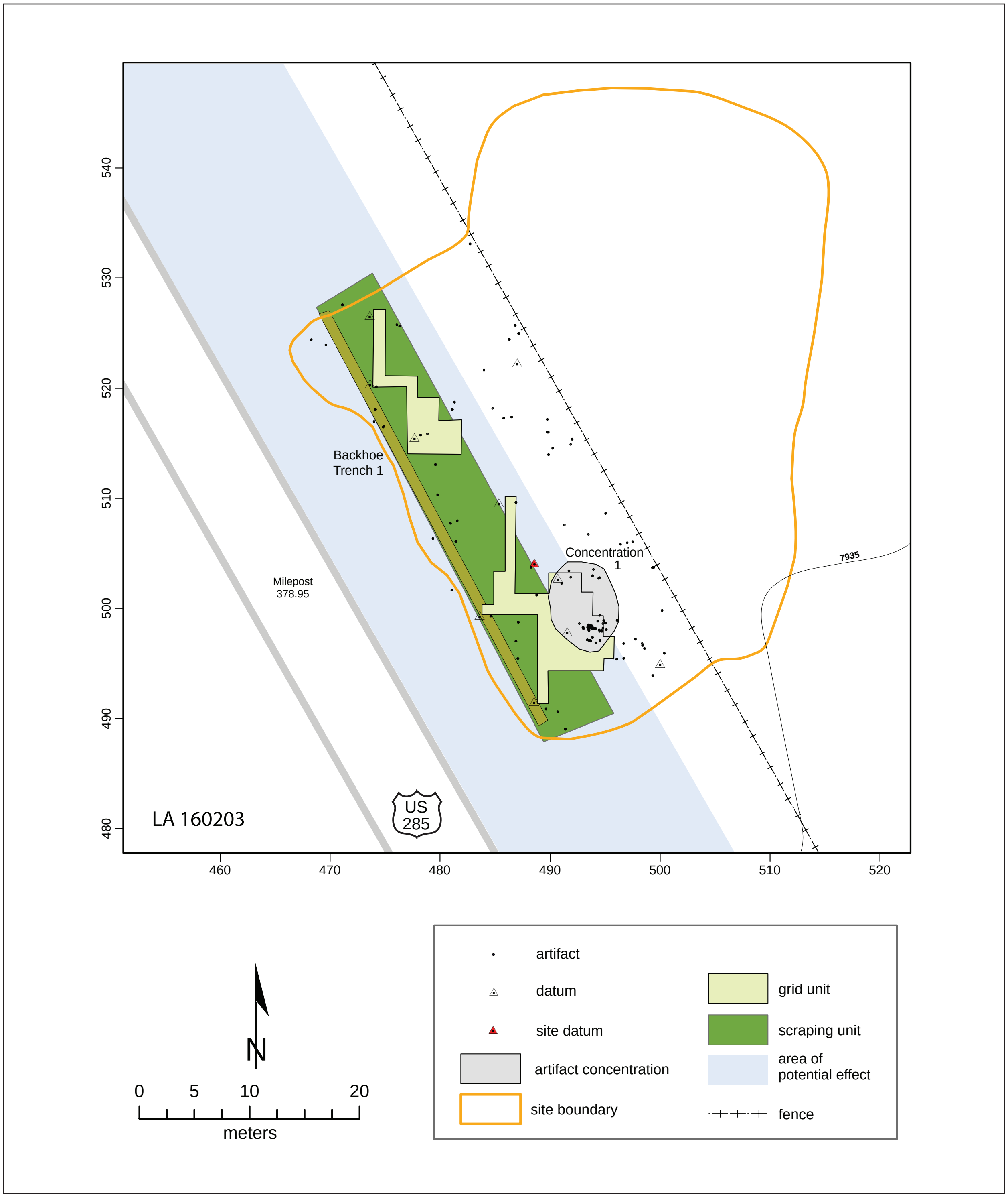


Figure 11.1. Site map, LA 160203.

Figure 11.2. Environment of LA 160203.

Figure 11.3. Hand-excavation units at LA 160203.

northwest-southeast trench extending the length of the site. The purpose of the trench was to look for additional cultural material and more deeply buried deposits, and to create a profile from which soil-formation processes could be evaluated. This trench was excavated until bedrock was encountered, roughly 80 cmbs in most locations. No subsurface artifacts, surfaces, or cultural deposits were encountered in the long backhoe trench.

Last, the front end of the backhoe was used to mechanically scrape the upper 10 cm of soil from a 44 m north-south by 7 m east-west unit across the entire APE. We closely monitored the scraping process, but no artifacts, features, or cultural staining was uncovered during this final scraping process (Fig. 11.4). The locations of surface-mapped artifacts, test pits, surface-stripped grid units, and the backhoe trench are shown in Figure 11.1.

Backhoe Trench

BHT 1 was excavated on LA 160203 along the US 285 right-of-way between the road shoulder and the fenceline in the right-of-way on the east side of the highway. The surface layer in the area of the trench consisted of disrupted A-horizon material originating from ground-disturbing road and ditch construction. At 20 cmbs, inclusions of roadside debris were common in this layer (Fig 11.5).

Beneath the disturbed surface layer, a comparatively intact A horizon persisted to 40 cmbs. The soil matrix was strongly structured, consisting of dark brown silt and fine sand with some clay development; dispersed angular basalt pebbles were present throughout the matrix. Fine to medium-sized roots and associated bioturbation were abundant. The A-horizon boundary with the underlying B horizon was wavy and clear or gradual.

The B-horizon soil consisted of granular, blocky-structured, brown silt with fine sand and moderate clay development. Inclusions of fine and medium roots, and unsorted angular basalt pebbles and caliche pebbles were common. The B horizon extended as deep as 50 cmbs.

The B-horizon boundary was irregular and clear; it was immediately underlain by an intermittent Bk/Ck soil. Partially defined by carbonate development along soil pores and ped faces, the Bk horizon was intermittent, diffuse, and weakly expressed. It was immediately underlain by Ck- and K-horizon soils extending as deep as 125 cmbs, terminating on basalt bedrock. The Ck horizon had highly fractured and weathered basalt cobbles and pebbles derived from bedrock. The caliche was intermittently indurated and earthy-textured.

No cultural deposits, artifacts, or features were discovered in BHT 1.

Features

No archaeological features were encountered at LA 160203.

Cultural Materials

A total of 92 flaked stone artifacts and 79 Euroamerican artifacts were analyzed within the highway right-of-way. Fifty-eight of these artifacts, all flaked stone, were collected within the APE, and an additional 133 flaked stone artifacts were recovered as a result of the 95 surface strip and 10 test units. The majority of artifacts were encountered in a large concentration (AC 1) of Polvadera obsidian biface flakes. AC 1 measured 9 m north-south by 6 m east-west; it was within the right-of-way and partially inside the APE (Figs. 11.1 and 11.6).

Flaked Stone

LA 160203 is the northernmost of the sites along the highway corridor. Parrish et al. (2008:62–64) originally recorded 123 flaked stone artifacts at the site, which is confined to the east side of the highway. Nearly half (n = 52) of the flaked stone artifacts were located within AC 1, measuring 8 m by 6 m. The remaining artifacts were distributed across the site as a general scatter. The specific material and artifact content of the artifact scatter were not tabulated in the report. The site as a whole consisted of 120 pieces of debitage and three tools. The debitage was composed of core flakes (n = 29), biface thinning flakes (n = 53), pressure flakes (n = 14), indeterminate flakes (n = 19), and angular debris (n = 5). Material types included nonlocal Polvadera obsidian (n = 96), lo-

Figure 11.4. Surface-scraping unit and backhoe trench at LA 160203.

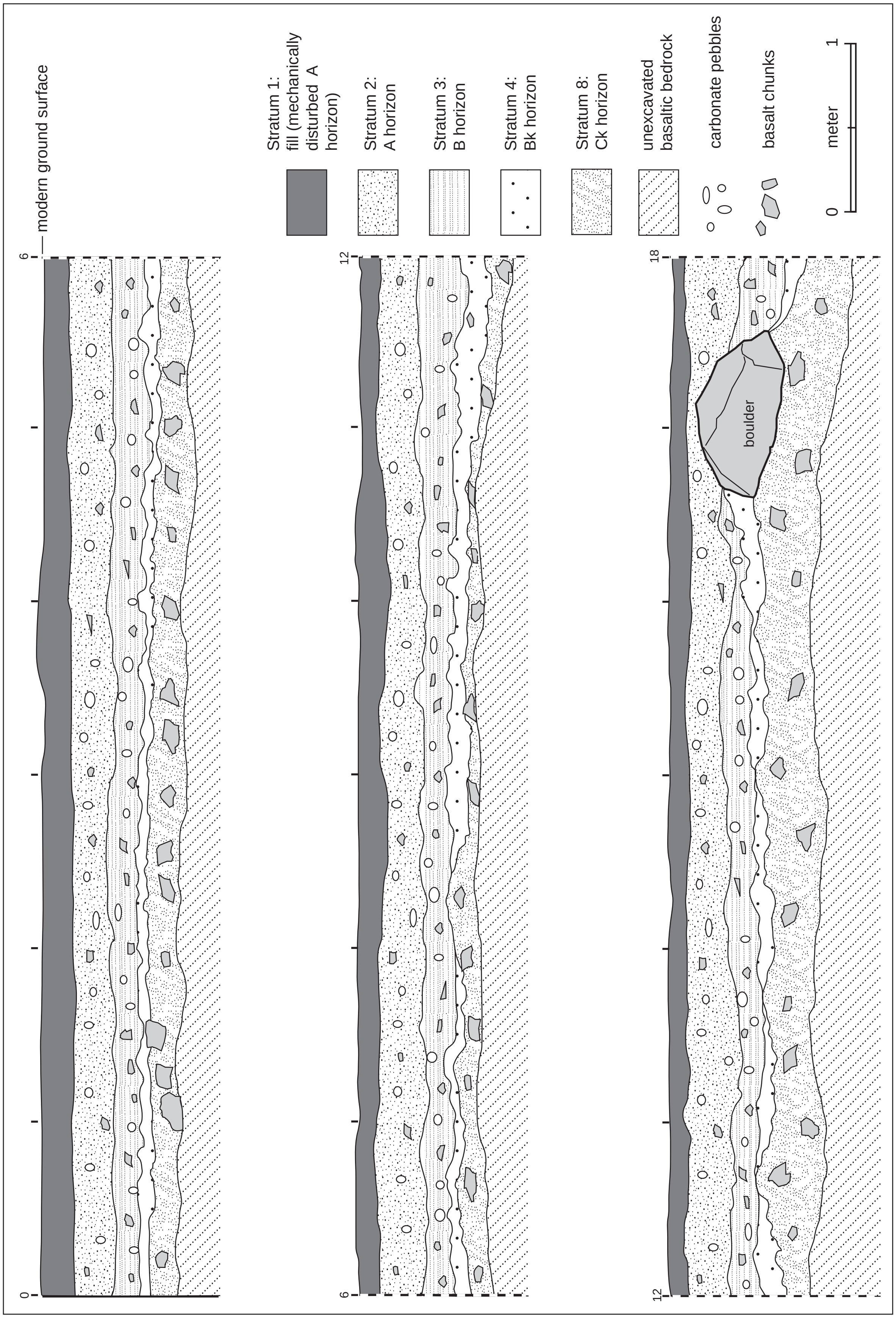


Figure 11.5. East wall profile, Backhoe Trench 1, LA 160203.

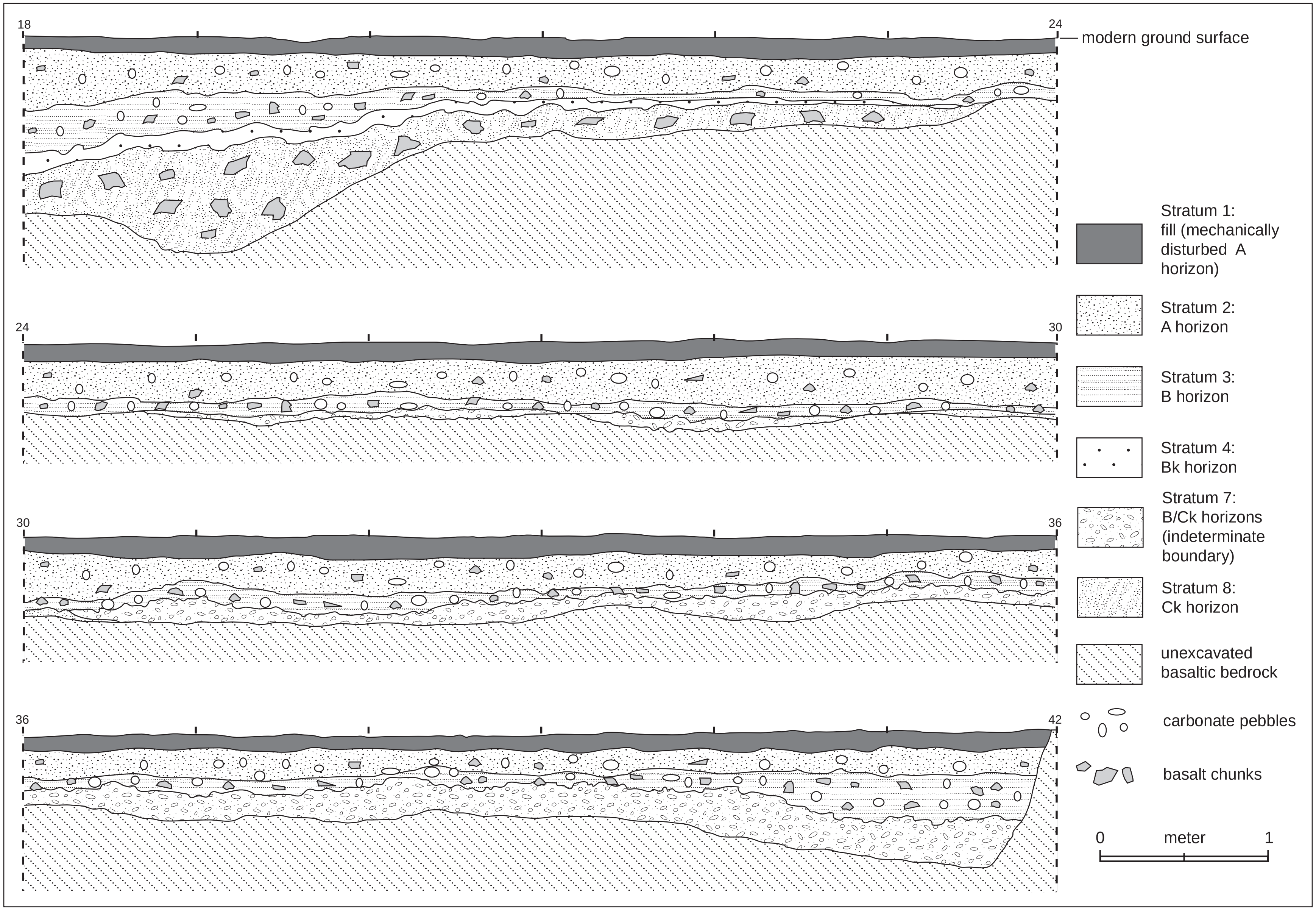


Figure 11.5 (continued)

Figure 11.6. Artifact Concentration 1, LA 160203.

cal basalt (n = 13), semilocal No Agua obsidian (n = 6), nonlocal Jemez obsidian (n = 4), and white chert (n = 1). All three tools were manufactured from basalt: two biface preform fragments and a side scraper fragment. All three had acute edge angles of around 30 degrees, suggesting cutting as well as scraping. The flaked stone assemblage indicated an occupation centered on tool production in association with subsistence hunting and gathering. An unspecified prehistoric cultural and temporal affiliation was assigned because of the absence of diagnostic artifacts.

A total of 92 flaked stone artifacts were mapped and analyzed within the highway right-of-way during the current project (Fig. 11.1). Artifact distribution was similar to Parrish's original site description. The majority (n = 60, 65 percent) of the artifacts were clustered within AC 1, and the remainder were scattered across the site. The construction zone is 19 m wide at this site, and surface artifacts within the construction zone were subsequently collected.

Material types and textures are presented in Tables 11.1 and 11.2. The flaked stone assemblage was composed of six material types; nonlocal Polvadera obsidian accounts for 68 percent (n = 63) of the artifacts. Other nonlocal material types include undifferentiated Jemez obsidian (n = 7) and Pedernal chert (n = 4). As a whole, nonlocal material types represented 78 percent (n = 72) of the artifacts analyzed. Local basalt was the primary (n = 14) local material, followed by undifferentiated chert (n = 4) and No Agua obsidian (n = 2). This was essentially the same material type assemblage and frequency distribution recorded by Parrish et al. (2008:63), but with the addition of two nonlocal Pedernal chert flakes. The Jemez Mountains were an important source of a large portion of the lithic material used on the site. Most (n = 71, 77 percent) of the materials have a glassy texture, exemplified by the obsidians. However, one basalt flake exhibited a glassy quality rather than the fine-grained texture that defined most of the group. The No Agua obsidian was glassy, but characteristically flawed. The undifferentiated chert trended toward a fine-grained but flawed quality.

