# *U.S. 380 TAYLOR CANYON: TESTING ONE SITE IN EASTERN SOCORRO COUNTY, NEW MEXICO*

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# U.S. 380 TAYLOR CANYON: TESTING ONE SITE IN EASTERN SOCORRO COUNTY, NEW MEXICO

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## ADMINISTRATIVE SUMMARY

Between December 11 and December 17, 1994, the Office of Archaeological Studies, Museum of New Mexico, conducted limited archaeological testing at one site in eastern Socorro County, New Mexico. Limited testing was conducted at LA 104548 at the request of the New Mexico State Highway and Transportation Department to determine the extent and importance of cultural resources present as part of the proposed improvements along a 12.8 km (8.0 miles) stretch of U.S. 380 east of Bingham in Socorro County, New Mexico (Levine 1994). LA 104548 is located on Department of the Interior, Bureau of Land Management land.

The site is a sherd and lithic artifact scatter that probably represents a temporary camping location. No intact features or deposits were found on the site associated with site occupation or use. The data potential of the portion of the site located within the project area was determined to be minimal beyond that already documented, and no further investigations are recommended.

MNM Project 41.595
NMSHTD Project No. TP-380-1(30)39 CN 2708 J 00040
CPRC Archaeological Survey Permit No. SP-146
BLM Cultural Resource Use Permit No. 21-8152-94-9

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# INTRODUCTION

At the request of William L. Taylor, Environmental Program Manager, New Mexico State Highway and Transportation Department (NMSHTD), a limited testing program was conducted at LA 104548, located on U.S. 380 east of Bingham in Socorro County, New Mexico (Fig. 1). The site is located on Bureau of Land Management (BLM) land. Limited testing was conducted between December 11 and December 17, 1994, by Peter Y. Bullock, assisted by Joy Beasley, Heather Bixler, and Jennifer Noble. Yvonne Oakes acted as principal investigator. Figures were drafted by Robert Turner, the report was edited by Robin Gould, and photographs were printed by Nancy Warren.

Limited testing was conducted at LA 104548 to determine the extent and importance of the portion of the site located within the proposed project limits. The testing was restricted to the proposed project corridor of planned improvements. Exact site location is contained in Appendix 3 (removed from reports in general circulation).

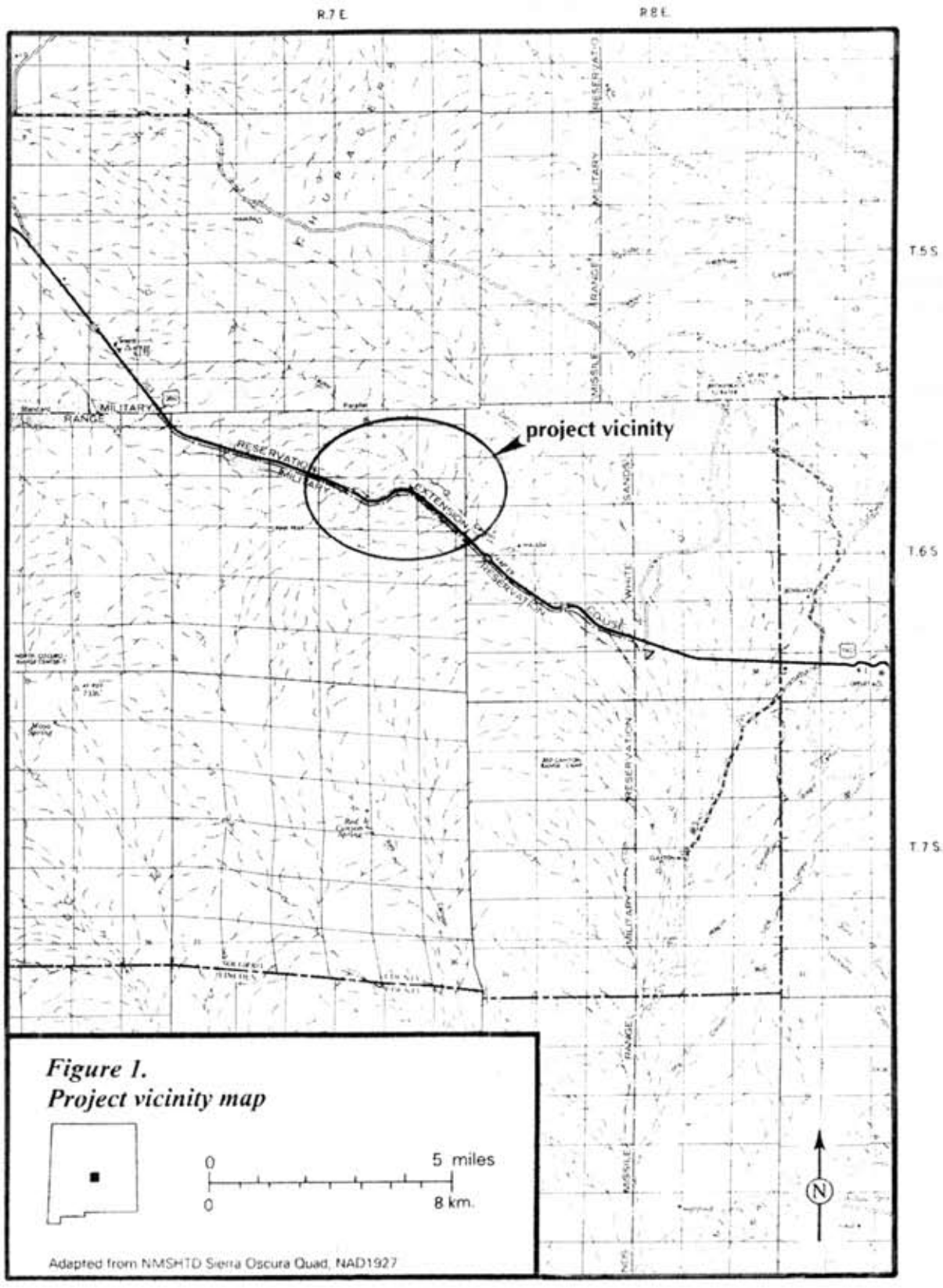


***Figure 1.***
***Project vicinity map***

# ENVIRONMENT

LA 104548 is located in hilly terrain at the southern end of Chupadera Mesa. The site is on the south bank of a deeply entrenched unnamed arroyo 1.2 km (0.75 miles) west of Taylor Canyon. Site elevation is 1,859.28 m (6,100 ft). The local landscape is primarily hilly piñon-juniper parkland. Exposed outcrops of sandstone and limestone occur in the vicinity. Flatter areas support a cover of mixed grasses, with mesquite and broadleaf yucca also present.

## Geology

Eastern Socorro County forms part of the Basin and Range physiographic province (Fenneman 1931:385). Considered part of the Tularosa Basin (Fenneman 1931:386), the terrain is characterized by a series of intermontane basins or toughs, divided by a line of fault-formed mountain ranges. Both the Oscura Mountains, south of the project area, and the rocky plateau of Chupadera Mesa, located to the north, comprise part of this line of mountain ranges (Fenneman 1931:385, 387).

These fault-formed mountain ranges and plateaus are primarily composed of limestone and sandstone. Although exposed in areas at lower gradients, this bedrock is usually buried by Quaternary deposits of varying thickness.

Permanent streams are not present in the site area. However, numerous intermittent streams flow from Chupadera Mesa. Sink holes are common at a number of locales, usually in the limestone pediment where Quaternary sediments are thin (Fenneman 1931:387).

Soils of the project area are characteristic of the Camborthids-Torriorthents-Rock Land association. Widely distributed in central New Mexico, this soil association is characterized by varied topography and high contrasting soil characteristics (Maker et al. 1974:60). Soils are either shallow, (having developed over limestone, sandstones, or shale), or deeply deposited alluvium. These soils are generally lightly colored with thin surface layers of sandy or gravelly loam, grading to a yellowish brown, calcareous, gravelly, clayish loam. Angular fragments of the underlying bedrock are common in these deposits (Maker et al. 1974:61).

The moderate coarseness of most of these soils makes them permeable with a high available water capacity (Neher and Bailey 1976:14). These soils are susceptible to erosion, and arroyos and gullies often occur in valley bottoms. The soils of this association are usually utilized as rangeland for cattle or sheep (Maker et al. 1974:60).

## Climate

The climate of the project area is characterized as woodland (Castetter 1956:256, fig. 1). Although the composition of this Woodland Biome varies considerably across the state in relation to annual precipitation, temperature, altitude, rate of evaporation, and seasonal distribution of

rainfall (Castetter 1956:272), the general tendency since the Pleistocene has been toward an overall dryer regime, with summer-dominated rain patterns (Tuan et al. 1973:24, fig. 6). Annual precipitation at Bingham, to the west of the site, averages 24 cm (9.46 inches). The total number of frost-free days averages between 200 and 230 a year (Tuan et al. 1973:192).

## Flora and Fauna

The project area forms part of the Woodland Biome (Castetter 1956:256, fig. 1). The gravelly nature of the area's soils serves to inhibit the growth of grasses that would in turn restrict the spread of trees and shrubs (Castetter 1956:271). Piñon, juniper, and oak form the most common components of woodland in the site area. Other species present include cholla, beargrass, sumac, and privet (Castetter 1956:273). Grasses common to the project area are primarily blue grama. Sideoats grama, alkali sacaton, galleta, bush muhly, three-awns, black grama, and sand drop-seed are also present in small quantities (Maker et al. 1974:60).

