MUSEUM OF NEW MEXICO

NM 537–TAPICITO RIDGE: THE TESTING OF FOUR SITES SOUTHWEST OF DULCE, NEW MEXICO

Peter Y. Bullock

OFFICE OF ARCHAEOLOGICAL STUDIES

ARCHAEOLOGY NOTES

189

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with a contribution by
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ARCHAEOLOGY NOTES 189

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ADMINISTRATIVE SUMMARY

Between February 20 and March 24, 1995, the Office of Archaeological Studies, Museum of New Mexico, conducted limited testing of four archaeological sites on NM 537, southwest of Dulce, Rio Arriba County, New Mexico. Limited testing at LA 103123, LA 103124, LA 103125, and LA 107433 was conducted at the request of the New Mexico State Highway and Transportation Department to determine the extent and importance of cultural resources present as part of the planned improvements along a 9.47 km (5.92 miles) stretch of NM 537. All four of the sites are on Jicarilla Apache Tribal Land.

The four sites tested are all surface ceramic and lithic artifact scatters, probably from short-term or temporary, seasonal-resource use. No intact cultural features or deposits were found on three of the sites (LA 103123, LA 103124, and LA 103125). A stone-lined hearth was found at LA 107433 but could not be associated with the surface artifacts. LA 103125 consisted of artifacts redeposited in road fill from earlier highway construction.

In all four cases, the data potential of the portions of the sites within the proposed project area is minimal, and no further investigations are recommended.

MNM Project 41.597 (Tapicito Ridge)
NMSHTD Project No. FLH-1352(13), CN 2655
CPRC Archaeological Survey Permit No. SP-146
BIA Archaeological Resource Protection Act Permit No. BIA/AAO-95-002

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INTRODUCTION

At the request of William L. Taylor, environmental program manager, New Mexico State Highway and Transportation Department, a limited testing program was conducted at four sites (LA 103123, LA 103124, LA 103125, and LA 107433) on NM 537 near Dulce, New Mexico (Fig. 1 and Appendix 1). All four of the sites are on Jicarilla Apache Tribal Land. Limited testing was conducted under CPRC Archaeological Testing Permit No. SP-146, Bureau of Indian Affairs Archaeological Resources Protection Act Permit No. BIA/AAO-95-002, and with the written permission of the Jicarilla Apache tribal government. Fieldwork was carried out between February 20 and March 24, 1995, by Peter Y. Bullock, assisted by Steve Lakatos, Joy Beasley, and Heather Bixler. Nancy Hanks was a volunteer with the project. Eric Blinman acted as principal investigator. Ceramic analysis was carried out by C. Dean Wilson with the assistance of Raul Troxler. Maps were drafted by Robert Turner, the report was edited by Tom Ireland, and photographs were printed by Nancy Warren.

Limited testing was conducted to determine the extent and importance of the portions of the sites within the proposed project area, following procedures outlined in "Site Testing and Evaluation Proposal" (Historic Preservation Division Log 43648). Testing was restricted to the proposed project corridor of planned improvements to NM 537 southwest of Dulce, New Mexico.

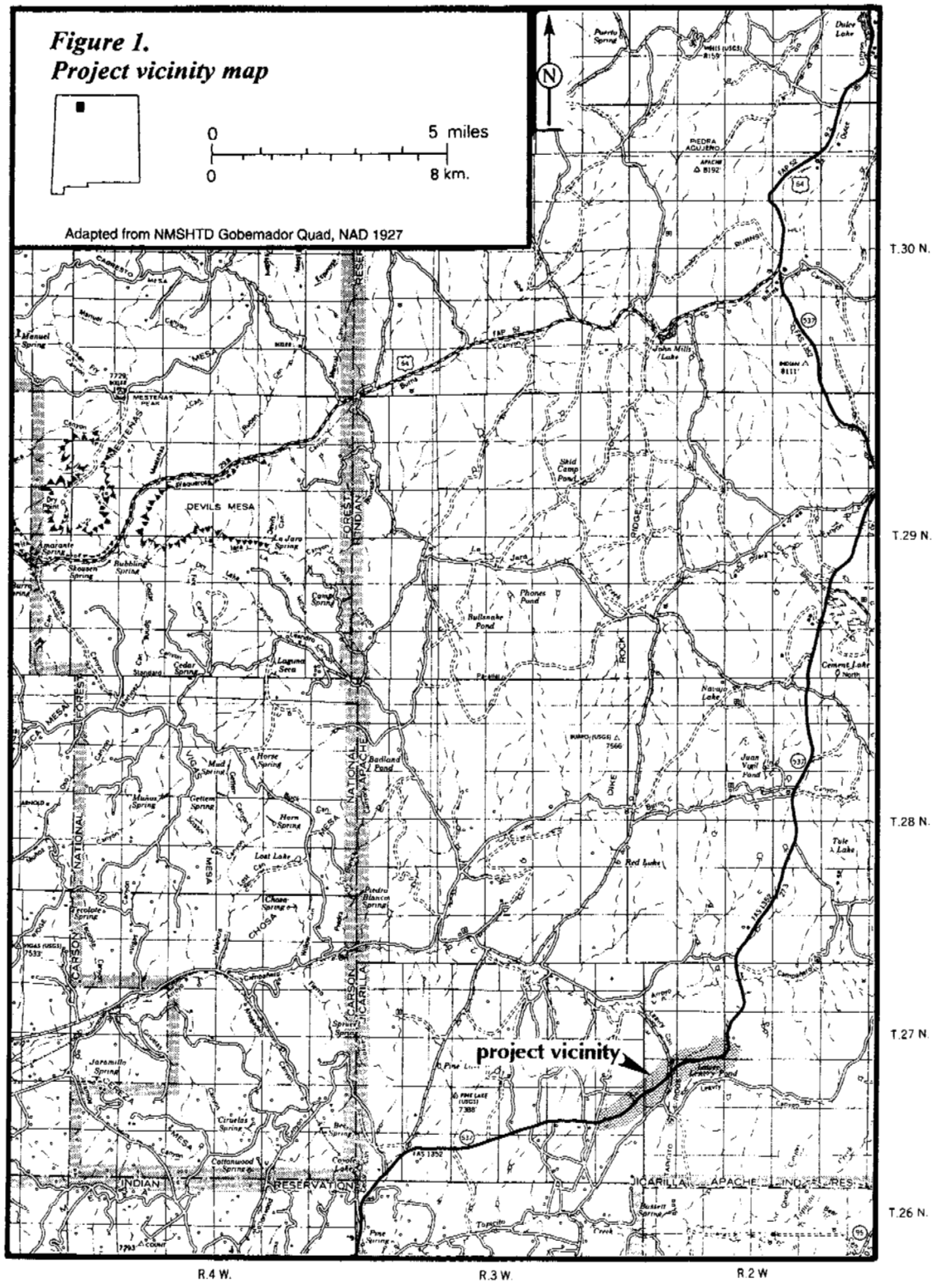
Figure 1.
Project vicinity map
0
5 miles
0
8 km.
Adapted from NMSHTD Gobernador Quad, NAD 1927
N
project vicinity
T.30 N.
T.29 N.
T.28 N.
T.27 N.
T.26 N.
R.4 W.
R.3 W.
R.2 W
DEVILS MESA
JICARILLA APACHE INDIAN RESERVATION

ENVIRONMENT

The project area is west of the continental divide in the extreme southeastern portion of the Colorado Plateau, within the San Juan River drainage system. Both Leavry Canyon and Tapicito Ridge bisect the project area. Elevation within the project area varies from 2,218 m (7,280 ft) in the south to 2,249 m (7,380 ft) in the north.

The countryside south of Dulce is hilly mixed woodland. Occasional outcroppings of sandstone and shale occur, primarily on the tops of ridges. The area supports a heavy mixed conifer cover, with small patches of open grassland. Oak thickets are also present in the project area. The most common invasive species is big sagebrush, which has filled most open areas.

Geology

The project area is within the extreme southeastern portion of the Colorado Plateau (Fenneman 1931:275, Fig. 101). The terrain is characterized by high elevation and an extensive hilly and canyonlands landscape. Both Leavry Canyon and Compaños Arroyo drain the project area. Higher elevations within the project area are composed of Tertiary deposits, the remnants of perennial canyon cutting (Fenneman 1931:278). Bedrock in this area of New Mexico is principally sedimentary. However, Tapicito Ridge, an intrusive igneous dike, bisects the project area.

Soils within the project area are characteristic of the Argiborolls-Eutroboralfs-Rock Land association. This association occurs on hilly and mountainous topography. The soils in this association are silty clays, sandy clay loams, and sandy loams, the product of weathering sandstone and shale. Soils are deep, noncalcareous, and commonly deposited over weathered bedrock. Erosion is extensive in this region due to the frequently steep slopes. A 2 to 6 cm layer of forest duff is commonly present. Areas with this soil association are generally used for rangeland or timber production (Maker et al. 1974:115).

Climate

The climate of the project area, typical of the northern mountains of New Mexico, is characterized as a mixed Petran Montano-Woodland vegetation zone (Castetter 1956:256, Fig. 1). In this area of New Mexico most precipitation occurs as early spring or late summer showers, and winter snows provide additional moisture. Precipitation in Dulce averages 44.95 cm (17.7 inches) (Gabin and Lesperance 1977:268), while recorded precipitation east of the project area in Chama averages 47.24 cm (18.6 inches) a year (Maker et al. 1974:103, Table 6; Tuan et al. 1973:87, Fig. 38).

Flora and Fauna

The project area is between the Woodland and Conifer Forest biomes (Castetter 1956:270,274-275). Vegetation differences are characterized by changes in elevation rather than soil or topographical variation. Piñon-juniper and oak thickets dominate the lower elevations. Slightly higher locales also have ponderosa pine and Douglas fir. Open areas support mixed grasses and big

sagebrush. Subclimax forest communities dominate the project area, the result of recent extensive burning and timber production designed to promote the growth of grass (Castetter 1956:272).

Animal populations vary according to habitat, local climate, and topographic and soil variation (Castetter 1956:266). Habitats tend to correspond to local plant communities. Fauna characteristic of the project area include jackrabbit, cottontail rabbit, and other small rodent species. Larger species common to the area include deer and elk. Bobcat, mountain lion, and bear are less common.

CULTURAL RESOURCES OVERVIEW

A detailed reconstruction of the cultural history of north-central New Mexico is beyond the scope of this project. Regional summaries are available for the area (Stuart and Gauthier 1981).

Paleoindian Period

The Paleoindian period (10,000-5500 B.C.) was first recognized in 1926 at the Folsom site in northeastern New Mexico (Wormington 1947:20). A series of Paleoindian traditions have since been defined, beginning with Clovis and continuing through Plano (Stuart and Gauthier 1981:294-300). Originally defined on the plains of eastern New Mexico, the Paleoindian cultural area has been expanded to include virtually all of North America. Although it was originally believed this culture depended mainly on big-game hunting, the importance of plant gathering and small-animal hunting to Paleoindian subsistence is now recognized (McGregor 1965:120; Wiley 1966:38; Jennings 1968:78-79; Wilmsen 1974:113; Cordell 1979:19-21; Stuart and Gauthier 1981:31-33).

Paleoindian sites of any period are rare. Few are recorded in the northwestern portion of New Mexico, although isolated occurrences of projectile points and projectile point fragments have been recorded in both the San Juan Basin and the upper Rio Grande Valley (Kearns 1992:17; Cordell 1979:134; Judge 1974). The Paleoindian occupation of the San Juan Basin began during the Clovis period, intensified during the Folsom period, and continued through the Plano into the early Archaic (Kearns 1992:28).

Folsom sites are well documented in the San Luis Valley, northeast of the project area, where Washington Pass chert is evidence of travel to or interaction with the San Juan Basin (Kearns 1992:19). Additional Paleoindian sites may be present in the general project area but are buried under more recent soil deposits (Cordell 1979:134).

