MUSEUM OF NEW MEXICO

A DATA RECOVERY PLAN FOR SEVEN ARCHAEOLOGICAL RESOURCES ALONG U.S. 285, CHAVES AND DE BACA COUNTIES, NEW MEXICO

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by
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ARCHAEOLOGY NOTES 226

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ADMINISTRATIVE SUMMARY

The New Mexico State Highway and Transportation Department (NMSHTD) has requested the Office of Archaeological Studies (OAS), Museum of New Mexico, Santa Fe, to prepare a data recovery plan for seven archaeological sites located in Chaves and De Baca counties, New Mexico. The prehistoric period resources are LA 34150, LA 51095, LA 117246, LA 117248, LA 117250, LA 117255, and LA 117257. LA 51095 is located on State Trust land. LA 117248 is located on Bureau of Land Management/Roswell resource area land. The others are located on private land and highway right-of-way, acquired from private sources. All of the prehistoric sites mentioned above were found to be eligible to the *National Register of Historic Places*. Portions of the sites are within the limits of the proposed project to reconstruct U.S. 285. This data recovery plan is consistent with *Treatment of Archaeological Properties: A Handbook* (Advisory Council on Historic Preservation).

MNM Project No. 41.6481 (Salt Creek Excavation Project)
NMSHTD Project No. SD-WIPP-285-5 (206)
CN 2514
JPA 343/97

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INTRODUCTION

At the request of Mr. Gregory D. Rawlings of the New Mexico State Highway and Transportation Department (NMSHTD), the Office of Archaeological Studies (OAS), Museum of New Mexico, has prepared a data recovery plan for seven archaeological sites along U.S. 285 and U.S. 60 in Chavez and De Baca counties, New Mexico (Fig. 1). The prehistoric period resources are LA 34150, LA 51095, LA 117246, LA 117248, LA 117250, LA 117255, and LA 117257. LA 51095 is located on State Trust land. LA 117248 is located on Bureau of Land Management/Roswell resource area land. The others are located on private land and highway right-of-way, acquired from private sources. This sites were originally located by SWCA, Inc., during an archaeological resource inventory of U.S. 285 (Phillips et al. 1997). Seven sites south of Encino and north of Roswell, New Mexico, which are within the proposed project limits, were determined to have potential to provide important information on local prehistory and history. Therefore, the archaeological resources were recommended for data recovery prior to construction.

A data recovery program was developed for these sites and is presented in this report. The data recovery plan includes proposed research orientations and problem domains, and a strategy for implementing research objectives through excavation and analysis. Also included are descriptions of the sites, an overview of the history and prehistory of the project area, and data on the environment. Site locations are provided in Appendix 1.

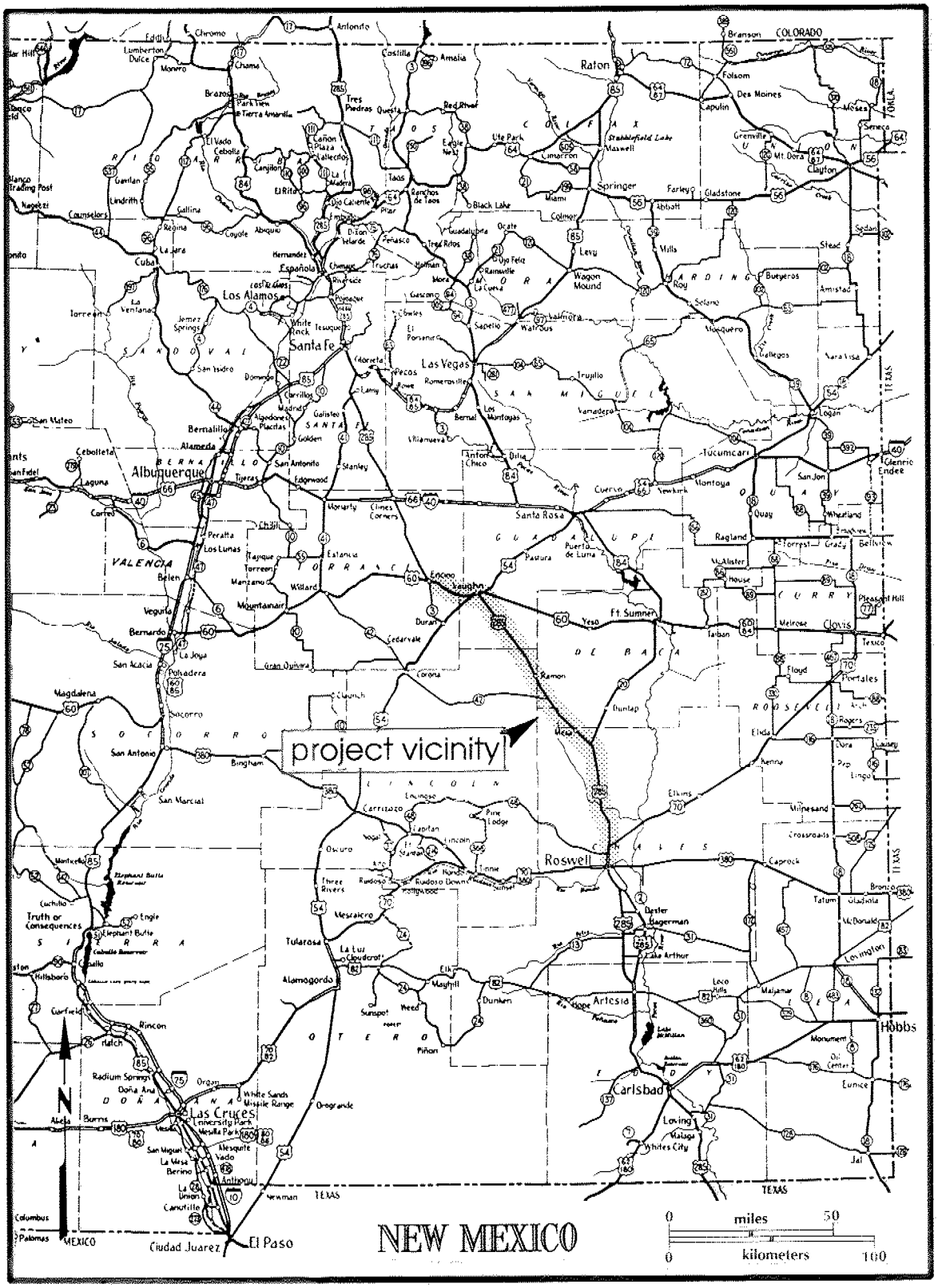

Figure 1. Project vicinity map.

NATURAL ENVIRONMENT

by
Regge Wiseman, Dorothy Zamora, and Stephen C. Lentz

Geologically, the project area is located within a semi-isolated remnant of undivided strata of the Artesia Group (Permian). The surface geology of the surrounding, lower-lying terrain is Quaternary alluvium of the Pecos Valley (Dane and Bachman 1965).

Soils in the vicinity of the project belong to the Upton-Simona Association. Maker and others (1971:15) describe these soils as "Although small and scattered areas of deep soils occur in this association, it is dominated by shallow soils underlain by fractured strongly cemented to indurated caliche."

Reakor soils, a major component of this association and especially common in the vicinity of the sites, are a reddish brown calcareous loam. Today, the vegetation of this association is used mostly for grazing because the soils are generally too shallow for irrigation. Small-plot farming of the type practiced by prehistoric peoples would have been possible, but such plots would necessarily be rather widely scattered because of the distribution of the small pockets of deeper, more arable soils characteristic of this association. Thus, gardening would have been possible in the vicinity of the sites, but serious cropping would have been much easier several kilometers further south where larger expanses of arable land are found.

Prior to intensive agricultural development in the late 1800s, surface and underground water sources in the Roswell area were especially productive. Occupants of the project sites had permanent water available at the Pecos River 5.5 km to the east. Skull Lake, lying 1.5 km to the west, was also a potential water source for the prehistoric peoples. Although we suspect that its water is unfit for human consumption today, this may not have been the case prior to the twentieth century when the freshwater component of the underground aquifer was eliminated by overpumping for irrigation. Prior to that time, the Bottomless Lakes, which are hydrologically similar to Skull Lake and are located 24 km to the south, had potable water lenses at the water surface (Earl King, pers. comm. 1981).

According to Kuchler (1964), the potential natural vegetation of the project area is Creosote Bush-Tarbush (*Larrea-Flourensia*) Association, though the site is located in a marginal part of the association. Many of the minor species of this association (i.e., yucca, agave, sotol, and some species of cactus) that would have been most useful to humans either do not occur or do not occur in useful numbers this far north. Mesquite occurs on and in the vicinity of the sites today, but again, the numbers of plants preclude the possibility that it was a major local resource for humans.

Dick-Peddie's map (1993) includes the area of the project sites within his Chihuahuan Desert Scrub association, an association dominated by creosotebush and tarbush. However, he notes in his discussion (1993:131ff) that the Chihuahuan Desert in southern New Mexico has spread at the expense of Desert Grassland over the past 150 years, mainly because of grazing pressure. Because a very slight climatic shift also occurred during the past 150 years, the changes brought on by overgrazing could not be reversed to normal vegetative conditions (i.e., Desert Grassland). Although scientists cannot say for certain, it is possible that the presence of species such as soaptree yucca within Chihuahuan Desert Scrub areas may indicate these areas were

formerly Desert Grassland. If this is true, then the project sites, at the time of prehistoric occupation, were probably within the grassland zone, because soaptree yuccas are quite common on the sites and in the surrounding area.

One of the natural attractions of the Roswell area was the variety and abundance of wildlife. Early pioneers describe large herds of antelope, cottontails, jackrabbits, and an abundance of fish (Shinkle 1966). The Pecos River formed the western boundary of the range of large bison herds that frequented the southern Great Plains, though small herds and individuals moved west of the river as well. Antelope in groups of 5 to 30 animals can be observed grazing most days in the valley north and northeast of the project sites.

Roswell's climate today is characterized by mild winters and hot summers. The normalized mean January temperature is 3.3 degrees C; that of July is 25.9 degrees C; and the yearly mean is 14.7 degrees C. The average frost-free season is in excess of 200 days (Tuan et al. 1973).

Precipitation is currently summer dominant. The mean normalized annual amount is 295 mm, with 210 mm falling in the growing season of April through September (U.S. Department of Commerce 1965).

CULTURE HISTORY

Stephen C. Lentz (with portions adapted from Wiseman 1996)

The following culture history outline of southeastern New Mexico has been compiled from a number of archaeological studies. Sources include Stuart and Gauthier (1981), Sebastian and Larralde (1989), Kelley (1984), Jelinek (1967), Katz and Katz (1985a), and Leslie (1979). The interested reader is referred to those sources for additional information. Since there is a lack of consensus about an absolute chronology for the Roswell area, which hosts numerous overlapping cultural traditions and has many interpretive problems (see Sebastian and Larralde 1989), we have divided it into several major divisions: the Paleoindian, the Archaic, the Formative period of the Jornada Mogollon, the Ceramic, and the Historic periods. The following summary is concerned primarily with the relevance of regional culture-histories to the project area.

The prehistoric occupation of the Roswell locality is poorly understood. There is a scarcity of systematic research--as of this writing, only a few small cultural resource inventories have been performed. Also, the project locality is peripheral to two major culture areas: the Plains culture to the east and the Anasazi to the west. Attempts at relating the Roswell area archaeological remains to one or the other often yield ambiguous results. Finally, local collectors have been stripping sites of their diagnostic artifacts for close to a century. This has resulted in a substantial loss of information.

The Paleoindian Period (13,000 B.C. to 1,000 B.C.)

Human occupation of southeastern New Mexico began with the Paleoindian period. The earliest, or Clovis period, dates to at least 13,000 years ago. These groups and their successors of the Folsom period (8000-6000 B.C.) primarily hunted megafauna, such as mammoths and extinct forms of *bison antiquus,* and maintained a nomadic or seminomadic lifestyle. Although most accounts of Paleoindians refer to them as big-game hunters, it is probable that wild vegetal foods and small animals were consumed as well. Paleoindian occupation and use of the project area is demonstrated by Clovis, Folsom, and Eden projectile point fragments found during the Haystack Mountain Survey (Bond 1979).

The retreat of the Pleistocene glaciers and resultant warming of the more southerly latitudes resulted in a shift in human adaptation between 3000 and 1000 B.C. During the Archaic period, resources were more broadly based and focused on smaller animals such as deer and rabbits. The appearance of grinding tools and specialized burned-rock features suggests a greater reliance on plant foods.

The Archaic Period (3000-1000 B.C to A.D. 750)

The Archaic phase of adaptation succeeds the Paleoindian period, and refers to a time of migratory hunting and gathering groups employing a seasonal pattern of wild plant and animal exploitation. The Archaic of the greater Roswell region has not been systematically studied. Radiocarbon dates suggest a very generalized beginning date of between 3000 and 1000 B.C. and

ending at A.D. 750. Researchers, looking at the remains from single site excavations or limited surveys, have posited affiliations with the central Texas Archaic (Bond 1979), the Texas Panhandle Archaic (Jelinek 1967), the Oshara Tradition of northwestern New Mexico (Jelinek 1967), and the Chihuahua Tradition and the Cochise Culture of south-central and southwestern New Mexico and adjacent Arizona.

Later Archaic peoples (between 1000 B.C and A.D. 1) are better known in that more sites with a wider variety of remains have been documented. They used relatively small hearths (1-m-diameter clusters of small rocks) and burned-rock rings. Previously named projectile point styles associated with this phase include the Darl and the Palmillas types of the Texas sequence as well as the San Pedro-style projectile point. Subsistence involved exploiting both riverine and upland plant and animal species.

The terminal Archaic phase (A.D. 1 to 750) saw a continuation of the previous patterns and a greater use of burned-rock rings. Although this suggests that certain upland resources such as agave and sotol were becoming more important in the diet, the ratio of riverine to upland sites remained the same, with the emphasis still on floodplain living. Projectile point types commonly associated with this phase include the previously known San Pedro style; the Pecos point (a newly described provisional type), and several less standardized styles of points commonly found in the region. Within the project area, LA 117257 is described as a possible Archaic phase campsite.

The Ceramic Period (A.D. 750 to A.D. 1300 or 1400)

Between A.D. 750 and A.D. 1150, occupation of the floodplain environment reached its zenith. Four major changes also occurred at this time. Brown Ware ceramics, the bow and arrow, and a type of rock habitation structure (the stone circle or piled-rock structure) appear for the first time. The earliest use of ceramic artifacts appears to have occurred in southeastern New Mexico between A.D. 600 and 900 (Stuart and Gauthier 1981). In addition, the subsistence system changes from a riverine emphasis supplemented by upland foods to one that emphasized upland products supplemented by riverine foods. Projectile point styles are dominated by the corner-notched Scallorn projectile points. Scallorn, Maljamar, and Ellis projectile points were recovered from the Townsend site (LA 34150).

Late Prehistoric or Ceramic period occupation in the Roswell area involved villages of pithouses or pueblo-style architecture and impressive accumulations of trash (termed, at least in part, the Lincoln phase by Kelley [1984]). Corn agriculture was clearly important to the diet, but hunting, fishing, and gathering of wild plant foods remained important. This occupation ended rather abruptly some time in the fourteenth or fifteenth century when the entire region was abandoned, at least by sedentary peoples. Just what happened to these people, and the whereabouts of their descendants, is unknown.

The Formative and El Paso Phases of the Jornada Mogollon

The Jornanda branch of the Mogollon (Lehmer 1948) included the western portion of the Roswell district. The Mogollon occupation of the project area may have lasted from A.D. 500 to A.D. 1400.The Mesilla Phase or Formative period extends from A.D. 500 to A.D. 1100. During the Early Formative, a basically Archaic adaptation continued to be pursued. Later, pithouse sites

appear, comprising both round and rectangular structures with numerous extramural hearths and storage pits. El Paso Brown is the dominant pottery, and imported ceramics are few and originate in the Mimbres area. The succeeding Doña Ana phase or Late Formative (A.D. 1100 to A.D. 1200) multiroomed, above-ground pueblos occur at this time, occupied along with pithouses. El Paso Brown, El Paso Polychrome and trade wares from the Zuni and Tularosa Basin areas occur. During the El Paso phase (A.D. 1200 to A.D. 1400), sites are described as consisting of adobe room blocks arranged either around plazas or in east-west oriented tiers. A wide variety of indigenous and nonlocal ceramics characterize this phase, including El Paso Polychrome, Chupadero Black-on-white, Lincoln Black-on-red, and Three Rivers Black-on-terracotta. Ceramic period sites in the immediate vicinity of Roswell appear to reflect the oasislike character of the area. That is, local natural resources are especially favorable to more intensive occupation and presumably greater population stability than in the more xeric environs. A number of sites known or suspected of having architecture are present, and they display the attributes of the more sedentary Jornada Mogollon peoples to the west.

