NMDOT Project CN 4100381

NMCRIS #131095

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Data Recovery Plan for Coyote Canyon Rockshelter (LA 139965) along NM 434, Mora County, New Mexico

Nancy J. Akins, James L. Moore, and C. Dean Wilson

Office of Archaeological Studies — Museum of New Mexico

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NMCRIS Activity No. 131095

DATA RECOVERY PLAN FOR COYOTE CANYON ROCKSHELTER (LA 139965) ALONG NM 434, MORA COUNTY, NEW MEXICO

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Submitted by
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NMDOT Project CN 4100381
CO5488/Task 25 [FY12-25]

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ADMINISTRATIVE SUMMARY

At the request of Laurel T. Wallace, Cultural Resources Coordinator, NM Department of Transportation, the Office of Archaeological Studies [OAS] has prepared a research design and data recovery plan for LA 139965. The site consists of two small rock shelters that could have cultural material representing Prehistoric, Protohistoric, and Historic period occupations and has been determined eligible under Criterion 'd' by NMHDP (log 70581). It is located on the west side of NM 434 just north of Coyote Creek State Park at mile marker 17.3. NMDOT plans to widen NM 434 to provide for two 11 foot (3.35 m) driving lanes, 2 foot (0.6 m) shoulders, and a drainage ditch that meets current NMDOT design standards. The right-of-way in the site area is 80 ft (24.4 m) wide. The area west of the current pavement up to the cliff face will be disturbed during construction.

LA 139965, Coyote Canyon Rockshelter, is within the NMDOT owned right-of-way along NM 434 (Figure 1), and all data recovery will be confined to the right-of-way. Cultural deposits within the right-of-way will be completely excavated. Excavations will be performed by OAS personnel and will comply with provisions set forth in Section 106 of the National Historic Preservation Act (36 CFR 800), Executive Order 11593 (1972), the National Environmental Policy Act of 1969 (91 Stat 852), and the State Cultural Properties Act of 1969 (as amended).

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1 INTRODUCTION

This project will be conducted as part of the first phase of planned improvements along an 8.25-mile stretch of NM 434 north of Coyote Creek State Park (NMDOT Project CN 4100381) (Figures 1 and Appendix3.1). In this area, NM 434 is a narrow, two-lane paved road lacking shoulders that poses a safety hazard due to the design and increased traffic. NMDOT in cooperation with the Federal Highway Administration (FHWA) plans to widen the highway to provide for two 11-foot (3.35 m) driving lanes, 2 foot (0.6 m) shoulders, and a drainage ditch that meets current NMDOT design standards. The right-of-way in the site area is 80 ft (24.4 m) wide (Walley et al. 2012:1). Construction will impact the area between the current pavement and the cliff face. The area to be investigated lies within the NMDOT owned right-of-way, and the project is federally funded by FHWA.

LA 139965 was first recorded by Marshall and Marshall in 2003 as a multicomponent site that occupies an area 60 m long at the base of a cliff. It includes two small rockshelters they named Coyote Canyon Rockshelter and talus areas with cultural material. Potential occupations include Jicarilla Apache, Puebloan, and Anglo or Hispanic groups (2004:39). The initial survey for this project located one other site (a historic lumber camp and ranch headquarters) and nine isolated occurrences (IOs) within a three mile (4.8 km) radius of the site. Only one other prehistoric site was recorded during the survey, LA 139968, a cobble pile with two metates dating to the prehistoric or Protohistoric period, is just outside the town of Mora (Marshall and Marshall 2004:5, 7). Given the lack of information on this area, excavations at LA 139965 should provide important information on the early history and prehistory of Coyote Canyon.

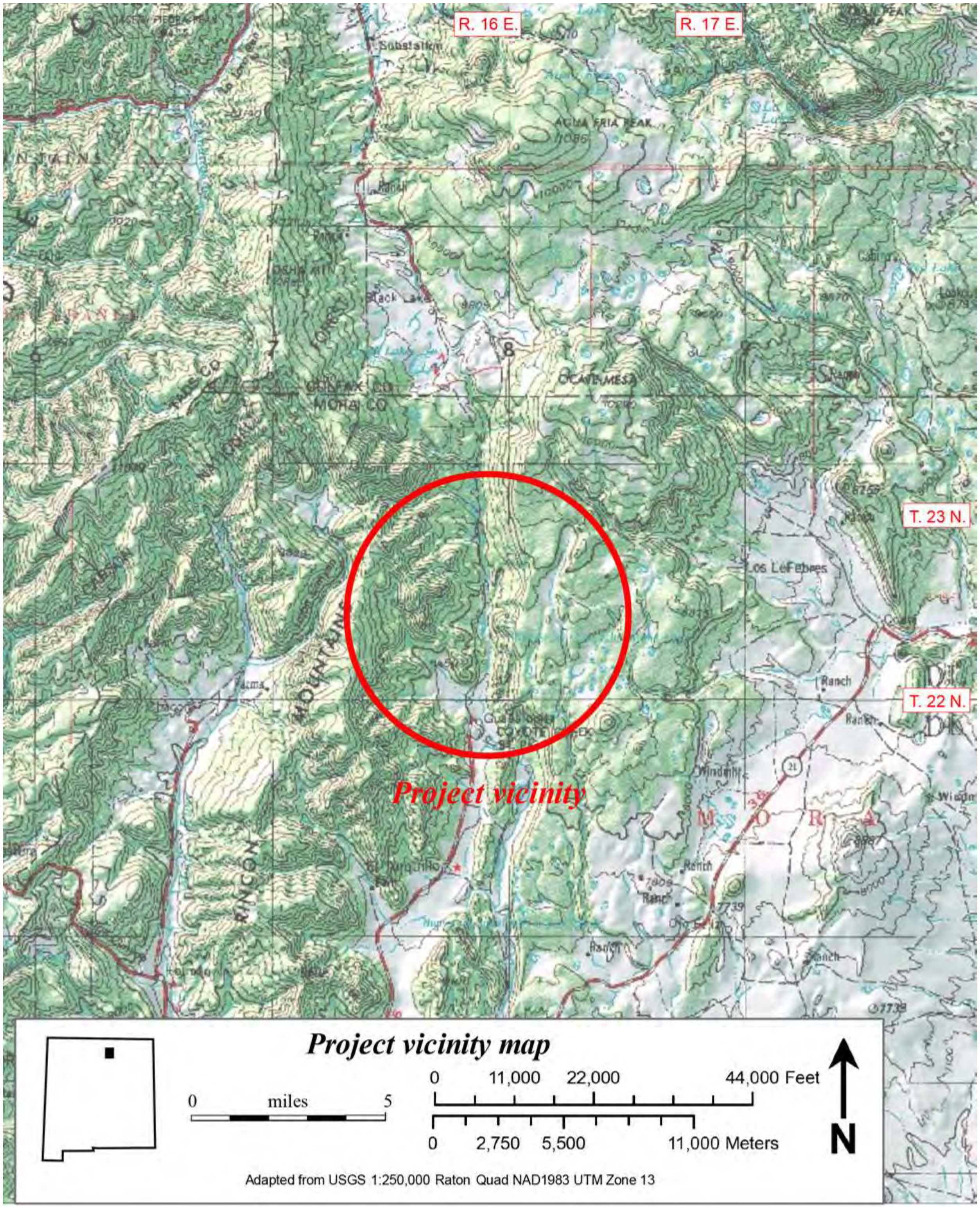

Figure 1. Project vicinity map.

2 NATURAL ENVIRONMENT

Coyote Canyon Rockshelter is located along Coyote Creek near the south entrance of Guadalupita Canyon and is just north of Coyote Creek State Park. Black Lake is about 13 km (8 mi) to the north and the village of Guadalupita is 4 km (2.5 mi) to the south. The shelters are approximately 50 m (164 ft) west of Coyote Creek at the base of a volcanic cliff at an elevation of 2,347 m (7,700 ft). Oak, squawberry, juniper, ponderosa pine, willow, grass, and mullein occur on and around the site. A grassy meadow and riparian vegetation are present on the opposite side of NM 434 from the site.

The Rincon Mountains lie to the west and Ocate Mesa to the Northeast. The Rincon Mountains are in the eastern portion of the Sangre de Cristo Mountains and consist of an asymmetric anticline that is flat-topped with a steep cliff face in the site area. Ocate Mesa is a basalt-capped volcanic field that lies between the Rocky Mountains and Plains. Lava flows in the Black Lake/Guadalupita area along Coyote Creek are olivine basalt that can be more than 46 m (150 ft) thick (Brown 2004:13–14).

The site lies at the intersection of two soil groups. To the west are Moreno-Brycan-Hesperus soils described as deep, nearly level to sloping, and well drained. Vegetation is mainly grass with some conifers and brush at the edge. To the east are Dargol-Rock outcrop-Vamer soils described as shallow to-deep, gently sloping-to-very steep well-drained soil on mountainsides, mesas, ridges, benches, foothills, etc. These tend to be covered with coniferous tress and grasses (Sellnow 1985:11).

At Coyote Creek State Park, the average daily high temperatures range from 9° C (49° F) in January to 30° C (87° F) in July and the lows from -9° C (15° F) in January to 11° C (52° F) in July (Brown 2004:16). Most of the moisture comes from May through October (56 cm, 22 in) with 1.5 to 1.8 m (5–6 ft) of snow falling in the mountains in winter (Houghton 1985:2).

Coyote Creek is a tributary of the Mora River and originates near Black Lake. Flow varies by season with most of the runoff coming from summer thunderstorms and melting snow. Flow can be reduced to trickle in July and August (Ebright 2010:A–3).

Located at the southern end of the Rocky Mountain Physiographic Province, vegetation is Mixed Conifer Forest in the uplands and Montane Riparian Forest in the canyon bottom along Coyote Creek. Surveys along NM 434 have documented 54 species of birds, 15 mammals, 2 reptiles, 1 amphibian, and 8 fish. Mammals include deer, elk, bear, coyote, raccoons, pocket gophers, woodrats, cottontail, chipmunks, meadow voles, deermouse, long-tailed voles, and the New Mexico meadow jumping mouse. Three birds of prey were observed (red-tailed hawks, peregrine falcons, and the northern goshawk). Swallows nest within the cliff faces (NMDOT 2014:3–18, 3–23–3–24).

3 CULTURAL SETTING

Few archaeological investigations have taken place in Mora County resulting in little information for the specific area so that this background relies on more general information from the northeastern portion of New Mexico. Located near the edge of the Sangre de Cristo Mountains and the Plains, the area is complex both environmentally and culturally and has the potential for providing information on the interaction between Southwestern and Plains groups. This section relies on the records search and cultural overview in Marshall and Marshall (2004:19–20; Brown and Marshall 2004:24–33) but is more focused on the particular area and is updated and supplemented when possible. Emphasis is placed on the possible Jicarilla Apache occupation suggested by Marshall and Marshall (2004:39).

Paleoindian Period

Humans entered the New World by about 16,000 years ago, well before the earliest recognized group or Clovis tradition. No unequivocally ancestral Clovis sites have been identified, but pre-Clovis sites such as the Debra L. Friedkin site in central Texas suggest they differed in technological organization (Jennings and Waters 2014:25–44).

In the Southwest, the earliest well documented groups were mobile hunter-gatherers that hunted now-extinct fauna in the late Pleistocene and early Holocene. Distinctive projectile point styles are used to divide the period into three groups: Clovis (10,000–9,000 BC), Folsom (9,000–8,000 BC), and Plano (8,000–5,000 BC). Dated Clovis sites tend to be found in the high Plains along the Rocky Mountains and the distinctive Clovis points and blade technology may have originated in the southeast and moved northward and eastward. The Rocky Mountains appear to have been a significant barrier (Beck and Jones 2010:84–86). Clovis technological organization included bifacial and blade core reduction strategies and the tool kit had scrapers, gravers, notches, and other flake tools (Jennings and Waters 2014:26), as well as shaft straighteners, and bone points and foreshafts (Gunnerson 1987:10). Folsom and Plano groups hunted early forms of bison relying more on plant resources towards the end of the period. Finely made fluted projectile points are typical of Folsom assemblages while Plano complexes are characterized by a variety of projectile point and knife forms (Marshall and Brown 2004:24).

A variety of Paleoindian points have been found along the foothills of the Sangre de Cristo Mountains (Clovis, Folsom, Planview, and Cody). Two sites located between Mora and Las Vegas have these points, LA 4558 with Clovis, Folsom, Cody, and Eden points and LA 12586 with Folsom material. In addition, LA 3647 near Tecolote had Clovis, Folsom, and Planview points. Other sites have Paleoindian components (Brown and Marshall 2004:24–25). Given its location, LA 139965 could have been used by Paleoindian groups.

Archaic Period

The Archaic period in the northeastern part of the state is also poorly known. This is due in part to our inability to date lithic scatters that lack diagnostic artifacts along with many of the known sites being multicomponent. Subsistence during the Archaic is generally considered to be more oriented towards plants but also included hunting small and larger game such as deer. Distinctive artifacts include stemmed or corner-notched projectile points, basin metates, one hand manos, scrapers, drills, choppers, and knives.

More is known about the Archaic in the northern Rio Grande Valley on the west side of the Sangre de Cristo Mountains where a drier climate decreased lake and creek levels after about 6050 BC and may have shifted game distributions northward. Moister conditions in the Middle Archaic expanded the piñon-juniper woodlands causing some shift of hunter-gather residences into the uplands for collecting pine nuts and hunting deer. The Late Archaic was characterized by seasonal movement from the juniper savanna in early summer to ponderosa pine/mixed conifer forest in mid to late summer, and piñon-juniper woodlands in the fall. Winter camps were in riverine settings (Vierra 2013:147–148).

Pueblo and Plains Woodland Periods

The influence of Rio Grande Puebloan and Plains groups overlap in northeastern New Mexico during this era. Reliance on cultigens, pottery manufacture, the bow and arrow, and a more sedentary life-style characterize some groups while others continued a mobile hunter-gatherer lifestyle. Puebloan sites are present in the Cimarron, Waltrous Valley, and Tecolote-Ribera areas (Marshall and Brown 2004:25).

With the exception of the Cimarron area, evidence for the Puebloan occupation of the northeastern part of the state begins around AD 1000. Sites in the Cimarron area date as early as AD 400–700 and are similar to Basketmaker II sites elsewhere in the state. These have simple above-ground structures, corner-notched projectile points, and corn but no ceramics. Crude thick-walled ceramic vessels and pithouse architecture appear around AD 900–1000. Above-ground structures reappear along with the occupation of rockshelters around AD 1000–1250. Ceramic types associated with these latest sites include Taos Gray, Taos Black-on-white, and Kwahe'e Black-on-white. Large multi-room pueblos with Santa Fe Black-on-white ceramics are found in the final phase (AD 1200–1300). This change in architectural form is accompanied by a movement from upper canyons at higher elevations to lower canyons and margins of the plains during the later period (Marshall and Brown 2004:26-27; Simmons 1989:100–101).

From AD 1300 to 1450, the occupation of northeastern New Mexico is referred to as the Antelope Creek focus reflecting the Great Plains orientation of this period. Sites are characterized by contiguous room pueblos with rows of upright slabs ranging from 6 to 80 rooms in size. Subsistence was a mix of agriculture and bison hunting, and ceramics are a mix of cord-marked wares and Pueblo tradewares. By AD 1450 most of these groups had left the area (Marshall and Brown 2004:27; Simmons 1989:101).

Protohistoric and Early Historic Periods

A number of groups occupied northeastern New Mexico after AD 1500. The Apaches are the best-known and best documented due to their contact with the Spanish explorers. The Jicarilla Apache are the group most likely to have occupied and used the project area and their history and what we know archaeologically is detailed below. Other groups who could have passed through or used the area include the Kiowa and Kiowa Apache and Comanche in the 1700s and 1800s and Hispanics who settled on the western slopes of the Sangre de Cristo Mountains and used the area for trapping or as a route between the Plains and upper Rio Grande (Marshall and Marshall 2004:27–31).

Jicarilla Apache

The Jicarilla Apache currently occupy a reservation in north-central New Mexico but formerly roamed across most of northeastern New Mexico and well out onto the Plains. Speaking a Southern Athabaskan language, the Jicarillas are linguistically and culturally related to other Apache groups including the Mescalero, Lipan, Chiricahua, Kiowa, and Western Apaches, as well as the Navajo. The modern Jicarillas are comprised of two bands with somewhat different origins, as discussed below.

