MUSEUM OF NEW MEXICO

OFFICE OF ARCHAEOLOGICAL STUDIES

RESULTS OF A LIMITED TESTING PROGRAM FOR THE POJOAQUE INTERCHANGE AT US 84/285, AND A DATA RECOVERY PLAN FOR LA 101412, SANTA FE COUNTY, NEW MEXICO

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ADMINISTRATIVE SUMMARY

At the request of the New Mexico State Highway and Transportation Department, test excavations at three sites at the US 84/285 Pojoaque Interchange demonstrated that only one of these sites has the potential to provide information on local prehistory and history. LA 101412 is a prehistoric site containing materials from the Rio Grande Developmental, Coalition, and Classic periods. LA 101412 contains intact subsurface deposits and use surfaces possibly associated with Developmental period structures, activity areas, or features.

No further investigations are recommended at LA 101411 and LA 101413. All sites lie entirely within the proposed project limits, on lands controlled by Pojoaque Pueblo. This plan includes discussions of local prehistory and history, research orientation, site descriptions, and field strategies.

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INTRODUCTION

At the request of Mr. William L. Taylor of the New Mexico State Highway and Transportation Department (NMSHTD), the Office of Archaeological Studies (OAS), Museum of New Mexico, conducted test excavations at three sites at the US 84/285 Pojoaque Interchange, Santa Fe County, New Mexico (Fig. 1). Stephen C. Lent was the supervisor, and was assisted by Patrick Severts, Sonya Urban, and Kelly Hoodenpyle. Sonya Urban wrote the site descriptions and Patrick Severts worked on the testing report and data recovery plan. The report was edited by Robin Gould, and the figures were produced by Ann Noble. Timothy D. Maxwell acted as principal investigator.

Three sites, LA 101411, LA 101412, and LA 101413, were within the NMSHTD proposed project area at the US 84/285 Pojoaque interchange. These sites were identified by Mr. Michael P. Marshall (1993). Lent (1978) had also tested in approximately the same area for the Office of Contract Archeology, University of New Mexico. Between March 15, 1994, and April 4, 1994, the OAS tested LA 101411, LA 101412, and LA 101413 in the vicinity of Lent's 1978 test excavations (see Appendix 1). Results of the testing program by the OAS at these three sites are described below.

Of the three areas tested, only one site, LA 101412, yielded intact subsurface deposits. Diagnostic cultural materials and subsurface use surfaces and features were present at LA 101412 dating to the Rio Grande Developmental period (ca. A.D. 900-1200), and the Coalition period (A.D. 1200-1325). These deposits are within the proposed NMSHTD right-of-way. The other two sites--LA 101411 and LA 101413--were located in areas that had been mechanically altered and were void of information potential. Redeposited and mixed modern and prehistoric trash was recovered from LA 101411, and no further investigations are recommended. The spatial integrity of LA 101413 had been compromised by heavy equipment, and no further investigations are recommended.

In sum, test investigations at the Pojoaque Interchange show that only one site, LA 101412, has the potential to provide information on local prehistory and history. A data recovery plan is included in this report. This program includes proposed research orientations and a strategy for implementing research objectives through excavation and analysis. Also included are descriptions of the sites and testing results, a discussion of regional history and prehistory, and data on the environment. Site location and legal information are included as Appendix 1.

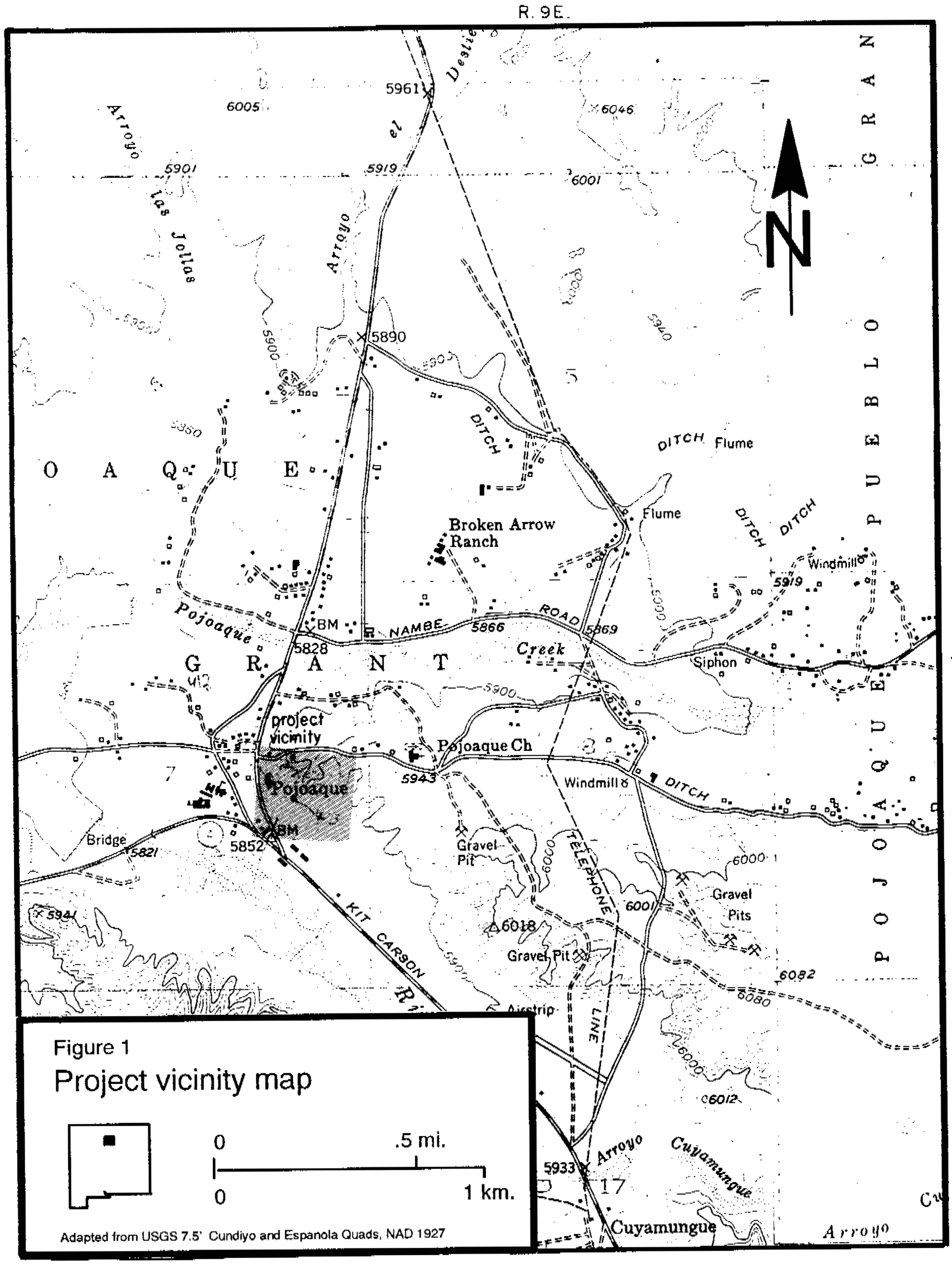

Figure 1
Project vicinity map

Adapted from USGS 7.5' Cundiyo and Espanola Quads, NAD 1927

ENVIRONMENT

The following section has been extracted from Anschuetz (1986).

Physiography

Pojoaque Pueblo is located in a fault-zone feature known as the Española Basin, one in a chain of six or seven basins composing the Rio Grande Rift, extending from southern Colorado to southern New Mexico (Kelley 1979:281). This basin, which is considered an extension of the Southern Rocky Mountain Province (Fenneman 1931), is enclosed by uplands of alternating mountain ranges and uplifted plateaus, and the Rio Grande flows along the long axis of the feature (Kelley 1979:281). The northern boundary of the Española Basin is composed of the eroded edge of the Taos Plateau. The Sangre de Cristo Mountains form the east edge, and the southern boundary is marked by the Cerrillos Hills and the northern edge of the Galisteo Basin. The La Bajada fault escarpment and the Cerros del Rio volcanic hills denote the southwestern periphery. The basin is bounded to the west by the Jemez volcanic field, and the Brazos and Tusas mountains form the northwestern boundary.

Elevations along the Rio Grande through the basin vary from 1,845 m in the north to 1,616 m in the south, and altitudes in the surrounding mountains reach 3,994 m in the Sangre de Cristos, 3,522 m in the Jemez Mountains, and 2,623 m in the Brazos and Tusas mountains (Kelley 1979:281).

The Española Basin is centered about the confluence of the Rio Grande and the Rio Chama, its principal tributary (Kelley 1979:281). This juncture is 18.4 km north of the present study area. The principal perennial drainages within the Pojoaque Pueblo Grant consist of the Rio Pojoaque and the Rio Tesuque, which have their headwaters in the Sangre de Cristo Mountains, 25.6 km to the southeast. Both drainages form narrow valleys that range between 400 and 800 m wide. These valleys merge just northwest of Pojoaque Pueblo, at which point the Rio Pojoaque flows west to the Rio Grande.

Geology

The Rio Grande Rift was established during the late Oligocene epoch (about 30 million years B.P.) when a cycle of crystal downwarping and extensional faulting succeeded a period of regional uplift (Kelley 1979:281). As the subsidence of the Española Basin proceeded through the Miocene and Pliocene epochs (about 3 to 25 million years ago), erosion from the Nacimiento, Jemez, and Brazos uplifts to the north and northwest and the mature Laramide Sangre de Cristo uplift to the east provided most of the sediments for what is known as the Santa Fe group, the prominent geologic unit within the Española Basin. Other sources of sediments of this geologic unit include volcanic fields in the Jemez, Brazos, and Sangre de Cristos (in an area northeast of the Española Basin). Formations within the Santa Fe group, such as the Tesuque formation, consist of deep deposits (over 1 km thick) of poorly consolidated sands, gravels and conglomerates, mudstones, siltstones, and volcanic ash beds (Lucas 1984).

The Española trough was subjected to extensive tilting and faulting during the late Pliocene, after which time widespread tectonic stability set in. The resulting geologic structure of the basin is characterized by west-dipping strata that are transversed by numerous north-trending normal faults. These stratigraphic characteristics, coupled with rapid sedimentation, allowed deposition to reach a maximum depth of 2 km at the western periphery of the basin. The subsequent erosion of upturned beds and elevated scarps has resulted in the highly dissected, rugged topography found in much of the project area (Kelley 1979; Lucas 1984).

A second notable geologic unit found in the vicinity of the project area is the Quaternary Valley and Arroyo alluvium (Lucas 1984). The Ortiz Pediment gravels once covered the Tesuque formation of the Santa Fe group. Because of extensive erosion, these gravels are now found only on isolated high ridges and hilltops, such as the Las Barrancas badlands area northwest of the Rio Pojoaque and Rio Tesuque confluence (see Kelley 1979, fig. 1). The Cerros del Rio volcanic field lies along the Cañada Ancha drainage southwest of the project area. This field extends some distance to the west and consists of a variety of volcanic features. The Quaternary Terrace gravels are river gravel deposits that are exposed in the bottoms of the tributary arroyos between the higher piedmont deposits and the lower valley bottom alluvium.

Climate

Latitude and altitude are the two basic determinants of temperature; however, altitude is the more powerful variable in New Mexico (Tuan et al. 1973). In general, mean temperatures decline faster with increased elevation than with increased latitude. Cold air drainage is a common and well-known feature of New Mexico valleys (Tuan et al. 1973). Narrow valleys create their own temperature regimes by channeling air flow: the usual patterns are warm up-valley winds during the day and cool down-valley winds at night. In contrast, shifts in temperature over broad valley floors are influenced by the local relief (Tuan et al. 1973).

Climatic data for the immediate Pojoaque area are unfortunately incomplete (see Reynolds 1956a, 1956b; Gabin and Lesperance 1977). The comparative data presented in the following discussion are taken from the Santa Fe and Española weather stations. The Santa Fe station, which is 24 km south of the study area, is at an elevation of 2,195 m. The Española station lies 12.4 km to the north at an elevation of 1,732 m. These stations, therefore, bracket the study area, which is at an elevation of 1,799 m.

The mean annual temperature reported by the Santa Fe and Española stations are 48.6-49.3 degrees Celsius and 49.4-50.7 degrees Celsius, respectively (Gabin and Lesperance 1977). The climatological data further indicate that the study area conforms to the general temperature regime of New Mexico; that is, hot summers and relatively cool winters.

The average frost-free period (growing season) at Santa Fe is 164 days. The latest and earliest recorded frosts are May 31 (in 1877) and September 12 (in 1898) (Reynolds 1956a:251). In contrast, Española reports an average growing season of 152 days, with an extreme first frost date of September 12 (recorded in 1898) and a last frost date of June 6 (in 1927) (Reynolds 1956a:250). The shorter growing season for Española, which is approximately 450 m lower than Santa Fe, may be attributable, in part, to cold air drainage through the Rio Grande and Rio Chama valleys. Although a frost-free season of 130 days is sufficiently long to allow the growing of most indigenous varieties of maize through dry farming (Schoenwetter and Dittert 1968; Hack 1942), the unpredictability of late spring and early fall frosts creates agricultural risk. The best agricultural strategy is to plant late enough that seedlings will not erupt above the ground until after the last frost, but early enough that they will be able to fully mature prior to the first killing fall frost (Anderson and Oakes 1980).

Precipitation records from Santa Fe show an annual mean of 361-366 mm. In contrast, the lower Española area reports an annual precipitation mean of only 237-241 mm (Gabin and Lesperance 1977). Annual precipitation records from these stations, as from much of the northern Southwest, vary greatly from year to year. For example, a maximum of 630 mm of precipitation was recorded in Santa Fe during 1855, compared to a minimum of 128 mm in 1917 (Reynolds 1956b). The amount of precipitation is even more variable for any given month in successive years.

Late summer is the wettest season in the annual cycle of the study area, whereas June is one of the driest months. Precipitation records from Santa Fe and Española indicate that more than 45 percent of the mean annual precipitation falls between July and September (Gabin and Lesperance 1977). Although October is drier than September, it is nevertheless, the fourth wettest month of the annual cycle in the Española records. Significant precipitation (7.6 percent of the annual total) also falls in Santa Fe during this month. Late summer and fall moisture is derived from the Gulf of Mexico, when air masses from this region push inland to bring the economically important monsoons (Tuan et al. 1973:20). Summer rains tend to be violent and localized. This saturates the ground surface in the beginning of a storm, resulting in the loss of much of the moisture through runoff.

Moisture is also lost through evapotranspiration, the combined evaporation from the soil surface and transpiration from plants when moisture is unlimited (Chang 1959). Mean annual evapotranspiration losses are 859 mm in Santa Fe and 932 mm in Española (Gabin and Lesperance 1977), creating potential annual moisture deficits of 493 mm and 691 mm, respectively. June, which is a critical time for the germination of plants, suffers the greatest moisture deficits.

The above temperature, precipitation, and potential evapotranspiration data suggest that Pojoaque is climatologically a high risk area for dry-farm agriculture. The dates of the first and last frosts are unpredictable, and frost damage may result in significantly reduced crop yields in some years even though the long-term mean growing season is more than adequate for maize agriculture. Cold air drainage within the valleys increases the risk of frost damage. Precipitation levels are clearly not sufficient to overcome the deficits of potential evapotranspiration, and the amount of precipitation in any given year cannot be predicted from year to year, let alone from month to month. The seasonality of rainfall is a third problem since there may be too much moisture in the early fall when many agricultural plants need to dry for harvesting and storage.