Within the current project area, a component of the Townsend site (LA 34150) is a large Jornada Mogollon base camp, with numerous burned hearth features, chipped stone, and El Paso Brown and Chupadero Black-on-white ceramic artifacts (see description in this report).

North of Roswell, along the Pecos River below Fort Sumner, a slightly different late prehistoric sequence has been defined (Jelinek 1967). These remains also include architecture, but the structures and the pottery, at least in part, are more directly tied to cultural events in central New Mexico. These small villages of pithouses, and later, small pueblos of *cimiento* construction, were abandoned about A.D. 1250 or 1300 when, as Jelinek (1967) suggests, the people abandoned farming to hunt bison full-time.

Between ca. A.D. 1000 and 1200, sites are characterized by large lithic and ceramic artifact scatters and occasional indications of permanent architecture. There are also smaller sites that Jelinek (1967) states "appear to represent temporary camps." At site P9, the pottery assemblage is dominated by Roswell Brown. The two identifiable projectile points are wide, corner- and side-notched arrow(?) points with convex blades and basal edges.

The Roswell phase dates between ca. A.D. 1200 and 1300. The two principal sites of this period, P7 and P8, are characterized as concentrations of several thousand flakes or sherds with little or no indication of permanent architecture (Jelinek 1967). The permanent architecture probably refers to pithouses or pueblos, such as those excavated closer to Fort Sumner. The pottery assemblage during the Roswell phase is dominated by Roswell Brown, Jornada Brown, and Chupadero Black-on-white. The lithic assemblage includes many small end scrapers. The three identifiable projectile points are wide, side-notched arrow points with convex blade edges and straight to convex basal edges and a triangular, multiside-notched form.

These late prehistoric remains in the vicinity of Roswell contrast with the extensive scatters of artifacts that are commonly found in the sand dune country east of the Pecos River (such as the Bob Crosby Draw site) and on the Sacramento Plain north, west, and south of Roswell (Stuart and Gauthier 1981). It is currently unclear how these scatters relate to either Jornada Mogollon or Plains manifestations. Given the geographic location of the sites, they could have been occupied by peoples from either culture area, however, the exact cultural distribution remains unclear (see Speth 1983; Rocek and Speth 1986).

The Roswell locality evidently was abandoned by farmers in the A.D. 1300s or early 1400s. But because of its water and faunal resources, this region must have figured prominently in all subsequent hunting and gathering patterns of the region until the coming of the Spaniards in the late 1500s and 1600s.

The Historic Period

The time between the abandonment of southeastern New Mexico in the 1400s and the coming of unidentified peoples described by the early Spanish explorers in the late 1500s is unknown. It is probable that nomadic use of the region continued during this time. Jelinek (1967) attributes the occasional late prehistoric Rio Grande glaze sherds, increased abundance of obsidian, and a tipi ring site to his post-McKenzie phase. These remains, plus abandoned *rancherìas* described by early Spanish explorers, certainly indicate the presence of hunter-gatherers during the protohistoric and early historic periods, but the inhabitants effectively disappeared as an identifiable group before more detailed accounts and relationships could be recorded.

From Spanish contact until after the American Civil War, roaming Apache and other Plains tribes kept Spanish, Mexican, and Euroamerican settlement of southeastern New Mexico in abeyance. Following the Civil War, mass westward movement of Americans and eastward drifting of small groups of New Mexican Hispanics led to settlement of the region.

Roswell was founded about 1870. Artesian water was discovered in 1891, and its development promoted widespread irrigation and a rapid population influx. The railroad reached Roswell in 1894, setting the course for urbanization of the area. The town's economy, then as today, was based on agriculture and stockraising.

The Encino area was used primarily for sheep and cattle ranching until the Hispanic farming village of Derramadero, located northeast of Encino, was settled in the late 1800s. After 1900, homestead acts and the construction of the railroad brought settlers into Torrance county. Encino was founded in 1905.

PREVIOUS ARCHAEOLOGICAL WORK IN THE ROSWELL AREA

The list below includes some of the more significant investigations in the Roswell area.

* Sample survey of the Abo Oil Field north of Roswell (Kemrer and Kearns 1984); documented a wide range of site types, probably all of which are campsites, lithic material collection/quarry areas, and food collecting sites; no structural sites identified with certainty;

* Testing of the Townsend site north of Roswell (Maxwell 1986); recovered hearths, artifacts, and animal bone from three time periods defined by radiocarbon dates--490-250 B.C. (pre-pottery), A.D. 460-820 (pottery and corner-notched arrow points), and A.D. 1200-1400 (pottery and side-notched arrow points); bison bones associated with earliest and latest periods;

* Survey and excavation along the Middle Pecos River northeast of Roswell (Jelinek 1967); defined culture sequence from Paleoindian to Late Prehistoric for Fort Sumner section of Pecos River; excavations focused on Late Prehistoric (pottery) phases;

* Excavations at several sites in the Haystack Mountain area northeast of Roswell (Schermer 1980); test excavations at several pottery period camp sites; darts points at several of the sites may indicate Archaic occupations as well;

* Excavation of the Garnsey Spring campsite (pottery period and possibly some Late Archaic remains) and the protohistoric Garnsey Bison Kill east of Roswell (Parry and Speth 1984; Speth 1983);

* Excavation at the Rocky Arroyo site south of Roswell (Wiseman 1985); excavation of a large, deep pit structure in a small village dating to the A.D. 1200s;

* Excavation at the Henderson site southwest of Roswell (Rocek and Speth 1986); excavation in surface rooms and pit structures dating to A.D. 1200s and 1300s;

* Excavation at Bloom Mound southwest of Roswell (Kelley 1984); excavation in surface rooms and pit structure dating to A.D. 1300s;

* Survey of the Two Rivers Reservoir southwest of Roswell (Phillips et al. 1981); documented lithic material quarries, camp sites, food collecting sites, and probable pottery period structural sites;

* Excavation of the Historic period Ontiberos Homestead west of Roswell (Oakes 1983);

* Testing of 20 lithic artifact sites west of Roswell (Hannaford 1981);

* Excavation of the Fox Place site at Roswell (Wiseman 1991); excavation of part of a large village containing numerous tiny pit structures and one large, deep ceremonial pit structure, all dating to the A.D. 1200s and early 1300s.

* Excavation of Los Molinos site (LA 68182) at Roswell (Wiseman, n.d.a); excavation of a substantial midden associated with 70+ bedrock basin metates and mortars that date to the period A.D. 800-1350, perhaps earlier.

* Excavation at the Bob Crosby Draw site (LA 75163) northeast of Roswell (Wiseman, n.d.b); excavation of a portion of a multicomponent dune site dating to the period A.D. 800-1350, perhaps earlier.

* Data recovery at LA 103523: A complex domestic area in Eddy County, New Mexico. A ring midden complex was excavated at this site by Human Systems Research, Inc. (Kemrer and Meyer 1996).

PREHISTORIC SITE DESCRIPTIONS

(compiled from Phillips et al. 1997)

These sites were revisited by OAS archaeologists Lentz and Akins on April 7 and 8, 1997. The descriptions given by Phillips et al. (1997) are basically consistent with what was observed at these sites. A deteriorated bison skull was noted at the Townsend site. Some artifacts had been obscured on several sites by the recent upgrade of a small above-ground powerline.

LA 34150

Cultural/Temporal Affiliation: Native American multicomponent

Site Type: artifact scatter with features

Dimensions: 630 by 420 m

Site Description:
LA 34150, the Townsend site (Figs. 2, 3) , is a large, multicomponent Native American site on the north and south banks of Salt Creek. U.S. highway 285 bisects the site. An old alignment of U.S. 285, recorded as LA 117249, 2-1, Reach 1, Segment B, cuts across the eastern edge of the site and crosses Salt Creek east of the site boundaries. LA 34150 was tested in 1982 prior to a proposed channelization of Salt Creek (Maxwell 1986). The tested area lay outside the current right-of-way and the proposed channelization never took place. The description that follows is for the site as it appears today. The site consists of an extensive scatter of artifacts containing four loci of features, medium-high artifact density, and fire-cracked rock.

Locus 1 is in the central portion of the site, south of Salt Creek and east of the current road alignment (and bounded on the east by LA 117249). Locus 1 contains Features 1-7, consisting of fire-cracked rock and artifact concentrations (Features 1-6) and a possible midden or habitation (Feature 7). Flaked stone, sherds, ground stone, and a whole soapstone pendant are present, but no obsidian was observed. Locus 1 has been truncated by the former and current alignments of U.S. 285 and by a bladed area to the north (which is probably associated with a channelization project in the wash). A drop in artifact density to the south defines the southern boundary of the locus. Locus 1 occupies part of the first terrace and a low hill.

Locus 2 occupies the upper slope and top of a low rise above Salt Creek that may be the remnants of the second terrace. The locus boundaries are defined by the distribution of features and artifacts; it contains Features 9-14, all of which are clusters of fire-cracked rock with associated artifact concentrations. Flaked stone, the only artifact type present in Locus 2, includes a single obsidian flake.

Locus 3 is west of U.S. 285 on both sides of Salt Creek, but primarily on the north bank; artifacts in this area are dominated by flaked stone, with two metates and a single sherd also observed. This area includes the portion of the site previously recorded and tested by the Museum of New Mexico (Maxwell 1986). As reported by Maxwell, the site was located on both sides of Salt Creek, but primarily on the south bank. An extensive testing project was undertaken prior to

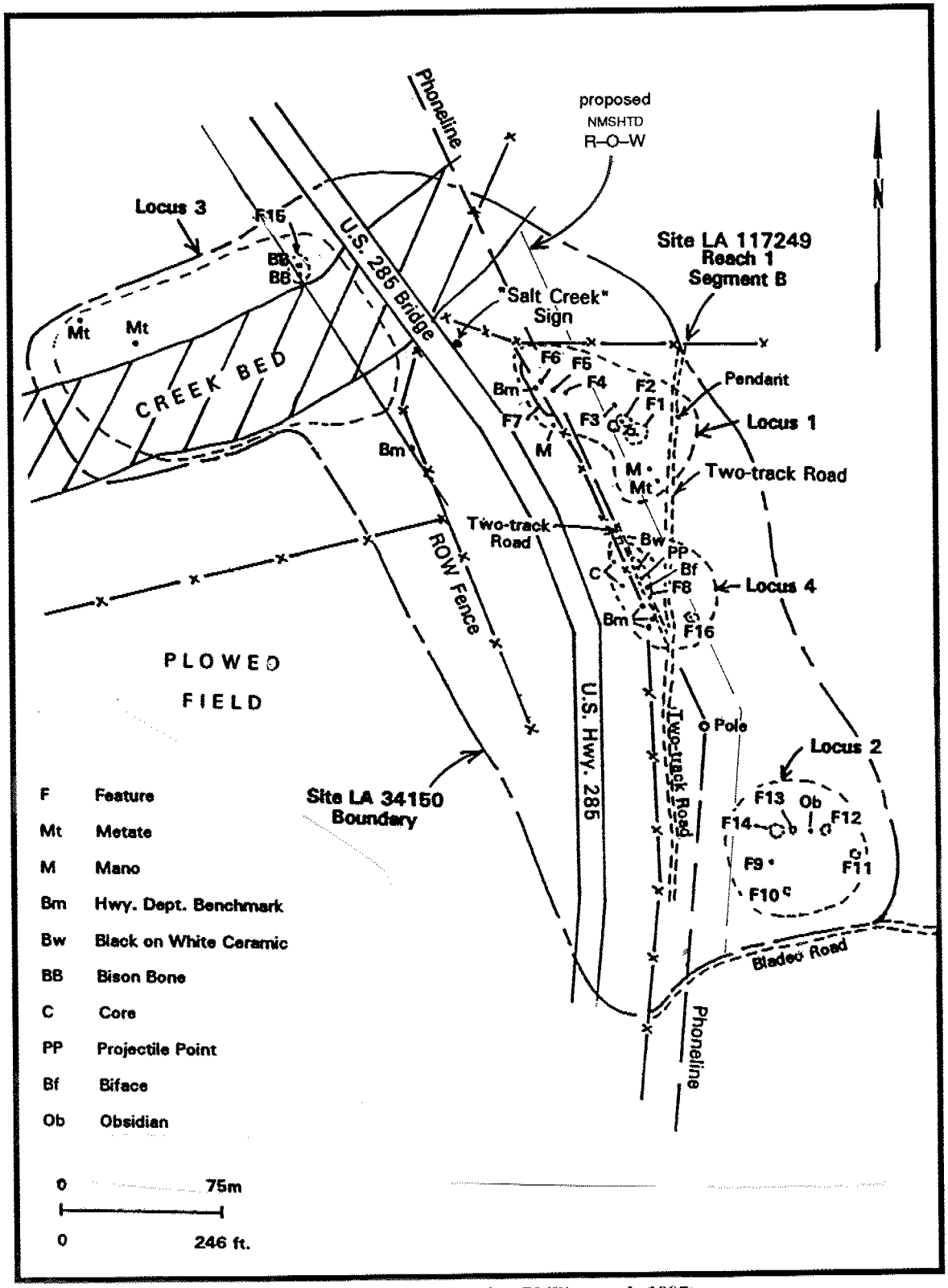

Figure 2. The Townsend Site, LA 34150 site map (after Phillips et al. 1997).

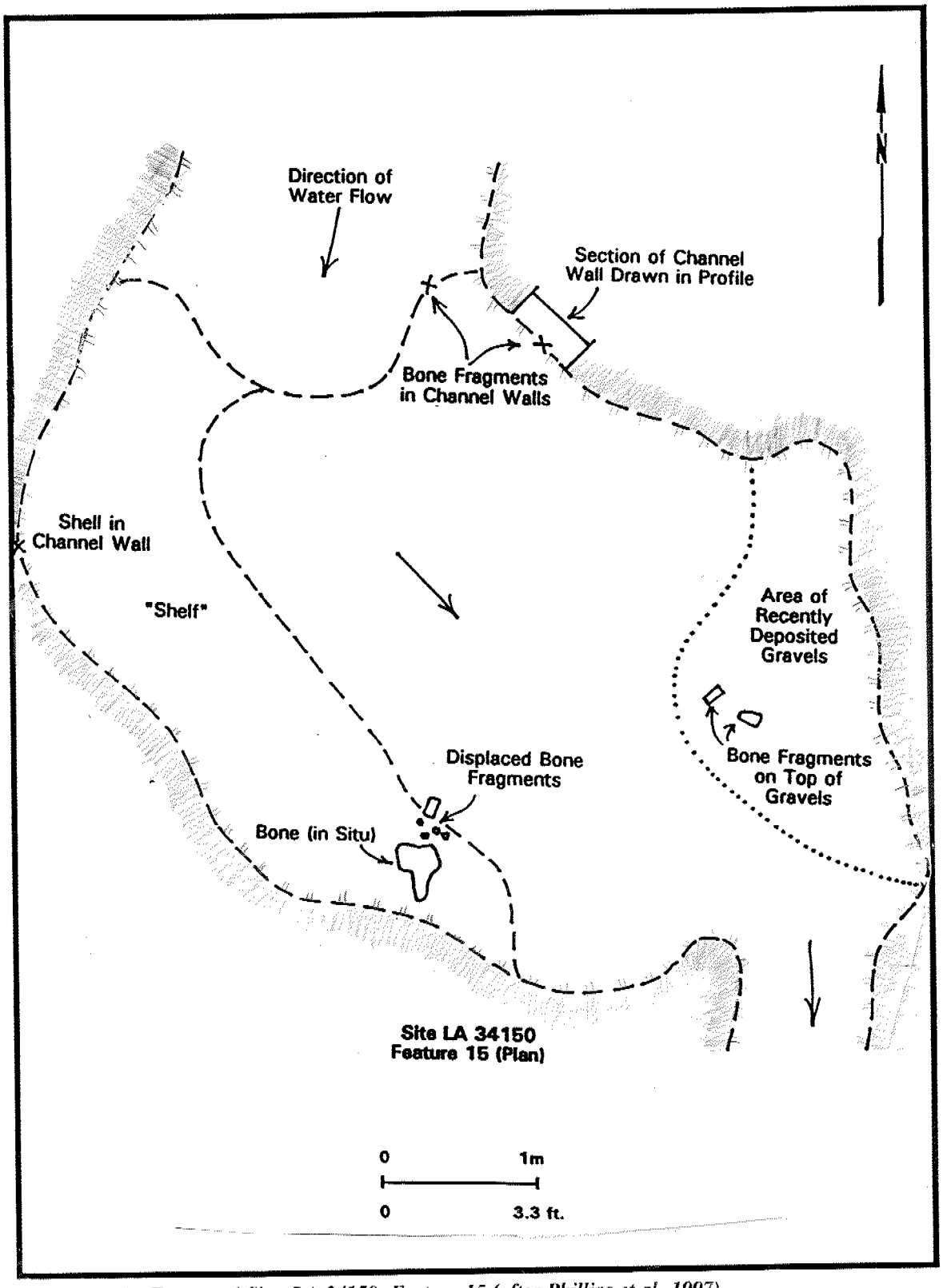

Figure 3. The Townsend Site, LA 34150, Feature 15 (after Phillips et al. 1997).

proposed channelization of Salt Creek to protect the highway bridge; this project resulted in the discovery of three different occupations of the site, including a Late Archaic bison butchering area and two Ceramic period campsites. No investigation of the portion of the site east of the highway (Loci 1, 2, and 4) was undertaken; the site description did not include those areas as part of the site. Locus 3 includes two spots at which very large mammal bones have previously, or are now being, exposed in the walls of the wash. The Bison Cutback (Maxwell 1986), is located at the extreme western end of the site. Speth (Maxwell 1986) identified bones recovered from this area as *Bison bison*; a partial human skeleton was also recovered from this area. Additionally, very large mammal bones, in apparent association with flaked stone artifacts, were observed at Feature 15, in a small side drainage cutting headward into the north bank of Salt Creek just west of the highway bridge (Fig. 3). Lentz and Akins (April 8, 1997) also observed a deteriorated bison skull at Feature 15. Long bones were observed about 1.5 m below the present ground surface, which is below the level at which they were collected in the Bison Cutback (80 cm-1.3 m).