The Southern Athabaskans appear to have entered the Southwest around 1450, shortly before the first Spanish expedition into the region (Wilshusen 2010:195). Citing Spanish documents, Gunnerson (1979:162) suggests that the Southern Athabaskans arrived in the Southwest shortly before the Coronado expedition of 1540–1542. As related in Castañeda's memorial of that expedition, Coronado was told at the village of Cicuye (Pecos Pueblo) that a people called the Teyas had first arrived in the area about 16 years earlier (Covey 1990:148). The Teyas had attacked and destroyed several villages, probably in the Galisteo Basin, and besieged Cicuye. Unable to take that village, they made peace and left the region. However, the Teyas now came to Cicuye to winter and trade, but were not allowed into the village. During his journey onto the plains in search of the land of Quivira, Coronado encountered two groups of nomadic peoples who moved around with their goods carried by dogs. These were the Querechos and the Teyas. The Querechos have long been accepted as early Apaches, and a linguistic and ethnohistoric analysis by D. Gunnerson (1974) suggests that the Teyas were Apaches as well. This documents the entrance of the Apaches into the Southwest in the early years of the sixteenth century. Archaeology appears to support this scenario, suggesting that the Apaches arrived in northeastern New Mexico and on the Llano Estacado of Texas and Oklahoma by ca. AD 1450–1500 (Eiselt 2006:57).

Emigrating from west-central Canada, the Southern Athabaskans began moving south about 1,000 years ago, arriving in the Southwest as a more or less homogenous group (Gunnerson 1979:162). The ancestors of the Lipan and Kiowa Apaches, and some of the ancestors of the Jicarilla remained on the Plains, while other groups moved into the mountains of northeastern New Mexico and into the southern part of the province. The Jicarillas first entered the historical record in 1630, when Benavides mentioned the conversion of a group of Apaches living in rancherías in the area north of Taos (Ayer 1916:41; Tiller 1983:447). By 1700, these people were referred to as Jicarilla. These were the mountain Apaches, ancestors of the modern Ollero band of the Jicarillas.

The Jicarillas were living in rancherías and growing crops in northeastern New Mexico when contacted by Ulibarri in 1706 (Tiller 1983:449), though they also maintained a Plains hunting tradition (Noyes 1993:xxiii). Other Apache bands, including the Carlanas, Palomas, and Cuartelejos, were living to the northeast and east of the Jicarillas and were also partly agricultural and partly Plains hunting groups (Noyes 1993). All four of these bands were essentially friendly to the Spanish, trading with them rather than raiding. By 1714 the Jicarillas were serving in Spanish campaigns against the Faraon Apaches, who were raiding the Pueblos and Jicarillas in addition to the Spanish (Thomas 1935:81). However, a far more potent enemy had appeared on the scene by this date.

Beginning around the turn of the eighteenth century, the Comanches—a Shoshonean tribe—began moving south from the Northern Plains, probably to obtain better access to Spanish settlements and the rich wildlife of the Southern Plains (Noyes 1993:xix). By 1706, the Comanches had allied with the Utes and were threatening Taos; by later in that year they were raiding the Jicarillas (Noyes 1993:xix). By 1719 the Comanches had the Carlanas, Cuartelejos, Palomas, and Jicarillas in full retreat from the Plains. The Comanches had mostly driven these groups from the Plains by the 1730s (Gunnerson 1979:163; Tiller 1983:447). Most of the Jicarillas were driven from their homeland in the 1720s and 1730s, moving to an area south of Taos Pueblo near modern Ranchos de Taos, though a few remained in their homeland until the 1740s (Eiselt 2006:105). Most of the members of the Carlana, Palomas, and Cuartelejo Apaches joined together and became the Llanero band of the Jicarillas between about 1730 and 1750, though some Carlanas may have joined the Lipan Apaches in central Texas (Gunnerson 1979:163; Tiller 1983:450). The Llaneros were living near Pecos Pueblo in 1752, but also still made their homes on the far southern Plains to escape the Comanches (Tiller 1983:450). In 1786 the Llaneros asked for refuge in New Mexico, but were refused by the Spanish and remained on the Plains until 1801 when they moved in with the Jicarilla in northeastern New Mexico, regardless of Spanish objections (Tiller 1983:450).

Governor Anza negotiated a treaty of peace with the Comanches in 1786, bringing to a close the period of continual warfare. The terms of this treaty also made peace between the Jicarillas and Comanches. With the peace, Spanish settlers began encroaching on the Jicarillas traditional Jicarilla homeland. Still, despite this encroachment and the creation of numerous land grants in Jicarilla territory by the Mexican government after 1821, the Jicarillas continued to live undisturbed in their traditional homeland throughout the Mexican period (1821–1846 [Tiller 1983:450]). However, this situation began to change after New Mexico was acquired by the United States in 1846. American settlers began moving into Jicarilla territory and upsetting the economic balance between the Jicarillas and the Spanish settlers who were already living there (Tiller 1983:451). Hostilities began with the Jicarillas and other Indian groups that continued for many years, though there were several failed attempts to establish peace. In 1854 the acting governor of New Mexico declared war on the Jicarillas and the Utes with whom they were allied (Tiller 1983:451). After two years of war the Jicarillas and Utes negotiated a peace treaty. The Jicarillas occupied lands near Cimarron and Abiquiu, though an official reservation was not created for several decades. After years of negotiation and a brief relocation to the Mescalero reservation in the south, a reservation was finally established for the Jicarillas in 1887 (Tiller 1983:452), allowing them to live on part of their original lands in northeastern New Mexico.

Jicarilla Apache Archaeology

Gunnerson (1969) was one of the first archaeologists to describe probable Jicarilla Apache sites in northeastern New Mexico. During a 1719 expedition against the Comanches and Utes, Antonio de Valverde provided a description of Jicarilla houses, describing those at one settlement as made of adobe with flat roofs (Thomas 1935:113–114). At a second settlement the houses were described as terraced, and Valverde noted that the Jicarilla's crops were irrigated by canals and ditches (Thomas 1935:115). By the late 1740s, the Apaches were apparently no longer able to live in such semi-permanent residences, and were living in "houses, palisade huts, and other shelters," as described by Governor Codallos (Twitchell 1914:150, as cited by Gunnerson 1969:3). Using descriptions like these in conjunction with surveys, Gunnerson (1969) defined several probable Jicarilla residential sites in northeast New Mexico. The Glasscock Site is along Ocate Creek, a tributary of the Canadian River, and contained a seven room L-shaped structure of coursed adobe that probably had a flat roof and lacked a prepared floor. Hard-fired baking pits, similar to those used until recently by the Jicarilla for baking green corn, were found at both the Glasscock Site and the Ponil Bend Site (Gunnerson 1984:63). The ceramic assemblage at the Glasscock Site was dominated by Ocate Micaceous, but also contained a small number of Historic Pueblo sherds including Ogapoge Polychrome and Tewa Polychrome, and two glaze ware sherds that may have originated at Pecos Pueblo (Gunnerson 1969:27). Projectile points include specimens made from obsidian and Alibates chert. Ground stone and bone tools were also recovered. A few majolica sherds and a single metal tool, possibly an awl, were the only artifacts found that were of European manufacture. Similar adobe structures were alluded to by Hurtado in the Mora Valley in 1715 (Gunnerson 1969:36; Thomas 1935).

The Sammis Site, near Cimarron, contained a single pit structure, or structure in a pit, that was attributed to a Jicarilla occupation, and which yielded numerous Ocate Micaceous sherds as well as a single majolica sherd. Two probable Jicarilla occupations were defined at the Chase Bench Site in Ponil Canyon. An early, pre-1750 occupation was represented by two structures that both yielded Ocate Micaceous sherds. One structure consisted of a shallow depression nearly 3 m in diameter bounded by rocks and containing chunks of adobe that either originated in the walls or the roof, while the second structure was not well-defined. In contrast, a post-1850 occupation was represented by seven probable tipi rings associated with Cimarron Micaceous sherds, as well as metal and glass artifacts (Gunnerson 1969:32–35). Both obsidian and Alibates chert were found at this site.

A small jacal structure was documented by Gunnerson (1984:64) in the lower Vermejo Valley. This structure was a surface house measuring 3.3 m in diameter, outlined by vertical posts set about a meter apart, and which contained a well-prepared hearth. Three storage pits, the largest of which was 1.5 m deep and 1.4 m in diameter, were also found at this site (Gunnerson 1984:64).

Gunnerson (1979:168) also reported on the John Alden Site north of Villanueva, which contains a reported 100 crude structures located on a mesa top north of Villanueva. The structures appear to consist of shallow depressions ringed with stone walls that were possibly as much as a meter tall, and are a bit larger than three meters in diameter, with a hearth in the center. One structure may contain three rooms, and the best preserved example is L-shaped with a corner fireplace near the top of the L. Artifacts are sparsely distributed, suggesting a brief occupation, and are dominated by a non-micaceous ware that is otherwise similar to Cimarron Micaceous. Some sherds of Powhoge Polychrome were also identified and, in association with and a dateable military button, suggest an occupation around 1850.

Glassow (1980:75–77) investigated Jicarilla sites in the Cimarron district, representing two periods of occupation. The early period is known as the Cojo phase and may pre-date the early 1700s. Among the sites dating to this period of occupation in Ponil Canyon, at NP-12 he encountered three wickiup-like structures, a bottle-shaped roasting pit, non-random rock scatters, numerous ground stone tools, some corn, and a low density of other artifact types. The pottery at this site was mainly Ocate Micaceous, but some Pecos Glaze Polychrome and Kotyiti Glaze-on-red sherds were also found, dating the site to the early 1600s. Other sites in the area contained Sankawi Black-on-cream or unidentified Rio Grande glaze wares in addition to Ocate Micaceous sherds. Some evidence of contemporary occupations was found in rock shelters. The later period of occupation is the Jicarilla phase, which appears to post-date 1800. Only a few sites dating to this period were found, and they contain sparse scatters of cultural debris. Cimarron phase sites were defined by the presence of Cimarron Micaceous sherds, and include the Chase Bench Site that was previously excavated by Gunnerson (1969), as discussed earlier.

Eiselt (2006:238–244) has investigated mid-1800s Jicarilla sites in the Rio del Oso, a tributary of the Chama River. Nineteen residential sites were recorded, each containing multiple rock rings that probably represent extended family base camps. Base camps occur in what Eiselt (2006:239) terms settlement areas, and form non-overlapping clusters of features and artifacts separated by 20–100 m. The base camps contain three to ten rock rings as well as other features, and low-density artifact scatters and trails surround the camps. Most of the rock rings appear to represent wickiup bases, though tipis and square army tents also appear to have been used (Eiselt 2006:251). Extramural features include thermal features, rock alignments, agricultural terraces, corrals or pens, shrines, trails, and artifact scatters (Eiselt 2006:258). Artifact assemblages consist primarily of chipped stone debitage and tools, micaceous schist debris, Cimarron Micaceous sherds, and ground stone (Eiselt 2006:285). Euroamerican artifacts occur but only make up about 4 percent of assemblages.

Girard (1988) investigated nineteen probable Jicarilla sites clustered in five areas between the mouths of the Rio Chiquito and the Rio Grande del Rancho in the Taos area. These sites are characterized by micaceous pottery made by Apaches and also include chipped and ground stone artifacts, and Euroamerican items. Unfortunately, cultural features were only found at two sites. In one case, there is a small, shallow roasting pit, while the other site contains the remains of a pole and brush shelter and a sandstone chimney over a hearth. Archaeomagnetic and tree-ring dates indicate that the latter site was occupied in the 1860s.

Though well outside the study area, Seymour (2002, Seymour and Church 2007) have identified probable Apache sites in southern New Mexico that may be ancestral to the Mescalero Apache, and that probably bear some resemblance to contemporary Jicarilla sites. This occupation has been defined as the Cerro Rojo Complex, and includes evidence of an expedient chipped stone reduction strategy producing retouched tools and distinct side-notched and tri-notched projectile points. The side-notched points from the type site are notched a quarter to a third of the length of the blade above their concave bases (Seymour 2004:174). The tri-notched points have side-notches that are half to three-quarters of the length of the blade above the base, with a third notch or concavity in the base (Seymour 2004:174). Other tools include Plains-style end scrapers (Seymour 2004:172). It should be noted that Seymour's (2004) assignment of the points described above to Apache manufacture has been disputed (Kenmotsu and Miller 2008). As Kenmotsu and Miller (2008:234) note, Seymour's points (2004:174) resemble the Washita and Harrell types and are described as variants on those types. While Washita and Harrell Points have been recovered from sites believed to have been occupied by Apaches, they were also made by other groups and therefore cannot be considered diagnostic of an Athabaskan occupation (Kenmotsu and Miller 2008:234).

Structural characteristics of the Cerro Rojo Complex include rock-ringed huts, tipi rings, structural clearings, lean-tos, and sleeping platforms in rock shelters. Though the pottery produced by these probable Apaches is not micaceous as are the types made by the Jicarilla, they tend to consist of plain brown wares. Trade wares include contemporary Pueblo pottery from the Middle and Northern Rio Grande, the Salinas district, and the El Paso area. Summer camps are located in high-altitude settings in the mountains, while winter camps are in lower altitudes along rivers and in the foothills (Seymour and Church 2007:100).

Jicarilla Archaeological Phases

Glassow divides the occupation of the Jicarilla Apaches in northeastern New Mexico into two phases (1980). Neither phase is well described and was based on studies conducted in the Cimarron district. These phases were originally separated by a hiatus in Jicarillas occupation in Glassow's study area caused by warfare with the Comanches and Utes (Glassow 1980:76). The original dates were later refined by Glassow (1984), eliminating the hiatus. Assignment of sites to these phases is primarily based on the types of pottery present, with Ocate Micaceous being diagnostic of the Cojo phase, and Cimarron Micaceous of the later Jicarilla phase (Glassow 1980:70). However, the presence of Pueblo sherds and a few Euroamerican artifacts with known date ranges were also used to assign and refine dates assigned to sites.

Cojo phase

The earliest archaeological manifestation attributed to the Jicarilla Apaches is the Cojo phase (ca. AD 1525/1550–1725/50), centered in the Cimarron District (Eiselt 2006:57; Glassow 1984:103). As summarized by Eiselt (2006:57), this phase is marked by the occurrence of Ocate Micaceous ceramics, bell-shaped baking pits, non-random rock scatters, numerous ground stone artifacts, Plains-like chipped stone tools, and a number of different house styles including adobe, masonry, and pole and thatch houses. Gunnerson (1984) also notes the variety of structures used during this period, based on his own excavations as well as contemporary descriptions (Gunnerson 1984:64). There also tends to be a few trade items of Pueblo origin. Sites of this phase usually occur along the western tributaries of the Canadian River on valley floors.

Jicarilla phase

The Jicarilla phase is dated after about 1750 (Glassow 1984:103). Cimarron Micaceous pottery is diagnostic of an occupation during this phase, and is often accompanied by chipped and ground stone artifacts, Pueblo pottery, and some Euroamerican artifacts. Known sites in the Cimarron district tend to have sparse artifact scatters suggesting short occupations and a non-agricultural orientation. The John Alden Site near Villanueva dates to this phase and, as discussed earlier, contains about 100 structures with a sparse artifact scatter indicating a short occupation, similar to the sites in the Cimarron district (Gunnerson 1979). However, Eiselt's (2006) sites in the Rio del Oso also date to this phase and are distinctly agricultural. Cimarron phase houses tend to consist of rock rings indicative of wikiups or tipis, but somewhat more substantial structures can also occur, with at least partial rock walls.

<u>Hispanic and Anglo</u>

Located within what was the Mora Grant and probably the Guadalupita Grant common lands, the LA 139965 area could have been used of residents of either or both of the Mora and Guadalupita communities. The Mora Grant was issued by Mexican Territorial Governor Albino Perez to José Tapia and 75 settlers on September 28, 1835, but Spanish settlers were in the area as early as 1818 or 1820 (Marshall and Marshall 2004:31). In 1851, after the Treaty of Guadalupe Hidalgo conveyed the land from Mexico to the United States, the grant residents petitioned the Surveyor General for confirmation of the community grant. Problems with the survey and objections by the succeeding Survey General delayed acceptance of the survey until 1871. In the meantime, Anglo-American lawyers, politicians, merchants, and land speculators with connections to the Washington establishment and Republican Party were able to find investors willing to purchase portions of land grants in New Mexico. Stephen B. Elkins and Thomas B. Catron bought up as many rights to the Mora Grant common lands as they could. When the survey was finally accepted, the patent was issued to Catron and Elkins even though they owned only a small portion of the land. Thus, by the late 1880s, the grant common lands were primarily owned by Catron and two Massachusetts residents (Benjamin Butler, a politician and Adelbart Ames, a businessman) who divided the land and filed suit to partition the common lands in 1876. The local Hispanic and Anglo residents of the grant lands ignored the claims of Catron and partners and continued to use the common lands for livestock, refusing to pay royalties or move from the land. Catron was never able to establish clear title to his portion of the land and in 1913 his interests were sold at the Mora County Courthouse door for failure to pay property taxes. A resident of Las Vegas bought the land, but in 1915 the partition suit of 1876 was resurrected in the local court—without informing the people on the grant. The land was again sold at the Mora County Courthouse door. As a result, the descendants of the original grant members lost their claim to the common lands (Goodman 1993:35–38). The Guadalupita grant was one of five small land grants that overlapped portions of the Mora Grant. It was initiated with permission from the principal Mora grantees in 1837 and settled in 1851 (Ebright 2010:A–1).