Fauna populations vary according to their habitats and local climatic and geological variations. These habitats tend to correspond to local plant communities. Faunal species for the area of LA 104548 should therefore correspond to the Woodland Biome. Faunal species characteristic of the project area include jackrabbit, cottontail rabbit, and assorted small rodents such as mice, ground squirrels, and gophers. Larger faunal species common to the area include deer, black bear, bobcat, coyote, and mountain lion.

A detailed reconstruction of the cultural history of central New Mexico is beyond the scope of this report. Little research has been conducted in the immediate area of LA 104548. However, a number of studies have been carried out in the general region that include the northern Tularosa Basin (Kelley 1984; Marshall and Wait 1984; Clifton 1985; Laumbach and Kirkpatrick 1985; Laumbach 1986; Oakes 1986; Shields 1987; Sale 1988; Shields and Laumbach 1989; Levine et al. 1997), allowing the construction of a basic cultural developmental sequence for the area.

## Paleoindian Period

The Paleoindian period (10,000-5,500 B.C.) was first recognized in 1926 at the Folsom site in northeastern New Mexico (Wormington 1947:20). A series of Paleoindian traditions have since been defined, beginning with Clovis and continuing through Plano (Stuart and Gauthier 1981:294-300). Originally defined on the plains of eastern New Mexico, the Paleoindian cultural area has since been expanded to include virtually all of North America. Although originally believed to be dependent on big-game hunting, the importance of plant-gathering and small animal hunting to Paleoindian subsistence is now recognized (McGregor 1965:120; Willey 1966:38; Jennings 1968:78-79; Wilmsen 1974; Cordell 1979:19-21; Stuart and Gauthier 1981:31-33).

Paleoindian sites of any period are rare. Only one Paleoindian site has been recorded in the northern Tularosa Basin (Marshall 1976). The Mockingbird Gap site, a multicomponent Paleoindian site (Weber 1966), was recorded approximately 27 km (17 miles) to the west of LA 104548. A number of fragmentary Folsom projectile points have been recorded on the White Sands Missile Range (Laumbach and Kirkpatrick 1985:66). Other Paleoindian sites are probably present but buried under Pleistocene alluvial or eolian deposits (Cordell 1979).

## Archaic Period

The Archaic period is distinguished by distinctive projectile points and lithic artifact scatters, including grinding implements, fire-cracked rock, and a lack of ceramics. Archaic subsistence adaptations are based on a highly mobile, broad-based economy characterized by a combination of seasonally scheduled hunting and gathering activities. Sites generally are small and artifact assemblages are limited, suggesting small population and limited site occupation (Laumbach and Kirkpatrick 1985:67).

The Archaic period is best defined in western New Mexico where it is generally referred to as the Oshara Tradition (Irwin-Williams 1973). The Oshara Tradition is divided into five phases: Jay (5500-4800 B.C.), Bajada (4800-3200 B.C.), San Jose (3200-1800 B.C.), Armijo (1800-800 B.C.), and En Medio (800 B.C.-A.D.400) (Irwin-Williams 1973). Although centered in northwestern New Mexico, Oshara Tradition projectile points do occur as isolated occurrences in the project area. The Oshara Tradition sequence has been modified by Weber (1963:228) for the southern portion of New Mexico, specifically the Rio Abajo area.

## Pueblo Period

Defining the Pueblo period for the area of LA 104548 is problematic. A number of cultural traditions come into contact in the northern Tularosa Basin, and some cultural hybridization is believed to have occurred (Peckham 1976). A basic developmental sequence developed by Marshall and Wait (1984) for the Rio Abajo, has been utilized successfully (Oakes 1986; Levine et al. 1997) in the general site area.

The San Marcial phase (A.D.300-800) is the earliest representation of sedentary riverine adaptation in the Northern Tularosa Basin. Contemporaneous to Basketmaker III and Pueblo I periods, this period is characterized by small settlements of jacal and masonry surface structures.

The following Tajo phase (A.D. 800-1000) sees increased settlement size. Linear room blocks of jacal or cobble masonry construction occur in conjunction with pit structures. Utility wares are comprised of brown wares, with Red Mesa Black-on-white occurring on all sites of this period. The Taylor Draw site (LA 6565), located less than a mile to the east, is the largest recorded Tajo phase settlement in the area (Peckham 1976).

The early Elmendorf phase (A.D. 950-1100) is roughly contemporary to the Pueblo II period. In this phase, settlements are clustered into village groups, with rooms per site numbering as many as 54. Pit structures increase in size and number during this period.

The late Elmendorf phase (A.D. 1100-1300) is roughly contemporary to the Pueblo III period. Large fortified pueblos appear during this period, perhaps signaling social unrest or regional instability. Masonry structures dominate settlement construction, although jacal structures still occur. Small, perhaps seasonal, settlements continue to be constructed away from the large pueblos. The presence of White Mountain Redware is diagnostic of the period.

The Piro phase (A.D. 1300-1680) begins with the emergence of a glaze ware ceramic industry, and ends with the regional abandonment following the Pueblo Revolt of 1680. This period is characterized by the coalescence of the population into large plaza villages. These were comprised of multistoried masonry structures built around a plaza or public space. The region saw a substantial population increase at this time, with new settlements built in previously uninhabited areas.

After A.D. 1540, the population of the area decreased sharply, possibly as a by-product of Spanish contact. Large areas were abandoned as the population decreased. Spanish occupation and settlement increased variation in construction design and techniques. The region was abandoned by both the Spanish and Piro in 1680, during the Pueblo Revolt.

## Historic Period

Although Spanish settlement resumed along the Rio Grande after 1682, no settlement in the general area of LA 104548 is recorded from roughly A.D. 1050 until the late 1800s (Levine et al. 1997:19). The region was utilized by the Apaches historically (Basehart 1973), however only a single Apache site has been recorded in the region (Laumbach 1986:17).

Homesteaders moved into the area in the late 1800s, establishing farms and ranches. A number of mines operated in the Oscura Mountains and near the town of Bingham during this period (Laumbach and Kirkpatrick 1985:71). Most farms failed during the "dust bowl" days of the 1920s, with most of the area reverting to rangeland.

## TESTING PROGRAM

A limited testing program was conducted for the archaeological site of LA 104548, located on U.S. 380 east of Bingham, Socorro County, New Mexico. Testing was conducted following the procedures included in the *Testing and Site Evaluation Proposal* (SHPO Log No. 43648), and was implemented in consultation with the Bureau of Land Management, Socorro District. LA 104548 is located on BLM land.

LA 104548 is a sherd and lithic artifact scatter. The site was tested as part of the proposed improvements along 12.8 km (8.0 miles) of U.S. 380 east of Bingham, New Mexico (Levine 1994). The purpose of the limited testing was to determine the extent and importance of the portion of the site located within the proposed project limits.

### Field Methods

The field methods utilized in testing followed the procedure included in *Testing and Site Evaluation Proposal* (SHPO Log No. 43648). A copy of this document is included as Appendix 1.

### LA 104548 Testing Results

LA 104548 is a sherd and lithic artifact scatter measuring 30-by-40 m, on U.S. 380 at [redacted] (Fig. 2). The site is situated north of U.S. 380, on the top of a small knoll [redacted] an unnamed [redacted] (Figs. 3 and 4). The site slopes slightly downward toward the north. Site elevation is 1,859.28 m (6,100 ft).

A total of 59 surface artifacts were piece-plotted and collected at the site. Of this total, 56 were lithic artifacts and 3 were ceramic. Surface artifacts were present as a thin scatter, with a concentration of artifacts occurring in a small surface depression. An additional 80 artifacts (79 lithic artifacts and 1 piece of bone) were collected from 9 test units and 26 auger tests. All of the artifacts were recovered from either the top 10 cm of surface duff material, or associated with rodent burrows. The site has experienced surface erosion and extensive rodent burrowing.

*Test Unit Descriptions*

**Test Unit 1.** Test Unit 1 was dug within the main concentration of surface artifacts, near the northern edge of the project area. Surface vegetation was a sparse (15 percent) cover of mixed grasses.

Excavation ended 60 cm below the modern ground surface in culturally sterile soil. Testing revealed three strata of material. Stratum 1 was a fine sandy clay. Stratum 2 was a dense brown clay containing rock and gravel, with caliche also present. Stratum 3 was a sandy clay containing some caliche. Rodent burrows were present within all three strata. Eighteen lithic artifacts were