Locus 4, consisting of Features 8 and 16, is between Loci 1 and 2. Features 8 and 16 consist of artifact concentrations with little fire-cracked rock but relatively large numbers of sherds and two chert arrow points.

Lithic artifacts are distributed across the entire site but sherds were generally only observed in Loci 1 and 4 and ground stone was present only in Locus 3, suggesting that different parts of the site may correspond to different components (Locus 3 contained the buried Ceramic period features found during the testing program). The fire-cracked rock and artifact concentrations present in Loci 1 and 2 may represent activity areas, such as roasting pits, food processing stations, or habitations. The apparent absence of ceramics from Locus 2 suggests that it is preceramic in age; Loci 1 and 4 represent one or more Ceramic period occupations.

Feature 1 is a scatter of fire-cracked rock and artifacts of variable density. It measures 8-by-4 m and is on a gentle west-facing slope; a mesquite is growing in the center of the feature. The ground surface appears to be slightly eroded, suggesting that the feature is in the process of being exposed. The 50 to 60 pieces of fire-cracked rock consist of small limestone cobbles. Two sherds (a plain brown ware and a brown ware with a single indentation) and 19 flakes (17 chert core reduction flakes of all stages and two flakes of a dark-colored fine-grained igneous material) were observed.

Feature 2 is a dense cluster of fire-cracked rock measuring 1.2-by-0.8 m. It also contains artifacts, a burned animal bone, and a soil stain about 40 cm in diameter. The 20 to 30 small, cobble-sized pieces of fire-cracked rock are primarily limestone but two are sandstone; a few are oxidized red. One chert secondary flake, one chert interior flake, and one interior flake of a dark-colored fine-grained igneous material were recorded. This feature is in a level area with little erosion, suggesting that the feature may be intact.

Feature 3 is a low- to moderate-density scatter of fire-cracked rock and artifacts that measures 2.5-by-1.8 m. The feature is on a slightly eroded north-facing slope. The feature includes 30 to 40 small, cobble-sized pieces of fire-cracked limestone and four interior flakes of chert.

Feature 4 may be part of the buried midden or habitation exposed in profile to the west (and recorded as Feature 7). Feature 4 consists of a light scatter of fire-cracked rock and artifacts on a slightly eroded, gentle, northwest-facing slope. Within an area measuring 1.8-by-1.4 m, 20 to 30 pieces of fire-cracked limestone were observed. Seven artifacts were noted: one interior flake

of reddish brown quartzite, two flakes of chert (one primary and one interior), and four items of a black, fine-grained igneous material (three interior flakes and one piece of angular debris).

Feature 5 consists of a loose scatter of artifacts and fire-cracked rock measuring about 4-by-2 m. The feature is on an eroded but gentle west-facing slope and may also be an exposure of the deposits recorded as Feature 7. The feature contains 10 to 20 fire-cracked pieces of limestone, a chert projectile point midsection, three small plain brown ware sherds, and 12 core reduction flakes (one primary, two secondary, and four interior flakes of chert; three interior flakes of black, fine-grained igneous material; and two pieces of angular debris of reddish brown quartzite).

Feature 6 is a concentration of fire-cracked rock about 1 m in diameter that consists of 8 to 10 small, cobble-sized and 10 to 20 gravel-sized pieces of limestone or dolomite. Six primary chert decortication flakes, two purple quartzite flake fragments, and one small plain brownware sherd are present. Slightly ashy soil staining is apparent within the feature, which, like Features 4 and 5, may be part of the same deposit recorded as Feature 7. Feature 6 may be actively deflating.

Feature 7 is a possible midden or habitation exposed as an organic stain in the edge of a road cut, just inside the east right-of-way fence. The stain appears to extend from the present ground surface downwards for a distance of 10 to 35 cm; the stain contains a moderate amount of fire-cracked rock and a few bits of charcoal. The stain is 25 m long and rests on an older red clayey sand that is substantially more compact than the feature fill. A large number of artifacts are exposed in the profile or have eroded from it--the field estimate was 50 or more pieces of flaked stone, 4 pieces of ground stone, and 10 to 15 sherds. If Feature 4 through 6 are surface exposures of the same midden, the feature may extend up to 13 m eastward from the road cut.

Feature 8 is an artifact scatter measuring 19-by-8 m and containing an estimated 10 or more Chupadero Black-on-white sherds, 50 or more flakes of chert, quartzite, and a dark-colored fine-grained igneous material (including all stages of core reduction); a complete but crude gray-green chert biface, and a nearly complete San Andres "fingerprint" chert arrow point. Five to ten pieces of small, cobble-sized fire-cracked rock are also present. The artifacts are concentrated in an old two-track road through the feature, and some of the flaked stone artifacts may be the product of, or have been modified by, vehicular crushing.

Feature 9 is a cluster of fire-cracked rock and flaked stone on top of a low hill or terrace at the south end of the site, 7.5 m east of the existing east right-of-way fence. The feature measures about 2 m in diameter and contains 15 to 20 chert flakes (mostly primary core decortication flakes with a few interior flakes and flake fragments) and limestone fire-cracked rock. The feature is centered in a shallow depression, suggesting that it is being exposed by deflation.

Feature 10 is about 15 m from Feature 9, in a slightly blown-out area. The feature measures 2-by-1 m and contains 20 to 25 gravel-sized and 10 to 15 cobble-sized pieces of fire-cracked rock and an ashy gray soil discoloration. One interior core reduction flake of tan chert was also noted.

Feature 11 measures 3 m in diameter and includes 10 to 15 pieces of fire-cracked rock and 20 to 30 flakes in a shallow depression on the northeast side of an eroding dune. The fire-cracked rock ranges from gravel-sized to small, cobble-sized. The chert and quartzite flakes are mostly primary and secondary core decortication flakes, with about five biface thinning flakes also observed. The feature may be in the process of being exposed, or may already be deflating.

Feature 12 measures 1 m in diameter and consists of 6 to 10 bifacial thinning flakes, about 10 pressure flakes, 10 to 20 chert core reduction flakes, 10 to 20 quartzite core reduction flakes, a complete silicified shale bifacial knife, an exhausted chert core, a unifacial "turtleback" scraper, and fire-cracked rock. Also present are 10 to 15 small, cobble-sized pieces of burned limestone and more than 20 gravel-sized pieces of burned limestone. The feature is on the edge of an eroding dune and possibly has just been exposed.

Feature 13 is a 60-cm-diameter concentration of five to ten pieces of small, cobble-sized pieces of fire-cracked limestone. The feature also contains one yellow chert interior core reduction flake. The feature is in a slight hollow between clumps of grass.

Feature 14 measures 1.5 m in diameter and includes a scatter of 15 to 20 pieces of gravel-sized to small, cobble-sized fire-cracked limestone. The feature also contains a yellow-tan chert core remnant, 6 to 10 interior chert core reduction flakes, 5 to 7 chert flake fragments, and 10 to 15 bifacial thinning flakes (primarily made of chert, though a few were of dark-colored, fine-grained igneous material).

Feature 15 (Fig. 3) is an area in which very large mammal bones (possibly bison) and flaked stone artifacts are being exposed in an arroyo in the north bank of Salt Creek, west of the U.S. 285 bridge. Two strata are visible: an overlying deposit of very recent alluvium (Stratum I) and an older, more compact alluvium or residual paleosol (Stratum II). Stratum I is a light to medium brown silty sandy loam that contains large pieces of old highway asphalt surfacing, a piece of nylon, and a bent metal fencepost. Stratum II contains a possible *Olivella* shell and at least eight pieces of large bone, including a possible long bone shaft midsection and a proximal long bone head. The area in which bone is visible measures 2.4 m north-south by 2.8 m east-west; the bone midsection is exposed in the east wall near the top of Stratum II, and the proximal head is exposed in the west wall where erosion has removed the overlying sediments. A piece of what appears to be flaked stone is exposed in the east wall, but was not removed for detailed examination. Contact between Stratum I and Stratum II appears to represent an unconformity, with an unknown amount of Stratum II having been eroded prior to the deposition of Stratum I; a lens of sand and gravel is visible near the top of Stratum II near the long bone midsection, suggesting that the bones were deposited in a stream environment.

Feature 16 is a heavy concentration of ceramics and flaked stone in a blowout that measures 7-by-1.5 m. One sherd of Three Rivers Red-on-terracotta, 10 or more sherds of plain brown ware, and more than 20 sherds of unidentified black-on-white (possibly Chupadero, but the sherds are thumbnail-sized or smaller) were recorded. At least 40 pieces of flaked stone were observed, most of which are interior core reduction flakes and bifacial thinning flakes but including 10 to 15 core decortication flakes. Materials include chert, quartzite, and one piece of silicified shale.

Proposed OAS Data Recovery Program:

The site will be contour-mapped using an electronic total station (ETS). Important surface artifacts, such as the bison skull, will be piece-plotted. The NMSHTD has requested that all material remains within the right-of-way be submitted to data recovery. This includes the bison "bone bed" to the west, and the Jornada-Mogollon base camp to the east. The project area currently extends beyond the limits of the current right-of-way 15.24 m (50 ft) east. Hand tools will be used to remove the 75 cm to 1.0 m overburden covering the bone bed. Areas that are artifactually sterile will be explored mechanically and deep backhoe trenches used to determine if Archaic bison remains are

present well beneath the surface north of the arroyo and east of the highway. It was estimated that approximately 35 excavation units should be excavated to adequately test the features on the Jornada Mogollon component and selected areas of the bone deposits. The number of excavation pits will vary according to perceived need as the project develops. All artifacts will not be collected. A proposed sampling strategy is described in the Field Methods section later in this report. Auger testing will be performed at the base of every excavation unit, as well as in areas between excavation units to determine the depth of the deposits and to ensure that no cultural materials remain. Finally, to ensure that all features have been located, the Jornada Mogollon area will be mechanically scraped to reveal any remaining features.

LA 51095

Cultural/Temporal Affiliation: unknown Native American

Site Type: lithic artifact scatter with fire-cracked rock concentrations

Dimensions: 700 m by 80 m

Site Description:
LA 51095 was first recorded by Norman Nelson (1985b) and Charles Haecker as a lithic scatter measuring 60-by-15 m. Three clusters of fire-cracked rocks were observed within the scatter, which consisted of tens of flakes of purple quartzite and white chert (Fig. 4). The three fire-cracked rock concentrations were observed 15 to 20 cm below the present ground surface, in the edges of a bladed fence line road east of the current U.S. 285 right-of-way fence. One quartzite spokeshave was noted, but no temporally diagnostic artifacts were observed. Subsequently, Yvonne Oakes and Dorothy Zamora of the Museum of New Mexico tested the site, collecting 173 flaked stone artifacts but found little evidence of subsurface deposits. Oakes (1986) recommended clearance for construction within the right-of-way at LA 51095. In 1990, Laura Michalik (1991a) revisited the site and recommended that a proposed fiber optic line be rerouted through the area tested by Oakes and Zamora.

During the current study, LA 51095 was observed to extend well beyond the previously defined boundaries. All artifacts visible were pinflagged, resulting in the identification of three concentrations within a large, low-density scatter of lithic artifacts. Locus A, east of U.S. 285 at the southern end of the site, corresponds roughly with the site as previously recorded. Locus A contains only 10 flakes, probably due to collecting during testing, and no fire-cracked rock. Locus B, north of Locus A and east of U.S. 285, contains 14 flakes, including 2 with evidence of utilization. Locus C is north of Locus B but west of U.S. 285; 46 flakes were observed there, including 4 with evidence of utilization. Each locus contains secondary decortication flakes and interior flakes; only Locus C includes primary decortication flakes and a core fragment. A variety of lithic raw materials was observed, including orange (Alibates or Yeso?), light brown, "fingerprint" (San Andres), light gray, purple-gray, white, yellow-brown, reddish brown, and dark brown chert; light gray, purple-brown, and gray-green quartzite; limestone; and dark-colored, fine-grained igneous material. Tools consisted of a unifacial quartzite scraper, two chert unifacial scrapers, and a tested cobble possibly used as a unifacial scraper. Within the existing right-of-way, artifacts are present but appear to have been displaced by road construction and maintenance activities. The site has been affected by construction of the existing U.S. 285 alignment through the long axis of the site, by construction of two aerial telephone lines (outside the right-of-way) and a buried fiber optic line (inside the right-of-way), by two fence line roads (outside the right-of-way), by livestock grazing, and by previous archaeological testing.

Proposed OAS Data Recovery Program:
The site will be contour mapped using an electronic total station (ETS). Important surface artifacts, particularly those associated with hearth features, will be piece-plotted within the project limits. Limestone bedrock outcrops near the surface. An artificial berm is present within the site boundaries, created by a utility trench. Some secondary deposition is visible within this feature. A minimum of 10 excavation units and auger tests will be excavated to determine the depth of this disturbance. Then the berm will be removed mechanically down to the cultural level. Material

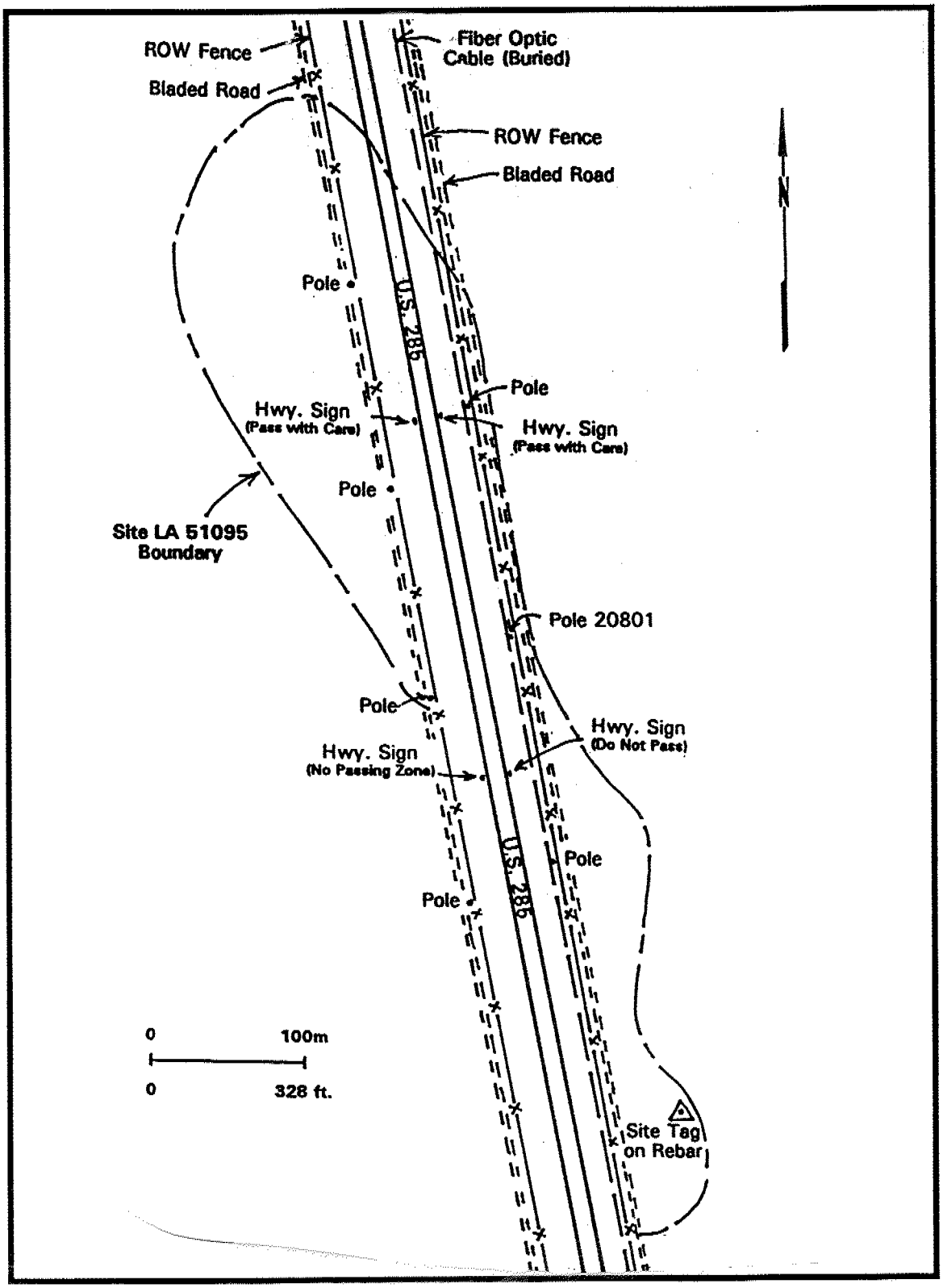

Figure 4. LA 51095 site map (after Phillips et al. 1997).

within the right-of-way that provides important information or information relevant to the research objectives will be collected. A proposed sampling strategy is described in the Field Methods section later in this report.