Archaic Period

The Archaic occupation of northwestern New Mexico appears to have lasted from 5000 B.C. to A.D. 100 (Eddy 1966; Stuart and Gauthier 1981:36). The Archaic period is referred to in western New Mexico as the Oshara Tradition, centered in the northwestern portion of the state (Irwin-Williams 1973).

This period is distinguished by distinctive projectile points and lithic artifact scatters, including grinding implements, fire-cracked rock, and a lack of ceramics. Archaic subsistence adaptations are based on a highly mobile, broad-based economy characterized by a combination of seasonally scheduled hunting and gathering activities. The Oshara Tradition is divided into five phases: Jay (5500-4800 B.C.), Bajada (4800-3200 B.C.), San Jose (3200-1800 B.C.), Armijo (1800-800 B.C.), and En Medio (800 B.C.-A.D. 400) (Irwin-Williams 1973).

Archaic sites not part of the Oshara Tradition also occur in the San Juan Basin. Sites associated with the Chiricahua-Cochise Archaic have been recorded as far to the northeast as the Dulce area. The Northern Colorado Plateau Archaic Tradition is also represented by sites in the San Juan Basin (Kearns 1992:24).

Pueblo Period

The project area is in the eastern part of the Navajo Reservoir Pueblo cultural sequence area. Although there has been some discussion regarding the dating of this cultural sequence (Hammack 1992:50), it is generally divided into the following phases: Los Pinos (A.D. 1-400), Sambrito (A.D. 400-700), Rosa (A.D. 700-850), Piedra (A.D. 850-950), and Arboles (A.D. 950-1050) (Eddy 1966; Stuart and Gauthier 1981:26).

Los Pinos Phase

The Los Pinos phase is compatible to Basketmaker II in the Pecos classification. This phase is characterized by jacal surface structures with shallow depressions serving as floors. The Los Pinos phase is largely preceramic, although brown ware does appear by A.D. 300 (Dittert et al. 1961; Stuart and Gauthier 1981:41).

Sambrito Phase

The Sambrito phase is marked by the appearance of true pit structures. Brown ware ceramics increase in occurrence. Exotic shell ornaments and Mesa Verde gray wares are present at Sambrito sites. The Sambrito phase corresponds to the Basketmaker III period of the Pecos classification (Hammack 1992; Stuart and Gauthier 1981:41).

Rosa Phase

Although there has been some discussion regarding the correct dates for the Rosa phase (Boyer 1994; Hammack 1992:50-52), it is generally considered equivalent to the Early Pueblo I period. The Rosa phase is characterized by larger population and villages. A wider variety of ceramic forms and styles were introduced during this period (Dittert et al. 1961; Stuart and Gauthier 1981:41).

Piedra Phase

The Piedra phase corresponds to the Late Pueblo I period. Population and village sizes continue to increase during the Piedra phase. Stockades appear at small sites, surrounding small clusters of pit structures. Black-on-white decorated pottery is common during this period. Exotic goods, including turquoise and shell ornaments also become more common during the Piedra phase (Dittert et al. 1961; Stuart and Gauthier 1981:41).

Arboles Phase

Contemporary with the Pueblo II period, the Arboles phase is characterized by dramatic drops in population. Despite this, villages remain large. Ultimately, however, the region was abandoned by the end of the Arboles phase, about A.D. 1050 (Dittert et al. 1961; Stuart and Gauthier 1981:41; Shields and Cater 1992:68).

Gallina Culture

Centered southeast of the project area, the Gallina culture is assumed to have developed out of the Arboles or Piedra phases (Ellis 1988). The Gallina culture expanded north and west into the

general project area after A.D. 1100. Early Gallina sites are comprised of pit structures surrounded by stockades, similar in layout to earlier Piedra sites. Later Gallina sites are comprised of square pit structures, masonry roomblocks, and towers. Defense was a major preoccupation of the Gallina culture. Defensive village placement, line-of-sight village signaling capability, and the continued use of stockades were all common aspects of Gallina sites (Stuart and Gauthier 1981:93; Upham and Reed 1989). The Gallina culture ended by the late A.D. 1200s, although it is generally assumed to have ultimately developed into the Jemez Pueblo population (Ford et al. 1972:25; Ellis 1988:13).

Jicarilla Apache

The Jicarilla Apaches are an Athapaskan-speaking people who migrated into the northern New Mexico and southern Colorado area between A.D. 1300 (Tiller 1983:440) and 1525 (Gunnerson 1974:5). The traditional lands of the Jicarillas are the high plains, plateaus, and valleys of the southern Rockies (Tiller 1983:440).

The Jicarillas developed subsistence practices designed to fit the specific geographical areas in which they lived. Thus, Jicarilla Apache bands living in the Abiquiu and Cimarron areas practiced sedentary agriculture by the late 1600s, while Jicarillas living on the plains east of the Rockies followed a bison-hunting subsistence style. The Jicarilla Apaches were active traders with the Pueblo Indians prior to the Pueblo Revolt of 1680 (Tiller 1983:447).

The Comanches moved into the southern plains in the early eighteenth century. Their arrival forced the Jicarilla Apaches living in the area west, off the plains, into the foothills of the southern Rockies. Comanche attacks on both Jicarilla and Spanish settlements forced the two groups to unite for defense. The Jicarillas served as Indian auxiliaries to the Spanish army repeatedly from 1724 until 1786, when the Comanches were finally defeated (Tiller 1983:449-450).

Peace brought increased Spanish settlement in northern New Mexico and the lands of the Jicarillas, a situation that worsened with Mexican independence and the Mexican government's policy of granting land to individuals to promote settlement (Tiller 1983:450).

Although an uneasy accommodation was reached between the Jicarillas and the Mexican authorities in Santa Fe, the problem of increased settlement on Jicarilla lands returned with the arrival of American control of New Mexico in 1848. The arrival of large numbers of American settlers to northern New Mexico resulted in Jicarilla-American hostilities that continued until 1854 (Tiller 1983:452).

In 1855 American government policy provided for the resettlement of the Jicarillas and the creation of a reservation for the tribe. After considering a number of possible options, a Jicarilla reservation was established in northern Rio Arriba County in 1873, at the headwaters of the San Juan River.

The Rio Arriba reservation area was not popular with the Jicarillas, who continued to live in a number of bands scattered across northern New Mexico from Cimarron to Abiquiu. An alternative plan, to move the Jicarilla to the Mescalaro Apache Reservation in south-central New Mexico, was put into affect. Most of the Jicarilla Apaches were rounded up and moved south to the Mescalaro Apache Reservation in 1883.

The Mescalaro Apache Reservation proved even more unpopular with the Jicarillas than the proposed reservation in Rio Arriba County. Petitions to return to northern New Mexico were approved in 1887, and the Jicarillas were moved to a reservation west of the continental divide in Rio Arriba County (Tiller 1983:452). Land was added to the reservation in 1907 (Tiller 1983:453), making the reservation the size it is today.

TESTING PROGRAM

LA 103123, LA 103124, LA 103125, and LA 107433 are ceramic and lithic artifact scatters (Earkin 1994; Gaunt 1994). All four of the sites were tested as part of the planned improvements along a 9.47 km (5.92 miles) stretch of NM 537 southwest of Dulce, New Mexico. The purpose of the limited testing was to determine the extent and importance of the portions of the sites within the planned project area. All four of the sites are located on Jicarilla Apache Tribal Land.

Field Methods

The limited testing followed the procedures and practices outlined in *Testing and Site Evaluation Proposal* (HPD Log 43648) (see Appendix 2). A main datum and baseline were established for each site. Surface artifacts were pinflagged to locate artifact clusters and assist in recording and mapping site limits. A map of each site was produced using a transit, stadia rod, and 50 m tape. The location of all test units, cultural features, and surface artifacts was plotted. All surface artifacts were collected after mapping.

Test units measuring 1 by 1 m or 1 by 2 m were hand excavated in the portion of each site within the proposed project area. These tests were placed within or adjacent to areas of surface artifact concentrations or in other areas of possible prehistoric activity indicated by discolored soil. Existing soil integrity was an additional consideration in the placement of test units. Test units were excavated in 10 cm levels until culturally sterile soil or bedrock was reached. The number of test units excavated per site varied, depending on surface artifact occurrence, soil integrity, and site size. All of the excavated dirt was screened through 1/4 inch wire mesh, and the artifacts were collected.

Stratigraphic profiles of each test unit were drawn, and both test unit and general site photographs were taken. Test units were backfilled when excavation was completed. Cultural material recovered in these investigations will be curated at the Archaeological Research Collection, Laboratory of Anthropology, Museum of New Mexico, unless otherwise requested by the Jicarilla Apache Tribe. Field and analysis records will be on file at the Historic Preservation Division, Archeological Records Management Section.

LA 103123

LA 103123 is a ceramic and lithic artifact scatter north of NM 537. Originally recorded as 60 by 60 m, the site area was expanded to 80 by 90 m based on surface artifact occurrence (Figs. 2 and 3). The site slopes down toward the west and southwest. The main artifact concentration is outside of the project area, adjacent to a shallow drainage. The elevation of the site is 2,218.9 m (7,280 ft).

A total of 21 surface artifacts were piece-plotted at LA 103123, and an additional six artifacts were collected from test units and auger tests. The site has experienced surface erosion and modification caused by extensive timbering activities. Surface artifacts have been redeposited. Recent large-scale burning of surface vegetation has also taken place. A portion of the site adjacent to NM 537 has been mechanically scraped. Five test units and 20 auger tests were dug at LA 103123.

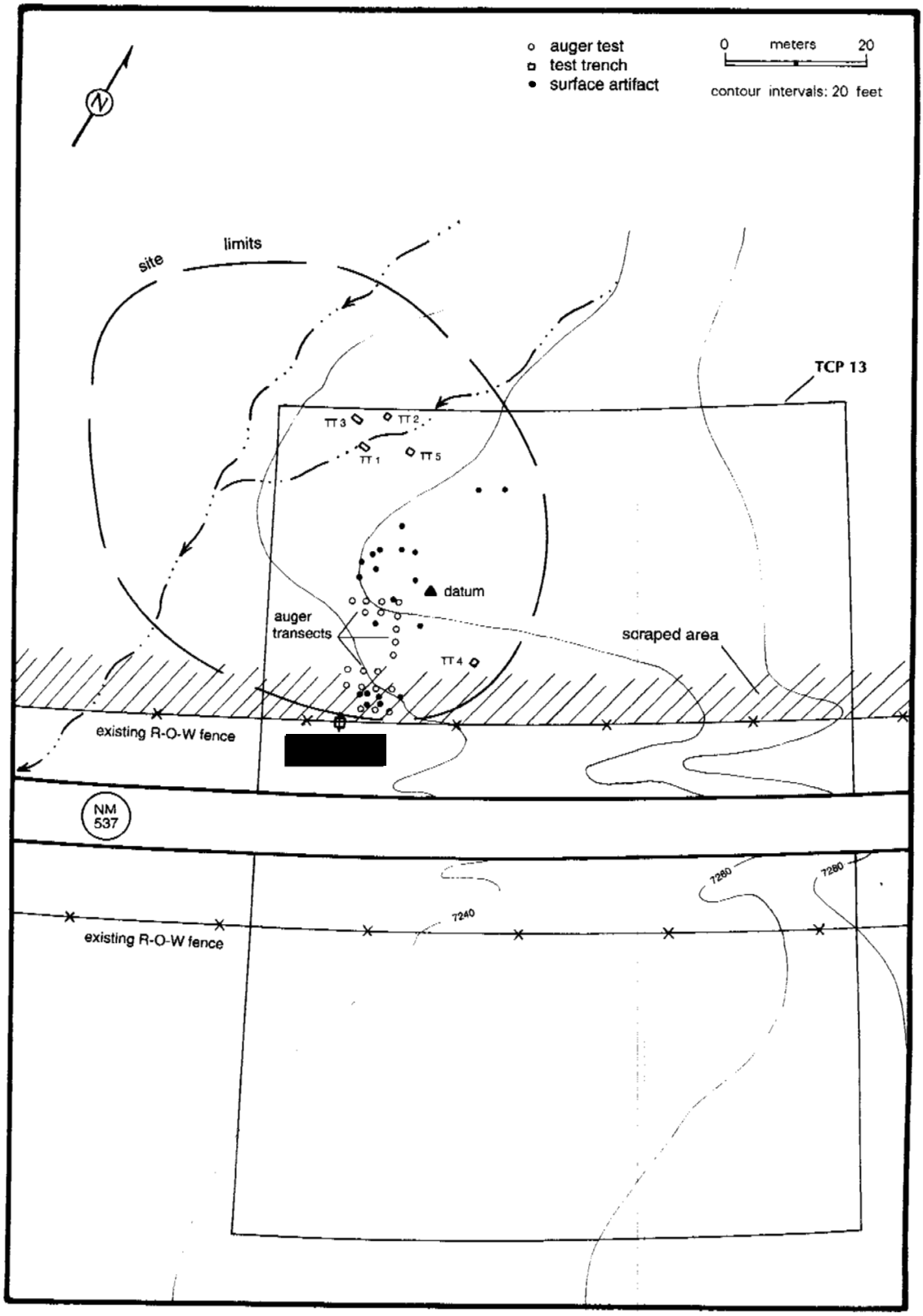

Figure 2. LA 103123 site map.

