MUSEUM OF NEW MEXICO

OFFICE OF ARCHAEOLOGICAL STUDIES

Excavation of a Late Pueblo III Roomblock along NM 36, Catron County, New Mexico

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ADMINISTRATIVE SUMMARY

In August and September 2000, LA 53677 (Brushy Pueblo) was excavated by the Office of Archaeological Studies of the Museum of New Mexico (OAS) as part of a site management plan under the Archaeological Site Stabilization and Protection Project (ASSAPP), federally funded by the Enhancement Program of the Intermodal Surface Transportation Efficiency Act of 1991 through the New Mexico State Highway and Transportation Department (NMSHTD). The program sought to identify endangered cultural properties within existing highway rights-of-way, and to propose management actions if their preservation was threatened by erosion or highway-related activities.

LA 53677 was found within the highway right-of-way along NM 36 in Catron County, New Mexico. Much of the site soil had been removed as a source of road materials, and the area was being used as a highway pull-out. The cut slope of the pull-out had eroded to reveal cultural materials, including a slab-lined hearth. Permits were obtained to test the site for subsurface cultural features. A data recovery plan was prepared and approval was given for excavation of the portion of the site within the highway right-of-way.

Data recovery revealed the remainder of the exterior hearth, a shallow pit, and much of a three-room pueblo fieldhouse that also extended beyond the right-of-way. No trace of the pueblo had previously been visible on the site surface. The structure was built of rock and consisted of a linear alignment of three rooms, the walls of which stood as high as 45 cm. No floor features were present within the rooms, however, and most of the artifacts had been removed, apparently at abandonment.

Radiocarbon intercept dates were obtained from two of the pueblo rooms: A.D. 1300 (2-sigma calibrated range, A.D. 1280 to 1320) and A.D. 1140 (2-sigma calibrated range, A.D. 960 to 1270). The former date corresponds well with the late Pueblo III sherds recovered from the site, which included St. Johns Polychrome, Springerville Polychrome, Snowflake Black-on-white, and Klagetoh Black-on-white. The latter date corresponds less well, but could reflect the use of old wood in construction.

Numerous very large pueblos have been found in the immediate vicinity of LA 53677, including Hubbell Corner (Site 143, McGimsey 1980), which contains up to 500 rooms. The LA 53677 pueblo, which is situated at the base of Mariano Mesa, may be associated with one of these large communities.

MNM Project No. 41.596 (Endangered Sites)
NMSHTD Contract No. J00089; Project No. TPE-7700(14)
State Land Excavation Permit No. 090
NMCRIS No. 71575

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CHAPTER 1

INTRODUCTION

Archaeological excavation was conducted at LA 53677 (Brushy Pueblo) by the Office of Archaeological Studies of the Museum of New Mexico (OAS) in August and September, 2000 as part of a site management plan under the Archaeological Site Stabilization and Protection Plan (ASSAPP). The ASSAPP project was federally funded by the Enhancement Program of the Intermodal Surface Transportation Efficiency Act of 1991, and administered by the NMSHTD. The purpose of the program was to identify cultural properties within existing NMSHTD highway rights-of-way and to propose and implement management actions if the preservation of those properties was threatened by erosion, vandalism, or highway-related activities.

The site was located along NM 36 in Catron County, New Mexico, 17.5 km (10.9 miles) north of Quemado in the foothills of Mariano Mesa. Land status was primarily highway-acquired right-of-way from private sources, but also included a small portion of New Mexico State lands (Fig. 1). Permits were obtained for testing and data recovery at the site from the appropriate landowners, including Mr. David Eck of the State Land Office, whose cooperation was instrumental in the preservation of LA 53677 site data.

LA 53677 was identified as an endangered site, and fell within the parameters of the ASSAPP project (Oakes and Williamson 2001). The site had been heavily disturbed by soil removal and by its use as a pull-out. Cultural material was observed eroding out of the cut slope within the highway right-of-way. The site was first tested by OAS and a slab-lined hearth was partially uncovered. It was subsequently determined that the most efficient course of action was to conduct data recovery (Oakes 2000) within the small site area in order to retrieve any remaining site data and to eliminate the potential for further destruction of the site. In addition to the hearth, OAS uncovered a shallow pit and a portion of a three-room pueblo. The site was backfilled by NMSHTD District 5 crews upon completion of the investigations.

The ceramics recovered indicated a late Pueblo III occupation with pottery sherds deriving from three distinct regional sources: the Cibola area, the Mogollon Highlands, and the Little Colorado drainage. Two radiocarbon dates were obtained from the site: a calibrated intercept date of A.D. 1300, which correlated well with the ceramic assemblage, and another that probably reflected the use of old wood.

Work was completed under the direction of Yvonne Oakes, assisted by Dorothy Zamora, Phil Alldritt, and Peter Bullock. Yvonne Oakes also served as principal investigator for the ASSAPP. The implementation of this fieldwork was greatly aided by the cooperation of the NMSHTD District 5 crew in Quemado under Tom Brannon, and by David Eck of the New Mexico State Land Office.

This report presents the results of the data recovery program at Brushy Pueblo (LA 53677). In an attempt to better understand the complex prehistory of this relatively unknown area of the Southwest, examination is also made of the surrounding settlement system in the Mariana Mesa area, which has large pueblos and a diversity of pottery from widely dispersed regions.

This undertaking complies with the provisions of the National Historic Preservation Act of 1996, as amended through 1992, and applicable regulations. The report is consistent with appropriate federal and state standards for cultural resource management.

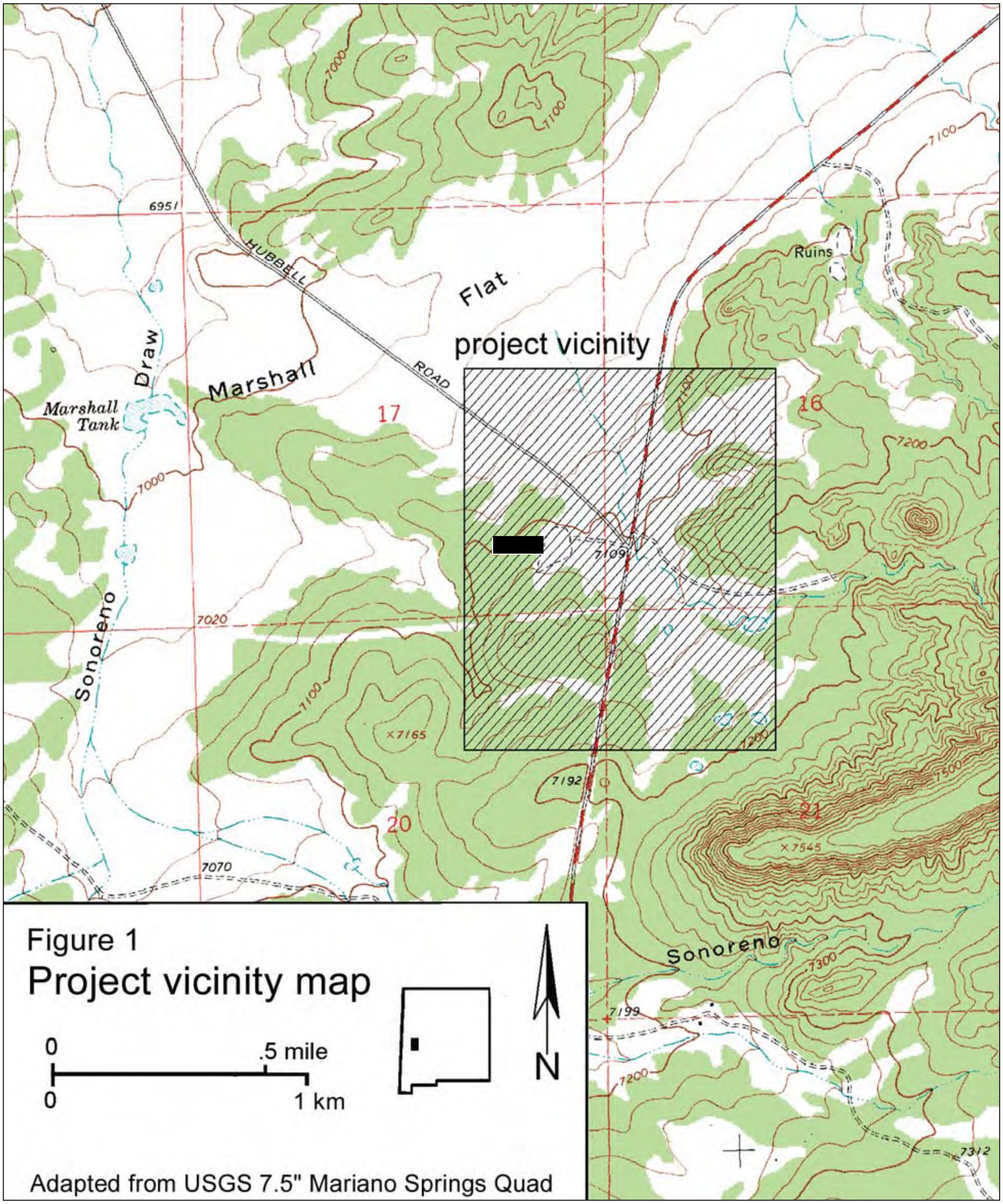

Figure 1
Project vicinity map

Adapted from USGS 7.5" Mariano Springs Quad

CHAPTER 2

ENVIRONMENTAL SETTING

Site Locale

Brushy Pueblo (LA 53677) lies in the western foothills of Mariano Mesa, the dominant landform of the region directly north of Quemado, New Mexico (Fig. 1). The site was on the eastern side of a small mesa, and abutted the higher hills and ridges of Mariano Mesa, which rises to the east (Fig. 2). Site elevation was 7,109 feet (2,167 m). To the north and west, the land opens into Marshall Flat, an area of low rises and broad valleys dotted with ephemeral drainages. The site was in the transitional zone between rolling grasslands and hilly piñon-juniper woodlands. It was close to an ephemeral stream that drains Cottonwood Spring, 1 mile (1.6 km) to the east. Two miles (3.2 km) to the north flows the intermittent drainage of Hubbell Draw, and one mile to the south is Sonoreno Draw. There are no perennial streams in the region.

Numerous sites are in the vicinity of Brushy Pueblo. The most significant is Hubbell Corner (LA 8112), a large 300-room pueblo with a great kiva, which is 0.35 km to the northwest. Between Hubbell Corner and Brushy Pueblo lies a small, unrecorded roomblock; another unrecorded pueblo of 20-30 rooms lies 0.4 km to the west. The Big Q site (LA 89418), which contains pithouses and small roomblocks, is 0.7 km to the south. One mile to the north lie two adjacent large pueblos recorded by Danson (1957).

Physiography

The site was within the southern boundaries of the Colorado Plateau, in the Zuni Mountain subdivision (Danson 1957:8). The area is also known geologically as the Mogollon Slope (Fitzsimmons 1959:114), which extends south from the Zuni River to the Basin and Range province of the Mogollon Highlands. The slope

Figure 2. Site environs with Mariano Mesa in background, facing northeast

is a structural unit of sedimentary rock capped by late Cretaceous shales of the Mesaverde Group (Kayser and Carroll 1988:2-1). It is further defined as within the middle Eocene Baca basin, a narrow basin at the southeast margin of the Colorado Plateau (W. Stone 1994:323).

The landscape of the site area is dominated by Mariano Mesa, an uneroded Tertiary and Quaternary lava remnant rising to over 8,000 feet (2,438 m) in elevation (Dane and Bachman 1965). It is topped with a lava-derived basalt cap and extends for 15 miles (24.1 km) north to south; it is 7 miles (11.2 km) at its widest. At the north end, near the site, the mesa edges are steep and irregular. To the south, the mesa slopes down gradually to meet the surrounding land. The lower foothills of Mariano Mesa are mostly sandy extensions of the mesa (Danson 1950:383). Most sites are around the edges of the steeper northern limits of the mesa. Other noticeable landmarks are Cerro Prieto and Tejana Mesa to the west, and Techado (also variously spelled Trechado) and Veteado peaks to the north. Techado Peak is a volcanic plug with dikes extending to the northwest and southeast. These dikes form part of the Continental Divide, which runs to the east of Mariano Mesa. Numerous other smaller mesas, buttes, ridges, and knolls dot the surrounding landscape.

Otherwise, the area is gently sloping to level with sedimentary deposits covered with alluvium. Broad, sandy valleys are common, sometimes with small dune areas on north-facing slopes (Johnson 1985:23). The sedimentation is interbedded sandstone, siltstones, mudstones, claystones, and shales of the Mesaverde Group (Kayser and Carroll 1988:2-1). It is believed that the area once consisted of well-grassed valleys and ridges, and mesas covered with stands of piñon and juniper (Danson 1957:10).

The region is part of the upper Little Colorado River watershed, but it is unlikely that any water reaches the Little Colorado. Most drainages in the area are dry much of the year. Small streams flow off of Mariano Mesa for only a short distance. Occasionally, springs are present in the foothills of the mesa. Several intermittent arroyos drain the area, flowing west to meet Frenches Draw (Bullard 1962:6). Other large drainages are Hubbell Draw and Nations Draw. All of these ephemeral flows drain an area of 400 square miles (1,036 square kilometers) (Kayser and Carroll 1988:2-3).