The flaked stone assemblage is represented almost entirely by debitage in the form of angular debris (n = 17), core flakes (n = 44), biface flakes

Table 11.1. Surface flaked stone artifact morphology and function by material type, LA 160203

Morphology	Function	Chert, Undifferentiated	Pedernal Chert	Obsidian, Undifferentiated	Polvadera Obsidian	No Agua Obsidian	Nonvesicular Basalt	Total
Angular debris	unutilized angular debris	3	–	1	10	–	3	17
Core flake	unutilized flake	1	2	5	29	2	5	44
Biface flake	unutilized flake	–	–	1	23	–	2	26
Multidirectional core	unutilized core	–	–	–	1	–	–	1
Biface, early stage	side scraper	–	–	–	–	–	1	1
Biface, middle stage	biface, undifferentiated	–	–	–	–	–	3	3
Total		4	2	7	63	2	14	92

Table 11.2. Surface flaked stone material type by texture, LA 160203

Material Type	Glassy	Glassy and Flawed	Fine-grained	Fine-grained and Flawed	Total
Chert, undifferentiated	–	–	1	3	4
Pedernal chert	–	–	2	–	2
Obsidian, undifferentiated	7	–	–	–	7
Polvadera obsidian	63	–	–	–	63
No Agua obsidian	–	2	–	–	2
Nonvesicular basalt	1	–	13	–	14
Total	71	2	16	3	92

(n = 26), and a single core. Each of the material types was involved in late-stage core and biface reduction, but Parrish recorded more biface (n = 53) and pressure (n = 14) flakes during his site recording. Polvadera obsidian is represented by the highest frequency (n = 63) of debitage, with core and biface reduction represented in nearly equal numbers. Of interest was a multidirectional Polvadera obsidian core representing core reduction; it had 50 percent cortex coverage and measured 23 by 20 by 14 mm. This small core was found within AC 1 and may be directly associated with the 29 Polvadera obsidian core flakes concentrated at this locality. This was the only core recorded on the entire project.

Angular debris is associated with most of the material types, but Polvadera obsidian has the highest occurrence (n = 10). Five pieces of Polvadera obsidian angular debris were mapped within the artifact concentration and may be associated with the multidirectional core at this locus. Most (n = 85, 92 percent) of the material types lack cortex and were derived from the later stages of core and biface reduction (Table 11.3). Polvadera obsidian has two artifacts with primary-stage cortex coverage, including the multidirectional core. A few primary flakes were also associated with the local basalt and undifferentiated chert.

The later stages of reduction are further exemplified by the small-artifact dimensions (Table 11.4). The core is also small and was probably exhausted. The largest flakes are an undifferentiated chert 28 mm wide and a local basalt flake 38 mm long. Most of the various debitage types from all materials have dimensions under 25 mm.

The bulk (n = 88, 96 percent) of the assemblage is unutilized debitage. Formal tools were represented by four basalt artifacts—a side scraper and three undifferentiated biface fragments. The tools were found as part of the general artifact scatter, mainly to the northeast of AC 1 in the area of the tools found by Parrish. A middle-stage biface functioned as an end scraper. The medial fragment measured 48 by 44 by 15 mm. The remaining tools are represented by middle-stage bifaces with undifferentiated functions (Fig. 11.7). They may have been the target of late-stage core and reduction, or preforms transported to the site for further reduction. One lateral fragment measured 18 by 17 by 6 mm. A proximal fragment measured 31 by 34 by 5 mm. Another proximal fragment measured 24 by 28 by 5 mm.

As mentioned, 65 percent (n = 60) of the surface artifacts were confined to AC 1 (Table 11.5), which represented a discrete activity area on the site. Both late-stage core reduction and biface/tool production occurred at this locality, with core and biface reduction employing nonlocal Polvadera obsidian accounting for 85 percent (n = 51) of the artifacts. This was the location of the only core found on the site and on the entire project. Although tool production was a major activity at this location, all of the tools on the site were manufactured from basalt. The end products of the core and bifacial reduction activities were apparently removed from the site. AC 1 was probably a discrete and very briefly utilized locus. Unfortunately, no diagnostic artifacts were recovered from the activity area or the site as a whole.

Over half of AC 1 overlapped the 19 m wide construction zone, and 60 artifacts had been collected from the site surface at this locality. This higher frequency of artifacts within the construction zone indicated that additional treatment was necessary to adequately characterize the subsurface nature of the activity area. Initially, ten 1 by 1

Table 11.3. Surface flaked stone material type by dorsal cortex percentage, LA 160203

Material Type	0%	1–49%	50–100%	Total
Chert, undifferentiated	1	2	1	4
Pedernal chert	2	–	–	2
Obsidian, undifferentiated	7	–	–	7
Polvadera obsidian	60	1	2	63
No Agua obsidian	2	–	–	2
Nonvesicular basalt	13	–	1	14
Total	85	3	4	92

Table 11.4. Surface flaked stone measurements by material type and artifact morphology, LA 160203

Artifact Morphology		Length (mm)	Width (mm)	Thickness (mm)
		Chert, Undifferentiated		
Angular debris	mean	22.7	18.0	9.0
	number	3	3	3
	standard deviation	10.7	7.5	3.0
	minimum	11	11	6
	maximum	32	26	12
Core flake	mean	26.0	38.0	7.0
	number	1	1	1
	standard deviation	–	–	–
	minimum	26	38	7
	maximum	32	38	12
		Obsidian, Undifferentiated		
Angular debris	mean	27.0	11.0	8.0
	number	1	1	1
	standard deviation	–	–	–
	minimum	27	11	8
	maximum	27	11	8
Biface flake	mean	12.0	8.0	2.0
	number	1	1	1
	standard deviation	–	–	–
	minimum	12	8	2
	maximum	12	8	2
		Polvadera Obsidian		
Angular debris	mean	14.3	8.4	3.7
	number	10	10	10
	standard deviation	4.9	3.4	1.6
	minimum	8	3	2
	maximum	22	15	7
Core flake	mean	19.5	13.8	4.1
	number	8	8	8
	standard deviation	4.2	4.4	1.1
	minimum	12	8	2
	maximum	25	20	5
Biface flake	mean	12.4	10.0	2.6
	number	8	8	8
	standard deviation	4.1	3.7	1.1
	minimum	8	7	1
	maximum	19	16	4
Multidirectional core	mean	23.0	20.0	14.0
	number	1	1	1
	standard deviation	–	–	–
	minimum	23	20	14
	maximum	23	20	14
		Nonvesicular Basalt		
Angular debris	mean	14.7	11.0	7.3
	number	3	3	3
	standard deviation	5.0	2.0	4.0
	minimum	10	9	3
	maximum	20	13	11
Core flake	mean	38.0	25.0	6.0
	number	1	1	1
	standard deviation	–	–	–
	minimum	38	25	6
	maximum	38	25	6
Biface flake	mean	7.0	8.0	1.0
	number	1	1	1
	standard deviation	–	–	–
	minimum	7	8	1
	maximum	7	8	1

Note: angular debris and whole flakes only

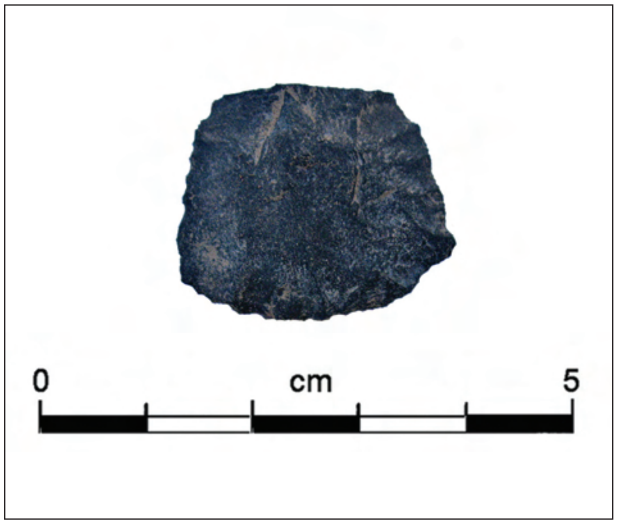


Figure 11.7. Basalt middle-stage biface, LA 160203.

Table 11.5. Surface flaked stone artifacts from AC 1, LA 160203

Morphology	No.
Polvadera Obsidian	
Biface flake	19
Core flake	22
Angular debris	9
Multifaceted core	1
Subtotal	51
Obsidian, Undifferentiated	
Core flake	2
Angular debris	1
Subtotal	3
Pedernal Chert	
Core flake	1
Basalt	
Biface flake	1
Core flake	2
Angular debris	2
Subtotal	5
Total	60

m grid units were excavated to sterile soil around AC 1 and across the site. These test units indicated that cultural material was confined primarily to the surface or the initial loose 5 cm surface strip. No subsurface charcoal, staining, or other evidence of cultural disturbance was encountered. Only three artifacts came from Level 2 in two test units, and these artifacts may have been displaced by rodents (Table 11.6).

The initial thin layer of soil in a series of grid units was then stripped to define the extent of the artifact concentration and further characterize the subsurface nature of the associated flaked stone assemblage (Fig. 11.1). A total of 95 1 by 1 m grid units were examined around AC 1 and at the location of 10 flaked stone artifacts found in three grid units about 16 m to the north.

Flaked stone artifacts (n = 133) were found in only 20 of the 95 investigated grid units (Table 11.7). Grids 497N/494E (n = 43), 497N/494E (n = 12), 498N/493E (n = 21), and 498N/494E (n = 16) accounted for 70 percent (n = 94) of the artifacts. These grid units are located essentially in the center of AC 1. Artifact frequencies quickly decreased as the spatial extent of AC 1 was delineated. AC 1 measured about 8 by 6 m, and about 2 m of the concentration are preserved east of the construction zone. The recovered surface and subsurface flaked stone assemblages should accurately represent this discrete activity area.

Flaked stone artifacts recovered from the surface-stripped grid units are presented in Tables 11.8–11.12. The subsurface assemblage is essentially a continuation of the surface assemblage with only a few exceptions. Polvadera obsidian remained the dominant material type, accounting for 89 percent (n = 118) of the artifacts. New material types are represented by two pieces of undifferentiated chert and one piece of No Agua obsidian. Pedernal chert was not found in the subsurface assemblage. While all of Polvadera obsidian (n = 51) on the surface had a glassy texture, the subsurface material was divided between glassy (n = 76) and glassy and flawed (n = 42).

The subsurface flaked stone assemblage is composed entirely of debitage in the form of angular debris, core flakes, and biface flakes. The surface had a higher frequency (n = 19) of Polvadera obsidian biface flakes, while the subsurface assemblage is dominated by core flakes (n = 74) and only eight biface flakes. The glaring difference in debitage types is the increased number (n = 36) of Polvadera angular debris below the surface, compared to nine pieces of angular debris on the surface. The surface material types generally lack cortex (n = 56, 93 percent). This is also true of the subsurface material types (n = 112, 84 percent). Artifact sizes are consistently small, indicative of the later stages of core biface reduction. All of the subsurface debitage was unutilized, and no formal tools were recovered. In actuality, the surface and subsurface assemblages are extensions of each other and can be considered a palimpsest separated by only about 5 cm of loose fill that undoubtedly has shifted over time. Artifacts have most likely been exposed and reburied many times over the years. AC 1 exemplifies an activity area centered on late-stage core and biface reduction. Specifically, this may have been a unique, rather short-term event involving the reduction primarily of a Polvadera obsidian core. The bulk of the Polvadera obsidian debitage that characterizes this locality may have accumulated during this one reduction episode. Unfortunately, the products of the reduction activity were not found, and no diagnostic artifacts remain to assign a specific cultural and temporal affiliation to the episode.

A smaller occurrence of ten artifacts was found in Grids 515N/478E (n = 7), 515N/479E (n = 2), and 516N/477E (n = 1) about 16 m north of AC 1. Surrounding grid units verified that no additional artifacts occurred in the area. The small occurrence consisted of Polvadera obsidian core flakes (n = 8), a basalt core flake, and an undifferentiated Jemez core flake. The artifacts are considered a manifestation of the general scatter of artifacts across the site.

In summary, the flaked stone assemblage analyzed in the field and recovered during the data recovery program supports Parrish et al.'s (2008) original site assessment. The site was probably a briefly occupied locus focused specifically on late-stage core and biface reduction. Imported materials from the Jemez Mountains, including Polvadera obsidian, undifferentiated obsidian, and Pedernal chert, were used in greater numbers than the local materials. AC 1 was unique for showing a specific reduction episode of Polvadera obsidian resulting in the bulk of the debitage on the site, including biface flakes, core flakes, angular debris, and a multifaceted core. The epi-

Table 11.6. Subsurface flaked stone assemblage, AC 1, LA 160203

Morphology	Function	Undifferentiated Chert	Undifferentiated Obsidian	Polvadera Obsidian	No Agua Obsidian	Basalt	Total
Angular debris	unutilized angular debris	1	–	35	–	2	38
	unutilized flake	–	–	1	–	–	1
Core flake	unutilized flake	1	4	74	1	6	84
Biface flake	unutilized flake	–	–	8	–	–	7
Total		2	4	118	1	8	133

Table 11.7. Flaked stone artifacts collected from grid units by level, LA 160203

North	East	Level 1	Level 2	Total	Column %
495	492	1	–	1	0.8%
495	493	1	–	1	0.8%
496	492	1	–	1	0.8%
496	493	1	–	1	0.8%
496	494	2	–	2	1.5%
496	495	3	–	3	2.3%
497	492	6	–	6	4.5%
497	493	42	1	43	32.3%
497	494	12	–	12	9.0%
498	491	1	–	1	0.8%
498	492	4	–	4	3.0%
498	493	21	2	23	17.3%
498	494	16	–	16	12.0%
499	491	3	–	3	2.3%
499	492	1	–	1	0.8%
499	493	2	–	2	1.5%
500	492	3	–	3	2.3%
515	478	7	–	7	5.3%
515	479	2	–	2	1.5%
516	477	1	–	1	0.8%
Total		130	3	133	100.0%
% of total		97.7%	2.3%	100.0%	

Table 11.8. Flaked stone artifacts collected from grid units by level, LA 160203

North	East	Level 1	Level 2	Total	Column %
495	492	1	–	1	0.8%
495	493	1	–	1	0.8%
496	492	1	–	1	0.8%
496	493	1	–	1	0.8%
496	494	2	–	2	1.5%
496	495	3	–	3	2.3%
497	492	6	–	6	4.5%
497	493	42	1	43	32.3%
497	494	12	–	12	9.0%
498	491	1	–	1	0.8%
498	492	4	–	4	3.0%
498	493	21	2	23	17.3%
498	494	16	–	16	12.0%
499	491	3	–	3	2.3%
499	492	1	–	1	0.8%
499	493	2	–	2	1.5%
500	492	3	–	3	2.3%
515	478	7	–	7	5.3%
515	479	2	–	2	1.5%
516	477	1	–	1	0.8%
Total		130	3	133	100.0%
% of total		97.7%	2.3%	100.0%	

Table 11.9. Subsurface flaked stone assemblage, AC 1, LA 160203

Morphology	Artifact Function	Undifferentiated Chert	Undifferentiated Obsidian	Polvadera Obsidian	No Agua Obsidian	Basalt	Total
Angular debris	unutilized angular debris	1	–	35	–	2	38
	unutilized flake	–	–	1	–	–	1
Core flake	unutilized flake	1	4	74	1	6	84
Biface flake	unutilized flake	–	–	8	–	–	7
Total		2	4	118	1	8	133

Table 11.10. Subsurface flaked stone material types by texture, AC 1, LA 160203

Material Type	Glassy	Glassy and Flawed	Fine-grained	Fine-grained and Flawed	Total
Undifferentiated chert	–	–	2	–	2
Undifferentiated obsidian	2	2	–	–	4
Polvadera obsidian	76	42	–	–	118
No Agua obsidian	–	1	–	–	1
Basalt	1	–	4	3	8
Total	79	45	6	3	133

Table 11.11. Subsurface flaked stone material types by cortex percentage, AC 1, LA 160203

Material Type	0%	1–49%	50–100%	Total
Undifferentiated chert	2	–	–	2
Undifferentiated obsidian	4	–	–	4
Polvadera obsidian	98	14	6	118
No Agua obsidian	–	–	1	1
Basalt	8	–	–	8
Total	112	14	7	133

Table 11.12. Flaked stone measurements by material type and artifact morphology, AC 1, LA 160203

Morphology		Length (mm)	Width (mm)	Thickness (mm)
Angular debris	mean	10.0	7.0	2.0
	number	1	1	1
	standard deviation	–	–	–
	minimum	10	7	2
	maximum	10	7	2
Core flake	mean	20.0	13.0	4.0
	number	1	1	1
	standard deviation	–	–	–
	minimum	20	13	4
	maximum	20	13	4
Undifferentiated Obsidian				
Core flake	mean	11.0	9.0	2.0
	number	1	1	1
	standard deviation	–	–	–
	minimum	11	9	2
	maximum	11	9	2
Polvadera Obsidian				
Angular debris	mean	11.6	8.7	2.5
	number	36	36	36
	standard deviation	6.0	4.3	1.7
	minimum	5	4	1
	maximum	30	22	7
Core flake	mean	14.7	14.9	3.7
	number	15	15	15
	standard deviation	11.8	10.7	3.6
	minimum	5	5	1
	maximum	47	42	13
Biface flake	mean	11.8	7.5	1.7
	number	6	6	6
	standard deviation	5.6	2.8	0.8
	minimum	6	4	1
	maximum	21	10	3
Basalt				
Angular debris	mean	21.0	13.0	5.0
	number	2	2	2
	standard deviation	0.0	4.2	1.4
	minimum	21	10	4
	maximum	21	16	6
Core flake	mean	11	11	2
	number	2	2	2
	standard deviation	0.0	5.7	1.4
	minimum	11	7	1
	maximum	11	15	3

Note: angular debris and whole flakes only

sode involving the reduction of this core most likely produced a large portion of the accumulated Polvadera obsidian. The presence of three other basalt biface fragments on the general site may represent preforms brought to the site for further bifacial reduction, or the end result of on-site tool production. However, basalt biface flakes are much less common on the site. Other artifact types are limited to a single basalt scraper. The data recovery effort demonstrated that cultural material was confined to the surface or the initial 5 cm of loose fill. No other artifact types were found, and no evidence of subsurface features, stains, or charcoal was observed. In addition, no subsurface cultural material was observed in the backhoe trench that ran the north-south length of the site. This trench usually encountered basalt bedrock at a depth of less than 80 cmbs. The site is viewed as another example of a very briefly occupied locus associated specifically with core and biface reduction. Unfortunately, it must be assigned an unspecified prehistoric cultural and temporal affiliation because of the absence of diagnostic artifacts.