Figure 3. North portion of LA 103123, looking west.

Test Unit 1

Test Unit 1 is in the northwestern portion of the project area, adjacent to a cluster of surface artifacts and stained soil. The surface vegetation of this test unit prior to excavation was limited to a 5 percent coverage of mixed grasses.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Testing revealed three strata of material. Stratum 1 was a 10 cm layer of surface duff and sandy loam. Stratum 2 was a sandy loam containing some gravel. Stratum 3 was a sandy clay. One artifact (a sherd) was recovered from Stratum 1.

Test Unit 2

Test Unit 2 is a 1 by 1 m unit in the northwestern portion of the project area adjacent to a surface artifact scatter. No vegetation was present.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Testing revealed three strata of material within the trench. Stratum 1 was a thin layer of surface duff and silty soil. Stratum 2 was an alluvial deposit of grayish brown sandy loam containing gravel. Stratum 3 was a sandy clay. Two artifacts were recovered from Test Unit 2, both from Stratum 1.

Test Unit 3

Test Unit 3 is a 1 by 2 m unit excavated adjacent to a surface artifact scatter in the

northwestern portion of the project area. A 5 percent coverage of mixed grasses was present.

Excavation ended 30 cm below the modern surface. Testing revealed two strata of material over decaying sandstone bedrock. Stratum 1 was a sandy clay-loam and surface duff. Stratum 2 was a course sandy clay. No artifacts were collected from either strata.

Test Unit 4

Test Unit 4 was in the southeastern portion of the site in an area of scattered surface artifacts and charcoal-stained soil. No surface vegetation was present prior to excavation.

Excavation ended 30 cm below the modern surface in culturally sterile soil. Testing exposed four strata of material. Stratum 1 was a sandy, silty loam, redeposited material from the roadcut for NM 537 to the south. Stratum 2 was a dark brown sandy clay loam, the original surface material. Stratum 3 was a sandy clay. Stratum 4 was a decaying sandstone. No artifacts were recovered from Test Unit 4.

Test Unit 5

Test Unit 5 was a 1 by 1 m unit dug in the northwestern portion of the project area. No surface vegetation was present in this area of the site prior to excavation.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Excavation exposed two strata of material. Stratum 1 was surface duff and grayish brown silty loam. Stratum 2 was a sandy loam directly over decaying sandstone bedrock. Three artifacts were recovered from Test Unit 5, all from Stratum 1.

Auger Tests

In addition to the trenches, 20 auger tests were dug at LA 103123. These were dug as a series of transects in an area of surface artifacts, charcoal-stained soil, and surface modification. Auger tests were dug until sandstone bedrock was reached. No cultural features or deposits were found in any of the auger tests conducted at LA 103123.

Cultural Features

No intact cultural features or deposits were found within the portion of LA 103123 within the proposed project area.

LA 103124

LA 103124 is a small ceramic artifact scatter. Originally recorded as 12 by 8 m, the site was expanded to 34 by 10 m based on surface artifacts (Fig. 4). The site is north of NM 537 on a steep slope and adjacent to a shallow drainage. The main site concentration of surface artifacts is downslope to the north, outside of the proposed project area. The elevation of the site is 2,231.1 m (7,320 ft).

Seventeen surface artifacts were piece-plotted at LA 103124, and an additional 35 ceramic and

lithic artifacts were collected from the test units and auger tests. The site has experienced surface erosion and some arroyo cutting, as well as modification caused by timbering activities. Rodent burrows are prevalent in the site area. Extensive burning of surface vegetation has also taken place. Surface artifacts have been redeposited. Four test units and seven auger tests were dug at LA 103124.

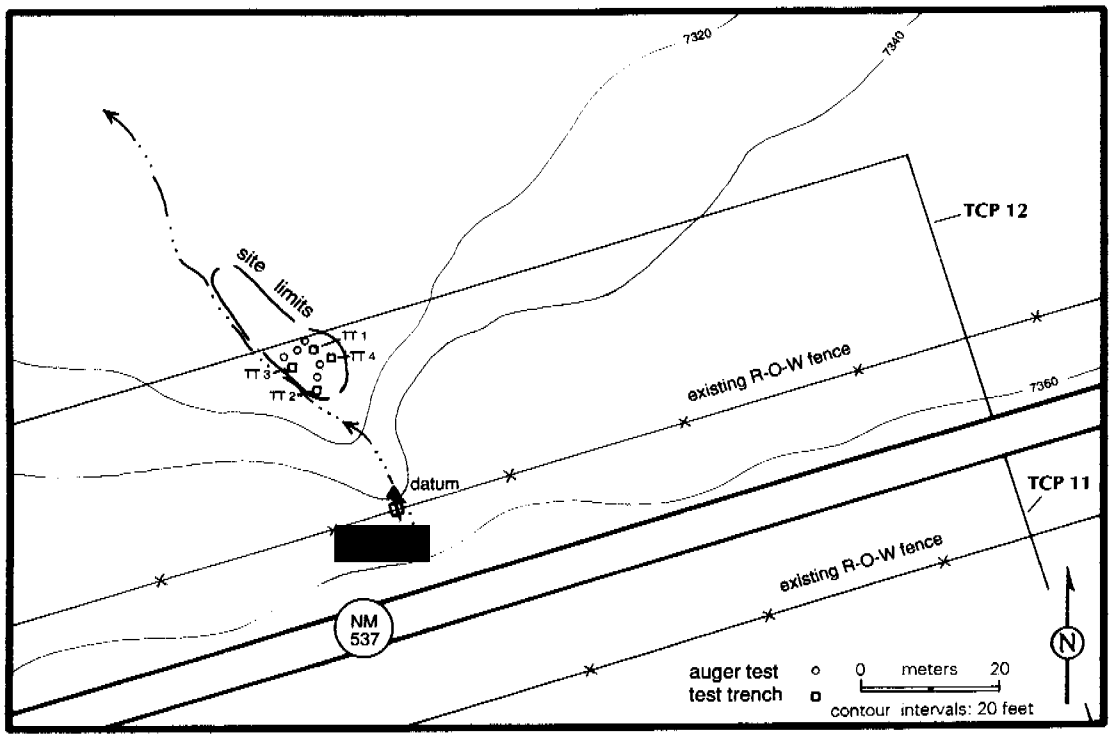

Figure 4. LA 103124 site map.

Test Unit 1

Test Unit 1 was a 1 by 1 m test unit dug within a surface artifact concentration. The test unit was in the northeastern portion of the site area within the project area. Surface vegetation was a 40 percent cover of mixed grasses.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Testing revealed three strata of material within Test Unit 1. Stratum 1 was a sandy loam and surface duff material. Stratum 2 was a mottled sandy clay loam. Stratum 3 was a sandy clay. Ten artifacts were recovered from Test Unit 1, all from Stratum 1.

Test Unit 2

Test Unit 2 was dug in the southwestern portion of the site area within the proposed project area. Surface vegetation was a 20 percent coverage of mixed grasses.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Three strata of material were exposed in Test Unit 2. Stratum 1 was a sandy clay loam. Stratum 2 was a mottled dark brown, sandy clay. Stratum 3 was a fine clay. Rodent burrows were present throughout the

test unit. Four artifacts were collected from Test Unit 2. All of the artifacts were collected from Stratum 1 or the fill of rodent burrows.

Test Unit 3

Test Unit 3 was in the center of a surface artifact cluster, in the portion of the site within the proposed project area. No surface vegetation was present within the test unit area prior to excavation.

Testing ended 30 cm below the modern ground surface in culturally sterile soil. Rodent burrows were common within the test unit area. Three strata of material were found within Test Unit 3. Stratum 1 was comprised of surface duff and sandy loam. Stratum 2 was a lens of dark brown, redeposited, alluvial sandy loam. Stratum 3 was a sandy clay containing some pieces of sandstone. Eight artifacts were collected from Test Unit 3, all from Stratum 1 or the fill of rodent burrows.

Test Unit 4

Test Unit 4 was adjacent to a cluster of surface artifacts. The test unit was in the portion of LA 103124 within the proposed project area. Surface vegetation was a 40 percent coverage of mixed grasses.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Two strata of soil were revealed in Test Unit 4. Stratum 1 was a sandy, silty loam and surface duff layer. Stratum 2 was a dark mottled sandy, silty clay. Ten artifacts were collected from Test Unit 4, all of them from Stratum 1.

Auger Tests

Seven auger tests were dug at LA 103124 to locate possible cultural features or deposits missed during the excavation of test units. Auger tests were hand dug in two short transects between the test trenches. Three sherds were collected from the surface duff in Auger Test 6.

Cultural Features

No intact cultural features or deposits were found in the portion of LA 103124 within the proposed project area.

LA 103125

LA 103125 is a ceramic and lithic artifact scatter on the south side of NM 537. Originally recorded as 80 m by 140 m, LA 103125 was found during testing to measure 60 m by 130 m (Fig. 5). The site slopes downward toward the south and west. The elevation of the site is 2,215.8 m (7,270 ft).