Because of the lack of perennial streams, the major source of water in the area is groundwater, which flows westward due to the sloping topography. The depth to the water table is 20 feet in larger valleys and 900 feet at higher elevations. In general, the water quality is poor because of the presence of abundant mudstones (W. Stone 1994:323).

Climate

Prehistorically, the Mariano Mesa environment may have been much less marginal than it is today, although marginality is a relative term dependent on specific situations in specific areas (Speth 1990). Paleoenvironmental recharge studies, for example, indicate a much wetter climate between 8,500 and 10,000 years ago. Climatic conditions, however, may not have influenced cultural processes to the degree once believed (Bayham and Morris 1990; Larson et al. 1996), although some environmental variables (such as annual and local precipitation rates, and availability of seasonal resources) may still have influenced significantly the changing cultural adaptations of the region. These are examined in the following paragraphs.

The climate of the area is generally considered to be temperate, but ranging from steppe to semi-arid to dry subhumid, a result of the many different topographic landforms present (Ferguson and Hart 1985:13). Tuan et al. (1973) and W. Stone (1994:323-324), however, label the area as semi-arid. Average annual precipitation is approximately 15 inches (38 cm), with a variation of less than 20 percent (McGimsey 1980:1), although precipitation is usually greater at higher elevations. The wettest months are July through September (Newcomer 1994:58). The growing season ranges between 108 and 130 frost-free days (Johnson 1985:23) depending on elevation. Prehistorically, the propagation of maize crops would, therefore, have been possible most of the time in the higher elevations, particularly if the climate was wetter than it is now. McGimsey (1980:1-3) suggests that early populations probably employed floodwater farming along arroyo banks or on floodplains of larger streams. The earlier mentioned low variation in precipitation could indicate a more stable environment than in surrounding areas, particularly in the Mogollon Highlands to the south. Average annual air temperature is 47 to 54 degrees F (Johnson 1985:23).

Several researchers have associated periods of drought or heavy rainfall with changes in prehistoric cultural adaptations. Berman (1979:37) states that in west-central New Mexico, between A.D. 350 and 1000 and again between A.D. 1050 and 1100, there was higher than average winter precipitation with resultant higher water tables and greater groundwater retention in the spring, which are beneficial to the growing of crops. After about A.D. 1050, the precipitation pattern changed to summer-dominant, causing degradation of floodplains, erosion, channel entrenchment, and a pollen regime of mostly cheno-ams, with an increase in piñon and juniper (Wood 1978:203). The lowering of the water table may have induced the buffering mechanism of moving settlements closer to more viable streams

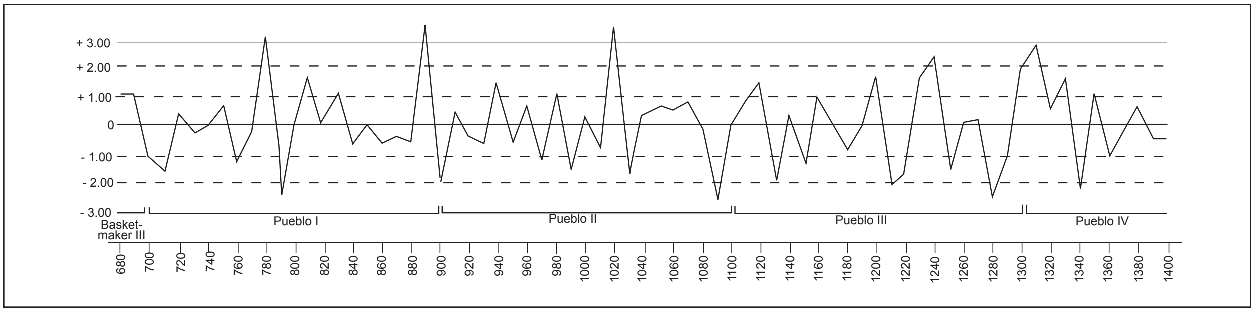

Figure 3. Decadal climatic variation for Mariano Mesa

(Jorde 1983:388), or it could have led to the construction of walk-in wells, not uncommon in the area at this time. It is noteworthy that Pueblo III sites in the region are concentrated closer to stream sources at the higher elevations of the region.

A reconstruction of the prehistoric, localized Mariano Mesa climatic variability was plotted for the period from A.D. 680 to 1400 from decadal variations in rainfall and temperature based on tree-ring analyses provided by Dean and Robinson (1977). Data were then compared with five surrounding areas previously plotted by Oakes and Zamora (1999), including Reserve, Luna, Aragon, Little Colorado River, and Zuni. The plot (Fig. 3) shows standard deviations; any variation from the mean greater than two standard deviations was originally interpreted as indicating the need for adaptive cultural responses. Dean (1988:138) later revised his interpretation, stating that a standard deviation of 1.1 was more realistic for indicating severe climatic fluctuations that could have had serious consequences for prehistoric populations.

Figure 3 shows ten extremely high departures from the mean, indicating both very cold and wet conditions as well as periods of severe drought. These variations could have caused a variety of possible behavioral responses, such as population movement, aggregation, relocation of fields, use of water control devices, and changes in types of subsistence resources used (Dean et al. 1985:542). These periods of extreme fluctuation in precipitation on Mariano Mesa are generally spaced evenly through time and do not cluster together, except perhaps after A.D. 1200.

Overall, there are large temporal spans when climatic variability may not have imposed any environmental stress on the local populations (see table at right).

The longest potentially stress-free climatic period was between A.D. 900 and 1015, a span of 115 years during the Early Pueblo II period that saw considerable population growth in the Mariano Mesa region. Abandonment of this region is considered to have been complete by A.D. 1350. Figure 3 shows A.D. 1340 to be the time of the last major drought before this.

Available Resources

Vegetation

The Mariano Mesa area is part of the Upper Sonoran life zone, with its attendant diversity of plant species. Grasses are perhaps the most dominant plant form, and include bunch grass, blue grama, sideoats grama, Western wheatgrass, spike muhley, alkali sacaton, Indian ricegrass, littleseed ricegrass, galleta, sand dropseed, and prairie junegrass (Danson 1957:11; Johnson 1985:14; Kayser and Carroll 1988:2-4; Cepeda and Allison 1994:332). These are found primarily in the broad, alluvial valleys. Also located here are stands of Spanish bayonet, bear grass, yucca, and prickly pear along with low shrubs of vine-mesquite, bottlebrush, squirreltail, winterfat, wolfberry, sage, rabbitbrush, and fourwing saltbush (Johnson 1985:23; Kayser and Carroll 1988:2-4). Other floral resources found at higher elevations (generally above 6000 feet on ridges and mesa tops) are juniper, piñon, live oak, Arizona walnut (along water courses), sycamore, and mountain mahogany. Large numbers of wildflowers include zinnias and purple asters (Cepeda and Allison 1994:332). Ponderosa pine and oak are found only at higher elevations (Bullard 1962:6).

The site area may be thought of as an ecotone where piñon and juniper trees have periodically invaded the surrounding grassland (Cepeda and Allison

Periods of climatic stability

Span (A.D.)		Duration	Period
From	To		
680	775	95 years	late BM III/early P I
795	885	90 years	late P I
900	1015	115 years	early P II
1025	1085	60 years	late P II
1125	1210	85 years	early P III
1245	1275	30 years	late P III
1345	1400	55 years	late P IV

1994:332). Today, the area has greatly diminished water supplies and sparsely concentrated grasses. Dry farming can be pursued only in the wettest years. Danson (1957:66) reports that in 1951, after a severe drought, the grasslands were covered with sand in many areas, and that a number of the lower-elevation junipers were dying. There was also a deepening of arroyos at this time.

Adequate wood resources are critical to the survival of prehistoric populations in any area. Piñon and juniper for fuel and construction are readily available on the higher mesas and ridges immediately adjacent to the site. Ponderosa pine and oak are present higher up on the flanks of Mariano Mesa.

Soils

Soils of the region are derived from local igneous sources as well as from sedimentary outcrops, alluvium, and some eolian sediments. The site is within the lower hills and alluvial fans of the Flugle-Typic-Ustorthents association. The lower drainages, draws, swales, and playas contain Catman-Manzano-Hickman soils, which are deep and well drained (Johnson 1985). Higher elevations of Mariano Mesa have Cabezon-Datil-Hubbell soils, which can be either shallow or deep, but are well-drained.

The valleys and bottomlands contain soils that are slowly permeable but susceptible to salt and alkaline buildup. Soils high in alkalinity are generally unfavorable for maize agriculture; however, Kayser and Carroll (1988:2-7) suggest that corn here may have adapted to these environmental conditions and thus become more tolerant of alkalinity. Alluvium can reach a depth of 190 feet (W. Stone 1994:324). Run-off is slow, and the land is subject to flooding during heavy, sudden storms (Johnson 1985:25). Blowing of the sandy soil is common. The rich grasses are found on these alluvial soils. The lower hills have moderately permeable soils, some of which are derived from basaltic flows. Here are located scattered shrubs, isolated piñon and juniper, and mixed grasses (Kayser and Carroll 1988:2-3).

Fauna

The Upper Sonoran life zone supports a wide variety of fauna that could have easily supported prehistoric populations. However, fauna are an unpredictable resource that may vary according to locality, seasonality, or abundance, especially during times of drought. Those fauna normally present include white-tailed deer, mule deer, pronghorn, elk, coyote, wildcat, mountain lion, gray fox, turkey, raccoon, beaver, porcupine, jackrabbit, cottontail, squirrel, chipmunk, prairie dog, pocket gopher, rodents, quail, jays, golden eagles, hawks, ravens, and other birds (Danson 1957:11; Kayser and Carroll 1988:2-5). The deer and large cats are found at higher elevations on the ridges and foothills of Mariano Mesa. Today, the hunting of deer and elk is a major tourist draw to the area.

Raw Materials

Because of the varied topography of the region, lithic raw materials for tool use and construction are plentiful. The materials usually occur as chunks or cobbles in conglomerate formations (Camilli et al. 1988:6-5). Ample supplies of good-quality petrified wood are found all along the bases of mesas. Occasional obsidian nodules are found in the lava areas, but its use is not common. The lava also produced large amounts of both vesicular and dense basalt, used primarily for the masonry roomblocks constructed by pueblo peoples. Sandstone outcrops are also common, and are used as a source of ground stone or for construction material. Chinle cherts are obtained from west of Zuni and appear in many lithic assemblages (McGimsey 1980:3; Camilli et al. 1988:6-6).

Clay deposits for the manufacture of pottery are available in the surrounding Cretaceous sediments. Suitable clay is also found in the mudstones that outcrop near Mesa Tinaja to the west of the site area (Camilli et al. 1988). The Baca Formation produced quartz, milky quartz, jasper, and silicified wood. Fossil mammal bones have also been found in the sandstone layers of the upper Baca Formation (Guilinger 1982:47). Other formations produced basalt, rhyolite, chert, sandstone, and quartzite. One notable source for the rarely used obsidian is 30 miles (48 km) to the west at Red Hill (Kayser and Carroll 1988:2-6).

Modern Land Use

Today, the region is less moist than in prehistoric times and droughts are not uncommon. The water table is low and the area suffers from vegetational degradation from overgrazing (Bullard 1962:6). Drainages are dry for most of the year and are becoming deeply entrenched. The major land use is the grazing of cattle and sheep with minor employment of dry-farming (Danson 1957:66), but suitable farming areas are widely distributed and often occur in small, irregular patches (Maker et al. 1972:18). The nearby town of Quemado is mainly a supply location for the scattered ranches of the region.

CHAPTER 3

MARIANO MESA CULTURAL ASSOCIATIONS

Previous Archaeological Work in the Area

The Mariano Mesa region is known for its apparent blending of Anasazi and Mogollon cultural characteristics, as exemplified by ceramics and architecture. This seeming mix of cultures has made this region an archaeological enigma and, therefore, very attractive to researchers. Possibly the first reconnaissance survey of the region was conducted by the Peabody Museum's Upper Gila Expedition in 1947, when large areas of west-central New Mexico and east-central Arizona were examined (Danson 1957). In the Mariano Mesa locality, the survey recorded 163 sites within a five-mile radius of the northern tip of the mesa, a greater percentage of sites than found in any of the other areas surveyed. Breakdown of assignable sites to periods, using the Pecos Classification, was 31 Pueblo I sites, 69 Pueblo II sites, and 54 Pueblo III sites. No sites dating later than A.D. 1300 were found.