Euroamerican Artifacts

A total of 79 Euroamerican artifacts were subjected to in-field analysis within the highway right-of-way at LA 160203 (Table 11.13). No Euroamerican materials extended into the APE.

Euroamerican artifacts were distributed across two function-based categories: indulgences (n = 61, mnv = 23) and food (n = 2, mnv = 2). The indulgence category included beer (n = 44, mnv = 6), liquor (n = 3, mnv = 3) and soda (n = 2, mnv = 2) bottle and can fragments. The manufacturer of one of the liquor bottles was identified as Schnaaps. The food items consisted of two indeterminate canned products.

Diagnostic attributes indicated Euroamerican artifacts were manufactured by machine. None of the artifacts date prior to 1960, and all are assumed to be associated with vehicle-window discard and picnicking after the commission of NM 74 in 1926.

Recommendations

The flaked stone assemblage analyzed in the field and recovered during the data recovery program supports Parrish et al.'s (2008) original site assessment. The site was probably briefly occupied and focused specifically on core and biface reduction. Unfortunately, no diagnostic artifacts or features were found during this extensive data recovery effort. The site therefore retains the original designation as a small, task-specific, flaked stone scatter with an unspecified prehistoric cultural and temporal affiliation. Diagnostic attributes indicate that Euroamerican artifacts were manufactured by machine. None of these artifacts dated prior to 1960, and all of the Euroamerican artifacts associated with the historic component are assumed to have originated from vehicle-window discard and picnicking after the commission of NM 74 in 1926.

The data recovery efforts at LA 160203 were more extensive than the other sites because of the 19 m wide APE, compared to 8 m at the other sites. The portion of LA 160203 overlapping the APE was confined to flaked stone artifacts, and no Euroamerican artifacts associated with the historic component extended into the construction zone. The majority of the flaked stone artifacts were confined to the area of AC 1 that partially overlapped the APE. The hand excavation of ten 1 by 1 m test pits determined that subsurface material was limited to the top 5 cm of loose surface fill. The surface-stripping of this 5 cm level from 95 1 by 1 m grid units effectively delineated the horizontal extent of AC 1 and other areas of the site. The final excavation of a 42 m long backhoe trench and the mechanical stripping of a 308 sq m unit failed to find additional artifacts, features, or other surface or subsurface cultural deposits within the APE. The recovered flaked stone artifacts were derived mainly from core and biface reduction activities with few associated tools.

No other artifact types were discovered during data recovery. Cultural material in the APE was confined to the surface and initial 5 cm of loose fill in the area of AC 1. Artifact distribution was minimal in other areas of the site. No evidence of subsurface features, stains, or charcoal were found in the APE. The data recovery effort has determined that the portion of LA 160203 overlapping the APE is not likely to yield additional information important to the understanding of local or regional history or prehistory beyond what has been documented. The portion of the site within the APE is not considered eligible for nomination to the *National Register of Historic Places*, and no further archaeological investigations are recommended. However, the remaining portion of the site preserved outside of the current APE may still contain significant buried deposits eligible for nomination under Criterion D. This site area should be avoided and preserved in place.

Table 11.13. Euroamerican artifacts, LA 160203

Type	Function	Count	Column %
	Unassignable		
Unidentifiable	unidentifiable	2	2.5%
	bottle	10	12.7%
	can	4	5.1%
	Food		
Canned goods	unidentifiable canned goods	1	1.3%
Bottled goods	unidentifiable bottled goods	1	1.3%
	Indulgences		
Miscellaneous, beverage	beverage can	11	13.9%
	beverage bottle	1	1.3%
Soda/carbonated beverage	soda bottle	1	1.3%
	soda can	1	1.3%
Beer	beer bottle	41	51.9%
	beer can	4	5.1%
Liquor	liquor flask	2	2.5%
Total		79	100.0%

12. Flaked Stone Analysis

Charles A. Hannaford

The primary contributions of flaked stone analyses derive from data on material selection, reduction technology, and tool use. These topics provide information about ties to other regions, mobility patterns, and site function. While material selection studies cannot reveal how materials were obtained, they can usually provide some indication of where they were procured. By studying the reduction strategies employed at a site it should be possible to compare how different cultural groups approached the problem of producing usable flaked stone tools from raw materials. These comparisons can contribute to discussions of ethnic group affiliation. The types of tools in an assemblage can be used to help assign a function and assess the range of activities that occurred at a site. Flaked stone tools provide temporal data in some cases, but they are usually less time-sensitive than other artifact classes, like pottery and wood.

Flaked stone artifacts within the current highway right-of-way (road edge to fence) were mapped and analyzed in the field by Matthew Barbour to characterize the lithic assemblage. Artifacts outside of the APE were not collected. Only those artifacts within the APE were collected and analyzed in the lab. All flaked stone artifacts were examined using a standardized analysis format (OAS 1994). This analytical format includes a series of attributes that describe material, artifact type and condition, cortex, striking platforms, and dimensions. Each collected flaked stone artifact was further examined by Gavin Bird with a binocular microscope to define morphology and material type, examine platforms, and determine whether it was used as a tool. The level of magnification varied between 20x and 100x, with higher magnification used for wear-pattern analysis and identification of platform modifications. Utilized and modified edge angles were measured with a goniometer; other dimensions were measured with a sliding caliper. Analytical results were entered into a computerized database to permit more efficient manipulation of the data and rapid comparison with other databases on file at the OAS. The flaked stone analysis followed procedures and data used to address research questions outlined in the previously approved testing and data recovery plan for the Tres Piedras project (Moore 2009).

Four of the five archaeological sites overlapping the project area contained flaked stone artifacts (Table 12.1). In most cases, few flaked stone artifacts extended into the narrow construction zone and were collected. Only LA 160203 contained a larger construction footprint, which allowed the recovery of a larger collected assemblage. No flaked stone artifacts were present at LA 144951, at the south end of the project.

The sites can be characterized as low-density flaked stone scatters with surface assemblages ranging between 100 and 200 recorded artifacts. The flaked stone scatters generally embody special-activity sites and temporary camps. Artifact assemblages are rather restricted in content. Unutilized debitage derived from late-stage core and biface reduction activities accounts for most of the artifacts. A combination of imported material types originating in the Jemez Mountains, especially Polvadera obsidian, and locally available materials, such as basalt, are present at all of the sites. Projectile points recorded at two sites aid in assigning temporal affiliations. LA 160196 had an Early Archaic to Middle Archaic (ca. 3500 to 1800 BC) affiliation based on a Ventana side-notched dart point. LA 160201 had three projectile point styles suggesting possible San Jose (3200 to 1800 BC), Armijo 1800 to 800 BC), and En Medio (800 B.C. to A.D. 400) occupations. LA 74879 had three projectile point fragments with undifferentiated styles. No points were found at LA 160203. Both of these sites lacked diagnostic artifacts and have unspecified prehistoric cultural and temporal affiliations.

The projectile points suggest that these rather small special-activity sites and briefly occupied camps may have been used for hunting. The area is still a popular hunting locality today. In general, the range of flaked stone tool types is rather restricted at all of the sites. Outside of reduction debris, scraping tools in the form of side and end scrapers are the most common tool type at

Table 12.1. Flaked stone attributes, all sites

	LA 160196	LA 160201	LA 74879	LA 160203	Total
		Material Type			
Chert, undifferentiated	4	1	4	6	15
Pedernal chert	1	7	13	2	23
Obsidian, undifferentiated	–	11	10	11	32
Polvadera obsidian	13	56	20	181	270
No Agua obsidian	9	3	2	3	17
Basalt	42	18	142	22	224
Quartzite, undifferentiated	–		1		1
Total	69	96	192	225	582
		Morphology			
Angular debris	12	18	19	56	105
Core flake	43	32	79	130	284
Biface flake	9	44	84	34	171
Bipolar flake	–	–	1	–	1
Multidirectional core	–	–	–	1	1
Uniface, early stage	2	–	3	–	5
Uniface, middle stage	–	1	1	–	2
Biface, early stage	1	–	1	1	3
Biface, middle stage	1	–	1	3	5
Biface, late stage	1	1	3	–	5
Total	69	96	192	225	582
		Function			
Unutilized angular debris	12	18	19	56	105
Unutilized flake	52	76	164	164	456
Unutilized core	–	–	–	1	1
End scraper	–	–	2	1	3
Side scraper	2	1	3	–	6
Biface, undifferentiated	1	–	1	3	5
Projectile point preform	–	–	1	–	1
Projectile point, unidentified stemmed	–	–	1	–	1
Projectile point, unidentified corner-notched	–	1	–	–	1
Projectile point, unidentified	–	–	1	–	1
Chopper	2	–	–	–	2
Total	69	96	192	225	582

each site; however, they are present in only small numbers. LA 160201 had a few choppers, denoting heavier chopping. A few biface fragments found at LA 74879 and LA 160203 may represent preforms brought to the site for further reduction or the actual product of the late-stage core and biface reduction characterizing each of the artifact assemblages. The assemblages are not representative of the artifact density and broader tool categories characteristic of base camps.

Site occupations were most likely short term. The flaked stone debris at these special activity sites may also have accumulated during the course of multiple use episodes. The LA 160196 Early Archaic to Middle Archaic (ca. 3500 to 1800 BC) occupation was followed by a possible Jicarilla Apache (1750? to 1900?) occupation, based on the presence of micaceous ceramics (Parrish 2008).

LA 160201 had three projectile point styles, suggesting possible San Jose (3200 to 1800 BC), Armijo (1800 to 800 BC), and En Medio (800 B.C.

to A.D. 400) occupations. Multiple projectile point fragments were also found at LA 74879, but the fragments were not diagnostically sensitive. In contrast, much of the reduction debris at LA 160203 may have quickly accumulated during one reduction episode of a Polvadera obsidian core.

The sites lack evidence of residential structures and other feature types suggestive of lengthy occupations. A single indeterminate pit with a radiocarbon date overlapping the Archaic-period occupation was found at LA 160196, but no flaked stone artifacts were associated directly with the feature. The ephemeral feature contained charcoal in the fill, suggesting thermal activities at the site, although not in direct association with the feature. Thermal activities suggest that fire for light, heat, and resource processing may have occurred at the site, suggesting at least an overnight stay. However, the functional nature of several basalt clusters at this site and LA 160196 remains ambiguous, and it is uncertain how they may relate, if at all, to the flaked stone assemblages. LA 74879 and LA 160203 lack any evidence of features. In summary, the duration of the occupations at the sites was probably very short.

Parrish et al. (2008:18–23) documented 188 sites within 500 m of the project corridor, with site occupations extending from Clovis time to World War II. Artifact scatters of unknown cultural and temporal affiliations (n = 105) were the most common, followed by Archaic-period scatters primarily dating from 1800 BC to 200 AD. An additional 11 artifact scatters contain ceramics representing Ancestral Puebloan site use from Basketmaker III to European contact. However, fewer than 10 of the prehistoric sites contained hearths or simple features. Needless to say, the project area was a heavily utilized locality over a long period of time. The surrounding archaeological context is characterized by a long-term pattern of numerous special-activity sites appearing as small flaked stone scatters. These common flaked stone scatters manifest similar combinations of local and imported materials, especially from the Jemez Mountains. Projectile points portray a similar long-term trend of regional hunting. Noticeably absent are residential sites or larger, more complex artifact scatters with features that might be associated with base camps.

This larger regional perspective suggests a heavily utilized landscape frequented primarily by mobile hunter and gatherer groups over a very long period. The four small sites along the highway corridor are typical manifestations of this much larger pattern. In actuality, the numerous sites within the Petaca Peak quadrangle are often drawn with site boundaries that nearly overlap and can be easily connected by isolated occurrences. In the case of LA 74879 and LA 160201, the only reason for the demarcation between the two sites is that construction of picnic tables in the twentieth century removed the intervening cultural materials. Human utilization of the project area could easily be viewed as an archaeological landscape rather than a collection of isolated sites.

Groups from all time periods most likely employed similar foraging strategies as they passed through the area utilizing the local lithic, plant, and animal resources. A combination of local and imported lithic material were probably procured and utilized during the pursuit of other subsistence activities, probably emphasizing hunting. The region afforded similar variables such as the forest, which was attractive to game animals, and a range of exposed local material types, especially basalt. Site inhabitants from all periods repeatedly generated a similar pattern of late core and biface reduction debris that is almost identical in content across many sites. The debris probably accumulated slowly over time as groups passed through the area. Concentrated core reduction debris probably served as opportunistic sources for scavenged material and convenient edges to later groups. Surface artifacts were thus exposed to a repeated pattern of scavenging and recycling. Any piece of debitage could serve as a potential core for further reduction or a convenient edge source for various activities. The pathway, therefore, of any individual artifact during the course of procurement, manufacture, use, maintenance, and discard was most likely a very fluid process of continuous potential recycling across different time periods. This results in mixed spatial contexts and precludes the definition of specific activity areas, sets of associated tools, and discrete reduction episodes. The sites in this area probably grew from slow accretion of low-intensity activities based on the repeated use of a good hunting locality. The heavily used landscape, with many potentially fluid spatial and temporal components, creates a context that limits the ability of the flaked stone assemblages to add much conclusive evidence to the research.

Research Question 1: Are Potentially Significant Cultural Remains Present?

Three sites—LA 160196 (five artifacts), LA 160201 (one artifact), and LA 74879 (three artifacts)—are in 8 m wide construction zones with very limited flaked stone artifact content. A single undifferentiated projectile point preform of Polvadera obsidian was collected from LA 74879, but the remaining eight flaked stone artifacts from the three sites were represented by scattered unutilized debitage. Hand and mechanical excavation units verified that there was no subsurface depth to the flaked stone assemblages and no other evidence of features or cultural disturbance. The small number of artifacts verifies that no significant flaked stone remains extend into the construction zones of these sites.

In contrast, LA 160203 had a 19 m wide APE. A total of 92 flaked stone artifacts were mapped between the highway and the right-of-way fence, most (n = 60) of them concentrated in AC 1. This artifact concentration measured about 8 m long by 6 m wide, and at least one-half of the artifact concentration overlapped the construction zone. A total of 133 flaked stone artifacts were recovered from 95 1 by 1 m surface-stripped grid units in the construction zone, but artifacts were confined to only 20. Artifacts were confined to the initial 5 cm of loose surface soil. Grid unit 497N/493E (n = 43), roughly in the center of the artifact concentration, contained the highest artifact density. This grid unit approached the standard of 50 artifacts per cubic meter of fill used to determine potentially significant deposits. However, surrounding grid units established that artifact frequency quickly declined, and only grid units 497N/494E (12), 498N/493E (21), and 498N/494E (16) contained higher artifact frequencies. The grid units effectively delineated the subsurface extent of the artifact scatter, and only 10 artifacts were found away from the primary activity locus. No additional artifact types were recovered during the data recovery effort in the construction zone.

AC 1 was probably a discrete activity area associated with flaked stone reduction activities. The concentration is unique in portraying a short-term episode centered on the reduction of a multifaceted core of imported Polvadera obsidian. The recovered flaked stone assemblage is characterized exclusively by unutilized reduction debris. No tools were recovered, and the artifact concentration is not associated with features or evidence of subsurface cultural staining. The data recovery effort has verified that the portion of the flaked stone scatter extending into the construction zone is essentially surficial in nature and composed of a restricted range of unutilized debitage. The portion of the site in the construction zone is represented by a low-density flaked stone artifact scatter, but the data recovery effort has effectively defined the spatial extent of artifacts and the content of the flaked stone assemblage. No additional significant deposits, features, or cultural deposits were discovered in the construction zone that might enhance the dating or interpretation of the flaked stone scatter beyond what has been recorded and described. The site area in the construction zone is not considered eligible for nomination to the *National Register of Historic Places*, and no further archaeological investigations are recommended.

Research Question 2: When Were These Sites Used?

Unfortunately, the restricted nature of the various flaked stone assemblages have added little information regarding the age of the sites. Diagnostic projectile points were limited to a single corner-notched En Medio (800 BC to AD 400) point fragment found at LA 160201. Specific point styles suggest possible San Jose (3200 to 1800 BC), Armijo 1800 to 800 BC), and En Medio (800 B.C. to A.D. 400) occupations at this site, but the direct association of the generic debitage with the temporal components remains problematic. Similarly, a Ventana side-notched dart point suggested an Early Archaic to Middle Archaic (ca. 3500 to 1800 BC) occupation at LA 160196. A second occupation, based on micaceous ceramics, suggests a Jicarilla Apache (1750? to 1900?) component. The data recovery program retrieved a radiocarbon date that overlapped with the Archaic temporal component, but no flaked stone artifacts were associated with the ephemeral pit. Again, it is uncertain how the generic reduction debris was associated with the use episodes. No diagnostic artifacts were recovered from LA 74879 and LA 160203, and their cultural and temporal affiliations remain "unspecified prehistoric."