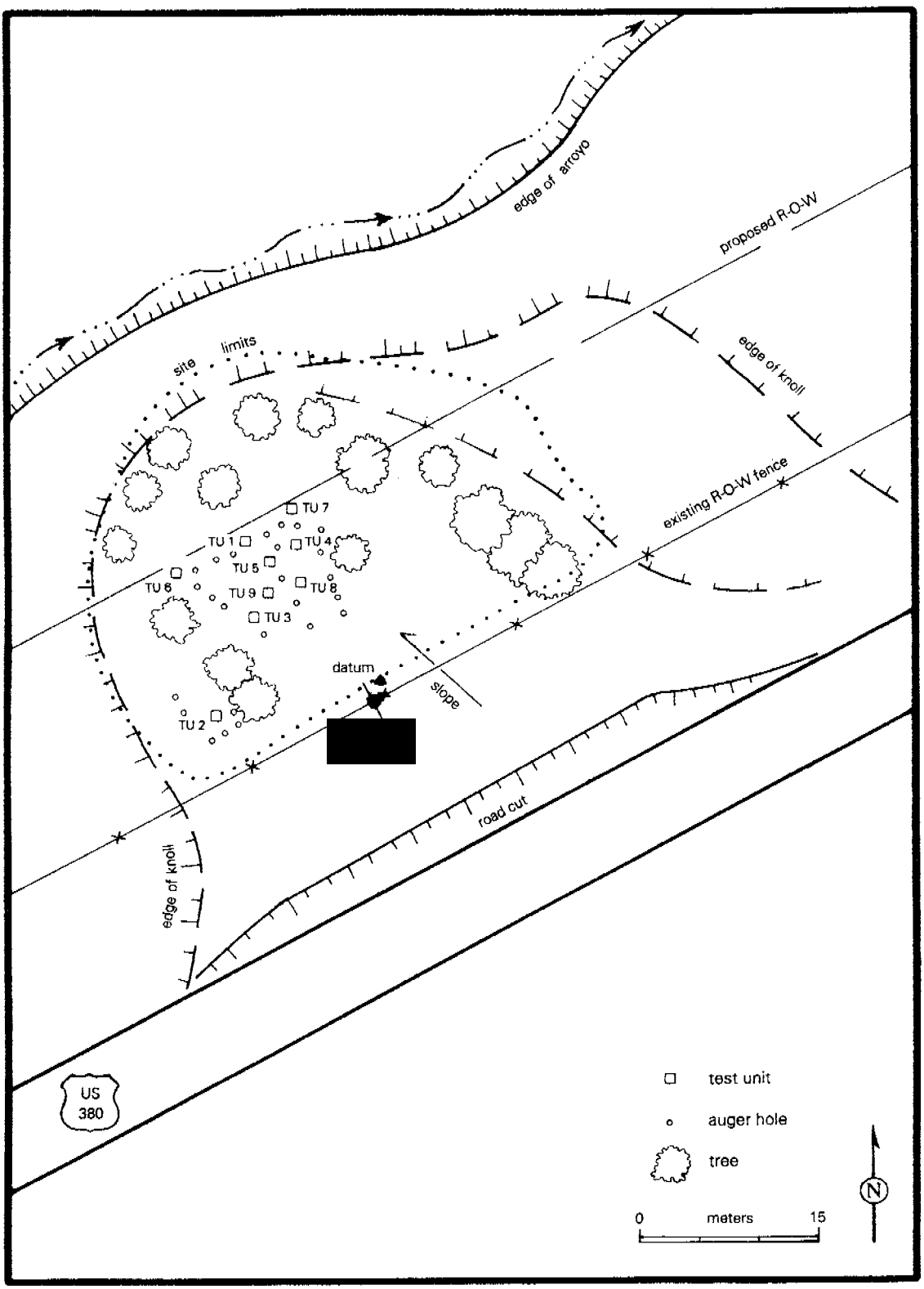


*Figure 2. LA 104548, site map.*

*Figure 3. LA 104548, view looking north.*

*Figure 4. LA 104548, unnamed arroyo located just north of the site, looking west.*

recovered from Stratum 1.

**Test Unit 2.** Test Unit 2 was dug in the western portion of the site, in an area containing a small cluster of obsidian flakes. Surface vegetation was a sparse cover of mixed grasses.

Excavation ended at a depth 30 cm below the modern ground surface in culturally sterile soil. Two strata of material were revealed in Test Unit 2. Stratum 1 was a sandy soil containing large amounts of gravel. Seven lithic artifacts were recovered from Stratum 1. Stratum 2 was a dense clay containing both gravel and angular rock. Rodent burrows were present throughout both strata of material.

**Test Unit 3.** Test Unit 3 was dug in the central area of the site, within the main artifact concentration. Surface vegetation was 20 percent mixed grasses. Gravel comprised another 20 percent of the unit's surface prior to excavation.

Excavation ended 20 cm below the modern ground surface in culturally sterile soil. One stratum of material was present. Stratum 1 was a sandy clay containing large amounts of both gravel and angular rock. Six lithic artifacts were collected from the upper portion of Stratum 1.

**Test Unit 4.** Test Unit 4 was dug in the central area of the site, in the eastern portion of the main surface artifact concentration. Surface vegetation was a 25 percent cover of mixed grasses. The surface of the unit prior to excavation also contained a 20 percent cover of gravel and cobbles. Three lithic artifacts were collected from the surface of Test Unit 4 prior to excavation.

Excavation ended 70 cm below the modern ground surface in culturally sterile soil. Three strata were revealed in this test unit. Stratum 1 was a fine clay. Stratum 2 was a sandy clay containing some gravel and caliche. Stratum 3 was a dense clay also containing some caliche. Fifteen lithic artifacts (all of them from Stratum 1), were recovered from Test Unit 4.

**Test Unit 5.** Test Unit 5 was dug in the center of the main surface artifact concentration. Mixed grasses covered 10 percent of the surface. There was also an 80 percent gravel surface cover prior to excavation of the test unit.

Excavation ended 50 cm below the modern ground surface in culturally sterile clay. Three strata of material were exposed in the test unit. Stratum 1 was a brown, silty, surface duff layer. Stratum 2 was a dense clay containing some gravel. Stratum 3 was a dense clay identical to Stratum 2, except for the presence of small caliche flecks. Rodent burrows were present in both Strata 2 and 3. Thirteen lithic artifacts were recovered from Test Unit 5, all of them from Stratum 1.

**Test Unit 6.** Test Unit 6 was dug in the western portion of the main surface artifact concentration. Mixed grasses covered 10 percent of the surface. Surface gravel covered most of the test unit prior to excavation.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Two strata of material were revealed in Test Unit 6. Stratum 1 was a sandy clay containing both gravel and angular pieces of rock. Three artifacts were recovered from Stratum 1. Stratum 2 was a dense gritty clay that also contained large amounts of angular rock and gravel. Rodent burrows were

present in both strata.

**Test Unit 7.** Test Unit 7 was dug in the northern portion of the project area, within the main surface artifact concentration. Surface vegetation was limited to a thin cover (10 percent) of mixed grasses.

Excavation of Test Unit 7 ended 30 cm below the modern ground surface in culturally sterile soil. Two strata of material were present in Test Unit 7. Stratum 1 was a sandy clayish soil containing a large quantity of gravel. Stratum 2 was a dense fine clay, with small flecks of caliche present. Rodent burrows were present within both strata of material. One artifact was collected from Stratum 1.

**Test Unit 8.** Test Unit 8 was dug in the southern portion of the main surface artifact concentration. Mixed grasses covered 20 percent of the surface.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. Two strata of material were found within this test unit. Stratum 1 was a brown sandy loam. A total of five artifacts were collected from Stratum 1. This total included four lithic artifacts and a single piece of bone. Stratum 2 was a dense clay containing large quantities of gravel and angular rock. Rodent burrows were present in Stratum 2.

**Test Unit 9.** Test Unit 9 was dug in southern portion of the main surface artifact concentration. Mixed grasses covered 30 percent of the surface.

Excavation ended 30 cm below the modern ground surface in culturally sterile soil. One stratum of soil was revealed in Test Unit 9. Stratum 1 was a sandy gritty clay, containing large quantities of both gravel and angular rock. Rodent burrows were present throughout this test unit. Artifacts collected from this test unit totaled nine lithic artifacts.

*Auger Test Descriptions*

A total of 26 auger tests were dug at LA 104548 in an effort to test areas not covered by test trenches. These auger tests were dug until either cultural material or rock was reached, except in areas where deep clay was present. No cultural material was found in any of the auger holes (Table 1).

**Table 1. LA 104548, Auger Tests**

| Auger No. | Depth of Test | Material at Base |
|---|---|---|
| 1 | 18 cm | rock |
| 2 | 30 cm | rock |
| 3 | 34 cm | rock |
| 4 | 18 cm | rock |
| 5 | 77 cm | clay with caliche |
| 6 | 46 cm | rock |

| Auger No. | Depth of Test | Material at Base |
|---|---|---|
| 7 | 46 cm | rock |
| 8 | 50 cm | clay |
| 9 | 48 cm | clay |
| 10 | 50 cm | clay |
| 11 | 32 cm | rock |
| 12 | 54 cm | rock |
| 13 | 15 cm | rock |
| 14 | 29 cm | rock |
| 15 | 33 cm | rock |
| 16 | 17 cm | rock |
| 17 | 46 cm | clay |
| 18 | 45 cm | clay |
| 19 | 22 cm | rock |
| 20 | 46 cm | rock |
| 21 | 10 cm | rock |
| 22 | 12 cm | rock |
| 23 | 12 cm | rock |
| 24 | 22 cm | rock |
| 25 | 49 cm | clay |
| 26 | 18 cm | rock |

*Cultural Features*

No intact cultural features or deposits were found within the portion of LA 104548 located within the proposed project area.

# LITHIC ARTIFACT ANALYSIS

A total of 134 lithic artifacts, three ceramic sherds, and a single piece of bone were collected at LA 104548, taken to OAS offices in Santa Fe, and analyzed.

## Analytical Methods

The guidelines and format of the Office of Archaeological Studies *Standardized Chipped Stone Analysis Manual* (OAS Staff 1995) were followed in the analysis of the LA 104548 material. Attribute definitions are included in Appendix 2. The following attributes were included in analysis.

### *Material Type*

Codes for material types are for general material groups unless the material is unquestionably from a recognized source. For example, although a wide range of chert occurred on LA 104548, all was classified as "chert." If a specimen was of a specifically named chert (such as Alibates chert), it was coded by the specific name.

### *Morphology*

This is the characterization of artifacts by form. Definitions are included in Appendix 2.

### *Portion*

Portion is the part of the artifact recovered. Flakes and tools can be whole or fragmentary. Angular debris and cores are whole by definition. A list of the portion codes is included in Appendix 2.

### *Dorsal Cortex*

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

### *Flake Platform*

Flake platform is recorded for whole and proximal flakes. Either the morphology of the impact area prior to flake removal or extreme modifications of the impact area caused by the actual flake removal is coded.

*Size*

Artifact size is recorded in millimeters.