In 1949 through 1951, building on the Peabody Museum's earlier survey, three seasons were spent selectively excavating sites, or portions thereof, of a variety of pueblo time periods (McGimsey 1980). Additional sites were recorded, bringing the number of sites within 75 square miles of Mariano Mesa to 638. Seven sites were excavated, including the probable great kiva at the Hubbell Corner (LA 8112, Site 143); 22 rooms, three pithouses, a kiva, and a walk-in well at the late Pueblo III Horse Camp Mill site (LA 10983, Site 616); a portion of late Pueblo III Techado Spring site including a walk-in well (LA 6010, Site 190); LA 4032 (Site 486), a small Pueblo I habitation, badly eroded; Site 494, a small Pueblo II roomblock; LA 31817 (Site 481), a Pueblo III roomblock with 34 rooms and a kiva excavated; and Site 188, a small two-room Pueblo II site.

In 1953 to 1954, the Upper Gila Expedition again sent a crew to excavate one of the earliest known sites in the region, the Cerro Colorado site (LA 25894). The site sits on top of Cerro Colorado, a volcanic remnant, approximately six miles (9.6 km) west of Mariano Mesa. It is a Basketmaker III site containing up to 50 pithouses, of which 15 were excavated (Bullard 1962). Cerro Colorado has been called the best-dated site in the Southwest because of the tight clustering of tree-ring dates between A.D. 626 and 675 (Berry 1982:756). It remains the earliest excavated site in the region.

Little archaeological work was conducted in the Mariano Mesa area after the completion of the Upper Gila Expedition excavations. Then, in 1972, a transmission line was surveyed to the west of the project area from Zuni southeast to the Apache National Forest (Wilson 1972). Fifty-five sites were recorded, and included one isolated Cody knife, 11 possible Archaic campsites (no diagnostic artifacts), seven likely Basketmaker III sites, five Pueblo I sites, 18 Pueblo II sites, seven Pueblo III sites with one extending into Pueblo IV, and a probable 1800s Navajo hogan. Three areas of petroglyphs were also recorded.

In 1979, the University of Tulsa conducted a Class II survey for the BLM on a large area west of Tejana Mesa. Thirty-six sites were recorded, most of which dated to the Pueblo II period (Camilli et al. 1988:1-6). Not until the 1980s was there renewed interest in the region, and only because of proposed coal lease options for land to the west of Mariano Mesa. Eck (1982) conducted an initial survey on lands near Hubbell Ranch and recorded 21 sites. In 1983, Hogan (1983) surveyed 640 acres of Fence Lake Coal Lease land and found 15 sites. As part of the same project, Elyea (1983) later recorded 18 more sites, and Hogan (1985) noted the presence of nine rock art localities. Two more Fence Lake surveys in 1984 yielded eight more sites (Hunter-Anderson 1984; Mills 1984).

In the same area, the 31,640-acre San Augustine Coal area surveys (Kayser and Carroll 1988) recorded 215 sites; interestingly, none of 83 classified sites were Basketmaker III or earlier. Nor were any sites purely of the Pueblo I period. There were 30 Pueblo II sites, 26 sites with mixed Pueblo II-Pueblo III, and four very late Pueblo III sites. Site density averaged 28 sites per square mile, which Kayser and Carroll (1988:10-1) say is nearly three times the rule of thumb for New Mexico.

An innovative, major survey was undertaken by Fowler et al. (1987) in 1985-1986, called the Anasazi Monuments Project. Its purpose was to look only at large, previously recorded sites to determine if perhaps these outlying sites might be part of the greater Chacoan system beyond the San Juan Basin. The survey area covered the land between I-40 on the north, U.S. 60 on the south, the Arizona/New Mexico line on the west, and Cebolleta Mesa on the east. Many sites visited were drawn from Danson's site files of 1957. They found that many of the sites had strong resemblances to Chaco great houses with attendant great kivas and possible roads. Several of these are in the area surrounding Mariano Mesa.

Testing of several small sites for NMSHTD projects also took place in 1985 and 1986. West of Quemado (LA 51922), a small hearth area with associated ceramics was tested and found to contain Navajo sherds (Oakes 1986). It produced an uncorrected radiocarbon date of A.D. 1560 ± 90. A small Pueblo I artifact scatter (LA 8063) was also examined on this project. Hannaford (1985) tested LA 8066 (the Quemado site) near Red Hill, a basalt procurement area during Early Archaic times. Fifteen Archaic projectile points had previously been collected by Honea and Benham (1963).

Recently, as part of the ASSAPP project, one additional site along NM 36 was identified as endangered (LA 89148); testing revealed a burial lying within a small pit in the highway roadcut. It was excavated and found to date to the early Pueblo II period. The site is extensive and also contains ceramics and a small roomblock, suggesting an additional Pueblo III occupation (Oakes and Williamson 2001).

Paleoindian Period

The Paleoindian period (ca. 10,000 to 6000 B.C.) is considered a subsistence adaptation mostly dependent on large-game hunting, although the increasing recovery of ground stone implements indicates reliance on wild vegetal foods as well. By the end of the Pleistocene, however, changing environmental conditions saw large mammals gradually disappear to be replaced by modern-day species of bison, deer, elk, bear, etc. As a result, Paleoindian populations apparently shifted to a broad-spectrum subsistence economy, and the Paleoindian period gave way to the Archaic.

The region surrounding Mariano Mesa has not produced much residual Paleoindian materials. Most are isolated projectile points recovered on surveys. However, the heavy alluvial deposition in the area's valley floors may mask potential Paleoindian sites. The sparse number of Paleoindian finds suggests that the area was only sporadically used for hunting, or that the alluvial deposits cover this type of site (Hogan 1985:39).

Kayser and Carroll (1988:3-3) note the presence of several Clovis projectile points (dating from 9500 to 9000 B.C.). Folsom points (8800 to 8300 B.C.) were also found on the edges of playas to the northeast. Cody knives (7000 to 6000 B.C.) have also been recovered, as have Cody Complex points (Scottsbluff and Eden). Honea and Benham (1963) recorded several possible Paleoindian lithic artifacts west of Quemado. A Cody Complex point was found adjacent to LA 48025, a pueblo site (Camilli et al. 1988:2-1). They also noted similar points at LA 37341 and LA 27227 in Nations Draw and west of Zuni Salt Lake. An isolated probable Paleoindian point was recovered near the Hubbell Ranch land (Eck 1982). Hogan (1985:39) recorded a Cody Complex site and several isolated points in this same area. The Quemado Lake area to the south reportedly has a Paleoindian site on Gila/Apache National Forest land, but no data are available.

Archaic Period

Archaic populations may be defined as migratory hunting and gathering peoples who followed a seasonal pattern of efficient exploitation of a limited number of selected plant and animal species within a variety of different ecozones (Schroedl 1976:11). Archaic manifestations are generally present by about 6000 B.C., whereas ending dates may vary from A.D. 1 to 400 because of difficulty in defining the transition to succeeding periods (Oakes 2000:5).

The Mariano Mesa area lies within a posited Archaic interface between the Cochise tradition to the south and the Oshara in the north. Both are mostly characterized by specific projectile point styles found within their respective regions. In this and many other areas, however, there is considerable overlap of the two traditions (Hogan 1985; Chadderdon 1990). Some suggest that the boundary between the two may not actually exist (Elyea and Hogan (1983). It is possible that the traditional concept of Archaic territorial boundaries based on differences in projectile point morphologies may not be an appropriate vehicle for distinguishing cultural entities (Oakes 2000:5-6).

Archaic sites are dated primarily by projectile point styles because datable wood or organic material is rarely recovered. Cochise-type sites dating to the later Chiricahua and San Pedro stages have been fairly frequently recorded in this general area. On the Fence Lake Project, Hogan (1985:7) noted ten sites that may be Archaic. Points found include San Augustin (Chiricahua Cochise), and Bajada and San Jose of the Oshara tradition. Slightly more than half of the 45 points analyzed were Cochise styles. Dates for the points ranged from 5500 B.C. to A.D. 400. Also found were 59 probable Archaic components on sites, and 30 nondiagnostic lithic scatters. He suggests that because of the short-term nature of the sites, the area was not part of a habitually used home range for Archaic peoples (Hogan 1985:40). Eck (1982) recorded four Archaic sites in this area also.

An Archaic site was identified west of Zuni Salt Lake by Camilli et al. (1988:2-1). Also, an Early Archaic basalt procurement area (LA 8066) was recorded by Honea and Benham (1963) at Red Hill, where projectile points dating from 5500 to 3200 B.C. were recovered. Most were Jay and Bajada types of the Oshara tradition. Hannaford (1985) later tested the site but found no cultural features. No Archaic sites in the project area have been dated by absolute means.

Pueblo Period

Basketmaker III

Earliest pueblo sites in the Mariano Mesa region are classified as Basketmaker III (BM III), dating approximately from A.D. 400 to 700. They consist of pit structures arranged individually or in pithouse villages widely dispersed over the landscape. Population size was thought to be low; hunting and gathering accompanied by marginal agriculture was the primary subsistence adaptation. Ceramics utilized at this time include Lino Gray, Alma Brown Wares, and San Francisco Red (Oakes 2000:6).

One of the largest and best-dated sites in the region is Cerro Colorado (LA 25894), a BM III pithouse village of up to 50 structures located high on top of a volcanic remnant of the same name. Fifteen pithouses were excavated by Bullard (1962). Tree-ring dating produced a tight cluster of dates between A.D. 604 and 737 (Robinson and Cameron 1991:22). Before this site was excavated, early investigators had been puzzled by the absence of early Pueblo sites in the region (Danson 1950; 1957).

Other BM III sites have been recorded on survey, but only one has been tested. Bullard (1962:7) notes another large pithouse village at the foot of Tejana Mesa. No site number is given. Two more sites are located at Red Hill (Danson’s 637 and 638). Site 637 is another pithouse village with at least ten structures. Ceramics were mostly Lino Gray, with Alma Plain and San Francisco Red. One early Black-on-white sherd was also seen. Site 638 contains many pithouses with a dominance of Lino Gray, San Francisco Red, but with Fugitive Red also present. Several Black-on-white sherds may indicate a later occupation also.

Oakes (1986:17) tested the area around a small pithouse site (LA 51922) west of Quemado and recovered mostly Lino Gray sherds. On Fischer Ranch, north of Mariano Mesa, Berman (1979:32) lists another BM III site.

Pueblo I

By the subsequent Pueblo I period (A.D. 700 to 900), the population seems to have increased somewhat but remains small and dispersed. Sites themselves are small, usually not reaching over 10 rooms in size. However, along with pithouses and associated jacal structures, small masonry-walled pueblos appear for the first time (Danson 1957). Sites are commonly found on higher ridges in the foothills of Mariano Mesa, on low benches above the plains, and at the base of mesas within the valleys (Hogan 1985:11; Camilli et al. 1988:4-11). Danson (1957) recorded 31 Pueblo I sites near Mariano Mesa, with 29 of them being late Pueblo I extending into Pueblo II. Ceramics on Pueblo I sites include the Alma Brown Ware series, Gray Wares, White Mound Black-on-white, Three Circle Red-on-white, some Red Mesa, Kiatuthlanna, and Puerco Black-on-white. Danson (57:69) notes that there are more gray wares than brown on the west side of Mariano Mesa.

LA 4032 (Site 486) was excavated by McGimsey (1980:4,11) but was badly eroded. One habitation area of slab-lined rooms and several outside firepits was examined. He considered the site to have evidence of extended trading relations because of intrusive sherds (Wingate Black-on-red and Mimbres Bold Face) and shell found on the site. He assigned the site to a Pueblo I occupation of ca. A.D. 850 to 900, based on the presence of Kiatuthlanna and Red Mesa Black-on-white (McGimsey 1980:268).

Pueblo II

Sites increase greatly in size in the Mariano Mesa area by the Pueblo II period (A.D. 900 to1100). In fact, this period has the greatest number of sites and possibly the largest population count. Architecture consists of masonry rooms or roomblocks with units of up to 20 rooms, but most contain two to six rooms (Hogan 1985:11). Many of the numerous one- or two-room structures may be seasonal fieldhouses; Hogan (1985:43) suggests the occupants may have come in from large sites outside of the area. He believes that year-round occupation of these small units did not really become common until ca. A.D. 1050. Construction is usually of basalt but can sometimes be coursed sandstone. Jacal units are also present. Rooms are larger and longer than those found in later sites. Kivas are present and commonly rectangular and fairly deep (Danson 1957:70). Danson (1957:82) also notes that five of the pueblo sites had plazas, but these are not identified.

Danson (1957) recorded 69 pure Pueblo II sites, 29 of mixed Pueblo I and II, and 40 with Pueblo II and III components near Mariano Mesa. He noted that every ridge coming from the mesa had at least one site, and many had six or more; one ridge had 23 sites. Most were small roomblocks but many had eight or more rooms. Kayser and Carroll (1988:8-51) recorded 30 Pueblo II sites on their nearby survey, and 26 more that extended into Pueblo III. Bullard (1962) also notes that Pueblo II sites are dense around the foot of the mesa, along Largo Creek, Frenches Draw, and Nations Draw. Ceramic assemblages were primarily Anasazi but exhibited an increasing variety of trade wares. Pottery included Red Mesa Black-on-white, Escavada Black-on-white, Reserve Black-on-white, Puerco Black-on-white, Gallup Black-on-white, Wingate Black-on-red, and both gray and brown corrugated wares.