LA 117246

Cultural/Temporal Affiliation: unknown Native American

Site Type: artifact scatter

Dimensions: 82 by 30 m

Site Description:
LA 117246 is a small scatter of flaked and ground stone on the gentle south slope of a hill, east of the East Fork of Fivemile Draw (Fig. 5). Local plant cover includes grasses (grama and fescue) and yucca. The site appears to have been affected by the current and previous alignments of U.S. 285 and by the blading of a ranch road east of the right-of-way.

Lithic materials include purple quartzite, green-yellow petrified wood, and black rhyolite. Most of the 15 to 20 flakes were cortical or partly cortical, although five interior core reduction flakes were also identified. Six pieces of a unifacially ground sandstone metate were identified in the push-pile of the bladed ranch road; five pieces were separated from the sixth by 20 m. A solitary piece of fire-cracked rock was also identified in the ranch road push-pile.

Proposed OAS Data Recovery Program:
Ground stone (not relocated by OAS) and possible thermal features are present at this site. However, the artifact scatter is sparse. The site will be contour-mapped using an electronic total station. Important surface artifacts, particularly those associated with hearth features, will be piece-plotted within the project limits. Limestone bedrock outcrops near the surface. An artificial berm is present within the site boundaries, created by a utility trench. Some secondary deposition is visible within this feature. A minimum of four excavation units and auger tests will be excavated to determine the depth of this disturbance. Then the berm will be mechanically removed to the cultural level. Material remains within the right-of-way will be excavated with hand tools. This may involve the use of four or more excavation units. The number of excavation units and auger excavations used on this site will vary according to the exposure of cultural remains and features and the judgment of the archaeologist as to whether the potential contribution to the goals of the data recovery plan has been maximized.

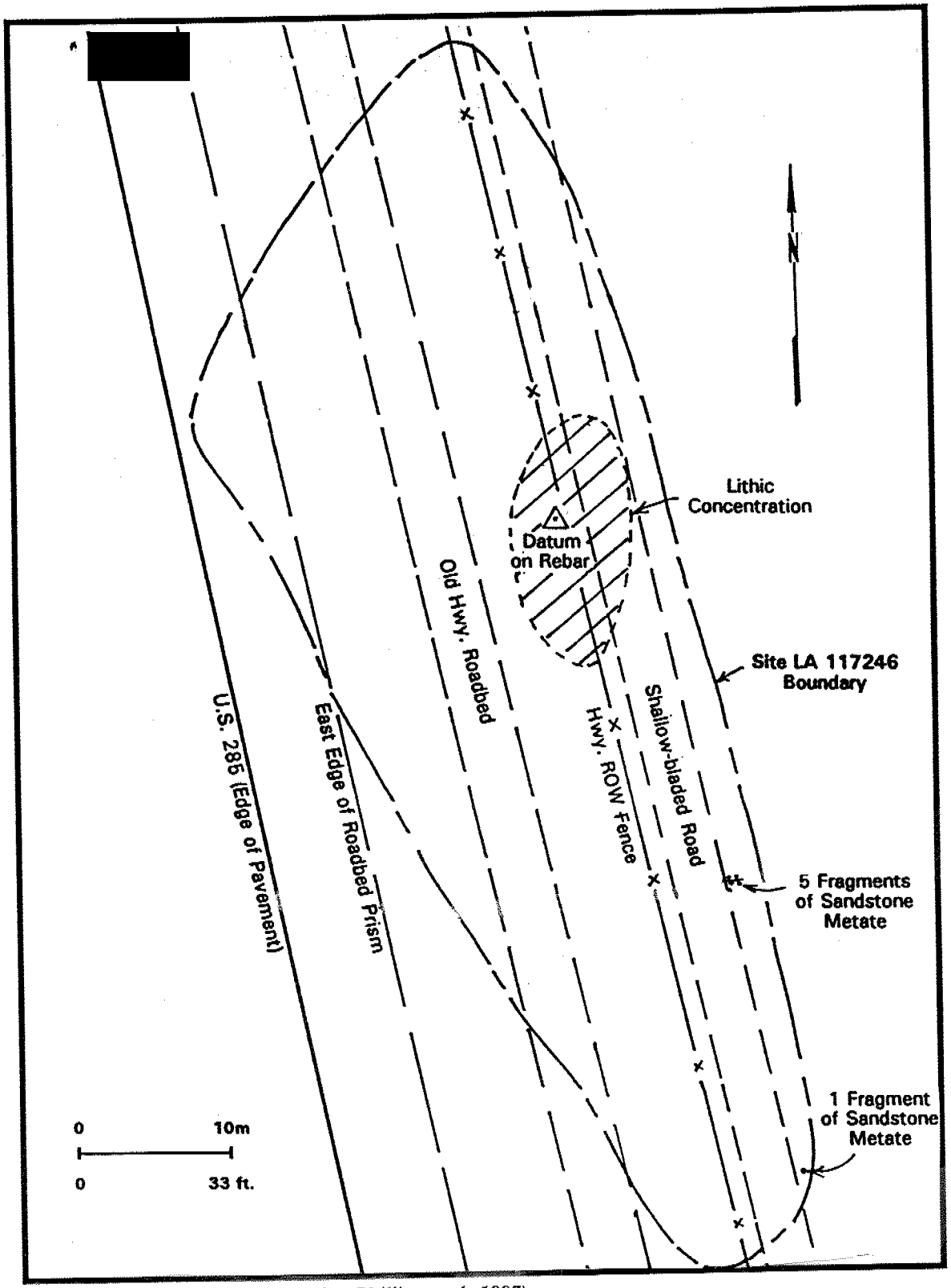

Figure 5. LA 117246 site map (after Phillips et al. 1997).

LA 117248

Cultural/Temporal Affiliation: unknown Native American

Site Type: artifact scatter

Dimensions: 250 by 160 m

Site Description:

LA 117248 is a large, dispersed lithic scatter on an exposed plain southwest of the Middle Fork of Fivemile Draw (Fig. 6). The site has been slightly disturbed by wind and water erosion, by construction and maintenance of U.S. 285 (which bisects the western edge of the site), by grazing, and by the installation and maintenance of power poles in the eastern third of the site. A ditch or arroyo also cuts north-south through the eastern third of the site, in part defining the site's eastern boundary. Local plant cover includes mesquite, grasses, and forbs.

Most of the remains consist of lithic debitage. About 200 to 250 flakes were estimated to be present; an arbitrary sample of 164 flakes was examined in the field. Material types included (from most to least common): purple quartzite, chert, black rhyolite, tan-white quartzite, and chalcedony. Of the 164 flakes examined, 75 were 50 to 100 percent cortical, 40 were partially cortical, 34 were identified as interior core reduction flakes, three flakes were classified as interior bifacial reduction flakes, and the rest were flake fragments.

The other artifacts--five cores, one mano, one biface, and two unifaces--were assigned Point Location (PL) numbers. PL1 is a black rhyolite uniface. PL2 is a partial tan quartzite biface. PL3 consists of two cores (one of purple quartzite measures 6.0-by-4.5-by-3.5 cm; the other, of chert, measures 6.0-by-4.5-by-2.5 cm). PL4 is a mottled red and white chert uniface. PL5 is a unifacially ground one-hand mano on a quartzite cobble; it measures 8.0-by-6.0-by-1.8 cm. PL6 is a chert core that measures 3.5-by-3.0-by-1.5 cm. PL7 is a tan quartzite core that measures 9.5-by-7.5-by-6.5 cm. PL8 is a rust-colored rhyolite core that measures 7.0-by-5.0-by-4.5 cm.

Purple quartzite and chert gravels are eroding from cuts and blowouts within the site boundaries. Based on the amount of core reduction flakes, the site could be a quarry and initial reduction site for flaked stone.

Proposed OAS Data Recovery Program:
The site will be contour-mapped using the electronic total station (ETS). Important surface artifacts, particularly those associated with hearth features, will be piece-plotted and collected *but only within the NMSHTD project limits*. This site is on BLM land and this agency stipulates that the entire site be mapped, including outside of the right-of-way. Material remains within the right-of-way will be excavated using hand tools. Since this is an extensive scatter with exotic materials, this may involve the use of 15 or more excavation units with the proviso that more or fewer units will be used at the discretion of the site director, depending on the amount of material uncovered. This site was originally identified as a quarry site. The OAS feels that it more closely resembles a base camp. This question is addressed in the research design. Mechanical equipment may be used to strip off the artificial overburden, and a trench excavated to ensure that no deeply buried deposits have been overlooked.

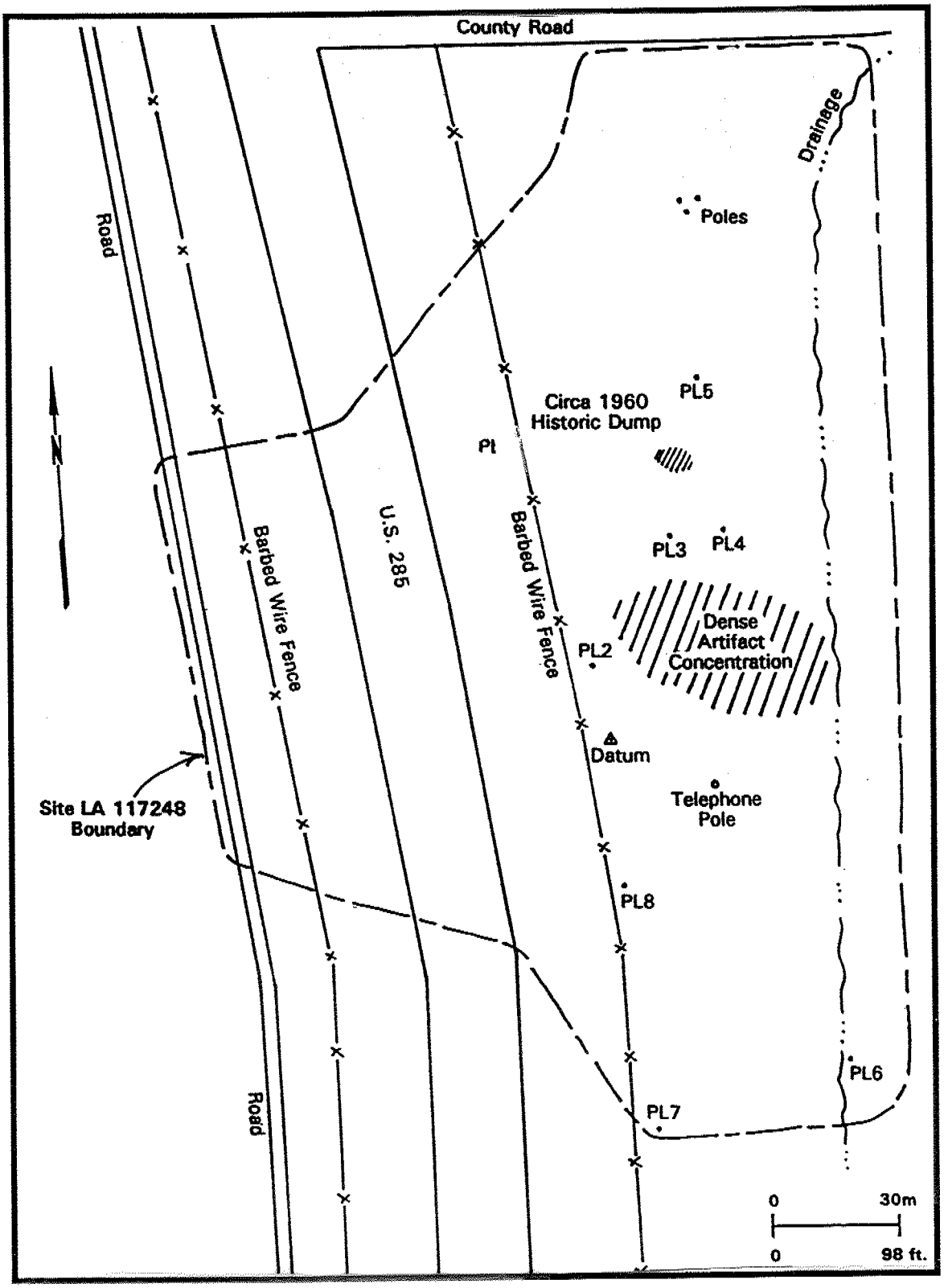

Figure 6. LA 117248 site map (after Phillips et al. 1997).

LA 117250

Cultural/Temporal Affiliation: Jornada Mogollon, A.D. 200-1450

Site Type: artifact scatter

Dimensions: 23 by 22 m

Site Description:
LA 117250 is a low-density artifact scatter consisting of flaked stone debitage, ground stone, and sherds (Fig. 7). The site is within the current right-of-way, west of U.S. 285, on the north slope of a gently rolling hill south of Salt Creek. The site has been disturbed by wind and water erosion and by construction and maintenance of the current or earlier alignments of U.S. 285. The dense local plant cover includes mesquite, yucca, grama and fescue grasses, Russian thistle, and forbs. Most of the artifacts noted were seen in eroded areas.

The artifact assemblage consists of two unifacially ground sandstone metate fragments (the first measures 3.5-by-2.5-by-2.0 cm; the second measures 4.0-by-2.0-by-2.0), four brown ware sherds (most likely Jornada Brown), and one chert core reduction flake (with 40 percent cortex). The scatter was recorded as a site rather than an isolated occurrence due to the presence of three artifact classes. The site may be affiliated with the Jornada Mogollon but cannot be dated more tightly than between about A.D. 200 and 1450.

Proposed OAS Data Recovery Program:
The site will be contour-mapped using the electronic total station (ETS). Material remains within the right-of-way will be excavated. All artifacts will not be collected. A proposed sampling strategy is described in the Field Methods section later in this report. Mechanical equipment may be used to strip off the artificial overburden, and a trench excavated to ensure that no deeply buried deposits have been overlooked. Given the dimensions and the artifact density of this site, a minimum of two excavation units and auger excavation should be used. Accurate identification of this site based on the ceramic artifacts present is needed. The "brown wares" identified by Phillips et al. (1997) were typed by the OAS as Chupadero Black-on-white.