The most likely Hispanic use of the LA 139965 area would have been related to sheepherding. Located along Coyote Creek, the site had access to water, a grassy area across the creek, and a steep cliff to provide some protection from environmental conditions. Sheep camps in the Mora and Guadalupita area could have resembled those described by Carrillo for the Chama Valley (1992:158–160). In addition to jacal summer dwellings near communities, some had large canvases that were made into temporary tents. The canvases were held down by stones and pegs and formed a circular structure. Access was through an unstaked corner of the canvas. Cooking was done outdoors. Shepherds carried few person items and were armed with bows and arrows. Mules and horses were used for transport until wagons became available. Hispanics in general tended to rely on hunting native wildlife to minimize the number of domestic animals consumed. Deer and elk meat was made into jerky and at times pounded into a fine powder on a metate.

Anglo presence is documented just north of LA 139965 at the Shollenbarger Camp Ranch Headquarters (LA 139967), a logging camp used by the Fort Sumner Lumber Company and probably by earlier owners since the 1920s. The lumber company camp was a small community with a foreman’s house, a cook and mess hall, a repair shop and garage, workers’ cabins, a washroom, a store, a well, corrals, and possible dance hall (Marshall and Marshall 2004:48).

4 PREVIOUS RESEARCH AND CURRENT SITE CONDITION

The 2003 record search covered an area 1.0 km of NM 434 right-of-way survey from Mora to Black Lake (41.4 km, 25.75 mi) (Marshall and Marshall 2004:19–21). At that time, six sites and the Village of Guadalupita and Town of Mora had been recorded within that area. The previously documented sites include LA 78461, a Hispanic or Anglo root cellar or dugout dating around 1920; LA 78460, an Apache camp with ceramic and chipped stone artifacts, probably dating to the Protohistoric period; LA 85164, late nineteenth to early twentieth century water control features; LA 85163, a Valdez phase habitation site; LA 85162, a Middle and Late Archaic, Anasazi, and Apache site with hearths and an artifact scatter; and LA 47911, a stone circle and cairn of unknown affinity. None of the archaeological sites are in the vicinity of LA 139965. The only State and National register properties are the Mora Historic District and the adjacent Ceran St. Vrain Mill (Marshall and Marshall 2004:20–21).

Current NMCRIS records indicate three projects have taken place in the vicinity of LA 139965 (Figure Appendix3.2). The first was the cultural resources survey for the proposed NM 434 improvement project conducted by Cibola Research Consultants for Marron and Associates (Marshall and Marshall 2004). The others were also by Marron and Associates at Coyote Creek State Park in 2007. NMCRIS has three site records for the 2007 studies, two with no information other than that the sites (LA 156550 and LA 156551) were recorded in 2007 and are Historic. The third is the Historic Eusebio and Theodora Romero Acequia, which was mapped and reported (NMCRIS, accessed June 18, 2014).

The Marshall and Marshall survey recorded LA 139965 and ten other new cultural resources as well as 31 isolated occurrences [IOs]. Only one of the sites and nine of the IOs are located within a 4.8 km (3 mi) of LA 139965. The site, LA 139967, is over 3.3 km (2.1 mi) to the north and is the remains of a lumber camp and ranch headquarters. The IOs include a stock tank, a highway accident memorial, the gateway to Coyote Creek State Park, a modern hearth ring, a chipped stone artifact, an isolated historic artifact, a pump/well house, and a logging road (Marshall and Marshall 2004:8, 48). The chipped stone artifact was found a considerable distance south, nearly 3.2 km (2 mi) from LA 139965.

Marshall and Marshall described LA 139965 as two shelters or overhanging shelter areas that contained cultural deposits (Figure 2) and suggest that before the earlier NM 434 construction, the shelter areas may have been contiguous. They identified the shelters as the North Shelter and the South Shelter. The North Shelter is described as 3.0 m from the highway pavement and occupying an area 5 by 10 m. Numerous artifacts were observed adjacent to the main shelter area including bones—mostly from middle-sized mammals, a human incisor, two one-hand manos, chipped stone artifacts, and a ceramic. The chipped stone artifacts were a large obsidian biface, a large obsidian side-scraper, a gray chert flake, and five projectile points (one triangular and four corner-notched) made from basalt, Polvadera obsidian, gray chert, and gray quartzite. They felt the points suggest probable Athabaskan, perhaps Jicarilla Apache affinity. The sherd was from the rim of a medium-sized utility jar and similar to Faint Blind Corrugated identified at Pecos Pueblo suggesting it may have been imported from that area (2004:40, 43).

The South Shelter was described as 5.0 m from the pavement and was larger, 40 m long with cultural material as much as a meter deep. Artifacts in this area were more scattered and less abundant. They observed nine pieces of bone (large ungulates, some burned), 5 pieces of chipped stone (4 chert, 1 quartzite), a quartzite cobble fragment, 3 ceramics, a ground stone anvil, and two historic artifacts (an aqua bottle glass fragment and an unspent rim-fire cartridge). The ceramics include a plain micaceous smoothed-neckband utility jar sherd and two plain gray non-micaceous sherds that could be a prehistoric Taos plainware. The micaceous sherds represent a general Sangre de Cristo micaceous tradition that includes Taos, Picuris, Jicarilla, and Hispanic traditions (2004:40, 43).

Marshall and Marshall felt the site retained stratified cultural deposits as much a meter deep. The site was recommended as eligible to the *National Register* under Criterion 'd' because it is of archaeological and historical interest and has considerable potential to provide information on the prehistoric and historic occupation of the Coyote Canyon area (2004:43).

Marron and Associates revised the NM 434 sites in 2012. New boundaries were mapped for LA 139965 but no further analysis or observations were made (Walley et al. 2014). Boundaries filed with ARMS extend the site slightly to the north and south, and across the pavement to the east.

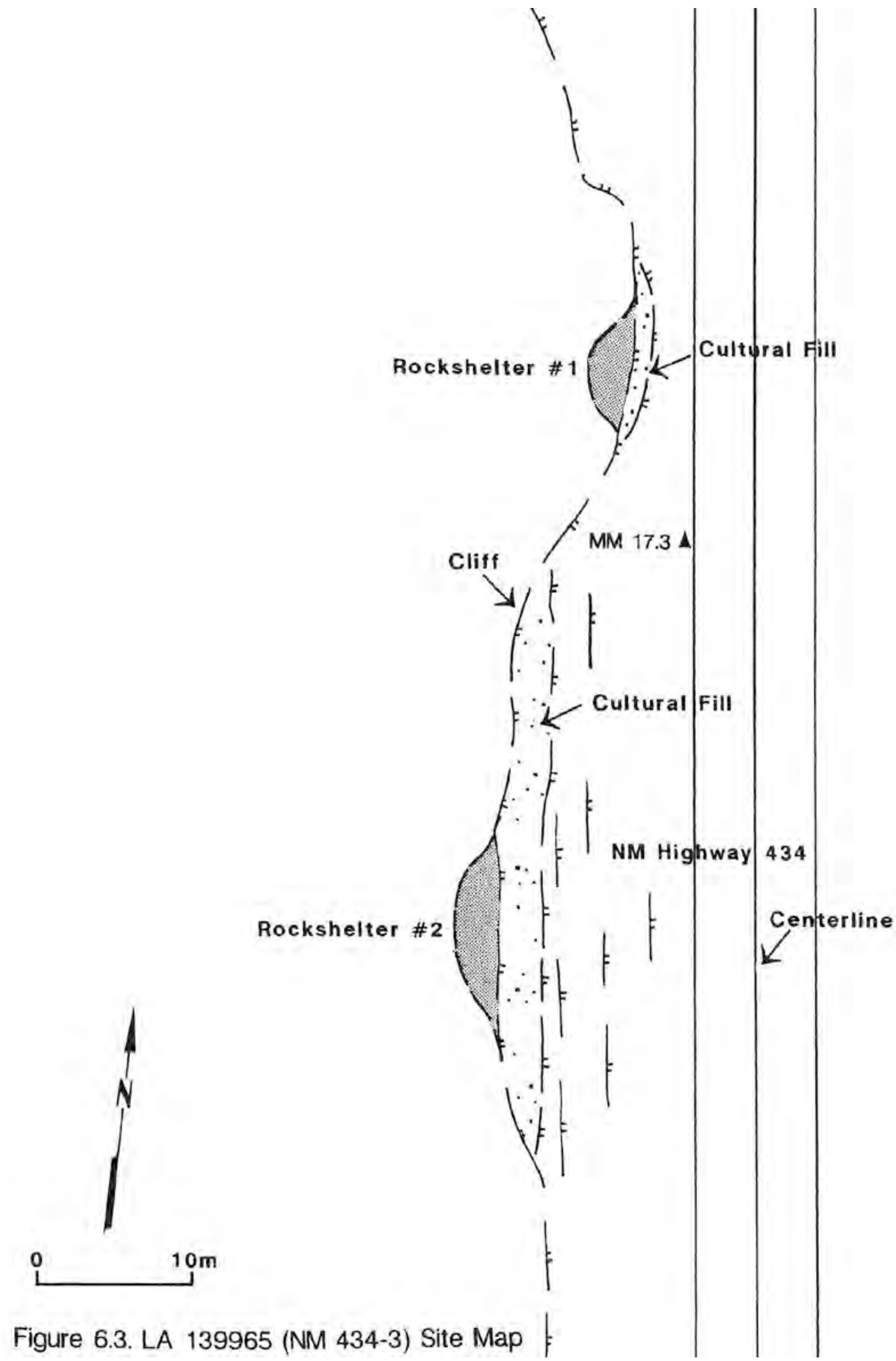

Figure 2. Map of LA 139965 from Marshall and Marshall 2004:41.

OAS visited LA 139965 on June 18, 2014 to assess the current site condition. While little time could be spent on the site, the boundaries, road, and creek were mapped with a Trimble (Figures 3 and A2.3) and the site examined. The North Shelter is the deeper of the two measuring about 4.6 m long and extending as much as 1.6 to 1.8 m in from the rock edge. Fill within the shelter is at least 40 cm deep in some areas (estimated by pin flag penetration). At the mouth of this shelter, a number of large rocks (Figure 4) are piled and along with some cut and piled brush help conceal its presence from view. The rocks were not there when the site was surveyed in 2003 (Mike Marshall, personal communication, June 29, 2014). They could have been placed to protect the deposits, by children building a shelter, or others who disturbed the shelter content and collected most of the surface artifacts. No artifacts were observed within the shelter and very few were observed in the talus around North Shelter. A chert scraper was located and photographed (Figure 5) but no other definite artifacts were observed. Identification of artifacts is complicated by the presence of large clasts of igneous rock that have fallen from the cliff above the shelter and occur as smaller boulders in lower strata. Some may be fire fractured and others tested for material quality, but others were fractured by falling from above. Numerous small and large pieces of this igneous rock are present in the talus area and some are probably debitage. Talus and at least some of the shelter fill is a naturally dark gray soil; no evidence of charcoal was observed. Most of the black staining on the cliff face and in the shelter appears to be water rather than smoke stains (Figure 6).

The talus area between the North and South Shelters has a scatter of artifacts, mainly large pieces of the igneous rock that have characteristics suggesting lithic reduction (Figure 7). The southern shelter is longer but shallow with more talus (Figure 8). Recent rock-fall covers the fill in some areas. More artifacts were observed in the talus area here, including a partial radius from a deer and an awl made from artiodactyl long bone. A gray chert lithic, an igneous chopper, and pieces of quartzite cobbles were observed along with numerous pieces of the local igneous rock. Fill in the main portion of the South shelter is shallow, about 10 to 20 cm deep. Given the slope of the talus, it is unlikely that the depth of fill in the talus is as great as the 1.0 m estimated by Marshall and Marshall (2004:43).

The site does not appear to extend to the other side of NM 434. If it does, it is beneath up to a meter of rock and road bed (Figure 9). Coyote Creek is within a few meters of the pavement on the east side, is up to about a meter lower in elevation, and is probably a good indication of the location of the original ground surface.

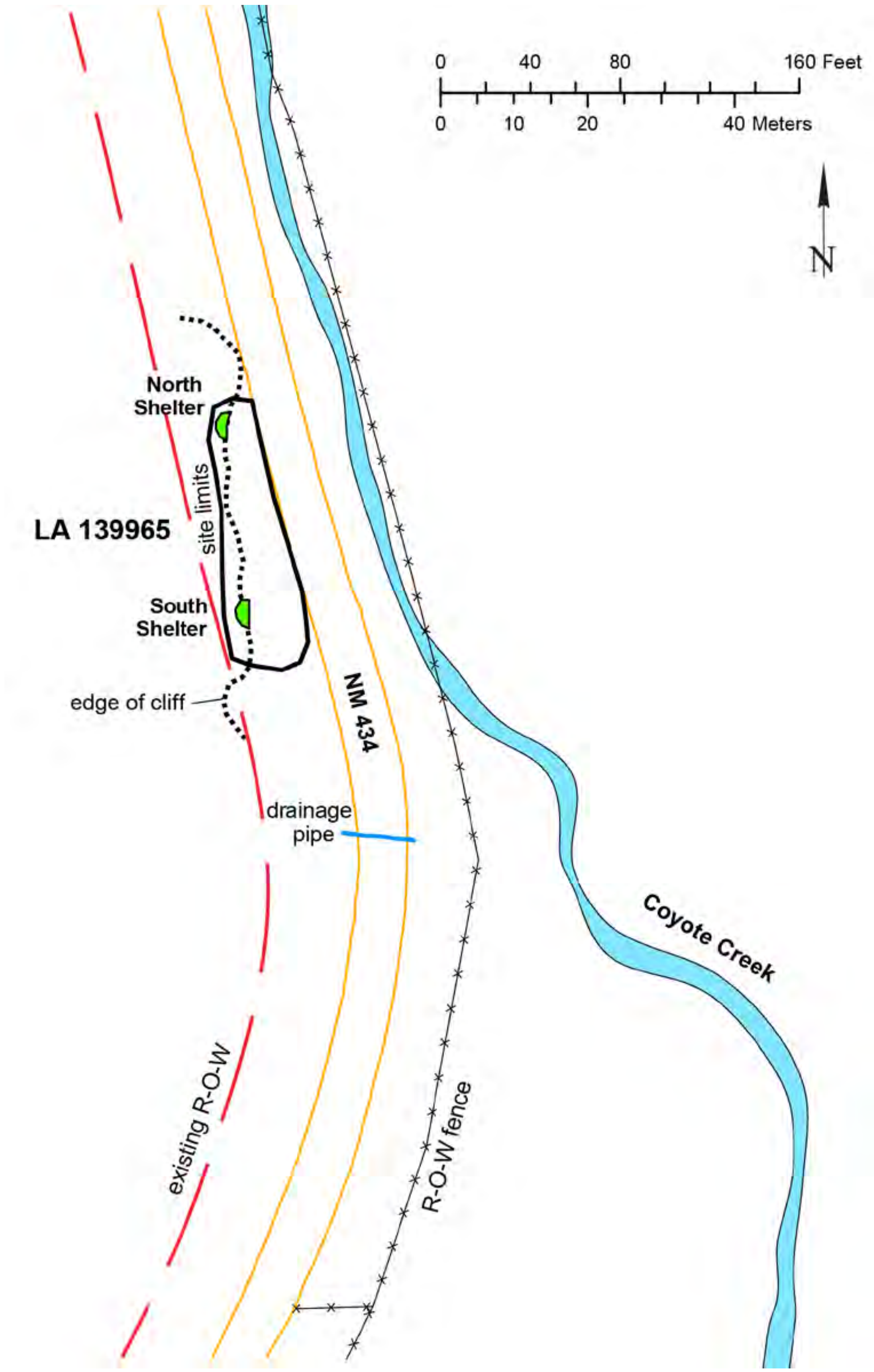

Figure 3. LA 139965 June 2014 Trimble map.