All four sites have flaked stone assemblages containing biface flakes that might be associated with the manufacture and use of generalized bifaces. These bifaces are often related to an efficient curated reduction strategy directed toward the production of portable bifaces and formal tools that might be indicative of Archaic nomadic groups. In contrast, Pueblo assemblages are often characterized with expedient core/flake reduction, with less emphasis on biface manufacture (Moore 2009:38). Unfortunately, reduction strategy can also be influenced by site function and the types and sizes of material available in the area. The regional context indicates a repetitive long-term pattern of short-term hunting occupations. The restricted range of the flaked stone assemblages suggests that the region was utilized in a very similar manner by hunting groups over a long period of time. Hunting groups from all time periods employed similar reduction strategies, involving efficient biface reduction and tool manufacture as they passed through the area, along with the expedient reduction and use of a range of locally encountered materials.

Of interest was the reduction of a multidirectional core of Polvadera obsidian at LA 160203. As a piece of imported material, one would expect that the material would have been initially processed into more of a bifacial preform for transport and to verify the quality of the material. Instead, a piece of raw material with over 50 percent cortex was transported to the site and largely reduced to exhaustion during one reduction episode. On this particular site, much of the reduction debris was generated during one probably very brief use-episode. Unfortunately, the product of the reduction efforts was not found, and the site has an unspecified cultural and temporal affiliation.

Research Question 3: How Do These Sites Fit into the Settlement Systems to Which They Belong?

The surrounding archaeological context is characterized by a long-term pattern of numerous special-activity sites appearing as small flaked stone scatters. These common flaked stone scatters manifest restricted tool assemblages and are composed mainly of debris associated with the reduction of local material (mainly basalt) and materials originating from the Jemez Mountains (Polvadera obsidian, Jemez obsidian, and Pedernal chert). Projectile points suggest that most of these special-activity sites were used for hunting. The four sites in the highway right-of-way follow this pattern and can be characterized by long-term but repeated low-intensity use that has generated classic palimpsests of reduction debitage and secondary informal tool use. Only LA 160196 had a single ephemeral pit with charcoal that might suggest an extended overnight occupation.

Noticeably absent are larger base camps that can be associated with larger mixed-gender groups, a wide range of artifact types characteristic of many activities, and dwellings and feature types indicating longer-term occupations and a wide range of processing and storage activities. In contrast, hunting groups from all time periods seem to have employed a similar forager strategy in which consumers moved to resources (see Chapter 5). Specifically, hunting-related task groups created small artifact scatters as they quickly passed through exploiting the regional faunal and lithic material. These seem to have been on a seasonal basis; the lack of hearths suggests mainly warm-season occupations. Polvadera obsidian, Jemez obsidian, and Pedernal chert have sources well to the south of the project area. Site occupants were obtaining this material through trade or long-distance travel, suggesting territories overlapping with the Jemez Mountains. Travel may have been primarily from south to north, since there seems to be less material originating from the Colorado area, and subsequently drifting south. The long-term use of local and imported materials provides opportunities for later groups to exploit and reuse materials found on the many regional sites. In conclusion, multiple occupations and high regional site density introduce problems of mixing and reuse. These problems consistently obscure conclusions that can be confidently derived from the flaked stone assemblages found at the four sites overlapping the project area.

13. Analysis of Indigenous Ceramic Artifacts

Matthew J. Barbour and C. Dean Wilson

LA 160196 was the only site where Native ceramic sherds were identified. Twenty-four of these sherds were within the right-of-way and were subjected to in-field analysis. However, these sherds were outside the APE and were not collected. All 24 sherds exhibit unpolished surfaces and micaceous pastes, apparently reflecting the use of residual clay (Fig. 13.1). The presence of pottery exhibiting these characteristics is consistent with the assignment of a Jicarilla Apache occupation of LA 160196 dating to the late nineteenth century. These sherds represent a minimum of two vessels and, as discussed by Parrish et al. (2008:52), may represent Cimarron Micaceous based on their relatively thick vessel walls and micaceous rock temper (Warren 1981). However, Petaca Micaceous is similar to Cimarron Micaceous, sharing thick vessel walls and large aplastics. Differences between the two types are in rim characteristics, but no rim fragments were encountered. Both ceramic types were used by Jicarilla Apaches and overlap in temporal and spatial distributions. Pottery exhibiting similar characteristics has been assigned to a variety of types that are known to have been produced by Tewa and Northern Tiwa Pueblo groups as well as Hispanic and Jicarilla Apache potters who adopted manufacturing techniques from adjacent pottery groups sometime between the late eighteenth and early twentieth century (Adler and Dick 1999; Carrillo 1997; Eiselt and Ford 2008; Hurt and Dick 1946; Woosley and Olinger 1990). As a result, the pottery could be associated with several groups traveling the north-south route that has become the current highway. However, an Apache affiliation is likely given that the area is within the traditional range of the Jicarilla Apaches.

Figure 13.1. Micaceous pottery sherds, LA 160196.

14. *Euroamerican Artifact Analysis*

Matthew J. Barbour, Susan M. Moga, and Virginia Prihoda

Euroamerican artifacts represent objects that were not available in the American Southwest prior to the establishment of European settlements in the sixteenth century. The types of assemblages typically include a variety of artifact types such as glass bottles, can and metal fragments, and wheel-thrown ceramics.

Collected and analyzed Euroamerican artifacts (n = 3) represent 1.42 percent of the total artifact assemblage (n = 212) recovered during data recovery investigations. An additional 1,973 Euroamerican artifacts were analyzed in the field, but they were outside the APE and not collected. Information from the two data sets was combined and is presented as such in this chapter.

Euroamerican artifact analysis was conducted by Matthew Barbour and Virginia Prihoda of OAS. Collected materials were analyzed following the standards and methodology outlined in Boyer et al. (1994), specifically created to quantify Euroamerican assemblages. General descriptive attributes such as material type, manufacturing technique, and color were recorded for each artifact. Research questions do not address Euroamerican artifacts directly. The analysis was focused on a function-based analytical framework for determining site use and dates associated with artifact deposition.

Analysis Methods

The OAS Euroamerican analysis format and procedures were developed over the last ten years and incorporate the range of variability found in sites dating from the sixteenth to twentieth century throughout New Mexico (Boyer et al. 1994). These methods are loosely based on South's (1977) Carolina and Frontier artifact patterns and the function-based analytical framework described by Hull-Walski and Ayres (1989) for dam construction camps in central Arizona. This detailed recording format allows for the examination of particular temporal and spatial contexts and for direct comparisons with contemporaneous assemblages from other parts of New Mexico and the greater Southwest. Recorded attributes were entered into an electronic data base (Statistical Package for the Social Sciences, or SPSS) for analysis and comparison with similar data bases on file at OAS.

Functional in nature, the Euroamerican artifact analysis focused on quantifying the utility of various objects. One benefit to this type of analysis is that "various functional categories reflect a wide range of human activities, allowing insight into the behavioral context in which the artifacts were used, maintained, and discarded" (Hanaford and Oakes 1983:70). It also avoids some of the analytic pitfalls associated with frameworks focused on categorizing artifacts strictly by material type (e.g., glass, metal, ceramic, mineral, etc.).

One weakness of material type–based analyses is that only a limited number of functional categories are represented in a single material class. For instance, metal, while beneficial for examining construction and maintenance materials such as nails and wire, does not incorporate patent medicines or other bottled goods into the same analysis. In addition, variables such as finish, often chosen to analyze glass artifacts, are appropriate for glass containers, but not for flat glass, decorative glass, or other glass items like light bulbs, which can serve different roles within a single spatial and temporal context .The OAS analytic framework was designed to be flexible, documenting not only the qualities of each material type, but also the functional role of particular items.

In functional analyses, each artifact is assigned a hierarchical series of attributes that classify an object by assumed functional category, artifact type, and its specific role within that matrix. These attributes are closely related and provide the foundation for additional variables that, with increasingly more detail, specify an artifact's particular function. In this analysis, 9 out of the 12 functional categories were used: economy/production, food, indulgences, domestic, construction/maintenance, personal effects, entertainment/leisure, transportation, and unassignable.

Functional categories not used were furnishings, communications, and military/arms. Each category encompasses a series of material types whose specific functions may be different but related. For example, a pickle jar and a meat tin are both assumed to have initially contained food. Both items would be included in the functional category for food, but each container is made from a different material type, and the contents had different functions.

In essence, this function-based analysis is based on an inventory of different artifact attributes where variables are recorded hierarchically to amplify the functional categories and provide a detailed description of each artifact, when possible. Attributes that commonly provide detailed information about individual artifacts and, in turn, functional categories include material type, date and location of manufacture, and artifact form and portion.

Chronometric data are derived from a variety of descriptive and manufacturing attributes, especially the latter. If an artifact retains enough information to derive beginning or ending dates, those variables are recorded under the *date* attribute. *Manufacturer* records the name of the company that produced a particular object. Together these data can be used to assign specific date ranges to an artifact based on known manufacture periods or the dates of operation for manufacturing companies. A related attribute is *brand name.* Many brand names also have known production periods that can provide temporal information. The manufacturer or brand name is generally listed as *labeling/lettering* and is used to advertise the product and describe its contents and suggested use.

When evident, manufacture *technique*, such as "wheel-thrown" or "forged," was also recorded. Since some manufacturing techniques have changed over time, this attribute can often provide a general period of manufacture. A related attribute is *seams*, which records how sections of an artifact, particularly cans and bottles, were joined together during manufacturing. Through time these processes were altered and are reflected in the types of seams used to construct various containers. The type of *finish/seal* was recorded to describe the opening of a container prior to adding the contents and the means of sealing it closed. Like *seams*, many finish/seal types have known manufacturing periods offering general temporal information. In addition, *opening/closure* records the mechanism used for extracting the contents of a container.

For some artifacts, attributes such as *color*, *ware*, and *dimensions* can also provide information on the period of manufacture. The current color of an artifact was recorded if determined to have diagnostic value. A good example is glass, where the relative frequency of various colors in an assemblage can provide some temporal information, since the manufacture and preservative processes have changed over time. *Ware* refers to china artifacts and categorizes the specific type of ceramic represented, when known. Because temporal information exists for most major ware types, this attribute provides relatively more refined dating information compared to seams and color. Dimensions of complete artifacts can also provide chronometric data, especially artifacts like nails or window-pane glass, where thickness or length of the object can be temporally sensitive.

In addition to temporal information, the manufacturing process of particular objects can be used to support functional inferences. *Material* records the type material(s) from which an object was manufactured (e.g., glass, metal, paper, clay). *Paste* describes the texture of the clay used to manufacture ceramic objects and is further defined by porosity, hardness, vitrification, and opacity. *Decoration* and *design* describe the type of technique used to apply distinctive decorative motifs to an object, such as china or glassware.

In addition to the attributes discussed above, several others were used to quantify an object's condition and use-life. For each item the *fragment/part* variable described what portion of a particular form was represented. Fragments of objects that refit to complete or partial objects recovered from a single excavation context were recorded together as a *minimum number of vessels* (MNV) of one, and the number of specimens present represented by *count*.

Cultural alteration of an item to extend its use-life was recorded as *reuse*. This variable describes any evidence of a secondary function, and the *condition/modification* variable monitors any physical modifications associated with that secondary use. If environmental conditions have altered the surface of an artifact through either glass patination or metal corrosion, it was recorded as *aging*.

The appearance of an artifact was monitored as *shape*. This variable was generally used to describe the physical contours of complete objects. Finally, quantitative data recorded for most Euroamerican artifacts, including *volume*, *length/height*, *width/diameter*, *thickness*, and *weight*.

Analysis Results

Analysis of the 1,976 collected and field-quantified Euroamerican artifacts was distributed over nine broad functional categories (Table 14.1). Furnishings, communications, and military/arms items were not recovered from the project area.

Functionally Unassignable Items

A total of 198 artifacts, or 10 percent of the total Euroamerican assemblage, could not be assigned a particular activity or behavior. It is possible to speculate that many of these goods represent indulgence and food items, since the category is comprised primarily of highly fragmented bottle glass and metal can fragments that do not retain enough diagnostic attributes to assign them a specific function. Objects such as machine-made bottle glass do provide temporal indicators of manufacture in the late nineteenth and early twentieth century.

Economy/Production

Economy/production items are associated with subsistence, industry, and commerce. These artifacts accounted for the less than 1 percent of the Euroamerican assemblage and were comprised exclusively of indeterminate machine parts (n = 2). The absence of economy and production items is not surprising. Economic endeavors in Carson National Forest are primarily small-scale. Fuelwood- and piñon-gathering activities are typically performed on a family or individual level and may not provide physical evidence that can be identified through analysis.

Food

Euroamerican artifacts typically classified as food products are represented by inorganic containers distinguished by qualitative characteristics such as container shape and size. Only 61 Euroamerican artifacts were identified as food related. These artifacts comprised 3.1 percent of the Euroamerican artifact assemblage.

The 61 artifacts in the food items category could be further segregated by container type into canned goods, bottled goods, and miscellaneous. The majority of can fragments were identified as fragments of square or tapered cans, which may have contained different types of packaged meat products, including sardines (n = 27; Fig. 14.1). Other canned products (n = 9) included coffee, evaporated milk, juice, spices, and vegetables. Bottled food items consisted of condiments such as vinegar (n = 1), a soy sauce bottle with Oriental markings embossed on the glass body (n = 1, mnv = 1), and other unidentifiable food glass containers (n = 3).

Indulgence

Indulgences (n = 1,695, mnv = 245) are items that are not a necessity for human subsistence, but are consumed for pleasure or recreation. These types of items represent 85.8 percent of the total Euroamerican assemblage. The vast majority of items identified within this functional category were related to the consumption of alcoholic beverages (n = 1195, mnv = 107), or 71 percent of the indulgence category. Alcoholic containers were subdivided to include beer (n = 728, mnv = 46), wine (n = 240, mnv = 7), and liquor (n = 227, mnv = 20) containers represented by both complete and fragmented bottles and cans. Common brand names identified include Schlitz (mnv = 13), Budweiser (mnv = 8), Gallo–Flavor Guard (n = 3), and Jim Beam Bourbon (n = 1). The Schlitz cans are highly diagnostic. Based on the manufacturing dates of Schlitz (1856+), aluminum cans introduced in 1959 (Rock 1984), and the advent of the pull-tab, these cans date between the early 1960s and 1974.

Small quantities of other indulgence types were recovered in relatively low frequencies. Unidentifiable indulgence items (n = 448) consisted of crown caps and bottle shards. Soda bottles and cans represented 3 percent of the total Euroamerican assemblage. Brands associated with these artifacts included Nesbitt's (Fig. 14.2), Vernor's Ginger Ale, Shur-fine Soda, Seven-Up, Sprite, Coca-Cola, Crush, and Pepsi. A Copenhagen tobacco can lid fragment was also recorded.

Table 14.1. Euroamerican artifacts by site

Type	Function	LA 74879	LA 144951	LA 160196	LA 160201	LA 160203	Total
			Unassignable				
Unidentifiable	Unidentifiable, Unassignable	–	–	–	–	2	2
	Bottle	32	50	36	1	10	129
	Can	5	10	26	10	4	55
	Can, Aerosol	–	–	1	–	–	1
	Wire	–	–	1	–	–	1
	Sheet	–	–	1	–	–	1
	Bucket/Pail	–	1	–	–	–	1
	Rope/Cording	–	–	7	–	–	7
	Tube (Toothpaste, Ointments, Glue, etc.)	–	–	1	–	–	1
Subtotal		37	61	73	11	16	198
			Economy/Production				
Machinery	Machinery Parts	–	–	2	–	–	2
		–	–	2	–	–	2
			Food				
Canned Goods	Unidentifiable, Canned Goods	2	2	7	8	1	20
	Coffee Can	1	–	–	–	–	1
	Condensed Milk, Evaporated Milk	1	–	–	–	–	1
	Juice Can	–	–	1	–	–	1
	Meat Can	4	2	13	6	–	25
	Sardine Can	–	1	1	–	–	2
	Spice Can	–	–	1	–	–	1
	Vegetable or Fruit Can	–	3	–	–	–	3
Bottled Goods	Unidentifiable, Bottled Goods	–	–	1	1	1	3
	Condiment Bottle	–	–	2	–	–	2
	Vinegar Bottle	–	1	–	–	–	1
	Soy Sauce Bottle, Oriental Markings	1	–	–	–	–	1
Subtotal		9	9	26	15	2	61
			Indulgences				
Miscellaneous, Beverage	Beverage Can	9	11	59	2	11	92
	Crown Cap	2	–	–	–	–	2
	Beverage Bottle	24	15	310	4	1	354
Soda/Carbonated Beverage	Soda Bottle	25	2	1	–	1	29
	Soda Can	3	8	5	5	1	22
Wine	Wine Bottle	–	–	220	20	–	240
Beer	Beer Bottle	5	23	583	8	41	660
	Beer Can	11	2	9	4	4	30
	Ale Bottle	–	–	22	16	–	38
Liquor	Unidentifiable, Liquor	–	1	93	–	–	94
	Brandy Bottle	10	–	7	–	–	17
	Liquor Flask	1	1	–	50	2	54
	Whiskey Bottle	9	8	45	–	–	62
Tobacco-Chewing	Chewing Tobacco Can	–	–	1	–	–	1
Subtotal		99	71	1355	109	61	1695
			Domestic				
Dishes	Unidentifiable, Dishes	–	–	2	–	–	2
Subtotal		–	–	2	–	–	2
			Construction/Maintenance				
Hardware	Nail, Common	–	–	1	–	–	1
Fencing	Barbed Wire	1	1	2	1	–	5
	Fence Staple	–	–	–	1	–	1
Subtotal		1	1	3	2	–	7
			Personal Effects				
Medicine/Health	Medicine Bottle, Indeterminate	–	–	1	–	–	1
Subtotal		–	–	1	–	–	1
			Entertainment/Leisure				
Outdoor Sports and Recreation	Camping Stove Fuel Canister	–	–	1	–	–	1
Subtotal		–	–	1	–	–	1
			Transportation				
Cars and Trucks	Headlight	–	–	2	–	–	2
Lubricants/Fluids/Fuel	Motor Oil Can	2	–	1	2	–	5
	Antifreeze Can	–	–	1	–	–	1
	Gas Can	–	–	1	–	–	1
Subtotal		2	–	5	2	–	9
Total		148	142	1468	139	79	1976

Figure 14.1. Tapered meat can.