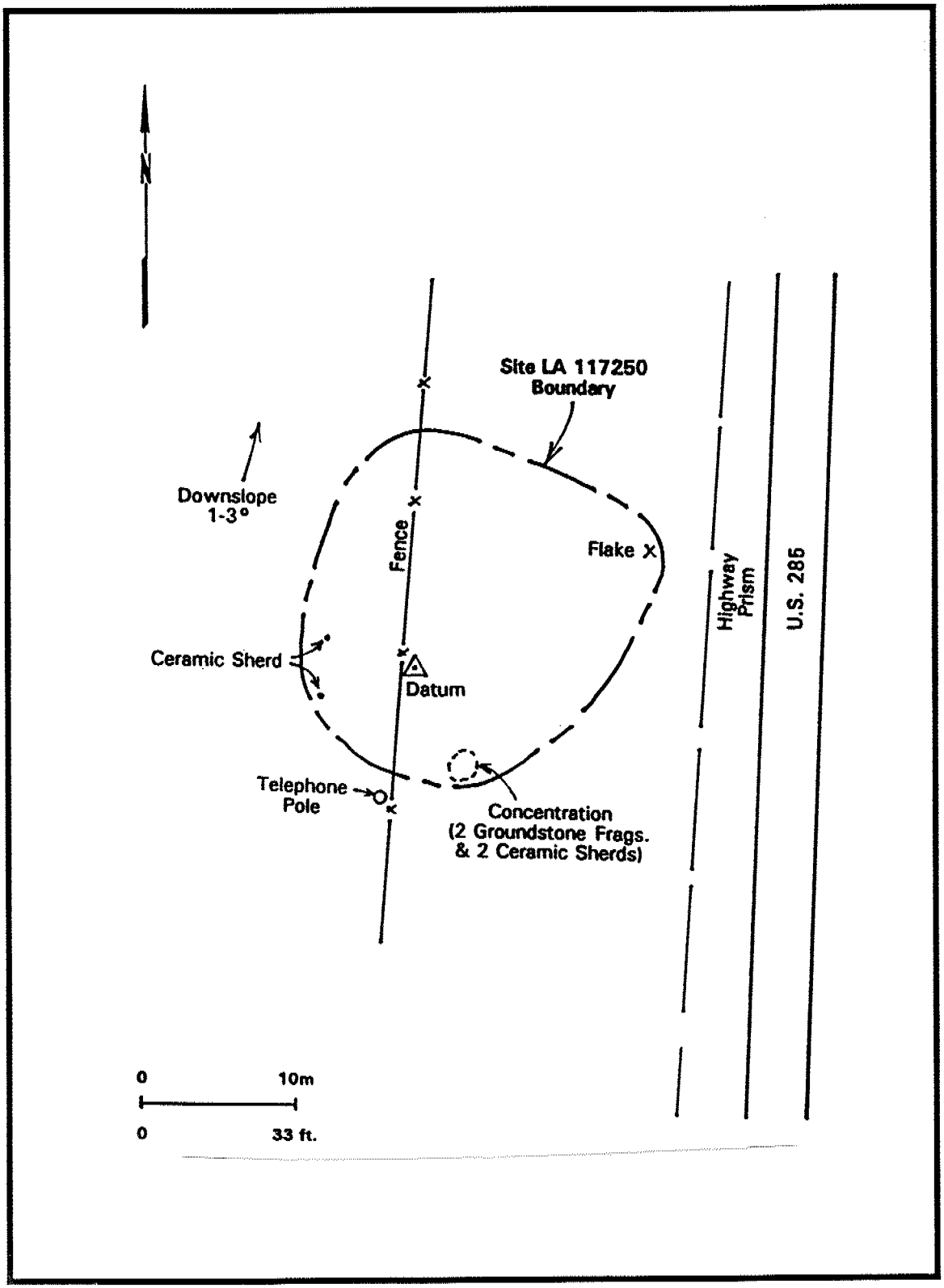

Figure 7. LA 117250 site map (after Phillips et al. 1997).

LA 117255

Cultural/Temporal Affiliation: unknown Native American

Site Type: artifact scatter with features

Dimensions: 130 by 10 m

Site Description:
LA 117255 was found at Milepost [redacted] just south of Mesa, New Mexico, on a slope between a low hill (to the east) and an intermittent pond (270 m to the west). The site is a small lithic artifact scatter associated with two ashy soil stains (Features 3 and 4) and two black soil stains (Features 1 and 2) (Fig. 8).

Features 1, 2, and 4 are less than 1 m apart. All four features have been exposed to a depth of 10 cm in a recently graded fence line road outside the right-of-way for U.S. 285. The linear nature of the entire site may be a result of the blading.

Feature 1, the largest, most visible, and best defined of the four features, is a semicircle of black-stained soil containing small charcoal chunks and baked (?) earth; part of a possible hard-packed surface is visible at the north edge of the feature. At least 2 to 3 cm of fill is visible above this surface in the edge of the road cut above the feature. The exposed portion of the feature measures 1.6-by-0.6 m. No artifacts or fire-cracked rock are directly associated with Feature 1 or with the other features, but a whole cobble mano with three grinding facets was observed in the general vicinity of Features 1, 2, and 4.

The other three features are less clearly defined. Feature 2 is 45 cm northwest of Feature 1, measures 35 cm in diameter, and consists of a dark gray to light gray soil stain. Feature 3 is about 20 m north of Feature 2; Feature 3 is an irregular, slightly ashy soil stain that measures 30 cm in diameter. Feature 4 is a similar and quite irregular soil stain about 1 m south of Feature 1; it measures 25 cm in diameter. Features 2 through 4 may be cultural, or they may have been produced by natural fires.

One piece of fire-cracked rock was seen south of the features. Otherwise, the artifact scatter is at the north end of the site, and is divided from the features by Reach 1, Segment I of the old alignment of U.S. 285 (LA 117249), which bisects the site immediately south of Milepost [redacted] The scatter consists of eight artifacts: two pieces of chert angular debris and six quartzite artifacts, the latter including one scraper, one piece of angular debris, two secondary core decortication flakes and two interior core decortication flakes. No sherds were found, but one piece of glass was noted.

Proposed OAS Data Recovery Program:
The site will be contour-mapped using the electronic total station (ETS). All material remains within the right-of-way will be excavated with hand tools. All artifacts will not be collected. A proposed sampling strategy is described in the Field Methods section later in this report. Mechanical equipment may be used to strip off the artificial overburden, and a trench excavated to ensure that no deeply buried deposits have been overlooked. A minimum of eight excavation units should be used, in conjunction with augering.

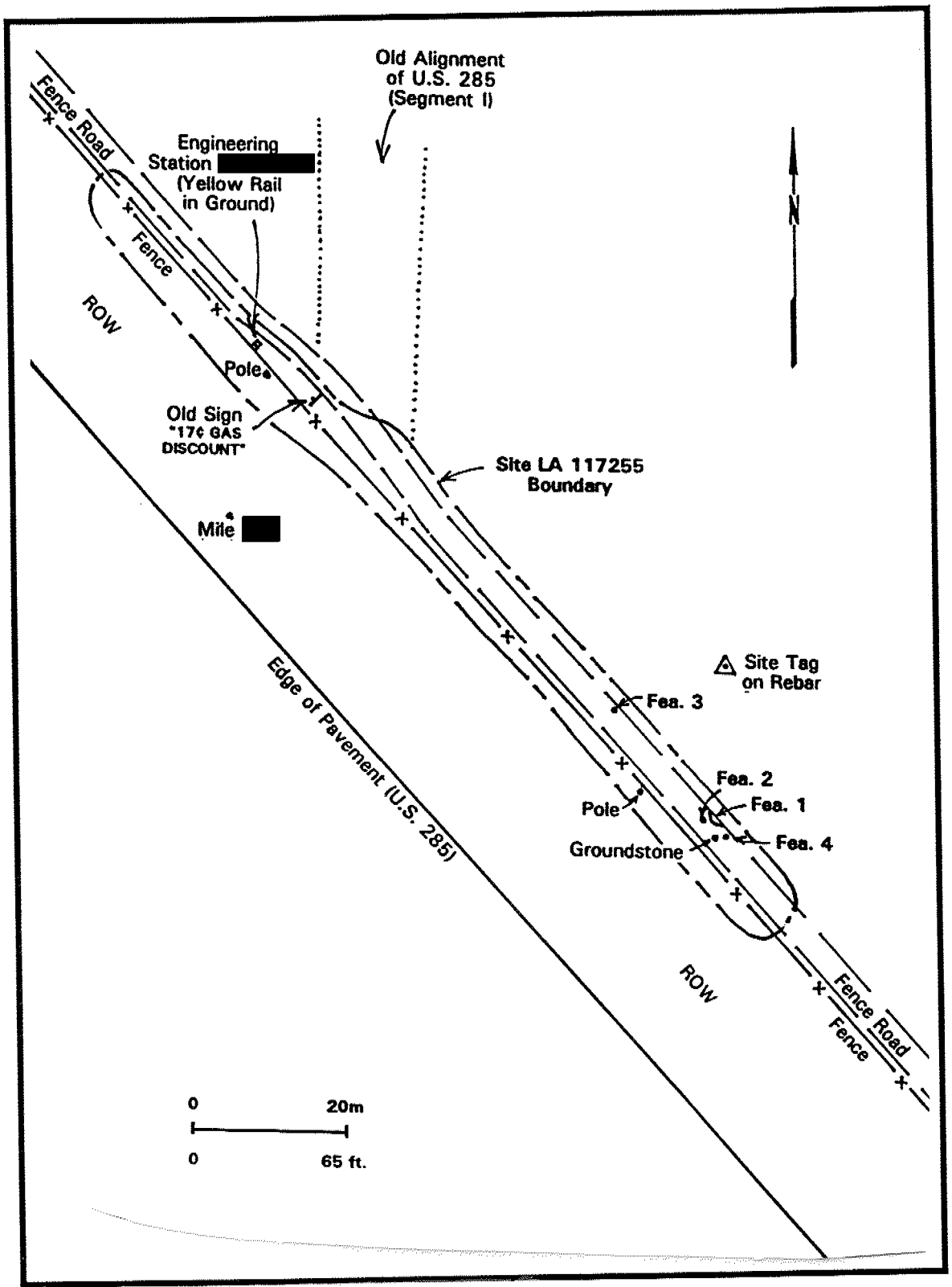

Figure 8. LA 117255 site map (after Phillips et al. 1997).

LA 117257

Cultural/Temporal Affiliation: possible Archaic period

Site Type: artifact concentration and scatter

Dimensions: 40 by 17 m

Site Description:
LA 117257 consists of a concentration of lithic artifacts and fire-cracked rock on a low rise, 175 m south of Milepost 166 (Fig. 9). The site commands a 360-degree view that takes in two ephemeral lakes (Red Lake and North Home Lake) and part of North Home Draw. The site portion within the existing right-of-way appears to have been damaged by recent placement of a fiber optic cable.

The fire-cracked rock consists of at least seven pieces of heavily burned limestone. Of the 25 flaked stone artifacts, 23 were made of various cherts (including one San Andres "fingerprint," one Alibates or Yeso, and several multicolored), one was made of petrified wood, and one was made of possible metasiltstone. One core, one biface base, and one side scraper (all of chert) were observed; the remaining artifacts were dominated by small biface reduction flakes (n = 13) with partly cortical core reduction flakes (n = 2), interior core reduction flakes (n = 4), and angular debris (n = 1) noted as well. Twenty of the artifacts (including all of the tools) and five of the pieces of fire-cracked rock were found in a concentration at the south end of the site; a light scatter of fire-cracked rock and debitage extended north from the concentration. The site may have been a temporary campsite at which biface production and modification took place, possibly during the Archaic period. The presence of fire-cracked rock suggests that a hearth or roasting feature is or was present. The site is not obviously deflated, and some of the artifacts near the fence may have been brought to the surface by the recent construction of a buried fiber optic cable. However, fragments of limestone bedrock are visible along the fiber optic cable trench, suggesting that if subsurface deposits are present, they are fairly shallow.

Proposed OAS Data Recovery Program:
The site will be contour-mapped using the electronic total station (ETS). Material remains within the right-of-way will be excavated until the potential contribution to the goal of the data recovery plan have been maximized. Mechanical equipment may be used to strip off the artificial overburden, and a trench excavated to ensure that no deeply buried deposits have been overlooked. A minimum of four excavation units should be used, in conjunction with augering.

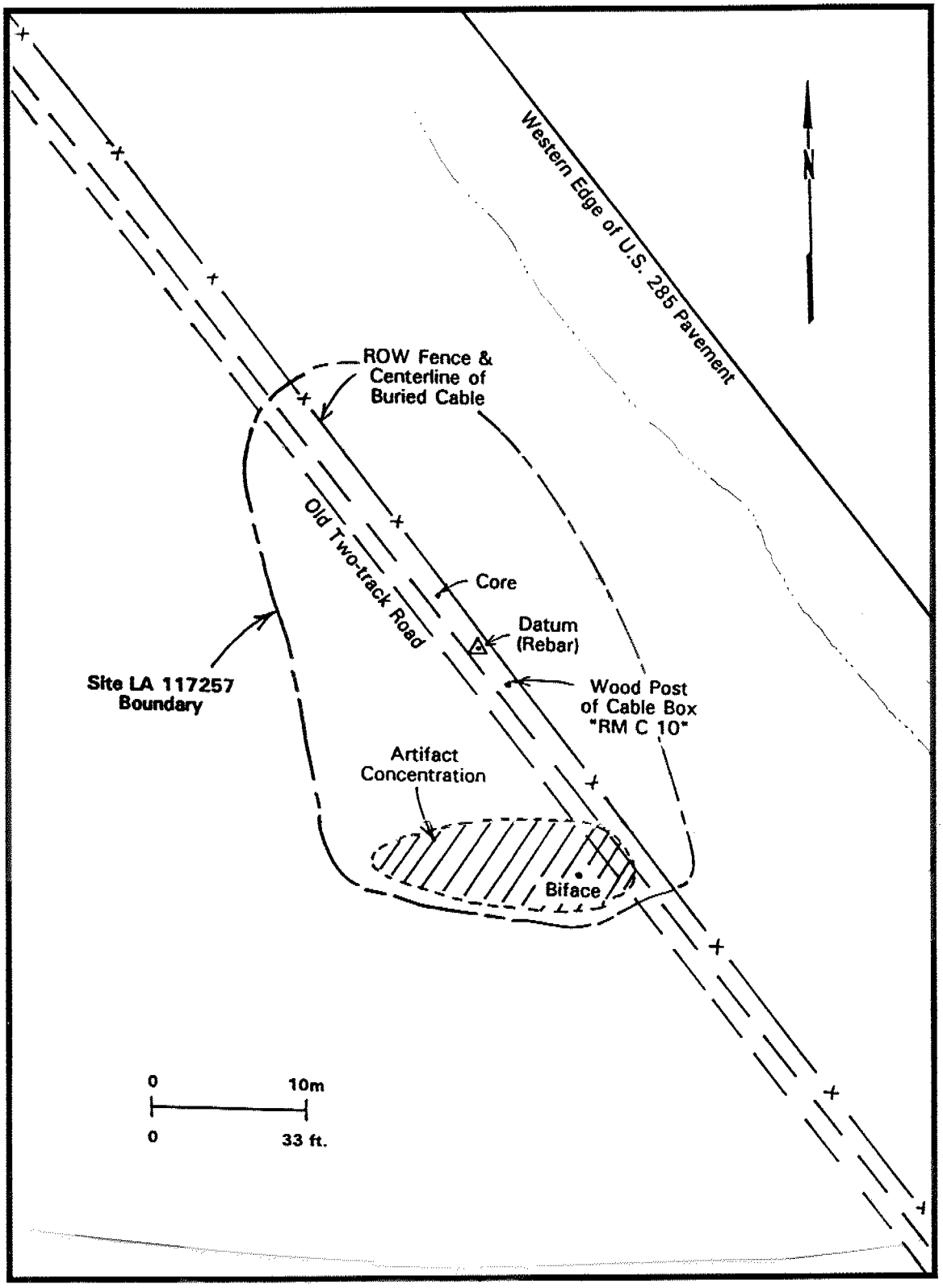

Figure 9. LA 117257 site map (after Philips et al. 1997).

RESEARCH DESIGN AND DATA RECOVERY PLAN

The following research design and data recovery plan is proposed for seven sites: LA 34150, LA 51095, LA 117246, LA 117248, LA 117250, LA 117255, and LA 117257. These sites are described above.

Problem Orientation

Prehistoric occupation of southeastern New Mexico has been documented from the Paleoindian period through the presence of the Mescalero Apache, a period spanning approximately 13,000 years. Earlier research was geared mainly to defining the culture history of the region (Lehmer 1948) and its specific cultural attributes (Mera 1943). Interest in refining cultural manifestations, principally ceramic artifacts, has continued up to the present with the work of Greer (1965), Runyon and Hedrick (1973), Brook (1975), and Leslie (1979). Today, professional research goals have taken on broader, more regional aspects with primary interests in differentiating sedentary phases (Whalen 1977; Katz and Katz 1985a), determining site functions (O'Laughlin 1980; Wiseman 1996), assessing subsistence bases (Basehart 1974; Oakes 1985), and correlating site locations with environmental parameters (Oakes 1985; Katz and Katz 1993). It is evident that the Salt Creek groups lived an Archaiclike, hunter-gatherer lifestyle throughout the prehistoric and historic periods. While explanation of prehistoric economy of southeastern New Mexico is still tenuous, the potential for gathering substantial information on the settlement strategy and subsistence system is a unique opportunity.