The roadbed of NM 537 has been raised with added fill in the area of LA 103125. The whole site is below and downslope from this deposited fill. The site area has experienced extensive surface erosion and modification associated with timbering activities. Some arroyo cutting is also

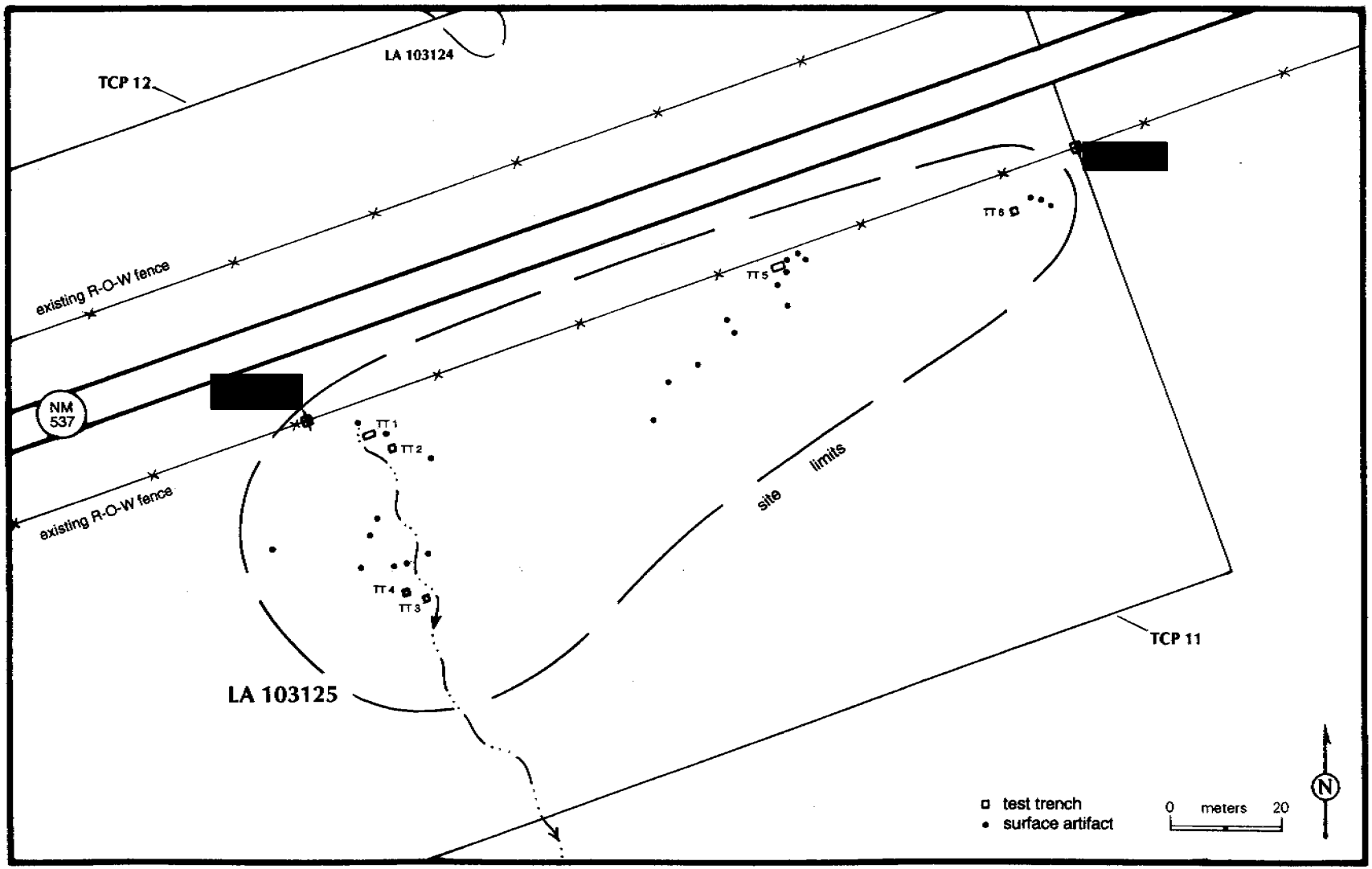

Figure 5. LA 103125 site map.

present, primarily in the western portion of the site. Large-scale burning of surface vegetation has also occurred within the site area. A total of 38 surface artifacts were piece-plotted at LA 103125, with an additional 52 collected from 6 test units. All of the collected artifacts were recovered from redeposited material originating in the fill of the raised roadbed of NM 537.

Test Unit 1

Test Unit 1 was a 1 by 2 m test unit excavated in an area of a surface artifact cluster and a possibly associated ash stain. This test unit was in the western portion of the site. Surface vegetation was a 20 percent coverage of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Two strata of material were revealed in Test Unit 1. Stratum 1 was a light brown, silty alluvial sand. Stratum 2 was a dark, silty soil containing pieces of recently burnt wood. Both strata of material were directly over sandstone bedrock. Test Unit 1 also contained extensive rodent burrows. Five artifacts were collected from Test Unit 1, all of them in Stratum 1 or the fill of rodent burrows.

Test Unit 2

Test Unit 2 was a 1 by 1 m unit in the western area of the site, adjacent to the surface artifact cluster investigated with Test Unit 1. Surface vegetation was a 10 percent cover of mixed grasses.

Excavation ended at 20 cm below the existing ground surface in culturally sterile soil. Three strata of material were exposed in Test Unit 2. Stratum 1 was a fine alluvial sand. Stratum 2 was a black ashy soil containing pieces of burnt wood of recent origin. Stratum 3 was a dark brown, silty loam. Two artifacts were found in Test Unit 2, both of them from Stratum 1.

Test Unit 3

Test Unit 3 was a 1 by 1 m unit excavated adjacent to an area of ashy stained soil and a surface artifact concentration. This unit was in the southwestern portion of the site, within the proposed project area. Surface vegetation was a 75 percent coverage of mixed grasses.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. Three strata of material were found within Test Unit 3. Stratum 1 was a fine, silty sand. Stratum 2 was a brown sandy loam with extensive rodent burrows. Stratum 3 was a mottled sandy loam and clay. A single artifact was collected from Stratum 1 in Test Unit 3.

Test Unit 4

Test Unit 4 was a 1 by 1 m unit excavated in the southwestern portion of the site, within the proposed project area. The test unit was dug adjacent to an arroyo, in an area of charcoal-stained soil. Surface vegetation prior to excavation was a 20 percent coverage of mixed grasses.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Three strata of material were revealed in Test Unit 4. Stratum 1 was a fine alluvial sand. Stratum 2 was an ashy sandy loam containing burnt wood, of recent origin. Stratum 3 was a sandy silty clay. No artifacts were collected from Test Unit 4.

Test Unit 5

Test Unit 5 was a 1 by 2 m unit within the proposed project area in the north-central portion of the site. This test unit was dug adjacent to a surface artifact scatter. No surface vegetation was present prior to excavation.

Excavation ended 20 cm below the modern ground surface at decaying sandstone bedrock. Testing revealed a single stratum of material over bedrock. Stratum 1 was a fine alluvial silty sand. A total of 36 artifacts were collected from Stratum 1.

Test Unit 6

Test Unit 6 was a 1 by 1 m test unit near the eastern edge of the site, within the proposed project area. This test unit was excavated near a surface artifact scatter and adjacent to a small erosional drainage. There was a 25 percent vegetation coverage in the test unit area prior to excavation.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Four strata of material were revealed in Test Unit 6. Stratum 1 was a silty sand. Stratum 2 was a silty sandy clay. Stratum 3 was a silty loam, containing a decaying log of recent origin. Stratum 4 was a sandy clay. Eight artifacts were recovered from Test Unit 6, all of them from Stratum 1.

Cultural Features

All of the artifacts recovered at LA 103125 are redeposited from nonlocal highway fill. No intact cultural features or deposits were found in the portion of LA 103125 within the proposed project area.

LA 107433

LA 107433 is a sparse ceramic and lithic artifact scatter on both sides of NM 537, along the top and sides of a ridge bisected by the highway. The site was originally recorded as 165 by 285 m (Figs. 6 and 7), but the size was reduced to 120 by 180 m. The site slopes downward toward the west and east. The elevation of the site is 2,225.0 m (7,300 ft).

Seventy-six artifacts were piece-plotted on the surface of LA 107433. An additional 111 artifacts were recovered from test units. The site has experienced extensive surface erosion and modification connected with timbering activities. Large-scale burning of surface vegetation has also taken place within the site boundary. Artifacts have been redeposited. Twelve test units were excavated at LA 107433.

Test Unit 1

Test Unit 1 was a 2 by 1 m unit dug in an area of surface artifact concentration. The test unit was on the ridge top south of NM 537, in the southern portion of the site area, within the proposed project area. Surface vegetation was a 10 percent coverage of mixed grasses.

Excavation ended at 7 cm below the modern ground surface, partially in culturally sterile soil.

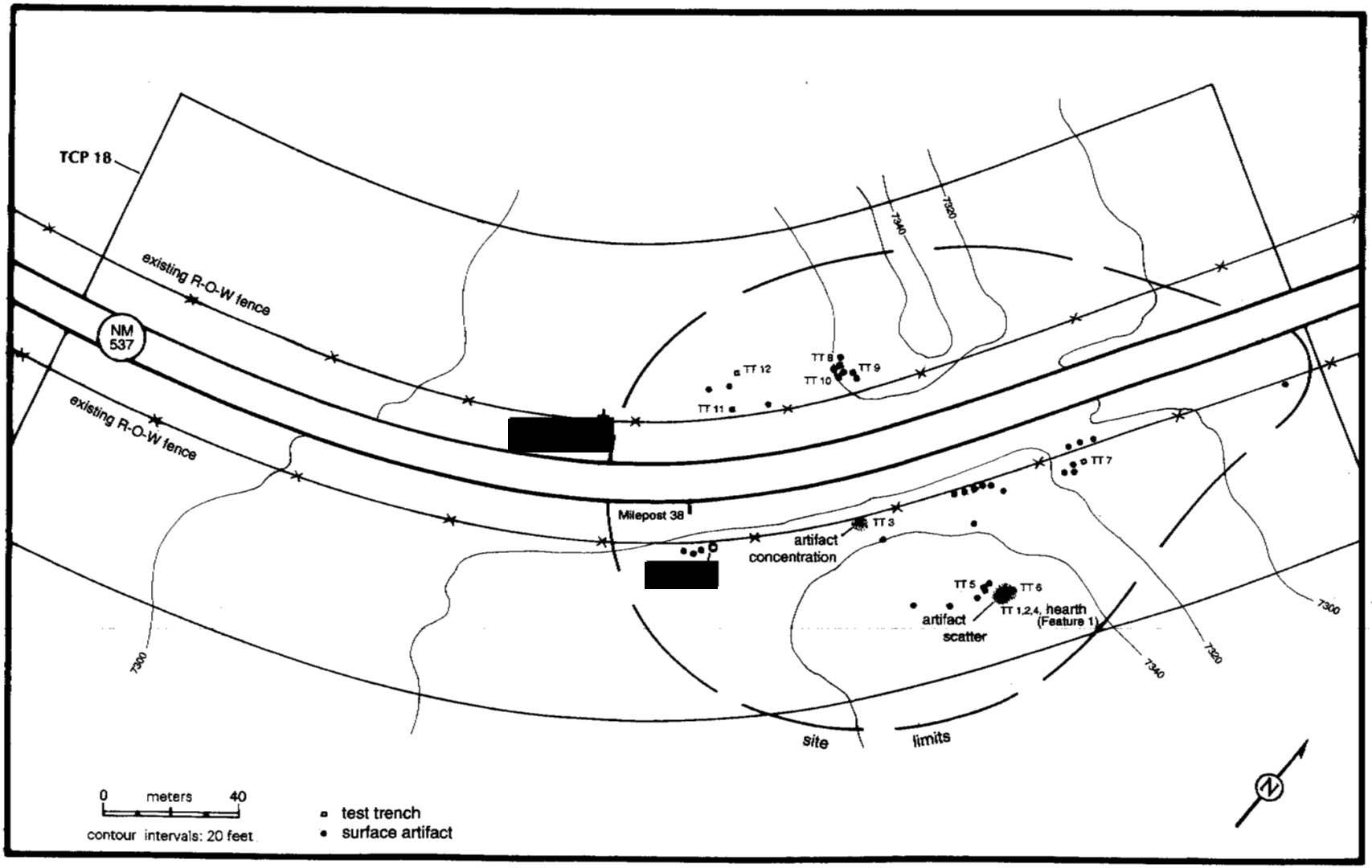

Figure 6. LA 107433 site map.

Figure 7. North portion of LA 107433, looking east.

Excavation of a portion of Test Unit 1 stopped because of a cobble-lined hearth, the base of which was directly on bedrock. No surface associated with the hearth was found during excavation or in the test unit profile. One-quarter of the feature was collected as a flotation sample. The flotation sample revealed the presence of fuel woods (juniper, piñon, and ponderosa pine), but no definite evidence of vegetal foodstuffs (Toll 1996). One stratum of material was found in Test Unit 1. Stratum 1 was a silty sandy soil, mottled with charcoal. A total of 20 artifacts were collected from Test Unit 1. All of the recovered artifacts were from Stratum 1.