The Cox Ranch Pueblo (LA 13681) near Red Hill is an unusually large Pueblo II-III site with approximately 300 rooms. LeBlanc (1989:346) thinks it is possibly a Chacoan outlier because it is multistoried, has a great house and great kiva, and smaller roomblocks. It overlooks Cheap Johns Lake to the west of the project area. One potential Pueblo II site (Danson's 494) was excavated by McGimsey (1980). It is a small, contiguously aligned pair of roomblocks. One contains four rooms with a possible kiva, and the other has eight rooms and a possible kiva. One of the rare burials found in the Mariano Mesa area was a child recovered beneath a room floor. No grave goods were present. McGimsey (1980:229) believes the site is late Pueblo II, based on the simple architecture and dominance of Reserve Black-on-white. However, a tree-ring sample dated to A.D. 1191+ (Bannister et al. 1970) seemed too late to him, but he concedes that it may be an A.D. 1100s site. Given the additional presence of Tularosa Black-on-white (although in lesser amounts), the site would perhaps be best placed in Pueblo III.

Danson's Site 601 is a small, U-shaped, 13-room pueblo of which eight rooms were excavated by McGimsey (1980). It probably dates between A.D. 1000 and 1100 (McGimsey 1980:250). Site 188 is located across a narrow valley from Site 601. It is a two-room jacal unit that produced a cutting date of A.D. 1071; it was also excavated by McGimsey (1980). Another Danson site (LA 48030; Site 617) is Kin Cheops I, which dates between A.D. 1050 and 1150. It is located on the northwest edge of the Mariano Mesa area and is multistoried with a plaza, great house, great kiva, and a road segment. Fowler et al. (1987:169) relate the site to the larger Chacoan system because of these features. Site 481 (LA 31817) extends from Pueblo II to III, and was excavated by McGimsey (1980). Thirty-four rooms were dug plus a pithouse beneath one room floor; a D-shaped kiva was also present on the site. The site produced a cutting date of A.D. 1248.

Pueblo III

This period (A.D.1100 to 1300) saw a decrease in site density but an increase in site size, which indicate population aggregation. However, the aggregation does not seem to be the result of density packing or of overpopulation (Kintigh 1996:139). There are few new sites; most are additions to previous ones. Many of the sites are located on the ridges and foothills of northern Mariano Mesa; some sites are focused on Frenches and Nations Draws. For the first time, there is some aggregation around Los Veteados slightly to the north (Tainter and Gillio 1980:61). Hogan (1985:44) sees this as a gradual abandonment of the lowland areas to areas that are better watered. Early hypotheses also held that the people were moving to these higher areas at Mariano Mesa perhaps because of droughts (Bullard 1962). An examination of the decadal climatic chart shown earlier in this report reveals that moisture was down only slightly than previously, and that sustained periods of moisture were not uncommon.

Sites are either a single large unit or a cluster of several structures. Twenty or more rooms per site is usual, constructed in an L-shaped or U-shaped roomblock. Less common are rooms built on three sides of an open square or plaza. Danson (1957:70) believes this type of construction, plus the presence of walk-in wells within the walls, was perhaps built for defensive purposes. Those few that have this walled-in layout are some of the latest pueblos built in the region. The walls of roomblocks are built with better shaping and coursing than previously. Kivas and great kivas are frequently present (Danson 1957:70) and seem to appear in pueblos of over ten rooms. Ceramics for the period include late Red Mesa Black-on-white, Gallup Black-on-white, Puerco Black-on-red, Wingate Black-on-white, St. Johns Polychrome, and smudged wares. There are also a few Springerville Polychrome, Houck, and Querino Polychrome present. However, brown ware utility sherds outnumber gray wares (Danson 1957:71). Trade of ceramic wares is perhaps more common than trade of marine shell, turquoise, or obsidian, of which there is not much evidence (Kintigh 1996:139).

Danson (1957) recorded 54 Pueblo III sites on his Mariano Mesa survey, and another 37 that had Pueblo II-III components. Site 143 (LA 8112; Hubbell Corner site) had only the large kiva excavated by McGimsey (1980). The site contains five masonry roomblocks arranged in a general semicircle (Fowler et al. 1987:174). McGimsey (1980:16) believes the people from this site eventually moved to Site 616, based on similarities in architecture, room size, and firepit layout. Site 190 (LA 6010; Techado Spring site) is an example of a walled-in pueblo of about 500 rooms with an interior plaza, two kivas, and a walk-in well (Danson 1957:72). The Horse Camp Mill site (LA 10983; Site 616) is another very similar pueblo, again with 500 rooms, of which 22 were excavated, plus three pithouses, a D-shaped kiva, and a walk-in well (McGimsey 1980). Three different styles of wall construction were found on the site: cobbles and unshaped boulders, well-coursed masonry, and a rare wall of shaped adobe bricks (Danson 1957:80). Coursing sometimes alternated between basalt and sandstone slabs. This site is considered to be one of the very last occupied sites of the region, with tree-ring dates of A.D. 1236 to 1286 (Robinson and Cameron 1991:22). Other large Pueblo III sites include LA 48029 (Kin Cheops II), LA 55366 (Tom's Rock Pueblo; Site 625), LA 4995, and LA 44918 (Veteado Pueblo), LA 48039, Cerro Prieto (LA 48656; a possible post-Chacoan system outlier), and New Cox Ranch site (LA 48056). These large pueblos do not seem to be common much before A.D. 1250. By A.D. 1300, the smaller pueblos were definitely on the decline (Kintigh 1996:136).

Fowler et al. (1987) consider Techado Spring, Horse Mill Camp, and Veteado Pueblo to all be contemporary and the last inhabited sites in the area, although Camilli et al. (1988:2-6) note that LA 48031 contains the latest ceramics in the region. The settlement pattern seen on these late Pueblo III sites is similar to that found near Zuni. Kintigh (196:135) notes that sites in both areas are usually located near edges of canyons or ridges and at the bases of mesas. He sees a diversity of settlement types and sizes, however, and asks whether there are different levels of social integration represented. And was there any interaction between the large and the small pueblos? Was there competition between settlements for goods or resources (Kintigh 1996:136)?

Pueblo IV

By the late Pueblo III-early Pueblo IV period (A.D. 1300 to 1600), only a few large pueblos remain in the Mariano Mesa area; however, some possess over 500 rooms. Camilli et al. (1988:2-9) found no sites of this period on the large San Augustine Coal Lease survey in the area. Late pottery types include Klagetoh Black-on-white, late Tularosa Black-on-white, Pinedale Polychrome, Fourmile Polychrome, Glaze A series, and obliterated corrugated. By A.D. 1350, the area was abandoned.

Sites in the project area that extend into Pueblo IV times include Horse Mill Camp, Techado Spring, and Veteado Pueblo. Only Horse Mill Camp has been extensively excavated (McGimsey 1980), and showed evidence of rapid abandonment; i.e., many site goods were left in place.

Athabaskan Period

After pueblo abandonment, numerous Athabaskan occupations of the area are recorded (Thomas 1932; Espinosa 1940; Schroeder 1963). The first Spanish contact in the area occurred in 1539 at Zuni Pueblo; the area at that time was occupied by Apaches and Navajos. One dated Athabaskan site (LA 8063) lies west of Quemado and contains a hearth with an uncorrected radiocarbon date of A.D. 1560 ± 90, plus 16 Navajo sherds and numerous faunal fragments (Oakes 1986). Brugge (1961) reports that a small party of Navajos on the nearby Rio Quemado stole some horses in 1824. Danson (1950:390) records some Athabaskan pottery near an unidentified spring in the project area. Tree-ring dates from the Carrizo Wash area produced 47 samples with a mean tree-ring date of 1586 ± 128.2. One cutting produced a 1535 date (Stokes and Smiley 1966). In the project area, Correll (1976:1-2) obtained possible Athabaskan dates beginning at A.D. 1387 and extending to 1834. Athabaskan groups are known to have occupied the area up to the late 1800s.

Historic Period

The first settlers of the region were mostly sheep ranchers who eventually turned to cattle raising. After enjoying an economic boom in the late 1800s, however, drought and falling cattle prices caused the collapse of the prolific ranching business. Many ranches were abandoned and population decreased. Homesteading began in about 1900, but after a depression between 1918 and 1924, these settlers became subsistence farmers rather than cattlemen (Wozniak 1985:12-28). Gradually they switched to ranching. Today, large ranches sparsely dot the open plains and valleys surrounding Mariano Mesa. The land is used primarily for the grazing of livestock, mostly cattle, and as browse for wildlife. Quemado and Pietown are the only viable communities in the area.

CHAPTER 4

THE BRUSHY PUEBLO SITE (LA 53677)

Introduction

Brushy Pueblo (LA 53677) is a late Pueblo III roomblock situated in the lower western foothills of Mariano Mesa. It consists of a three-room masonry structure, an outside firepit, and a nearby storage pit or work area (Fig. 4). In 1985, the southern part of the site was designated LA 53677 (ARMS site files). When this area along NM 36 was surveyed by the NMSHTD in 1987, the site was instead thought to be an extension of the much larger Hubbell Corner site (LA 8112), so the designation was changed (Marshall and Nelson 1987). Another NMSHTD survey (Levine 1995) maintained these same boundaries as included within LA 8112. OAS operated under this site designation when it first visited the site in 1998 for its potential qualification as an Endangered Site under the Archaeological Site Stabilization and Protection Program. However, during subsequent excavation of the site, a reconnaissance survey of the surrounding area revealed that the site was separated from Hubbell Corner (LA 8112) by several hundred meters. Therefore, the original designation of LA 53677 was used for the site.

On the first OAS visit in 1998, it was noted that most of the site area had been mechanically bladed and now served as a pull-out along the highway, leaving exposed a cut bank approximately 1 to 2 m high. Within this area, the top of a slab alignment and a partial St. Johns Polychrome ceramic vessel were observed. A subsequent visit several months later revealed that progressive erosion had exposed more of the slab alignment. Permission was granted to test the area for further cultural features.

Testing involved the placement of three 1-by-1-m test pits along the remaining undisturbed portion of the right-of-way. The slab alignment proved to be a slab-lined hearth. Only the upper part of this was examined; the remainder was left intact. Charcoal staining was found in the other two test pits. Fifty-two ceramics and six lithic artifacts were recovered during testing. The ceramics included Tularosa Black-on-white, Reserve Smudged, St. Johns Polychrome, White Mountain Redware, indented and smudged corrugated, and plain gray ware. Based on these finds, it was recommended that a data recovery plan be prepared for the excavation of the remaining, highly unstable, portion of the site (Oakes 2000).

The data recovery program uncovered the remainder of the slab-lined hearth, most of an eroded, shallow storage pit, and about half of a three-room masonry pueblo roomblock, which also extended outside of the highway right-of-way. A total of 862 artifacts were recovered from the testing and data recovery programs (Table 1). Ceramics constituted the majority (74.9 percent) of artifacts found. All artifacts from the project were analyzed.

Site Setting

Brushy Pueblo is mostly within the NMSHTD right-of-way along NM 36 approximately 17.7 km (11 miles)

Table 1. Artifacts recovered from Brushy Pueblo

Artifacts	Room 1	Room 2	Room 3	Hearth	Pit	Disturbed Area	General Site	Testing	Total Count	Total Percent
Ceramics	236	60	37	4	35	10	211	52	645	74.8
Lithic artifacts	38	22	17	1	6	4	94	6	188	21.8
Ground stone	8	3	-	-	-	-	2	-	13	1.5
Miscellaneous	-	-	-	1	-	1	-	-	2	0.2
Fauna	1	-	-	-	10	-	3	-	14	1.6
Total	283	85	54	6	51	15	310	58	862	100.0