Figure 14.2. Nesbitt's soda bottle.

Domestic

Domestic items include products used in food service, preparing or preserving food, child care, or the care of household trappings. Items included in this category represented less than 1 percent of the total Euroamerican assemblage (n = 2). The artifacts consisted of two lead-glazed white ware sherds from a minimum of two indeterminate table ware vessels. Both objects were found on LA 160196.

Construction and Maintenance

Construction and maintenance items are used in building and maintaining structures and machinery. Seven construction and maintenance artifacts were recovered within the project area. The objects are fence nails and barbed wire, presumably used in the installation and maintenance of the fenceline along the right-of-way of US 285.

Personal Effects

Personal effects are portable items belonging to individuals who presumably lived or worked at a site. With the stretch of sites along US 285, a solitary personal effects item could have been tossed from a moving vehicle and landed in the project area. A solitary brown glass medicine bottle fragment manufactured from an automatic bottle machine was identified. No specific medicinal use could be determined from the shard, but the bottle shape suggests it contained tablets for indigestion.

Entertainment, Leisure, and Educational

Artifacts in the entertainment, leisure, and educational category indicate activities intended to entertain or amuse, or to provide relaxation or recreation. Only one entertainment item was collected and analyzed, a fuel canister for a camping stove found at LA 160196. The canister indicates the area was used for recreational camping within the last 30 years.

Transportation

Transportation items are used in travel for the conveyance of people or freight from one place to another. Less than 1 percent (n = 7) of the total Euroamerican artifact assemblage was identified as transportation items. These items consisted of a red taillight cover (n = 2), motor oil cans (n = 5), an antifreeze can, and a gas can. The motor oil cans contained approximately 8 oz of fluid. Oil cans in urban and suburban areas are typically associated with motor vehicle maintenance. But given their context, these objects may also represent the use of oil in chainsaws for wood harvesting.

A Chronological Examination of the Assemblage

Euroamerican artifacts along US 285 represent a temporal and spatial palimpsest dating from before the construction of NM 74 in 1926 to the present. To examine activities associated with the use of the project area, these materials were divided into four analytic periods based on artifact-specific diagnostic attributes: historic use of the area prior to NM 74 (AD 1926), historic NM 74 and US 285 (AD 1926 to 1960), modern use of US 285 (AD 1960 to present), and nondiagnostic artifacts (Table 14.2).

Historic Use of the Area prior to NM 74 (before 1926)

Prior to 1926, the project area was utilized in the seventeenth, eighteenth, and nineteenth century by mobile Native American groups. These populations were replaced by Hispanic and Anglo American travelers along an unnamed dirt road (possibly a stagecoach line at one time) connecting Taos Junction with Tres Piedras in the early twentieth century. In addition, the New Mexico Chili Line ran along the periphery of the project area between 1880 and 1941 (Lent 1991).

Thirteen Euroamerican artifacts, or 0.7 percent of the total number of artifacts (n = 1976) analyzed in-field, have diagnostic attributes which date prior to 1926. These artifacts, consisting of canned goods and dishes, were distributed within four functional categories: unassignable (n = 4, mnv = 4), food (n = 6, mnv = 4), domestic (n = 2, mnv = 2), and indulgence (n = 1, mnv = 1).

Canned goods had visibly soldered seams and were produced by hand. One of these cans, identified at LA 160201, was modified (see Fig. 10.9). The can measured 12.5 cm in diameter by 7.6 cm tall with a rim designed for a slide-on lid, and it was crushed. It was continuously punctured in the wall of the can with what may have been a square-cut nail, spaced evenly apart at 1-inch intervals. The artifact suggests Athabaskan presence in the area during the late nineteenth to early twentieth century. Ethnographic accounts discussed by Rogge et al. (1995) propose objects comparable to the perforated can were used by Apaches for brewing tiswin (corn beer) in the early twentieth century. However, none of the cans encountered can be definitively tied to Native American use.

The domestic category contained two broken ceramic dishes; one was made of white ware, the other creamware. Picnicking activities are the most plausible scenario in which these materials were disposed. Woven cane baskets with flip-top lids, purchased from Sears or Montgomery Wards catalogs, were often used to transport these utilitarian items on excursions. Many of the food cans were probably also associated with this type of activity.

Historic NM 74 and US 285 (1926 to 1960)

In 1926 the unnamed dirt road extending from Taos Junction to Tres Piedras was paved and established as NM 74. These road improvements facilitated increased travel and exploitation of the project area. This was followed in 1942 by the designation of the road as US 285. Euroamerican artifact frequencies (n = 318) and distribution across multiple function-based categories reflect the increased traffic along the route. These categories include construction/maintenance (n = 2), unassignable (n = 20), food (n = 22), and indulgences (n = 276).

The high frequency of indulgence items is not surprising and likely represents window discard. The combination of traveling in vehicles and drinking cool beverages, even to the present day, has not gone out of style. The majority of artifacts from this category were liquor (n = 93), beer (n = 61), and wine (n = 30) beverage containers. One of the beer bottles was embossed with the brand name of M. K. Goetz Brewing Company. This company originated in St. Joseph, Missouri, in 1859 and eventually expanded to Kansas City in 1926, where it stayed in business into late twentieth century. Others (n = 30, mnv = 12) came from the famous Anheuser Busch Company, St. Louis, Missouri.

Food items likely represent products consumed on day trips and overnight excursions to the area. These could be related to hunting, fuelwood gathering, and piñon collection. Recorded food items are an evaporated milk can, meat cans

Table 14.2. Euroamerican artifacts by analytic period

Type	Function	Before 1926	1926 to 1960	After 1960	No Assigned Period	Total
	Unassignable					
Unidentifiable	Unidentifiable, Unassignable	–	–	–	2	2
	Bottle	–	11	26	92	129
	Can	4	9	28	14	55
	Can, Aerosol	–	–	–	1	1
	Wire	–	–	–	1	1
	Sheet	–	–	–	1	1
	Bucket/Pail	–	–	–	1	1
	Rope/Cording	–	–	7	–	7
	Tube (Toothpaste, Ointments, Glue, etc.)	–	–	–	1	1
Subtotal		4	20	61	113	198
	Economy/Production					
Machinery	Machinery Parts	–	–	–	2	2
Subtotal		–	–	–	2	2
	Food					
Canned Goods	Unidentifiable Canned Goods	1	5	7	7	20
	Coffee Can	–	–	1	–	1
	Condensed Milk, Evaporated Milk	–	1	–	–	1
	Juice Can	–	–	–	1	1
	Meat Can	5	11	3	6	25
	Sardine Can	–	–	1	1	2
	Spice Can	–	–	–	1	1
	Vegetable or Fruit Can	–	3	–		3
Bottled Goods	Unidentifiable Bottled Goods	–	1	1	1	3
	Condiment Bottle	–	–	–	2	2
	Vinegar Bottle	–	–	1	–	1
	Soy Sauce Bottle, Oriental Markings	–	1	–	–	1
Subtotal		6	22	14	19	61
	Indulgences					
Miscellaneous, Beverage	Beverage Can	1	7	69	15	92
	Crown Cap	–	2	–	–	2
	Beverage Bottle	–	68	270	16	354
Soda/Carbonated Beverage	Soda Bottle	–	–	29	–	29
	Soda Can	–	1	21	–	22
Wine	Wine Bottle	–	30	195	15	240
Beer	Beer Bottle	–	61	507	92	660
	Beer Can	–	1	27	2	30
	Ale Bottle	–	1	36	1	38
Liquor	Unidentifiable, Liquor	–	93	1	–	94
	Brandy Bottle	–	–	–	17	17
	Liquor Flask	–	1	–	53	54
	Whiskey Bottle	–	9	4	49	62
Tobacco-Chewing	Chewing Tobacco Can	–	–	1	–	1
Subtotal		1	274	1160	260	1695
	Domestic					
Dishes	Unidentifiable, Dishes	2	–	–	–	2
Subtotal		2	–	–	–	2
	Construction/Maintenance					
Hardware	Nail, Common	–	1	–	–	1
Fencing	Barbed Wire	–	1	–	4	5
	Fence Staple	–	–	–	1	1
Subtotal		–	2	–	5	7
	Personal Effects					
Medicine/Health	Medicine Bottle, Indeterminate	–	–	–	1	1
Subtotal		–	–	–	1	1
	Entertainment/Leisure					
Outdoor Sports and Recreation	Camping Stove Fuel Canister	–	–	–	1	1
Subtotal		–	–	–	1	1
	Transportation					
Cars and Trucks	Headlight	–	–	–	2	2
Lubricants/Fluids/Fuel	Motor Oil Can	–	–	1	4	5
	Antifreeze Can	–	–	–	1	1
	Gas Can	–	–	–	1	1
Subtotal		–	–	1	8	9
Total		13	318	1236	409	1976

(n = 11, mnv = 11), fruit or vegetable cans (n = 3, mnv = 3), a soy sauce bottle, one unidentifiable bottle, and several unidentifiable food cans (n = 5, mnv = 5). A nail and a section of barbed wire (construction/maintenance) were also found in the site area. These objects were probably associated with maintaining the right-of-way fence along NM 74/US 285.

Modern Use of US 285 (1960 to 2010)

The majority of Euroamerican artifacts (n = 1,236, 62.6 percent) have diagnostic attributes dating the product to the modern use of US 285. This coincides roughly with the creation of the Taos Gorge Bridge in 1965, which presumably led to increased use of the area by Taos residents.

The indulgence category represented 93.8 percent of the total assemblage, dating between 1960 and 2010. These counts were over four times greater than that of the previous period and suggest that deposition during this period largely reflects window discard. Beer was the favorite beverage. Counts of liquor bottles decreased from those of the 1926–1960 period. The consumption of canned or bottled food products also declined during this period and may reflect a switch to products such as fruit and beef jerky, evidence of which may not be noticeable in the archaeological record. Remnants of transportation objects were also found. These included motor oil cans (n = 4), an antifreeze can, and a gas can, which may indicate planning for lengthy travel or the use of chainsaws in fuelwood gathering. Such items had not been recorded previously.

Nondiagnostic Artifacts (no assigned date of deposition)

The artifacts analyzed (n = 409) in this category could not be assigned to a specific period of time. The majority were too fragmented to distinguish the method of manufacture, while others lacked manufacturing marks. It is probable that many of these artifacts were produced in all of the time periods defined above.

Artifacts from this period were assigned to eight function-based categories: unassignable, economy/production, food, indulgences, construction/maintenance, personal effects, entertainment/leisure, and transportation. Not surprisingly, the highest frequency of artifacts came from the indulgence category (n = 260), followed by unassignable items (n = 113). This follows the patterns of consumption and discard along US 285 after 1926, in which the majority of materials are bottled and canned products, likely thrown from a moving vehicle.

Addressing the Research Design

The research design and data recovery plan (Moore 2009) does not directly address the late nineteenth and twentieth centuries. However, many of the research questions proposed can be partially addressed through the examination of Euroamerican artifacts. This section addresses these questions and summarizes the findings of analysis.

Research Question 1: Are Potentially Significant Cultural Remains Present (Moore 2009:25)?

All Euroamerican artifacts encountered within the right-of-way were analyzed in the field. Only three artifacts definitively dating prior to 1960 were identified and collected from within the APE. Based on in-field analysis, each site did contain artifacts dating prior to 1960. However, the majority of diagnostic Euroamerican artifacts on any given site date after 1960, and many more could not be assigned to a specific period of deposition.

Indulgence items were the most common product discarded within the project area and presumably represent window discard along NM 74/US 285 in the twentieth century. However, several other activities, such as picnics, woodcutting, hunting, and piñon collection, may be visible within the archaeological record.

These artifacts have the ability to provide information regarding consumption and discard patterns along US 285. However, historically significant artifacts manufactured before 1960 cannot be tied to archaeological features on the landscape, and subsurface investigations suggest there are no buried deposits within the right-of-way. Therefore the potential of these artifacts to augment the history of the area has been exhausted by current research endeavors.

Research Question 2: When Were These Sites Used (Moore 2009:25)?

LA 74879, LA 160196, and LA 160201 have Euroamerican artifacts dating prior to the establishment of NM 74 in 1926. These artifacts may be associated with Apache use of the area or may reflect early movements of Anglo and Hispanic populations along the unnamed road connecting Taos Junction and Tres Piedras in the late nineteenth and early twentieth century. It is also unclear why these specific locales were utilized during this earlier period of time.

The remaining sites, LA 144951 and LA 160203, have only Euroamerican artifacts dating after the establishment of NM 74. The majority of Euroamerican artifacts on all sites date after 1960 and likely reflect increased use of the area after the establishment of the Rio Grande Gorge Bridge in 1965. Installation of the bridge allowed residents of Taos access to the area for hunting and piñon and fuelwood gathering (Fig. 14.3).

Research Question 3: How Do These Sites Fit into the Settlement Systems to Which They Belong (Moore 2009:27)?

Euroamerican artifacts dating to the nineteenth century are too few to provide important information about site use and settlement systems prior to the establishment of US 285. As previously stated, it is unclear if these materials represent Apache or Anglo-American use of the project area.

All Euroamerican artifacts dating to the twentieth century appear to represent vehicle discard, fuelwood gathering, and picnicking and other recreational activities. The increase in materials after 1960 is likely associated with the establishment of the Rio Grande Gorge Bridge in 1965, which opened the area to Taos residents but may also reflect advances in mass-production and our current consumption and discard patterns, which include recycling of materials.

Summary and Conclusions

Within the right-of-way of US 285, 1,976 Euroamerican artifacts were discovered and subjected to in-field analysis. This analysis has exhausted the potential of these artifacts to provide useful information about the history of the area. Only thirteen of these artifacts dated prior to 1926, including a perforated soldered seam can at LA 160201, possibly used by Apaches for brewing tiswin (corn beer) in the late nineteenth or early twentieth century. Between 1926 and 1960, the frequency of canned and bottled goods increased within the project area, suggesting increased use of the locale after the establishment of NM 74. However, the vast majority of artifacts analyzed dated after 1960.

The number of beer, wine, and other liquor containers in the right-of-way quadrupled after

Figure 14.3. Pail, possibly used in the harvesting of piñon nuts.

1960. The majority of these materials were probably discarded from the windows of vehicles, but activities such as picnics, woodcutting, hunting, and piñon collection are also evident in the Euroamerican assemblage. These activities may have created a need for thirst-quenching beverages and contributed to the overall counts of indulgence items.

Interestingly, while the narrow-gauge branch of the Denver and Rio Grande Railroad, called the Chili Line, meandered within a reasonable distance from the eastern border of the project area between 1880 and 1941, the train did not appear to affect the artifact types or counts for the project area. Artifacts associated with the locomotive line were confined to the immediate vicinity of the tracks.

The sheer volume of trash left along US 285 is impressive and illustrates the mass production and discard strategies of our current "throw-away" society. The New Mexico Litter Control & Beautification Act of 1985 encouraged individuals to take responsibility for their actions within their environment. However, after observing Euroamerican artifacts along the US 285 corridor, it appears that change has been slow in northern New Mexico.

15. Botanical Analysis

Mollie S. Toll

Archeological testing and data recovery along US 285, south of Tres Piedras, included examination of a presumed Middle or Late Archaic thermal feature at LA 160196. Charcoal in Feature 7 was used for carbon-14 dating, which will narrow chronological affiliation from the broad potential range of 5500 BC–AD 600. The total contents of the feature were collected, and a single very large soil sample (10,070 ml) was processed to extract organic materials for botanical analysis. There were no artifacts found within Feature 7, and there was no visible oxidized ring indicating the bounds of thermal activity. Flotation analysis was intended as a search for cultural activity associated with Feature 7.

The single large soil sample collected during excavation was processed at the OAS using the simplified bucket version of flotation (see Bohrer and Adams 1977). The sample was processed in four batches of 2500 ml. Each batch was immersed in a bucket of water and a 30-40 second interval allowed for settling out of heavy particles. The solution was then poured through a fine screen (about 0.35 mm mesh) lined with a square of chiffon fabric, catching floating or suspended organic materials. The squares of fabric were lifted out and laid flat on coarse mesh screen trays until the recovered material had dried. The total weight of recovered material was 61.74 g.