Test Unit 2

Test Unit 2 was a 2 by 1 m unit dug adjacent to Test Unit 1 to expose the rest of the hearth, found in Test Unit 1. Surface vegetation prior to excavation was a 10 percent cover of mixed grasses.

Excavation ended at 5 cm below the modern ground surface in culturally sterile soil, at the top of the hearth found in Test Unit 1. One stratum of soil was revealed by Test Unit 2. Stratum 1 was a sandy, silty loam. A total of 27 artifacts were collected from Test Unit 2.

Test Unit 3

Test Unit 3 was a 1 by 1 m test unit dug in the central portion of the site, within the project area just to the south of NM 537. The test unit was in the area of a possible pot drop. Surface vegetation was a 20 percent coverage of mixed grasses.

Excavation ended 10 cm below the modern ground surface in culturally sterile soil. Two strata of material were revealed within this test trench. Stratum 1 was a dark, sandy mottled loam and clay. Stratum 2 was a yellowish, sandy clay. Rodent burrows were present within Test Unit 3. Five artifacts were collected from Test Unit 3, all of them from Stratum 1.

Test Unit 4

Test Unit 4 was a 2 by 1 m unit adjacent to Test Units 1 and 2, in the central part of LA 107433, south of NM 537. Ten percent of the test unit supported surface vegetation prior to excavation.

Excavation ended at 10 cm below the modern ground surface in culturally sterile soil. A single stratum of soil was exposed in this test trench. Stratum 1 was a sandy, silty, mottled soil. A total of 39 artifacts were collected from Test Unit 4. All of the artifacts were recovered from Stratum 1.

Test Unit 5

Test Unit 5 was a 2 by 1 m unit dug adjacent to a small surface artifact cluster, south of NM 537, in the central portion of the site. Surface vegetation was limited to a 5 percent coverage of mixed grasses.

Excavation ended at 20 cm below the modern ground surface at bedrock. Three strata of material were exposed in Test Unit 5. Stratum 1 was surface duff and silty, sandy loam. Stratum 2 was a sandy clay. Stratum 3 was a fine, yellow clay. Three artifacts were collected from Test Unit 5, all from Stratum 1.

Test Unit 6

Test Unit 6 was dug in an area of charcoal-stained soil. This test unit was within the proposed project area south of NM 537, in the south-central portion of the site. No surface vegetation was present prior to excavation.

Excavation ended at 20 cm below the present ground surface at decaying sandstone bedrock. A single stratum of material was present within Test Unit 6. Stratum 1 was a dark brown, sandy, silty loam and surface duff. This stratum extended to bedrock. Extensive rodent burrows were also present within Test Unit 6. Fourteen artifacts were collected from Stratum 1 in this test trench.

Test Unit 7

Test Unit 7 was a 1 by 1 m test unit excavated just south of NM 537, in the central portion of the site area, within the proposed project area. The test unit was placed adjacent to an area of charcoal-stained soil and a surface artifact concentration. No surface vegetation was present prior to excavation.

Excavation ended 10 cm below the modern ground surface in culturally sterile soil. A single stratum of material was found within this test unit. Stratum 1 was sandy loam containing plastic and burnt wood of recent origin, material redeposited from a recently constructed drainage ditch running parallel to NM 537. No artifacts were found within Test Unit 7.

Test Unit 8

Test Unit 8 was a 1 by 1 m unit dug in the north central portion of LA 107433, within the proposed project area north of NM 537. The test unit was dug adjacent to a scatter of surface artifacts. Surface vegetation was a 60 percent coverage of mixed grasses.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Testing revealed three strata of material. Stratum 1 was surface duff with a brown, sandy, silty loam. Stratum 2 was a clay loam containing pieces of burnt wood of recent origin. Stratum 3 was a fine clay. No artifacts were found within this test unit.

Test Unit 9

Test Unit 9 was placed near Test Unit 8 in the portion of the site within the proposed project area north of NM 537. No surface vegetation was present prior to excavation.

Excavation ended at 10 cm below the modern ground surface at bedrock. Two strata of material were exposed within the test trench. Stratum 1 was surface duff with silty loam. Stratum 2 was a fine clay containing pieces of decaying shale bedrock. No artifacts were found within either Stratum 1 or 2.

Test Unit 10

Test Unit 10 was placed in the northern portion of the site near Test Units 8 and 9, adjacent to a surface artifact scatter. No surface vegetation was present prior to excavation of the test unit.

Excavation ended 30 cm below the modern ground surface at bedrock. Two strata of material were revealed within Test Unit 10. Stratum 1 was surface duff with a sandy, silty loam. Stratum 2 was a brown, sandy clay. Stratum 2 was directly on decaying shale bedrock. No artifacts were found within this test unit.

Test Unit 11

Test Unit 11 was dug to investigate an area of charcoal-stained soil. The test unit was in the portion of the site within the proposed project area north of NM 537. No surface vegetation was present prior to excavation.

Excavation ended at 30 cm below the modern ground surface in culturally sterile soil. Two strata of material were revealed within the test unit. Stratum 1 was surface duff with silty, sandy loam, containing pieces of burnt wood of recent origin. Stratum 2 was a sandy clay. No artifacts were recovered from this test unit.

Test Unit 12

Test Unit 12 was placed within the proposed project area north of NM 537, in the central portion of the site area. No surface vegetation was present in the area of the test trench. The test unit was excavated adjacent to a small surface artifact scatter.

Excavation ended at 40 cm below the modern ground surface in culturally sterile soil. Testing

revealed two strata of material within the test unit. Stratum 1 was surface duff and silty, sandy loam. Stratum 2 was a sandy clay. No artifacts were found within either of the two strata.

Cultural Features

Intact cultural features are limited to a single rock-lined hearth (Feature 1, Fig. 8). This hearth was dug into culturally sterile soil to bedrock. The bottom was then lined with cobbles. This feature measures 77 by 77 cm and is circular. The hearth was oxidized by burning, and charcoal and ashy soil are contained within the feature fill. A flotation sample of approximately one-quarter of the fill revealed the presence of burnt wood (juniper, piñon, and ponderosa pine), but no evidence of foodstuffs.

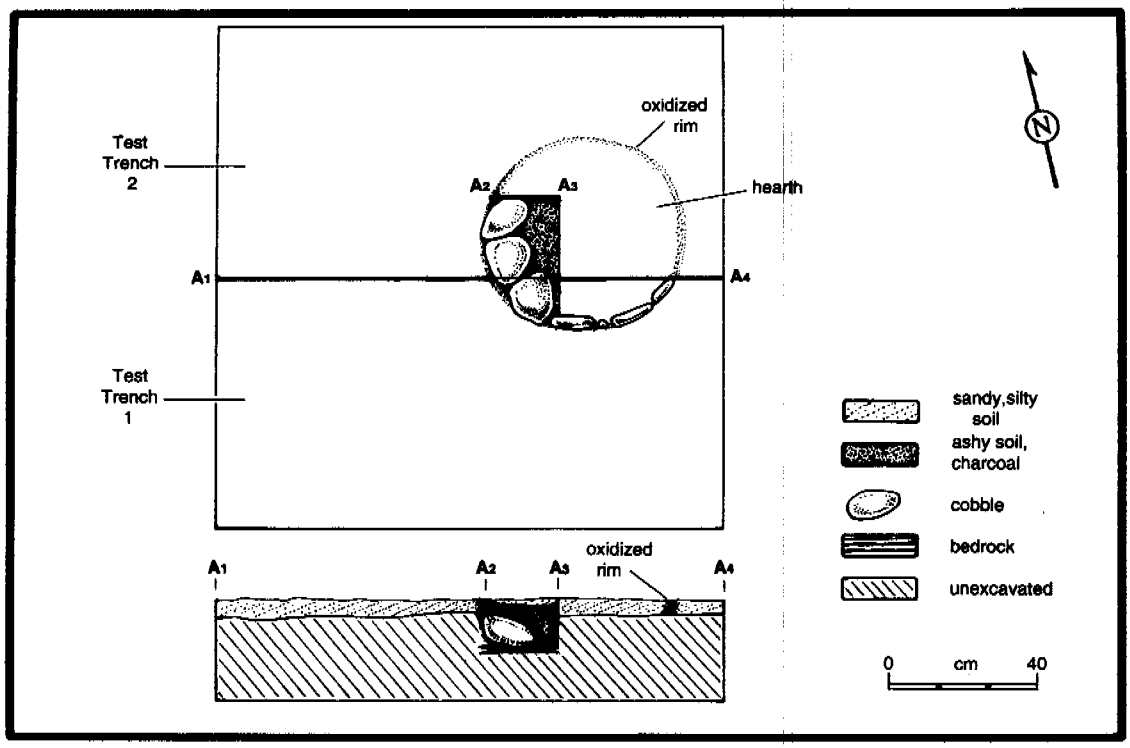

Figure 8. Plan and profile, Feature 1, LA 107433.

Independent dating of the hearth was not attempted because of the poor quality of datable material. Carbon-14 dating of charcoal from the hearth is questionable, because of the risk of contamination caused by the presence of recent widespread burning at the site and extensive rodent burrows within the feature. Also, all of the identified charcoal within the flotation sample is from long-lived tree species, resulting in the likelihood that "old wood" would invalidate the result. Although oxidation is present within the feature's rock-lined base, the lack of burned earth between the rocks makes the feature inadequate for archaeomagnetic dating.

Artifacts were found in the area of the site around this feature, but none of them were directly associated with it. Despite this lack of direct association, the artifacts and feature are considered parts of the same site component. However, the lack of a definable surface, coupled with an inability to independently date the feature through the use of either Carbon-14 or archaeomagnetic dating, limits the available information potential of the feature.

LITHIC ARTIFACT ANALYSIS

Out of an assemblage of 355 artifacts collected and analyzed in Santa Fe, 31 are lithic artifacts.

Methods

Attributes chosen for lithic analysis reflect the desire to achieve the greatest return of useful information within the available time constraints. The guidelines and format of *Standardized Lithic Artifact Analysis* (OAS 1995) were followed. Definitions used in lithic analysis are also included in this volume.

Microwear analysis was deemed impractical and too time consuming for analysis. Microwear analysis is also limited in its ability to make specific interpretations concerning worked materials (Neusius 1988:211). Relative distinctions in artifact wear can be made based upon the hardness of the contact material (Neusius 1988:211), but failure to deal with the variation caused by differences in material properties (Brose 1975), including hardness, makes most analogy interpretations questionable. In areas of active environmental action, such as these site areas, weathering also confuses microwear studies (Schurrenberger and Bryan 1985:137).

The following attributes were use analysis:

Material Type

Codes for material types are for general material groups unless the material is unquestionably from a recognized source. For example, although a wide range of chert occurs on these sites, all were classified as "chert." If a specimen was of a specifically named chert (such as Washington Pass chert), it was coded by the specific name.

Morphology (Artifact Type)

Morphology is the characterization of artifacts by form.

Portion

Portion is that part of the artifact present. Flakes and tools can be whole or fragmentary. Angular debris and cores are whole by definition.

Dorsal Cortex

Cortex is estimated to the nearest 10-percent increment. For flakes this is the cortex on the dorsal surface. Cortex on the platform was not included. For other morphological types, the percentage of cortex on all surfaces is estimated and added together.

Flake Platform

Flake platform is recorded for whole and proximal flakes. Some lateral flakes also have their platforms recorded, if the platform is still present. The morphology of the impact area prior to

flake removal or extreme modifications of the impact area caused by the actual flake removal was coded.

Size

Artifact size is recorded in millimeters.