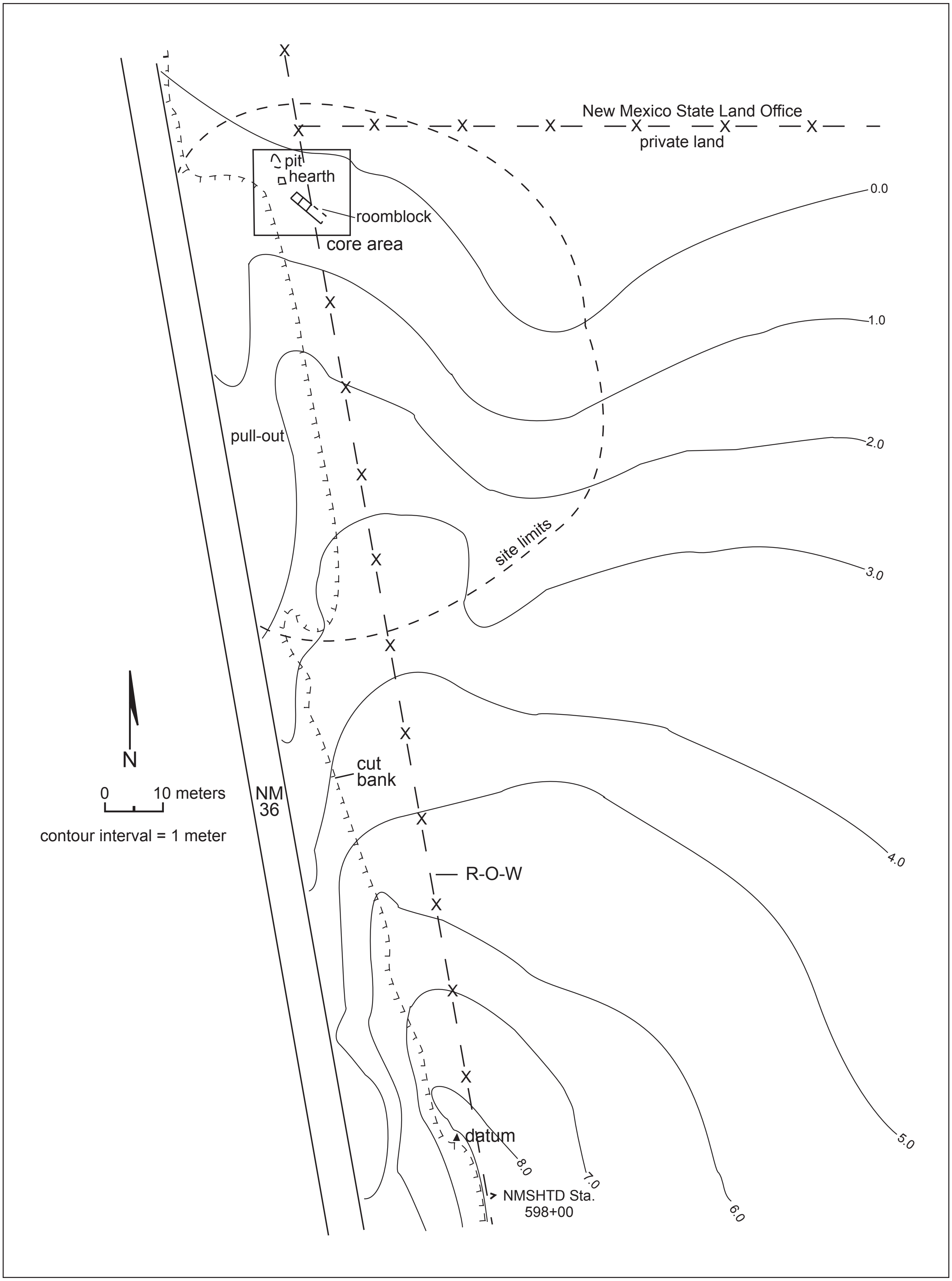

Figure 4. Topographic map of Brushy Pueblo

north of Quemado, New Mexico at an elevation of 2,170 m (7,120 feet). The site is dominated by the steep flanks of Mariano Mesa rising immediately to the east. To the west lie open valleys, alluvial fans, and several prominent volcanic remnants such as Tejana Mesa and Cerro Preto. A small, intermittent drainage runs 20 m north of the site with a spring located about 1.5 km upstream. Vegetation on the site is mostly high grasses with some shrub oak and rabbitbrush. However, piñon and juniper stands begin 50 m to the east as the land rises toward Mariano Mesa.

The site area is 105 m by at least 70 m, covering a total of 7,350 square meters with approximately 35 percent within the existing highway right-of-way. Land ownership beyond the right-of-way fence is private and New Mexico State Trust land, separated by an east-west fence line. It is estimated that 1.5 percent of the site is on State Trust property.

Research Objectives (adapted from Oakes 2000)

Theoretical Perspective

LA 53677 lies geographically within the core area of the supposed Mogollon-Anasazi cultural contact zone. Archaeological sites located south of U.S. 60 have generally been classified as Mogollon, while to the north they are considered Anasazi. However, there is much mixing of gray and brown ware ceramic assemblages in both zones, and there is some stylistic architectural overlap. Identification of the cultural groups occupying this interface is problematic, and several provocative explanations have been suggested.

Ruppe (1953) defines this culturally mixed zone as the Acoma Culture Province. Dittert (1959) later divides it into six subregions, the south edge of which delineate the southern boundary of the Acoma Culture Province. He believes most sites in the area are Anasazi because of the presence of gray wares. Any brown wares are thought to be intrusive, even though brown wares sometimes outnumber gray wares. He concludes that the brown wares were brought to the area by actual migrations of Mogollon populations from the south. Others say that Anasazi populations moved south into this area as well. However, as Stuart and Gauthier (1981) indicate, it would be highly improbable for migration to have occurred simultaneously from both north and south. Tainter and Gillio (1980) present another scenario whereby these populations may be local groups participating in an economic interaction sphere that includes areas to both the north and the south. Tainter's study of burial data to the north in the Puerco area found populations to be homogeneous beginning at about A.D. 750, thus suggesting no migrations of Mogollon people into the area. More burial data are needed before this study can be verified.

Theoretical questions that could have been asked on this project were numerous. Were there separate Mogollon and Anasazi sites within the Quemado area? How can they be distinguished? Are the distinctions valid? Could both cultures have been represented by discrete local populations? Was the blending of cultural characteristics evident only in specific time periods? What were the possible causes of such an amalgamation?

The Mogollon-Anasazi relationship would seem to be critical to an understanding of the Quemado area archaeology. However, the research focus of this project allows for only a limited contribution to the issue because of the limited nature of the site remains within the highway right-of-way.

Research Orientation

Research goals for the small portion of LA 53677 within the highway right-of-way were stated in simple propositions. The primary purpose, under the ASSAPP program, was to preserve whatever data were left by excavation of the remaining site features. The other principal research goal of the data recovery plan was to determine the nature of the possible relationship of the site to the roomblocks at nearby Hubbell Corner (LA 8112). To accomplish this task, the project concentrated on three basic avenues of inquiry: chronological and cultural placement of the Hubbell Corner site and Brushy Pueblo, comparative ceramic analyses of Brushy Pueblo and data from McGimsey's (1980) report on Hubbell Corner, and potential architectural correlates between the two sites. These goals are addressed in the following paragraphs.

Avenues of Inquiry

Chronological and cultural context. Determining the date of occupation for Brushy Pueblo was essential to establishing possible cultural continuity between this area and the Hubbell Corner site. Although several chronometric indices were potentially usable, only dendrochronology and radiocarbon techniques were available to produce absolute dates. Charcoal, wood, and organic samples were taken from burned areas and surfaces in order to obtain datable material. Diagnostic ceramics were also used to provide relative dates for the site.

In order to establish cultural identity, specific diagnostic traits were examined. There are certain characteristics that show up in this area that are usually considered to be Mogollon in nature. Broadly, these include the use of brown ware ceramics, square kivas, and masonry structures. Anasazi characteristics are identified by gray ware pottery, round kivas, and adobe structures. Normative archaeology implies that if the greater number of traits present on a site match one of the cultural groups, then the site is placed within that group. This simplistic approach virtually ignores the less dominant assemblage and offers no explanation for the mixture.

In this region of possible Mogollon-Anasazi blending, explication of this duality of cultural diagnostics was sought by examining a number of possibilities, such as: (1) there were migrations of people from both areas meeting at the same time in this frontier zone; (2) the people were of one group but adopted traits of the other for political or socioeconomic reasons; (3) a local population selectively adapted cultural characteristics of areas to both the north and the south, perhaps through marriage ties.

Comparative ceramic analyses. A goal of the data recovery plan was to determine if Brushy Pueblo was part of the much larger Hubbell Corner site. Because no absolute dates were available for Hubbell Corner, associations were based primarily upon a comparison of the ceramic assemblages. All sherds from Brushy Pueblo were typed and numerous attributes monitored. In addition to standard OAS analytical procedures, it was also documented whether the ceramics present were derived from Mogollon or Anasazi cultures in order to provide data for the examination of the relationship between the two. Other excavated sites in the region that date to this same time period were also used as sources of comparative ceramic data.

Architectural correlates. Site structure at Brushy Pueblo was compared to that at Hubbell Corner in terms of types of building materials used, style of hearths, placement of features on the site, and any architectural anomalies. A literature search of extant reports was also conducted for comparative site structure data.

Subsistence adaptations. A determination of the subsistence adaptations of the site occupants was not possible because of the low number of subsistence resources recovered, even though food processing occurred on the site. Macrobotanical and palynological samples were obtained but analysis produced limited results.

An attempt was also made to determine length of site occupation based on an examination of the site structure, the limited resources recovered, and artifact analysis.

Excavation Procedures

Prior to the excavation of the site, Brushy Pueblo was mapped with a total station. A main datum was established and a 1-by-1-m grid system was laid out over the site. The main datum intersected the north-south and east-west baselines. Grids were designated by north and east coordinates of their northwest corners. Elevation was taken of grids on the site with the total station, producing a topographic map of the site area.

Hand tools, including shovels, trowels, picks, brushes, and soil augers, were used exclusively to excavate the site. All excavations took place within the 1-by-1-m grid system, and soil was removed in natural levels. Excavation began with the surface stripping of the site, beginning at the northernmost edge and proceeding south (Fig. 5). Exposed grids that revealed the potential for cultural features, either by staining or architectural presence, were then expanded to determine the full extent of the remains. Note that excavations were also conducted to the south (Fig. 5) on the top of the knoll where several artifacts had been observed during testing. They were determined to be from a site located to the southeast of Brushy Pueblo.

Fill on the site consisted of a very sandy loam, which was screened through 1/4-inch mesh. Few small lithic flakes were observed and, therefore, 1/8-inch screening was not used. All grids were excavated until culturally sterile soil was reached and no further cultural material was recovered. Auger probes confirmed that sterile soil had been reached. None went below 70 cm in depth. A Munsell scale was used to record soil color for each excavation unit, which was generally a 7.5 YR 4/4 (Brown).

All artifacts were collected and their location recorded by grid provenience and level. Artifacts recovered from utilized and/or floor surfaces were mapped in place and collected separately. All features found were photographed and plans and profiles drawn. Samples for radiocarbon, dendrochronological, macrobotanical, and palynological analysis were taken from the features encountered.

At the end of excavations, NMSHTD District 6 personnel from Quemado backfilled the site with a mechanical blade, leaving the roomblock intact (Fig. 6). A total of 172 (1-by-1-m) grids were excavated, with another 22 grids surface collected. Mean depth of excavation units was 0.26 m, for a total of 44.7 cubic meters of soil removed by hand.

Cultural Features

As stated above, stripping of the site surface proceeded from north to south; areas of artifact concentrations or

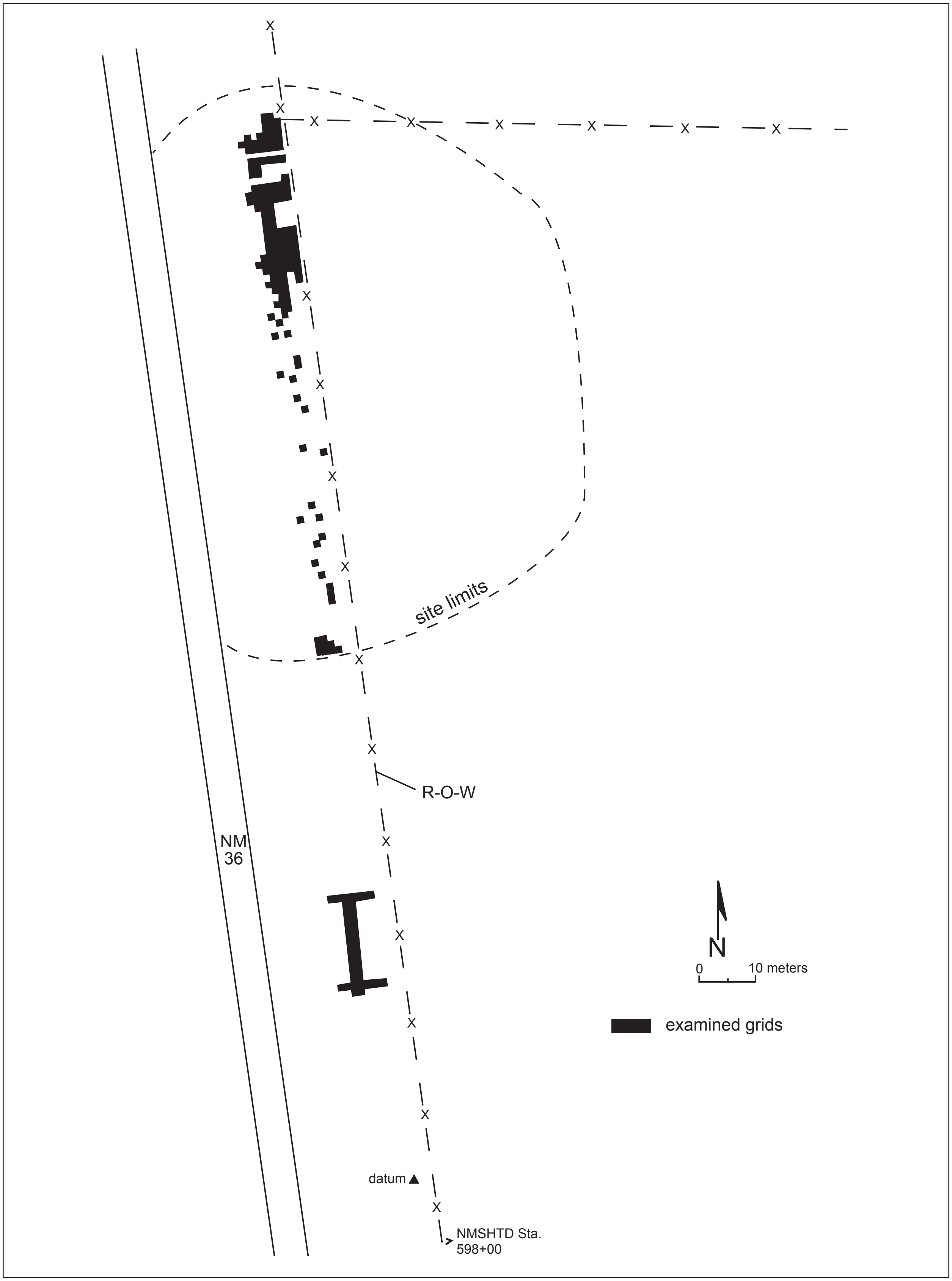

Figure 5. Location of excavated grids

Figure 6. Roomblock in the process of being backfilled

soil staining were investigated as they were uncovered. Three cultural features were thus found, and an area of disturbance also noted (Fig. 7). It is believed, based on their placement on the same ground surface, that the three features are contemporaneous. No burials were found on the site, which is not uncommon for the region (McGimsey 1980:16).