The foundation of the prehistoric research proposed for this project is that of regional settlement and subsistence patterns grounded in theoretical models of culture change. In recent years, archaeologists have found it more productive to move away from a focus on individual sites to an examination of regional patterns. Specific sites provide only a glimpse of prehistoric lifeways but their importance is increased by examining their role in the context of regional events. Therefore, the data recovery program will have as its objective the formulation of explanatory models of human behavior, and inferences will be integrated on both local and regional levels. Recently, paradigms based on the concepts of Darwinian evolution (or "selectionist" models, see Leonard and Reed 1993; O'Brien and Holland 1990) have been developed to account for human behavior. This is achieved primarily through three mechanisms: variation, inheritance, and natural selection.

One of the fundamental assumptions within the selectionist framework is the identification of the operation of selective agents as a means of building explanations of the phenomena under scrutiny, that is, accounting for the differential persistence of varying forms and behaviors. Central to this model is that individuals, or groups, select for reproductive advantage and success in manipulating the environment. We would not argue with that viewpoint, even though it has been depicted as a fundamental break from transformational cultural-evolutionary explanations. However, we feel that a variation on the cultural-evolution model, particularly a processual-adaptational viewpoint, is not incompatible with the drive to succeed biologically.

Many evolutionary models ultimately refer back to the proposition that, if there are inherited differences in how effectively organisms transmit rules for structure or action to other

organisms, then evolution automatically follows. The two processes implied by this hypothesis, transmission and selection, are the two processes that selectionists argue can be measured. The proposition that cultural information is transmitted through an inheritance system is perhaps untestable in the absolute sense in the archaeological record. However, the selectionist approach may offer a powerful means of examining change based on the tenet that materials contained in the archaeological record were parts of human phenotypes, as were behaviors behind the manufacture, use, and discard of materials.

During the analysis of the material remains from these sites, an attempt will be made to operationalize a selectionist approach to the artifacts recovered from this project. Although theoretical considerations, on an integrative level, provide a matrix within which empirical data are evaluated, it may be premature to assume that a small sample of sites will contribute substantially towards theory building. However, the results of the project will certainly contribute to a regional perspective. We recognize that even though culture change may occur because of selection or other factors, we probably will not be able to test this proposition during the excavation part of this project. Nevertheless, it is our contention that systematic data collection methods can be applied to most theoretical models. Data compilation, artifact analysis, and synthetic report preparation will be the venues within which these models will be tested (see ceramic analysis, below). Therefore, our long-range theoretical considerations will be (1) to look at both history and process and see how they relate, and (2) that change also occurs as a response to demographic and environmental stress. Emphasis will be placed on pattern recognition of an inter- and intrasite basis and attempt to address questions concerning extensive use of the area by prehistoric, protohistoric, and historic groups.

The Salt Creek sites probably played specific roles in the general adaptive strategies of local prehistoric groups. These include habitation loci where subsistence activities occurred, temporary logistical camps where materials and foodstuffs were processed, and areas designated for hunting and gathering, including foraging and collecting. These sites provide an excellent opportunity to examine prehistoric adaptations during these phases and of verifying or modifying the shift in subsistence emphasis. Baseline information will be collected: During what period did they exist? What were their cultural and ethnic affiliations? What were their subsistence strategies? What precipitated abandonment? These are baseline data that we feel should be addressed in every data recovery plan. Apart from that, more specific research issues are raised below.

Prehistoric Research Questions

Problem Domain I: Settlement and Subsistence Patterns

Widely accepted throughout the field of Southwestern archaeology is the assumption that settlement patterning is closely linked to subsistence. This, in turn, is tied to the exploitation of the ecological resources of an area. To this end, several general statements about the environment in the Roswell region in relation to the sites may be made. The xeric condition of the landscape (unproductive soils, frequent lack of potable water, undependable precipitation) and surficial nature of the cultural remains would seem to preclude use of the sites as sedentary habitation units. We suggest that several of the sites were temporary campsites or specialized activity locales used by foragers and collectors of differing chronological periods. Other sites, because of more advantageous locations, may have served as sedentary loci, or were reoccupied on a regular basis through time.

As stated above, the proposed research design is formulated to test both selectionist and processual-adaptational frames of reference. A major feature of this model proposes that culture is adaptively organized to solve specific problems posed by the environment. One overarching concern for prehistoric groups has always been the acquisition of resources. Thus, variability in a culture's systemic organization is responsive to the variability in availability of subsistence items. These variables condition the deployment of a population on the landscape. Some adaptive responses include collecting, foraging, hunting, storage, trade, sedentism, mobility, and so on. It is probable that there were specific environmental factors in the Roswell area that conditioned the selection of particular food procurement strategies. These may have included accessibility of resources (both floral and faunal), seasonal availability of wild plants, animal migration patterns, and demographic concerns. The generalized strategy of wild food gathering, limited horticulture, and opportunistic hunting would have been the most advantageous response to the local environment.

In a hunter-gatherer subsistence system, such as that seen throughout the Archaic and Formative periods, the settlement system is thought to have included macrobands, microbands, and possibly task groups, with band size varying seasonally. People may have been grouped in macrobands inhabiting camps in desert basin or playa zones during the winter. In the spring they are thought to have moved into riverine or lower bajada zones as microbands or task groups. The focus of exploitation shifted to the upper alluvial fans and riverine zone during the summer, again either as microbands or task groups. Some macrobands may have formed during this season, dispersing into microbands in the fall to exploit resources in the basin and riverine zones, with some task group use of the mountains. Hunter-gatherer groups were probably living proximate to Southwestern farming groups during the prehistoric pottery period, a notion that has particular relevance to southeastern New Mexico. An alternative model of the prehistoric occupation in the Roswell District, then, would be that populations of both agriculturists and hunters and gatherers were to be found there. The presence of ceramics on sites created by groups of both types, it could be argued, has caused the remains of two very different settlement and subsistence systems to be lumped together into an apparently anomalous pattern. This alternative model appears to account for at least as much of the observed patterning in the Roswell District as the model that considers all Ceramic period sites to be a part of a single adaptation, and it offers several potential directions for future research (Sebastian and Larralde 1989:83):

During the Late Formative period, a pattern emerged that is thought to have been necessitated by the structure of the economy and available wild resources. Possibly as early as late summer, food stores from the previous year were probably low or exhausted. Areas around villages could be used for foraging through part of the year but would not have provided sufficient resources for year-round use (Mauldin 1986:259). Thus, complete or partial abandonment of villages for part of the year may have been compelled by limitations of the subsistence base, even when supplemented by cultigens.

Winter and spring subsistence was based on foods collected and stored during other seasons, supplemented by foraging around villages. Preparation of fields along drainages and on alluvial fans may have been the most important task completed in early summer. Part of the population could disperse across the landscape when this task was completed, though their movement was limited by the availability of water. The onset of the monsoon season in late summer would allow most of the population to forage in other environmental zones, particularly the desert basins.

These models make several important points. First, the Early Formative phase population is believed to have been residentially mobile, with a settlement system resembling that of the Archaic. This subsistence system was based on collection of wild plant foods and hunting, possibly supplemented by limited horticulture or possibly, farming. The mobility strategy apparently shifted back and forth between foraging and collecting, depending on season. Finally, there were important differences between early and late parts of the phase, involving both the level of dependence on cultigens and how society was structured.

Over time we can see a shifting scale of residential mobility. The Archaic population was highly mobile, continuously moving in response to resource needs until the Late Archaic, when cold-season villages began developing. This represents an initial reduction in the scale of mobility, with people living in small macroband camps for at least part of the cold season. A further reduction in mobility occurred in the Formative phase and is represented by greater use of stored foods at cold-season camps, suggesting longer periods of occupancy. Cultigens increased in importance during this phase and represent a dependable storable surplus that was probably critical to subsistence in cold-season villages. Changing settlement patterns are also suggestive of this process, in which sites concentrate around areas containing arable land. These changes had considerable impact on the settlement system. Later Formative period sites may have been occupied for longer periods of time than those of the Archaic. While the population continued to move in response to resource availability through most of the year, they may have exercised the option to remain at cold-season camps when storage allowed.

Substantial changes are evident in the El Paso phase. While these changes were along the same trajectory as earlier regional developments, they represent a tangible shift toward a more sedentary lifestyle dependent to a large degree on farming. This surge may be the result of influence originating in the Casas Grandes towns. This possibility may be supported by the sudden abandonment of adobe pueblos and a return to a more nomadic lifestyle after the collapse of Casas Grandes.

Past research in the region indicates that baked succulents such as lechuguilla, sotol, agave, and yucca were a fundamental aspect of the Ceramic period subsistence (Greer 1965, 1967, 1968; Roney 1985; Katz and Katz 1985a; McBride pers. comm. 1997), in at least some areas. Archaeological remains of baking ovens usually take the form of midden rings or circles of burned rock surrounding central pits, though burned-rock mounds of other shapes are also known. Midden circles date as early as the Middle Archaic period in Texas but are more common in later time periods. Most dated ovens belong to the post-A.D. 500 pottery period (Roney 1985:144). Since these succulents provide a reliable, year-round source of carbohydrates, they were understandably important to prehistoric and historic diets and probably obviated the value of, or need for, many other carbohydrate sources including corn (Sebastian and Larralde 1989; Roney 1985). The presence or absence of cultigens is one aspect of the subsistence picture that may help answer the question as to whether the site occupants were full-time hunter-gatherers or farmers in a hunting-gathering mode. Leslie's (1979) assessment of the structural sites in the vicinity of Hobbs in far southeastern New Mexico, though without benefit of flotation and pollen recovery techniques, suggests that corn was not being grown east of the Pecos River within New Mexico. The WIPP Project (Lord and Reynolds 1985), located between Leslie's sites and the Pecos River, excavated three nonstructural sites but failed to find evidence of cultigens in flotation and pollen samples. On the other hand, corn was clearly being grown within the Pecos Valley at Roswell (Kelley 1984, appendix 6; Rocek and Speth 1986; Wiseman 1985) and probably near Fort Sumner as well (Jelinek 1967). Further south along the Pecos at Brantley Reservoir, the Katzes (1985a) did not find evidence of farming in the several nonstructural, prehistoric sites they excavated. Thus, if

cultigens are documented at LA 34150 and LA 117257, especially in quantity, the remains may help us determine whether the site occupants were farmers or full-time hunter-gatherers. The finding of small amounts of cultigens would be less clear, for hunter-gatherers could have obtained them in trade from farmers.

W. H. Wills (1988:54-55) points out that succulents are usually dispersed across the landscape rather than concentrated in specific locations. This probably affected settlement and subsistence in yet another way. He posits that the scattered nature and year-round availability of these resources in the Trans-Pecos led to the retention of a more nomadic, "forager" pattern, rather than a less nomadic, logistically organized pattern (Binford 1980). Simply stated, foragers move to the food, and collectors move the food to the people. Collectors do this by means of task groups that are sent out to obtain specific resources and return them to the group, a behavior warranted by resources that are frequently randomly distributed. The primary differences between collector and forager lifestyles are the degrees and ways in which people plan, organize, and conduct their food-quest in response to resource distributions and seasons of availability.

Various criteria have been used to suggest that a given site or group of sites are those of full-time hunter-gatherers rather than of horticulturists or agriculturists. Criteria include aspects of the chipped stone technology (percentage of biface thinning flakes and material types, for instance), mano and metate types, projectile point types, artifact assemblage composition, items of exchange, subsistence patterns, and rock art. Of these, Mobley (1979) provides the most thorough treatment. The reader wishing more discussion of these matters is referred to Sebastian and Larralde (1989:82-83).

If different levels of mobility are reflected by Archaic and Early Formative deposits, the latter should resemble those from the Late Formative period. Thus, Early and Late Formative reduction strategies should be similar, while Archaic strategies will be quite different. The following characteristics are expected:

Collectors send out work parties to set up temporary special-activity sites, collect the target resource(s), and take the food back to long-term base camps. The base camps are generally quite visible archaeologically because they are used for a wide range of daily activities, resulting in the substantial variability of artifact types, activity areas, and refuse deposits. Some form of structure, whether ephemeral or more substantial in construction, is usually present, as are pits for the storage of food and other items. Base camps are generally used over long periods of time (several months) each year for several years, sometimes in sequential years and sometimes in staggered years or sets of years. A logistically organized group generally has only one or two base camps that it uses during a given year. Special activity sites, on the other hand, are created during collecting expeditions, might be used only once, and are almost invisible archaeologically because they are used for only short periods, have little or no accumulation of nonperishable debris and broken artifacts, and have limited artifact inventories that reflect comparatively few activities.

Foraging and collecting may not have been mutually exclusive (Sebastian and Larralde 1989; Collins 1991:8). Both strategies may have been pursued as necessity dictated. In a given year or over a series of years, some groups may have actually used both strategies because of factors relating to season, climatic regimen, economic success, demography, competition, and other factors (see Boyd et al. 1993 for a recent discussion). Sebastian and Larralde present an example of a "mixed" forager/collector strategy in the concept of "serial foraging." Using the Archaic peoples of southeastern New Mexico as an example, Sebastian and Larralde (1989:55-56) contend that this strategy involves a small residential group that moves into the general vicinity of an

abundant resource and camps there, uses the target resource and other hunted and gathered resources encountered in the general area until the target resource is gone, or until another desired resource is known to be available, and then moves on to the next scheduled procurement area. Such a strategy could be expected to create a great deal of redundancy in the archaeological record, n continuous series of small, residential camps from which daily hunting-and-gathering parties move out over the surrounding terrain, returning to process and consume the acquired foods at day's end. If the resources were randomly distributed, all the sites would look generally the same. But since many of the resources appear in the same place year after year or in some other cyclical pattern, some sites tend to be reoccupied.

Reoccupied sites, then, would be a clustering of small, single-event, serial-foraging sites. But, Sebastian and Larralde (1989:56) envisage an intervening variable. They suggest that the only exception to the rule of basically redundant but sometimes overlapping small campsites would be the winter camps. Given the relatively brief winters of the Roswell District, many of the sites would, on the surface, be no different in appearance from reoccupied short-term camps. Excavation of such sites might recover resources indicating a winter seasonal occupation or features indicative of storage, however. It would be extremely useful to be able to differentiate single, large-group occupations from multiple, small-group occupations. This might show that winter sites differ from warm season camps in that they were occupied by larger groups. In this model, the settlement pattern of serial foragers should then start taking on the appearance of collector sites.

Storage facilities are thought to be integral to the existence and identification of base camps and habitation sites. The storage of quantities of foodstuffs in pits is a characteristic of logistically organized subsistence systems. Generally speaking, storage implies a location that is easily protected or otherwise secure from theft. Sebastian and Larralde (1989:86) advance the hypothesis that, because some resource patches are spread over the landscape and create a logistical problem for exploitation, some people may actually have cached foods in the collection areas and then moved their families from cache to cache as needed throughout the winter season. This constitutes yet another variation on the forager theme. But while it may actually reflect the situation in southeastern New Mexico, it also has the strong potential for confusing the interpretation of archaeological remains. Available year-round, foods of this kind provided the principal staples of groups responsible for hearths, and thermal features would be evidence that these were not specialized food processing facilities, and that those responsible may have been foragers.

Since at least two settlement strategies, presumably based on resource procurement, can be distinguished, the main thrust of the investigations will center on:

--Distinguishing between logistical, short-term sites and sites that have been occupied for a longer duration. This may be distinguishable stratigraphically, through the seriation of diagnostic artifact assemblages, or through chronometric data.

--Documenting the shift between Archaic (or Formative) and El Paso phase adaptations, defined in terms of settlement patterning. Can these residential changes be inferred from the data collected from the Salt Creek sites? Is there a bimodal distribution?

--According to Sebastian and Larralde (1989), winter camps of serial foragers may take on the appearance of collector camps due to a larger population occupying these loci.

Excavation of such sites might recover resources indicating a winter seasonal occupation or features indicative of storage. This might show that winter sites differ from warm season camps. Data from these sites might be used to discriminate between these two subsistence strategies.

--It was stated earlier that "it is evident that the Salt Creek groups lived an Archaiclike, hunter-gatherer lifestyle throughout the prehistoric and historic periods." Is this really the case, or was there some sedentary behavior driven by the introduction of limited horticulture, or cultigens whose maintenance reduced mobility and modified the character of the settlement patterning?

Problem Domain II. Site Structure

As the foregoing discussion suggests, the material remains and distribution of forager and collector sites should have fairly distinctive attributes on an inter- and intra-site basis. The archaeological visibility of forager sites should be subtle, perhaps even inconspicuous. Within the forager strategy, groups are moved to the resources, sites are inhabited for shorter periods of time, have smaller accumulations of trash, and similar ranges of artifact types. They are occupied for relatively short periods of time (days or weeks), and relatively few items (manufacturing debris, broken artifacts, etc.) should be left behind. Collector sites display different material and spatial relationships, as described earlier.