*Edge Number*

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

*Function*

Function characterizes and describes use on all artifacts.

*Wear Patterns*

Artifact modification caused by human use is coded as wear.

## Analytical Results

Lithic analysis was conducted with the assumption that the environmental setting of the site should suggest the types of activities for which the locale is suited. It was also assumed that any activities indicated by the lithic assemblage can be used to define the range of tasks represented. In this manner it becomes possible to visualize differences in the way hunters from a logistically organized pueblo might utilize the space as opposed to hunters from a mobile Archaic seasonal camp. The presence of diagnostic pottery and a projectile point on the site insured that a Pueblo I (Tajo phase) date could be assigned to at least one component at the site. The presence of a Pueblo III projectile point (late Elmendorf phase) indicates that the site was reused during this later period.

In the field, a bias toward larger more easily observed flakes probably skewed our data regarding flake size and morphology. Large flakes tend to be core flakes from early stage lithic reduction. The predominance of core flakes exhibiting cortical or single-faceted platforms in this assemblage may be the result of a sampling bias of this type, rather than from extensive early-stage lithic reduction. Few hammerstone flakes (spalls from hammerstones) were found on the site. Angular debris, which occurs at all stages of flintknapping, was also present in very small quantities. Low rates of angular debris to flakes are an indication of tool manufacturing. The lithic artifact data are presented by attribute.

*Material Selection*

Material use serves as an indication of human decision-making processes with regard to the suitability of materials (Young and Bonnishsen 1985:128). The testing of material samples

presumed to be useable lithic material and their subsequent discard for a variety of factors, few readily apparent, indicates the accepted suitability of lithic materials for tool manufacture or use.

The lithic artifact assemblage from LA 104548 is dominated by two fine-grained materials (Table 2). Chert is by far the most common material at the site, forming 75 percent of the assemblage. Obsidian is the second most common lithic material, forming 14.7 percent of the total. Three other materials, metamorphic sandstone, siltstone, and quartzite, are present in smaller quantities.

All of the materials present are local, except for the obsidian. The obsidian present at LA 104548 visually resembles Jemez obsidian from the Jemez Mountains of north-central New Mexico. Material from this source has been widely traded since the prehistoric period. Nodules of Jemez obsidian, the by-product of erosional forces, are present in the gravel deposits of the Rio Grande (Akins and Bullock 1992). These nodules may occur in the Rio Grande gravels as far south as the San Antonio area.

*Artifact Morphology and Material*

Core flakes make up the largest morphological group within the lithic artifact assemblage, numbering 108 (79.4 percent). Core flakes also make up the largest morphological category within most material categories. The smaller material classes are restricted to almost all core flakes.

*Flake Morphology and Flake Portion*

The largest category of flake portion represented is whole flakes (Table 3). Proximal flake fragment is the second largest category, with distal flake fragment a close third in occurrence. Although LA 104548 has been heavily grazed for decades, and both cattle and horses can easily break or modify flakes by stepping on them, the numeral closeness of proximal and distal flake fragments suggests little artifact modification has taken place.

*Dorsal Cortex and Platform Type*

The amount of cortex on lithic artifacts and the predominance of core flakes exhibiting cortical or single-faceted platforms, can provide possible evidence of reduction strategies pursued in a particular location. Single-facet platforms predominate in this assemblage (Table 3). High numbers of absent, cortical, and multifaceted platforms are also present. These data suggest a high level of labor expenditure with regard to lithic tool production.

The greater the range of cortex present within a material category, the more likely a range of material reduction occurred (Table 4). In this manner, evidence for the reduction of chert is present at LA 104548. It also appears possible that lithic reduction of both siltstone and obsidian took place at this site. Limited flintknapping of other materials also occurred.

## Table 2. LA 104548, Lithic Artifact Morphology by Material Type

| | Material Type | | | | | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Metamorphic Sandstone | | Chert | | Siltstone | | Quartzite | | Obsidian | | | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| Core Flake | | | 81 | 79.9 | 10 | 100.0 | 3 | 100.0 | 14 | 70.0 | 108 | 79.4 |
| Biface Thinning Flake | | | 10 | 9.8 | | | | | 6 | 30.0 | 16 | 11.8 |
| Hammerstone Flake | 1 | 100.0 | 2 | 2.0 | | | | | | | 3 | 2.2 |
| Biface, Third Stage | | | 1 | 1.0 | | | | | | | 1 | 0.7 |
| Multi. Core | | | 5 | 4.9 | | | | | | | 5 | 3.7 |
| Angular Debris | | | 3 | 3.9 | | | | | | | 3 | 2.2 |
| Total | 1 | 100.0 | 102 | 100.0 | 10 | 100.0 | 3 | 100.0 | 20 | 100.0 | 136 | 100.0 |

## Table 3. LA 104548, Flake Morphology by Portion and Platform Type

| | Portion | | | | | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Whole | | Proximal | | Medial | | Distal | | Lateral | | | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| Core Flake | 53 | 81.5 | 14 | 70.0 | 11 | 100.0 | 18 | 100.0 | 12 | 92.3 | 108 | 85.0 |
| Biface Thinning Flake | 9 | 13.8 | 6 | 30.0 | | | | | 1 | 7.7 | 16 | 12.6 |
| Hammerstone Flake | 3 | 4.6 | | | | | | | | | 3 | 2.4 |
| Total | 65 | 100.0 | 20 | 100.0 | 11 | 100.0 | 18 | 100.0 | 13 | 100.0 | 127 | 100.0 |

| | Platform | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Absent | | Cortical | | Single | | Multiple | | Collapsed | | Crushed | | | |
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| Core Flake | 28 | 100.0 | 15 | 93.8 | 55 | 93.2 | 2 | 12.5 | 3 | 100.0 | 5 | 100.0 | 108 | 85.0 |
| Biface Thinning Flake | | | | | 2 | 3.4 | 14 | 87.5 | | | | | 16 | 12.6 |
| Hammerstone Flake | | | 1 | 6.3 | 2 | 3.4 | | | | | | | 3 | 2.4 |
| Total | 28 | 100.0 | 16 | 100.0 | 59 | 100.0 | 16 | 100.0 | 3 | 100.0 | 5 | 100.0 | 127 | 100.0 |

## Table 4. LA 104548, Percent of Dorsal Cortex by Material Type

| | Material Type | | | | | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Metamorphic Sandstone | | Chert | | Siltstone | | Quartzite | | Obsidian | | | |
| Cortex % | N | % | N | % | N | % | N | % | N | % | N | % |
| 0 | | | 66 | 64.7 | 2 | 20.0 | 2 | 66.7 | 14 | 70.0 | 84 | 61.8 |
| 10 | | | 11 | 10.0 | | | | | 1 | 5.0 | 12 | 8.8 |
| 20 | | | 3 | 2.9 | 1 | 10.0 | | | 3 | 15.0 | 7 | 5.1 |
| 30 | | | 6 | 5.9 | | | | | | | 6 | 4.4 |
| 40 | | | 2 | 2.0 | | | | | | | 2 | 1.5 |
| 50 | | | 1 | 1.0 | | | | | | | 1 | 0.7 |
| 60 | | | | | 2 | 20.0 | | | 1 | 5.0 | 3 | 2.2 |
| 70 | | | 4 | 3.9 | | | | | | | 4 | 2.9 |
| 80 | | | 5 | 4.9 | | | | | | | 5 | 3.7 |
| 90 | 1 | 100.0 | 4 | 3.9 | 5 | 50.0 | | | 1 | 5.0 | 11 | 8.1 |
| 100 | | | | | | | 1 | 33.3 | | | 1 | 0.7 |
| Total | 1 | 100.0 | 102 | 100.0 | 10 | 100.0 | 3 | 100.0 | 20 | 100.0 | 136 | 100.0 |

## Table 5. LA 104548, Artifact Function by Material Type

| | Material Type | | | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Chert | | Siltstone | | Quartzite | | Obsidian | | | |
| | N | % | N | % | N | % | N | % | N | % |
| Utilized Debitage | 19 | 61.3 | 2 | 66.7 | 2 | 100.0 | 6 | 60.0 | 29 | 63.0 |
| Retouched Debitage | 3 | 9.7 | | | | | 1 | 10.0 | 4 | 8.7 |
| Utilized/Retouched Debitage | 6 | 19.4 | 1 | 33.3 | | | 1 | 10.0 | 8 | 17.4 |
| Notch | 1 | 3.2 | | | | | | | 1 | 2.2 |
| Scraper, End | 1 | 3.2 | | | | | 2 | 20.0 | 3 | 6.5 |
| Biface, Third Phase | 1 | 3.2 | | | | | | | 1 | 2.2 |
| Total | 31 | 100.0 | 3 | 100.0 | 2 | 100.0 | 10 | 100.0 | 46 | 100.0 |
| Second Function | | | | | | | | | | |
| Utilized Debitage | 9 | 90.0 | 1 | 100.0 | | | 4 | 66.7 | 14 | 77.8 |
| Retouched Debitage | | | | | 1 | 100.0 | | | 1 | 5.6 |
| Utilized/Retouched Debitage | | | | | | | 1 | 16.7 | 1 | 5.6 |
| Scraper, End | 1 | 10.0 | | | | | 1 | 16.7 | 2 | 11.1 |
| Total | 10 | 100.0 | 1 | 100.0 | 1 | 100.0 | 6 | 100.0 | 18 | 100.0 |
| Third Function | | | | | | | | | | |
| Utilized Debitage | 1 | 100.0 | | | | | 1 | 100.0 | 2 | 100.0 |
| Total | 1 | 100.0 | | | | | 1 | 100.0 | 2 | 100.0 |

*Utilization by Material*

Analysis of utilization is limited to presence or absence and a description of the form of utilization or wear. Bidirectional wear is traditionally considered an indication of cutting or slicing, while unidirectional wear was thought to indicate scraping. Experiments conducted by Vaughan (1985) indicate that wear patterns are unreliable indicators of the type of use.