Soils

Soils found within the project area fall into two geomorphic groups: soils of the Dissected Piedmont plain and soils of the Recent Alluvial valleys (Folks 1975). The former, which is most common, is composed of Pojoaque-Rough Broken Land association. Pojoaque soils are derived from Quaternary period surficial deposits, as well as mixed sandstone, shale and siltstone alluvium of the Tesuque formation of the Santa Fe group (Lucas 1984). These well-drained soils are characterized as moderately sloping to moderately steep (5-25 percent), deep, loamy and gravelly deposits that are often covered with lag gravels (Folks 1975:4). Pojoaque soils are intermingled with Rough Broken Land soils and most often occur on the ridgetops between drainages. This soil association is not used for farming today.

Soils of the Recent Alluvial valleys geomorphic group are composed of the El Rancho-Fruitland soil association. These deep, loamy soils, which commonly occur on the low terraces of the Rio Pojoaque and Rio Tesuque drainages within the vicinity of the study area, are derived from Tesuque Formation sedimentary rocks and Sangre de Cristo granitic rocks (Folks 1975:3). Slopes range from 0 to 5 percent. This soil association is used today for irrigated crops.

Flora

Pojoaque Pueblo is located in or near three habitat types: (1) piñon-juniper grasslands; (2) dry riparian; and (3) riparian/wetlands. Piñon-juniper grasslands, which support a variety of plant and animal species, is the most common habitat. The characteristic vegetation includes piñon, juniper, prickly pear, cholla, yucca, and several species of muhly and gramma grass (Pilz 1984).

The dry riparian habitat occurs in arroyo bottoms, on arroyo banks, and in the level to nearly level floodplains adjacent to some of the wider drainages. In the project area this habitat occurs in the Calabasa Arroyo, Arroyo Cuma, and in a narrow finger of the Arroyo Ancho. Some of the more common plants found are rabbitbrush, fourwing saltbush, mountain mahogany, Gambel oak, Rocky Mountain beeplant, and numerous grasses, including Indian ricegrass, three-awn, side-oats gramma, and flax (Pilz 1984).

The riparian/wetlands habitat is found only along the perennial streams, such as the Rio Pojoaque and Rio Tesuque. Modern vegetation includes willow, cottonwood, salt cedar, rushes, and sedges (Pilz 1984). In the wider valley bottoms, ditch irrigation is practiced, including the area north of the present study area.

Fauna

Fauna found within the project area includes coyote, badger, porcupine, blacktailed jackrabbit, desert cottontail, spotted ground squirrel, and many species of birds. Mule deer and black bear are known to occur, but in low numbers (Pilz 1984). Use of the area by elk, black and grizzly bear may have been more common prior to the turn of the century (Carroll 1984:2).

CULTURAL HISTORY OVERVIEW

Stephen C. Lent and James L. Moore

To place the prehistoric and historic developments of the Northern Tewa Pueblo area in perspective, a brief overview of the prehistoric background and a summary of archaeological work at the Pueblo and in the vicinity of the project area is given in the following section. The discussion is limited to the Pueblo period.

Chronology

Researchers in the Rio Grande area have perceived the developments in that area as departing from the traditional Pecos Classification (Kidder 1927). Wendorf and Reed (1955) have redefined the Pueblo I through Pueblo V periods based on the occurrence of ceramic types, changes in settlement patterns, economy, and other characteristics. The principal temporal intervals defined by Wendorf and Reed include the Developmental, Coalition, and Classic periods.

The Developmental Period (A.D. 600-1200)

The early portion of the Developmental period in the Northern Rio Grande dates between A.D. 600 and 900 and is comparable to the late Basketmaker III and Pueblo I periods of the Pecos Classification. Late Basketmaker sites are rare and tend to be small with a ceramic assemblage composed primarily of Lino Gray, San Marcial Black-on-white, and various plain brown and red-slipped wares. The majority of the documented early Developmental sites are in the Albuquerque and Santa Fe areas (Frisbie 1967; Reinhart 1967; Peckham 1984). Although the settlement of the Rio Grande drainage has typically been attributed to immigration from southern areas (Bullard 1962; Jenkins and Schroeder 1974), investigations north of Albuquerque suggest an in situ development of an indigenous population (Frisbie 1967; Lent et al. 1986).

Within the vicinity of the present study area, early Developmental sites are scattered along the Rio Tesuque and Rio Nambe drainages (McNutt 1969; Peckham 1984:276). Based on excavation data, early Developmental habitation sites are small villages of shallow, circular pithouse structures. The sites commonly feature between one and three pithouses (Stuart and Gauthier 1981), and rectilinear surface storage cists are often found in association. These pit structures appear to be more similar to San Juan Anasazi examples than those of the Mogollon, although San Juan architectural "elaborations" such as benches, partitions, and slab linings are absent (Cordell 1979:43).

Sites of the Developmental period tend to be located near intermittent tributaries of the Rio Grande, presumably for access to water and arable land. A preference for elevated settings near hunting and gathering resources is also exhibited, possibly because of their use as an overlook (Cordell 1979).

The transition to above-ground rectilinear and contiguous habitation structures is more apparent in the Santa Fe district (Wendorf and Reed 1955:140). However, McNutt (1969) reports the presence of pithouses in the Red Mesa component of the Tesuque Bypass site near modern Tesuque Pueblo. A late Developmental community (LA 835, the Pojoaque Grant site), is composed of 12 to 15 small room blocks with associated kivas and a Cibola-style great kiva. Ceramics recovered through excavation in conjunction with tree-ring dates suggest an occupation between A.D. 800 and 1150. The variety of pottery and other materials of nonlocal origin associated with the site suggests that LA 835 may have served as a regional economic center (Stubbs 1954). At the northeast juncture of the Pojoaque Pueblo access road and US 84/285 is LA 61, the ancestral component of Pojoaque Pueblo. The associated site complex consists of an extensive series of prehistoric Anasazi components and the historic and modern Tewa pueblo of Pojoaque. Pueblo occupation in the area began around A.D. 950, and has continued, with occasional abandonment, to the present day. Ceramics associated with the site include pottery from the Developmental, Coalition, and historic periods, i.e., mineral-painted wares, organically painted wares, Biscuit wares, Glaze wares, micaceous wares, historic Tewa polychromes, and polished black-on-red and buff types.

The Coalition Period (A.D. 1200-1325)

The Coalition period (A.D. 1200 to 1325) in the Northern Rio Grande is marked by a shift from mineral pigment to organic paint (primarily Santa Fe Black-on-white) in decorated pottery. There are substantial increases in the number and size of habitation sites coincidental with expansion into previously unoccupied areas. Although above-ground pueblos were built, pit structure architecture continued into the early phases of this period. Rectangular kivas, which are incorporated into room blocks, coexisted with the subterranean circular structures (Cordell 1979:44). Frisbie (1967) notes the shift away from less optimal upland settings and a return to the permanent water and arable land adjacent to the major drainages.

In the Northern Rio Grande, the Coalition period is characterized by two interdependent trends in population and settlement reflected in substantial population growth. These trends include a significant increase in the number and size of the habitation sites and the expansion of permanent year-round settlement by Anasazi agriculturalists into areas of greater latitude and elevation. The Chama, Gallina, Pajarito Plateau, Taos, and Galisteo Basin districts, which had been the focus of infrequent Anasazi use prior to A.D. 1100 to 1200, were intensively settled during this period (Cordell 1979). Among the representative sites of the Coalition period are LA 4632, LA 12700, and Otowi, or Potsuwii (LA 169).

The Classic Period (A.D. 1335-1600)

The Classic period (A.D. 1325-1600) postdates the abandonment of the San Juan Basin by sedentary agriculturalists. It is characterized as a time when regional populations may have reached their maximum size, and large communities with multiple plaza and room-block complexes were established (Wendorf and Reed 1955:13). The beginning of the Classic period in the Northern Rio Grande coincides with the appearance of locally manufactured red-slipped and glaze-decorated ceramics in the vicinity of Santa Fe, Albuquerque, Galisteo, and Salinas after ca. A.D. 1315, and Biscuit Wares in the Pajarito Plateau, Santa Fe, and Chama areas (Mera 1935; Warren 1979). In the Santa Fe area, the Galisteo Basin saw the evolution of some of the Southwest's most spectacular ruins. Many of these large pueblos were tested or excavated by N. C. Nelson in the early part of the twentieth century (Nelson 1914, 1916). Possibly the first stratigraphic excavation in the United States was executed by Nelson on the room blocks and the midden of San Cristóbal Pueblo (LA 80). Other projects in the Galisteo area include those by Smiley, Stubbs, and Bannister (1953); the School of American Research (Lang 1977); a project at San Lazaro (LA 91, LA 92) by Southern Illinois University (Smiley 1988); and in the summer of 1992, a project at Pueblo Blanco for Northern Illinois University (Creamer n.d.). The majority of these Classic period sites were established in the early 1300s. By the late 1400s, this area appears to have experienced a substantial decline in population.

Sites of the Classic period are characterized by a bimodal distribution--large communities associated with small structures, fieldhouses, or seasonally occupied farmsteads. This contrasts with the preceding Coalition period, where a greater range of site types characterized the settlement pattern. Investigations of the large Biscuit Ware pueblo sites on the Pajarito Plateau include initial studies by Adolph Bandelier (1882), Hewett (1953), and Steen (1977), who recorded sites within Frijoles Canyon including Pueblo Canyon, Tshirege, and Tsankawi. Several large archaeological projects have included Cochiti (Biella and Chapman 1979), a UCLA intensive survey and limited excavation project (Hill and Trierweiler 1986), and a National Park Service survey of Bandelier National Monument (McKenna and Powers 1986).

The Biscuit series and incised wares were produced in and adjacent to the study area. Beginning with Wiyo Black-on-white (A.D. 1300-1400), the series includes Biscuit A (A.D. 1375-1450), Biscuit B (A.D. 1400-1500 or 1550), and Sankawe Black-on-cream (A.D. 1500-1600) (Breternitz 1966). The appearance of Potsuwi Incised, about the time that Biscuit B became common, suggests contact with the Plains Indian groups. The addition of a red slip to Sankawe (or Tsankawi) Black-on-cream was the origin of the Tewa Polychrome series, ancestral to types that are still being produced in the Rio Grande pueblos. The Chama Valley and Pajarito Plateau were mostly abandoned by the end of this period, and population was concentrated along the Rio Grande when the Spanish arrived in A.D. 1540.

Native groups underwent numerous changes in lifestyle, social organization, and religion after the Spanish settlement of New Mexico. The introduction of new crops and livestock contributed to major changes in subsistence, as did mission programs that taught new industries (Simmons 1979:181). Incursions by Plains Indians caused the abandonment of many pueblos and a constriction of the region occupied by Pueblo groups (Chavez 1979; Schroeder 1979). A combination of new diseases to which the Pueblos had no natural defenses, intermarriage, conflict attendant with the Pueblo Revolt of A.D. 1680-92, and abandonment of their traditional life contributed to a significant decrease in Pueblo populations over the next few centuries (Dozier 1970; Eggan 1979).

METHODS

Purpose of Testing

The purpose of the testing program was to determine the nature and extent of surface and subsurface archaeological remains. These remains required professional assessment for their potential contribution to the prehistory or history of a region. The following procedures were used at each site.

Definition of Site Limits and Artifact Distributions

To determine site limits, archaeologists traversed the site using parallel transects across the portion of the site within the proposed project limits. Artifacts observed during these transects were marked with pinflags. Site limits were considered to be the boundary between the presence and absence of artifacts and features. The pinflags also revealed areas of relatively higher artifact density and provided an indication of artifact distribution in general. On sites with high artifact density (where marking each artifact with a pinflag was impractical), only the site limits and artifact concentrations were marked with pinflags.

Selection of Site Areas to be Tested

The overall strategy used for determining the areas to be tested was purposive, rather than probabilistic--that is, nonrandom. Features such as hearths and rock alignments were tested to determine if they had the potential to contribute significant data. Unidentifiable, but visible surface manifestations of possible subsurface features were selected for testing in order to determine their nature and extent. These manifestations included, but were not be limited to, soil discolorations, charcoal/ash deposits, or rock alignments/concentrations.

Collection and Recording

A sample of the assemblage was recorded in the field. Artifacts that provided data on temporal placement or cultural affiliation were collected. Surface artifacts that occurred within areas selected for test excavations were collected before testing proceeded. Locations of artifacts were recorded using either a Brunton or by grid designations based on Cartesian coordinates. This grid system was established prior to test excavations, and consisted of a north-south/east-west baseline intersecting at a point arbitrarily defined as 50N/50S. Feature locations and general characteristics were mapped in relation to this grid system. Photographs of the site and features were also taken.

Test Excavation Procedures

Test excavations were performed entirely with hand tools. Test pits did not exceed 1-by-1-m and excavation proceeded in arbitrary 10 cm or 20 cm levels. As natural strata were defined, excavation proceeded using those layers as the boundaries of the vertical excavation units. All soil and sediment deposits were screened through ¼-inch mesh. Samples for flotation, pollen, or radiocarbon analysis were taken from test excavation areas, as appropriate. Recovered artifacts were bagged by horizontal and vertical provenience unit. All test pits were backfilled at the completion of the testing program.

Augering

Any depressions suggestive of possible subsurface features, such as pit structures, were tested with hand soil augers. These auger tests were used to recover charcoal, wood, artifacts, or other evidence associated with semisubterranean structures or buried cultural material. Auger tests were also used to determine the subsurface extent of cultural lenses or strata that were identified during test excavations. All soil removed by auger testing was screened through ¼-inch mesh. Additional auger tests were also used to determine if other buried features, having no surface manifestations, were present.

Limits of Testing

The combined horizontal extent of tested areas did not exceed 2 percent of the total site area, excluding the testing of possible features and any auger tests. When intact features were found during test excavations, digging ceased, the feature was documented, and black plastic was used to indicate the location of the feature should data recovery be recommended in the future. The test pit was then backfilled.

Expansion of Testing

There were no equivocal results regarding the nature and extent of subsurface remains. Should there have been a need to expand the testing program, then appropriate authorities would have been contacted with a revised proposal. The additional testing would have proceeded after the revised proposal had been approved.

Human Remains

No human remains were encountered.

Laboratory Analyses

All collected artifacts were cleaned, sorted, and examined in the laboratories of the Office of Archaeological Studies. Analyses within each artifact material class were conducted in accordance to standards established by the Office of Archaeological Studies (see specific analytical techniques for ceramic and lithic artifacts below).

Disposition of Recovered Artifacts

Pojoaque Pueblo officials have specifically requested that all artifacts recovered during testing and data recovery by returned to the pueblo at the conclusion of the OAS analysis.

Site Mapping

Site boundaries, physical and cultural features, test excavation locations, auger tests, and areas of proposed project limits were recorded with a Brunton compass and a metric tape measure. A scaled site map is included in this report.

RESULTS OF TEST EXCAVATIONS

Background

In 1978, Lent tested part of the project area and determined that his area was associated with LA 61, the Pojoaque Pueblo site. Mr. Michael P. Marshall (1993), however, identified three sites, LA 101411, LA 101412, and LA 101413 (see Appendix 1), as requiring testing. Thus, Marshall recorded three sites (LA 101411-101413) when Lent had determined that these remains were associated with LA 61. To briefly summarize the 1978 testing program, a total of 10 test pits were excavated in three main concentrations of artifacts and rubble. It was concluded that one area had some disturbance of the surface and removal of surface artifacts had occurred.