Figure 4. North Shelter at LA 139965.

Figure 5. Chert scraper from talus below North Shelter.

Figure 6. Black stained rock at North Shelter.

Figure 7. Igneous rock on surface of talus.


Figure 8. South Shelter.


Figure 9. Coyote Creek across from LA 139965.

5 RESEARCH QUESTIONS

Little is known about prehistory and early History of the area where LA 139965 is located. As a result, the research questions for this project are general but designed to contribute to our knowledge of the region. Excavations at LA 139965 will be used to address three inter-related questions: chronology, ethnicity, how and why the site was occupied. Marshall and Marshall (2004) provide no real dates for this site, but suggest that it might represent a multi-occupational locale. While a possible Jicarilla Apache occupation is suggested, a prehistoric Pueblo occupation is also possible based on the types of sherds noted. Establishing when the shelter was used and by whom are critical concerns. It is also important to establish why the shelter was used, and how it was occupied by the group or groups that lived there. These questions are discussed below as a series of research questions that provide a structure to guide research at LA 139965. This section focuses on the research questions. How the excavations and artifact analyses can be used to address these questions is described throughout Chapter 6.

Research Question 1: Chronology

Before questions of ethnicity and site structure can be addressed, we need to have a better idea of when the site was occupied and the time span covered by the occupation(s). Groups from the Paleoindian period on could have followed Coyote Creek as they passed through the foothills of the Sangre de Cristo Mountains. Short term hunting, hunting and gathering, and sheepherding camps may have left little evidence behind so that all possible means of dating must be explored. When available, chronological data with be obtained through traditional and plasma oxidation radiocarbon samples, artifact assemblages (chipped stone and projectile points, ceramics, faunal and floral taxa, ground stone types, Historic-era materials), tree-ring samples, and any other items or techniques that can provide information on when the site was used.

Research Question 2: Ethnicity of Site Occupants

The possible ethnicity of groups using the rockshelters is closely tied chronology. Chronometric dating of the deposits may eliminate some time periods from consideration or suggest use when no cultural material can be attributed to that era. Establishing the ethnicity of site residents is an important aspect of this research, but it can be a very difficult question to answer with any degree of certainty. Evidence of ethnicity can often be found in materials like textiles or basketry, and is often displayed by how people decorate themselves, their clothing, their weapons, and their houses. Unfortunately, few of these items are preserved in the archaeological record or are in good enough shape to allow such an analysis. House types can be indicative of the ethnicity of the people who lived there, but the multiple groups in the Southwest used the same kinds of houses. The presence of well-preserved houses can help narrow the possibilities but is rarely definitive. Normally, archaeologists are left with the more durable items of material culture that were discarded at a site during its occupation. Rarely are any of the more durable items indicative of ethnicity in and of themselves; however, by examining the content and structure of entire assemblages it is often possible to estimate the ethnicity of site occupants.

Clark discusses the concept of ethnicity in terms of migration, but some of his ideas can also be useful for looking at the ethnicity of the occupants of a site in the absence of migration. Ethnicity and enculturation are behaviors that rarely diffuse across social boundaries, and therefore tend to reflect membership in a specific cultural group. Ethnicity is an expression of group solidarity, usually displayed in opposition to others. Typical criteria for group membership include a shared language, ancestry, and origins that are distinct from others. Ethnic groups tend to be unstable over time, and displays of ethnicity are situational and can be exhibited when there is an advantage to be gained, or hidden when not (Clark 2007:42–44). Thus, to paraphrase Clark's (2007) discussion, ethnicity is a display of membership in a group that is demonstrably different from other groups.

Clark (2007:44) uses enculturation to refer to what many term ethnicity. Enculturation, as used by Clark, refers to basic social training that occurs within households, as younger members of a group learn from older members how to act properly. This type of training is both active and passive, as members are instructed in proper behavior or learn by watching elders. As he states:

> Households that have formed stable settlements, communities, and larger social groups develop common frameworks for transmitting such knowledge. This corpus represents a shared enculturative tradition in the behavioral sense whether or not the associated group consciously expresses its identity. Unconscious and deeply embedded elements of enculturation are ideal for our purposes because they define a group merely by contact history. (Clark 2007:44)

Thus, while Clark (2007) sees ethnicity as a conscious display of group membership, he views enculturation as passive evidence for group membership. Throughout the rest of this discussion, we define “ethnicity” as either the active or passive display of group membership through behavior, architecture, and/or material culture, without making these finer distinctions.

Deeply embedded aspects of enculturation can aid in distinguish one group. “The material correlates of enculturation can be retrieved from small, obscure, and complex attributes on utilitarian artifacts from private domestic contexts where contextual visibility is low” (Clark 2007:47–48). Thus, rather than examining the showy aspects of culture that might be used to express ethnicity—but can also result from exchange or emulation—evidence of group membership should be looked for in the more mundane aspects of life that represent enculturation gained through behavioral training. These are the deeply embedded characteristics that carry canonical information about who you are and what group you belong to, without being an overt display of that membership.

In a study of Pueblo movement into the Hohokam area, Clark (2001) used these concepts to define several data sets that helped distinguish between immigrants and the original population. As he notes: “The tools, installations, architecture, utilitarian vessels, and waste associated with domestic life are potentially rich in attributes that can be used to assess migration. As a rule, the more mundane the artifact, the more likely it is to passively reflect enculturation background” (Clark 2001:13). Types of data that were especially useful in distinguishing between original population and immigrants included: “domestic spatial organization, foodways, and embedded technological styles reflected in the non-decorative production steps of ceramic vessels, textiles, walls, domestic installations, and other nonutilitarian item” (Clark 2001:18). The most useful of these indicators was domestic spatial organization, because “it reflects culturally specific aspects of social organization…and cosmology” (Clark 2001:41). Thus, rather than using decorative styles on pottery to investigate the possibility of migration into a region, Clark (2001) examined the more mundane aspects of life. Decorated pottery was often exchanged between regions, and new styles of decoration flowed across the northern Southwest, helping to blur differences between groups when only their pottery is examined. By looking at how people built their houses, made pottery vessels and textiles, what they ate, and how they organized their settlements, a better picture of similarities or differences between populations can be drawn.

Since it is unlikely that any structures will be encountered during the excavation of LA 139965, our examination of ethnicity will focus on material culture. The techniques used in chipped stone reduction and tools and pottery manufacture can carry clues to the ethnicity of site occupants (Chapter 6). Indeed, the very structure of the material culture assemblage can carry ethnic information. For example, Wilson (2003) has compared ceramic assemblages from the San Juan and Northern Rio Grande regions, finding distinct differences in percentages of decorated versus utility wares that appear to be indicators of ethnicity. Moore (2013) has similarly compared projectile point assemblages between the same two regions, and has also identified important differences that appear to be indicative of ethnicity. Moore (2003) has also compared the structure of Hispanic and Anglo assemblages in northern New Mexico, distinguishing differences that are indicative of ethnicity. By examining how the various artifact assemblages as well as the material culture assemblage in general are structured, it may be possible to discern patterns that can be used to suggest the ethnicity of site occupants.

Current evidence suggests that one (or more) of three ethnic groups could have used LA 139965: prehistoric Pueblo peoples, Jicarilla Apache, and Hispanics. The assemblages left behind by these groups should be distinguishable, both in the some of the types of items used and the overall structure of the assemblage. A prehistoric Pueblo occupation should lack any evidence of items made during the Historic period, and should contain pottery types manufactured prior to colonization of New Mexico by the Spanish. A Jicarilla Apache occupation would be indicated by the overwhelming presence of Apache-made micaceous pottery in association with a chipped stone assemblage containing certain artifact types that, in combination, are considered indicative of an Athabaskan occupation (see Chapter 3 for a more detailed discussion). An early Hispanic occupation would be indicated by the presence of mostly native ceramics that includes Pueblo pottery and possibly pottery manufactured by Apaches or by wares and forms suggesting Hispanic manufacture. Euroamerican artifacts could be sparse, but if metal objects are found, the uses (projectile points, cooking vessels) could also provide clues to the origins of the occupants. An Hispanic chipped stone assemblage would commonly contain tools used for fire-making. Food items, food preferences, and food preparation methods could also help to distinguish between Athabaskan and Hispanic groups (Chapter 6, fauna, flora, ground stone). European flora and fauna might occur more than we would expect from a Jicarilla occupation. Comparisons can be made with the assemblages of contemporary sites for which the ethnicity of site occupants are known, permitting an estimation of the ethnicity of the occupants of LA 139965.

This process will be rendered more difficult if few artifacts are found or there is evidence of multiple periods of occupation and bioturbation or other types of disturbance have mixed the deposits. If this is the case, attempts will be made to separate assemblages based on location and depth within the site, but if this is not successful then identifying the ethnicity of site occupants might not be possible.

Research Question 3: Why Was the Site Occupied and How Did It Function in Its Settlement System?

What remains of LA 139965 is the rockshelters and talus fronting the shelters and cliff edge. We cannot know what may have lay under the pavement of NM 434. Any potential evidence of temporary shelters (tipis, rock rings, sheepherder tents) and features such as firepits has all been removed. Thus, we are limited to considering how the rockshelters were used—whether or not this use was in conjunction with structures and features below.

The “why” portion of the question may be the easier to answer. Protected by the cliff on one side and the creek on the other, the site provided a good location for observing the grassy meadow to the east for either hunting or grazing sheep. Stands of oak, fish in the creek, and other resources could also attract use of the area. Faunal and macrobotanical assemblages can help us recognize resources that contributed to the “why” groups chose to stop at this location and provide some information of how the site functioned within the settlement system. The function part can be addressed through the types of stone tools and ceramic vessels that were used, whether there are thermal or storage features, and the foods that were prepared. Plants and animal could help determine the time of year and whether the focus was on hunting, gathering, or even herding.

6 EXCAVATION AND LABORATORY METHODS AND PROCEDURES

Field Methods

The general topography of the site poses several logistic challenges. Steep slopes with surface and probably subsurface artifacts lead up to the rockshelters and the base of cliff. Since artifacts occur or have the potential to occur along an area 40–60 m long, the excavation methods must be tailored to working on the steep rocky slope. Table 1 (Appendix 2) summarizes the areas involved and the anticipated excavation within these areas. Figure 10 provides a schematic of the site area, the rockshelters and talus areas, and proposed 100 percent excavation areas, including three exploratory trenches. Since the site has not been mapped beyond determining the probable boundaries with a Trimble, and because it has not been tested to determine the extent and depth of the cultural deposits, the total estimated number of grid units should be considered the minimum effort for the site. If some areas have greater potential and others produce little or no cultural material, excavations will concentrate on the productive deposits while reducing the number of grid units in areas lacking cultural deposits. Table 2 (Appendix 2) lists the field and laboratory personnel.

Preliminary Efforts

Before clearing vegetation and establishing a grid system, surface artifacts will be flagged, located with the total station (see below), and collected. At least two main datums will be established—one near each of the rockshelters. After this initial collection, brush and trees will be removed to clear the area to establish a grid system. Prior to excavation, a pXRF will be used to characterize the stains on the cliff and within the rockshelters (see the analysis section for details on the process).

Horizontal Proveniencing: The Grid System

A Cartesian grid system will be established that will tie measurements to the NAD 83 UTM projection, allowing precise spatial plotting of the excavation areas, features, site boundaries, and any other mapped aspects of the site. Two main site datums will be established and used for backsights. The current site marker is high on the slope in a location that cannot be used as a datum, necessitating the installation of new site datums. A 1 by 1 m grid system tied to main site datums will be imposed over the site area to facilitate horizontal referencing. Grid lines will be established at even meter intervals within the UTM system and will use the last three digits of the UTM measurements of the southwest corner to identify the individual grid units.

Most excavation will be accomplished in these 1 by 1 m grids. The exceptions might be for features and for partial grids in the backs of the shelters, which will be included with adjacent grids. If use surfaces are identified, artifacts will be left in place and plotted on grid unit maps. Features rarely conform to a grid system and will be treated as independent excavation units unless they are so large that excavation in grids provides a higher level of control within the feature.

Vertical Proveniencing: Strata and Levels

Just as the grid system is tied to the site datums and linked to its UTM location, so are all elevations. The last four digits of the elevation in meters above sea level will be used to reference all vertical measurements. Subdatums will be established when needed, and their elevations and horizontal coordinates will be determined with respect to the elevation above sea level.

Two methods will be used to track vertical excavation units: strata and levels. Soil strata will be assigned unique numeric designations as they are encountered, and descriptions of each will be recorded on individual forms. In order to track the sequence of strata from one area to another, each vertical excavation unit will also be assigned a level number, beginning with the surface. Since the surface is an arbitrary level with no thickness, it will be designated Level 0. The first vertical excavation unit to be dug will be labeled Level 1, the second Level 2, and so on. Since stratum and level numbers represent two completely different series, stratum numbers may not be in sequence as excavation proceeds downward, but level numbers will always be in sequence.

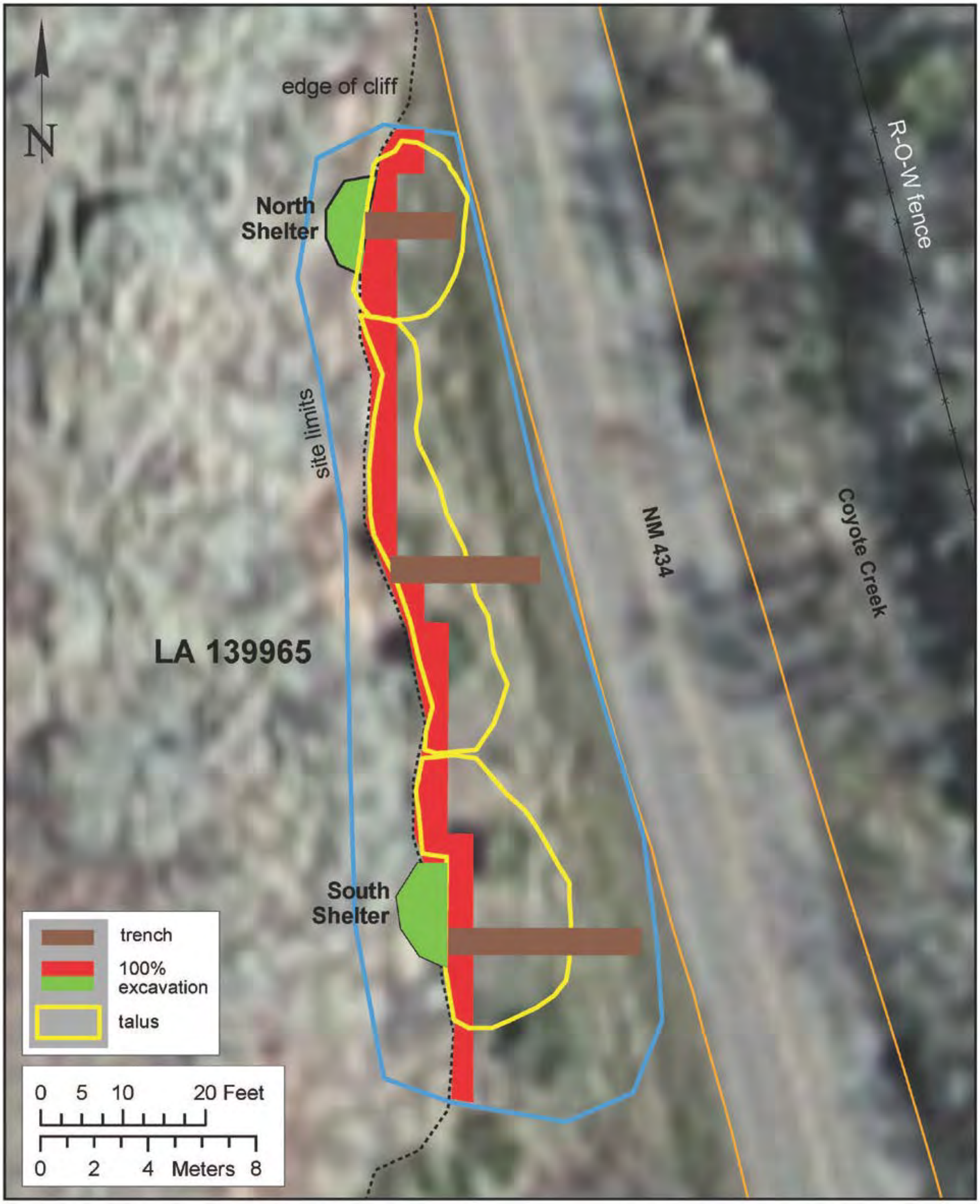

Figure 10. Schematic representation of proposed excavation areas. Although the scale is accurate, lack of pre-excavation post-processed GIS data precludes precise rendition of grid-delimited excavation boundaries, so excavation area boundaries in the plan are approximate.