Exterior Hearth

This feature was located on the remaining western edge of the site, and was eroding out of the cut slope. It consisted of a rectangular slab-outlined hearth of which only a portion was visible when the site was first visited (Fig. 8). The hearth area was tested to determine its exact nature and then fully excavated during data recovery. It was located 5.5 m northwest of the roomblock, and measured 40 cm by 52 cm by 17 cm deep. The slabs were of sandstone, and averaged 4 cm thick and 16 cm high. The bottom of the hearth consisted of hardened, burned soil. Soil within the hearth had been dug out to a depth of 5 cm below the ground surface. The hearth fill consisted of a bottom layer of dark gray ash covered with site soil that had apparently blown in. A 19 cm by 12 cm flat slab was lying on the ground surface 10 cm from the hearth. It may have been used as a comal or as a warming stone. There was slight charcoal staining of the surface immediately west of the slab. Within the hearth fill were four sherds, including two of undifferentiated Cibola White Ware, two sherds of St. Johns Polychrome (one of which may match a broken bowl in Room 2), a ground stone fragment, and a polishing stone. A flotation sample was taken from the hearth. The dense ash fill of the hearth was not datable radiometrically.

Exterior Pit

A shallow pit was uncovered 3.5 m northwest of the hearth. The complete western edge and part of the southern had eroded away due to its orientation on the cut slope. The pit measured 1.7 m by 74 cm by 21 cm deep, forming an elongated saucer shape (Fig. 9). It may have been deeper but erosion was very heavy in this area. The bottom of the pit displayed slight to moderate charcoal staining; the sides retained only small bits of charcoal flecking. Within the pit were found 35 sherds of seven different types (one partially restorable vessel), five lithic artifacts, one possible polishing stone, and 10 pieces of non-human bone (one burned). A radiocarbon sample was recovered from the floor and the soil immediately above it. The function of the pit could not be determined: it could have been for storage, or served as an outdoor, shaded work area. Another radiocarbon sample was taken from the lower fill of the pit.