Notches and projectile points are specialized tools that may be indicators of specific activities (Wikle 1977:14-15). As with other tools, however, they may also have been used in a variety of ways for which they were not designed. The range of recorded wear patterns on this site shows that a number of activities, involving more than just tool manufacturing or finishing, took place at this locale.

*Material Quality*

Single-function artifacts (artifacts with a single utilized, retouched, or retouched and utilized edge) are exclusively composed of fine-grained material (chert and obsidian) (Table 5). Chert has the widest range of functional categories, but only just ahead of obsidian. The ratio of functional occurrence of chert to obsidian is 3 to 1.

Artifacts exhibiting two multiple functions show a different pattern of chert versus obsidian use, with the widest range of functions exhibited by obsidian. Functional occurrence also changes the ratio of chert to obsidian to 1 to 1.

Artifacts exhibiting three multiple functions are present, but in extremely small numbers. The range of functions and ratio of functional occurrence are limited to one artifact each of both chert and obsidian, both of them utilized debitage.

Fine-grained lithic materials such as chert and obsidian are exactly the cryptocrystalline, isotropic, highly silicious lithic materials with elastic qualities that are usually considered the most durable for reduction (Crabtree 1972:4-5). These materials also produce the sharpest cutting edges, rather than the more durable edges produced by coarser grained materials (Akins and Bullock 1992:26).

The material quality of both single and multiple functional classes of lithic artifacts indicates selection for quality, rather than for simple convenience. This suggests that the tool needs of the parties involved were easily met by readily available existing materials. Although sudden tool needs may have occurred, sufficient time allowed a degree of tool preparation prior to tool use. This form of use strategy could be dictated by a hunting strategy based on an intimate knowledge of the area, probably reflecting use by a segment of the local population.

*Tools*

Use of a site as a logistical or resource extraction location could be supported by the presence of bifaces and biface thinning or resharpening flakes (Akins and Bullock 1992:27). A biface is a flake or core blank that has been reduced on both faces from two parallel but opposing axis (Kelly 1988:718). Bifaces can be used as either tools or cores without further modification, thus

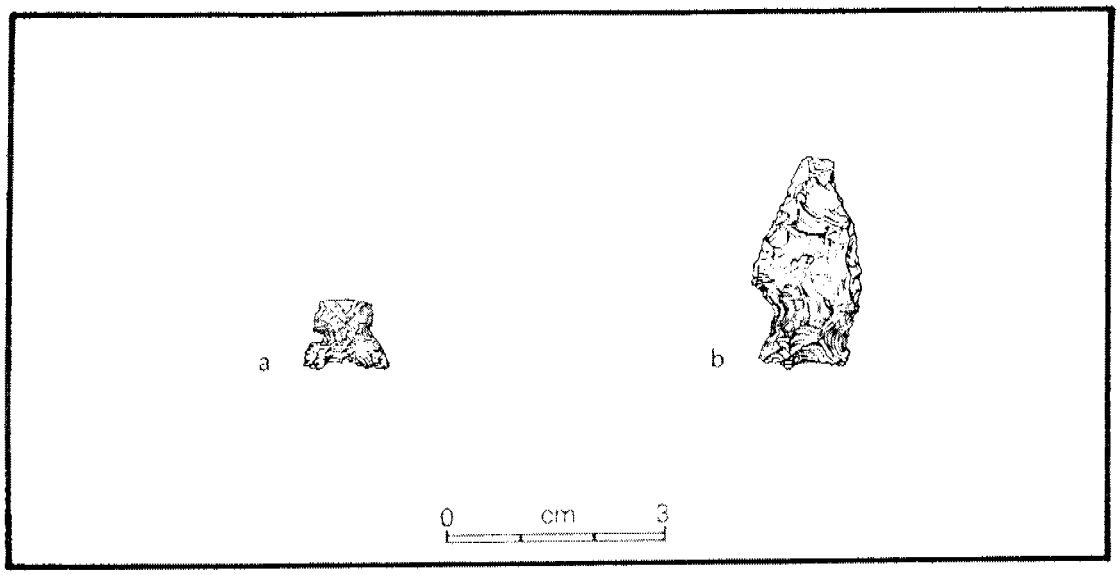


*Figure 5. LA 104548 projectile points: (a) Pueblo I, Tajo phase; (b) Pueblo III, late Elmendorf phase.*

minimizing tool edges and providing durable long use-life tools, while minimizing the amount of material transported. Bifaces have the advantage over other lithic tools of being reliable, easy to maintain, and can potentially be reshaped as raw material. Differences in biface occurrence should be evident between residential versus logistical sites (Kelly 1988:721-723).

The proportion of formal tool forms comprising prehistoric tool kits tends to change through time and space, reflecting the range and duration of activities pursued (Christianson 1987:77). The occurrence of utilized debitage as expedient tools may indicate a wider range, or more intense pursuit, of activities taking place than those represented by formal tools. Of course, utilized debitage may also represent the occurrence of an unplanned or unexpected activity (Akins and Bullock 1992:28-29).

## CERAMIC ARTIFACTS

Three pieces of pottery were collected from LA 104548. This small ceramic assemblage was identified by C. Dean Wilson for both ceramic type and vessel form. No further ceramic analysis was conducted.

All three sherds are white wares, specifically Red Mesa Black-on-white. This is the main intrusive variation on sites dating to the Tajo phase in this southern area of Chupadera Mesa (Peckham 1976:51-52).

Red Mesa Black-on-white has a wide geographic distribution, present from the San Juan Basin to the Mogollon region. It also ranges from east-central Arizona to east of the Rio Grande (Schmader 1991:A-16).

Red Mesa paste color ranges from white to dark gray. Temper is usually comprised of angular sandstone, sand and crushed sherd, or crushed sherd. Crushed sherd temper dominates later assemblages. The surface is usually slipped and polished, with both of these attributes being highly variable. Slip can range from thin to heavy, and polish from streaky to well polished. Designs are executed in black or brown iron paint. Motifs include parallel lines, framing lines with both ticked and unticked solids, saw teeth, squiggle line hachure, and checkerboards (Schmader 1991).

The sherd assemblage from LA 104548 is comprised of one bowl rim sherd and two bowl body sherds, all of which appear to be from the same vessel. This suggests a single pot drop connected with the Pueblo 1 period use of the site.

Red Mesa Black-on-white is found on all Tajo phase sites along the Rio Abajo (Marshall and Wait 1984), and on all sites dating to the Tajo period on the White Sands Missile Range (Sale 1988; Shields 1987; Laumbach 1986; Clifton 1985; Laumbach and Kirkpatrick 1985). Similar material was also present at the Fite Ranch site (Oakes 1986), the Bingham site (Levine et al. 1997), and at Taylor Draw (Peckham 1976).

The dendrochronology dates obtained by Peckham for the Taylor Draw site (LA 6565), located less than 1 mile to the northeast, are for the late tenth century and early eleventh century A.D. (Peckham 1976:50). Since the temporal range of Red Mesa is from approximately A.D. 875 to A.D. 1100 (Schmader 1991), these dates are well within the accepted time range for Red Mesa Black-on-white ceramics (Peckham 1976:50).

The presence of Red Mesa Black-on-white ceramics and the lack of Chupadero Black-on-white ceramics at LA 105458 is consistent with Tajo phase sites, as defined be Marshall and Wait (1984:49) for the Rio Abajo, including sites such as Taylor Draw (Peckham 1976). This suggests that one period of site use during the Tajo phase can be assigned to this temporal period. The proximity of this site to the Taylor Draw site to the northeast, suggests that use could be connected

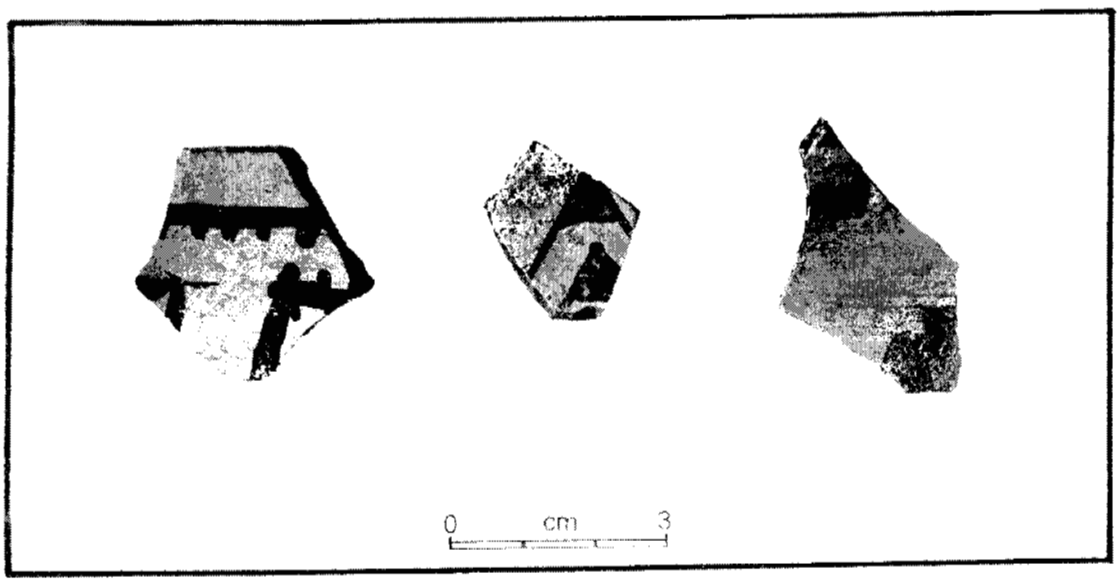


*Figure 6. Ceramic artifact assemblage from LA 104548.*

with the occupation of that larger site. The small number of bowl sherds and the similarity of their design (Fig. 6) suggests they are all part of the same vessel and represent a single pot drop.