Cultural deposits will be carefully excavated to preserve as much of the vertical relationship between materials as possible. The vertical treatment of deposits will vary according to their location. The relatively flat areas within the rockshelters can be excavated in traditional levels unless strata can be distinguished in the initial grid units. On the talus slope, the initial removal of a thin (5 cm) layer of surface fill will follow the slope contour rather than level horizontal units. Depending on the fill, excavation will continue in levels that conform to the slope or will revert to the traditional flat level. When possible, cultural deposits will be excavated by stratum, massive cultural strata may be subdivided into two or more vertical units.

Recording Excavation Units

The excavation of a grid or other unit will begin by filling out a Grid Unit Excavation form for the surface. This form records beginning and ending elevations and describes other pertinent data. Surface rock will be sketched on map paper along with the location of vegetation and any indications of disturbance. Ending depths for each succeeding level will be recorded on relevant forms (Grid Unit Excavation or Non-grid Unit Excavation forms for features), providing a record of all excavations. Grid Unit forms will be completed for each level or stratum of each grid unit, including the surface, and will describe soils, provide an inventory cultural materials recovered, amount and type of rocks encountered, and other observations considered relevant by the excavator or site supervisor. The description of the soil matrix will include information on cultural and non-cultural inclusions, evidence of disturbance, and how artifacts and other materials, such as gravel, are distributed if variations are noticed.

Recovery of Cultural Materials

Most artifacts will be recovered in two ways: visual inspection of levels as they are excavated and screening though hardware cloth with variably-sized mesh. Surface artifacts will be collected and plotted for the entire site area. Within the rockshelters, cultural material will be point plotted and collected separately when observed in situ. Materials collected during screening will be aggregated by material type within each vertical provenience. Regardless of how cultural materials are collected, they will all be inventoried and recorded in the same way. Collected materials will be assigned a field specimen (FS) number, which will be listed in a catalog and noted on all related excavation forms and artifact bags. This will allow the relationship between recovered materials and where they were found to be maintained. All bulk materials collected from a unit of excavation will receive the same FS number. Thus, if chipped stone, ceramic, and bone artifacts are recovered from the same level, they will be bagged separately but all be given the same FS number, as would any samples taken from that level. Architectural or chronometric samples that are not associated with specific units of excavation and point plotted artifacts will receive unique FS numbers.

Many artifacts will be recovered by systematically screening soil strata. All sediments removed during the hand-excavation of grid units and features will be passed through screens. Two sizes of screen will be used. Most fill will be passed through 1/4-inch mesh hardware cloth, but 1/8-inch mesh hardware cloth will be used in certain circumstances. While most artifacts are usually large enough to be recovered by 1/4-inch mesh hardware cloth, some that are too small to be retrieved by that size screen can provide important clues to the activities that occurred at a site. The trade-off in gaining additional information by finer screening is the increase in the amount of time required to process sediments and to recover artifacts. Sampling is a way to balance these concerns; thus, smaller mesh will only be used under certain circumstances.

A sample of the fill from the grid unit trenches in the rockshelters and the talus will be screened through 1/8-inch mesh hardware cloth to obtain small items such as microflakes and bones from small animals. A small bucket (8.8 liters or 2 US dry gallons) of soil from each level or stratum in the initial trenches and from within the rockshelters will be screened through the 1/8-inch mesh hardware cloth. Flotation and pollen samples will be taken from each grid unit and level or stratum. Any charcoal pieces will be collected and charcoal-laden fill collected for dating. Similar guidelines will be used for the talus area. A small bucket of soil from every other grid—in a checkerboard fashion—for each grid in the talus outside of the trenches will be screened through 1/8-inch mesh.

Other cultural materials, primarily botanical in nature, will be recovered from bulk soil samples. Sampling methods for these materials are detailed below. In general, sediments for flotation analysis will be collected from culturally-deposited strata and features, and should contain at least two liters of soil, if possible. Macrobotanical materials will be collected as individual samples whenever found.

Specific Excavation Methods

The site area—estimated at 380 sq m—is too large for complete excavation, and some of the site area is disturbed by the drainage ditch adjacent to the highway and covered by large boulders. A minimum of 151 grid units will be excavated (see Table 1 [Appendix 2]), concentrating on areas within the rockshelters and the associated talus aprons (see Figure 10).

Exploratory Trenches

Initially, three sets of three contiguous grid units, i.e., exploratory trenches (see Figure 10), will be used to define the stratigraphy from the base of the talus into each of the two rockshelters and to the cliff base. These exploratory trenches will be excavated following the contour of the slope in 5 cm levels (or by stratigraphic layer if it is distinctive enough to follow). One will be placed in front of each rockshelter and a third will be placed between the two rockshelters. These grid trenches will stop at the edge of each shelter, and any rocks on the surface (or incorporated into the North Shelter wall) will be photographed and mapped before the trench is extended into the shelter. At least one aspect of the trench will be profiled as a continuous unit along the long axis, and each completed grid unit will be profiled along the perpendicular axis before starting the adjacent grid unit. One 2-gallon sample of each grid level or stratum from the exploratory trench excavations will be screened through 1/8-inch mesh. Excavation will cease when bedrock or culturally sterile fill is reached. Culturally sterile fill will be defined by 10 cm of excavated fill that lacks any cultural material. The base of each culturally sterile excavation unit, when not defined by bedrock, will be tested by trowel, shovel, or auger to a depth of at least 50 cm to confirm the absence of underlying cultural strata. If cultural strata are detected, normal excavation will resume within the grid until true culturally sterile soil is reached.

Rockshelters

Excavation within the shelters will be approached as a structure would be. Documentation will begin by mapping the surface rock within each shelter. A number of large rocks have been piled at the entrance to the North Shelter, possibly at a much later date to protect the deposits. These will be photographed and mapped so that they can be removed and the grid unit trench extended into the shelter. Within the shelters, excavation will be by grid unit in 5 cm levels unless individual strata can be discerned. Once the exploratory trench is complete and the stratigraphy defined and described, the adjacent grid units will be excavated by strata with special attention given to defining possible use surfaces and point plotting any artifacts found. If no stratigraphy is evident, fill will be removed in 5 cm levels. All cultural fill within the shelters will be excavated. At least one 2-gallon sample of each grid level or stratum within the rockshelters will be screened through 1/8-inch mesh. Fill will be considered culturally sterile when bedrock is reached or when 10 cm of excavated fill lacks cultural material. The base of each culturally sterile excavation unit, when not defined by bedrock, will be tested by trowel, shovel, or auger to a depth of at least 50 cm to confirm the absence of underlying cultural strata. If cultural strata are detected, normal excavation will resume within the grid until true culturally sterile soil is reached.

Talus

Talus excavation within the exploratory grid unit trenches will follow the contour of the slope. Each grid will be photographed and the surface rocks mapped before beginning excavation. Excavation of the talus slope will be in 5 cm levels following the natural slope. Fill will be removed until at least 10 cm of fill includes no cultural material. At that point, the base of each culturally sterile excavation unit, when not defined by bedrock, will be tested by trowel, shovel, or auger to a depth of at least 50 cm to confirm the absence of underlying cultural strata. If cultural strata are detected, normal excavation will resume within the grid until true culturally sterile soil is reached. For all of the talus units that are contiguous with the rockshelter deposits, a 2-gallon sample of each grid level or stratum within the unit will be screened through 1/8-inch mesh. For at least one-third of the talus units that are not contiguous with the rockshelter deposits, a 2-gallon sample of each grid level or stratum within the unit will be screened through 1/8-inch mesh. Flotation and pollen samples will be taken from each stratum defined in the talus and from any area that could contain botanical material.

The talus areas beyond those investigated by the exploratory trenches will be investigated along the full length of the cliff face within the site. Excavation will proceed with contiguous grid units that will be defined so that no less than 60 cm of area adjacent to the cliff face is excavated (in some areas, adjacent grids will be excavated up to 1.6 m from the cliff face). Away from the cliff face, additional grid units will be excavated into the talus. This will include all of the talus within 1 m of the front of the shelters. Away from the shelters, grid units will be placed in any areas of surface artifact concentrations and in areas where expansion from the exploratory trenches is warranted.

Other Areas
Two grid units, in addition to the three units excavated as part of the exploratory trenches, will be placed to the east of the talus limits along the highway drainage ditch and shoulder. Depending on the results of the exploratory trenches, some of the unspecified excavation units will be placed in the areas between the talus edge and the drainage ditch margin. For at least one-third of these other excavation units, a 2-gallon sample of each grid level or stratum within the unit will be screened through 1/8-inch mesh. Flotation and pollen samples will be taken from each stratum defined in the units and from any area that could contain botanical material. The base of each culturally sterile excavation unit, when not defined by bedrock, will be tested by trowel, shovel, or auger to a depth of at least 50 cm to confirm the absence of underlying cultural strata. If cultural strata are detected, normal excavation will resume within the grid until true culturally sterile soil is reached.

Features
Features will be excavated as individual units and assigned a unique number. After defining the horizontal extent, features will be photographed and the initial indications of their presence mapped. The feature will then be divided in half for excavation. For most features, excavation will be in 5 cm arbitrary levels. However, large features (greater than 70 cm diameter) may be excavated in 10 cm arbitrary levels. Arbitrary 10 cm levels may also be used if features are numerous and the feature types redundant. Excavation of half of the feature will define internal strata, and a profile of the exposed fill will be drawn and photographed. The second half will then be removed by strata. Excavation data for sections removed from small features will be recorded on Nongrid Unit Excavation forms. Information included on this form parallels those recorded on Grid Excavation forms, but differs in how locational information is documented. Flotation samples will be taken from each half of the feature for each strata if strata can be defined, and the remaining soil screened through 1/8-inch mesh hardware cloth. Plans showing location and sizes of excavation units will be drawn for each feature. A second cross-section illustrating the vertical form of the feature perpendicular to the profile will be drawn, as will a plan of the feature. A summary form will be filled out after excavation is completed that describes the shape, contents, construction details, and any other pertinent observations.

Botanical Sampling
The collection of samples for botanical analysis will focus on contexts that can provide the best information on plant use and foodways, or that may provide materials amenable to absolute dating. Five types of botanical samples will be collected for analysis—flotation, pollen, radiocarbon, macrobotanical, and dendrochronological wood. The collection of flotation and pollen samples will be standardized in order to recover consistent data from similar contexts. Because the soft fill within the rockshelter is easily disturbed and may not retain evidence of use surfaces, flotation and pollen samples will be taken from each excavation level or stratum of each grid unit within the rockshelter and from each stratum of the talus area. Flotation and pollen samples will also be taken from or near the base of deposits in all features that are large enough to produce sufficient material for sampling, and at least one sample will be taken from each cultural stratum. Additional pollen samples will be taken from near the base of non-thermal features.

Pollen washes on ground stone and other cultural material will be done in the laboratory. Residue samples may also be obtained from ground stone tools to help define the type of plant(s) that were processed.

Macrobotanical samples will be collected to aid in defining prehistoric or historic foodways and botanical resource use. Seeds, nut shells, and other plant parts will be collected when encountered during excavation or screening if they have potential for providing information on botanical resource use. Unburned materials, especially wood fragments will not be retained for analysis unless they show evidence of having been culturally modified other than by fire, such as building materials. While macrobotanical specimens do not represent a statistically valid sample, they can provide important subsidiary information on how plants were used at an archaeological site.

Two types of botanical samples amenable to providing absolute dates will be collected when found. Radiocarbon samples will be taken from thermal features and scatter samples may be taken from cultural strata to ensure that sufficient dateable materials were available for analysis. Scatter samples may be less reliable indicators of the actual period of site occupation, but provide some indication of when the site was occupied. While it is unlikely that wood sufficient for tree-ring dating will be obtained, these will be collected.

Another potential means of dating could come from any carbon that may be adhering to the ceiling of the rockshelters. A hand-held X-ray fluorescence device will be used to determine which if any of the black stains in the rockshelters are manganese or other mineral staining or could be carbon sooting. If carbon of sufficient thickness is found, we may collect samples of rock or scrapings for potential AMS radiocarbon dating. We may also try to date very small samples of organic material and of soot—such as carbon deposits that are too thin for mechanical removal—using the same nondestructive plasma oxidation methods used to obtain radiocarbon dates from rock art pigments (e.g., Rowe 2009:1728–1735).

X-Ray Fluorescence Study

The purpose of this study is to distinguish between the possible causes of the black staining in the LA 139965 rockshelters. At least some of the staining is due to minerals in the water running down the cliff side, probably manganese or iron. However, carbon sooting from camp fires is also possible. If some of the staining is from soot, it is possible that it could be radiocarbon dated with the carbon derived from the fuel gasses (e.g., Rowe 2009), which could define or confirm other evidence of use of the shelters.

Hand-held X-ray fluorescence spectroscopy (pXRF) has been used for distinguishing between the charcoal-based and manganese- and iron-based pigments used in pictographs in New Mexico and Texas (Koening et al. 2014:169–186; Rowe 2009:1728–1735; Rowe et al. 2011:37–47). We may be able to adapt the basic principals involved with the pictograph studies for distinguishing water staining from soot. These hand-held pXRF devices are nondestructive and can measure the presence of metallic elements rapidly so that hundreds of readings can be taken in a relatively short time. The tool works by irradiating a sample (in this case, a stain within or outside of the rockshelters) with an X-ray tube that can easily distinguish iron and manganese. Carbon stains would be inferred if there is no difference in the relative abundance of these elements between darkened and non-darkened surfaces (Koening et al. 2014:171, Rowe et al. 2011:41–43).

With the aid of Dr. Marvin Rowe, areas within and outside the rockshelters will be examined with the pXRF before any excavation takes place. This will allow us to document the stains that could be the result of human activity. If soot on pot sherds can be radiocarbon dated, then the charred residue or soot on the shelter walls—if sufficiently thick—can be scraped off and submitted for AMS dating. Accuracy of soot dates depends on the source of the soot—the type of fuel and for wood, where it came from within a tree (Beta Analytic website, accessed June 29, 2014). Alternatively, organic carbon can be extracted using low-pressure oxygen plasmas to isolate the carbon dioxide formed by the plasma oxidation of the organic matter. This technique has been used to date the organic material in pictograph pigments from rockshelters and very small samples of flesh, grass, a woven mat, a stick of desert ash, a sotol stalk, and twine from an infant burial found in Hinds Cave, both in the Lower Pecos River region of southeast Texas (Rowe 2009:1730, Steelman et al. 2004).

Residue Analysis

A sample of chipped stone formal tools, such as projectile points, scrapers, and knives, may be submitted for residue analysis if they appear to have potential to provide relevant information. Informally used chipped stone tools may also be submitted for this type of analysis. Analysis of protein residues adhering to tools of this type can provide supplementary information on the range of animals that were hunted, consumed, and used for the production of leather and other goods.

Mechanical Equipment

Mechanical equipment may be used to remove boulders that are too large to be removed by hand and that cover cultural deposits. Mechanical equipment may also be used to move backdirt piles, to remove non-cultural fill to facilitate excavation, and to excavate stratigraphic trenches outside of the site area (if warranted).

Backfilling

It is unlikely that excavations will result in conditions that will be dangerous to wildlife or the general public. Any backfilling will be reserved for situations that might be considered hazardous. Road construction should begin within a few months of the archaeological work so that no longer term measures should be necessary.

Special Situations: Human Remains
Special situations can arise that were not anticipated before commencing excavation. These include the discovery of human remains or other items of a sensitive nature. Marshall and Marshall (2004:40) report observing a human incisor in the North Shelter area, which could indicate the presence of a human burial in the vicinity. It is also possible that it was a deer incisor, which is similar to a human incisor and can be mistaken for human by even experienced archaeologists. Based on the possibility of finding human remains, a site-specific burial permit request has been submitted along with this data recovery plan.

If human remains are encountered, they will be left in place and protected from view and potential disturbances. NMDOT and HPD will be notified, followed by the Mora County sheriff's office and the state medical examiner. NMDOT and the SHPO will coordinate with the Jicarilla Apache, Navajo Nation, Hopi, and any other tribes that express interest in consulting concerning the remains and the final disposition. Additional information pertaining to the recovery of human remains appears in Appendix 1.