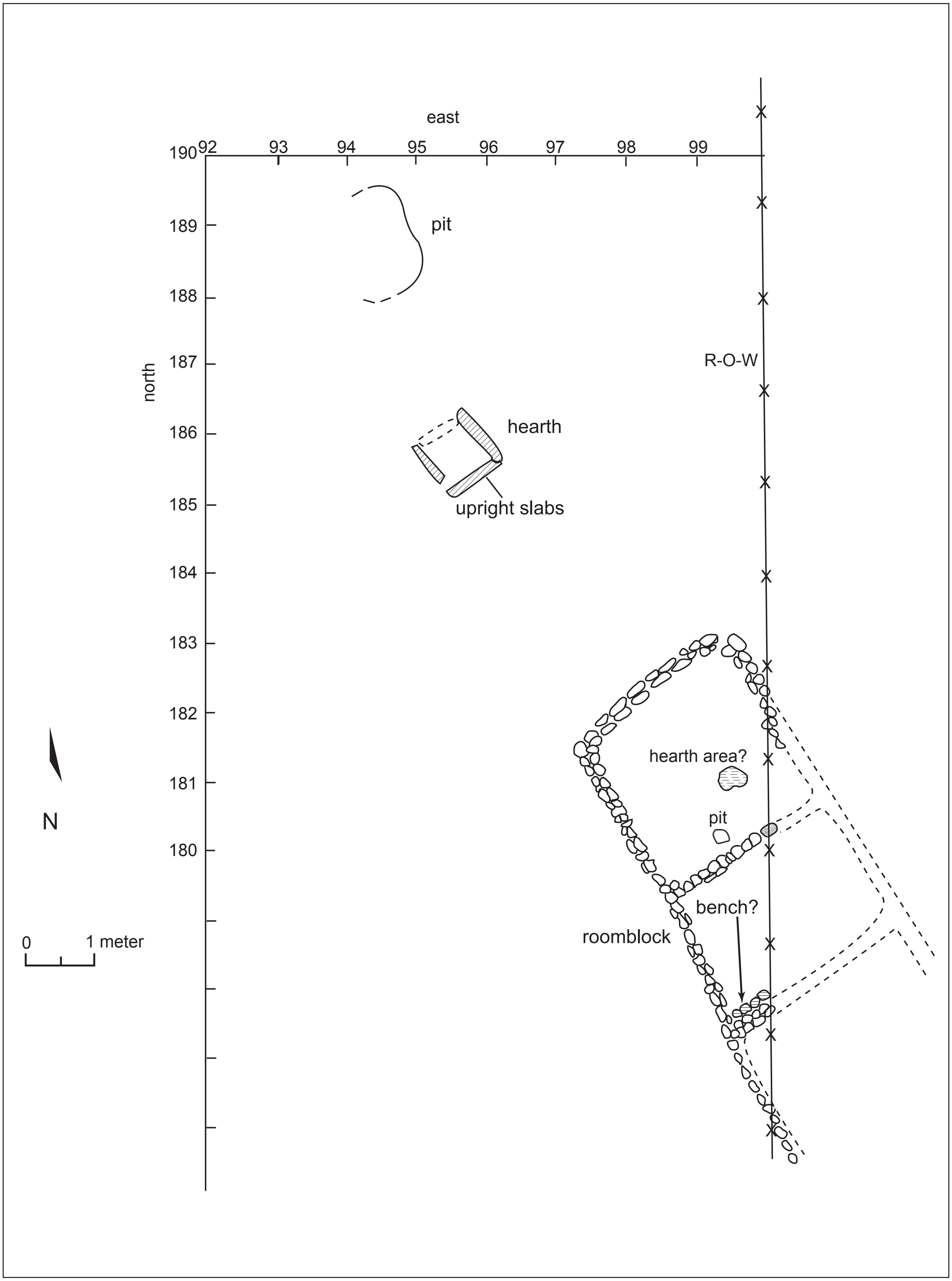

Figure 7. Site map of Brushy Pueblo

Figure 8a. Hearth with roomblock in background

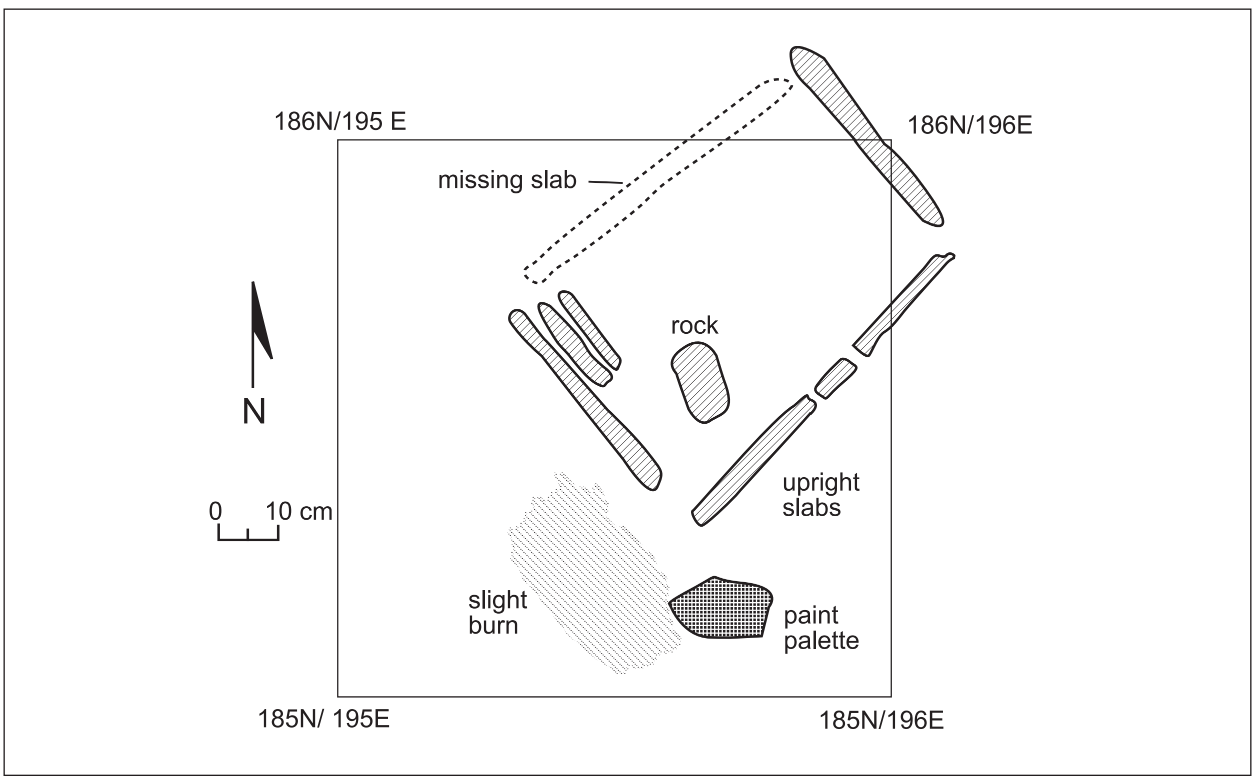

Figure 8b. Plan of hearth

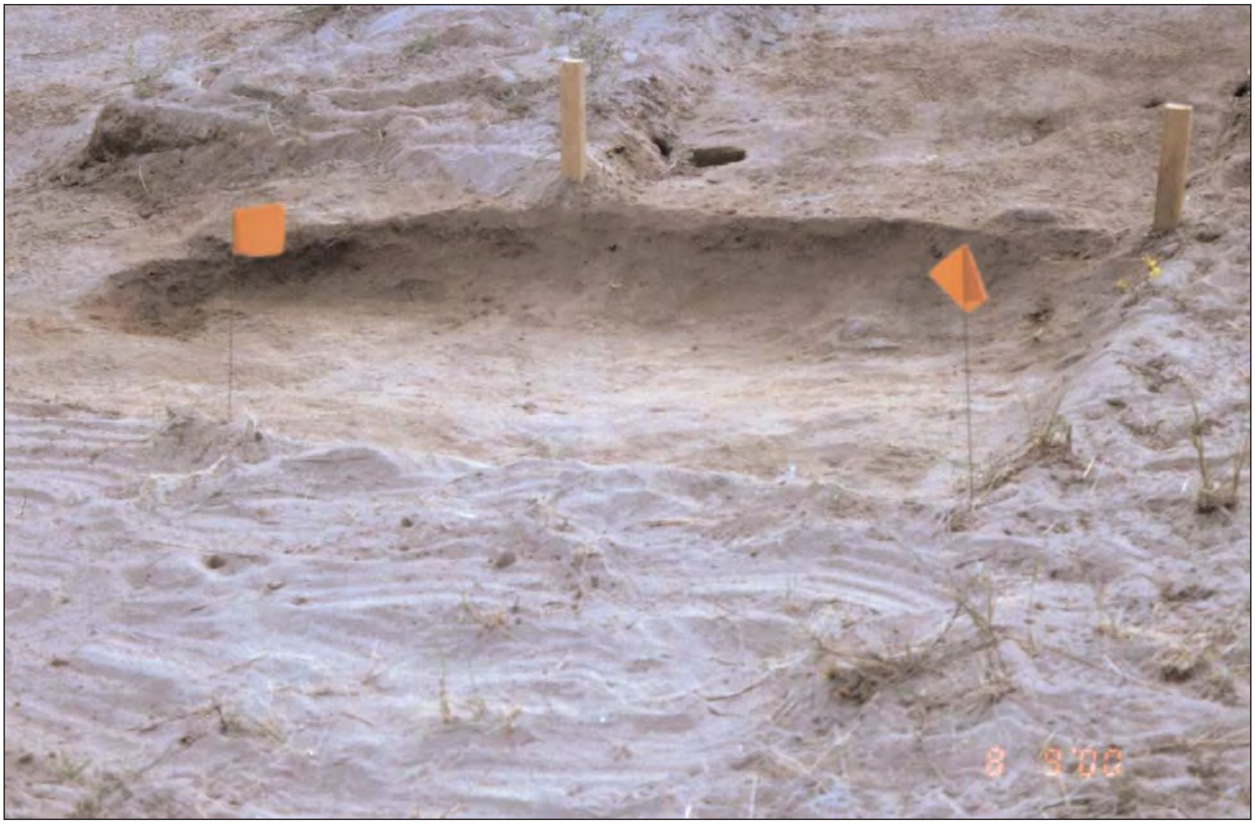

Figure 9a. Shallow pit or work area

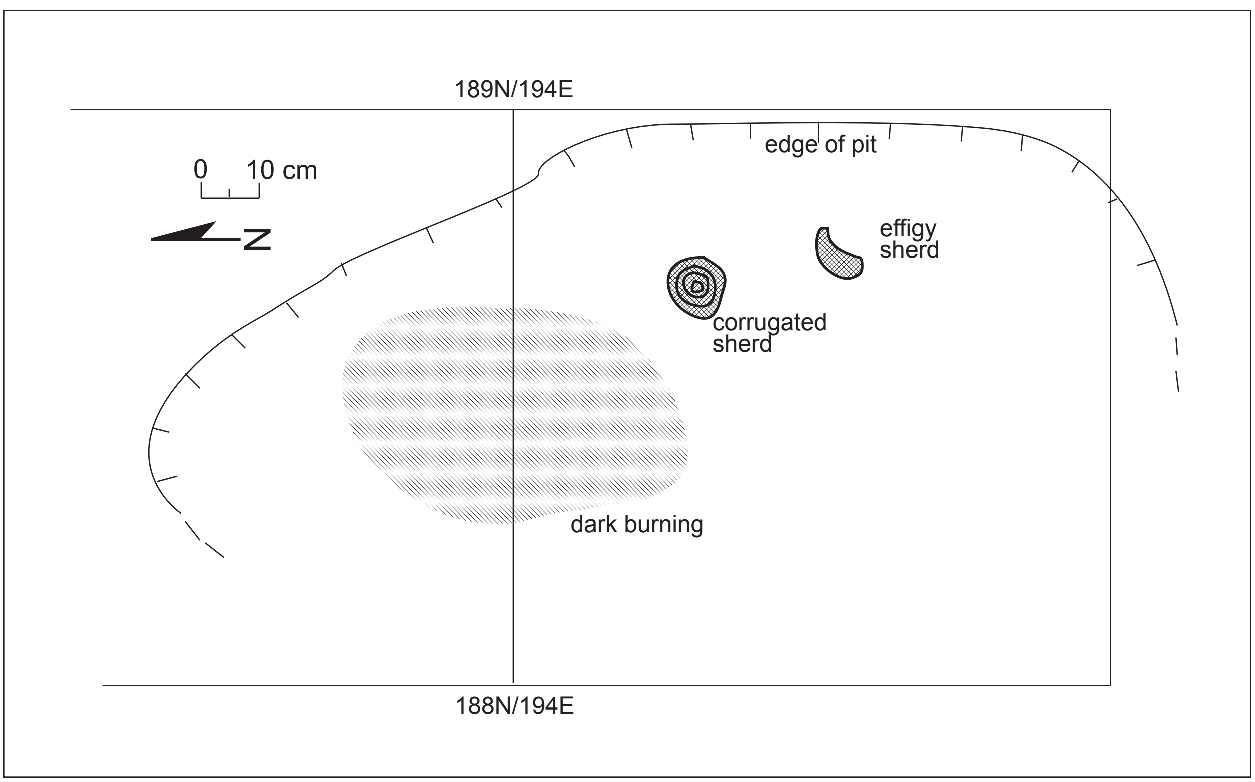

Figure 9b. Plan of pit or work area

Figure 10a. View of roomblock, facing southeast

Figure 10b. View of roomblock, facing north

Roomblock

This feature was not visible on the site surface prior to data recovery. It was discovered through surface stripping, which exposed a corner of the masonry roomblock. Excavations then proceeded to define the outside walls of the structure. Once these were outlined, interior cross-walls were uncovered through the excavation of 10-cm levels of interior fill. As a result, the roomblock was found to contain three rooms, and work continued by room proveniences. It was also discovered that about half of the roomblock extended outside of the highway right-of-way. This portion was not excavated. The entire length of the north wall was uncovered, as was most of the longer west wall, yielding a dimension for the roomblock of 7.3+ m by 3.0 m, or 21.9 square meters (Fig. 10). Interior rooms varied in size from 3.0 m by 2.8 m (8.4 square meters) for Room 1, to 3.0 m by 2.2 m (6.6 square meters) for Room 2. Room 3 was projected to be at least 3.0 m by 2.5 m (7.5 square meters).

Interior room fills yielded no stratigraphy as the excavation continued. Artifacts were, therefore, recovered by either upper or lower level provenience within rooms. Depth of fill within rooms ranged from 51 to 54 cm below ground surface.

Walls of the roomblock were of masonry, but exhibited some slight differences between rooms. Room 1 had the best constructed walls, which consisted of coursed sandstone blocks interspersed with smaller rocks and mud mortar (Fig. 11). Walls stood to a maximum height of 50 cm, with the lowest at 14 cm. Mean width of walls was 25.5 cm. In Room 2, walls contained more mud mortar than Room 1 walls, with consequently fewer rocks (Fig. 12). Room 3 walls were similar to Room 2 walls. No plastering was evident on any of the interior wall faces. Mud plastering was only evident in Room 2 along the west interior wall and near the northeast corner. All walls were built directly on the ground surface; there were no footings.

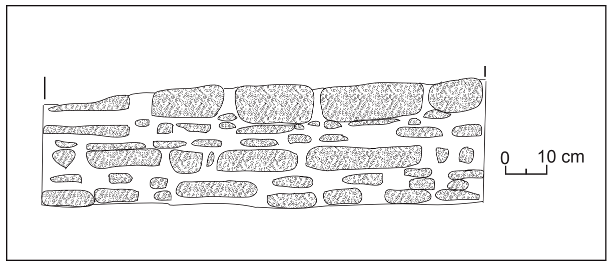

Figure 11. Portion of south wall of Room 1, showing coursing

Figure 12. Stack of rocks against south wall in Room 2

The floor throughout the roomblock was compacted soil with very little charcoal staining. Disturbance by roots and rodents was heavy. Only two features were found on the roomblock floor. A small amorphous pit (20 cm by 15 cm by 12 cm) located near the south wall in Room 1 contained a deer humerus. A charcoal-stained area a little south of center may have been the locus of an expediently placed hearth (see Fig. 7). It measured 22 cm by 19 cm. Within the lower fill of Room 1 were found a two-hand mano and a small slab metate. They likely were present on the roof of the structure prior to its collapse. No roof beams were found, however. A carbon-14 sample was taken from the floor.

Room 2 contained an anomalous stacking of rocks against the south wall, which may have served as a low bench or could have been a fortuitous result of wall fall (Fig. 12). No artifacts were associated with it. However, the fill of the room contained three two-hand manos. A radiocarbon sample was obtained from the lower fill within the room. Room 3 was barely within the highway right-of-way. The possibility of floor features is unknown.

There were a total of 422 artifacts within the rooms (see Table 1), 48.9 percent of the total site assemblage. The lack of floor artifacts and generally low counts within room fills suggest that the pueblo rooms had been cleaned out at abandonment. Little left behind at abandonment is, apparently, a characteristic feature of late Pueblo rooms in the Quemado area (McGimsey 1980:16).

Disturbed Area

An area along the fenceline near the north end of the site had unusual depth of cultural fill compared to the rest of the site. Excavations reached 44 cm below ground surface before cultural material was no longer present. Artifacts were low in count but did extend throughout the fill. Charcoal flecks were occasionally present. Portions of undisturbed edges were found but were uneven and did not make a consistent outline. It was eventually determined that the replacement of several fence posts and placement of heavier fencing in this area were responsible for the soil disturbance.

Dating of the Site

Brushy Pueblo was dated by radiocarbon assays and ceramic cross-dating. A dendrochronological sample produced no date. Ceramics in the area were a blend of Mogollon and Anasazi traditions, and the decorated sherds (both black-on-white and red wares) defined a time frame fairly accurately because of their limited periods of use. It can be stated, therefore, that the ceramics on the site indicated a late Pueblo III occupation, which is consistent with the results of the radiocarbon analyses. Four samples were analyzed: one each from Room 1 floor, Room 2 fill, the disturbed area, and the pit structure. C13:C12 ratios were calculated for the samples, and the dates have all been corrected and calibrated (Fig. 13). Three samples received extended counting; the fourth (from the disturbed area) proved to be modern and was not used.

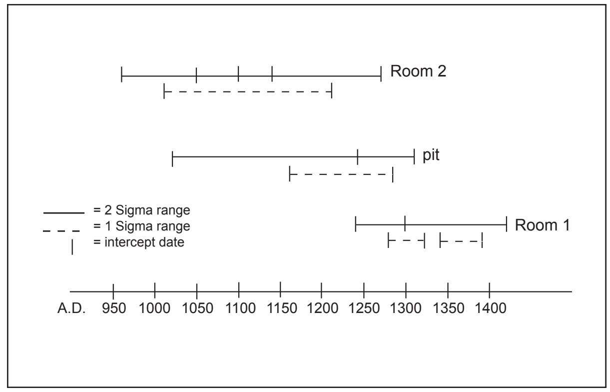

Figure 13. Radiocarbon dates for Brushy Pueblo

The date for Room 2 is too early for the ceramics on the site and is believed to be the result of old-wood use by the site occupants. However, the sample from Room 1 produced a date that seemed to be excellent for the site, matching the ceramic data. The other date for the pit unit is slightly earlier and its retrieval from a shallow depth possibly allowed for contamination. Ceramics from this feature correlate with those found within the rooms, making this unit very likely contemporary with the roomblock. Although no date was obtained for the hearth, it too contained late Pueblo III sherds and should correspond in time with the roomblock. In conclusion, a date of A.D. 1300 seems appropriate for Brushy Pueblo. This is one of the latest dates obtained within the region, falling at the interface between the Pueblo III and Pueblo IV periods.

A total of 573 sherds were recovered during excavation of LA 53677. Data recorded during the analysis of these sherds included typological categories associated with both Anasazi and Mogollon pottery traditions, as well as attribute categories including temper, vessel form, surface manipulation, and paint type.

CHAPTER 5

CERAMIC ANALYSIS

C. Dean Wilson

Ceramic Traditions and Types

Pottery from LA 53677 represented a mixture of types associated with traditions and wares indicative of resources and technologies from areas in the southern Colorado Plateau where LA 53677 is located, as well as from the Mogollon Highlands just to the south (Table 2). While pottery types defined for the Mogollon Highlands are limited to brown utility wares, a surprisingly large portion of the pottery examined represented types of this tradition. Pottery exhibiting characteristics indicative of production in the southern part of the Colorado Plateau included Cibola Gray Ware, Cibola White Ware, and White Mountain Redware.

Table 2. Distribution of ceramic types

Type	Count	Percent
Plain gray rim	1	0.2
Unknown gray rim	1	0.2
Plain gray body	3	0.5
Indented corrugated	33	5.8
Plain corrugated	4	0.7
Smeared plain corrugated	1	0.2
Alternating corrugated	3	0.5
Smeared indented corrugated	2	0.3
Unpainted polished white	54	9.4
Mineral painted undifferentiated	65	11.3
Reserve Black-on-white	1	0.2
Tularosa Black-on-white	81	14.1
Reserve/Tularosa (undifferentiated)	10	1.7
Klagetoh Black-on-white	1	0.2
Snowflake Black-on-white	1	0.2
Indeterminate painted White Mountain Redware	39	6.8
St. Johns Black-on-red	15	2.6
St. Johns Polychrome	1	0.2
White Mountain Red unpainted	6	1.0
Springerville Polychrome	1	0.2
Jornada Clapboard	1	0.2
San Francisco Red	2	0.3
Alma Plain rim	9	1.6
Alma Plain body	18	3.1
Reserve Plain/Indented Corrugated	12	2.1
Reserve Indented Corrugated	98	17.1
Reserve Indented Corrugated Smudged	61	10.6
Reserve Plain Corrugated	33	5.8
Reserve Plain Corrugated Smudged	5	0.9
Reserve Smudged	9	1.6
Tularosa Patterned Smudged	1	0.2
Plain Smudged with red slip	1	0.2
Total	573	100.0

Mogollon Brown Utility Wares

These sherds represented 43.5 percent of all the pottery or 83.8 percent of all utility wares, and thus were the largest ceramic group identified. Mogollon brown wares have pastes of self-tempered, volcanic-derived clays with high iron content common throughout the Mogollon Highlands. Brown ware pastes consistently fire to yellow-red or red colors when exposed to a controlled oxidization atmosphere. In addition, the majority of brown wares contain temper dominated by small, angular volcanic rock and sand particles. This combination of temper and paste represents the utilization of alluvial and pedogenic clays commonly available in the Mogollon Highlands south of Mariano Mesa. Similar clays and pastes are represented in components associated with the entire Mogollon occupation.