Edge Number

Artifacts can have one or more utilized edges. Each utilized edge on an artifact is given an edge number. Consecutive numbers are used for artifacts with more than one utilized edge. Each edge was analyzed separately for function and wear patterns.

Function

Function describes and characterizes artifact form.

Wear Patterns

Artifact modification caused by human use is coded as *wear*.

Results

The lithic artifact assemblages from all four sites tested are extremely small: 8 (LA 103123), 3 (LA 103124), 11 (LA 103125), and 9 (LA 107433).

Material Selection

Material use serves as an indication of human decision making processes with regard to the suitability of materials (Young and Bonnichsen 1985:128). The presence within a site area of tested material or substantial numbers of core flakes exhibiting dorsal cortex can thus be presumed to illustrate the manner in which this material suitability is determined. All four of these sites lack tested material and any core flakes exhibiting dorsal cortex. This suggests that the lithic material suitability analysis was conducted at another, unknown location prior to the use of these sites.

Lithic artifacts collected at the four sites were manufactured from three materials: chert, metamorphic sandstone, and obsidian. Chert is the only lithic material present at both LA 103123 (8 of 8 artifacts) and LA 107433 (9 of 9 artifacts). Out of three artifacts at LA 103124, two are chert, and one is obsidian. LA 103125 has a total of 11 lithic artifacts: five are chert, three are obsidian, and three are metamorphic sandstone.

While obsidian is definitely a nonlocal material at these sites, the origin of both the chert and metamorphic sandstone are more problematic. Both chert and metamorphic sandstone may be present in the sedimentary rock deposits of the region, but no specific lithic procurement areas have been identified in the general site area.

All of the obsidian artifacts collected during testing were identified visually as Polvadera obsidian from the Jemez Mountains. Polvadera obsidian is present at sites in the general project

area from the early Archaic period onward (Kearns 1992:29). However, an additional prehistoric obsidian source has been recorded near San Antonio, in south-central Colorado (Shackley 1995). It is not known if this material is visually similar to Polvadera obsidian.

Artifact Morphology

Core flakes make up a majority of artifacts at two sites (LA 103125, and LA 107433). LA 103125 has eight core flakes, one resharpening flake, and one biface thinning flake. LA 107433 has seven core flakes and a single resharpening flake. At LA 103123 there are three core flakes, two resharpening flakes, and a single biface thinning flake. At LA 103124 there is a single core flake and two resharpening flakes. No cortex is present on any of the core flakes recovered at these sites.

Tools

Tools are present at all four sites. The assemblage at LA 103123 contained a multifaceted core utilized as a hammerstone, a biface fragment, and utilized debitage. Utilized debitage was present at LA 103124. LA 103125 contained utilized debitage and a multifaceted core used as a hammerstone. At LA 107433 the assemblage included a biface fragment and utilized debitage.

The presence of bifaces and their percentage within an assemblage has been used by Kelly (1988:721-723) to differentiate between types of sites. Biface production should take place at residential sites, indicated by the presence of large numbers of bifaces and biface thinning flakes. In contrast, logistical camps and resource-procurement areas should have few biface thinning flakes, but large percentages of resharpening flakes and biface fragments.

The frequency of both resharpening flakes and biface thinning flakes is high in these assemblages, indicating that these sites functioned as logistical camps or resource-procurement areas. The small numbers of artifacts recovered and the limited variety of lithic materials utilized supports the idea that these sites were used as resource-procurement areas. The presence of nonlocal materials indicates long-distance procurement, supporting the conclusion that these sites functioned as part of a larger settlement system.

It should be possible to determine, however roughly, the types of activities pursued at these four sites (Christensen 1987:77). However, our lithic artifact assemblages are too small for this to be practical. The presence of utilized debitage suggests the manufacture and use of expedient tools, and the number of resharpening flakes indicates tool rejuvenation. This is more likely to occur at a logistical camp or resource-extraction location than in a residential area (Akins and Bullock 1992:27). Limited tool manufacture is indicated for LA 103123 and LA 103125 by the presence of biface thinning flakes.

These sites reflect a similar range and occurrence of possible lithic artifact-related activities. One possible exception is LA 103124, with its high percentage of obsidian artifacts. The extremely small assemblage (three lithic artifacts) may account for this discrepancy.

LA 103125 differs from the other sites by artifact material type, containing lithic artifacts of obsidian and metamorphic sandstone as well as chert. The whole assemblage of LA 103125 is problematic, however, because the artifacts are all redeposited from nonlocal highway fill.

GROUND STONE ARTIFACT ANALYSIS

Three ground stone artifacts from two sites (LA 103125 and LA 107433) were collected during the Tapicito Ridge project. These artifacts were analyzed in Santa Fe.

Methods

Attributes chosen for analysis reflected the desire to achieve the greatest return of useful information within the available time constraints. The guidelines and format followed *Standardized Ground Stone Artifact Analysis* (OAS 1994).

Results

All three of the ground stone artifacts are mano fragments. However, they differ at the site level in both material and form. One mano fragment, recovered from the surface of LA 103125, is an internal fragment comprised of fine-grained basalt. The use-surface on this fragment is a steeply convex grinding surface. This use-surface had been resharpened by pitting. Like the rest of the artifact assemblage from LA 103125, this ground stone artifact was redeposited from the raised roadbed of NM 537.

In contrast to LA 103125, both of the two ground stone artifacts collected from LA 107433 are made of sandstone. Both of these artifacts are mano fragments found on the modern ground surface. One is an edge fragment of medium-grained sandstone. It has a slightly shaped exterior edge and a slightly convex use-surface. The second artifact is a burnt end portion of a two-handed mano. Made of fine-grained sandstone, this mano was heavily shaped by pitting. The manner in which this mano was used changed sometime prior to its breaking. Originally used as a two-handed mano, it was turned 90 degrees and utilized as a small metate. Because of the small size of the mano, it is unlikely this correspondingly small metate was used in connection with foodstuffs. More likely, this secondary use was connected with craft work of some sort, although the specific material is impossible to determine.

The presence of ground stone artifacts on these sites is consistent with the occurrence of ceramics. The problems associated with the redeposited nature of the artifact assemblage at LA 103125 extends to the piece of ground stone from that site. The ground stone assemblage from LA 107433, although small, indicates food processing and limited craft production.

CERAMIC ANALYSIS

C. Dean Wilson

During investigations of the Tapicito Ridge Project, 319 sherds were collected from four sites including LA 10123 (19 sherds), LA 103124 (47 sherds), LA 103125 (79 sherds), and LA 107433 (174 sherds). Despite limitations related to the small number of sherds recovered from these sites, analysis of these ceramics provides a rare opportunity to characterize pottery and examine ceramic trends associated with this archaeologically poorly known area.

Analytic Categories

Goals of this ceramic analysis included determining the potential time of occupation of these sites, identifying cultural affiliation, and examining patterns of vessel production, exchange, and function. In order to accomplish these goals, a variety of information was recorded during ceramic analysis. Data classes recorded include context of recovery, descriptive attributes, typological classification, counts, and weights.

The recording of ceramic type categories and various descriptive attributes forms the basis for broad characterizations of these ceramic assemblages. Descriptive attributes recorded for each sherd include temper type, pigment, interior and exterior surface manipulation, paste color, paste vitrification, vessel form, vessel appendage, postfiring modifications, rim radius, and rim arc. In addition, refired paste color was recorded for a small sample of sherds.

Tempering Material

Temper categories were identified through microscopic examination of freshly broken sherd surfaces. Temper categories were based on combinations of color, shape, fracture, and reflectivity of temper particles. The majority of the sherds contain combinations of rounded and angular quartz sand. *Sand* refers to rounded or subrounded, white to translucent, sorted, white to clear sand grains. Small angular fragments often occur along with these grains and may indicate the use of sands weathered from local sandstone sources. *Angular quartz* refers to the presence of quartz fragments similar to sand, except that the particles tend to be angular. While similar angular fragments occur in crushed igneous rock employed in much of the northern Anasazi country, dark particles and distinct crystals often characteristic of crushed igneous rock are absent. These fragments, however, may represent the use of crushed leucocratic igneous rock with rare crystalline structures (Blinman and Wilson 1994). *Heterogenous sand*, as used here, refers to the combination of rounded white to clear sand along with smaller rounded black grains that may be rolled basalt. *Silt and very fine sand* includes cases where aplastic particles are limited to very fine rounded silt-sized grains of quartz. These probably reflect natural inclusions in untempered clay. *Sherd* refers to the use of crushed potsherds as tempering material. Sherd temper is identified as angular to subangular particles that are relatively small and usually white, buff, gray, or orange.

Paint

Pigment categories were based on surface characteristics and recorded for interior and exterior surfaces. *Mineral pigment* refers to the use of ground minerals such as iron oxides. Mineral

pigment rests on the vessel surface, obscures surface irregularities, and displays visible relief. Pigments tend to be dull in luster, and color ranges from black to red depending on the associated firing atmosphere. Mineral paints are applied with organic binders and thus display some characteristics of organic paint as well.

Organic pigment refers to the use of vegetal pigments without mineral additions. Color ranges from black to bluish, and edges are often fuzzy. Organic pigment soaks into rather than rests on the surface. Surface irregularities and polishing are visible through the paint, often creating a shiny appearance. Surfaces with clear dark organic pigments were distinguished from those with gray and faded diffuse pigment.

Glaze pigment refers to mineral-painted decorations applied with lead as a fluxing agent, producing a glazed decoration. This pigment is often a distinctive greenish color, although glazed pigments are occasionally gray, black, red, or yellow. Glaze pigments are usually shiny or glassy. When not applied correctly, they may be runny and drippy. When not weathered, lead glaze paint is often very thick, although it tends to weather off easily. In cases where the glaze pigment itself weathers off, leaving behind the organic binder, it may be misclassified as organic.

Surface Manipulation

Surface manipulation refers to surface textures created during vessel construction as well as evidence of polishing and slipping. Surface manipulation attributes were recorded for both interior and exterior surfaces. *Plain unpolished* refers to surfaces that are smoothed and obliterated, but not polished. *Striated* refers to a series of long shallow parallel grooves resulting from brushing with a fibrous tool. *Plain polished* refers to surfaces that have been smoothed and polished with a polishing stone, producing an evenly smooth, compact, and lustrous surface. *Filleted neckbanded coils* refers to surface decorations formed by leaving a row of wide coils unobliterated. In most of the Southwest, the earliest textured pottery exhibit wide filleted coils limited to jar necks (Lucius and Breternitz 1992). *Clapboarded coiled* refers to surface decorations formed by leaving a series of unindented overlapping coils. These are similar to filleted neckbanded coils but tend to be thinner and more pronounced. In earlier forms, such decorations are limited to jar necks, but they may cover the entire exterior vessel surface in later forms. *Basket impressed* refers to basket impressions on the exterior surface. These impressions indicate that the vessel was initially formed within a basket.

Natural Paste Color

The color of a sherd cross section provides clues concerning firing conditions to which vessels were exposed. Red or buff profiles indicate oxidation atmospheres. Black or dark gray profiles reflect reduction atmospheres. Light gray and white colors may indicate intermediate or neutral atmospheres. Paste color of sherd profiles recorded include dark black, gray to white, brown to red, white or gray exterior with dark core, and brown to red with dark core.

Vitrification

Vitrification refers to lustrous or glassy pastes. Vitrification ensues as fluxing agents melt the clay during firing and is partially indicative of firing temperature. Categories recorded include *not vitrified*, *slightly vitrified*, and *moderately vitrified*.