Unexpected Discoveries
Unexpected discoveries are possible during any archaeological investigation, and the procedures that will be followed in such an event are broadly detailed. The procedure that will be followed in the event of an unexpected discovery will vary with the nature and extent of the find. The procedures that will be followed should human remains be discovered were detailed above. Unexpected discoveries or conditions can present a problem, because they will not have been specifically covered in the plan developed for that investigative phase. Remains such as deeply-buried strata representing considerably earlier occupations of the area that are not evident from surface manifestations have the potential to alter the scope and intent of this plan. In this case, we will consult with NMDOT, the Historic Preservation Division of the Department of Cultural Affairs, and the Cultural Properties Review Committee to determine the best course of action to expedite the recovery.

Laboratory Analysis Methods and Procedures

When brought in from the field, the FS logs and bags will be compared, and the artifacts will be washed or cleaned, and they will be sorted for analysis. Artifacts and samples will be temporarily curated at the OAS laboratory during analysis and will be prepared for permanent curation.

Laboratory analysis will be conducted by the staff of OAS (Table 2 [Appendix 2]) and by specialized professional consultants, where necessary. Analysis procedures will follow the standards established by OAS.

Ceramic Analysis
Ceramics recovered by the excavations at LA 139965 will be analyzed at the Office of Archaeological Studies laboratory under the direction of C. Dean Wilson. Both historic and prehistoric Native American-made pottery may be recovered. Detailed and systematic examination of various attributes is needed to fully determine the timing and nature of the deposits and features that may be exposed by the excavations. Ceramic studies may contribute to these studies by using distributions of ceramic types and attribute classes from dated contexts to examine patterns related to ethnic affiliation, place of origin, form, and trends relating to the decoration, production, exchange, and use of the associated pottery vessels. In order to examine these issues, it is necessary to record a variety of data in the form of both attribute classes and ceramic type categories. These technological and stylistic attributes apply to pottery from all periods.

Recording of Data
Attribute categories that will be recorded during this study are similar to those employed during other recent OAS projects. These include temper type, pigment, surface manipulation, modification, and vessel form. Rim radius measurements will also be recorded for each rim sherd to provide information relating to vessel size. Information recorded for any whole or partial vessels that might be recovered will include precise form, measurements of vessel dimensions, modification patterns, and sooting patterns.

Other information will be provided by the ceramic type categories. Ceramic types are assigned to pottery groups that are identified by various combinations of paste and surface characteristics that have known temporal, spatial, and functional significance. A particular ceramic item is initially assigned to a specific tradition reflecting probable cultural association and region of origin as indicated by technological and paste characteristics. Ceramics are then assigned to a ware group based on surface manipulation and form. A ceramic item may then be assigned to a type known to have been produced during a specific time-span based as indicated by surface texture or design style.

Given the potential for the occurrence of both prehistoric and historic components at LA 139965, it is possible that ceramic types associated with a number of different ethnic groups and traditions may be recovered. Prehistoric pottery types will most likely reflect forms noted for the northeastern-most portion of the area defined for the Rio Grande Pueblo, which is sometimes placed into the Cimarron district (Cordell 1978). Pottery occurs at sites in this district dating from AD 900 to 1300 and appears to resemble types defined for Rio Grande Puebloan traditions in regions to the east. Any prehistoric Pueblo pottery identified during this analysis will be defined either using type names defined for similar pottery from regions to the east (such as Taos Incised, Kwahe'e Black-on-white, or Santa Fe Black-on-white) or descriptive names (such as Plain Gray or Smeared Corrugated) commonly used to describe similar prehistoric pottery forms. Differences and similarities between analogous types defined for other regions will be noted to determine whether locally produced forms or trade wares from regions to the east are most likely represented. Other prehistoric pottery that could potentially occur at sites in this area may include Plains cord-marked wares such as Borger Corrugated associated the Antelope Creek focus (AD 1300 to 1450) in areas to the east in the Southern Plains (Suhms and Jelks 1989).

Native pottery types associated with historic components may include forms known to have been produced by Rio Grande Pueblos, Jicarilla Apaches, and even Hispanic villagers. Historic painted forms should be limited to Tewa polychrome and certain glaze painted types known to have been produced and widely traded by Pueblo potters. The undecorated pottery will most likely include a mixture of polished plain and micaceous utility ware for which it may or not be possible to assign types defined for traditions associated with a particular group based on paste and surface characteristics. Polished plain wares known to have been produced by Northern Tewa and Hispanic potters from the eighteenth through the nineteenth century may include red slipped, black smudged, and red-on-tan forms (Carrillo 1997; Dick 1968; Harlow 1973; Wilson 2011). Micaceous wares will probably represent the most common pottery identified during this project and may include pottery forms known to have been produced by Northern Tewa and Tiwa Pueblo, Hispanic, and Jicarilla Apache groups (Eiselt 2006). If paste, surface, or vessel form attributes clearly indicate production by a particular group, specific types associated with that particularly group (such a Tewa Polished Micaceous, Casitas Red-on-brown, or Ocate Micaceous) will be assigned. Otherwise such pottery is assigned to generalized descriptive type categories (Historic Red Slipped or Unpolished Highly Micaceous) indicative of production of groups of unknown identity during the historic period.

Examination of Research Questions

Together Information regarding descriptive attributes and ceramic types recorded are expected to provide data relating to a range of issues. The primary limitations of the interpretations presented will most likely be the result of the small number of ceramics that will probably be recovered from LA 139965.

One of the most important questions that can be addressed using ceramic data accumulated during this project will be the determination of the time of occupation (Research Question 1). The simple occurrence of ceramics in any context will be important for differentiating components dating after the use or acquisition of ceramics by groups in this area. Given the nature of ceramic change and occupational hiatuses in this area, the differentiation of prehistoric and historic components should be easy, even with extremely small assemblages.

For prehistoric components, finer data precision may be achieved through the identification of types—particularly white wares—known to have been produced in this and surrounding regions during specific periods (Lang 1982). Types associated with the earliest ceramic periods (before AD 1200) may include gray wares with plain, neckbanded, incised, or indented surfaces and Red Mesa Black-on-white and Kwahe'e Black-on-white. The occurrence of pottery assigned to Smeared Corrugated and Santa Fe Black-on-white, may indicate a component dating between AD 1200 and 1350. Other pottery such as many of the glaze ware types and Plains cordmarked types may be indicative of prehistoric components after AD 1350. The assignment of pottery to prehistoric types belonging to various regional traditions may also provide clues concerning origin of these groups (Research Question 2) and interaction with surrounding areas.

It is likely that the historic component of this site reflects seasonal use by Jicarilla Apache groups dating sometime from the middle seventeenth to the early late nineteenth century. Pottery types associated with this component may include Northern Rio Grande Pueblo plain ware, micaceous ware, and polychrome types. Pueblo decorated pottery produced in the Tewa Basin during the first three quarters of eighteenth century may be indicated by Tewa Polychrome while that produced from the late eighteenth through the nineteenth century will most likely be indicated by Powhoge Polychrome. Hispanic types may also include plain and micaceous types that appear to have been produced from the late eighteenth through the nineteenth century. Pottery produced by Jicarilla groups could include Ocate Micaceous, which appears to date from AD 1640 to 1750, and Cimarron Micaceous, dating from about AD 1750 to 1920 (Gunnerson 1969). Information relating the assignment of historic pottery to types indicative of production by different ethnic groups may provide clues about trade between the Jicarilla Apache and other groups as well the possible seasonal utilization of this shelter by different groups.

Information relating to surface characteristics and vessel form may provide information about the use of vessels in various activities at these rock shelters (Research Question 3). Most of the pottery recovered will most likely be utility (gray or micaceous) forms associated with cooking or storage. Additional, evidence of the use of these vessels may be provided by observation relating to wear, modification, and sooting patterns. The presence of decorated forms including bowls may reflect additional activities relating to the preparation and consumption of food stuffs at this site.

Chipped Stone Artifact Analysis

All chipped stone artifacts will be examined by Mary Weahkee and James Moore using a standardized analysis format (OAS 1994a). This format includes a series of mandatory attributes that describe material, artifact type and condition, cortex, striking platforms, other important characteristics, and dimensions. The primary areas our analysis format explores are material selection, reduction technology, and tool use. These topics provide information about ties to other regions, mobility, and site function. While material selection studies cannot reveal *how* materials were obtained, they can usually suggest *where* they came from. Visual identification can be augmented by more specialized analyses such as x-ray fluorescence to determine obsidian sources and infrared light to help identify cherts from the Texas Panhandle. These techniques will be used to identify potential exotic materials recovered from the site. By studying the reduction strategy employed at a site it is possible to compare how different cultural groups approached the problem of producing useable chipped stone tools from available raw materials. The types of tools in an assemblage can be used to help assign functions to sites or different site components, and to aid in assessing the range of activities that occurred during those occupations. By examining the distribution of chipped stone artifacts across a site, the locations where specific activities occurred can sometimes be defined. Certain types of chipped stone tools can provide temporal data, but are usually less time-sensitive than other materials like pottery and wood.

Chipped Stone Analytic Methods

Each analyzed chipped stone artifact will be examined using a binocular microscope to aid in defining morphology and material type, examine platforms, and determine whether it was used as a tool. The level of magnification will vary between 20x and 100x power, with higher magnification used for wear pattern analysis and identification of platform modifications. Utilized and modified edge angles will be measured with a goniometer; other dimensions will be measured with a sliding caliper. Weights will be obtained using digital scales. Analytic results will be entered into a computerized data base to permit more efficient manipulation of the data, and to allow rapid comparison with other data bases on file at the OAS.

Attributes that will be recorded for all analyzed chipped stone artifacts include **material type**, **material quality**, **artifact morphology**, **artifact function**, amount of surface covered by **cortex** and **cortex type**, **portion**, evidence of **thermal alteration**, **edge damage**, **wear patterns**, **angles of formal and informal tool edges**, and **dimensions**. Other attributes are aimed specifically at examining the reduction process, and can only be obtained from flakes. They include **platform type**, evidence of **platform lipping**, presence or absence of **opposing dorsal scars**, **distal termination type**, **platform angle**, **bulb of percussion type**, evidence of **ventral curvature**, and the presence or absence of **waisting**. The last four attributes are aimed specifically at distinguishing between removals from cores and bifaces.

Research Questions

In general, analysis of chipped stone assemblages is aimed at providing information on how and where raw materials were obtained, how those materials were reduced, and what types of activities can be identified in each assemblage. The latter includes not only a consideration of the types of tools that might be recovered, but also their state. Fracture patterns on fragmentary tools can suggest whether a particular tool was broken during manufacture or use, and those data can be used to expand on the information available from tool form alone. Examination of the debitage assemblage can help explore the mobility pattern followed by site occupants, the condition of nodules when they arrived at that location, and whether or not the site has suffered significant damage from post-occupational impacts like trampling. Over and above these areas of interest, analysis of chipped stone assemblages can be used to address the research questions posed in this plan.

Research Question 1: Chronology

Temporally diagnostic artifacts like projectile points, may help identify components when more accurate dating is not possible. When the projectile points suggest dates inconsistent with the components in which they are found they may provide information on the salvaging of materials from earlier sites. Since projectile point salvaging was fairly common prehistorically, other aspects of chipped stone assemblages may be needed to be assessed to determine whether the dates provided by projectile point analysis are actually appropriate. This would include indicators that might suggest an occupational date that is consistent or at odds with the dates assigned to associated projectile points. Other types of chipped stone artifacts that have the potential to provide general temporal data include certain types of scrapers, strike-a-light flints, and gunflints.

Characteristics of reduction strategy and technology can also be used as a rough chronological indicator. However, this type of analysis is not always a reliable temporal indicator, and is best used in association with other chronometric evidence. Mobile hunter-gatherers during the Paleoindian and Archaic periods focused on a different reduction strategy than did the later agricultural occupants of the region. The reduction strategy used by hunter-gatherers focused on the manufacture of large, multi-functional bifacial tools that could be efficiently transported and, when necessary, transformed into other needed formal tools. Southwestern farmers tended to focus on more expedient core-flake reduction. These differences in focuses can often be used to distinguish sites or components used by hunter-gatherers from those used by farmers. Hunter-gatherer assemblages tend to contain considerably more debris generated by the manufacture of bifaces than do those produced by farmers, and characteristically exhibit much higher percentages of biface flakes and modified flake platforms, higher ratios of flakes to angular debris, more evidence of flake breakage during removal, and higher percentages of non-cortical debitage. Thus, by examining an assemblage for evidence of the reduction strategy used, we can also roughly assess the period of use. This can be important in a multi-occupational situation where diagnostics and absolute dates are scarce or non-existent.

Research Question 2: Ethnicity of Site Occupants

Chipped stone assemblage data should be quite important in examining this question. Because Pueblo, Jicarilla, and Hispanic occupations are possible, the assemblage is expected to exhibit a focus on expedient reduction. In order to help establish the ethnicity of site or component occupants, the assemblage will be examined for certain characteristics. However, it should be noted that the presence or absence of these characteristics alone does not provide enough information to assess the ethnicity of site occupants. These data must be combined with other assemblage characteristics in addition to elements of site structure in order to make this type of assessment. This is because some chipped stone characteristics are shared by multiple cultures, and others can move from group to group through trade.

The first step in this process will be to determine whether or not a Jicarilla use of the site is indicated. While detailed comparative discussions of Apache chipped stone technology and artifact types are not available, comparisons can be made to early Navajo assemblages, since both groups share a common origin. Torres (2000:4) suggests that early Navajo chipped stone technology was similar to that of the Avonlea assemblages of the High Plains, thought by some archaeologists to have been ancestral to the southern Athabaskan groups in the Southwest (though not by all, see Dyk and Morlan 2001). Some of the shared attributes that Torres (2000) notes include projectile point styles, large flakes and blades used as cutting tools, formal and informal end scrapers, and microblade tools. An aspect of Apache assemblages that is mentioned by some authors is the occasional presence of artifacts made from Alibates chert, an exotic material that is available near present-day Amarillo, Texas. While this material often occurs on Paleoindian sites and in assemblages generated by Athabaskan residents, it tends to be very rare in Pueblo assemblages. Thus, the occurrence of Alibates chert can be used to suggest an Athabaskan affinity for site residents, but by itself is not definitive.

Kearns (1996) presents a more detailed examination of Navajo chipped stone technology, based on the study of assemblages from 37 excavated early Navajo sites dating to the Dinétah (AD 1500–1700) and Gobernador (AD 1700–1775) phases. Artifact types thought to be indicative of early Navajo occupation include:

> (1) small unnotched triangular projectile points, small basal-notched or concave base side-notched projectile points, and small side-notched points in general; (2) small multidirectionally flaked core nuclei or microcores; (3) flake knives and flake knife/scrapers made on elongate flakes or blades; (4) small hafted scrapers or exhausted scraper slugs, including snub-nosed end scrapers, other steeply retouched "formal" end or side scrapers, and thumbnail scrapers; (5) gravers, either singly or on combination tools; (6) bifacial knives and miscellaneous bifacially reduced tools… (Kearns 1996:143)

The list of tools presented by Kearns overlaps well with that developed by Torres, but with a few exceptions. Kearns (1996) makes no mention of the microblades listed by Torres (2000), and the latter does not mention the bifaces and gravers discussed by the Kearns. The projectile point styles listed by Kearns (1996) can occur in several cultural contexts. The unnotched points are similar to the Fresno type of the Great Plains and the Cottonwood Unnotched type of the Great Basin, while the side-notched styles resemble the Washita, Harrell, and Plains Side-notched types of the Great Plains (Kearns 1996:136). These styles are also similar to some of those illustrated by Seymour (2004:174, 176–177). Side-notched point examined by the author that have been ascribed an Athabaskan origin often differ from those of the Pueblos in the placement of the side notches. The notches on Pueblo side-notched points are generally placed about a quarter or less of the length of the blade edge above the junction of lateral and basal edges. In contrast, notches on Athabaskan side-notched points are often (but not always) placed halfway to two-thirds of the edge length above the junction of lateral and basal edges, quite distinct from those on Pueblo points. Basal notching also seems more common on Athabaskan points than it is on Pueblo points.