In a second area, a cobble pile was tested. It was determined that the cobble pile may have been a recent cultural occurrence. An ash lens was also encountered in this area, which may have been the remains of a historic burn. A substantial number of obsidian lithic artifacts in association with Biscuit A and Tesuque Smeared-Indented pottery were encountered during the excavation in this aarea.

In a third area, three rubble mounds were tested. These were determined to be of historic origin with no information potential. Despite the presence of substantial quantities of prehistoric artifacts, both on and below the surface of the site, portions of the site were probably removed by heavy equipment. It was concluded that the cultural remains in this area were the result the artifact scatter from nearby LA 61, identified as ancestral to current Pojoaque Pueblo.

Site Descriptions

LA 101411, LA 101412, and LA 101413 are all sites located on lands controlled by Pojoaque Pueblo.

LA 101411 was described by Marshall (1993:9, 10) as a "probable unit house--extensively disturbed" with Late PI to Late PIII ceramic artifacts. Testing revealed that the site is redeposited shoulder fill, and although artifacts are present, there is no integrity to the subsurface deposits.

LA 101412 was described by Marshall (1993:12) as a ceramic and lithic artifact scatter dating to the late PIII-early PIV, Tesuque and Biscuit A phases. Testing revealed that subsurface stratified cultural remains are present, dating to the Rio Grande Developmental and Coalition periods, including possible sturctures, features or activity areas.

LA 101413 was described by Marshall (1993:14) as a "ceramic and lithic scatter (disturbed unit house)" dating to the late Red Mesa-early Tesuque phase. Testing revealed that the surface of the site had been mechanically removed, that subsurface cultural materials were confined to the top 10 to 20 cm, and that there no were structural components present.

LA 101411

Two 1-by-1-m noncontiguous test pits and five auger tests were excavated (Fig. 2).

Test Pit 1. Test Pit 1 was randomly placed near the center of the site at 46N/50E to test for subsurface deposits. This unit was excavated to a depth of 80 cm below the present ground surface (bgs) in seven arbitrary 10 cm levels. Cultural materials were present throughout all levels. The stratigraphy consisted of (1) 38 cm of sandy loam with 10 percent gravels and medium-sized cobbles, 7.5 YR 4/3 brown with mixed ceramic and lithic artifacts and infrequent charcoal inclusions. Historic artifacts were present to 26 cm bgs; (2) a 42 cm layer of silty sand with 2 percent gravels, 7.5 YR 6/4 light brown with ceramic and lithic artifacts present. The base of the test pit was augered to a depth of 2.30 m bgs, and no cultural material was found.

Test Pit 2. Test Pit 2 was randomly placed at 50N/52E to test for subsurface deposits. It was excavated in eleven arbitrary 10-20 cm levels to a final depth of 1.50 m bgs. The soil ranged from a sandy clayey loam containing 10 percent gravels (7.5 YR 5/4 brown) towards the surface of the pit, to a sandy loam with 30 percent gravels (7.5 YR 5/8 yellowish brown) towards the base. Mixed ceramic, lithic, and historic artifacts were present throughout all levels of the test pit. The unit was augered to a depth of 80 cm below the base of the test pit. At 2.30 m both lithic artifacts and asphalt were present.

Auger Tests. Test excavations were augmented by soil augering. Five auger tests (AH) were excavated. Asphalt was recovered from all auger tests at an average depth of 30 cm.

LA 101412

Two 1-by-1-m noncontiguous test pits, and twenty-six soil auger tests were excavated at this site (Fig. 3).

Test Pit 1. Test Pit 1 was placed in a concentration of artifacts at 48N/59E. It was excavated to a depth of 96 cm bgs in nine arbitrary 10 cm levels. Artifacts were present throughout all levels of the unit. The subsurface stratigraphy consisted of (1) 20 cm of disturbed overburden with 35 percent gravels and medium-sized cobbles, 10 YR 6/3 pale brown, sandy loam with cultural material present; (2) a 14-cm layer of homogeneous soil with 25 percent gravels, 10 YR 5/3 brown, with an increase in ceramic artifacts and charcoal inclusions; (3) a 25-cm alluvial gravel and cobble layer, 10 YR 5/4 yellowish-brown, with a decrease in cultural material; (4) 35 cm homogeneous sandy loam, 10 YR 4/3 brown, with another increase in charcoal inclusions and artifacts. The unit was terminated at a compacted sandy clayey loam (10 YR 4/3 brown) with charcoal embedded in it (Fig. 4). It was discontinuous, and may represent an extramural activity area or some other use surface. The surface appeared to be approximately 2 cm thick, and a single ceramic artifact was observed lying on this surface in the northeast corner. The unit was augered to a final depth of 2.20 m bgs. Charcoal was present to 2.10 m bgs, and the remainder of the auger test was culturally sterile.

Test Pit 2. Test Pit 2 was placed in a concentration of artifacts at 41N/52E. The unit was excavated in ten arbitrary 10 cm levels to a final depth of 1.10 m bgs. Intact prehistoric subsurface deposits were present between 32 and 1.05 cm bgs, associated with charcoal

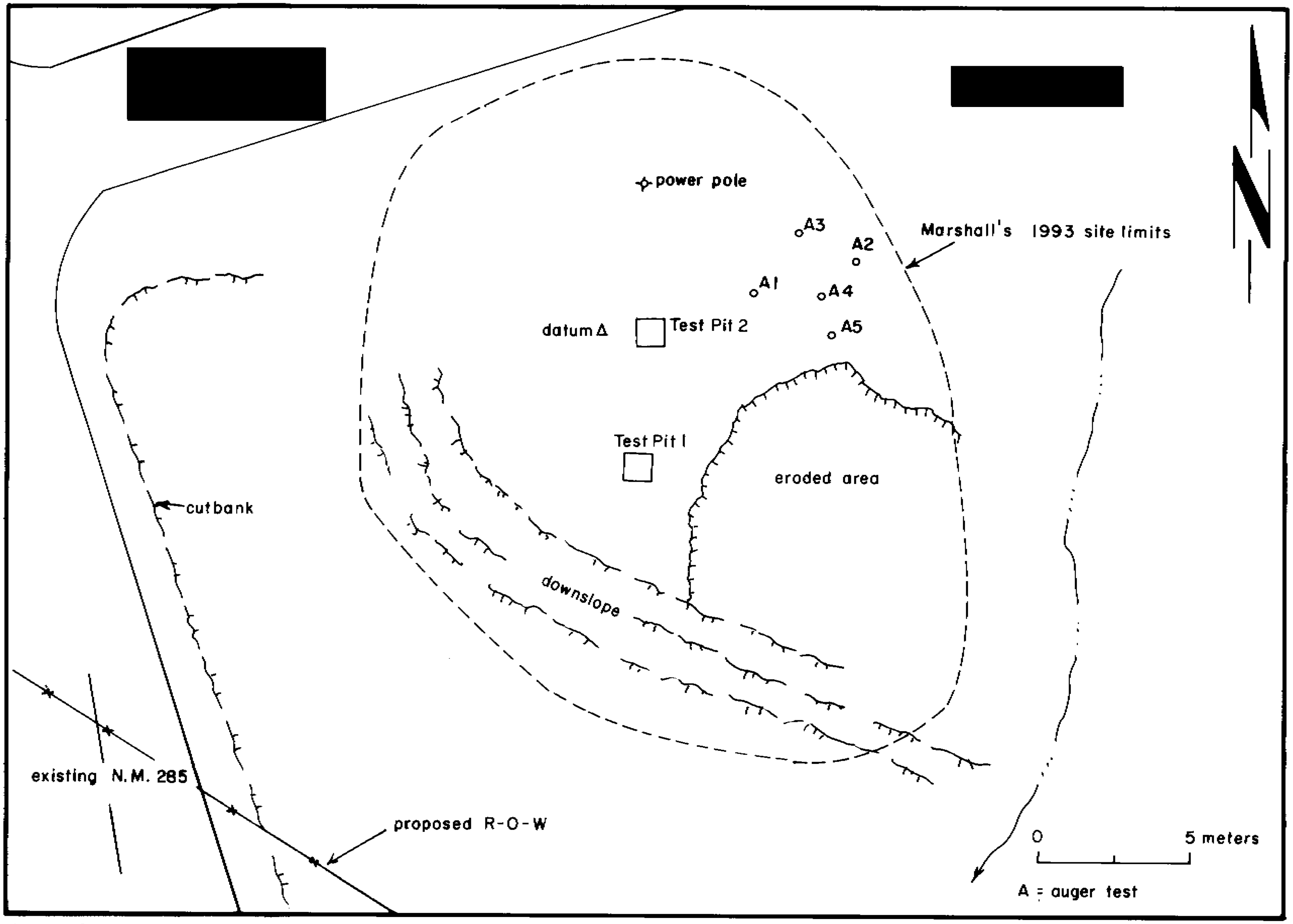

Figure 2. LA 101411 site map.

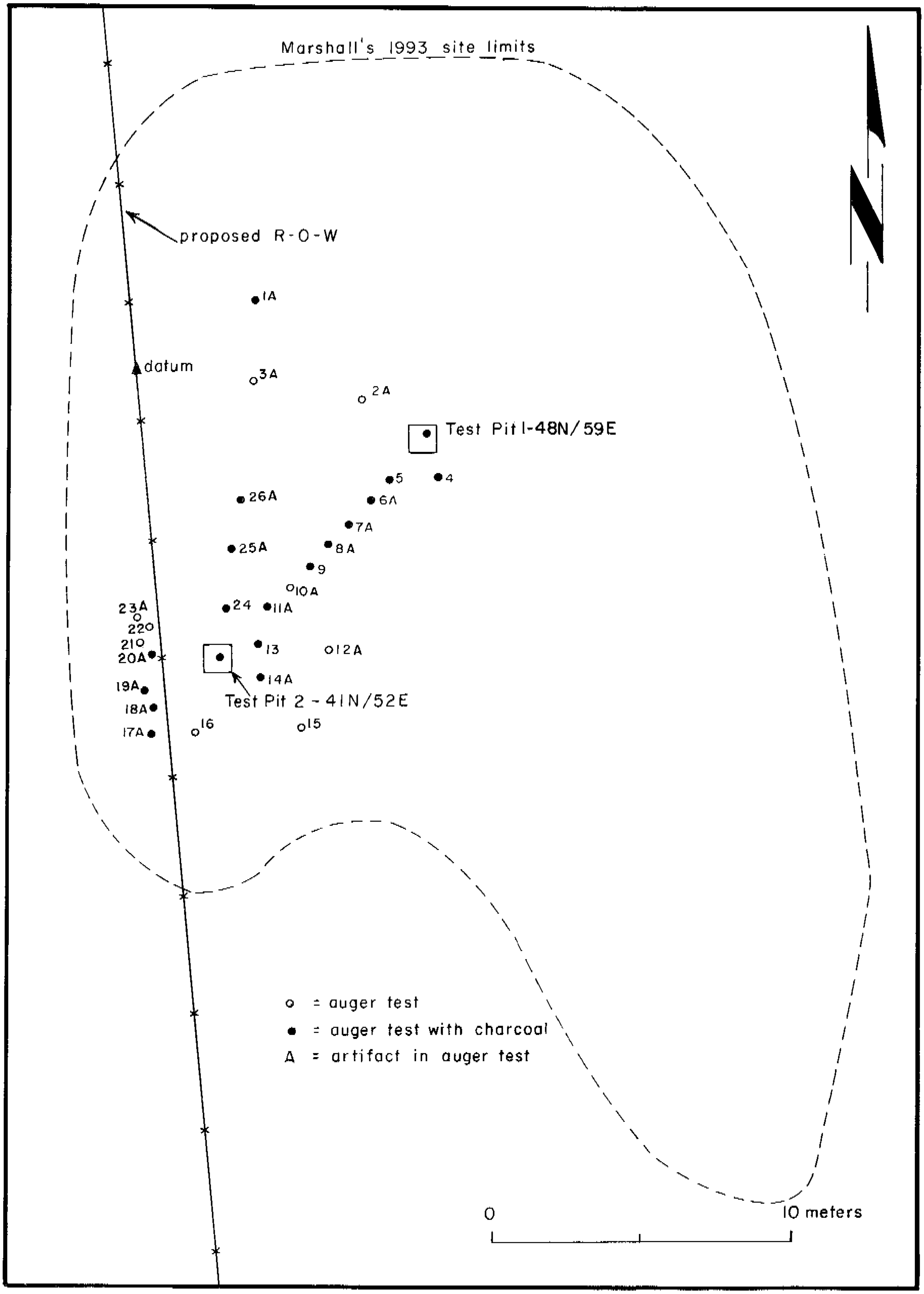

Figure 3. LA 101412 site map.

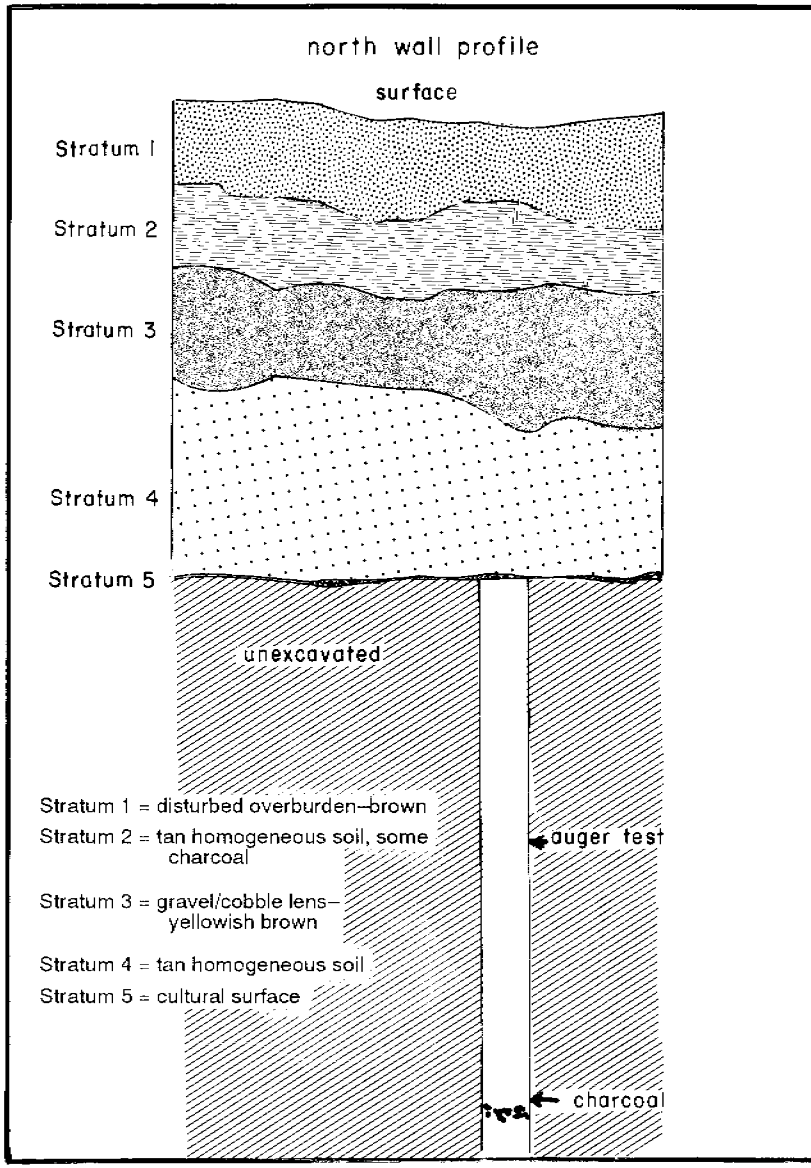

Figure 4. LA 101412, Test Pit 1, north wall profile.