Vessel Form

Sherds were assigned to vessel form categories based on shape and surface characteristics. Bowl sherds are recognized by shape or the location of polishing or painted decorations. *Bowl rim* sherds are identified by inward slope from the rim. *Bowl body* sherds were recognized by polishing or painting on the interior surface of the vessel. *Jar body* refers to unpolished gray body sherds without polishing or painted decorations or to sherds exhibiting polishing or painted decorations on the exterior but not interior surface. *Jar neck* refers to nonrim sherds with distinct changes in curvature indicating they were derived from the neck of a jar. *Cooking/storage jar rim* refers to forms with relatively wide rim diameters, which could have been utilized for cooking or storage. *Strap handle* refers to wide coils derived from vessel handles.

Refired Paste Color

Samples from 34 sherds were fired in controlled oxidation conditions at a temperature of 950 degrees C to standardize conditions to which ceramic pastes were exposed. This allows paste comparisons based on the influence of mineral impurities (particularly iron) on paste color (Shepard 1965). The color of each sample was recorded using the Munsell soil color chart.

Typological Classification

Each sherd was also assigned to a specific typological category based on combinations of various traits. Typological assignments are arrived at by a series of decisions. A sherd is first placed into a spatially distinct tradition based on temper, paste, and paint characteristics. Next, ware categories are assigned based on surface manipulation and form. Sherds are then assigned to a specific ceramic type using temporally sensitive surface manipulations and design styles.

Most of the Anasazi sites found near Dulce and surrounding areas have been assigned to the Rosa phase of the Gobernador tradition (Hall 1944; Peckham 1963), the Largo/Gallina phase of the Gallina tradition (Cordell 1978; Mera 1935; 1938), or the Dinetah or Gobernador phases of the Navajo occupation (Hill 1995). A perusal of pottery descriptions from this area indicates that sites dating to all of these phases are dominated by pottery displaying traits similar to those noted in Tapicito Ridge Project ceramics. An examination of the characteristics of this pottery indicates that these sherds were not of Navajo or Athabascan origin. Therefore, during the present analysis, all sherds exhibiting apparently local temper and pastes were assigned to types of a Gobernador/Gallina tradition. These sherds were next assigned to gray utility or decorated white ware types.

Previous analysis of similar ceramics from nearby sites investigated during the Bull Well Project resulted in the division of utility wares into brown-paste and gray-paste groups based on temper and paste associations (Wilson 1995). The great majority of Bull Well Project sherds were assigned to a paste group based on brown-gray or brown to reddish surface colors. Refired paste color and temper characteristics indicate that the few sherds from the Bull Well Project with light gray to gray surfaces originated elsewhere. In contrast, sherds recovered during the Tapicito Ridge Project with gray and reddish surfaces fired to the same red colors when exposed to standardized oxidation atmosphere. This indicates the use of similar clay resources in the production of pottery displaying a variety of surface colors.

The great majority of the Tapicito Ridge Project utility wares with both gray and reddish

surfaces were also tempered with a very similar sand temper, although some contained angular quartz fragments. Paste profiles of most sherds were dark gray, although some were red. Cores were usually absent. Thus, all these utility wares could have been locally produced utilizing the same clay and temper sources.

Differences in paste and temper characteristics reflect variation in firing atmosphere to which the vessels were exposed. Gray to dark gray sherds were derived from vessels exposed to reducing conditions, while brown or red surfaces and pastes indicate oxidizing conditions. Sherds from the Bull Well Project sites were dominated by reddish colors as compared to the gray colors dominating Tapicito Ridge Project assemblages. These differences reflect either a slight difference in firing conditions or postfiring conditions such as the burning of structures resulting in subsequent oxidation. Pastes of all the utility wares were silty in appearance.

Utility ware sherds were relatively soft and friable with only a slight degree of vitrification. The softness of these sherds could result from low-quality (possibly alluvial) silty clays rather than low-temperature firings. While most of the gray ware ceramics were tempered with sand or angular quartz, some of the sherds contained mica inclusions, which may be visible through the surfaces.

All utility ware sherds are unpolished and sometimes exhibit faint striations on the surfaces. Vessel thickness was variable, although most sherds are relatively thick, ranging from 4 to 11 mm, and average 6.7 mm in thickness. All sherds belonging to this paste group were derived from jars, and include jar bodies, jar necks, cooking jar rims, and indeterminate forms.

The typological classification of these utility ware sherds presented a dilemma because of the long-term production of pottery placed into different traditions with similar paste, temper, and surface characteristics. This makes it very difficult to determine even the basic tradition of utility wares found in this area (Knight 1990), particularly the plain untextured utility ware sherds dominating most assemblages.

Tapicito Ridge gray ware sherds exhibit pastes and forms similar to those classified as Sambrito Utility, which represents the earliest Northern Anasazi ceramic type (Dittert et al. 1963; Wilson and Blinman 1993). These sherds, however, differ from existing descriptions of Sambrito by the lack of polished surfaces. These gray ware sherds also resemble description of Dinetah Gray, a type dating to the early Navajo or Athabascan occupation of this area (Hill 1995; Wilson and Blinman 1993; Brugge 1963). Similarities include softness, paste colors, and forms. Differences include thicker average size and different ranges of surface textures.

Tapicito Ridge gray wares, however, are most similar to descriptions of Rosa Brown and Rosa Gray types dominating Rosa phase sites of the Gobernador tradition (Hall 1944; Marshall 1985; Peckham 1963; Wilson and Blinman 1993), and Gallina Gray of the Gallina tradition (Fiero 1978; Hawley 1988; Hibben 1949; Knight 1990; Seaman 1976). Sites belonging to both of these traditions have been documented in the Dulce area. While the precedence in describing similar ceramics from sites in this area as Rosa Brown or Rosa Gray (Hall 1944; Peckham 1963; Wilson 1995) was followed during the present study, there are also strong similarities with some descriptions of Gallina Gray. Thus, it is important to note that the choice of using Rosa phase types does not automatically imply a Rosa phase occupation.

Utility ware sherds were further assigned to type categories based on paste characteristics and surface texture. As most utility ware textures are along the neck or rim, plain body sherds were

placed into the general plain category, indicating they could have originated from vessels exhibiting a variety of surface textures. A few plain sherds exhibited brown or reddish surfaces and were classified as Brown Paste or Rosa Brown Body. Rosa Brown was first used to describe a subset of Rosa Gray firing to brown colors and apparently reflecting the use of high iron clays (Hall 1944; Peckham 1963). Some of the previous descriptions of Rosa Brown include sherds exhibiting surface textures and basket impressions, and they appear to be identical to the brown-paste pottery described here. Later descriptions of Rosa Brown seem to be limited to the distinct use of self-tempered clays in the production of figurines and miniatures (Eddy 1966; Wilson and Blinman 1993), a distinct class from the brownish pottery described during this study.

Similar pottery exhibiting gray pastes were classified as Rosa Gray (Hall 1944; Peckham 1963). Most body sherds exhibit gray pastes and were classified as Rosa Gray Body. Plain rim sherds derived from completely obliterated vessels were classified as Rosa Rim (or Gray Rim). Other utility ware types were identified by the presence of various surface textures that may have temporal significance. Types defined by surface texture include Basket Impressed Gray, Fillet Gray, and Clapboarded Gray. Sherds displaying these textures have pastes and temper similar to those noted for the plain gray wares, and thus these categories are best considered as varieties of Rosa Gray.

Sherds exhibiting painted or polished decorations on either vessel surface were classified as white wares. Eighteen of the sherds recovered during the Tapicito Ridge Project were assigned to white ware types. White ware sherds examined during this study consistently exhibited white to gray pastes and light-colored surfaces. Unlike the gray wares, they refired to buff to pink colors, indicating the use of clays with lower iron content. While some of the white ware sherds are tempered with sand or crushed quartz similar to that noted for the utility wares, most exhibit heterogeneous sand or fine sand temper, distinct from tempers present in the utility wares.

Surfaces are slightly polished to unpolished, and it was not always possible to differentiate unpainted white ware and gray ware sherds. Sherds are fairly hard, and vessels appear to have been well fired. White ware sherds not exhibiting painted decorations were classified as Polished White.

The majority of the white ware sherds are decorated with faded organic paint. Two sherds were decorated with a lead glazed paint. The conservative nature of white ware technology in the Dulce area made it very difficult to assign white wares not displaying a distinct design to a specific type. For example, unslipped white wares with slight to moderate polish and faded organic paint were produced during both the Rosa and Gallina phases. The earliest painted sherds from this area have iron oxide mineral or lead glaze paint and are usually classified as Rosa Black-on-white (Hall 1944; Peckham 1963; Wilson and Blinman 1995). Similar white wares found at later transitional and Gallina phase sites include Bancos Black-on-white and Gallina Black-on-white (Eddy 1966; Fiero 1976; Hibben 1944; Knight 1990; Mera 1935; Seaman 1976; Wilson and Blinman 1993).

The small size of most of the organic painted sherds often prevented the recognition of specific types displaying distinct designs. Thus, painted sherds were sometimes assigned to *Rosa/Gallina Black-on-white*, indicating that they could have derived from either of these white ware types. A single sherd exhibited an organic paint executed on a unpolished surface and was classified as *unpolished organic white*. Unpolished sherds are more common in Rosa phase components.

Two sherds, with a polished surface and lead glaze paint, were classified as *early glaze paint*. The presence of glaze paint in early white wares, however, probably indicates sherds derived from

Rosa Black-on-white vessels (Wilson and Blinman 1995).

Interpretation

Ceramic dating of Tapicito Ridge sites proved to be particularly difficult. This difficulty largely results from the very conservative ceramic traditions in this area. For example, assemblages dating to the Rosa, Transitional, Gallina, and Early Navajo phases are dominated by similar plain utility wares with dark high-iron pastes. While overall vessel shape may be a useful trait in distinguishing Rosa and Largo/Gallina phase vessels (Hibben 1944; Mera 1935; 1938), it is difficult to determine these shapes in assemblages dominated by small sherds. Coiled and neckbanded surface treatments may be present in assemblages dating to both the Rosa and Largo/Gallina phases. In addition, unslipped white wares exhibiting a slight to moderate polish and organic paint occur in both Rosa and Gallina phase assemblages. While the presence of distinct decorations may be used to recognize temporally distinct types, such distinctions were difficult to make because most of the painted sherds are small and do not display distinct designs.

Table 1 illustrates distributions of ceramic types at the four Tapicito Ridge sites. Basic similarities of these ceramic assemblages indicate at least the possibility of contemporaneous occupations. Assemblages are dominated by plain utility wares, but they also contain neck sherds exhibiting filleted or clapboarded treatments. All but one site (LA 103123) has similar white wares.

To better understand the nature of ceramic change in the Dulce area, sherds collected from other sites in this area were examined. These sherds are presently stored in the Mera collections at the Laboratory of Anthropology. These examinations indicate many similarities between ceramics from Rosa and Largo/Gallina phase sites. Still, there are some differences that are particularly evident in large sherd collections. Based on the characteristics observed in the Mera collection assemblages, a case may be made for placing the Tapicito Ridge sites into the Rosa phase, at least as recognized by Peckham (1963). A Rosa phase assignment is supported by the presence of wide neckbanded and basket-impressed utility wares and glaze painted white wares. These are more commonly associated with the earlier Rosa phase than later Largo/Gallina phase occupations. Painted decorations on unpolished surfaces and the faded nature of the organic paint noted for the Tapicito Ridge assemblage also fall more in the range noted for Rosa than Largo/Gallina phase assemblages.

It is also possible that assemblages noted for Tapicito Ridge Project sites as well as other sites in the Dulce area may be transitional between the Rosa and Largo/Gallina phases as normally defined. The Rosa phase is primarily dated for sites outside the Largo/Gallina regions, and it is usually postulated to date between A.D. 750 to 850 (Eddy 1966; Wilson and Blinman 1993). The end date assigned to the Rosa phase in areas of the Upper San Juan may simply reflect the time of abandonment of the area or replacement by other groups during the early or middle of the ninth century. In locations such as the Dulce area, there may have been continuity between the Rosa to Largo/Gallina phases (Cordell 1978; Gomalak 1990; Hall 1944) not found in most areas occupied by Rosa phase groups. Thus, some Rosa phase assemblages may date later and could span the time attributed by some to the poorly documented Transitional or Rosa Transitional occupation phases (Knight 1990; Gomalak 1990; Hall 1944).