Assuming there were equivalent levels of mobility during the Archaic, Formative, and El Paso phases, the following characteristics in the structure and distribution of material remains can be anticipated:

--Greater variability in all categories of features and material remains will be encountered at forager sites. These may be expressed as base camps with evidence of multiple reoccupation. Features may be distributed in an overlapping manner, or may be reused.

--A wider variety of ceramic artifacts may be expected. However, they may be localized in areas occupied by pottery period groups. Unless contaminated, Archaic and Formative sites, components, or activity areas should be free of ceramic artifacts.

-- Lithic assemblages should reflect reduction strategies aimed at maximizing the amount of useable edge removed from a core.

-- There may be differences in the way common or local materials were reduced versus rare or exotic materials. Rare and desirable materials, especially those that are glassy or very fine-grained, should be reduced in a way that maximizes the number of flakes removed. Common materials, especially those available locally, should be reduced in an expedient manner, though some maximization might occur.

--While the maximization of materials might encompass the systematic removal of flakes from a prepared core, it will more likely be expressed as the manufacture and use of large general purpose bifaces.

--Since suitable materials are not available in the study area, there should be little if any evidence of large general purpose biface manufacture at these sites. Evidence for the use of this type of tool should be restricted to flakes struck for use or resharpening, and spent or broken general purpose bifaces that were discarded.

--The same approximate range of raw materials should be reflected in both Formative and Mogollon period assemblages.

--A wide range of formal and informal tools should occur in assemblages from both time periods.

--A curated reduction strategy should be evident in Archaic chipped stone assemblages. An expedient strategy should be visible in Formative assemblages.

--Evidence for the use of large general purpose bifaces should occur in Archaic assemblages. For reasons specified above, it should be restricted to flakes removed from large bifaces and discarded tools.

--Only bifaces with specialized purposes should occur in Formative assemblages.

--A different range of lithic raw materials should occur in Archaic and Formative period assemblages.

--Archaic assemblages should contain a wide range of formal and informal tool types. Formative assemblages should contain fewer and a smaller range of formal tools and should be dominated by informal tools.

Therefore, one of the primary questions to be investigated is whether the sites were those of indigenous hunter-gatherers or other semisedentary groups.

Problem Domain III. Cultural Identity

Establishing the identity and culture history of people through their cultural remains is one of the salient research questions. Archaeologists typically equate constellations of artifacts, architecture, economic structure, and even single pottery types with a people, often on the basis of nothing more than untested assumption. This particular problem is highlighted in southeastern New Mexico. Because of the proximity of southeastern New Mexico to the Plains, scholars have debated unsuccessfully for years about the origin and cultural affiliation of the thousands of sites lying between the Pecos River and the Llano Estacado. The problem is nearly intractable because the artifacts on these sites are not greatly varied, the sites are rather simple in their content and character, and differences in artifacts and sites are not readily apparent over vast areas.

--What cultural group is represented by the pottery found on the Salt Creek sites? Does this indicate a Jornada-Mogollon presence, or were they another group in possession of Mogollon pottery. If so, how can this be determined?

--Will the material remains at the Salt Creek sites provide reliable data as to the occupant's cultural identity? Can this be determined through material remains alone, or do more intensive, scientifically based analyses on organic materials need to be performed?

--With what groups existing between the Pecos River and the Llano Estacado are the Salt Creek sites affiliated?

Answering the Problem Domains with Site Specific Research

All seven of the sites contain lithic artifacts. Aceramic lithic artifact scatters include LA 51095 (possible hearth features represented by fire-cracked rock), LA 117246 (sparse lithic artifact scatter), LA 117248 (no features, substantial lithic reduction activities noted--probable base camp), LA 117250 (small lithic and ceramic artifact scatter--probably Jornada Mogollon), LA 117255 (sparse lithic scatter with possible hearths), LA 117257 (putatively Archaic, possible hearths or roasting pits represented by fire-cracked rock), and LA 34150 (a multicomponent prehistoric Archaic, Jornada Mogollon, and possibly Plains period base camp).

Data recovered from these sites will be used to examine two general models. The first is related to the nature of cultural deposits and assumes that, like other areas in southeastern New Mexico, the settlement pattern is closely tied to the availability of resources--frequently, the distribution of cultural remains represents multiple reoccupations through time, and the second, that pattern recognition and site structure (distribution of features, floral and faunal remains, and ceramic and lithic artifacts) will suggest site function and duration and period of occupation.

1. Are the prehistoric components of the project sites foraging or collecting, base camps/habitation sites, special activity sites, or some combination thereof?

If the sites functioned as foraging loci, the following characteristics are expected:

--Evidence of repeated short-term occupations (numerous redundant features distributed over the landscape). Attributes that should *not* occur include long-term storage features, residential structures, and formal midden deposits. Attributes that may be present include ephemeral structures, sheet trash deposits, and a wide variety of manufacturing maintenance and food procurement activities.

--Evidence for a wide range of floral and faunal resources in the diet. Cultigens would likely be rare. Only local food remains should be found.

If the sites were used by Ceramic period logistical task groups, the following characteristic could be expected:

--Evidence of relatively longer period of occupation. Storage facilities may be present and there may be specific trash disposal and activity areas.

--Evidence for a wide range of floral and faunal resources in the diet. Cultigens may occur. Foods from nonlocal sources may be found.

--Structures or thermal features should be present and may evidence signs of reuse. There may be evidence of redundant or related features representing repeated use over time.

When found, structures should be shallow and reflect warm-season use, although interior hearths could be present.

--A variety of food containers (ceramic artifacts) should be present, although they may be limited in number.

With the foregoing questions in mind, is the Jornada-Mogollon component at LA 34150, LA 117257, and perhaps LA 117248 a base camp or habitation? We know that hearths are present on these sites. Are structures, storage pits, other types of pits, and thermal features (roasting pits, ring middens) also present? Do the features in the site form a single cluster, suggesting a single occupation? Or, is this a palimpsest situation, where multiple reoccupations have occurred, and perhaps overlapped (stratigraphically)? If multiple occupations are present, were the activities or site function during each occupation the same or different?

Determining whether cultural features (structures, storage pits, thermal features, etc.) are present is critical in defining site types. Such features define base camps (or habitation sites), and their absence is generally indicative of special activity sites. Important subsidiary studies will assist in determining site type, as well as overall subsistence patterns, and include floral, faunal, and artifactual data.

It may be difficult to distinguish between these patterns of use in some cases, particularly if curation of tools occurred at either site. However, the compilation of data should allow an assessment of the assemblages to determine the patterns of use.

Once individual components are defined, it may be possible to document the activities that took place within each component. The cultural features (storage pits, other types of pits, hearths, baking pits, etc.), associated artifactual materials, and the patterning of these remains are critical in defining site types through an analysis of the activities represented. Important subsidiary studies will assist in determining site type, as well as overall subsistence patterns, and include floral, faunal, and artifactual data, as discussed below.

The culture sequence formulated and outlined by Paul and Susana Katz (1985a) suggests that a major subsistence shift took place during the prehistoric sequence. Riverine resources such as mussels were important during the Archaic and nonriverine resources were largely supplemental. But during the entire Late Prehistoric period, upland resources became more important and riverine resources less important. While this is better conceived as a change in emphasis, rather than a sharp change from one set of resources to another, it may have led to a markedly reduced human presence along riparian environments.

On the Salt Creek Project, only a single site lies along a waterway (LA 34150). Freshwater mussel shell was observed at this location, and it is logical to assume that riverine resources were exploited on a fairly regular basis. There is evidence of repeated occupation through time by a variety of prehistoric groups, and both bison hunting and base camp residential subsistence activities are very evident. Depending on the frequencies and distribution of these aquatic resources, we may be able to infer the extent of reliance on these resources and test the model proposed by Katz and Katz (1985a) by comparing their data to the data recovered during the course of this project.

At this preliminary stage in the investigations we have little empirical data. More intensive work may greatly modify our perceptions and interpretations of the prehistoric components at the

project sites. The minimal data available suggest that multiple components are present at LA 34150, several of which may fit into the Katz and Katz model. The validity of this expectation requires confirmation. To implement this, features and artifacts belonging to separate occupations, components, or activity areas will need to be first isolated and analyzed as discrete entities, and later integrated into local and regional patterns.

2. What artifact assemblages are present at the project sites? What types of tools and manufacture debris are present. What are the relative abundances of the various types? On the basis of the artifacts, what types of activities were performed at the sites? How do these assemblages compare with those from other sites in the region?

All sites have lithic artifacts. Some have pottery and ground stone. Intensive surface investigation and excavation may also produce other artifact types (projectile points, bifaces, ornaments). Therefore, what artifact assemblages are present at the Salt Creek sites? What types of tools and manufacture debris are present and in what percentages? On the basis of the artifacts, what types of activities were performed at the site? How do these assemblages compare with those from other sites in the region? (Caution is required in interpreting the data in this manner because of the effects of tool use-life on artifact assemblage composition [Schlanger 1990], because this line of interpretation makes several assumptions about the data and the activities they represent, and because the technique greatly simplifies a number of complex variables and conditions).

The potential of these sites for being base camps or residential sites was suggested during survey (Phillips et al. 1997). If present and well preserved, subsurface features and cultural deposits have a strong potential for recovering many of the categories of data necessary for answering the research questions. At a minimum, we anticipate uncovering a possible structure or storage pit, and several hearths. Broad-scale excavation will undoubtedly uncover more such features. If other features are found, the possibility arises that more than one component is present. Additional components will provide either redundant or different information on the use of the sites through time. The more data we recover, the greater the likelihood that the information needed to successfully address the research questions will be collected. This is particularly appropriate for the large BLM site, LA 117248. Phillips et al. (1997) defined it as a quarry site. Preliminary site reconnaissance is at variance with that evaluation. Therefore:

> --Is LA 117248 a quarry site or a base camp? Although a wide variety of cortical material types are present, there appears to be no local source nearby. A quarry site is typically located at the source itself. Exotic materials are also present, suggesting trade, exchange, or importation. This, again, is not characteristic of a quarry site. The OAS suggests that (1) the site be excavated in such a manner as to identify site structure consistent with one or the other functional site types, and that (2) local lithic sources be identified.
>
> --Accurate identification of LA 117250 based on the ceramic artifacts is needed. The "brown wares" identified by Phillips et al. (1997) were typed by the OAS as Chupadero Black-on-white. What culture group actually occupied this site based on the artifact assemblage?

Obviously, the types of artifacts at a site help define the kinds of activities that took place at each specific location or component. Manos and metates imply processing plant foods, projectile points imply hunting, worked bone suggests basketmaking or sewing, and marginally retouched stone tools and utilized flakes suggest processing (hide dressing, woodworking). Multipurpose tools

such as hammerstones, drills, and manufacture debris such as chipped lithic debris, shell fragments, and some types of fragmentary artifacts, imply a host of generalized activities involving the manufacture or maintenance of items associated with day-to-day living. A wide range of artifact and debris types imply a base camp, residential situation, and fewer artifact and debris types imply special activity sites. The percentages of each category will provide an approximate index to the relative frequency of occurrence of each activity at the site.

Again, these data will be compared to other sites in the Roswell area in an effort to add to a regional cultural perspective.

3. What plants and animals were being processed or consumed at the project sites? What biotic communities were being exploited? Were the inhabitants of the sites exploiting all available biotic communities or only selected ones? Were cultigens being grown and consumed? During which season or seasons were the sites occupied?

The project sites have the potential of producing burned plant remains and possibly some animal bone. Cooking activities probably took place at both sites, as attested by the probable hearths, possible roasting pits, burned-rock concentrations, and quantities of burned rocks and stains on LA 34150 and by the extensive lithic scatter at LA 117257. Hearths may also be present at LA 117248.

Plant remains recovered at archaeological sites provide *primae facie* evidence for reconstructing various aspects of the human food quest. Animal bones, pollen, and charred remnants of plants will be studied to identify the species present and the biotic zones exploited, characterize the diet and food preparation techniques, and provide insights into the effects of taphonomic processes on the archaeological record. Floral and faunal data also have the potential to provide information on season of the year that they were collected or hunted. Since it is unlikely that the data from the project sites constitute a total view of the diet throughout the year or through time, it will be necessary to compare these results with those of other projects in the region to gain a better understanding of the total subsistence system.

Domestic plants were grown in the region, and may have been cultivated (albeit on a limited basis) at the Salt Creek sites. The WIPP Project (Lord and Reynolds 1985) excavated three nonstructural sites but failed to find evidence of cultigens in flotation and pollen samples. On the other hand, corn was clearly grown within the Pecos Valley at Roswell (Kelley 1984, appendix 6; Rocek and Speth 1986; Wiseman 1985) and probably near Fort Sumner as well (Jelinek 1967). Thus, if cultigens are documented for the project sites, then the relative quantities may help us determine if the site occupants were farmers or full-time hunter-gatherers. Relatively large numbers of domestic remains would indicate that the people were farmers. Small amounts of cultigens would be less clear, for hunter-gatherers could have obtained them in trade from farmers. Material remains from the larger sites, such as LA 34150, LA 51095, and LA 117248, have the potential to provide substantial insight into the local economy and the degree of reliance on cultigens. It is also of considerable practical and theoretical importance to substantiate whether a mixed hunting-gathering, limited horticulture strategy was in use by these groups.

Of great interest is the presence of substantial quantities of bison bone at LA 34150. Maxwell (1986) posits multiple occupations at this site, including preceramic and ceramic period occupations. The preceramic level was radiocarbon dated to 490-250 B.C. in associated with bison bones. Archaic subsistence in this area has been viewed as a small-game hunting economy (see

Stuart and Gauthier 1981:267). It is possible that Archaic groups used an "ambush" strategy for large mammal species, such as bison. This, too, is a departure from traditional concepts about Archaic subsistence. Also present were ceramic (Jornada Brown and a Scallorn projectile point) period features, with radiocarbon dates of A.D. 646-600 and A.D. 660-820. These dates are earlier than many of the published temporal intervals for brown wares. There is also a later occupation dating between A.D. 1200 and 1400, possibly associated with bison bones. No evidence of agriculture was found associated with any of the aforementioned temporal horizons. Between A.D. 1200 and 1400 is the time when Jelinek (1967) postulates a shift from agriculture to almost total reliance on bison. In some regions of the southern Plains and the Southwest during certain time periods, a collector lifeway actually became the established strategy and simple foraging was abandoned altogether. Boyd and others (1993) concur with Jelinek, and suggest that the abandonment of foraging strategies occurred on the southern Plains when bison became more abundant during the Late Archaic, Late Prehistoric, and Protohistoric periods.

Data recovery at the Townsend site could provide compelling information that could potentially revise current thinking about Archaic and later pre- and proto-historic adaptations. These include:

--Has the Archaic been stereotyped too quickly as a small game, foraging-collecting culture? Perhaps they were more opportunistic, and took advantage of medium (pronghorn, deer) and larger artiodactyls that watered at Salt Creek. When and to what end were Archaic groups hunting larger biomass? Was this tactic confined to Archaic groups only? This strategy may have been in existence from 500 B.C. through protohistoric times. What are the implications of this systematic reliance on faunal resources through a substantially long period of time?

--Do the dates for the presence of bison on the Plains need to be reviewed and perhaps revised? Maxwell suggests that this resource was probably exploited since Late Archaic times, when no bison were supposed to have existed in the area.

--Ground stone exists, but no evidence of agriculture. Wild plants were probably processed at these loci. Freshwater mussel shell was present. Apparently, a variety of resources was being exploited. The range of resources, and the period in which they were predominant, could be determined through systematic excavation. Subsequent botanical analysis (particularly pollen for the ceramic sites) will be critical to determine the range of plant resources being used.

--It is probable that Salt Creek flowed intermittently and was not a perennial water source. There are large base camps on both sides of the river. Assuming that the presence of a human group camped on the banks of the river would discourage bison and other mammals from watering at that location, either (1) the human occupations were short-lived but repeated, residing there only until the resource was consumed, or (2) animals had no other choice but to water at that location because the creek was not flowing and had puddled, leaving them vulnerable to an ambush tactic. Paleoenvironmental data may be able to furnish the answer as to the permanency of Salt Creek as a water source for both human and animal groups, and provide clues as to periodicity of use.

In summary, the excavation of the Townsend site may provide information of great theoretical and practical importance to the prehistory of southeastern New Mexico.

Also of interest is the biological relationships and nutritional status of the people who inhabited the Salt Creek sites. If human remains are located, excavations will stop until the proper agencies have been consulted. However, from a technological point of view, there are many ways that human skeletal materials can answer questions concerning the biological and cultural relationships that archaeologists ask of archaeological data. The problem in southeast New Mexico is that human skeletal remains are not common, are not recovered in sufficient numbers for statistical reliability, and are frequently not well enough preserved for many types of studies. Thus far, analyses of human remains from southeastern New Mexico are few in number, but the results have been interesting, especially regarding the central research questions posed here.