## BONE ARTIFACTS

A single fragment of bone was recovered at LA 104548. This bone fragment is from the long bone of a large mammal, probably deer (Cornwall 1956:201-202). The color of the bone suggests it has been heated, the probable cause of its good preservation. Although this bone fragment was found in the same area as the other artifacts and visually appears to have some age, there is nothing to indicate that it is actually prehistoric and not the product of recent deer processing.

# DISCUSSION

LA 104548 is located within a localized area of a large, deeply cut unnamed arroyo. This type of localized area may function as an ecological edge area.

Ecological edge areas are the areas of contact between different biotic communities. They generally occur at changes of elevation, or as in this case, where physical changes are present in the landscape. Ecological edge areas are "the most convenient location for proximity to the widest variety and stability of resources" (Epp 1984:332). A number of studies have found correlations between ecological edge areas and site locations (Thurmond 1990; Epp 1984; Reher and Witter 1977). Site concentrations along these biotic borderlands maximize density as well as diversity of both faunal and floral food resources (Thurmond 1990:1). The similar use of LA 104548 during two separate periods seems to support the concept of the area as one of relative abundance based on an increased variety of available resources. However, it is possible that the site represents repeated use of a single prolific resource.

It is likely that the use of LA 104548 was connected with the utilization of faunal, and possibly floral, resources. Water, retained in pools within the adjacent arroyo, would have attracted a wider variety, and larger numbers of animals to the site area than would normally have been present.

The lithic artifact assemblage suggests a number of activities for this site. Hunters actively pursuing game, processing their kills, maintaining or supplementing their tool kits, or simply passing the time by flintknapping, all would have contributed to the varied assemblage. The presence of projectile points from two different periods, one accompanied by broken pottery, shows that site utilization was repeated.

With historic Pueblo subsistence understood, we can postulate Anasazi and other prehistoric Pueblo subsistence based on historic Pueblo organization. Small mammals and birds were hunted both individually and opportunistically, but were also hunted in large-scale communal hunts. Larger mammals (deer, pronghorn) were hunted individually when it was possible, but were also hunted by hunting parties. These are described by White (1962:301-302) as usually lasting for approximately six days at Zia. Vegetal foodstuffs were gathered in a similar manner. These were gathered individually, except when seasonally occurring plants or fruit became available in large quantities. In these cases, organized communal gathering took place (White 1962:302).

Modern Pueblo activities, including hunts, were scheduled in advance around agricultural duties. Because these hunting parties had definite foci and goals, we would expect a high degree of preparation to have taken place prior to their occurrence. However, because of the lower degree of dependence on hunting than in nonagricultural societies, we would also expect a lower level of technological expenditure (Akins and Bullock 1992:35). Lithic assemblages from prehistoric Pueblo sites reflect an expedient lithic technology, with flakes primarily produced for use as short-term disposable tools used for a variety of functions. Formal tools, other than projectile points, therefore tend to be rare.

Two projectile points were recovered at LA 104548. One projectile point, made of chert, is diagnostic of the Tajo phase (known as Pueblo I in other areas of the Southwest), and dates from

A.D. 800 to 1000. This projectile point is probably contemporary to the three Red Mesa Black-on-white ceramic sherds recovered from the site. The second projectile point, also of chert, is diagnostic of the late Elmendorf phase (in some areas referred to as the Pueblo III period), dating from A.D. 1100 to 1300. It is impossible to separate the remaining lithic artifacts and assign them to either of these two components.

Lithic artifact scatters contain more information than is usually believed, but it has to be searched for. Patterns are present within these data that should be time sensitive, and reflective of cultural change. The degree of resolution possible may be limited and the results tenuous, but lithic analysis will only provide more information if approached with the expectation that the information exists.

# ASSESSMENTS AND RECOMMENDATIONS

Information derived from the surface mapping, the test excavations, and analysis of the artifact assemblage provides insight into site function at LA 104548, and aids in the interpretation of the portion of the site located within the proposed project area.

LA 104548 is a multicomponent Pueblo period site. The presence of a Pueblo I (Tajo phase A.D. 800-1000) projectile point indicates that the site was first utilized during the Pueblo I period, possibly as a short-term hunting camp. The presence of a fragmentary Pueblo III (late Elmendorf phase, A.D. 1100-1300), projectile point suggests that the site was reused during that period, again probably as a short-term hunting camp. The site is heavily eroded, and most of the artifacts have been redeposited. The site has also been heavily modified by rodent burrowing. No intact features or deposits were found.

Limited archaeological testing within the proposed project limits at LA 104548 did not reveal features or deposits likely to yield any information on the prehistory of the site or of the region. It is our opinion that no further investigations are needed.

# CONCLUSIONS

One prehistoric site was tested within the proposed project area of planned improvements to U.S. 380 east of Bingham, Socorro County, New Mexico. LA 104548 is a multicomponent site. The site was first utilized as a short-tern hunting camp during the Pueblo I period, or Tajo phase (A.D. 800-1000) as it is known in this area of New Mexico. During this period, a single Red Mesa Black-on-white style pot was broken on the site. The site area was again utilized as a short-term hunting camp during the Pueblo III period (or late Elmendorf phase, A.D. 1100-1300). Both utilization periods are based on the presence of diagnostic projectile points.

The eroded nature of the site makes it impossible to determine the exact nature of site use. However, the small number of artifacts, the diffuse nature of the artifact scatter, and site location above a small, deep arroyo, suggests LA 104548 functioned as a periodic hunting location.

It is our opinion that no further investigations are needed at the portion of LA 104548 located within the proposed project limits.

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# APPENDIX 1.

## TESTING AND SITE EVALUATION PROPOSAL

*Purpose of Testing*

The purpose of testing sites is to determine the nature and extent of surface and subsurface archaeological materials. Further, these materials need to be assessed for their potential contribution for increasing the knowledge of the prehistory or history of a region. The following components will be included in each testing project with the exception of auger testing or the use of mechanical equipment. The augering and mechanical earthmoving equipment components may or may not be used as necessary.

*Definition of Site Limits and Artifact Distributions*

To determine site limits, archaeologists will traverse the site using parallel transects across the portion of the site within the area of proposed project limits. If landowner permission has been received, the entire site will be examined. Artifacts observed during these transects will be marked with pinflags. Site limits will be considered to be the boundary between the presence and absence of artifacts and features. The pinflags will also reveal areas of relatively higher artifact density and provide an indication of artifact distribution in general. If artifact density across the site is so high that marking individual artifacts with pinflags is impractical, only site limits and artifact concentrations will be marked with pinflags.

*Selection of Site Areas to be Tested*

Areas to be tested include those of higher artifact density in relation to the site as a whole and are indicated by clusters of pinflags. Obvious features such as hearths and rock alignments may be tested to determine if they have potential to contribute important data. Unidentifiable, but visible surface manifestations of possible subsurface features will also be selected for testing in order to determine their nature and extent. These manifestations include, but will not be limited to, soil discolorations, charcoal/ash deposits, or rock alignments/concentrations.

*Collection and Recording*

Depending upon the density of artifacts present on the site surface, the entire assemblage, or a sample of the assemblage, may be recorded in the field. Artifacts that provide data on temporal placement or cultural affiliation will be collected. Surface artifacts that occur within areas selected for test excavations will be collected before testing proceeds. Locations of artifacts will be recorded using either a transit, tape, and stadia or by grid designations based on Cartesian coordinates. Feature locations and general characteristics will be recorded using some combination of Brunton, transit, tape, and stadia. Photographs of the site and features will also be taken.

*Test Excavation Procedures*

In general, test excavations will be performed entirely with hand tools. Exceptions regarding the use of mechanical earthmoving equipment are discussed below. Test pits will not exceed 1 by 2 m and excavation will proceed in arbitrary 10 cm levels. As natural strata are determined, test pits may be excavated using those strata as the vertical excavation unit. All soil and sediment deposits will be

screened through ¼ inch mesh. Samples for flotation, pollen, or radiocarbon analysis may be taken from test excavation areas, as appropriate. Recovered artifacts will be bagged by horizontal and vertical provenience unit. All test pits will be backfilled at the completion of the testing program.

*Augering*

Depressions suggestive of possible subsurface features, such as pit structures, may be tested with hand soil augers. These auger tests will be used to search for charcoal, wood, artifacts, or other evidence usually associated with semisubterranean living spaces. Auger tests may also be used to determine the subsurface extent of cultural lenses or strata that are identified during test excavations. All soil removed by auger testing will be screened through ¼ inch mesh. Additional auger tests may also be used to determine if other buried features, having no surface manifestations, are present.

*Limits of Testing*

The combined horizontal extent of tested areas will not exceed 2 percent of the total site area, excluding the testing of possible features and any auger tests. If intact features are found during test excavations, digging will cease, the nature of the feature will be recorded, and the test pit will be backfilled.

*Use of Mechanical Earthmoving Equipment*

Geomorphological data may be of value in assessing the nature of the site. Therefore, limited use of mechanical earthmoving equipment may be necessary. Such equipment may also be useful for finding subsurface features in alluvial or eolian deposits. If so, all surface artifacts within corridors where mechanical earthmoving equipment will be used, an adjacent buffering strip, and the expected position(s) for the mechanical equipment will be collected before use of the equipment begins. Examination of the excavated area will occur after the removal of each extracted unit of soil or sediment. The resulting backdirt will also be examined for the presence of artifacts.