The narrow clapboarded bands in Tapicito Ridge collections appear to be later than those noted in most Rosa phase sites. The presence of these sherds along with some Gallina-like white wares

may indicate a slightly later date than usually attributed to the Rosa phase. It is possible, then, that ceramic distributions at Tapicito Ridge Project sites indicate an occupation transitional to the Rosa and Largo/Phase periods as normally defined that may date sometime between A.D. 850 to 1050. A similar combination of types appears to be represented at other sites in this area assigned by Peckham (1963) to the Rosa phase. An examination of discussions and illustrations of sherds from these sites also indicates a mixture of ceramic types and styles indicative probably indicative of the transitional phase as defined here.

Ceramic distributions also contribute to interpretations regarding production, exchange, and vessel use for occupations in the Dulce area. The very conservative nature of the ceramic technology in this area reflects constraints presented by local clays. In particular, the dominance of similar gray wares with very dark or red clays reflect the use of local sources with very high iron content. A continuum of occupation between the Rosa and Largo/Gallina, and possible isolation from other areas as well, may have also contributed to the very conservative nature of the ceramic change in this area.

The distribution of temper types is presented in Table 2. Differences in clay and temper characteristics of gray and white wares suggest distinct areas of productions for various wares (Wilson and Blinman 1994). The consistent association of high-iron clays and sorted sand temper in gray wares suggest they were produced with combinations of local clay and temper sources. White wares with much lower iron content and heterogenous sand temper with rounded basalt fragments indicate the use of sources outside the local area and may indicate ware specialization. Ware specialization was probably influenced by the limited distribution of high-quality low-iron clays from which light-colored hard vessels could be produced. The diversity of both white ware paints and tempers reflect vessels produced in different localities of this region (Wilson 1995).

Functional constraints resulting from long-term mobility may have contributed to the general lack of ceramic change in this area. Tables 3 and 4 illustrate the distribution of vessel forms at Tapicito Ridge sites. Functionally related distributions show the dominance (94.4 percent) of gray ware sherds derived from jars and indicate that the majority of vessels from this site were utilized for cooking or storage activities. The low frequency of white ware sherds (5.6 percent) includes bowls and jars and indicates that white wares were utilized in a wider range of activities. Despite the small number of sherds recovered from Tapicito Ridge sites, multiple vessels are represented at all of these sites. This suggests moderately intense domestic activities by households for limited periods of time.

DISCUSSION

The four sites in the Tapicito Ridge Project have been assigned to a transitional Rosa to Largo/Gallina phase, based on associated pottery (Wilson, this volume). The small size of the artifact assemblages and the limited archaeological knowledge of the general project area makes any finer resolution problematic. The dominant use of locally made ceramics at these sites suggests that these sites were used by a local population.

The small ephemeral nature of all four sites suggests they are the result of short-term, limited, but possibly repeated activity. Limited-activity sites contain "a limited range of actions present within that specific culture, and are generally involved in the exploitation of resources located at a distance from residential sites" (Adams 1978:106). Short-term limited-activity sites usually involve the procurement of seasonally available plant and animal resources (Adams 1978:105). However, they may also involve the procurement of other materials in short supply, such as clay or specific types of stone (Adams 1978:106). For the Navajo Reservoir District, limited-activity sites associated with the Puebloan sequence are small, structureless, ceramic and lithic artifact scatters (Adams 1978:102).

Ellis (1988) believed that short-term activity sites with large percentages of ceramics in their artifact assemblages, such as those in this project, were connected with the seasonal exploitation of plant resources. Ethnographic examples of this form of resource utilization exist for the historic Pueblos. Anasazi subsistence can be postulated based on historic Pueblo organization. Among the Pueblos, small birds and mammals were hunted individually and opportunistically. They were also hunted in large-scale communal hunts. Larger mammals, deer, pronghorn, elk, and bison were hunted individually when possible, but usually by hunting parties. White (1962:301-302) describes these hunts as usually lasting for approximately six days at Zia.

Vegetal foodstuffs were gathered in a similar manner at Zia. The people of Zia Pueblo historically gathered and consumed a number of wild plants in large quantities. These were gathered individually, except when seasonally occurring plants or fruit became available in large quantities. The variety of these plants, and the quantities involved, suggest they were gathered in a number of areas, not all of which were close to the pueblo (White 1962:107). In these cases, organized communal gathering took place (White 1962:302).

Similar practices were followed by other Southwestern groups. Historically the Navajo also gathered the roots, nuts, berries, seeds, and leaves of wild plants. Although some of these plants were collected by individuals, nuts were commonly gathered by groups engaged in communal gathering (Ellis 1988:187; Bailey and Bailey 1986:49). Other southwestern groups, including the Utes (Smith 1974:66), also practiced communal gathering of nuts (Ellis 1988:187).

The Navajos hunted individually and engaged in groups, particularly antelope drives (Bailey and Bailey 1986:47-48). Among the Utes historically, individuals generally hunted deer (Smith 1974:52), while all-male hunting parties or groups hunted bison and elk (Smith 1974:53-55). The Utes also organized men and women in group antelope and rabbit drives (Smith 1974:56-57).

All of these activities would result in the type of limited-activity sites represented at Tapicito Ridge. However, site position within the landscape should also be a consideration. Of particular importance is the position of theses sites at the ecological edge of mixing between the Woodland

and Conifer Forest Biomes (Castetter 1956:274-275).

Ecological edge areas are the areas of contact between different biotic communities. They generally occur at changes of elevation or where physical changes are present in the landscape. Both of these are major characteristics of the project area. Ecological edge areas are "the most convenient locations for proximity to the widest variety and stability of resources" (Epp 1984:332). Correlations have been demonstrated between site location and ecological edge areas for sites dating from the Paleoindian (Thurmond 1990) and the Archaic (Reher and Winter 1977:124) to the Protohistoric periods (Epp 1988). Thurmond (1990:17) suggests that these biotic borderlands maximize the density and diversity of faunal and floral resources.

This increased availability of resources should result in short-term activity areas occurring in increased frequency in these ecological edge areas. Repeated visitation to the area should occur as different plant (and possibly animal) resources become available throughout the year.

As an increasing number of sites of this type are recorded in this general area, a more complete picture of site frequency, location of occurrence, and site structure will enable us to make more refined interpretations of these site data.

LA 103123

LA 103123 is a ceramic artifact scatter. Based on the ceramic assemblage (see Wilson, this volume), this site has been assigned to a transitional Rosa to Largo/Gallina phase. Portions of the site area have been mechanically scraped. Extensive surface erosion has also taken place, and artifacts have been redeposited. The main site area appears to be to the north, outside of the project area. No intact cultural features or deposits were found.

Archaeological testing within the proposed project area at LA 103123 did not reveal any features or deposits likely to yield important information on the prehistory of LA 103123 or the region. It is our opinion that no further investigations are needed.

LA 103124

LA 103124 has been assigned to a transitional Rosa to Largo/Gallina phase, based on the ceramics present (see Wilson, this volume). A small ceramic and lithic artifact scatter, the site has experienced extensive surface modification and rodent burrowing. No intact cultural features or deposits were found.

Archaeological testing within the proposed project area at LA 103124 did not reveal any features or deposits likely to yield important information on the prehistory of LA 103124 or the region. It is our opinion that no further investigations are needed.

LA 103125

LA 103125 is a ceramic and lithic artifact scatter that has been assigned to a transitional Rosa to Largo/Gallina phase based on the ceramics present (see Wilson, this volume). However, all of the artifacts are in redeposited highway fill. No intact cultural features or deposits were found.

Archaeological testing within the proposed project area at LA 103125 did not reveal any features or deposits likely to yield important information on the prehistory of LA 103125 or the region. It is our opinion that no further investigations are needed.

LA 107344

LA 107344 is a ceramic and lithic artifact scatter that has been assigned to a transitional Rosa to Largo/Gallina phase based on the ceramic assemblage from the site. The presence of two ground stone artifacts suggests that the limited processing of plant material took place at LA 107433. This may indicate that LA 107344 was a short-term logistical camp or habitation site.

One feature, a hearth, is of prehistoric origin but had no associated surface or artifacts. The feature could not be independently dated because of its form of construction, contaminated feature fill from recent burning and rodent burrows, and the lack of associated artifacts. A flotation sample

revealed the presence of burnt wood (juniper, piñon, and ponderosa pine) but no definite evidence of vegetal foodstuffs.

Archaeological testing of LA 107433 within the proposed project limits did not reveal any features or deposits likely to yield important information on the prehistory of LA 107433 or the region beyond that already recorded. It is our opinion that no further investigations are needed.

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APPENDIX 2: CERAMIC TABLES

Table 1. Distribution of ceramic types

Type	LA 103123		LA 103124		LA 103125		LA 107433	
	#	%	#	%	#	%	#	%
Brown paste Rosa	1	5.3			1	1.3	4	2.3
Gray rim (Rosa)			1	2.1	4	5.1	1	.6
Gray body	17	89.5	32	68.1	63	79.7	147	84.5
Basket impressed					4	5.1	8	4.6
Fillet gray					2	2.5	4	2.3
Clapboarded gray	1	5.3	5	10.6				
Striated gray					3	3.8	3	1.7
Polished white			6	12.8	2	2.5	3	1.7
Organic painted polished								
Rosa/Gallina Black-on-white			3	6.4			1	.6
Unpolished organic							1	.6
Early glaze paint							2	1.1
Total	19	100.0	47	100.0	79	100.0	174	100.0

Table 2. Distribution of temper types

	LA 103123		LA 103124		LA 103125		LA 107433	
	#	%	#	%	#	%	#	%
Brown paste sand and angular quartz	1	3.6			1	1.3	4	2.2
Gray angular quartz	6	21.4			2	2.5		
Gray sand and angular quartz	12	42.8	38	100.0	74	93.6	163	93.6
White sand and angular quartz	2	7.1			2	2.5	1	.6
Heterogenous sand	7	25.0					2	1.2
Silt and fine sand							3	1.7
Sherd							1	.5
Total	28	100.0	38	100.0	79	100.0	174	100.0

Table 3. Distribution of utility ware forms

Type	LA 103123		LA 103124		LA 103125		LA 107433	
	#	%	#	%	#	%	#	%
Brown jar body	1	5.3					3	1.8
Brown jar neck					1	1.3	1	.6
Gray bowl rim					1	1.3		
Gray cooking/storage jar			1	2.6	2	2.6	1	.6
Gray indeterminate rim					1	1.3		
Gray jar body	15	78.9	29	76.3	54	70.1	132	79.0
Gray cooking jar			1	2.6				
Gray jar neck	2	10.5	2	5.3	9	11.7	14	8.4
Gray indeterminate							1	.6
Basket impressed jar body					4	5.2	6	3.6
Basket impressed cooking jar							1	.6
Basket impressed jar neck							1	.6
Filleted gray jar body					2	2.6	3	1.8
Filleted gray jar neck							1	.6
Clapboarded gray jar body	1	5.3	5	13.2				
Striated gray jar body					3	3.9	3	1.8
Total	19	100.0	38	100.0	77	100.0	167	100.0

Table 4. Distribution of white ware forms

	LA 103124		LA 103125		LA 107433	
	#	%	#	%	#	%
Polished white bowl body	1	11.1			2	28.6
Polished white jar body	4	44.4	2	100.0		
Polished white jar neck					1	14.3
Polished white jar neck						
Organic paint bowl body	3	33.3			2	28.6
Organic paint jar neck	2	22.2			1	14.3
Early glaze bowl body					1	14.3
Total	9	100.0	2		7	