The soil sample was sorted using a series of nested geological screens (4.0, 2.0, 1.0, 0.5 mm mesh) and then reviewed under a binocular microscope at 7–45x. Reproductive plant parts (all uncharred seeds) were identified and counted. Flotation data are reported as a standardized count of seeds per liter of soil, rather than an actual number of seeds recovered. The relative abundance of nonreproductive plant parts (pine bark) was estimated per liter of soil processed.

All charcoal from the 4 and 2 mm screens was identified in preparation for carbon-14 dating. Each piece was snapped to expose a fresh transverse section and identified at 45x. Identified charcoal from each taxon was weighed on a top-loading digital balance to the nearest 0.1 g and placed in labeled metal foil packets. Low-power, incident-light identification of wood specimens does not often allow species- or even genus-level precision but can provide reliable information useful in distinguishing broad patterns of utilization of a major resource class. In the case of this project, charcoal analysis was the source of the *only* botanical information which could be associated with human activity.

Results

Materials recovered by flotation from Feature 7 consisted largely of modern root fragments. Minor components included insect exoskeleton fragments, numerous black spherical spores (0.4–0.5 mm in diameter), and a small terrestrial snail shell (1 mm in diameter). Pine bark comparing well with *Pinus ponderosa* was found in all but the smallest screen size; the largest pieces were unburned, while many smaller pieces were carbonized (Tables 15.1 and 15.2).

A total of 11 seeds were recovered, all unburned. It is suspected all were postcultural. They had all been in the ground some time, though this could be as little as a year. Seed coats were pitted and eroded, several seeds were deflated, and most were cemented with at least some soil matrix. Seed taxa included several very common annual weeds (pigweed, goosefoot, purslane) plus hedgehog cactus. All taxa recovered are common in the Great Basin desert scrub/Great Basin conifer woodland interface, where LA 160196 is located (Brown 1994).

Discussion and Conclusions

Charred wood and bark fragments recovered from Feature 7 provide evidence of utilization of conifer species, including ponderosa pine, from the petrane montane conifer forest, a few kilometers west of the study site, and valley margin woodland species (piñon and juniper). Sage, a component of both valley-bottom zones immediately

Table 15.1. Flotation contents of Feature 7, LA 160196

Taxa	Relative Abundance	Actual Count	Seeds per Liter of Soil
Cultural			
Pinus cf. *ponderosa* bark	+++		
Noncultural			
Pinus cf. *ponderosa* bark	++	–	–
Amaranthus	–	2	0.2
Pigweed	–	–	–
Chenopodium berlandieri	–	2	0.2
Goosefoot	–	–	–
Suaeda	–	2	0.2
Seepweed	–	–	–
Portulaca	–	2	0.2
Purslane	–	–	–
Cheno-am	–	1	0.1
Echinocereus	–	2	0.2
Hedgehog cactus	–	–	–
Total		11	1.1

Specimens listed as cultural are carbonized.
Specimens listed as noncultural are unburned.
++ 11–25 specimens; +++ >25 specimens

Table 15.2. Species composition of charcoal, Feature 7, LA 160196

Taxa	Number of Pieces	Weight (g)
Conifers		
Juniperus (juniper)	10	0.07
Pinus edulis (piñon)	8	0.15
Pinus ponderosa (ponderosa pine)	5	0.04
Undetermined conifer	81	0.59
All conifer	104	0.85
Nonconifers		
Artemisia (sage)	116	0.75
All conifer	116	0.75
Total	220	1.6

adjacent to the site—Great Basin desert scrub and Great Basin conifer woodland (Brown 1994)—was also a significant contributor to the utilized charcoal assemblage (47 percent by weight).

All seed taxa recovered (pigweed, goosefoot, purslane, and hedgehog cactus) are common to the site environs. All four taxa appear repeatedly in archeological contexts throughout the prehistoric era in the northern Rio Grande Valley (Bohrer 1985; Toll 1986) and have multiple and well-known records of ethnographic usage (Castetter 1935). However, since all specimens were unburned, we have no reason to infer that their presence is the result of human behavior.

Charcoal provides evidence that a fire was built at some undetermined point in the past at this location. The assortment of wood types from upslope forest, valley-margin woodland, and valley-bottom shrub-grassland suggests human intervention to gather and transport different wood types, rather than an in situ forest fire or modern efforts to clear roadside brush with fire. Other plant remains, however, provide no indication of human foraging or processing of floral subsistence ingredients.

16. Geomorphology of the Project Area

Donald E. Tatum

Soils across the project area are classified as Montecito loam, an alluvial soil derived from the weathering of basalt. These soils occupy landforms with slopes up to 15 percent. The Montecito grades into gravelly, sandy loam with depth. The soil association of the area is of the Torriorthents-Haplargids-Calciorthids Land. Typically, these calcic soils are shallow to somewhat deep, cobbly and stony. They occur with basalt outcrops and bedrock (USDA-NRCS 2009; Maker et al. 1974).

Backhoe trenching and hand excavation on the five project sites revealed a relatively thin soil mantle up to 1.5 m deep overlying caliche and basalt bedrock. The upper soil profile was disturbed at depths to 30 cmbs because of road, ditch, and fence construction, and other ground-disturbing activities. Roadside litter and debris from vegetation removal was common in the fill layer. The disturbed (fill) soils were immediately underlain by relatively intact A-horizon soils composed of silt and very fine sand with clay development. Inclusions of fine to large roots and basalt pebbles and cobbles were common. Bioturbation, especially from root growth, was prevalent in the A horizon. A-horizon soils in the project area, though usually somewhat shallow, sometimes persisted down to 50 cmbs.

The A horizon was usually underlain by a weak, horizontally discontinuous B horizon or a more strongly developed Bk horizon. As an indicator of the vigor of past vegetative growth, the B horizons often had plentiful fine to large-sized root pores infilled with material from the overlying A horizon, or with carbonate. Inclusions of angular, unsorted basalt gravel and weathered caliche fragments were common.

Because of the irregular bedrock topography, Bk horizons were often immediately underlain by, or occurred intermittently with, Ck and K horizons. Ck horizons were indicated by the prevalence of strongly developed carbonate mineral in the soil matrix and by the presence of highly fragmented and weathered basalt derived from the bedrock, often caliche encrusted.

In areas with deeper soil profiles and lower elevation bedrock surfaces, massive deposits of carbonate were prevalent. The K-horizon soils were alternately earthy-textured or indurated, and sometimes displayed large infilled root casts.

The bedrock substrate consisted entirely of vesicular basalt, in some areas exposed at the ground surface. In other areas, the depth to the top of the basalt exceeded 125 cmbs. The bedrock topography displayed typical basalt flow irregularities, sometimes outcropping above the ground surface, sometimes allowing for the development of a substantial soil profile.

In general, the stratigraphy in the project area uniformly consisted of a surface disturbance layer associated with road building; an A horizon, sometimes strongly developed; a B horizon, often weakly developed; and strongly developed Bk, C, Ck, and K horizons. The entire area is underlain by vesicular basalt deposits. The degree of soil development was strongly controlled by bedrock topography, with deeper bedrock surfaces allowing for greater soil development and depth, and shallower bedrock surfaces contributing weak, highly weathered and eroded soils.

17. Summary and Recommendations

Archaeological testing and data recovery was performed on five archaeological sites along US 285 south of Tres Piedras in Carson National Forest, USDA Forest Service. The archaeological investigations were performed in preparation for shoulder widening, installation of new culverts, and right-of-way fence replacement. Archaeological sites directly affected by these road modification activities include LA 74879 (AR-03-02-06-637), LA 144951 (AR-03-02-06-1236), LA 160196 (AR-03-02-06-1307), LA 160201 (AR-03-02-06-1312), and LA 160203 (AR-03-02-06-1314), representing a range of prehistoric and historic components. To treat these resources within the area of potential effect (APE), an approved testing and data recovery plan was developed (Moore 2009). The purpose of the testing and data recovery plan was to provide information on the characteristics and integrity of both surface and subsurface cultural material and the potential of the sites to contribute information on New Mexico's heritage. These data would be used to determine a site's eligibility for listing on state or national registers.

Four of the sites (LA 74879, LA 160196, LA 160201, and LA 160203) contain flaked stone assemblages. These sites can be characterized as briefly occupied special-activity sites with temporal components from various time periods, but all occupations were centered around core and biface reduction activities involving local (mainly basalt) and imported materials (Polvadera obsidian, undifferentiated Jemez obsidian, and Pedernal chert) from the Jemez Mountains. Projectile points suggest that the sites were related to transient hunting activities in all time periods. In general, the region represents a heavily utilized hunting locality, but the low number of features suggests that most sites were briefly occupied, task-specific sites rather than base camps occupied for longer periods with features and complex flaked stone assemblages. Broadly speaking, the sites in this region probably grew from a slow accretion of low-intensity activities based in the repeated use of a good hunting locality.

LA 74879 and LA 160203 contained no diagnostic artifacts and have unspecified prehistoric cultural and temporal affiliations. However, an unspecified stemmed point fragment from LA 74879 suggests at least a general Archaic component. LA 160196 was initially occupied during the Early Archaic to Middle Archaic (ca. 3500 to 1800 BC) based on a Ventana side-notched dart point. The investigators obtained an Archaic-period radiocarbon date from an indeterminate pit that overlapped this general Archaic occupation, but no flaked stone artifacts were associated with the feature. The site also has evidence of a Jicarilla Apache (1750? to 1900?) component based on micaceous ceramics; it is uncertain how Apaches utilized flaked stone on the sites.

Specific point styles suggest that LA 160201 had possible San Jose (3200 to 1800 BC), Armijo (1800 to 800 BC), and En Medio (800 B.C. to A.D. 400) occupations. This site may also have a later Apache component (ca. AD 1860-1930) based on a possible tiswin can. Projectile points, sherds, and possible cans typically show evidence of reuse, but it remains unclear how the multiple occupations may have mixed the flaked stone assemblages at the various sites. Hunting-related task groups from all time periods employed similar reduction strategies as they quickly passed through, exploiting the regional faunal and lithic resources.

The range of flaked stone tool types is rather restricted at all of the sites. Outside of reduction debris, scraping tools in the form of side and end scrapers are the most common tool type at each site; however, these scrapers are present in only small numbers. LA 160201 had a few choppers, denoting heavier chopping activities. A few biface fragments were found at LA 74879 and LA 160203 that may represent preforms brought to the site for further reduction or the actual product of the late-stage core and biface reduction characterizing each of the artifact assemblages.

The assemblages are not representative of the artifact density and broader tool categories characteristic of base camps. Only LA 160196 had an ephemeral pit, suggesting a somewhat more complex, extended occupation, but no plant remains were recovered for anything other than fuel. A higher frequency of artifacts was recovered from LA 160203, but only because the APE was wider (19 m) at this site. The sites are all rather small flaked stone assemblages manifesting a similar range of material and artifact types.

Euroamerican artifacts offer a similar tale of intermittent utilization during the late nineteenth and early twentieth century. Nineteenth-century artifacts are too few in number to provide useful information on site use and settlement systems prior to the establishment of US 285, and it is unclear if these materials represent Apache or Anglo-American use of the project area. All Euroamerican artifacts dating to the twentieth century appear to represent vehicle discard, fuelwood gathering, and picnicking and other recreational activities. The increase in materials after 1960 is likely associated with the establishment of the Rio Grande Gorge Bridge in 1965, which opened the area to Taos residents, but may also reflect advances in mass-production and our current consumption and discard patterns.

Table 17.1 summarizes eligibility and treatment recommendations for the five sites in the project area. The testing program has exhausted the information potential of LA 144951 (AR-03-02-06-1236). Both the APE and the remaining site area outside of the APE are not considered eligible for nomination to the *National Register of Historic Places*, and no additional archaeological investigations in either area are recommended. The testing program at LA 74879 (AR-03-02-06-637), LA 160196 (AR-03-02-06-1307), LA 160201 (AR-03-02-06-1312), and the more extensive data recovery program at LA 160203 (AR-03-02-06-1314) have exhausted the information potential of the portion of the sites within the APE. However, the areas outside of the APE at each site may still be eligible for nomination to the *National Register* under Criterion D because the site areas are likely to yield information important to history and prehistory. The areas outside of the APE at these sites should be avoided.

Table 17.1. Summary of eligibility and treatment recommendations

Site	Eligibility of Area within APE	Treatment Recommendations
LA 74879	not eligible	Data potential of APE exhausted and no further work recommended. The site area outside the APE may still be eligible under Criterion D and should be avoided.
LA 144951	not eligible	Data potential of both the APE and site as a whole has been exhausted, and no further work in either area is recommended
LA 160196	not eligible	Data potential of APE exhausted and no further work recommended. The site area outside the APE may still be eligible under Criterion D and should be avoided.
LA 160201	not eligible	Data potential of APE exhausted and no further work recommended. The site area outside the APE may still be eligible under Criterion D and should be avoided.
LA 160203	not eligible	Data potential of APE exhausted and no further work recommended. The site area outside the APE may still be eligible under Criterion D and should be avoided.

References Cited

Acklen, John C., G. Brown, D. Campbell, A. Earls, M. Harlan, S. Lent, G. McPherson, and W. Trierweiler

1990 *Archaeological Survey Results for the Ojo Line Extension Project*. Vol. 1. Public Service Company of New Mexico Archaeological Report No. 7. Public Service Company of New Mexico, Albuquerque.

Acklen, John C., Christopher A. Turnbow, and Dorothy Larson

1997 Conclusions and Recommendations. In *Ole Volume III: Analysis*, edited by J. Acklen, pp. 285–342. TRC Mariah Associates and Public Service Company of New Mexico, Albuquerque.

Adler, Michael A., and Herbert W. Dick

1999 *Picuris Pueblo through Time: Eight Centuries of Change at a Northern Rio Grande Pueblo*. William P. Clements Center for Southwest Studies, Southern Methodist University.

Alexander, Robert K.

1964 *Highway Cultural Inventory Project Final Report, 1961–1964*. New Mexico State Highway Department and Museum of New Mexico, Santa Fe.

Allen, Joseph W.

1972 *The Tsogue Highway Salvage Excavations near Tesuque, New Mexico*. Laboratory of Anthropology Notes 73. Museum of New Mexico, Santa Fe.

Anschuetz, Kurt F.

1998 Not Waiting for the Rain: Integrated Systems of Water Management by Pre-Columbian Pueblo Farmers in North Central New Mexico. Ph.D. dissertation, Department of Anthropology, University of Michigan, Ann Arbor.

Anschuetz, Kurt F., John C. Acklen, and David V. Hill

1997 Prehistoric Overview. In *Ole Volume I: Context*, edited by J. Acklen, pp. 71–118. TRC Mariah Associates and Public Service Company of New Mexico, Albuquerque.

Anschuetz, Kurt F., Timothy D. Maxwell, and John A. Ware

1985 *Testing Report and Research Design for the Medanales North Project, Rio Arriba County, New Mexico*. Laboratory of Anthropology Notes 347. Museum of New Mexico, Santa Fe.

Athearn, Frederic J.

1974 *Life and Society in Eighteenth-Century New Mexico, 1692–1776*. Ph.D. dissertation, Department of History, University of Texas at Austin. University Microfilms International No. 74-24,825, Ann Arbor, Michigan.

Bandelier, Adolf F. A.

1890 *Final Report of Investigations among the Indians of the Southwestern United States, Carried on Mainly in the Years from 1880 to 1885*. Papers of the Archaeological Institution of America, American Series 3 and 4. Cambridge.

Bannon, John F.

1963 *The Spanish Borderlands Frontier, 1513–1821*. Holt, Rinehart, and Winston, New York. Reprint, 1974, by University of New Mexico Press, Albuquerque.

Barbour, Matthew J.

2009 A Trial by Fire. *The Artifact* 47:1–22.

Baxter, John O.

1987 *Las Carneradas: Sheep Trade in New Mexico, 1700–1860*. University of New Mexico Press, Albuquerque.

Bennett, Ivan

1986 Frost. In *New Mexico in Maps*, edited by Jerry L. Williams. Second edition. University of New Mexico Press, Albuquerque.

Bertram, Jack B.
1989 The Abiquiu Obsidian Hydration Study: Its Implications for the Abiquiu Area and for Archaeological Methods and Analytical Techniques. In *Report of Surface Collection and Testing at 18 Sites near Abiquiu Reservoir, Northern New Mexico*, by J. Bertram, J. Schutt, S. Kuhn, A. Earls, W. Trierweiler, C. Lintz, J. Acklen, C. Carrillo, and J. Elyea, pp. 263–304. Mariah Associates, Albuquerque.

Bertram, Jack B., Jeanne A. Schutt, Steven Kuhn, Amy C. Earls, W. Nicholas Trierweiler, Christopher Lintz, John C. Acklen, Charles M. Carrillo, and Janette Elyea
1989 *Report of Surface Collection and Testing at 18 Sites near Abiquiu Reservoir, Northern New Mexico*. Mariah Associates, Albuquerque.

Binford, Lewis R.
1980 Willow Smoke and Dogs' Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45:4–20.

Bohrer, Vorsila L.
1985 Flotation from Abiquiu, New Mexico. Parts 1 and 2. Ms. on file, Chambers Consultants, Albuquerque.

Bohrer, Vorsila L., and Karen R. Adams
1977 *Ethnobotanic Techniques and Approaches at the Salmon Ruin, New Mexico*. San Juan Valley Archeological Project, Technical Series 2; Eastern New Mexico University Contributions in Anthropology 8(1). Portales.

Boyer, Jeffrey L.
1983 *The Taos Municipal Airport Expansion: A Cultural Resources Survey of the Proposed Runway Extension*. Contract Archaeology Report No. 2. Kit Carson Memorial Foundation, Taos.