*Expansion of Testing*

If testing results are inconclusive within the constraints outlined above, for example, the 2 percent maximum is reached and there are equivocal results regarding the nature and extent of subsurface materials, then appropriate authorities will be contacted with a revised proposal. The additional testing will proceed after the revised proposal has been approved.

*Human Remains*

If human remains are encountered, they will be protected and left in place. If conditions are such that the remains cannot be protected, field treatment will follow procedures outlined by the laws and regulations of the State of New Mexico (Sec. 16-6-11.2 NMSA 1978; HPD Rule 89-1) and the Museum of New Mexico policy adopted January 17, 1991 and modified February 5, 1991, "Policy on Collection, Display, and Repatriation of Culturally Sensitive Materials" (SRC Rule 11).

*Laboratory Analyses*

All collected artifacts will be cleaned, sorted, and examined in the laboratories of the Office of Archaeological Studies. Analyses within each artifact material class will be conducted by standards established by the Office of Archaeological Studies.

*Disposition of Recovered Artifacts*

Unless otherwise stipulated by landowners or land managers, all recovered artifacts will be curated in the Archaeological Research Collections at the Museum of New Mexico, Laboratory of Anthropology. As a division of the Museum of New Mexico, the Office of Archaeological Studies maintains a curation agreement with the Archaeological Research Collections unit.

*Site Mapping*

Site boundaries, physical and cultural features, test excavation locations, auger tests, mechanical equipment tests, and areas of proposed project limits will be recorded with a transit, stadia, and tape. A scaled map will be produced showing these data.

*Published Report*

A report, containing a summary of the test excavations, laboratory analyses, and recommendations for site management, will be produced upon completion of fieldwork and laboratory study and published in the Museum of New Mexico, Office of Archaeological Studies, *Archaeology Notes* series. Attached to the report will be updated site record forms for the New Mexico Cultural Resource Management Information System managed by the Historic Preservation Division, Archeological Records Management Section.

APPENDIX 2
DEFINITIONS OF ARTIFACT MORPHOLOGY CATEGORIES

00 **Indeterminate**. An item that has been identified as cultural but whose morphological type cannot be determined.

01 **Angular debris**. Debitage on which no ventral or dorsal surfaces can be defined, but which may exhibit negative scars characteristic of flintknapping. Also called shatter.

02 **Core flake**. An artifact which exhibits definable dorsal and ventral sides. Whole flakes exhibit a recognizable bulb of force and a platform. Core flakes suggest the initial stages of core reduction; they do not fit the polythetic set defining biface flakes and may not exhibit specialized (e.g., retouched or abraded) platforms.

03 **Biface flake**. A long, thin, curved flake that may exhibit numerous (and often opposing) dorsal scars, platform lipping, and platform modification.This is an "ideal type" definition for biface flakes, which encompass a wider range of variability than the definition suggests. Please refer to the polythetic set to define biface flakes.

04 **Resharpening flake**. A flake removed to sharpen a tool or rejuvenate its edge. Such flakes are removed from bifaces and end and side scrapers as they become dull through use. Striking platforms of these flakes are usually faceted, and they include a small part of the dulled tool edge. These flakes may be difficult to distinguish from some biface flakes because of the problem of distinguishing intentional wear produced by preparing a platform from use-wear. A distinction can often be made by applying the criteria listed for utilization, with a resharpening flake platform exhibiting more extensive damage than would be expected from platform preparation. See Frison (1968) for more information about resharpening flakes.

05 **Notching flake**. A flake resulting from notching a biface, exhibiting a recessed, U-shaped platform and a deep, semicircular scallop at the juncture of the striking platform and dorsal flake surface. The most easily recognizable notching flakes are those produced during the terminal stages of the notching task when the notch itself is most pronounced (see Austin [1986] for more information).

06 **Bipolar flake**. Bipolar debris is defined by the presence of two positive bulbs of percussion on opposite ends of the same surface, or the presence of one positive bulb of percussion at one end of the artifact and a negative scar originating from the opposite end of the same or a different surface. Bulbs of percussion are often sheared on bipolar flakes and may be difficult to observe. Crushing at opposite ends of the item is often evident. Compression rings emanating from opposite ends of the same surface may be seen.

07 **Blade**. A flake that is at least twice as long as it is wide, usually with straight parallel edges and parallel dorsal scars that are perpendicular to and originate at the platform. Blades usually originate from a prepared pyramidal or single platform core.

08 **Hammerstone flake**. A flake resulting from the rejuvenation of a hammerstone, or inadvertently removed during use. These flakes generally exhibit battering wear on the dorsal surface.

09 **Channel flake**. A flake removed during basal thinning of a Paleoindian fluted point. Essentially large biface flakes, channel flakes are long in relation to their width, and thin with slight or no ventral curvature. Platforms (when present) are heavily modified, and dorsal flake scars are predominantly *perpendicular* to the long axis of the flake except at the platform.

20 **Tested cobble**. Cobbles from which up to two flakes have been removed as though the material was tested for suitability as a tool medium, and cobbles which appear to have been intentionally broken in half.

21 **Core, undifferentiated**. Pieces of lithic material which exhibit no bulb of percussion and which have three or more negative scars that originate from one or more surfaces.

22 **Unidirectional core**. A core with flakes removed from only one platform plane.

23 **Bidirectional core**. A core with flakes removed from two opposing platforms.

24 **Multidirectional core**. A core with flakes removed from numerous platform planes.

25 **Pyramidal core**. A single platform core that is shaped like a cone and terminates in a point at the end opposite the platform plane.

30 **Cobble tool, undifferentiated**. A tool consisting either of an unmodified cobble that shows evidence of wear, or a modified cobble on which the type of modification cannot be clearly identified.

31 **Cobble tool, unidirectional**. A tool formed from a cobble that has been unifacially modified across less than one-third of one surface.

32 **Cobble tool, bidirectional**. A tool formed from a cobble that has been bifacially modified across less than one-third of adjacent surfaces.

40 **Uniface, undifferentiated**. An artifact that has flake scars which extend across one-third or more of only one surface. Unifaces undergo various changes in morphology from a unifacial core or roughout to a preform to a finished tool. This process can be subdivided into three stages as described below (following Callahan 1979).

41 **Uniface, early stage**. A uniface which exhibits primary thinning: a unifacially worked edge, irregular outline, widely and variably spaced flake scars.

42 **Uniface, middle stage**. A uniface which exhibits secondary thinning: a unifacially worked, semiregular outline, and closely or semiregularly spaced flake scars.

43 **Uniface, late stage**. A shaped piece which is unifacially worked with a regular outline and closely or quite regularly spaced flake scars.

50 **Biface, undifferentiated**. An artifact which has flake scars extending across one-third or more of both its dorsal and ventral surfaces. Bifaces undergo various changes in morphology from a bifacial core or roughout to a preform to a finished tool. This process can be subdivided into three stages as described below (following Callahan 1979).

51 **Biface, early stage**. A biface which exhibits primary thinning: a bifacially worked edge, irregular outline, and widely and variably spaced flake scars.

52 **Biface, middle stage**. A biface which exhibits secondary thinning: a bifacially worked, semiregular outline, and closely or semiregularly spaced flake scars.

53 **Biface, late stage**. A shaped piece which is bifacially worked with a regular outline and closely or quite regularly spaced flake scars.

*Definitions of Artifact Functional Categories*

001 **Utilized debitage**. Flakes or angular debris exhibiting alterations resulting from use of the artifact as a tool. These alterations are observable under magnification as a range of different patterns of microfracture and cross-sectional morphology of edge perimeters caused by the application of force during use. Types of wear include step fractures, scarring and nibbling, edge rounding, edge bevelling, rotary wear, polish, and striations.

002 **Retouched debitage**. Flakes or angular debris which exhibit the intentional detachment of small pieces of debitage from a portion of the edge (the perimeter). Marginal retouch is observable as a series of small negative scars which originate from the perimeter and extend over less than one-third of either surface.

003 **Utilized and retouched debitage**. Flakes or angular debris which exhibit both utilization and retouch.

010 **Hammerstone**. Tools used to remove debitage from cores or for pounding. Hammerstones are usually cobble tools, though cores and formal tools (such as choppers) are sometimes also used as hammers, either in addition to their original function or when no longer suitable for the purpose they were designed for. Wear patterns will usually consist of battering along one or more facets or edges.

011 **Chopper**. Tools with one or more bifacially flaked edges, often exhibiting heavy battering from use against an anvil. Flaking will usually be restricted to the margin of the tool, and scarring generally will not extend completely across either face. Choppers will usually be cobble tools, though cores are sometimes also used in this fashion.

012 **Plane**. Tools with one or more unidirectionally flaked edges, often exhibiting heavy wear. Flaking will generally be restricted to the margin of the tool and normally will not extend completely across the face. Planes are usually cobble tools and in form can resemble large end scrapers.

013 **Axe**. Tools with sharpened wedge-shaped distal ends and proximal ends that are notched or grooved for hafting. Shaping can be by flaking, grinding, or a combination of both. Wear is usually restricted to the distal end and can consist of heavy battering.

014 **Pecking stone**. This is a specialized type of hammerstone used to roughen and refurbish the surfaces of manos and metates. In many cases a tool used for this purpose will be indistinguishable from a hammerstone. In general, a pecking stone is an elongated pebble or cobble with sharp ends, and battering wear is usually restricted to one or both ends.

015 **Hoe**. Hoes are similar in shape to axes and are sometimes indistinguishable from them. Distal ends are either sharpened wedges or pointed and picklike. Shaping can be by flaking, grinding, or a combination of both. Wear is generally restricted to the distal end and can include battering on the end of the tool as well as polish along distal faces.