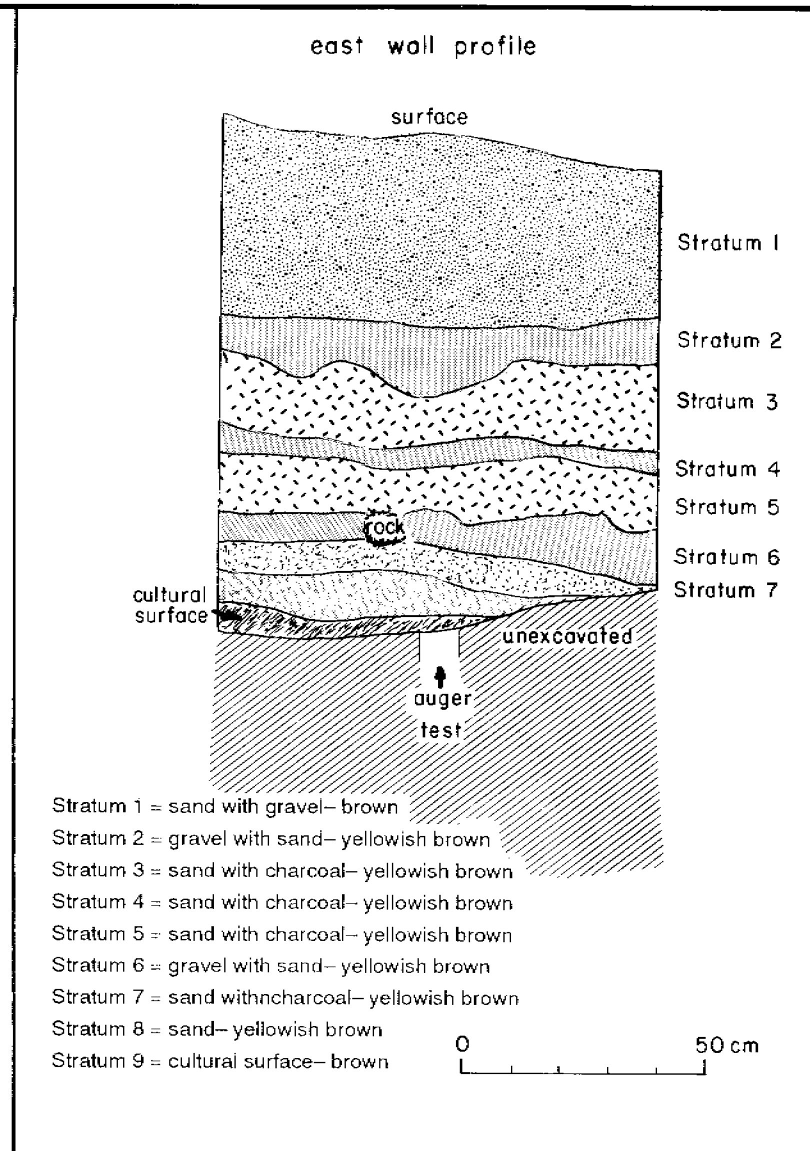

Figure 5. LA 101412, Test Pit 2, east wall profile.

inclusions. The soil ranged from silty sandy loam with 5 percent gravels (7.5 YR 5/4 brown) towards the surface of the test pit, with sandy soil containing 50 percent small gravels and cobbles (10 YR 5/4 yellowish-brown) towards the base. Layers of possible alluvial gravels and cobbles with high concentrations of artifact inclusions (10 YR 5/4 yellowish-brown) were interspersed with layers of sandy loam and 10 percent gravels (10 YR 5/4 yellowish-brown), which contained charcoal inclusions and prehistoric ceramic and lithic artifacts (Fig. 5). There was a hard, charcoal-embedded clay layer (10 YR 4/3 brown) encountered at 1 m bgs. It appeared discontinuous due to rodent activity and was approximately 5 cm thick. Excavation was halted at this point. The base of the test pit was augered to a depth of 2.40 cm bgs, and no further cultural material was found.

Auger Tests. Twenty-six auger tests (AH) were excavated. Cultural materials were recovered from AH 2, 3, 10, and 23 at an average depth of 40 cm. Charcoal and artifacts were recovered from AH 1, 4, 5-8, 11, 12, 14, 17, 19, 20, 25, and 26. Charcoal only was recovered from AH 9, 13, 18, and 24. No cultural material was recovered from AH 15, 16, 21, and 22.

LA 101413

Five noncontiguous 1-by-1-m test pits and nineteen auger tests were excavated at this site (Fig. 6).

Test Pit 1. Test Pit 1 was placed to test a charcoal stain on the surface at 50N/50E. It was excavated in three arbitrary 10 cm levels to a final depth of 35 cm below the present ground surface (bgs). Cultural materials were present to 8 cm bgs. The stratigraphy consisted of (1) 25 cm of compact sand with less than 5 percent gravels, 10 YR 5/4 yellowish-brown with ceramic artifacts present in the first 8 cm; (2) a 10 cm layer of compact clay, 10 YR 4/3 brown with charcoal inclusions. The charcoal stain and associated charcoal inclusions were present in all levels. The unit was augered to a depth of 1.01 m bgs, and no cultural material was found.

Test Pit 2. Test Pit 2 was placed over a concentration of artifacts at 38N/53E. The unit was excavated to a maximum depth of 30 cm bgs in three arbitrary 10-cm levels. The stratigraphy consisted of clayey loam with 10 percent gravels and sandy pockets, 7.5 YR 5/3 brown. Ceramic and lithic artifacts were found to a depth of 10 cm bgs, with charcoal inclusions present to 30 cm bgs. The base of the unit was augered and no cultural material was found.

Test Pit 3. Test Pit 3 was placed to test a concentration of ceramic and lithic artifacts at 62N/50E. It was excavated in seven arbitrary 10-cm levels to a final depth of 70 cm bgs. Intact subsurface deposits were present between 20 and 46 cm bgs. The subsurface stratigraphy consisted of (1) 20 cm of hard clay loam, 7.5 YR 5/3 brown with cultural materials and charcoal inclusions present; (2) a 26 cm layer of compacted clayey sandy loam, 7.5 YR 5/2 brown with artifacts, charcoal inclusions and staining; (3) clayey loam with less that 1 percent gravels, 7.5 YR 5/3 brown with no cultural materials present. The unit was augered to 1.97 m bgs and was culturally sterile.

Test Pit 4. Test Pit 4 was placed to test a concentration of ceramic and lithic artifacts at 52N/38E. The unit was excavated to a final depth of 50 cm bgs in five arbitrary 10-cm levels.

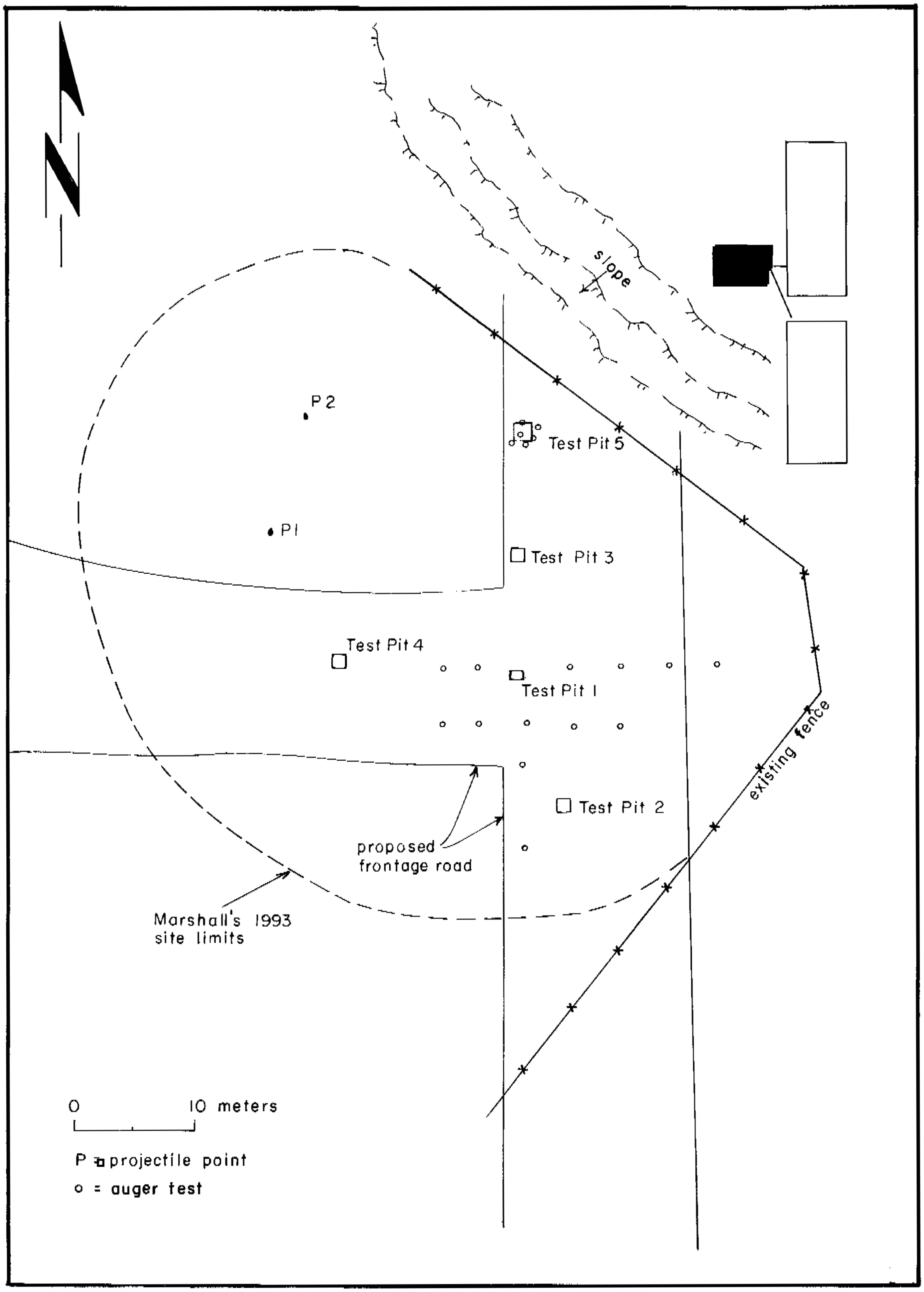

Figure 6. LA 101413 site map.

The stratigraphy consisted of (1) 27 cm of fine sandy clayey loam with fewer than 5 percent gravels, 10 YR 6/3 pale brown with ceramic and lithic artifacts. A concentration of charcoal was encountered at the eastern edge of the unit; (2) a 23-cm layer of extremely compacted fine angular clay with little sand, 10 YR 4/4 dark yellowish-brown with cultural material and charcoal inclusions present to 40 cm. The base of the test pit was augered to a depth of 1.50 m, and no cultural material was found.

Test Pit 5. Test Pit 5 was excavated at 66N/50E and 67N/50E to test a dark charcoal stain that was discovered during augering. The unit was surface stripped to a final depth of 5 cm bgs, and the stain was designated Feature 1 (see description below). The base of the unit was augered to a maximum depth of 30 cm bgs. Charcoal inclusions were present to 25 cm bgs.

Auger Tests. Nineteen auger tests (AH) were excavated. Charcoal was recovered from six of the auger tests, and cultural material was totally absent.

ARTIFACT ANALYSIS

Ceramic Analysis, Testing Phase of LA 101412

by C. Dean Wilson

Ceramic type categories were recorded for sherds from selected proveniences at LA 101412 to determine the potential dating and sequence of occupations represented. This analysis was limited to recording ceramic types, using types or categories of the Tewa series defined for the Northern Rio Grande (McKenna and Miles 1990).

Table 1 illustrates the distribution of ceramic types identified during this analysis. Ceramic evidence of the Classic and historic occupation was present at this site but primarily limited to the very upper, highly disturbed, and mixed deposits not formally analyzed during the present study. Types recorded during the present study, indicative of the later occupation are limited to two undifferentiated Biscuit Ware sherds. Later ceramic types from the upper fill of this site appear to be derived from the midden of the adjacent site of LA 61 (Pojoaque Pueblo site), which is ancestral to the Pueblo of Pojoaque.

The great majority of sherds associated with the lower levels, from which sherds were analyzed, represent unpolished gray ware types. Most gray ware sherds exhibit plain surfaces, although gray ware sherds exhibiting unobliterated coils and various forms of corrugations were also present. Although the distribution of gray ware types indicates an occupation dating sometime during the Developmental or Coalition periods, no clear pattern in the distribution of gray ware types from different levels was noted. The distributions of white ware types from the lower levels of LA 101412, however, indicate distinct occupations dating to the Developmental and Coalition periods. Santa Fe Black-on-white, along with Wiyo Black-on-white, are the dominant formal white ware types at the upper levels, while Kwahe'e Black-on-white and Red Mesa Black-on-white are dominant at the lowermost levels, indicating distinct components dating to both the Developmental and Coalition periods. The dominance of Kwahe'e over Red Mesa Black-on-white may indicate the Developmental phase component from LA 101412 dates to the later part of this span. Thus, ceramic distributions from the lower levels indicate a long-lived occupation spanning sometime between A.D. 1050 and 1325.

The implications of this preliminary ceramic analysis for data recovery are examined in greater detail in the section entitled "Problem Domains."