1984 *Archaeological Investigations at the San Antonio Mountain Scoria Mine, Rio Arriba County, New Mexico.* Contract Archaeology Report No. 5. Kit Carson Memorial Foundation, Taos.

1985a *Plains Electric Cooperative's Hernandez-Taos 115kV Transmission Line: An Archaeological Inventory Survey*. Contract Archaeology Report No. 8. Kit Carson Memorial Foundation, Taos.

1985b *An Archaeological Inventory Survey of a Portion of the Tarleton Gravel Pit near Arroyo Seco, New Mexico*. Contract Archaeology Report No. 13. Kit Carson Memorial Foundation, Taos.

1986 *A Revised National Register Nomination for the Taos Pueblo National Historic Landmark*. Contract Archaeology Report No. 15. Kit Carson Memorial Foundation, Taos.

1988 *Colorado Aggregate Company's Planned Red Hill Scoria Mine: Archaeological Inventory Survey*. Report 88-03. Taos.

1995 *Strong RMLR Access Road: Archaeological Survey near Taos Junction, Taos County, New Mexico*. Jeffrey Boyer, Consulting Archaeologist, Report 95-08. Carson National Forest Report 1995-02-121.

1997 *Dating the Valdez Phase: Chronometric Reevaluation of the Initial Anasazi Occupation of North-Central New Mexico*. Archaeology Notes 164. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

2002 *The Riverbend Subdivision: Archaeological Survey in Taos County, New Mexico*. Report 02-02. Taos.

2005 *An Archaeological Survey along NM 522 near Las Colonias, Taos County, New Mexico*. Archaeology Notes 362. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Boyer, Jeffrey, Charles Hannaford, Guadalupe Martinez, and Adisa Willmer
1994 *Historic Artifact Analysis: Standardized Variable and Attribute Codes.* Archaeology Notes 24d. Office of Archaeological Studies, Santa Fe, Museum of New Mexico, Santa Fe.

Broster, John B., and Arthur K. Ireland
1984 *A Cultural Resource Management Plan for Timber Sale and Forest Development on the Jicarilla Apache Indian Reservation.* Vol. 1. Forestry Archaeological Program, Bureau of Indian Affairs, Albuquerque Area Office, Albuquerque.

Brown, David E. (editor)
1994 *Biotic Communities: Southwestern United States and Northwestern Mexico*. University of Utah Press, Salt Lake City.

Bryan, Kirk
1939 Stone Cultures near Cerro Pedernal and Their Geological Antiquity. *Texas Archeological and Paleontological Society Bulletin* 11:9–45.

Bryan, Kirk, and Julian H. Toulouse Jr.
1943 The San Jose Non-Ceramic Culture and Its Relation to a Puebloan Culture in New Mexico. *American Antiquity* 8:269– 290.

Carlson, Alvar Ward
1969 New Mexico's Sheep Industry, 1850–1900: Its Role in the History of the Territory. *New Mexico Historical Review* 44:25–50.

Carrillo, Charles M.
1997 Hispanic New Mexican Pottery: Evidence of Craft Specialization, 1700–1890. LPD Press, Albuquerque.

2004 A History of Santa Rosa de Lima de Abiquiu. In *Adaptations on the Anasazi and Spanish Frontiers: Excavations at Five Sites near Abiquiu, Rio Arriba County, New Mexico*, by J. Moore, J. Boyer, and D. Levine, pp. 51–56. Archaeology Notes 187. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Castetter, Edward F.
1935 *Uncultivated Native Plants Used as Sources of Food*. Ethnobiological Studies of the American Southwest 1; University of New Mexico Bulletin, Biological Series 4(1).

Connor, Seymour V., and Jimmy M. Skaggs
1977 *Broadcloth and Britches: The Santa Fe Trade*. Texas A & M University Press, College Station.

Cordell, Linda S.
1978 *Cultural Resources Overview: Middle Rio Grande Valley, New Mexico*. Government Printing Office, Washington, DC.

1979 Prehistory: Eastern Anasazi. In *Handbook of the North American Indians,* Vol. 9, *Southwest,* edited by Alfonso Ortiz. Smithsonian Institution, Washington, DC.

Covey, Cyclone (editor)
1990 *Adventures in the Unknown Interior of America*. University of New Mexico Press, Albuquerque. Originally published 1961.

Crown, Patricia L.
1990 The Chronology of the Taos Area Anasazi. In *Clues to the Past: Papers in Honor of William M. Sundt*, edited by Meliha S. Duran and David T. Kirkpatrick. Papers of the Archaeological Society of New Mexico, No. 16. Archaeological Society of New Mexico, Albuquerque.

Crown, Patricia L., Janet D. Orcutt, and Timothy A. Kohler
1996 Pueblo Cultures in Transition: The Northern Rio Grande. In *The Prehistoric Pueblo World, A.D. 1150–1350*, edited by M. Adler, pp. 188–204. University of Arizona Press, Tucson.

Crum, Sally
1996 *People of the Red Earth: American Indians of Colorado*. Ancient City Press, Santa Fe.

Dick, Herbert W.
1965 *Picuris Pueblo Excavations*. No. PB-177047. Clearinghouse for Federal Scientific and Technical Information, USDC National Bureau of Standards, Institution of Applied Technology, Springfield, Virginia.

Domínguez, Francisco A.
1956 *The Missions of New Mexico, 1776: A Description by Fray Francisco Atonasio Dominguez, with Other Contemporary Documents*. Translation by Eleanor B. Adams and Fray An-

gélico Chávez. University of New Mexico Press, Albuquerque.

Dozier, Edward P.
1970 *The Pueblo Indians of North America*. Holt, Rinehart and Winston, New York.

Eiselt, Sunday B., and Richard I. Ford
2008 Sangre de Cristo Micaceous-Clays: Geochemical Indices for Sources and Raw Material Distributions. *Kiva* 23(2):219–234.

Ellis, Florence H.
1975 Life in the Tesuque Valley and Elsewhere in the Santa Fe Area during the Pueblo II Stage of Development. *Awanyu* 3(2):27–49.

1989 *San Gabriel de Yunque Ouingue: As Seen by an Archaeologist*. Sunstone Press, Santa Fe.

Ellis, Florence H., and J. J. Brody
1964 Ceramic Stratigraphy and Tribal History at Taos Pueblo. *American Antiquity* 29(3):316–327.

eNature
2000 eNature.com Field Guides. http://www.enature.com. Accessed March 9, 2010.

Espinosa, J. Manuel
1988 *The Pueblo Indian Revolt of 1696*. University of Oklahoma Press, Norman.

Fallon, Denise, and Karen Wening
1987 *Howiri: Excavation at a Northern Rio Grande Biscuit Ware Site*. Laboratory of Anthropology Notes 261b. Research Section, Museum of New Mexico, Santa Fe.

Fleming, Roscoe
1941 The Chili Line. *New Mexico Magazine* 19(11):24.

Fowler, Catherine S.
1971 Some Notes on Comparative Numic Ethnobiology. In *Selected Papers from the Great Basin Anthropological Conference*, edited by C. Melvin Aikens. University of Oregon Anthropological Papers 1. University of Oregon, Eugene.

Forbes, Jack D.
1960 *Apache, Navajo, and Spaniard*. University of Oklahoma Press, Norman.

Frank, Ross H.
1992 *From Settler to Citizen: Economic Development and Cultural Change in Late Colonial New Mexico, 1750–1820*. Ph.D. dissertation, Department of History, University of California at Berkeley. University Microfilms International, Ann Arbor, Michigan.

2000 *From Settler to Citizen: New Mexican Economic Development and the Creation of Vecino Society, 1750–1820*. University of California Press, Berkeley.

Fuller, Steven L.
1989 *Research Design and Data Recovery Plan for the Animas–La Plata Project*. Four Corners Archaeological Project Report No. 15. Complete Archaeological Service Associates. Cortez, Colorado.

Gabin, Vickie L., and Lee E. Lesperance
1977 *New Mexico Climatological Data Precipitation, Temperature, Evaporation, and Wind, Monthly and Annual Means, 1850–1975*. Museum of New Mexico Research Section. W. K. Summers and Associates, Socorro.

Girad, Jeffrey S.
1986 Summary of the 1986 SMU Archaeological Field School Survey. On file, Fort Burgwin Research Center, Taos.

1988 Investigations at Archaeological Sites in the Carson National Forest, Taos County, New Mexico. On file, Fort Burgwin Research Center, Taos.

Glover, Vernon J., and John McCall
1988 The Santa Fe Railway. In *Pecos: Gateway to Pueblos and Plains*, edited by J. Bezy and J. Sanchez, pp. 112–117. Southwest Parks and Monuments Association, Tucson.

Goddard, Pliny E.
1911 *Jicarilla Apache Texts*. Anthropological Papers Vol. 8. American Museum of Natural History, New York.

Grebner, Lawrence S.
2009 Creation and Historical Background of US 285: The Section between Ojo Caliente and Tres Piedras in Rio Arriba County. Intra-department correspondence, New Mexico Department of Transportation, December 3, 2009. Ms. on file, Office of Archaeological Studies, Museum of New Mexico.

Greiser, Sally T., T. Weber Greiser, and David Putnam
1990 Aboriginal Irrigation in the Taos Valley. On file, Historical Research Associates, Missoula.

Gunnerson, James H.
1969 Apache Archaeology in Northeastern New Mexico. *American Antiquity* 34(1):23–39.

Gunnerson, James H., and Dolores A. Gunnerson
1988 *Ethnohistory of the High Plains*. Cultural Resources Series, No. 26. USDI Bureau of Land Management, Colorado State Office, Denver.

Hackett, Charles W. (editor)
1937 *Historical Documents relating to New Mexico, Nueva Vizcaya, and Approaches Thereto, to 1773*. Vol. 3. Translated by A. Bandelier and F. Bandelier. Carnegie Institution, Washington, DC.

Hammond, George P., and Agapito Rey (editors)
1940 *Narratives of the Coronado Expedition, 1540–1542*. University of New Mexico Press, Albuquerque.

1953 *Don Juan de Oñate, Colonizer of New Mexico, 1595–1628*. Vols. 1 and 2. University of New Mexico Press, Albuquerque.

1966 *The Rediscovery of New Mexico, 1580–1594: The Explorations of Chamuscado, Espejo, Castaño de Sosa, Morlete, and Leyva de Bonilla and Humana*. University of New Mexico Press, Albuquerque.

Hannaford, Charles A., and Yvonne R. Oakes
1983 Historic Artifacts. In *The Ontiberos Site: A Hispanic Homestead near Roswell, New Mexico*, by Yvonne R. Oakes. Laboratory of Anthropology Notes 311. Research Section, Museum of New Mexico, Santa Fe.

Harrington, John P.
1906 The Taos Indians. On file, National Anthropological Archives, Smithsonian Institution, Washington, DC.

1940 Southern Peripheral Athapaskawan Origins, Divisions, and Migrations. In *Essays in Historical Anthropology of North America Published in Honor of John R. Swanton*, pp. 503–532. Smithsonian Miscellaneous Collections Volume 100. Smithsonian Institution, Washington, DC.

Hodge, Frederick W.
1912 *Handbook of the North American Indians*. Bulletin 30, Part 2. Bureau of American Ethnology, Washington, DC.

Holliday, Vance T.
1997 *Paleoindian Geoarchaeology of the Southern High Plains*. University of Texas Press, Austin.

Hull-Walski, Deborah A., and James E. Ayres
1989 *The Historical Archaeology of Dam Construction Camps in Central Arizona.* Vol. 3: *Laboratory Methods and Data Computerization*. Dames & Moore, Phoenix.

Hurt, Wesley R., and Herbert Dick
1946 Spanish-American Pottery from New Mexico. *El Palacio* 53(1).

Irwin-Williams, Cynthia
1973 *The Oshara Tradition: Origins of Anasazi Culture*. Eastern New Mexico University, Contributions in Anthropology 5(1). Portales.

1979 Post-Pleistocene Archeology, 7000–2000 B.C. In *Handbook of North American Indians*, Vol. 9, edited by A. Ortiz, pp. 31–42. Smithsonian Institution Press, Washington, DC.

Ivey, James E.
1993 Seventeenth Century Mission Trade on the Camino Real. In *El Camino Real de Tierra Adentro*, compiled by G. Palmer, J. Piper,

and L. Jacobson, pp. 41–67. New Mexico Bureau of Land Management Cultural Resources Series No. 11. Albuquerque.

Jenkins, Myra E., and Albert H. Schroeder
1974 *A Brief History of New Mexico*. University of New Mexico Press, Albuquerque.

Kelly, Robert L.
1988 The Three Sides of a Biface. *American Antiquity* 53:717–734.

Kennedy, Michael D.
1998 *Archaeological Investigations of Five Sites in the Santa Fe National Cemetery, Santa Fe, New Mexico*. Rio Grande Consultants, Albuquerque.

Kinnaird, Lawrence
1958 *The Frontiers of New Spain: Nicolas de Lafora's Description, 1766–1768*. Quivira Society Publications Vol. 13. Berkeley, California.

Lang, Richard W.
1977 *Archaeological Survey of the Upper San Cristobal Arroyo Drainage, Galisteo Basin, Santa Fe County, New Mexico*. School of American Research, Santa Fe.

1993 *The Sierra del Norte Sites: Processing and Use at Flint Quarries of the Lower Santa Fe Range, New Mexico.* Southwest Archaeological Consultants Research Series 241. Santa Fe.

1995 *Investigations of Limited Activity Sites at Bishop's Lodge in the Santa Fe Foothills*. Southwest Archaeological Consultants, Research Series 284. Santa Fe.

Larson, Robert W.
1968 *New Mexico's Quest for Statehood: 1846–1912*. University of New Mexico, Albuquerque.

Lent, Stephen C.
1991 *Survey, Test Excavation Results, and Data Recovery Plan for Cultural Resources near San Juan Pueblo, Rio Arriba County, New Mexico.* Archaeology Notes 17. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Lentz, Stephen C., and Matthew J. Barbour
2007 Fuel-Break Survey of the Valley of the Utes, Angel Fire, Colfax County, New Mexico. Archaeology Notes 392. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Levine, Frances E., J. Acklen, J. Bertram, S. Lent, and G. McPherson
1985 *Archeological Excavations at LA 16769*. Public Service Company of New Mexico Archaeological Report No. 5. Albuquerque.

Madsen, D. B., and D. Rhode (editors)
1994 *Across the West: Human Population Movement and the Expansion of the Numa*. University of Utah Press, Salt Lake City.

Maker, H. J., H. E. Dregne, V. G. Link, and J. U. Anderson
1974 *Soils of New Mexico.* New Mexico State University Agricultural Experiment Station Research Report 285. Las Cruces.

Malouf, Carling
1966 Ethnohistory in the Great Basin. In *The Current Status of Anthropological Research in the Great Basin: 1964*, edited by Warren L. d'Azevedo et al. University of Desert Research Institute for the Social Sciences and Humanities Publication 1, Reno.

Martorano, Marilyn A.
1999 Protohistoric Stage. In *Colorado Prehistory: A Context for the Rio Grande Basin*, by Marilyn Martorano, Ted Hoefer III, Margaret Jodry, Vince Spero, and Melissa Taylor, pp. 138–145. Colorado Council of Professional Archaeologists, Denver.

Martorano, Marilyn A., Ted Hoefer III, Margaret (Pegi) A. Jodry, Vince Spero, and Melissa L. Taylor
1999 *Colorado Prehistory: A Context for the Rio Grande Basin*. Colorado Council of Professional Archaeologists, Denver.

Maxwell, Timothy D., and Kurt F. Anschuetz
1992 The Southwestern Ethnographic Record and Prehistoric Agricultural Diversity. In *Gardens in Prehistory: The Archaeology of Set-*

tlement Agriculture in Greater Mesoamerica, edited by T. Killon, pp. 35–68. University of Alabama Press, Tuscaloosa.

McNab, Henry W., and Peter E. Avers
1996 *Ecological Subregions of the United States*. Chapter 43, Section M331F. USDA Forest Service.

McNutt, Charles H.
1969 *Early Puebloan Occupations at Tesuque Bypass and in the Upper Rio Grande Valley*. Anthropological Papers No. 40. Museum of Anthropology, University of Michigan, Ann Arbor.

Mera, H. P.
1935 *Ceramic Clues to the Prehistory of North Central New Mexico*. Laboratory of Anthropology Technical Series, Bulletin No. 8. Museum of New Mexico, Santa Fe.

Meyers, Harry C., Jr.
1950 The Archaeology of the San Luis Valley. Master's thesis, Department of Anthropology, University of Denver, Denver.

Miller, John P., and Fred Wendorf
1955 Alluvial Chronology of the Tesuque Valley, New Mexico. *Journal of Geology* 66(2):177–194.

Miller, Merton L.
1898 *A Preliminary Study of the Pueblo of Taos, New Mexico*. University of Chicago Press, Chicago.

Miller, Robert Ryan (translator)
1975 New Mexico in Mid-Eighteenth Century: A Report Based on Governor Vélez Cachupín's Inspection. *Southwestern Historical Quarterly* 79:166–181.

Miller, Wick R.
1966 Anthropological Linguistics in the Great Basin. In *The Current Status of Anthropological Research in the Great Basin: 1964*, edited by Warren L. d'Azevedo et al. University of Desert Research Institute for the Social Sciences and Humanities Publication 1, Reno.