016 **Maul**. Mauls are hafted hammers or battering tools with blunt distal ends and proximal ends that are notched or grooved by pecking for hafting. Shaping is usually by grinding, though flaking can also be used. Wear will generally consist of battering on the distal end.

017 **Tchamahia**. Specialized tool produced by grinding or flaking and grinding, and usually made from silicified limestone (hornstone), though other materials are sometimes used. Tchamahias are usually triangular or spatulate in form, and the distal end (in triangular forms) or distal end and one edge (in spatulate forms) are sharpened and wedge-shaped. The function of these tools is undetermined. They may have been used variously as ceremonial hoe blades, weapons, or symbols of status.

050 **Drill**. A tool characterized by a projection formed by natural fracture or intentional retouch, with wear (when present) in the form of rotary rounding or scarring.

051 **Graver**. A tool characterized by a lateral edge projection which is concave to straight. The edge angle is at least 40 degrees, and wear is in the form of unidirectional utilization or retouch.

052 **Spokeshave (notch)**. A tool characterized by a concave notch formed by retouch or natural fracture. Retouch or utilization should be visible on the interior of the notch.

053 **Denticulate**. A tool characterized by a widely spaced, marginally retouched serrated edge.

075 **Core-chopper**. A core with one or more bifacially flaked edges that are battered from use. These tools differ from chopper-hammerstones in that utilization is only along modified edges and does not occur on unmodified edges or facets.

076 **Scraper-graver**. A tool with at least two working edges, one that has been retouched at a steep angle to serve as a scraper and a second with a concave to straight projection with an edge angle of at least 40 degrees that demonstrates wear in the form of unidirectional utilization or retouch.

077 **Chopper-hammerstone**. A tool with at least one edge that has been bifacially flaked and is battered from use. Flaking will usually be restricted to the working edge(s) and will not extend completely across the face of the tool. One or more unmodified edges or facets will also be battered from use in removing debitage from a core or from other activities in which a pounding motion is used.

080 **Strike-a-light flint**. Tools used to produce sparks, exhibiting unidirectional or bidirectional utilization/retouch, abrasion, and occasional metal adhesions. This type of wear produces edges that vary between straight, concave, and convex, depending on the amount of use and the original edge angle. These tools will often resemble scrapers or spokeshaves but can be distinguished from them by the battered appearance of their working edges.

081 **Gunflint**. Tools used in gunlocks to produce sparks and ignite priming powder. Northern

European gunflints are wedge-shaped tools made from snapped blades and can exhibit heavy battering along their working edge. Spanish gunflints are bifacial, squared, pillow-shaped tools that can exhibit heavy battering on up to four edges.

090 **Unutilized angular debris**. Angular debris with no further modification or indication of use; corresponds with morphological code 01.

091 **Unutilized flake**. Flake with no further modification or indication of use; corresponds with morphological codes 02 through 09.

092 **Unutilized core**. Core with no further modification or indication of use; corresponds with morphological codes 20 through 25.

093 **Unutilized cobble tool**. Cobble tool with no further modification or indication of use; corresponds with morphological codes 30 through 32.

100 **Uniface, undifferentiated**. A uniface with no further modification or indication of use; corresponds with morphological codes 40 through 43.

Scrapers are tools that exhibit consistent unifacial or marginal unidirectional retouch extending across only one surface. Edge angles are usually steep (between 60 and 90 degrees). Wear is produced by the transverse movement of the edge across an object.

101 **End scraper**. End scrapers exhibit consistent steep unifacial or marginal unidirectional retouch along an edge located at the end of the tool's longest axis.

102 **Side scraper**. Side scrapers exhibit consistent steep unifacial or marginal unidirectional retouch along one or more edges that run parallel to the tool's longest axis.

103 **End and side scraper**. Tools exhibiting consistent steep unifacial or marginal unidirectional retouch along at least one edge at the end of their longest axis and one edge that runs parallel to their longest axis.

104 **Thumbnail scraper**. Thumbnail scrapers are small end scrapers, with the end opposite the scraper edge retouched to a point (spurred) for hafting. The spur may or may not be present. It may result from use of the tool to exhaustion in the haft, so that resharpening is no longer possible, and the spur is the remnant of the initial form.

150 **Biface, undifferentiated**. A biface is an artifact that exhibits consistent retouch flake scars along the edges of both opposing surfaces. If the scars cover one-third or more of both surfaces the item is bifacially retouched. If the scars cover less than one-third of both surfaces, it is marginally retouched. This code is used for bifaces that show no further modification or indication of use. It corresponds to morphological codes 50 through 53.

151 **Knife**. Knives are medium to large bifacial tools, frequently notched on one or both sides and designed for hafting. Utilization occurs along a thin lateral or terminal edge, generally with an angle of less than 40 degrees.

152 **Cody knife**. Paleoindian tool associated with the Cody complex. The Cody knife is asymmetrically stemmed with a triangular blade. If the blade is viewed as a right triangle,

one of the short sides is adjacent to the stem, the second forms a continuation of the stem, and the longest side forms the cutting edge and is tangential to the stem. Flaking is generally fine, parallel, and at an angle to the long axis of the tool. Many Cody knives represent reworked Scottsbluff points.

200 **Projectile points**. Brief descriptions of some of the more common types of projectile points found in New Mexico are provided in Appendix 2. For more detailed descriptions and illustrations see Honea (n.d.), Irwin-Williams (1973, 1979), Jennings (1968), Suhm and Jelks (1962), and Willey (1966). The first group of points are very general or unidentified types, and are followed by temporal groups beginning with the Paleoindian and extending through the historic period. Unassigned codes can be used for new types or types not included in this list.

## Flake Platform Type

This attribute records the point of impact on whole flakes or proximal fragments. Platforms that were modified to ease flake removal are separated from those that were not, and those types of modifications are recorded. The following codes include most of the platform types that will be encountered in an analysis. Other codes are available if needed. Each type of platform is described below.

*Flake Platform Definitions*

01 **Cortical**. Cortical platforms are covered by the original weathered surface of the nodule they were removed from.

02 **Cortical and abraded**. Cortical platforms that have been modified by grinding along their back edge, where the platform and dorsal flake surface meet.

03 **Single facet**. Single facet platforms lack cortex and scarring from previous removals or preparation.

04 **Single facet and abraded**. Single facet platforms that have been modified by grinding along their back edge, where the platform and the dorsal flake surface meet.

05 **Multifacet**. Multifacet platforms have scars from previous flake removals along a core or tool edge crossing them, but the scars are truncated and do not originate at the back edge of the platform.

06 **Multifacet and abraded**. Multifacet platforms that have been modified by grinding along their back edge, where the platform and the dorsal flake surface meet.

07 **Retouched**. Platforms are sometimes retouched to ease flake removal. Retouched platforms have flake scars running across them but differ from multifacet platforms in that the flake scars originate at the back edge of the platform.

08 **Retouched and abraded**. Retouched platforms that have been modified by grinding along

their back edge, where the platform and the dorsal flake surface meet.

09 **Abraded**. Platforms which have had their back edge (where the platform and distal flake surface meet) modified by grinding. Generally, this code will only apply when the abrasion has obscured other platform characteristics.

10 **Collapsed**. The platform will sometimes be detached from a flake by the force of the blow used to remove it. When a platform collapses, part of the proximal edge usually remains but is not diagnostic of the original platform type. Thus, even though the platform is gone, flakes with collapsed platforms are whole as long as a natural distal termination is also present. In cases where most of the platform is gone, and only the hertzian cone remains, the platform is also considered to be collapsed.

11 **Crushed**. Platforms are sometimes damaged by the force of the blow used to remove a flake but do not collapse. Platforms can be crushed by using too much force to detach a flake or by striking a weak platform (edge angle is too acute). In both cases the platform shatters, obscuring its original form and separating small fragments from the platform surface.

12 **Absent**. Platforms are absent when a flake is broken and only fragments lacking the striking platform remain.

## Portion

This attribute refers to the part of an artifact that is represented. By definition, angular debris and cores are whole--it is almost always impossible to determine whether these types of artifacts were fragmented during or after reduction. Flakes and formal tools can be whole or fragmentary.

*Artifact Portion Definitions*

0 **Indeterminate fragment**. A piece of debitage that has definable dorsal and ventral surfaces, but lacks a platform, termination, and other attributes that would allow it to be assigned to a more specific category. Portions of tools that cannot be more accurately oriented

1 **Whole**. A flake is considered whole if the proximal, medial, and distal portions are present. Both the platform and the natural termination must be present. If the platform is crushed or collapsed, the flake is considered whole if it is possible to determine, with reasonable certainty, where it was. An unbroken tool.

2 **Proximal**. The proximal portion of a flake is the area containing the platform. Proximal fragments lack natural terminations (i.e., end in snap fractures). The portion of a tool that is hafted or held in the hand.

3 **Medial**. The medial portion of a flake is considered to be the area that includes one or both lateral margins but does not include either the proximal or distal portions (i.e., the platform and natural termination). The medial portion encompasses an area perpendicular to the proximal/distal or long axis. A tool fragment that includes one or both lateral margins but lacks the hafted or held end and the tip or working end.

4 **Distal**. The distal portion of a flake is the area that includes the natural termination but lacks a platform. The tip of a hafted tool or the working edge of a hand-held tool.

5 **Lateral**. The lateral portion of a flake or tool is its side or edge. The lateral margins are located along the edges perpendicular to the platform-distal termination (or proximal-distal) axis and do not include more than approximately 30 percent of either the proximal or distal portions (estimated).