The two most compelling human biology studies are the analyses of the skeletons from Henderson Pueblo (Rocek and Speth 1986) and the Robinson site (Katzenberg and Kelley 1991). Physically, the inhabitants of the Henderson site resemble both the Pueblo populations to their west and, more markedly, the more scattered peoples of western Texas to their east and south. However, there is no evidence that the Henderson site was settled by recent migrants from either area; instead, the data point to some degree of stability in the local population (Rocek and Speth 1986:167).

Nutritional studies, particularly isotope and element analyses (carbon, strontium, etc.), will be used to estimate the relative contributions of plant and animal foods and of gathered and cultivated foods to the diet. A key aspect of these studies is the nature of the native vegetation in the region. Carbon isotope ratios, which have been used to estimate relative dependence on corn in the Midwest, are dependent on the photosynthetic pathways of the plants consumed. Since many Southwestern xeric plants consumed by both humans and herbivores use the 4-carbon pathway, the task of sorting out the information from isotope studies will be more difficult. Under these circumstances, it is advisable to study the isotope signatures of the animal bones for comparative data.

4. What exotic materials or items at the sites indicate exchange or mobility?

Imported materials have already been documented at several of the Salt Creek sites (for example LA 34150, LA 51095, and LA 1172481). These include extralocal lithic raw material, turquoise, and non-local pottery. Obsidian (of unknown origin but probably from the Jemez Mountains) was observed by Lentz and Akins (April 8, 1997) at LA 117255, obsidian, Alibates and San Andres "fingerprint" chert was observed at LA 117257, and Alibates and San Andres chert was present at LA 51095. The presence of these material types suggests contact or extralocal procurement of these items. Since exotic or trade materials are by their very nature generally few in number in any site, systematic recovery of these items is paramount. Currently, some investigators argue that all pottery is intrusive to this area, produced in the Sierra Blanca, El Paso, or Sacramento Mountain regions and traded into Roswell. Therefore, it would be of considerable research value to determine if pottery was produced in the Roswell area. This would provide an insight into the demographics of the area (whether groups are settled, partly settled, or transient). Materials and artifacts not naturally available in a region are indicative of either exchange relationships with other people or a mobility pattern that permits a group to acquire these items during their yearly round. Judging which situation is applicable to the project sites is difficult and will require careful comparison with data from the Roswell region. If it can be determined whether the site occupants acquired the goods through trade or by direct access, perspective will be gained on the territory they used and possibly on the identity of the people themselves. Identifying local clay sources,

petrographic ceramic artifact analysis, and X-ray fluorescence may provide clues to the identity and origin of the pottery present on the Salt Creek sites.

In small sites and sites of short occupation, the absence of exotics and extralocal materials can be caused by a variety of factors, including the possibility that such items may not have had time to find their way into the archaeological record, the occupants simply did not acquire exotic materials, or they did not leave them behind. Comparisons with other assemblages in the region and the long-term accumulation of excavation data from numerous sites, both large and small and of all types, should provide the appropriate information.

5. What are the dates of occupation at the various project sites? When were they abandoned?

Since it is likely that the sites were occupied on one or more occasions during the Prehistoric period, dating individual features and components is crucial. At the individual feature level, it is important to determine which are contemporaneous and which are not. This will provide relative dates of each component and the activities performed at different time periods at the sites. This in turn will permit documentation of site and region use through time, whether or not these uses changed through time, and if they did change, the directions, intensity, and, hopefully, the reasons for those changes. Chronometric information will also permit us to assess the chronology proposed by Katz and Katz (1985a; phase sequence, and postulated cultural changes for the region). Defining the span of occupation will not only provide data as to the founding of the site, but the approximate time is was abandoned.

Chronometric data are critical in southeastern New Mexico where dendrochronology, the most accurate and preferred dating technique, works poorly or not at all. Few absolute dates derived by other techniques are currently available (Sebastian and Larralde 1989).

Nevertheless, many of the Salt Creek sites will be difficult to date within a precise interval because they usually contain so few narrowly datable materials. Diagnostic pottery on the ceramic sites (El Paso Brown, Chupadero Black-on-white) are generally in use over a long period. During excavation, charcoal will be recovered from as many features and cultural situations as possible. Because of the importance of dating the project sites, we will submit both very small samples (for accelerator mass spectrometry analysis) and bulk samples (carbon-stained sands) for dating if necessary. Recent advances in radiocarbon dating make it the most viable technique for southeastern New Mexico at the present time. Techniques like obsidian hydration and thermoluminescence have been used in southeastern and south-central New Mexico; however, these techniques are burdened with methodological problems that compromise their reliability. It may be possible, however, to obtain archaeomagnetic dates from hearths. It remains to be determined whether baked limestone (the prevalent bedrock in the Salt Creek area) contains enough ferrous elements to be amenable to this technique. Burned sandstone, however, can be dated, and there may be some hearths in this context. The sites containing the most promising features for chronometric studies include LA 34150, LA 51095 and LA 1172481, and possibly LA 117255 and 117250, all of which contain thermal features.

FIELD METHODS

The first activity at each site will be to pinflag all surface artifacts within the right-of-way. A grid with main datum and baselines along the two major axes then be established. This baseline will parallel the right-of-way fence. Next, surface artifacts in undisturbed contexts will be piece-plotted using a laser transit, and collected within the project limits. In dense artifact concentrations, "dogleash" collection units or the grid system will be used.

Excavations will center on exploratory grids used to locate features and on individual features. Feature excavation will include the surrounding area up to a point where it is determined that all associated artifacts have been recovered. Hand tools will be used to excavate in 1-by-1-m squares, and all fill will be screened through ¼-inch wire mesh. Fill from the feature itself, and areas associated with the feature that might contain small artifacts (such as microflakes or beads) will be screened through a ⅛- inch wire mesh. Scattered burned rocks will be tallied, collected, and weighed. Concentrations will be mapped schematically. It is expected that 100 percent of the artifacts will not be recovered, and therefore a "purposive" rather than a random sampling strategy will be in effect. Even though all of the artifacts will not be collected, mechanical excavation will reveal all features. These features will be excavated.

Vertical excavation control will be maintained in relationship to a main site datum and (if necessary) to subdatums calibrated 10 cm above the present ground surface. If we should encounter situations of cultural depth, either 5- or 10-cm arbitrary levels will be maintained from locally designated subdatums. Stratified fills are not anticipated, but if some are found, they will be excavated by individual stratum as determined from vertical tests.

Cultural features such as hearths are present or are anticipated. When found, features will be excavated separately. Special attention will be given to obtaining soil samples for dating, flotation analysis, and pollen analysis.

During the excavations, photographs, drawings, and notes will be made as needed to document work progress, impressions, initial interpretations, features, and details uncovered during the work. Subsidiary maps will be prepared for each excavation area and will include all cultural features, excavation units, and modern features (highway markers, fence lines, etc.).

Human Remains and Sensitive Objects

We do not anticipate finding human remains at any of the project sites. In the event that human remains are recovered, archaeological excavations will cease and consultation with the appropriate Native American tribes (or tribes) and agencies will take place prior to any further action. Should permission to proceed be granted, we will treat human remains with sensitivity and will abide by stipulations resulting from consultations between the officials of appropriate Native American groups, the New Mexico Historic Preservation Officer, the NMSHTD, and the OAS. Also, the conditions outlined in the following documents will be met: Historic Preservation Division Rule 89-1 ("Regulations for the Issuance of Permits to Excavate Unmarked Human Burials in the State of New Mexico"); and Museum of New Mexico Rule 11, as amended April 2, 1991 ("Collection, Display, and Repatriation of Culturally Sensitive Materials").

Human remains or sensitive materials identified and recovered will not be handled or photographed in the field except as part of scientific data recovery by authorized persons. Photographs of human remains and other sensitive materials will not be allowed by or released to the news media, the general public, or other unauthorized persons. The only person authorized to take photographs of human remains and sensitive materials is the person designated by the project supervisor to take documentary photographs as part of the data recovery plan.

LABORATORY ANALYSIS

Artifact Preparation for Analysis and Sampling Considerations

All items except bone will be washed in water. Animal and human bone will be dry brushed.

All collections from all proveniences will be sorted to general artifact type (lithic debitage, sherds, formal artifacts, etc.), tabulated, and scrutinized for rare or unusual artifact types and materials. If the items in a particular artifact class number in the tens of thousands, a sample will be drawn for detailed analysis. Otherwise, all items from each site will be analyzed.

Where sampling is necessary, primary consideration will be given to items from critical proveniences--structure floors, bottom fills of other types of features, use surfaces, stratified contexts, datable locations, and proximity to features. The types of proveniences most likely to be excluded from the analysis are excavations for ascertaining site peripheries (for example, backhoe trenches), exploratory excavations that have negative results (do not locate activity areas, culturally meaningful deposits, or features), and surface collections.

Analyses

Ceramic Artifacts (by C. Dean Wilson)

Analysis of pottery from the Salt Creek Project will involve the recording of data in a manner providing a detailed characterization of ceramic assemblages from various contexts and comparisons with other assemblages from Jornada region sites as well as those from other Southwest regions. Such characterizations will provide information involving the nature of (historical) factors relating to affiliation and interaction with surrounding groups and the examination of the influence of local (selective) pressures on local ceramics (Neff 1993). The latter involves the examination of the influence of potentially distinct ceramic resources, environmental settings, and economic strategies in the Roswell area, and surrounding areas, on ceramic distributions. In order to examine these issues, it is important to record data relating to a wide range of phenomenon including the dating and affiliation of sites, as well as examination of patterns of vessel production, exchange, and use. Such patterns can be examined through the systematic recording of data reflecting area of origin, method of manufacture, stylistic treatment, firing technology, and vessel function. In order to examine these issues, a number of typological categories and descriptive attributes will be recorded.

Ceramic types represent groups relaying information about trait distributions with spatial, temporal, and functional significance. Ceramic items are assigned to typological categories based on a series of observations. First, an item is placed into a spatially distinct ceramic tradition; next into a functionally related ware group; and finally into a type based on temporally sensitive surface textures or design styles. In order to provide for a comparison with other studies, type categories used in previous studies (Jelinek 1967; Whalen 1994), will be employed with some modifications.

The recording of descriptive attributes reflecting resource use, manufacturing technology, and vessel form provide for the examination of various patterns. Ceramic attributes that will be recorded for all sherds examined include temper, pigment type, surface manipulation, slip, vessel form, rim diameter, and modification. Other attributes will be recorded for smaller selected samples and may include sherd profile, wall thickness, refired color, rim shape, and painted design styles. An even smaller sample of sherds will be submitted for petrographic analysis to determine the actual composition of temper.

In addition, clay and temper samples from archaeological contexts and local sources will be collected and characterized. Information relating to refired color and temper characteristics of these samples will be compared to those noted in ceramics recovered from sites investigated during the Salt Creek Project to identify sources that may have been used by local potters, and to develop criteria that can be used to recognize local pottery versus trade wares.

Animal Bone

The animal bone analysis will provide several types of information pertinent to answering research questions. Paramount for our purposes, it will inform us about the species present, the relative proportions of species taken, hunting strategies, and seasonality. This is especially critical for the Townsend site.

Faunal remains will be analyzed for species, age, age at death, taphonomy, and evidence of butchering, cooking, and consumption. Again, the presence of processing of faunal remains is critical to addressing the research issues raised by the Townsend site. Segregating prehistoric from intrusive post-occupational items will also be performed.

Chipped Stone Debitage

A key aspect of the analysis of the chipped stone debris will be to reconstruct the core reduction technology. We need to know what the sizes, shapes, and internal imperfections of the raw material units were and how they affected the sizes, shapes, and other characteristics of the end products, the flakes, and ultimately, the artifacts produced from them.

This type of analysis is necessary because of the nature of the raw materials available to the prehistoric people in southeastern New Mexico and will be necessary in looking at and evaluating similarities and differences in metric and nonmetric attributes of flakes, cores, and chipped stone artifacts throughout the region. The chipped stone analysis will permit us to answer research questions regarding artifact production technology and exchange, mobility, and social relations.

The chipped stone debris will be analyzed for type (core, flake, angular debris), subtype (types of cores and flakes), material, metric dimensions (length, width, thickness, weight), platform characteristics, cortex, termination type, heat treatment, intentional retouch, and use wear.

Lithic material identification is gaining increasing importance in southeastern New Mexico archaeology. Ongoing research, building on research conducted in part by Eastern New Mexico University, is focusing on the use of detailed observation and ultra-violet light discrimination to

identify imported materials such as Edwards chert, Tecovas chert, Alibates material, Ogalalla chalcedony, Long Arroyo chalcedony, and materials from the Delaware Mountains and Van Horn region of west Texas. Preliminary results indicate that examination of bulk site collections of local (mostly San Andres) cherts under ultra-violet light may permit intraregional discrimination of human movements and contacts.

Dating

As mentioned in the research design, chronometric studies are vital to the understanding of the cultural groups using the Salt Creek area. Each radiocarbon sample will first be sorted by plant species and by photosynthetic pathway category (3C, 4C, CAM, etc.). The samples will then be submitted to Beta-Analytic, Inc., for dating. The AMS dating technique will be used if necessary.

Formal Artifacts

All artifacts diagnostic of traditional categories of curated tools (projectile points, drills, manos, metates, etc.) will be analyzed according to assumed anticipated primary function. We readily acknowledge that many individual artifacts were ultimately used in a variety of ways, but the primary function, judged by design characteristics (shape, material, etc.), will be the main criteria for assignment. In some cases, artifacts were put to secondary uses after they were no longer needed or functioned properly in their primary roles.

By analyzing artifacts and assemblages from the standpoint of anticipated primary roles or needs, we can ascertain what activities the people expected to perform, and probably did perform, at a given location. Use-wear studies and other evidence for secondary uses can assist us in confirming anticipated uses and in discerning uses in addition to those for which the tools were designed. The two kinds of evidence, then, can give us a more complete picture of the functions of the individual artifacts, associated features, and the sites.

Formal artifacts will be analyzed for type (primary function inferred from design characteristics), material (stone, bone, shell, pottery, etc.), metric dimensions (length, width, thickness, weight), use wear, and other attributes having interpretive potential (burning, breakage type, pigment, etc.).

Human Remains

Subject to consultation, the following nondestructive observations and studies will be conducted if human remains are recovered during the excavations: standard measurements, gender, age, pathologies, and anomalies.

If the bone is sufficiently well preserved, and depending on the results of consultations with the appropriate agencies, destructive studies may be undertaken. The samples for these studies will be of two types: (1) a minimum of two quarter-sized pieces of bone from each individual represented, and (2) one cross section of the end of one long bone. The quarter-sized pieces will be ground for chemical analysis.

Overall, the proposed studies will yield information on stature, gender, diet, health, nutritional status, and genetic relationships to regional and extraregional peoples. This information will then be compared and contrasted to the results obtained by Rocek and Speth (1986) in their study of burials from the Henderson site, a Late Prehistoric farming village near Roswell.

Botanical and Pollen Recovery

Plant remains, as documented through pollen, microscopic plant fragments from flotation samples, and macroremains (large enough to be seen with the unaided eye), will also provide several other types of information pertinent to answering the research questions. They will inform us on wild species collected, domesticated species grown, the relative proportions of wild and domestic species used (the "mix"), wild-plant collecting strategies, and seasonality.

The floral materials will be analyzed to lowest taxonomic order possible and plant part represented. An attempt will be made to determine which remains were used by the prehistoric occupants of the sites and which were post-occupational intrusives.

Palynological analysis is especially critical on the ceramic sites. These data will provide important information on subsistence practices along the Salt Creek and on the other ceramic sites. The presence or absence of cultigens (i.e., was agriculture practiced) detectable through pollen analysis, is one of the main foci of the research design.

Pollen analysis will employ Intensive Systematic Microscopy (ISM) developed by Dean (n.d.) to look for possibly rare marker grains of corn pollen.

Data Integration and Interpretation

Once all of the analyses have been completed, the results will be synthesized and used to address the research questions. Pertinent sites in the region, as reported in the archaeological literature, will be compared to the project sites to gain perspective on regional culture dynamics.

RESEARCH RESULTS

The final report will be prepared and published in the *Archaeology Notes* series of the Office of Archaeological Studies, Museum of New Mexico.

All collections, except human remains and grave goods, will be submitted to the Museum of New Mexico Archaeological Research Collections. Human remains and grave goods will be reposited according to understandings reached through consultation with the appropriate governmental agencies and Native American group(s) to be determined by the SHPO and the NMSHTD.

All paper records and photographs will be submitted to the Archeological Records Management Section at the Laboratory of Anthropology, Museum of New Mexico, in Santa Fe.

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