Moore, James L.
1980 Archaic Settlement and Subsistence. In *Human Adaptations in a Marginal Environment: The UII Mitigation Project*, edited by J. Moore and J. Winter, pp. 358–381. Office of Contract Archeology, University of New Mexico, Albuquerque.

1981 *Prehistoric Water and Soil Conservation in the Middle Puerco River Valley*. Laboratory of Anthropology Notes 501. Museum of New Mexico, Santa Fe.

2001 *Prehistoric and Historic Occupation of Los Alamos and Guaje Canyons: Data Recovery at Three Sites near the Pueblo of San Ildefonso*. Archaeology Notes 244. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

2009 *Testing and Data Recovery Plan for Five Archaeological Sites along US 285 South of Tres Piedras, Taos County, New Mexico.* Archaeology Notes 414. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Moorhead, Max L.
1958 *New Mexico's Royal Road: Trade and Travel on the Chihuahua Trail*. University of Oklahoma Press, Norman.

National Register Bulletin
1991 How to Apply the National Register Criteria for Evaluation. Vol. 15. Interagency Resource Division, National Park Service, US Department of the Interior, Washington, DC.

NatureServe
2009 NatureServe Explorer. Version 7.1. NatureServe, Arlington, Virginia. http://www.natureserve.org/explorer. Accessed March 9, 2010.

New Mexico State Transportation Commission
2009 *State of New Mexico Memorial Designations and Dedications of Highways, Structures and Buildings*. New Mexico Department of Transportation, Santa Fe.

Noyes, Stanley
1993 *Los Comanches*. University of New Mexico Press, Albuquerque.

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

Opler, Morris E.
1934–1935
Jicarilla Apache field notes.

1971 Jicarilla Apache Territory, Economy and Society in 1850. *Southwestern Journal of Anthropology* 27(4):309–329.

Orcutt, Janet D.
1991 Environmental Variability and Settlement Changes on the Pajarito Plateau, New Mexico. *American Antiquity* 56:315–332.

Ortiz, Alfonso
1979 San Juan Pueblo. In *Handbook of the North American Indians*, Vol. 9, *Southwest,* edited by Alfonso Ortiz, pp. 278–295. Smithsonian Institution, Washington, DC.

Ortman, Scott G.
2010 Genes, Language and Culture in Tewa Ethnogenesis, A.D. 1150–1400. Dissertation, Arizona State University, Tuscon.

Parrish, Chris, Tom Shine, and Nicholas Parker
2008 *A Cultural Resource Survey for Proposed Road Improvements along US 285, Taos County, New Mexico.* Parametrix Report No. 2008-23. Albuquerque.

Pearce, Thomas M.
1965 New Mexico Place Names: A Geographical Dictionary. University of New Mexico Press, Albuquerque.

Peckham, Stewart
1984 The Anasazi Culture of the Northern Rio Grande Rift. In *New Mexico Geological Society Guidebook, 35th Field Conference: Rio Grande Rift, Northern New Mexico*, pp. 275–281. New Mexico Bureau of Mines and Mineral Resources, Socorro.

Post, Stephen S.
1996 *Las Campanas de Santa Fe Sunset Golf Course, and Estates IV, Estates V, and Estates VII Excavations*. Archaeology Notes 193. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

1997 Archaeological Clearance Letter for Phase 2 of the Northwest Santa Fe Relief Route, Santa Fe County, New Mexico. On file at the Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

2000 *Archaic Seasonal Camps and Pueblo Foraging in the Piedmont: Excavation of Two Small Sites along the Northwest Santa Fe Relief Route, State Road 599 (Phase 3), Santa County, New Mexico.* Archaeology Notes 277. Office of Archaeological Studies, Museum of New Mexico, Santa Fe.

Pratt, Boyd C., and David H. Snow
1988 *The North Central Regional Overview: Strategies for the Comprehensive Survey of the Architectural and Historic Archaeological Resources of North Central New Mexico*. Vol. 1. New Mexico Historic Preservation Division, Santa Fe.

Ramenofsky, Ann F., and C. David Vaughan
2003 Jars Full of Shiny Metal: Analyzing Coronado's Visit to Yunque-Yunque. In *The Coronado Expedition from the Distance of 460 Years*, edited by Richard C. Flint and Shirley C. Flint, pp. 116–139. University of New Mexico Press, Albuquerque.

Reed, Alan D.
1995 Ute Ceramics. In *Archaeological Pottery of Colorado: Ceramic Clues to the Prehistoric and Protohistoric Lives of the States's Native Peoples*, edited by R. H. Brunswing Jr., B. Bradley, and S. M. Chandler, pp. 120–128. Occasional Papers No. 2. Colorado Council of Professional Archaeologists, Denver.

Reeve, Frank D.
1960 Navajo-Spanish Diplomacy, 1770–1790. *New Mexico Historical Review* 35:200–235.

Renaud, Etienne B.
1942 *Reconnaissance Work in the Rio Grande Valley, Colorado and New Mexico*. University of Denver, Department of Anthropology Archaeological Series No. 3. Denver.

1946 *Archaeology of the Upper Rio Grande Basin in Southern Colorado and Northern New Mexico*. University of Denver, Department of Anthropology Archaeological Series No. 6. Denver.

Rock, James T.
1984 Cans in the Countryside. *Historical Archaeology* 18(2):97–111.

Rogge, A. E., D. Lorne McWatters, Melissa Keane, and Richard P. Emanuel
1995 *Raising Arizona's Dams: Daily Life, Danger, and Discrimination in the Dam Construction Camps of Central Arizona, 1890s–1940s.* University of Arizona Press, Tucson.

Sando, Joe S.
1979 The Pueblo Revolt. In *Handbook of North American Indians*, Vol. 9, edited by A. Ortiz, pp. 194–197. Smithsonian Institution Press, Washington, DC.

Schaafsma, Curtis F.
1976 *Archaeological Survey of Maximum Pool and Navajo Excavations at Abiquiú Reservoir, Rio Arriba County, New Mexico*. School of American Research Contract Archaeology Program, Santa Fe, New Mexico.

1978 Archaeological Studies in the Abiquiú Reservoir District. *Discovery 1978*:41–69. School of American Research, Santa Fe.

Scheick, Cherie L.
1991 *A Research Design for the Investigation of Limited Activity Sites at Las Campanas de Santa Fe*. Southwest Archaeological Consultants, Research Series 287. Santa Fe.

Schmader, Matthew, F.
1994 *Archaic Occupations of the Santa Fe Area: Results of the Tierra Contenta Archaeological Project*. Rio Grande Consultants, Albuquerque.

Scholes, Frances V.
1930 The Supply Service of the New Mexico Mission in the Seventeenth Century. *New Mexico Historical Review* 5:93–115, 186–210, 386–404.

Schutt, Jeanne A., Steven Kuhn, Janette Elyea, Jack B. Bertram, and Amy C. Earls
1989 Site Descriptions. In *Report of Surface Collection and Testing at 18 Sites near Abiquiu Reservoir, Northern New Mexico*, by J. Bertram, J. Schutt, S. Kuhn, A. Earls, W. Trierweiler, C. Lintz, J. Acklen, C. Carrillo, and J. Elyea, pp. 49–262. Mariah Associates, Albuquerque.

Seaman, Timothy J.
1983 *Archeological Investigations on Guadalupe Mountain, Taos County, New Mexico*. Laboratory of Anthropology Notes 309. Museum of New Mexico, Santa Fe.

Sides, Hampton
2006 *Blood and Thunder: An Epic of the American West*. Doubleday, New York.

Simmons, Marc
1969 Settlement Patterns and Village Plans in Colonial New Mexico. *Journal of the West* 8(1):7–21.

1979 History of Pueblo-Spanish Relations to 1821. In *Handbook of North American Indians*, Vol. 9, edited by A. Ortiz, pp. 178–193. Smithsonian Institution Press, Washington, DC.

Simmons, Marc, and Frank Turley
1980 *Southwestern Colonial Ironworking*. Museum of New Mexico Press, Santa Fe.

Skinner, S. Alan, C. Shaw, C. Carter, M. Cliff, and C. Heathington
1980 *Archaeological Investigations at Nambe Falls*. Archaeological Research Program, Research Report 121. Department of Anthropology, Southern Methodist University, Dallas.

Smith, Anne M.
1974 *Ethnology of the Northern Utes*. Papers in

Anthropology No. 17. Museum of New Mexico Printing Press, Santa Fe.

Snow, David H.
1983 A Note on Encomienda Economics in Seventeenth Century New Mexico. In *Hispanic Arts and Ethnohistory in the Southwest*, edited by M. Weigle, pp. 347–357. Ancient City Press, Santa Fe.

South, Stanley
1977 *Method and Theory in Historical Archaeology*. Academic Press, New York.

Stuart, David E., and Rory P. Gauthier
1981 *Prehistoric New Mexico: A Background for Survey*. New Mexico State Historic Preservation Bureau, Santa Fe.

Thomas, Alfred B.
1932 *Forgotten Frontiers: A Study of the Spanish Indian Policy of Don Juan Bautista de Anza, Governor of New Mexico, 1777–1787*. University of Oklahoma Press, Norman.

1940 *The Plains Indians and New Mexico, 1751–1778*. University of New Mexico Press, Albuquerque.

Toll, Mollie S.
1986 *Flotation Analysis at Two Multi-component Sites Overlooking the Chama River Valley, near Abiquiu, New Mexico*. Castetter Laboratory for Ethnobotanical Studies Technical Series 176. Department of Biology, University of New Mexico, Albuquerque.

Townsend, Stephen
2005 *A Heritage Resource Inventory for the Proposed Ojo Alternative 285P & TP Connect Transmission Lines, Carson National Forest, BLM, NMDOT, & Private Lands, Rio Arriba & Taos Counties, New Mexico.* Townsend Archaeological Consultants Report No. 2003-28. Las Vegas, New Mexico.

Tuan, Yi-Fu, Cyril E. Everard, Jerold G. Widdison, and Iven Bennett
1973 *The Climate of New Mexico*. State Planning Office, Santa Fe.

USDA-NRCS (United States Department of Agriculture–Natural Resource Conservation Service)
2009 United States Department of Agriculture/Natural Resource Conservation Service Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm.

Utley, Robert M.
1967 *Frontiersmen in Blue: The United States Army and the Indian, 1848–1865*. University of Nebraska Press, Lincoln and London.

Vierra, Bradley J.
1980 A Preliminary Ethnographic Model of the Southwestern Archaic Settlement System. In *Human Adaptations in a Marginal Environment: The UII Mitigation Project*, edited by J. Moore and J. Winter, pp. 351–357. Office of Contract Archeology, University of New Mexico, Albuquerque.

1990 Archaic Hunter-Gatherer Archaeology in Northwestern New Mexico. In *Perspectives on Southwestern Prehistory*, edited by P. Minnis and C. Redman, pp. 57–67. Westview Press, Boulder.

1998 *Results of the 1993–4 Excavations Conducted at the Chama Alcove Site, Rio Arriba County, New Mexico*. Center for Archaeological Research, University of Texas at San Antonio.

Viklund, Lonyta
1988 *A Predictive Model for Archaeological Remains in Santa Fe*. Southwest Archaeological Consultants, Research Series 211. Santa Fe.

Warner, Ted J. (editor)
1976 *The Dominguez-Escalante Journal*. Translated by Fray Angélico Chávez. Brigham Young University Press, Provo.

Warren, A. Helene
1981 *The Micaceous Pottery of the Rio Grande*. Archaeological Society of New Mexico Anthropological Papers No. 6, pp. 149–165. Albuquerque.

Wendorf, Fred, and Erik Reed
1955 An Alternative Reconstruction of Northern

Rio Grande Prehistory. *El Palacio* 62:131–173.

Wetherington, Ronald K.
1968 *Excavations at Pot Creek Pueblo*. Fort Burgwin Research Center Report No. 6. Taos.

Williams, Jerry L. (editor)
1986 *New Mexico in Maps*. 2nd edition. University of New Mexico Press, Albuquerque.

Winship, George P.
1990 The Journey of Coronado, 1540–1542. Fulcrum Publishing, Golden.

Winter, Joseph E. (editor)
1983 High Altitude Adaptations in the Southwest. Cultural Resources Management Report No. 2. USDA Forest Service, Southwestern Region.

Woosley, Anne I., and Bart Olinger
1990 Ethnicity and the Production of Micaceous Ware in the Taos Valley. In *Clues to the Past: Papers in Honor of William M. Sundt*, edited by Meliha S. Duran and David T. Kirkpatrick. Papers of the Archaeological Society of New Mexico No. 16. Albuquerque.

Appendix 1: Radiometric Dating

BETA

Consistent Accuracy . . .
. . . Delivered On-time

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4985 SW 74 Court
Miami, Florida 33155 USA
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Fax: 305 663 0964
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www.radiocarbon.com

Darden Hood
President

Ronald Hatfield
Christopher Patrick
Deputy Directors

February 19, 2010

Mr. Matthew J. Barbour
Office of Archaeological Studies
PO Box 2087
Santa Fe, NM 87504
USA

RE: Radiocarbon Dating Result For Sample LA160196F7

Dear Mr. Barbour:

Enclosed is the radiocarbon dating result for one sample recently sent to us. It provided plenty of carbon for an accurate measurement and the analysis proceeded normally. The report sheet contains the method used, material type, and applied pretreatments and, where applicable, the two-sigma calendar calibration range.

This report has been both mailed and sent electronically. All results (excluding some inappropriate material types) which are less than about 20,000 years BP and more than about ~250 BP include a calendar calibration page (also digitally available in Windows metafile (.wmf) format upon request). Calibration is calculated using the newest (2004) calibration database with references quoted on the bottom of the page. Multiple probability ranges may appear in some cases, due to short-term variations in the atmospheric 14C contents at certain time periods. Examining the calibration graph will help you understand this phenomenon. Don't hesitate to contact us if you have questions about calibration.

We analyzed this sample on a sole priority basis. No students or intern researchers who would necessarily be distracted with other obligations and priorities were used in the analysis. We analyzed it with the combined attention of our entire professional staff.

Information pages are also enclosed with the mailed copy of this report. If you have any specific questions about the analysis, please do not hesitate to contact us. Someone is always available to answer your questions.

Our invoice has been sent electronically. Thank you for your prior efforts in arranging payment. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,

Darden Hood
Digital signature on file

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BETA ANALYTIC INC.

DR. M.A. TAMERS and MR. D.G. HOOD

4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305-667-5167 FAX:305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Mr. Matthew J. Barbour — Report Date: 2/19/2010

Office of Archaeological Studies — Material Received: 1/27/2010

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 273549	3810 +/- 40 BP	-21.4 o/oo	3870 +/- 40 BP

SAMPLE : LA160196F7
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid
2 SIGMA CALIBRATION : Cal BC 2470 to 2200 (Cal BP 4420 to 4150)

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

Page 2 of 3

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-21.4:lab. mult=1)

Laboratory number: **Beta-273549**

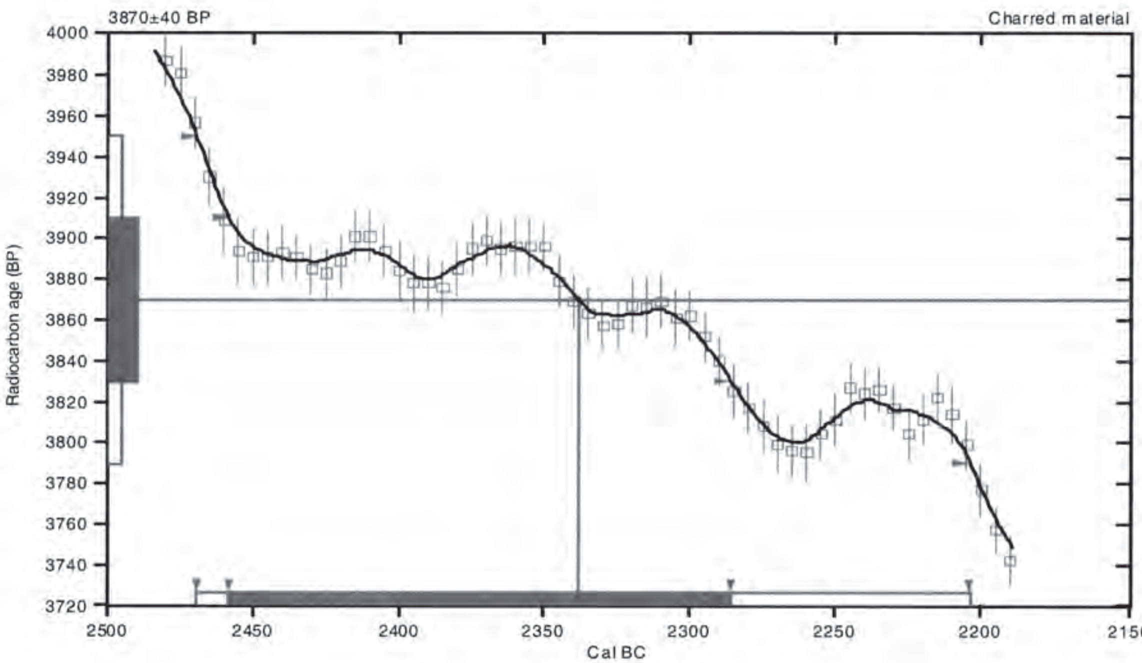
Conventional radiocarbon age: **3870±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 2470 to 2200 (Cal BP 4420 to 4150)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 2340 (Cal BP 4290)

1 Sigma calibrated result: (68% probability) Cal BC 2460 to 2290 (Cal BP 4410 to 4240)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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