The microcores discussed by Kearns (1996:137) tend to exhibit multiple platforms and are manufactured from high quality cryptocrystalline rocks. Reduction was opportunistic; that is, there is no evidence of systematic reduction as would be typical of blade cores. These cores also often exhibit evidence of informal reuse as scrapers, gravers, or other types of tools. Elongated flake knives are made on long, narrow flakes or blades that are marginally retouched along one edge (Kearns 1996:137). The small hafted scrapers that occur as part of the tool kit resemble exhausted, hafted hide scrapers recovered from sites on the Plains (Kearns 1996:138). While gravers occur in multiple cultural contexts in the Southwest, they were common in the Navajo assemblages examined by Kearns, and usually occurred as retouched spurs or utilized projections on multifunctional tools (Kearns 1996:138). Finally, bifacial knives and other types of bifaces were common in his assemblages, especially in those dating to the Dinétah phase (Kearns 1996:139). They tend to be variable in form, and no distinctive type of bifacial knife has been defined.

There are close similarities in the list of distinctive early Navajo chipped stone tools presented by Kearns (1996) with those discussed by Seymour (2004) for the Cerro Rojo complex, which is believed to be Apache (though aspects of Seymour's analysis are disputed by Kenmotsu and Miller 2008). They include projectile point styles, Plains-style end scrapers, gravers/perforators, long flake knives, and various bifacial tools. Thus, if LA 139965 was occupied by one or more Jicarilla groups, the chipped stone assemblage would be expected to contain side-notched points distinct from those used by the Pueblos, hafted end scrapers similar to those found on the Plains, elongated retouched flake knives, gravers as part of combination tools, and possibly microcores. In addition, bifacial knives and other tools should be comparatively common. The presence of most or all of these indicators would suggest that an Athabaskan occupation is likely, though not definite. The total or near total absence of these indicators may mean that site occupants were not Athabaskans, in which case the site may have been occupied by Pueblos or Hispanics.

Moore (1992, 2001a, 2001b, 2003, 2004, 2008, n.d.) has examined chipped stone assemblages from numerous Hispanic sites. Technologically they are similar to those produced by Pueblo and probable Apache occupations, but they differ somewhat in their orientation. The most common task for which Hispanics used chipped stone tools was fire-making, both in association with *chispas* (or strike-a-lights) to start fires and as part of the ignition system in firearms. Thus, strike-a-light flints tend to be very common in Hispanic assemblages, and locally-manufactured bifacial gunflints may also occur. While these types of tools can also occur on Native American sites, they tend to be much more common in Hispanic contexts. Hispanic-produced stone projectile points also differ from those made by Native American groups. Spanish points tend to be crude-looking in comparison, and often have shallow to very shallow side-notches. Flaking is usually marginal rather than extending completely across surfaces. Thus, an assemblage focused on expedient core-flake reduction in association with comparatively large numbers of strike-a-lights and Spanish style projectile points would be good evidence for a Hispanic occupation.

A Prehistoric Pueblo occupation would differ in several ways from those generated by Jicarilla or Hispanic site occupants. This type of assemblage should lack Plains-style end scrapers, side-notched projectile points like those that appear to have been used by Athabaskans, micro-cores, distinct elongated retouched flake knives, strike-a-light flints, gunflints, and Alibates chert. The assemblage should exhibit an expedient reduction strategy, various core types struck opportunistically, and well-made projectile points closely resembling types produced by the Pueblos.

Applying the characteristics modeled for Jicarilla, Hispanic, and Pueblo assemblages, it should be possible to begin the process of assessing the ethnicity of site occupants. However, assemblage characteristics vary with occupation type and duration as well as with ethnicity, clouding the picture. Occupation for specialized procurement activities would produce a very limited assemblage that might include few if any of the tool types listed in the above models for Jicarilla and Hispanic occupations. This would probably result in a default assessment of the ethnicity of site occupants as Pueblo, which may or may not be correct. During longer occupations there is an increased likelihood that materials diagnostic of ethnicity would be deposited, especially if the site was used as a general purpose camp rather than as a special-use locale. Thus, as discussed earlier, ethnicity data generated through examination of the chipped stone assemblage must be used in conjunction with other types of information in order to derive a more accurate assessment of the ethnicity of site occupants.

Research Question 3: Why was the site occupied and how did it function in its settlement system?

Why a site is occupied is usually closely linked to how it functioned in the settlement system of which it was part. While analysis of the chipped stone assemblage cannot fully answer either of these questions, it can provide data that can be used in addressing both. Chipped stone analysis can provide information on part of the range of tasks that were accomplished at a locale, both by examining the types of tools found and by determining what reduction activities were occurring there.

If the rock shelters were used as residential locales the chipped stone assemblage should exhibit evidence for a number of tasks related to food acquisition and processing, as well as manufacturing and maintenance activities. Chipped stone artifacts should be relatively abundant, and the assemblage should contain artifacts related to hunting and the processing of game (projectile points, scrapers, and knives), reduction and stone tool manufacture (debitage, cores, hammerstones, and biface flakes), and general manufacture and maintenance activities (drills, spokeshaves, utilized debitage and cores). The presence of a mixed tool kit indicative of the performance of a range of tasks would suggest a residential function for the shelter and its use as a base camp.

The recovery of a more restricted or specialized tool kit could mean that the shelter was used for other purposes. For instance, the recovery of numerous projectile points showing evidence of use-related breakage in association with cutting tools and perhaps scrapers might indicate a specialized hunting focus. Small numbers of chipped stone artifacts occurring at various levels in the fill and lacking many associated tools could indicate a sporadic use for short-term camps.

Examination of the chipped stone assemblage will help establish the types of activities in which the associated tools were used. Added to the range of activities suggested by other artifact analyses, it may be possible to define a fairly comprehensive list of the activities pursued at this location, enhancing our ability to both define the way in which LA 139965 functioned in its associated settlement system, as well as helping to determine why this location was selected for occupancy.

Ground Stone Analysis

Ground stone identification and analysis will be conducted by OAS staff using a standardized methodology (OAS 1994b), which was designed to provide data on material selection, manufacturing technology, and use. Artifacts will be examined macroscopically, and results will be entered into a computerized database for analysis and interpretation. Several attributes will be recorded for each ground stone artifact, while others will only be recorded for certain tool types. Attributes that will be recorded for all ground stone artifacts include material type, material texture and quality, function, portion, preform morphology, production input, plan view outline, ground surface texture and sharpening, shaping, number of uses, wear patterns, evidence of heating, presence of residues, and dimensions. Specialized attributes that will be recorded in this assemblage include information on mano cross-section form and ground surface cross section.

By examining function(s) it is possible to define the range of activities in which ground stone tools were used within the rockshelters (Research Question 3). Because these tools are often large and durable, they may undergo a number of different uses during their lifetime, even after being broken. Several attributes are designed to provide information on the life history of ground stone tools, including dimensions, evidence of heating, portion, ground surface sharpening, wear patterns, alterations, and the presence of adhesions. These measures can help identify post-manufacturing changes in artifact shape and function, and describe the value of an assemblage by identifying the amount of wear or use. Such attributes as material type, material texture and quality, production input, preform morphology, plan view outline form, and texture provide information on raw material choice and the cost of producing various tools. Mano cross-section form and ground surface cross-section are specialized measures aimed at describing aspects of form for manos and metates because as these tools wear, they undergo regular changes in morphology that can be used as relative measures of age.

Ground stone tools may be less useful or addressing questions of chronology (Research Question 1) and ethnicity (Research Question 2). Marshall and Marshall report observing two one-hand manos at the site (2004:40). While we tend to associate this form of mano with the Archaic, it was used by later groups as well. Hard (1986:116, citing Tiller 1983:444) notes that the Jicarilla Apaches had manos ranging from 16 to 24 cm in length. The lower end of this size range is just above that considered as one-hand manos. Hispanic settlers in the upper Chama valley hand ground food on a metate when they could not get to a mill (Carrillo 1992:153).

Historic Artifact Analysis

Material recovered from LA 139965 could include a range of modern road-side debris to early historic items acquired by groups like the Jicarilla Apaches. Any Euroamerican artifacts that are recovered will be examined by Susan Moga using a standardized analysis format (OAS 1994c). OAS analysis format and procedures have been developed over the last 10 years and incorporate the range of variability found in sites dating from the eighteenth to twentieth centuries throughout New Mexico. The detailed recording allows for direct comparisons with assemblages from contemporary sites from other parts of New Mexico and throughout the greater Southwest. Analytical results will be entered into a computerized database for analysis and comparison with others on file at OAS.

The main emphasis will be the identification of artifact function. One of the major benefits of this type of analysis is that “the various functional categories reflect a wide range of human activities, allowing insight into the behavioral context in which the artifacts were used, maintained, and discarded” (Hannaford and Oakes 1983:70). It also avoids some of the pitfalls of an analytic framework that focuses on categorizing artifacts by material type. Material-based analyses frequently include attributes that are appropriate for only some of the functional categories that might be included in a single material class. For instance, variables that are often chosen for analysis of glass artifacts are usually appropriate for glass containers, but may be inappropriate for flat glass, decorative glass, or items like light bulbs.

This analytic framework was designed to be flexible, which hopefully enables it to avoid these and other problems. The function of each artifact is described by a hierarchical series of attributes that classifies it by functional category, type, and specific function. These attributes are closely related, and provide a chain of variables that will specify the exact function of an artifact, if known.

Ten functional categories will be used in this analysis including economy/production, food, indulgences, domestic, furnishings, construction/maintenance, personal effects, entertainment/leisure, communication, and unassignable. Each category encompasses a series of types, and includes classes of items whose specific functions may be different but are related. An example is a pickle jar and a meat tin, both of which would be included in the food category, but which are made from different materials and had different specific functions.

The exact use to which an artifact was put will be recorded as a specific function within a type. In essence, this attribute represents a laundry list of different kinds of artifacts that may be familiar to most analysts, and is the lowest level of the identification hierarchy. Other variables are recorded to amplify the hierarchy of functional variables, and to provide a more detailed description of each artifact that warranted such treatment. Included in this array of attributes are those that provide information on material type, dating, manufacturer, and what part(s) is represented.

Chronological information is available from a variety of descriptive and manufacturing attributes, and especially from the latter. If the array of available variables provides enough information to assign beginning and ending dates to an artifact, it is recorded in the date attribute. Manufacturer is the name of the company that made an artifact, when known. This type of information can be critical in assigning a specific date to an artifact, because dates for the opening and demise of most manufacturing companies are available. A related attribute is the brand name associated with a product. Many brand names also have known temporal spans. At times, the manufacturer or brand name can be determined from the labeling/lettering present on an artifact, which was used to advertise the brand name or describe its contents or use.

The technique used to manufacture an artifact will be recorded when it can be determined. Because manufacturing techniques have changed through time, this attribute can provide a relative idea of when an artifact was made. A related attribute is seams, which records the way in which sections of an artifact were joined during manufacture. Like manufacturing techniques, the types of seams used to construct an artifact are often temporally sensitive. The type of finish/seal will be recorded to describe the shape of the opening in a container and the means of sealing it. Many finishes and seal types have known temporal spans of limited duration. Related to this attribute is opening/closure, which records the method of retaining or extracting the contents of a container.

In some instances, attributes such as color, ware, and dimensions can provide information on artifact dating. Thus, the current color of an artifact will be recorded if of diagnostic value. A good example of where this attribute applies is glass, where the various colors present at a site can be used to provide some idea of age. Ware refers to ceramic artifacts, and categorizes the specific type of pottery represented, when known. Because temporal information exists for most major ware types, this attribute can provide critical dating information. Dimensions are also of chronologic value, especially when examining artifacts like nails or window glass, where lengths or thicknesses vary through time.

A few attributes will be used to provide information on the manufacturing process. In some instances these attributes also have descriptive value, and can be used to verify functional information. “Material” records the material(s) from which an artifact was made. “Paste” describes the texture of clay used to manufacture ceramic objects, and is differentiated by porosity, hardness, vitrification, and opacity. “Decoration” describes the technique used to decorate an artifact, including pottery. A simple description of the decoration on an artifact is recorded as “Design.”

In addition to most of the attributes already discussed, several others will be used to provide a more comprehensive description of each artifact. Fragment/part describes the section of artifact represented. Artifacts or fragments of artifacts within a single excavation unit whose functions and descriptions are identical will be recorded together, and the number of specimens present will be listed under count.

Cultural and environmental changes to an artifact will also be recorded. Reuse describes evidence of a secondary function, and any physical modifications associated with that use will be described as condition/modification. If environmental conditions have had any effect on the surface of an artifact, it will be recorded as aging.

Other variables will be used to describe the appearance of an artifact. “Shape” describes physical contours, and will generally only be recorded if an artifact is whole. Several different measurements will be taken to complete descriptions including volume, length/height, width/diameter, thickness, and weight. Measurements will be taken using industry standards, where appropriate. The entire range of measurements is rarely applicable to a single artifact, and only those that are deemed appropriate will be taken.

Historic artifacts recovered from LA 139965 will inform on site function (Research Question 3), chronology (Research Question 1), and possibly ethnicity (Research Question 2). If the artifacts are not road trash dating from the recent era, dating these artifacts could help to distinguish Historic-era sheepherders from earlier Jicarilla camps. The types of artifacts will inform on the range of activities that took place.

Faunal Remains Analysis

Faunal remains will be analyzed at the Office of Archaeological Studies laboratory under the direction of Nancy J. Akins. Specimens from proveniences chosen for analysis will be identified using the OAS comparative collection, supplemented by that at the Museum of Southwest Biology when necessary. Recording will follow an established OAS computer-coded format that identifies the animal and body part represented, how and if the animal and part was processed for consumption or other use, and how taphonomic and environmental conditions have affected the specimen. Each data line will be assigned a lot number that identifies a specimen or group of specimens that fit the description recorded in that line. Lot numbers also allow for retrieving an individual specimen if questions arise concerning coding or for additional study. A count will also be included to identify how many specimens are described in a data line.

Taxonomic identifications will be made as specific as possible. When an identification is less than certain, this will be indicated in the certainty variable. Specimens that cannot be identified to species, family, or order will be assigned to a range of indeterminate categories based on the size of the animal and whether it is a mammal, bird, other animal, or cannot be determined. Unidentifiable fragments often constitute the bulk of a faunal assemblage. By identifying these as precisely as possible, information from the identified taxa is supplemented.

Each bone (specimen) will be counted only once, even when broken into a number of pieces during excavation. If the break occurred prior to excavation, the pieces will be counted separately and their articulation noted in a variable that identifies conjoinable pieces, parts that were articulated when found, and pieces that appear to be from the same individual. Animal skeletons will be considered single specimens so as not to inflate the counts for accidentally and intentionally buried taxa.

The skeletal element will be identified then described by side, age, and portion recovered. Side will be recorded for the element itself or for the portion recovered when it is axial, such as the left transverse process of a lumbar vertebra. Age will be recorded at a general level: fetal or neonate, immature, young adult, and mature. Further refinements based on dental eruption or wear will be noted as comments. The criteria used for assigning an age will also be recorded. This will generally be based on size, epiphysis closure, or texture of the bone. The portion of the skeletal element represented in a particular specimen will be recorded in detail to allow determination of how many individuals are present in an assemblage and to investigate aspects of consumer selection and preservation.

Completeness refers to how much of each skeletal element is represented by a specimen. It will be used in conjunction with portion to determine the number of individuals present. It will also provide information on whether a species is intrusive, and will inform on processing, environmental deterioration, animal activity, and thermal fragmentation.

Taphonomy is the study of preservation processes and how they affect the information obtained by identifying some of the nonhuman processes that affect the condition or frequencies found in an assemblage (Lyman 1994:1). Environmental alteration includes degree of pitting or corrosion from soil conditions, sun bleaching from extended exposure, checking or exfoliation from exposure, root etching from the acids excreted by roots, and polish or rounding from sediment movement, when applicable. Animal alteration will be recorded by source or probable source and where it occurs.

Burning, when it occurs after burial, is also a taphonomic process. Burning can occur as part of the cooking process, part of the disposal process, when bone is used as fuel, or after it is buried. Here, the color, location, and presence of crackling or exfoliation will be recorded. Burn color is a gauge of burn intensity. A light tan color or scorch reflects superficial burning, while bone becomes charred or blackened as the collagen is carbonized. When the carbon is completely oxidized, it becomes white or calcined (Lyman 1994:385, 388). Burns can be gradated over a specimen, reflecting the thickness of the flesh covering portions of the bone when burned. Dry burned bone is light on the exterior and black at the core or has been burned from the interior. Graded burns can indicate roasting. Completely charred or calcined bone and dry burns do not occur as part of the cooking process. Uniform degrees of burning are possible only after the flesh has been removed and generally indicate a disposal practice (Buikstra and Swegle 1989:256).