Table 1. Type Distributions from LA 101412

Type Distribution from 101412	LEVEL 3		LEVEL 4		LEVEL 5	
TYPE	#	%	#	%	#	%
Plain polished white			2	1.42	2	1.
Plain polished slipped white			2	1.42	3	1.5
Red ware polished slipped (undiff)						
Plain, Unpolished, Incised						
Plain, Unpolished, Micaceous						
Plain Micaceous Slipped						
Micaceous Ridged (Sapawi)	2	4.25			4	2.
Early Plain Micaceous	27	57.4	67	47.9	100	50.
Coiled, Plain Corrugated, Micaceous						
Neckbanded (Undiff)						
Kana'a Neckbanded					2	1
Corrugated, Indented (Undiff)	5	10.6				
Smeared, Indented, Corrugated, Micaceous	7	14.9	33	23.6	21	10.5
Tesuque Smeared Indented			1	.71		
Gray Ware (Undiff)	1	2.12	1	.71	2	1
Corrugated, Indented, Micaceous	1	2.1	17	12.1	49	24.5
Mineral Paint/White (Undiff)			2	1.4		
Red Mesa B/W					1	.5
Kwahe'e B/W			2	1.42	4	2
Carbon/White (Undiff)			1	.71		
Santa Fe B/W	4	8.51	8	5.7	7	3.5
Wiyo B/W			2	1.42	5	2.5
Biscuit Ware (Undiff)			2	1.42		
Total	47		140		200	

Table 1. (Continued)

LA 101412 TYPE	LEVEL 6		LEVEL 7		LEVEL 8	
	#	%	#	%	#	%
Plain polished white			1	1.56	2	6.66
Plain polished slipped white	1	1.53				
Red ware polished slipped (undiff)						
Plain, Unpolished, Incised						
Plain, Unpolished, Micaceous						
Plain Micaceous Slipped						
Micaceous Ridged (Sapawi)			1	1.56	2	6.66
Early Plain Micaceous	29	44.6	20	31.3	14	46.7
Coiled, Plain Corrugated, Micaceous						
Neckbanded (Undiff)			1	1.56		
Kana'a Neckbanded						
Corrugated, Indented (Undiff)						
Smeared, Indented, Corrugated, Micaceous	19	29.2	1	1.56	10	33.3
Tesuque Smeared Indented	1	1.53				
Gray Ware (Undiff)						
Corrugated, Indented, Micaceous	11	16.9	33	51.6		
Mineral Paint/White (Undiff)						
Red Mesa B/W	1	1.53	1	1.56	1	3.33
Kwahe'e B/W	2	3.01	1	1.56	1	3.33
Carbon/White (Undiff)						
Santa Fe B/W	1	1.53	4	6.25		
Wiyo B/W			1	1.56		
Biscuit Ware (Undiff)						
Total	65		64		30	

Table 1. (Continued)

LA 101412 TYPE	LEVEL 9		LEVEL 10		TOTAL	
	#	%	#	%	#	%
Plain polished white					7	1.10
Plain polished slipped white					6	.94
Red ware polished slipped (undiff)					0	0
Plain, Unpolished, Incised					0	0
Plain, Unpolished, Micaceous					0	0
Plain Micaceous Slipped					0	0
Micaceous Ridged (Sapawi)	4	8.51			13	2.04
Early Plain Micaceous	32	68.1	31	73.8	320	50.3
Coiled, Plain Corrugated, Micaceous	2	4.25			2	.31
Neckbanded (Undiff)					1	.15 6
Kana'a Neckbanded					2	.31
Corrugated, Indented (Undiff)					5	.79
Smeared, Indented, Corrugated, Micaceous	1	2.12			92	14.5
Tesuque Smeared Indented	1	2.12	4	9.52	7	1.10
Gray Ware (Undiff)					5	.79
Corrugated, Indented, Micaceous	7	14.9	4	9.52	122	19.2
Mineral Paint/White (Undiff)					2	.31
Red Mesa B/W					4	.62 9
Kwahe'e B/W			3	7.14	13	2.05
Carbon/White (Undiff)					1	.15
Santa Fe B/W					24	3.77
Wiyo B/W					8	1.26
Biscuit Ware (Undiff)					2	.31
Total	47		42		635	

Chipped Stone Artifact Analysis

James L. Moore

Analytical Methods

Each chipped stone artifact was examined using a binocular microscope to aid in defining morphology and material type, examine platforms, and determine whether it was used as a tool. The level of magnification varied between 15x and 80x, 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 data base using the Statistical Package for the Social Sciences Data Entry program.

Analysis was completed using the OAS's (1990) standardized methodology, and was designed to examine material selection, reduction technology, and tool use. While material selection studies cannot reveal *how* materials were obtained, they can usually provide some indication of *where* they were procured. In particular, by examining the type of cortex present on artifacts, it is possible to determine whether the material was obtained at the source or from secondary deposits. By studying the reduction strategy employed at a site it is possible to assess the level of residential mobility. Where a high degree of residential mobility is usually accompanied by the use of a curated strategy, sedentary peoples more commonly use an expedient strategy. The types of tools present can be used to help assign site function, particularly on artifact scatters lacking features. Tools can also be used to help assess the range of activities that occurred at a site.

Attributes Examined during the Study

Table 2 lists the attributes examined during this study and indicates which ones relate to each class of chipped stone artifact. Four classes were recognized: flakes, angular debris, cores, and formal tools. Flakes were debitage exhibiting one or more of the following characteristics: definable dorsal and ventral surfaces, a bulb of percussion, and a striking platform. Angular debris were debitage lacking striking platforms and bulbs of percussion, and on which ventral or dorsal surfaces could not be defined. Cores were pieces of lithic material that had two or more negative scars originating from one or more surfaces. Formal tools were artifacts that were intentionally altered to produce specific shapes or edge angles. Alterations took the form of unifacial or bifacial retouching, and artifacts were considered intentionally shaped when retouch scars extended across two-thirds or more of a surface, or when intentional retouch was less extensive but caused significant alteration of artifact shape or edge angle.

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

Table 2. Correlation of Attributes Analyzed with Chipped Stone Artifact Categories

attribute	flakes	angular debris	cores	formal tools
material type	x	x	x	x
material quality	x	x	x	x
artifact morphology	x	x	x	x
artifact function	x	x	x	x
cortex	x	x	x	x
cortex type	x	x	x	x
portion	x	x	x	x
platform type	x			
thermal alteration	x	x	x	x
wear patterns	x	x	x	
modified edge angles	x	x	x	x
dimensions	x	x	x	x

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

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

Platforms only occur on flakes and were recorded for that artifact type alone. Platform type is an indicator of reduction technology and stage. Any modifications on platforms were noted, as were missing and collapsed platforms. Flakes were further divided into removals from cores and tools using a polythetic set of variables (Table 3). A polythetic framework is one in which fulfilling a majority of propositions is both necessary and sufficient for inclusion in a class

Table 3. Polythetic Set for Distinguishing Biface Flakes from Core Flakes

Whole Flakes

1. Platform:
    a. has more than one facet
    b. is modified (retouched and/or abraded)
2. Platform is lipped.
3. Platform angle is less than 45 degrees.
4. Dorsal scar orientation is:
    a. parallel
    b. multidirectional
    c. opposing
5. Dorsal topography is regular.
6. Edge outline is even (flake has a waisted appearance).
7. Flake is less than 5 mm thick.
8. Flake has a relatively even thickness from proximal to distal end.
9. Bulb of percussion is weak (diffuse).
10. There is a pronounced ventral curvature.

Broken Flakes or Flakes with Collapsed Platforms

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

Artifact is a Biface Flake When:
-If whole it fulfills 7 of 10 attributes.
-If broken or platform is collapsed it fulfills 5 of 7 attributes.

(Beckner 1959). The polythetic set contains an array of conditions, and rather than requiring an artifact to fulfill all of them, only a set percentage in any combination need be fulfilled. This array of conditions models an idealized tool flake and includes information on platform morphology, flake shape, and earlier removals. The polythetic set used here was adapted from Acklen et al. (1983). In keeping with that model, when a flake fulfilled 70 percent of the listed conditions it was considered a removal from a tool. This percentage is high enough to isolate flakes produced during the later stages of tool production from those removed from cores, while at the same time it is low enough to permit flakes that were removed from a tool but do not fulfill the entire set of conditions to be properly identified. While not all flakes removed from tools could be identified by the polythetic set, those that were can be considered definite evidence of tool manufacture. Flakes that fulfilled less than 70 percent of the conditions were classified as struck from cores. Instead of rigid definitions, the polythetic set provided a flexible means of categorizing flakes and helped account for some of the variability seen in flakes removed during experiments. For this analysis, tool flakes were subdivided into two categories based on size. Retouch flakes were removed from small tools and were generally less than 1 cm long, while biface flakes seem to have been removed from larger tools and were more than 1 cm long.

Distinguishing between tool and core flakes in an assemblage is an important step in defining basic reduction technology. A predominance of tool flakes, particularly those removed from large bifaces serving as cores, suggests a high degree of mobility. Conversely, a predominance of core flakes and only a few small tool flakes suggests limited formal tool manufacture by a sedentary population.

Results of Chipped Stone Artifact Analysis

A total of 301 chipped stone artifacts was analyzed from LA 101412. Artifacts from two test pits (Test Pits 1 and 2) were examined. Material type by artifact morphology is shown in Table 4. Cherts dominate, comprising nearly 75 percent of the assemblage. Obsidians are the next most common material category, and make up about 15 percent of the assemblage. Other materials occur in smaller amounts and include basalt, siltstone, quartzite, quartzitic sandstone, and massive quartz.

Various cherts were noted in the assemblage, with Pedernal chert being by far the most common type. Most other varieties of chert are from unidentifiable sources; however, one fragment resembles Washington Pass chert, and may have been procured from that source. Unfortunately, this artifact is very small and identification was not absolute. Obsidian is also relatively common, and seems to have been obtained from several sources. Polvadera Peak obsidian was identified visually, and comprises about a quarter of the obsidian assemblage. Three pieces resemble types from Obsidian Ridge, and were probably obtained from that source. Without trace element analysis, however, this is tentative. The remaining obsidian artifacts are probably from Jemez sources, but lack distinguishing characteristics and could not be assigned to specific sources. No other materials are from known sources.

Table 5 illustrates cortex type for artifacts with cortical surfaces or platforms. Overall, waterworn cortex dominates the assemblage, indicating that most materials were obtained from gravel deposits, probably at some distance from their original sources. Exceptions to this include three pieces of probable Jemez obsidian, one of Polvadera Peak obsidian, and one of massive quartz. Since these artifacts have cortical surfaces that exhibit no evidence of transport by water, they were probably obtained at or near their sources.

Only one biface flake (0.6 percent) and three retouch flakes (1.7 percent) were recovered; the remainder of the assemblage are core flakes. This suggests that an expedient core-flake reduction strategy predominated. This is supported by a very low flake to angular debris ratio (1.69), which also suggests that most cores were reduced by hard-hammer percussion, which tends to result in large amounts of shatter. Much of the shattering is partially attributable to material quality, since 36.3 percent of the debitage and cores contain flaws large enough to have

Table 4. Material Type by Artifact Morphology for Analyzed Chipped Stone Artifacts from LA 101412

Material type	Angular debris	Core flake	Tool flake	Cores	Uniface	Biface	Total
chert	13(40.6)	16(50.0)	1(3.1)	1(3.1)		1(3.1)	32(10.6)
Pedernal chert	77(40.1)	111(57.8)	1(0.5)	2(1.0)	1(0.5)		192(63.8)
silicified wood	1(25.0)	3(75.0)					4(1.3)
obsidian	6(18.8)	20(62.5)	1(3.1)		1(3.1)	4(12.5)	32(10.6)
Jemez obsidian	1(33.3)	1(33.3)	1(33.3)				3(1.0)
Polvadera Peak obsidian	1(9.1)	8(72.7)				2(18.2)	11(3.7)
basalt	1(12.5)	6(75.0)		1(12.5)			8(2.7)
siltstone		1(100.0)					1(0.3)
quartzite	1(20.0)	4(80.0)					5(1.7)
quartzitic sandstone		2(100.0)					2(0.7)
massive quartz	6(54.5)	5(45.5)					11(3.7)
totals(percent)	107(35.5)	177(58.8)	4(1.3)	4(1.3)	2(0.7)	7(2.3)	301(100)

Table 5. Cortex Types by Material Type for Chipped Stone Artifacts Analyzed from LA 101412

Material type	Waterworn cortex	Nonwater-worn cortex	Indeter-minate	Totals
chert	10(100.0)			10(17.2)
Pedernal chert	27(100.0)			27(46.6)
silicified wood	2(100.0)			2(3.4)
obsidian	1(25.0)	3(75.0)		4(6.9)
Polvadera Peak obsidian	3(60.0)	1(20.0)	1(20.0)	5(8.6)
basalt	4(100.0)			4(6.9)
quartzite	2(100.0)			2(3.4)
massive quartz	3(75.0)	1(25.0)		4(6.9)
totals(percent)	52(89.7)	5(8.6)	1(1.7)	58(100.0)

Table 6. Platform Types by Flake Morphology for LA 101412

Platform type	Core flake	Biface flake	Retouch flake	Totals
cortical	12(6.8)			12(6.7)
single facet	49(27.8)			49(27.2)
multifacet	27(15.3)		1(33.3)	28(15.6)
retouched	4(2.3)		1(33.3)	5(2.8)
collapsed	24(13.6)			24(13.3)
crushed	3(1.7)			3(1.7)
absent (snap)	22(12.5)			22(12.2)
absent--broken in manufacture	34(19.3)	1(100.0)	1(33.3)	36(20.0)
obscured	1(0.6)			1(0.6)
totals(percent)	176(97.8)	1(0.6)	3(1.7)	180(100)

affected flaking. Flake platform type by artifact morphology is shown in Table 6. Nearly half (48 percent) of the core flake platforms are obscured or missing. Of those that remain, 66.3 percent are simple cortical or single facet platforms, 29.4 percent are multifacet, and only 4.4 percent were modified to facilitate removal. These percentages are consistent with an expedient reduction strategy. The relatively large percentage of multifacet platforms suggests that cores were extensively reduced before they were discarded. This is partially confirmed by the few cores recovered; all are multidirectional and their largest dimensions are less than 60 mm. Thus, they were reduced in a manner that would maximize the number of flakes removed and were relatively small when discarded.

Some materials can be thermally altered to improve their flaking characteristics. Fine-grained cherts and silicified woods are particularly amenable to this type of processing. However, thermal alteration can also occur when materials are unintentionally exposed to heat. Table 7 illustrates the range of thermally altered materials from LA 101412. Only cherts evidenced any signs of heat treatment, and these artifacts comprise 8 percent of the assemblage. Over 83 percent of the thermally altered artifacts were Pedernal chert, suggesting that this material may have been intentionally modified to facilitate reduction. Evidence of thermal alteration by material type is shown in Table 8. Two patterns are caused by mistakes occurring during purposeful heat treatment, or when materials are accidentally exposed to high levels of heat. Potlidding occurs when materials are heated too rapidly and water is turned to steam instead of being driven off, causing an explosion that blows out a portion of the artifacts surface. Crazing occurs when heated materials cool too rapidly and experience uneven contraction rates.

One pattern is good evidence of successful intentional thermal alteration. When cherts are properly heat treated, their crystalline structure is often altered and the material acquires a waxy luster. However, the exterior surfaces of the original nodule or flake retain the luster they had before being heated. Thus, artifacts with variable luster have at least one waxy surface,

Table 7. Thermally Altered Materials from LA 101412

Material	Thermal alteration	No thermal alteration	Total
chert	4(12.5)	28(87.5)	32(10.6)
Pedernal chert	20(10.4)	172(89.6)	192(63.8)
silicified wood		4(100.0)	4(1.3)
obsidian		32(100.0)	32(10.6)
Jemez obsidian		3(100.0)	3(1.0)
Polvadera Peak obsidian		11(100.0)	11(3.7)
basalt		8(100.0)	8(2.7)
siltstone		1(100.0)	1(.3)
quartzite		5(100.0)	5(1.7)
quartzitic sandstone		2(100.0)	2(.7)
massive quartz		11(100.0)	11(3.7)
totals(percent)	24(8.0)	277(92.0)	301(100.0)

Table 8. Types of Thermal Alteration on Chipped Stone Artifacts from LA 101412

Alteration type	Chert	Pedernal Chert	Totals
Potlid fracture	1(25.0)	1(5.0)	2(8.3)
Crazed	3(75.0)	10(50.0)	13(54.2)
Crazed & potlids		1(5.0)	1(4.2)
Potlid flake		1(5.0)	1(4.2)
Variable luster		4(20.0)	4(16.7)
Crazed & variable luster		3(15.0)	3(12.5)
Totals(percent)	4(16.7)	20(83.3)	24(100.0)

suggesting heat treatment, while other surfaces are dull or matte, suggesting that they represent the original pre-heat treatment luster. Seven examples of this characteristic (including three that are also crazed) were found during analysis; all are Pedernal chert. This is even stronger evidence that Pedernal chert was purposefully heat treated to improve its flaking characteristics.

It should also be noted that several artifacts that exhibited signs of thermal alteration were also burned. Unfortunately, this was noted late in the analysis, and was not separately monitored.

Table 9. Formal and Informal Tools from LA 101412 by Material Type

tool type	chert	Pedernal chert	obsidian	Polvadera Peak obsidian	quartzitic sandstone	totals
flake tools					1	1
drills	1					1
scrapers		1	1			2
bifaces			1	1		2
projectile points			3	1		4
totals	1	1	5	2	1	10

The burning on these artifacts suggests that some of the thermal alteration may have been unintentional.

Both formal and informal tools are uncommon, comprising only 3.3 percent of the assemblage (Table 9). The identifiable projectile points are consistent with a Puebloan date and suggest hunting activities. One of two biface fragments also appears to be part of a projectile point, but too little remains to allow a type designation. The remaining tools suggest general maintenance or manufacturing activities.

The results of testing and ceramic artifact analysis suggest that the trash in Test Pits 1 and 2 was deposited over a relatively long time span during the Developmental and Coalition periods. These deposits may represent trash discarded in abandoned rooms or pithouses, since occupational surfaces were found at the bottom of both test pits. Unfortunately, this is uncertain because of restrictions imposed by the testing regimen. While the limited information available from testing makes it difficult to discern a break between periods in these deposits, the ceramic analysis suggests that these deposits can be partially segregated. Deposits below Level 6 in both units seem to derive from a Developmental period occupation, while those above Level 6 contain mixed Developmental and Coalition period materials. These groups of deposits can be compared to determine whether there is variability in lithic procurement patterns or reduction techniques for these periods. While the limited data render any conclusions tentative, they can be used to make predictions for more intensive investigations.

Chipped stone artifacts from Developmental period (Component 1) deposits total 138, while 162 chipped stone artifacts were recovered from mixed Developmental and Coalition materials (Component 2). Pedernal chert was the main material used, comprising nearly 64 percent of both assemblages. However, when chertic materials (cherts and silicified woods) are combined, this category was somewhat more common in the Component 2 levels, where they comprised 80.3 percent of the total. Chertic materials made up only 70.3 percent of the Component 1 assemblage.

With the exception of obsidians, other materials composed nearly equivalent percentages of each assemblage (9.4 percent versus 8.6 percent, respectively). Significantly more obsidian was found in Component 1 (20.3 percent) than in Component 2 (11.2 percent). Virtually no difference was noted between percentages of nonwaterworn versus waterworn cortex.

Table 10. Dorsal Cortex Information by Component for LA 101412

Cortex percentage	Component 1	Component 2
0	86.1	84.2
1-49	5.1	7.9
50-100	8.9	7.9

Differences in artifact morphology and functional categories between assemblages are probably attributable to sample error. While both assemblages have low flake to angular debris ratios, Component 1 has the lowest of the two (1.42 versus 1.94 for Component 2). Both ratios are indicative of an expedient core-flake reduction strategy, but it is possible that the lower ratio for Component 1 may indicate somewhat more hard-hammer reduction. Since Component 1 contains only a few percent more flawed materials than does Component 2, material quality is not responsible for this variance. Both assemblages contain cores, unifaces, and bifaces, though in varying numbers. However, since few artifacts in these morphological categories were recovered, this variance is probably due to sample error. Both assemblages also contain scrapers and projectile points. Only one informal tool and one drill were found, both in Component 2 deposits. Little can be ascribed to this distribution because of the paucity of tools.

It is interesting that the only modified flake platforms were in the Component 1 assemblage. While percentages of single facet and multifacet platforms are similar for both assemblages, Component 2 contains considerably more cortical platforms (18.5 percent versus 5.1 percent for Component 1). Thus, platform data seem to suggest that more early stage reduction occurred in Component 2, while more tool production occurred in Component 1. However, this is not supported by dorsal cortex data (Table 10). Overall, both assemblages contain similar percentages of cortical flakes (14.0 percent for Component 1 versus 15.8 percent for Component 2). Thus, the variation in platform types may be related to differences in reduction technology rather than stage.

Thermal alteration is also closely related to reduction technology. Both assemblages contain similar percentages of thermally altered materials (7.3 percent for Component 1 versus 8.0 percent for Component 2). However, it is interesting that three of the four artifacts that exhibit variable luster indicative of purposeful heat treatment and subsequent reduction were found in Component 1 deposits. This may suggest a higher reliance on thermal modification in the earlier component, but the small number of artifacts exhibiting these characteristics could also be due to sample error.

While these assemblages provide only a small glimpse at material selection and reduction technology during the Developmental and Coalition periods at LA 101412, some interesting differences were noted that may indicate variation over time. In particular, the higher percentage of obsidian in Component 1 suggests better access to this exotic material, whether by exchange or direct procurement. Minor differences in platform characteristics suggest that reduction technology might also vary through time, particularly in platform modification and selection. Tentatively, it appears that platform modification was more common in Component 1, while the use of cortical platforms was more prevalent in Component 2. In addition, it can be tentatively suggested that more thermal alteration of cherts to facilitate reduction occurred in Component 1. Thus, in addition to a basic analysis of reduction technology, material selection, and tool use, future studies of the lithic assemblages at this site should focus on defining variations in material procurement patterns and reduction technology over time.

SUMMARY AND RECOMMENDATIONS

LA 101411

Summary

During testing at LA 101411, mixed prehistoric and modern artifacts were recovered from the subsurface. It was concluded that the site had been redeposited from elsewhere in the area and lacked substantial spatial integrity.

Recommendations

No further investigations are recommended at LA 101411

LA 101412

Summary

Test excavations at LA 101412 indicate that there are intact, subsurface deposits. The temporal interval indicated by the pottery recovered from LA 101412 suggests a stratified depositional sequence beginning with the Developmental period (A.D. 900-1200) and culminating in Classic period (A.D. 1325-1600) materials. A compelling aspect of this site is that there appears to be a transitional component linking the Developmental period with the Coalition, which occurs relatively infrequently in the Tewa province and provides an excellent research opportunity.

Recommendations

Test excavations at LA 101412 indicate that the site has the potential to yield information important to understanding the prehistory of the area and a data recovery program is recommended.

LA 101413

Summary

During the testing program at LA 101413, it was determined that the site had been altered by mechanical equipment and that no spatial integrity remains.

Recommendations

No further investigations are recommended at LA 101413

PROPOSED DATA RECOVERY PLAN

Timothy D. Maxwell

LA 101412 appears to have an occupation surface dating to the Developmental (A.D. 600-1200) and Coalition (A.D. 1200-1325) periods, with the overburden containing mixed artifacts from the Classic period (A.D. 1325-1600). It is not known whether this occupation surface represents an outdoor activity area or a room interior. Minimally, this stratum has the potential to offer information on limited activity sets as determined by artifacts in association with the surface. Optimally, the surface may be part of a residential structure and offer substantially more information about regional settlement and subsistence patterns.

Research Orientation

The foundation of the research proposed for this project is that of regional settlement and subsistence patterns. Of course, more specific concerns are to be addressed but in recent years, archaeologists have found it productive to move away from a focus on individual sites to an examination of regional patterns. Specific sites provide only a limited look at prehistoric lifeways but their importance is increased by examining their role in the context of regional events.

The prehistoric site to be studied is important for its potential contribution to understanding these regional patterns. The site dates to the Developmental period and may represent some of the earliest year-round settlement in the valley. As discussed in more detail below, area residents in the Developmental period built both surface rooms and pit structures for living. The shift from subterranean dwellings to above-ground rooms was a phenomenon that occurred across the Southwest. This shift may have important implications for concomitant changes in social organization and subsistence strategies. Since the site contains a possible residence, archaeological investigation should offer data that can be used in the study of this transition in living space. Even if the site proves to be a seasonal habitation or an outdoor activity area, the artifact assemblage can still provide information on the diversity of daily activities performed by valley inhabitants.

Since it is one of earlier Puebloan sites in the region it will also provide information on the earliest subsistence practices in the area. Paleoenvironmental reconstruction of the region shows that there were a series of changes in rainfall patterns. It is often believed that early farmers reacted to such uncertainty by varying their subsistence pursuits and the plant and animal remains at the site should shed some light on the types of subsistence options practiced during the Developmental period. As discussed below, other researchers see a pattern of increasing specialization in subsistence strategies over time. By comparing the results obtained at this site with the evidence from earlier and later sites in the valley, a pattern may emerge that helps resolve this discussion.

The appearance of several small communities in the Santa Fe and Pojoaque valleys during the Developmental period also presaged a trend toward increasing population aggregation that culminated in the Classic period (A.D. 1325-1600). Population growth has been cited as a causal factor (Kohler 1989) in the appearance of aggregated communities while others (Leonard and Reed 1993) believe that population growth is the result of successful adaptation and not a cause of new adaptations. Although this particular site cannot provide figures on regional population size, it has the potential to have data, such as room dimensions, that can be applied to studies of population growth. This is discussed in more detail below.

PROBLEM DOMAINS

The following research concerns will be addressed at LA 101412. The research problem is outlined and the specific archaeological techniques to be used are discussed.

Social Organization and the Structure of Living Space

Two questions are related to the evidence for a probable occupation surface. The surface has the potential to provide basic information on the type of living structure, the function of the structure, and the activities carried out at the site. Given the implications this occupational surface has for building a more complete understanding of site activities and perhaps social organization, the first data recovery concern is a simple one and revolves around identification:

1. Does the occupation surface represent an outdoor activity area, an enclosed living area, or a pit structure?

In general, the Developmental period is characterized by a shift to surface habitation structures; pit structures of this period have been found in the nearby Tesuque Valley (McNutt 1969). Other local residential sites of the period, such as LA 835, are composed of contiguous surface rooms built of puddled adobe on stone foundations. The difference between surface and subsurface architecture is likely to have implications for social organization and subsistence activities. As argued by Gilman (1983), the shift to surface rooms may be functionally related to increasing dependence on agriculture. As agricultural dependence increases, the majority of food appears during a brief harvesting period and greater amounts of food must be prepared and stored. Gilman (1983) maintains that specialized food preparation areas would be needed and are more efficient in above-ground dwellings while supplies of food have better protection from moisture and animals when stored in above-ground structures. Gilman also argues that increasing reliance on planted crops will increase sedentism and rather than move to warmer locales during colder months, people will move inside. Increased protection from the cold is offered by the improved thermal massing of masonry walls says Gilman (1983).

Alternatively, Plog (1974) believes that the socio-organizational differences between pit structures and surface rooms is related to interaction between population size, differentiation of activities, integration of activities, and technological change. As pointed out by Plog, social integrative structures should be reflected in architectural features such as kivas or multi-family dwellings. Plog found in a study of the Hay Hollow valley that the pithouse-to-pueblo transition was marked by population increase and increased differentiation of activities as seen in specialized space within rooms. New integrative structures also appeared, specifically, kivas, which became specialized, nonhabitation features.

Outdoor activity areas may also be specialized. As specialized differentiation in activities may have occurred, there may have been more formalized use of exterior space. For example, if warm season activities included the grinding of plant foods outdoors, then it would be expected that this area would be kept free of the debris that might be generated by other activities. Identification of such areas within bounded localities such as plazas enclosed by room blocks would also signal increasing differentiation of activities and the need to coordinate activities.

Site specific research. The issue of identification of the living surface will be resolved by removing overburden and expanding the original test pit until walls or features can be identified. If there are no architectural elements to indicate that the occupational surface was within an enclosed space, the surface likely represents an outdoor activity area. If the occupation surface was a surface room it may be bounded by walls, cobble foundations, adobe, or postholes that represent jacal construction; a pit structure would be indicated by subterranean walls formed by the removal of natural deposits.

2. What was the function of the living space?

In order to address questions of increasing differentiation and its implications for social organization, it is necessary to determine the function of any identified living space. Based upon ethnographic data, Hill (1970) provides a set of assumptions that can be tested to determine function. Briefly, living areas should display a variety of floor features, a diversity of artifacts types, and a nonrandom distribution of artifacts, while storage rooms should lack features and have low artifact diversity. Specialized activity rooms should have low artifact diversity and, depending upon the type of activity, a high number of specific tool types. If activity differentiation was not important, then the living surface should contain a wide variety of floor features, high artifact diversity, and manufacturing debris. These areas may also have a random distribution of artifact types.

Outside activity areas may also be specialized, for example, stone tool, pottery, basket, or food production may occur repeatedly in the same location. Soil may become compacted through continued use of the same location and it is expected that, if specialized, there will be a high frequency of similar artifact types. If there is random patterning to the artifact composition and distribution, the area may have had multiple uses or may be a discard area.

Site specific research. This issue will be studied through detailed inventory and mapping of site features and their locations and through laboratory analysis of the artifact assemblage. The inventory and mapping of site features, particularly those found on the occupation surface will provide a measure of activity diversity present. Statistical analysis of the artifact assemblage will quantify artifact evenness and richness (Kintigh 1989) and allow assessment of any mixture of activities within the activity area.

Subsistence Activities

The Developmental period witnessed a shift in population to generally higher elevational settings and an accompanying access to a wider range of environmental zones. Throughout the northern Rio Grande Valley, Dickson (1979) notes the spread of residential sites into the piedmont zone overlooking the major river drainages. With greater access to different resources, one would expect a wide variety of foods to appear. Gasser (1982) has observed increasing diversification in prehistoric Puebloan subsistence economy between A.D. 650 and 1225 as an increasingly wide spectrum of wild plant and animal foods were taken. Gasser believes that this may be due to environmental or social stress while Doebley (1981) surmises that it may be due to (1) a change in cultural preference; (2) a decrease in agricultural productivity; or (3) human destruction of the environment. Leonard (1989) re-examined Gasser's evidence and argues that the pattern of increasing food diversity was caused by a sampling problem and that there was actually increasing specialization in food production with the emphasis on agricultural production.

1. What was the nature of the prehistoric environment at the time the site was occupied?

2. What food resources were exploited and what does this information tell us about the potential of the local environment for farming, hunting and gathering, or a mixture of both?

The subsistence strategies of site occupants in the context of past environmental conditions can be assessed by the recovery and analysis of macrobotanical and faunal remains. For example, the presence of nonedible domesticated plant parts would suggest local farming practices while the occurrence of only edible portions might suggest the import of plant foods. The presence of certain skeletal elements such as skulls, vertebrae, or feet, may indicate that animals were hunted in proximity to the site. However, if these parts show evidence of extensive butchering, it may be evidence of food stress since these are skeletal elements with low meat value. The array of formal and informal tools can also be used to infer the range of past subsistence pursuits.

By gathering information on regional and local agricultural potential as well as the availability of wild plant and animal foods, it should be possible to examine the interplay between population and resource availability during the period(s) of occupation. Areas containing the two sites are often considered "marginal," a very dangerous concept. The danger in not in the use of this term, but in assigning it without carefully explaining what is meant by marginality. Regions that are extremely productive for hunter-gatherers might be marginal for farmers because of a lack of water or a short growing season. Conversely, some areas that are exquisitely suited to farming are marginal for hunter-gatherers because wild plant productivity is low or limited to very short seasons of availability. By reconstructing the regional environment it should be possible to determine its suitability for both hunting-gathering and agriculture.