Evidence of butchering will be recorded as various orientations of cuts, grooves, chops, abrasions, saw cuts, scrapes, peels, and intentional breaks. This type of evidence is much less ambiguous in historic assemblages where metal knives, axes, and cleavers leave more distinct marks than stone tools. The location of butchering will also be recorded. Additional detail will be obtained by indicating the exact location on diagrams of the body parts.

The fauna recovered from LA 139965 could represent subsistence and tool remains left by groups who used the shelters any time from the Paleoindian period to nineteenth century Mora and Guadalupita sheepherders. Most of these groups would have been hunting and gathering groups passing through the valley rather than longer term residents. While it is possible that the initial construction of NM 434 removed evidence of structures at the base of the talus, the rockshelters may still represent the more mobile aspect of any occupation. Rockshelter sites tend to contain more evidence of hunting larger game, rather than small game, regardless of the time period or location (e.g. Akins in prep.; 2004:133, 2005:143). Even the sheepherders may have relied on native fauna such as deer rather than diminishing the herd for food. Thus, the faunal remains, in conjunction with other chronologically sensitive data, could provide information on the time of year the hunting occurred, who might have been doing the hunting (Research Questions 1 and 2), and the range of activities that took place (Research Question 3).

Human Remains Analysis

Marshall and Marshall report observing a human incisor at LA 139965 (2004:40), so it is possible that the talus in front of the rockshelters or the shelters themselves and talus could harbor burials. Any human remains recovered will be analyzed by Nancy J. Akins. The human analysis will follow the procedures set out in Standards for Data Collection from Human Skeletal Remains (Buikstra and Ubelaker 1994) supplemented by recently developed collection forms that expand on traits documented in the Standards forms. Standards focuses on the need to gain the maximum amount of comparable information by recording the same attributes using the same standards. Documentation on how these should be recorded includes the following information:

1. A coding procedure for each element that makes up a relatively complete skeleton is provided. Diagrams of skeletons and anatomical parts allow for the location of any observations concerning these parts. Another form codes commingled or incomplete remains.
2. Adult sex is determined by examining aspects of the pelvis and cranium. Age changes are documented on the pubic symphysis using two sets of standards, on the auricular surface of the ilium, and through cranial suture closure.
3. For immature remains, the age-at-death is determined by scoring epiphyseal union, union of primary ossification centers, and measurements of elements.
4. Recording of dental information includes an inventory, pathologies, and cultural modifications. Each tooth is coded and visually indicated for presence and whether it is in place, unobservable, or damaged, congenitally absent, or lost premortem or postmortem. Tooth development is assessed, occlusal surface wear is scored, caries are located and described, abscesses are located, and dental hypoplasias and opacities are described and located with respect to the cemento-enamel junction. Any premortem modifications are described and located.
5. The secondary dentition is measured and dental morphology scored for a number of traits.
6. Measurements are recorded for the cranium (n = 35), clavicle, scapula, humerus, radius, ulna, sacrum, innominate, femur, tibia, fibula, and calcaneus (n = 46).
7. Nonmetric traits are recorded for the cranium (n = 21), atlas vertebra, seventh cervical vertebra, and humerus.
8. Postmortem changes or taphonomy are recorded when appropriate. These include color, surface changes, rodent and carnivore damage, and cultural modification.
9. The paleopathology section groups observations into nine categories: abnormalities of shape, abnormalities of size, bone loss, abnormal bone formation, fractures and dislocations, porotic hyperostosis/cribra orbitalia, vertebral pathology, arthritis, and miscellaneous conditions. The element, location, and other pertinent information is recorded under each category.
10. Cultural modifications such as trepanation and artificial cranial deformation are recorded in another set of forms.

If human remains are recovered, these may contribute to determining the ethnicity of the groups who used the site (Research Question 2). They could also contribute to identifying site function. Burial in the talus or rockshelters could add to the functions documented at the site and contribute to our knowledge of burial practices of the groups involved.

Archaeobotanical Analysis

Collection of flotation and pollen samples from throughout the rockshelters and talus. Any information obtained from these samples will be essential for documenting the season of occupation, what the focus of the site use may have been, and even chronology.

Macrobotanical studies conducted by OAS under the direction of Pamela McBride will include flotation analysis of soil samples, species identification, morphometric measurement of macrobotanical specimens (where appropriate), and species identification of wood specimens from flotation, macrobotanical, and radiocarbon samples. Flotation is a widely used technique for the separation of floral materials from the soil matrix. It takes advantage of the simple principle that organic materials (and particularly those that are nonviable or carbonized) tend to be less dense than water, and will float or hang in suspension in a water solution. Each soil sample is immersed in a bucket of water. After a short interval allows heavier sand particles to settle out, the solution is poured through a screen lined with “chiffon” fabric (approximately 0.35 mm mesh). The floating and suspended materials are dried indoors on screen trays, then separated by particle size using nested geological screens (4.0, 2.0, 1.0, and 0.5 mesh) before sorting under a binocular microscope at 7- to 45-power magnification.

This basic method was used as long ago as 1936, but did not become widely used for recovery of subsistence data until the 1970s. Seed attributes such as charring, color, and aspects of damage or deterioration are recorded to help in determining cultural affiliation versus post-occupational contamination. Relative abundance of insect parts, bones, rodent and insect feces, and roots help to isolate sources of biological disturbance in the ethnobotanical record.

All macrobotanical remains collected during excavation will be examined individually, identified, repackaged, and catalogued. Condition (carbonization, deflation, swelling, erosion, damage) will be noted as clues to cultural alteration, or modification of original size dimensions. When less than half of an item is present, it will be counted as a fragment; more intact specimens will be measured as well as counted. Corn remains will be treated in greater detail. Width and thickness of kernels, cob length and mid-cob diameter, number of kernel rows, and several cupule dimensions will be measured. In addition, the following attributes will be noted: overall cob shape, configuration of rows, presence of irregular or undeveloped rows, and post-discard effects.

Pollen samples selected for analysis will complement or accentuate the above-described strategies. Analysis will be conducted by a contracted professional palynologist experienced with prehistoric and historic sites in New Mexico, and particularly, New World domesticates. Pollen analysis methods are not presented here, because they may vary depending on the analyst. The full range of methods that may be applicable to the identification of New and Old World domesticate pollen will be explored in consultation with contract specialists and specialists that are on the OAS staff.

Chronometric Dating

Chronometric samples may be collected and used to define the occupation sequence if other means fail to provide sufficient data. Absolute dating methods that may be used in this project include dendrochronology and radiocarbon assays. Other relative dating methods that will be used, particularly chipped stone and ceramic stylistic and technological variation and historic artifact manufacture dates, are discussed in the appropriate analytical sections.

Dendrochronology produces extremely precise and accurate dates when appropriate samples are available. Ideal samples should have 15 to 20 years of growth rings, a sensitivity to climate variation that allows the sample to be matched with the regional chronology of climatic variation, qualities of outer surface that allow the outer ring to be interpreted as the death year of the tree, and an archaeological context that supports a linkage between tree death and the cultural behavior that is the target event of the dating effort. Tree-ring dating is most reliable when multiple samples are collected from structural remains where timbers were cut to length. Although construction timber reuse and stockpiling can cause inaccuracies, patterns of dates from multiple samples usually reveal the presence of remodeling or reuse of wood. Although wood samples from nonarchitectural contexts can be dated, samples from fuel wood in hearth contexts risk the same “old wood” problem that affects radiocarbon samples (Smiley 1985). The University of Arizona Tree-Ring Laboratory in Tucson is the preeminent laboratory for this method and they will be used if dendrochronological samples are recovered.

Radiocarbon dating has similar limitations as the first two methods, but it has the advantage that carbon is one of the most abundant materials in archaeological contexts (Taylor 2000). Plants incorporate carbon into their tissues through photosynthesis, drawing on the pool of carbon in the atmosphere. Radioactive isotopes of carbon produce cosmic radiation in the upper atmosphere, resulting in a relatively constant proportion of carbon-14 in the atmospheric pool. When plant tissue is no longer actively incorporating carbon, the amount of radioactive carbon declines at a rate consistent with the relatively short half-life of the isotope. The measured amount of radioactive carbon in a sample, the expected amount given the assumed atmospheric pool concentration, and the half-life value for the isotope can be used to calculate a radiocarbon age for the sample. Precision of radiocarbon age estimates is determined by the measurement error associated with determining the radioactive isotope contents.

However, the assumption of a constant value for the carbon-14 pool concentration has been shown to be inaccurate, and the radiocarbon age of a sample can only be translated into a calendric age estimate by comparison with carefully derived calibration curves (Stuiver and Reimer 1993). These curves reflect fluctuating pool values, increasing dating accuracy but affecting both precision and exclusivity of radiocarbon date interpretations. A single precise date expressed in radiocarbon years can yield an imprecise calendar date or multiple possible calendar date ranges.

Independent of the technical aspects of dating, radiocarbon samples are not unambiguously associated with cultural contexts. Although unburned organic materials deteriorate in most archaeological sites, charcoal is inert, and once it is produced, it is only subject to physical damage. Most charcoal results from heating and cooking fuel, but it can also result from the burning of structures and artifacts. Individual pieces of charcoal rarely carry any qualities that can be unambiguously related to a particular cultural event, therefore the integrity of potential samples is dependent on feature contexts. If samples are collected from potentially disturbed contexts, then the resulting dates can only be interpreted in relation to other independent dates. Other problems with radiocarbon dating are the “old wood” issue previously mentioned for dendrochronology and cross-section effects. Long-dead (dry) wood tends to be harvested for fuel, and on southwestern landscapes, standing dead trees may be sources of fuel for centuries after their death (Smiley 1985). In addition, slow-growing species, such as piñon and juniper, can incorporate centuries of growth into small branches (cross-section effect). These qualities can result in erroneously early radiocarbon dates, even though the sampled material is unambiguously associated with a particular cultural feature and behavior. To lessen the potential risks of these problems, the charcoal selected for dating can be sorted by species and plant part. Small twigs or branches contribute less to cross-section effects because they incorporate fewer years of growth and they persist for shorter periods on standing dead trees. Annual plants and perennial shrubs are better material for radiocarbon dating because they incorporate carbon over smaller numbers of years and are not likely to survive on the landscape a long time after dying. Care in collecting, selecting, and characterizing radiocarbon samples will increase their relevance to particular cultural contexts, but the other limitations of the technique and date interpretation will constrain use and interpretation in some contexts. OAS uses BetaAnalytic, Inc., of Coral Gables, Florida, for all radiocarbon dating analyses.

Contexts for archaeomagnetic dating are not expected, but if in situ burned surfaces are encountered during excavation, they will be preserved for assessment of sampling potential by OAS archaeomagnetists.

Schedule for Fieldwork, Analysis, Project Results, and Curation

Fieldwork may begin as early as August 18 and will last six to eight weeks, depending on the amount of cultural material encountered. Seasonal rain patterns may push the end date to later in October. Laboratory analyses and selection of contractors for specialized studies (e.g., residue and obsidian sourcing) will commence within two weeks of the end of the field season. Artifact processing and flotation sample processing will be concurrent with the excavation phase.

Preliminary and final reports on the data recovery program at LA 139965 will be published by the Office of Archaeological Studies in the Archaeology Notes series. A preliminary report will be submitted no later than January 2015. The final report will describe the site excavation, report the analysis results, and present interpretive summaries and an evaluation of significance for the site. It will include photographs, site and feature maps, and data summaries and will comply with the NMAC 4.10 report standards and the NMDOT Guidelines for Cultural Resource Investigations (June 2014). The report will be submitted and the artifacts curated by January 2016. Field maps and notes, analytical data sheets, and photographs will be deposited with the Archeological Records Management Section of the New Mexico Historic Preservation Division. Artifacts will be curated at the Museum of New Mexico Archaeological Research Collection facility.

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APPENDIX 1:
Specific Procedures to Follow for Discoveries of Human Remains, Funerary Objects, Sacred Objects, and Objects of Cultural Patrimony

At all times human remains must be treated with the utmost dignity and respect. Should human remains and/or funerary objects, sacred objects, or objects of cultural patrimony be encountered, work in the area of the discovery will stop immediately and the location will be secured and protected from damage and disturbance. Human remains and associated objects, sacred objects, and objects of cultural patrimony will be left in place and not disturbed. No remains or materials associated with the remains will be collected or removed until appropriate consultation has taken place and a plan of action has been developed.

If skeletal material or other human remains are discovered, the Office of the Medical Investigator (OMI), local law enforcement (Mora County), the New Mexico State Archaeologist will be contacted immediately. The OMI will make an official ruling on the nature of the remains, as either forensic (medicolegal) or archaeological. Since the remains would be from state land, the Cultural Properties Act regarding the discovery and excavation of unmarked burials (4.10.8.20 NMAC and 4.10.11 NMAC) applies. The NMDOT will coordinate with the NM SHPO on tribal consultation and an appropriate plan of action pursuant to Section 18-6-11.2 of the Cultural Properties Act. If ethnicity of the remains cannot be determined, the remains should be assumed to be Native American and the procedures outlined above should be followed. If the human remains are archaeological and determined to be non-Native American, the remains will be left in place and protected from further disturbance until a plan for their avoidance or removal can be generated.

If sacred objects, objects of cultural patrimony, or funerary objects not associated with human remains are found, the objects will be protected and the NM SHPO will be notified immediately and NMDOT will initiate tribal consultation and an appropriate plan of action pursuant to Section 18-6-11.2 of the Cultural Properties Act.

In the event that exhumation of human remains is necessary, they will be excavated in accordance with the guidelines and regulations appropriate for the land status and following the approval of a recovery plan as outlined above. On state or private lands, Guidelines for Excavation of Human Burials (4.10.11.10 NMAC) and the Museum of New Mexico policy on sensitive materials will be followed. There will be no public exposure of the remains. No photographs will be taken other than those necessary as part of archaeological documentation. No actions will be taken to conserve or stabilize bone that might prevent effective reburial. No destructive analyses of human remains or funerary objects will be undertaken without prior consultation with and approval by Tribes that have expressed a relationship with or custodial interest in the remains. Documentary reporting will conform to standards required by regulation**.** In situ images will not be included in documentary reporting; reporting of field burial observations will be limited to drawings. Laboratory images may be used in reporting, but only to document specific osteological conditions. Funerary objects, sacred objects, and objects of cultural patrimony will be illustrated by laboratory photographs or drawings, but illustrations will not be made public. All human remains will be retained by OAS for NMDOT pending the final outcome of disposition consultations the Native American Tribes who have connections to the Project area if the remains and/or objects are determined to be Native American.

APPENDIX 2:
TABLES

Table 1. LA 139965, estimated size and proposed investigations for site areas

Area	Estimated size (sq m)	Estimated excavation units	Percent of area	Percent 1/8 inch screening	Comments
North Shelter	8	8	100.0	20-100	
North Shelter talus	18	8	66.7	30-100	
North Shelter trench	4	4		100.0	1 m ditch, 3 m talus
Cliff edge between shelters	24	24	100.0	100.0	
Between shelters trench	4	4	35.5	100.0	
Talus between shelters	124	40		10-100	
South Shelter	8	8	100.0	20-100	
South Shelter talus	72	40	66.7	10-100	
South Shelter trench	8	8		100.0	
South of South shelter	40	5	12.5	25-50	rock fall and heavy vegetation
Drainage ditch and shoulder	70	5(2)	3.0	60.0	3 m included in trenches
Total estimated site area	380	151	39.7	20-80	
Heavily vegetated area south of shelters	80	?			possible backhoe trench

Table 2. LA 139965 personnel and organizations

Fieldwork	
Principal investigator	Eric Blinman
Project director	Nancy J. Akins
Field director	Nancy J. Akins
Field assistants	Ann Stodder
	Karen Wening
	Isaiah Coan
	Mary Weahkee
Soils specialist	Jeffery Boyer
pXFR specialist	Marvin Rowe
Backhoe operation	to be determined
Laboratory Analyses	
Artifact processing	Lynette Etsitty
Lithic analysis	James L. Moore
	Mary Weahkee
Ceramic analysis	C. Dean Wilson
Ground stone analysis	Karen Wening
Ornament analysis	Karen Wening
Hisoric artifacts	Susan Moga
Flotation processing	Lynette Etsitty
Flotation and macrobotanical	Pamela J. McBride
Faunal analysis	Nancy J. Akins
Human remains analaysis	Nancy J. Akins
GIS	Jessica Badner
	Isaiah Coan
Radiocarbon dating	Beta Analytic
	Marvin Roe
Pollen/phytoliths/starch	PaleoResearch, Inc.
Residue analysis	to be determined
Obsidian sourcing	to be determined

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