Evidence of seasonality will also be obtained, if available. This type of information may be derived from pollen, flotation, and faunal samples, and by inference drawn from the presence or absence of certain feature or artifact types (for example, the presence or absence of hearths in habitation structures). The unfortunate reality, however, is that evidence for seasonality is usually so spotty that while we may be able to document site use in a given season, absence of evidence for use in another season is usually inconclusive.

Site specific research. To answer these questions, data on the environment at the time of occupation must be obtained. General environmental reconstructions for northern New Mexico are available (for example, Rose et al. 1981). Site specific information can be obtained through the analysis of pollen samples, macrobotanical remains, and faunal remains recovered during excavation. Macrobotanical remains will be retrieved through the sampling of features while pollen samples will be taken from features and various strata. The samples will be analyzed by specialists for plant species identification. Faunal remains will be retrieved through screening.

Population Growth

The Coalition period (A.D. 1200-1325), which follows the Developmental period, is one in which a trajectory of rapid population growth seems to have been established and culminated in a population maximum in the Classic period (A.D. 1325-1600). Although the study of a single site cannot provide figures on population size, it can contribute to studies of population growth. If it is established that the occupational surface represents an enclosed living space, that data will be helpful in more encompassing studies of prehistoric population change. Through a determination of room size, researchers can establish room size variation throughout each period and make correlations between the probable number of occupants and room size. These data also make it possible to make more accurate estimates of the number of rooms that may be present in room block mounds of the Developmental period.

Site specific research. The data needed to address this problem depend upon the nature of the occupational surface. If it is determined that the occupational surface was within an enclosed living space then those data can be used in the assessment of population size in future studies.

Temporal Context

Temporal placement of the sites is important for understanding region patterns of social and subsistence organization. The site must be placed in the proper temporal location to detect regional trends and changes in social and subsistence patterns. This is necessary for addressing each of the previous problem domains. Although the region was first occupied during the Developmental period, little is known about these early occupations. During the late Developmental period (A.D. 900-1200), the construction of small communities began to increase dramatically but it is unknown whether the site dates to the early or later portions of the Developmental period. The high frequency of Red Mesa Black-on-white suggests that the site may date to the earlier period.

Site specific research. It may be that stylistic and typological analysis of pottery is the only available method for determining occupation dates; therefore, all sherds will be retrieved for study. If appropriate features are encountered, radiocarbon and archaeomagnetic samples will also be retrieved.

Issues to be Addressed by Ceramic Analysis

Temporal Issues. Before other patterns can be examined, it is necessary to determine the time of occupation and integrity of collections from various proveniences. Initial examinations of ceramic data will be directed toward the determination of the time of occupation represented at different proveniences LA 101412. The characterization of ceramics from LA 101412 will provide important data concerning the dating and changes from the Developmental through Coalition periods, as well as limited information from the Classic and historic occupations. All dating evidence including stratigraphic associations will be used to document ceramic change.

The Late Developmental period as defined for the Rio Grande region spans A.D. 900 to 1200 (Wendorf 1954; Stuart and Gauthier 1981) and is similar to, but extends slightly later than the Pueblo II period as defined for areas of the Anasazi to the west. While many areas of the Northern Rio Grande country appear to have been first occupied by Anasazi groups during the Late Developmental period (A.D. 900 to 1200), very little is known about the dating and nature of these occupations. Thus, the dating and documentation of ceramic change within Developmental phase contexts is particularly important. Decorated types associated with this occupation are distinguished from later types by the use of mineral paint. The presence of significant frequencies of sherds exhibiting painted styles indicative of both Red Mesa Black-on-white and Kwahe'e Black-on-white may provide the basis for the differentiation of distinct phases of the Late Developmental period. Occupations in the Northern Rio Grande region dominated by the Rio Grande variety of Red Mesa Black-on-white are poorly dated but appear to date sometime between A.D. 900 and 1050, while those dominated by Kwahe'e Black-on-white and associated trade wares are thought to date sometime between A.D. 1050 and 1200 (Stuart and Gauthier 1981). The dominance of Kwahe'e Black-on-white over Red Mesa Black-on-white may indicate that Developmental phase components from LA 101412 date to the later part of this span. Changes in frequencies of gray ware types, as identified by surface treatments, may also provide for increased dating resolution of Developmental phase components. The presence of independently dated trade wares from other areas of the Anasazi such as Cibolan White Ware, San Juan (or Mesa Verde) White Ware, White Mountain Redware, and Mogollon types provide the opportunity for ceramic cross-dating of Developmental period components. Changes in surface treatments in Kwahe'e Black-on-white toward manipulations more similar to those found in later organic painted types of the Coalition period might allow for the recognition of components dating to the later part of the Developmental phase.

The Coalition period, as defined for the Rio Grande region, appears to date between A.D. 1200 and 1325 (Wendorf 1954; Stuart and Gauthier 1981) and is similar to, but extends slightly later than the Pueblo III period as defined for Anasazi regions to the west. While more is known about the dating and associated trends of Coalition period occupation than for the Developmental period, ceramic change within this period is still poorly understood. This period is identified ceramically by the appearance of organic-painted white ware types, although low frequencies of mineral-painted types may still be associated with the earlier occupations of this period. The majority of painted ceramics from most Coalition phase components exhibit a fine bluish paste and styles indicative of Santa Fe Black-on-white. Other Coalition phase types such as Galisteo Black-on-white and Wiyo Black-on-white are differentiated from Santa Fe Black-on-white based on paste and surface characteristics. Santa Fe appears to be the overwhelmingly dominant white ware type during early phases of this period, and is associated with changing frequencies of Galisteo Black-on-white and Wiyo Black-on-white during later phases of the Coalition period (Stubbs and Stallings 1953). Changes in corrugated treatments may also provide additional evidence concerning the dating of the Coalition phase components. Early glaze ware types, Gallina Black-on-white, San Juan White Ware, White Mountain Redware, and Mogollon types may also provide the potential for ceramic cross-dating of Coalition phase contexts. Many of the difficulties in recognizing and dating Coalition phase components result from the long duration of Santa Fe Black-on-white as presently defined, which was produced from about A.D. 1200 and possibly as late as the fifteenth century. It is possible that detailed examination of various attributes recorded for Santa Fe Black-on-white sherds during intensive analysis may provide the basis for the further division of this type into temporally sensitive groupings.

The presence of Classic (A.D. 1325 to 1600) and historic (post A.D. 1600) period ceramics in the upper fill may provide a limited opportunity to examine later ceramic change and patterns. Occupations in the general area dating to the Classic phase may be identified by the presence of significant frequencies of earlier Glaze Ware (A through D) and Biscuit Ware types. Utility ware types include Sapawi Micaceous and Potsuwi'i Incised. Classic period components can be further subdivided by overall frequencies of Biscuit A (or Abiquiu Black-or-gray) versus Biscuit B (or Bandelier Black-on-gray) or by the rim forms allowing for recognition of temporally distinct glaze ware types. Early historic occupations are identified by the presence of Tewa Polychrome types, late glaze ware types (E and F), Kapo Black Utility, and Posuge Red Utility, and may be further placed into more precise spans by the presence and associations of various ceramic types and historic material.

Patterns of Interaction, Production and Exchange. Once basic temporal sequences are established, ceramic distributions may be used to examine a variety of patterns. While very little is known about ceramic changes related to various trends for Developmental and Coalition period components in the Northern Rio Grande country, much more is known about ceramic change at contemporaneous Pueblo II and Pueblo III sites in areas of the San Juan Basin. Thus, information from studies in Anasazi regions to the west may provide a framework for the examination of various patterns of change.

The migration of people from areas of the San Juan Basin are often proposed as the source of population during the Developmental and Coalition periods. Given the extremely wide extent postulated for the Chaco system and the presence of a great kiva in the Pojoaque area, the potential influence and presence of Chaco (or Cibola series ceramics) will be examined. Types produced in other regions to the west, such as White Mountain Redware, Mogollon Brown Ware, and San Juan White Ware types may also indicate widespread exchange and interaction during this time.

Models, involving the mass movement of populations from the San Juan Basin into the Northern Rio Grande, are of particular prevalence in interpretations of patterns noted for components dating to the Late Pueblo III or Middle Coalition period. While an increased similarity in the ceramics between these regions is often assumed to have resulted from such migrations (Reed 1949), no systematic attempt has been made to test this assumption. A detailed comparison of sherds from contemporaneous sherds from sites from the Northern San Juan and Northern Rio Grande regions may provide a unique opportunity to test such models. Large-scale movements of populations should result in the brief presence of Mesa Verde Black-on-white ceramics tempered with crushed andesite/diorite or sherd, and increasing similarities between this type and contemporaneous Tewa series types at sites dating to the last part of the thirteenth and first part of the fourteenth century. This relationship is potentially reflected by the presence of Galisteo Black-on-white, which is often assumed to represent a local copy of Mesa Verde Black-on-white (Mera 1935). Recent analysis of large numbers of Mesa Verde sherds from sites in the La Plata Valley dating from early Pueblo II to the late Pueblo III periods provides the basis for initial comparisons of contemporaneous ceramics produced in these regions. Thus, statistical comparisons of distributions of various similarly recorded attributes from contemporaneous assemblages from projects in these regions may provide insights concerning the nature of the relationship and interaction between the Northern San Juan and Northern Rio Grande regions. The presence of early Glaze ware types at late Coalition phase sites may be used to document exchange and interaction with areas to the west and south.

An increase in the specialization of production and importance of exchange is thought to have occurred during the Classic period (Habicht-Mauche 1993) and continued into the historic period. Much of the comparison of exchange during the Coalition and early historic periods is based on comparisons of distributions of Tewa black-on white and polychrome types versus Glazed wares. The study area appears to be located in the northernmost area of the production of Glazed wares, and is very close to areas where Tewa types such as Biscuit Wares continued to have been produced. Information concerning the distribution and characteristics of these two ceramic groups will provide information concerning exchange and interaction between adjacent areas. The identification of historic types associated with known Pueblos based on stylistic characteristics and temper type may be used to examine patterns of exchange during the historic period.

For all periods of occupation, distributions and changes in temper and pastes may provide additional information concerning patterns of local production and exchange with groups in other areas of the Rio Grande region that may not be evident by distributions of typological categories alone. The range of tempers and pastes noted in ceramics from this area also provides the potential for characterization of distinct production areas and localized exchange. The study area is located along an area of geological transition, resulting in potentially significant spatial differences in clay and temper sources from nearby locations. In order to recognize locally available pastes and temper, a range of clays and temper sources found within a reasonable catchment area of LA 101412 will be collected and characterized. Similar studies conducted by Shepard (1936, 1942) and Warren (1969, 1979) for glazed ware types indicate the potential for the recognition of an area of production for various sherds. Given the wide number of temper types noted for earlier types, the recognition of distinct production areas may also be possible for earlier components. Comparisons of distributions of pastes and temper types from assemblages associated with different components will allow for the examination of both the changing use of different material sources in local ceramic production as well as the identification of nonlocal ceramics. The characterization of gray wares exhibiting distinct micaceous pastes dominant at all local components provides the potential for distinguishing local gray wares from those produced in adjacent areas. Differences noted in the pastes of decorated types associated with different occupations may also reflect changes in patterns of production and exchange.

Vessel Use and Function. The presence of sherds at a given archaeological context is the result of the production and breakage of ceramic vessels for specific activities.

Attributes relating to vessel shape, thickness, size, material resources, surface manipulation, technological attributes, and wear pattern; all may reflect the intended and actual use of ceramic vessels in various economic or social activities. Many aspects pertaining to use are strongly reflected by both ceramic ware distinctions and vessel form categories recorded. Data concerning the distribution of ceramic functional groupings may provide information concerning the nature and structure of activities occurring at different sites. The range of activities, for example, should be reflected in the range of ceramic forms, although other characteristics such as size may also indicate the use for which a vessel was intended.

Changes in the distributions of functional characteristics may ultimately be related to changes in activities associated with population growth and aggregation. Various changes in Northern Rio Grande ceramics including changes in the associated firing technology, increased wall thickness, changes in overall forms of jars and bowls, increased frequencies of painted sherds to gray wares, and changes in surface manipulations in utility forms all indicate changes in forms and uses of ceramic vessels that may be related to changes in ceramic related activities. Thus, changes and relationships among these attributes will be examined. The influence and the effect of the highly micaceous pastes utilized in utility wares also needs to be examined.

FIELD AND ANALYSIS METHODS

The following proposed excavation and analysis methods are generalized because the research issues and data collection requirements defined above require a broad range of information on chronology, subsistence practices, and site structure and patterning.

Excavation Procedures

Given the problem orientation outlined above, the general field strategy will be to maximize three types of information: (1) chronometric, (2) subsistence, and (3) feature identification. This will mean exposing as much of the site within the right-of-way as possible, identifying all features and deposits within that area, excavating all of the structural remains, obtaining a wide variety of chronometric samples, and obtaining samples of biological remains from as many features and deposits as possible.

In the field, the first step will be to reestablish the baseline for a grid system, which will be used to provenience surface collection and excavation units. A permanent baseline, marked by a rebar, was installed during the testing phase. Surface artifacts will be collected in 1-by-1-m grids. Any formal tools found on the surface will be bagged separately. Systematic surface collection should help unravel the issue of potential multiple occupations.

Excavation by strata is desirable in this case, not only because it will isolate separate occupations but because it will yield temporally associated clusters of structural remains and thus elucidate site structure. Therefore, exploratory units will be excavated into features and areas containing known or potential cultural deposits to aid in defining their stratigraphic context. Excavation units consisting of 1-by-1-m-grid units will be dug by hand in arbitrary levels (not to exceed 20 cm) unless natural stratigraphic breaks are identified. Once subsurface stratigraphy has been defined, excavation will be expanded from the exploratory grids to expose any cultural deposits and features that are present. Excavation will continue until sterile soil is encountered. Connecting excavations will be used to link discrete features and artifact clusters.

Because of the amount of overburden, mechanical equipment may be used to strip sterile overburden away from cultural deposits, to remove noncultural fill from large pit features, to stratigraphically link widely separated hand excavation areas, and for backfilling when excavations are completed.

All soils removed during hand trenching will be screened through ¼-inch wire mesh, and all artifacts will be removed and bagged for analysis. Artifacts found on floors or occupational surfaces will be mapped in place and bagged separately.

When structural features are encountered, these will be excavated in their entirety. We will also attempt to identify and excavate exterior work surfaces associated with such features, and to use the surfaces to link discrete features into common behavioral units.

For trash deposits (either as middens or fill within pit features), the emphasis will be different: our concern is primarily with obtaining representative biological remains (plus associated dating materials) from as many different occupations and contexts as possible. Therefore, for trash deposits a sample excavation approach may be appropriate, including heavier sampling of deposits that are richest in biological materials.

As a general rule, however, at least one pollen sample and one flotation sample will be collected from each cultural stratum and from the surface of each structure floor or occupational surface. Ground stone found in its original use context will be collected for pollen washes.

Because of our concern with building local chronologies, fieldwork will emphasize the recovery of samples for absolute dating. We will collect *all* pieces of wood with a high potential for dendrochronological study, whether or not they are in original context. *All* contexts suitable for archaeomagnetic dating (hearths, burned floors, and burned walls) will be sampled. We will also attempt to collect at least one radiocarbon sample. Radiocarbon samples will be taken from each structure or hearth encountered, as well as from general stratigraphic sequences. General collection practices will yield samples for obsidian hydration dating and ceramic cross-dating.

All excavation units and features will be mapped using a transit and stadia rod or 30 m tape. Artifacts will be provenienced by grid and excavation unit (or by exact location when such treatment is warranted). Plans and profiles of individual features and exploratory trenches will be drawn, and standard recording forms will be completed. Features will be photographed before and after excavation.

Discovery of burials during the data recovery effort seems unlikely. Only a small part of the site is in the construction area, and should human remains be encountered, the number of burials exposed is likely to be low. If burials, associated burial goods, or isolated burial goods are found, excavation will cease and consultations with appropriate parties will be initiated as prescribed by the Native American Graves Protection and Repatriation Act. If the remains are to be excavated, and interested parties express no specific excavation treatment, standard archaeological excavation techniques will be employed. These include definition of the burial pit, use of hand tools to expose skeletal materials, mapping, photographing of the position of the skeleton and any grave goods, and retrieval of soil for pollen analysis. We will attempt to excavate all human remains encountered, in order to rescue them for culturally appropriate disposition. No person will be allowed to handle or photograph the remains except as part of scientific data recovery efforts. Photographs of sensitive materials will not be released to the media or general public. If the parties consulted have no specific desires for treatment of the remains, the remains will be submitted to the Museum of New Mexico Archaeological Research Collection (ARC) for physical storage at the Department of Anthropology, University of New Mexico. Remaining artifacts will be submitted to ARC for physical storage.

As a final note, given the research issues outlined earlier, it is critical to obtain an extensive sample of dating, pollen, flotation, and faunal samples. If initial excavations indicate that such remains are rare, field methods will be modified to maximize their recovery. For example, if only a few contexts appear likely to yield useful flotation samples, the size of samples from those areas can be increased to yield more statistically meaningful counts of remains.

Analysis

Laboratory analysis will be conducted by the staff of the Office of Archaeological Studies and qualified professional consultants. The types of cultural materials and brief descriptions of the kinds of information desired from each are presented below. Analytical techniques to be used in the data recovery phase of this project are outlined in the testing results portion of this report.

Ceramic Artifacts

Distributions of various ceramic data from LA 101412 will provide information concerning the dating of sites and contexts, as well as the examination of trends in the affiliation, production, exchange, and use of pottery vessels. While the examination of all issues involves recording a large and varied range of categories and attributes, it is not feasible nor necessary to record all of these for the entire ceramic collection. Before various issues can be addressed, it is first necessary to determine the temporal association and integrity (in terms of mixing of material from different temporal components) of the ceramics from a given provenience. This is important as data from undated or highly mixed proveniences will contribute very little to our understanding of various changes and trends.

Thus, different systems or levels of analysis will be conducted on sherd collections from contexts of different integrity and research potential. The first level of analysis involves a "rough sort" recorded on sherds from all proveniences, and includes basic data required for the dating and evaluation of the integrity of sherd collections. Sherds from selected dated contexts will be analyzed and described in greater detail during an "intensive analysis." This will include categories and attributes recorded during rough sort as well as the recording of additional attributes allowing for the examination of various trends and patterns. Specialized stylistic analysis will be conducted on selected samples of decorated rim sherds. An attempt will be made to implement the more detailed analysis on sufficient samples of sherds from as many distinct temporal components as possible. The basic analytical system employed, variables recorded, and research issues that will be addressed using this data are discussed below.

Data Categories and Attributes. Ceramic analysis will involve recording information concerning the context of recovery, typological classification, descriptive attributes, and quantitative data. Contextual data include information concerning the site, field specimen (FS) number, and associated provenience. Sherds from each FS exhibiting unique combinations of typological and attribute classes will be assigned to a distinct lot number, and data describing these sherds will be recorded on a distinct data line. Sherds from each lot will be bagged separately along with a tag indicating the associated site, field specimen number (FS), and lot number. Quantitative data recorded for each data line include sherd counts and weight in grams.

Type Categories. Each sherd will be assigned to a typological category reflecting a series of hierarchical decisions made during analysis. First, an item is placed into a spatially distinct ceramic tradition or series on the basis of temper, paint, and technological characteristics. Next, it is put into a ware category based on surface manipulation or decoration. Last, it is assigned to a specific type using temporally sensitive surface manipulations or design styles.

The majority of sherds from sites spanning the entire Pueblo occupation of the study area belong to types of the Tewa series defined for the Northern Rio Grande region. Sherds exhibiting distinct textured treatments or painted styles will be placed into previously described formal types of this and other locally occurring series (Habicht-Mauche 1993; McKenna and Miles 1990, 1932; Laumbach et al. 1977; Wendorf 1953), while those lacking distinct decorations or manipulations will be assigned to informal descriptive categories based on surface characteristics (for example, unpainted polished white). These types are defined based on combinations of pastes, paint types, design styles, and surface manipulations known to be temporally sensitive. Types belonging to other ceramic series or traditions will also be identified by the presence of temper, treatments, or styles not used locally, and a higher frequency of nonlocal types will identified based on the examination of temper and paste characteristics during intensive analysis. The number of and strategies used to define types in the Northern Rio Grande region varies significantly from one study to the next. Some studies have attempted to "split" the commonly used temporally distinct types into a number of other types based on variation observed in slipped and polished treatment or temper size (Habicht-Mauche 1993; Honea 1968; Stubbs and Stallings 1953). While some of the variation defined in these types may be temporally or spatially significant, the use of a large number of types based on such criteria is potentially cumbersome and confusing. Thus, we prefer to initially "lump" such variation into a limited number of spatially distinct type categories defined for this area. The variables used to recognize more recently and precisely defined types will be recorded during intensive analysis, and their distributions may be used to further examine the significance of these types. For example, Pindi Black-on-white will not be differentiated from Santa Fe Black-on-white during the recording of type categories, but distributions of temper differences used to differentiate this type (Stubbs and Stallings 1953) may be examined for sherds assigned to Santa Fe Black-on-white in order to evaluate the significance of associated variation. Given discrepancies in categories and attributes used to define types in the Northern Rio Grande, detailed descriptions and illustration of the types employed during this study will be presented for increased data comparability in future studies.

Descriptive Attributes. Descriptive attribute categories were selected to provide detailed descriptions of the associated ceramic collections as well as the investigation of a wide range of research issues. Descriptive categories that may be recorded during various levels of analysis include vessel form, temper, paint pigment, surface manipulation, slip, modification, refired paste color, and various stylistic attributes.

Vessel form categories are assigned to all sherds and vessels based on observed shape. Sherds are incomplete subsamples of the original parent vessels, and the resolution of vessel form characterization depends on sherd size and portion of vessel represented. Vessel form categories utilized will include information concerning both vessel shape and vessel part. Examples of categories that will be employed include bowl rim, bowl body, jar body, jar neck, wide mouth (cooking/storage) jar rim, narrow mouth jar olla rim. *Rim radius* will be measured in order to obtain information concerning the relative size of vessels.

The identification of *temper type* is critical for the identification of nonlocal ceramics as well as the examination of patterns of ceramic production. Temper categories are identified by examining freshly broken sherd surfaces through a binocular microscope. These characterizations of temper are limited, but broad tempering categories can be identified by ranges in the color, shape, fracture, and reflectivity of tempering particles. These categories reflect material sources available and used as tempering agents in different geographic areas. Temper types expected to be identified during the present study include various classes of igneous rock including tuff, ash, andesites, and diorites; crushed sandstones; and crushed potsherds.

Paint pigments are distinguished by surface color and characteristics (Shepard 1971). Pigment use in this area is known to have changed, and categories that may be encountered include organic, iron oxide mineral, organic mineral polychromes, mineral polychromes, clay, and glaze pigments.

Surface Manipulation refers to surface treatments including textured treatment (such as corrugations and polishing), and will be recorded for each surface. *Slip* refers to the presence of a separate clay applied to the vessel surface to produce a distinctive effect. Categories recorded for each surface will include information concerning the presence, relative thickness, and color of slips. *Modification* includes information concerning the modification of sherds or vessels through use, shaping, or repair.

Refiring Analysis will also be conducted on small samples of sherds and clays and will involve recording information concerning the color of samples exposed to common firing conditions using a kiln. This allows for the common comparisons of pastes derived from different sources based on the presence of mineral impurities (particularly iron oxides) in the clay. A small sample of sherds exhibiting the range of pastes and temper types identified will be submitted for petrographic analysis or various types of chemical or compositional analysis to provide for more detailed characterizations and sourcing information.

A detailed stylistic and technological analysis, similar to that used during the La Plata Project, may be recorded for an even smaller subset of decorated rim sherds, providing information for the examination of various temporal and spatial trends. Attributes that may be recorded include wall thickness, rim shape, rim decoration, painted styles, and design orientation.

Reconstructible vessels (where a third or more of the original vessel is present) will also be analyzed separately. Vessel analysis will involve recording previously discussed attributes as well as the dimensions of each vessel.

Lithic Artifact Analysis

Chipped stone artifacts will be studied to provide data on material procurement and selection, activities, and alterations to enhance flaking quality. Certain attributes will be studied on all chipped stone artifacts. Material type and texture will provide data on selection and source, and in particular whether materials were procured nearby or from distant locations. The type of cortex present will also be used as an indicator of material origin--while some types suggest procurement at the source, others indicate secondary deposits. In conjunction with other studies, these data will provide information on mobility and ties with other regions. Chipped stone artifacts will be classified by morphology and presumed function, which will provide a basic categorization of activities employing chipped stone tools as well as a basis for more intensive analyses. They will also be examined for evidence of thermal alteration to enhance flakeability, a process that is tied to reduction strategy and the suitability of materials for reduction. The flakeability of some materials can be improved by heating, and this can be an important aid in strategies, aimed at formal tool production, while it is less important in strategies based on informal tool use.

A range of other attributes will also be examined, depending on artifact morphology. Information on group mobility and tool production can be derived from an analysis of the reduction strategy employed. The reduction process produces three basic by-products: debitage, cores, and formal tools. Debitage and cores are the immediate by-products of this process, while formal tools are by-products that were modified to produce a specific shape. While the former categories provide information about the reduction strategy employed, the latter provide data on tool using activities. Thus, different attributes will be examined for each of these broad categories.

Debitage and cores will provide information on reduction strategies. Attributes used for this analysis will include debitage type, amount of cortical surface, artifact portion, and size. Cores will be morphologically identified by the direction of removals and number of striking platforms, providing basic information on how they were reduced. Flakes are debitage that were purposefully removed from cores, and can provide critical data on reduction technology. Hence, several attributes will be analyzed on this class of artifact including platform type and modification, platform lipping, direction of dorsal scarring, and distal termination.

Formal tools will be identified by morphology and wear patterns. Informal tools will be identified by the presence of marginal retouch or use-wear patterns along one or more debitage edges. A binocular microscope will be used to identify and classify retouch and wear patterns on all tools, and utilized or retouched edge angles will be measured. All evidence of edge modification will be recorded for informal tools, while evidence of use or modification unrelated to production will be recorded for formal tools. These attributes will provide information on activities employing chipped stone tools.

Data from lithic artifact analysis is important to the investigation of LA 101412. Information concerning basic site function, mobility, and ties with other regions can be derived from these studies. Chipped stone artifacts should reflect an expedient reduction strategy, and the amount of purposeful thermal alteration should vary over time in the prehistoric deposits. More thermal alteration should occur in the Developmental period assemblage when compared to the Coalition period assemblage. A wide range of subsistence-related, manufacturing, and maintenance activities should be represented in both assemblages. While local materials should predominate, exotic materials, particularly obsidian, could occur in significant quantities. Again, variation between temporal components is expected, with the Developmental assemblage demonstrating better access to exotic materials. Biface manufacture and use should be restricted to special-use tools (as defined by Kelley 1988). Evidence of large unspecialized bifaces serving as cores as well as tools should be rare.

Ground Stone Analysis

Ground stone artifacts will be tabulated and discussed in morphological and material classes. The possible correlation of the technological attributes of this class of artifact and specific processing activities will be discussed if adequate samples are recovered. If ground stone artifacts are found within intact, discrete settings, fill samples will be recovered for pollen or botanical analysis, and the ground stone artifact will be carefully bagged for pollen wash.

Several types of information are available from this class of artifact. In the absence of floral remains, certain varieties of ground stone tools can be used to infer plant food processing. While trough metates and two-hand manos suggest maize processing, basin metates and one-hand manos are more indicative of the processing of wild plant foods. Analysis of pollen samples from ground stone artifacts retrieved from floors or buried activity areas can provide information about the range of plant foods exploited. Wear patterns are often indicative of function, and can be used to suggest activities such as hide processing for which other indications might be lacking.

Faunal Remains

Faunal analysis will concentrate on identification of species, age, and bone elements to assist in documenting food procurement and consumption patterns. Evidence of processing, such as burning or roasting and cut marks, will also be recorded. These data will help determine season of occupation, hunting and food processing and consumption patterns, and may provide information on the local environment at the time of occupation.

Floral Remains

Plant remains will be identified to the specific level when possible, and will be compared with floral data from other sites to help provide a clearer picture of plant use during the period(s) of occupation. Floral remains will also aid in determining seasonality. The discovery of both edible and nonedible parts from domesticates will be indicative of local production, while the lack of all but edible parts might suggest that domesticates were raised elsewhere and imported to the site. Both pollen and macrobotanical remains will be useful in reconstructing the local environment at the time of occupation.

Human Remains

The probability of locating and recovering human remains appears to be low. If any human remains are found, the sample should be extremely limited. The main goal of skeletal analysis will be the nondestructive study of the remains to add to general data on prehistoric human populations, rather than to address specific questions raised in the research design. This approach will include standard metric studies, aging and sexing, and documentation of pathologies. There is a possibility that human remains from the sites could yield bone tissue samples for carbon isotope studies, allowing us to estimate the relative proportion of maize in the diet of the site's inhabitants. Before this or any other destructive analysis is attempted, however, the Office of Archaeological Studies will work with the State of New Mexico Historic Preservation Division to ensure prior consultation with all concerned parties.

Discovery of burials during the data recovery effort seems unlikely. Only a small part of the site is in the construction area, and should human remains be encountered, the number of burials exposed is likely to be low. If burials, associated burial goods, or isolated burial goods are found, excavation will cease and consultations with appropriate parties will be initiated as prescribed by the Native American Graves Protection and Repatriation Act. If the remains are to be excavated, and interested parties express no specific excavation treatment, standard archaeological excavation techniques will be employed. These include definition of the burial pit, use of hand tools to expose skeletal materials, mapping, photographing the position of the skeleton and any grave goods, and retrieval of soil for pollen analysis. We will attempt to excavate all human remains encountered in order to rescue them for culturally appropriate disposition. No person will be allowed to handle or photograph the remains except as part of scientific data recovery efforts. Photographs of sensitive materials will not be release to the media or general public. If the parties consulted have no specific desires for treatment of the remains, the remains will be submitted to the Museum of New Mexico Archaeological Research Collection (ARC) for physical storage at the Department of Anthropology, University of New Mexico. Remaining artifacts will be submitted to ARC for physical storage.

Research Results

The final report will be published in the Museum of New Mexico's *Archaeology Notes* series. The report will include all important information concerning excavation and analysis, as well as interpretive results. Photographs, site and feature plans, and data summaries will also be included. Field notes, maps, and photographs will be stored by the Archeological Records Management Section of the State Historic Preservation Division at the Laboratory of Anthropology in Santa Fe.

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