Pottery exhibiting such pastes was assigned to various Mogollon brown wares based on differences in surface textures with known temporal significance. Type categories applied during this analysis represent a combination of descriptive and formal types used in various investigations (Haury 1936; Rinaldo and Bluhm 1956; Fowler 1985; Mills 1987; Kayser and Carroll 1988).

Plain utility wares exhibiting plain polished surfaces without slips or other decorations were classified as Alma Plain rim and Alma Plain body. Plain brown wares are the dominant form in the earliest ceramic occupations of the Mogollon Highlands in all but the latest Pueblo period occupations (Wilson 2001). Similar plain sherds with a red slip on at least one surface were assigned to San Francisco Red.

Plain smudged brown wares were sherds with similar pastes and temper as plain brown ware, but with interior smudging. Plain smudged brown wares include sherds with a plain exterior surface, and a distinct deposit of soot on the interior surface. Plain smudged sherds were assigned to a particular type category based on the presence of slip and surface textures. Plain smudged types identified during the present study included Reserve Smudged and Plain Smudged with red slip. These types tend to be most common during late Pueblo period occupations in the Mogollon Highlands.

Figure 14. Reserve Smudged Corrugated bowl

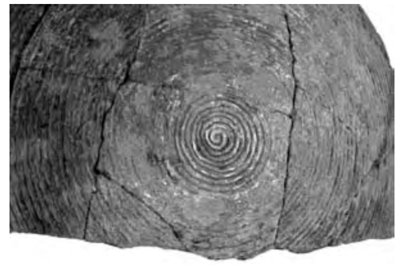

Figure 15. Bottom of Mogollon Brown Corrugated ware

The remaining brown ware sherds were assigned to a series of corrugated types based on characteristics of surface texture and the presence of interior smudging (Wilson 2001). Corrugated types identified included Reserve Plain/Indented Corrugated, Reserve Indented Corrugated, Reserve Indented Corrugated Smudged, Reserve Plain Corrugated, Reserve Plain Corrugated Smudged (Figs. 14 and 15), and Tularosa Patterned Smudged. The corrugated forms appear some time during the Pueblo period (A.D. 1000), and become more common during the later part of this period. Corrugated forms are the most common brown utility ware only during the late 13th and 14th centuries.

Cibola Gray Wares

Cibola Gray Ware types represented 8.3 percent of the sherds or 16.2 percent of all utility wares. Cibola gray wares have white to gray pastes and lack polished or painted decorations (Gladwin 1945; Goetze and Mills 1993; Toll and McKenna 1997; Windes 1997). Gray ware sherds were placed into types based on temporally sensitive surface manipulations. These types were defined using descriptive terms rather than specific Chaco or Cibola type names.

A few sherds were unpolished and completely smooth on both surfaces. Such pottery is largely equivalent to Lino Gray as defined in other studies. As plain rim sherds have a shorter temporal duration than plain body sherds, which may derive from the portions of vessels associated with a variety of types, rim and body sherds were assigned to distinct categories. Plain gray rim refers to rim sherds that appear to have derived from the upper portion of plain gray ware vessels. Unknown gray rim refers to small sherds that may have originated from a plain vessel or portion of a fillet on a neckbanded or corrugated vessel. Plain gray body includes all unpolished gray body sherds. This type commonly occurs at sites dating to all Anasazi occupations, but is the dominant type at sites dating to the Basketmaker III and Pueblo I periods. Such sherds could have originated from Lino Gray vessels as well as from the lower portions of neckbanded, neckcoiled, or corrugated forms.

Most of the gray ware sherds exhibited corrugated, thin overlapping coils often covering the entire vessel surface. Such pottery is also commonly decorated by patterns resulting from regularly spaced indentations along the coils. Corrugated pottery was separated into types based on the form associated with the manipulation of the coils. Corrugated gray ware types recognized during the present study include indented corrugated, plain corrugated, smeared plain corrugated, smeared indented corrugated, and alternating corrugated.

Cibola White Ware

Cibola White Ware sherds represented 37.2 percent of all pottery and 77.7 percent of all decorated pottery from LA 53677. Cibola White Wares are characterized by light pastes, sand and/or sherd temper, polished surfaces, and designs executed in mineral paint.

White ware sherds for which the specific style could be determined were assigned to a descriptive category. Unpainted Polished White refers to unpainted sherds with at least one polished surface. Such sherds could have derived from the unpainted portion of most Cibola White Wares. Mineral painted undifferentiated refers to sherds with decorations in mineral paint not indicative of a particular type.

All sherds assigned to specific white ware types appear to reflect late forms most common in the southernmost part of the Cibola region. While most of the sherds exhibit styles associated with the Tularosa phase, a few sherds exhibiting slightly earlier styles were assigned to Reserve Black-on-white. This type is similar to later southern Cibola White Ware types, but decorative styles differ slightly from the majority of pottery from later Tularosa phase components. Vessel walls tend

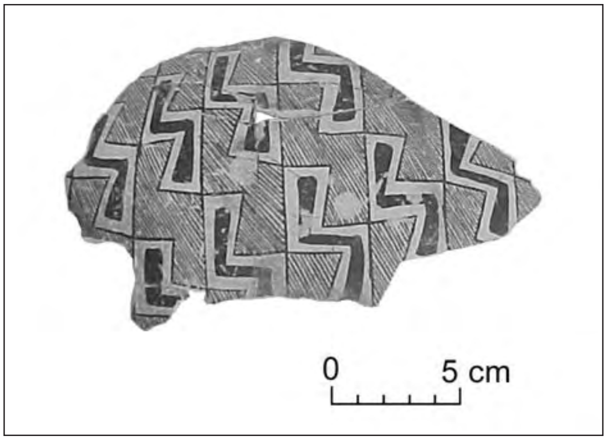

Figure 16. Tularosa Black-on-white vessel

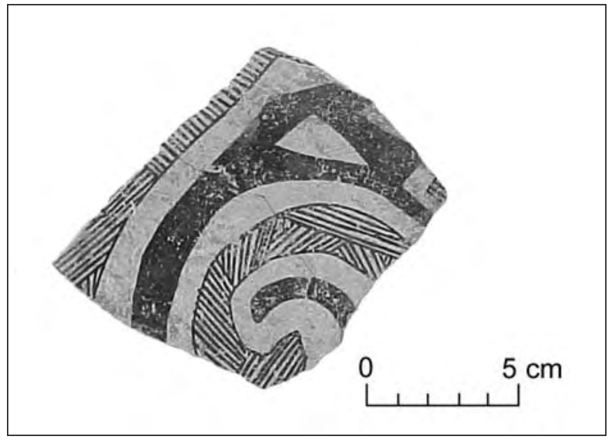

Figure 17. Tularosa Black-on-white sherd

to be relatively thin when compared with later types. Reserve Black-on-white vessels are commonly decorated with opposed solid and hatched elements. Hatched elements are often wider than solid elements. These elements include triangular, rectilinear, and curvilinear shapes. Solid design elements include scrolls, narrow band lines, triangles, and sawteeth. Design elements are relatively large, particularly when compared with those noted for Tularosa Black-on-white. In addition, spacing between hatched lines is relatively wide. All-over layouts are most abundant, although banded layouts are also fairly common. Given the common occurrence of Reserve Black-on-white at early Pueblo assemblages, there was a tendency to place some sherds exhibiting only solid or hatched designs into this type.

Tularosa Black-on-white pottery is similar to Reserve Black-on-white but exhibits later painted styles and manipulations (Figs. 16 and 17). Surfaces tend to be well polished and are often slipped. Slipped surfaces are often pearly white and tend to exhibit a crackled finish. Vessel walls are relatively thick. Compared to earlier types, Tularosa Black-on-white designs tend to be small and well-executed. Designs include interlocking hatchure and solids with rectilinear patterns more common than curvilinear. Hatched lines tend to be thin, more closely spaced, and line work appears to be finer than that in earlier Cibola White Wares. Unlike other Cibola White Wares, hatched lines are usually oriented longitudinally. Hatched portions tend to be smaller in size than other Cibola White Wares, and are more equally balanced in proportion to the solid elements. Painted designs tend to cover much more of the total vessel surfaces than later types, often creating striking effects.

Sherds with styles and manipulations indicative of items derived from either Reserve or Tularosa Black-on-white were categorized as Reserve/Tularosa (undifferentiated).

Snowflake Black-on-white pottery covers a wide range of decorations (Fig. 18). The most useful definition of this type refers to the use of bold, solid, and stepped elements. These elements are usually attached to the end of broad rectilinear bands. Klagetoh Black-on-white represents another rare late type of pottery that exhibits many of the characteristics common on late forms of Tularosa Black-on-white, such as thick vessel walls and crackled slips. Design elements are similar to those described in Tularosa Black-on-white but tend to be larger with thicker lines and wider spaces between lines and elements (Mount et al. 1993).

White Mountain Redware

White Mountain Redware types represented 10.8 percent of all sherds and 22.6 percent of the decorated sherds. White Mountain Redwares appear to represent a specialized tradition that appeared during the late Pueblo II period in the Upper Little Colorado drainages. White Mountain Redwares represent one of the most

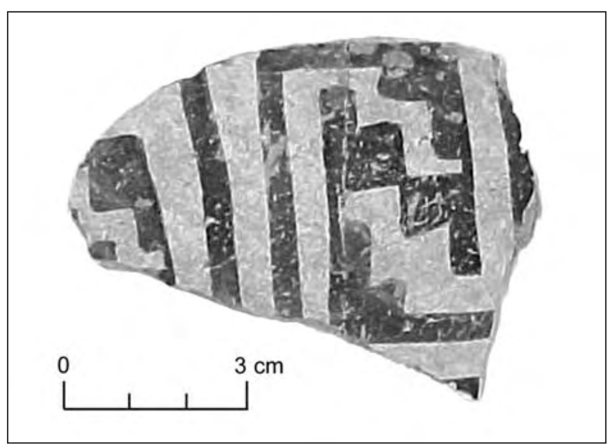

Figure 18. Snowflake Black-on-white sherd

Figure 19. St. John's Black-on-red bowl sherd

widely distributed pottery traditions, and are found at sites throughout much of the Southwest (Carlson 1970). They are characterized by a light paste, sherd temper, and dark red slip. Surfaces are well polished. Painted decorations are executed in a sharp black mineral or organic paint, and later with glaze paint sometimes in combinations with decorations in white clay.

Painted White Mountain Redware sherds not displaying distinctively painted designs indicative of previously defined formal types were classified as indeterminate painted White Mountain Redware, whereas those not displaying any designs were assigned to White Mountain Red unpainted. St. Johns Black-on-red contains bright red to red-orange slips (Fig. 19). Designs are similar to those described for Tularosa Black-on-white and include interlocking opposed solids and fine hatchure. Similarly decorated bowls with the addition of wide designs in white clay paint on the exterior surface were assigned to St. Johns Polychrome. A single sherd exhibiting a black mineral paint outlined with a clay paint on a single surface was classified as Springerville Polychrome. Springerville Polychrome refers to pottery exhibiting manipulations and designs as noted in St. Johns Polychrome but with both white and black paint on bowl interiors and jar exteriors.

Examination of Ceramic Trends

Distributions of pottery types and attribute categories provide important clues concerning the time of occupation of LA 53677. Other trends examined include the influence of and exchange with surrounding areas, and the use of ceramic vessels in various activities.

Ceramic Dating

Despite the small number of sherds recovered, a large number of types belonging to several Anasazi and Mogollon wares and traditions were identified. While plain ware sherds were represented by both Anasazi gray and Mogollon brown utility wares, the great majority (89.6 percent of the gray wares, and 84.3 percent of the brown wares) were represented by corrugated forms. Corrugated pottery was represented by a wide range of treatments, including plain corrugated, indented corrugated, smeared corrugated, alternating corrugated, and patterned corrugated exteriors. Cibola White Wares are exclusively later (Tularosa phase) types, and include Reserve Black-on-white, Tularosa Black-on-white, Klagetoh Black-on-white, and Snowflake Black-on-white. White Mountain Redware types identified included St. Johns Black-on-red, St. Johns Polychrome, and Springerville Polychrome.

Together, this combination of types appears to represent an assemblage dating to the Late Tularosa phase, probably during the 13th century. The Tularosa phase or horizon is often viewed as a time of population increase and elaboration of traits out of both Reserve phase occupations in the northern Mogollon Highlands and the Late Pueblo II and Early Pueblo III periods of the southern Cibola region of the Colorado Plateau (Martin and Plog 1973; Berman 1979; Kayser and Carroll 1988; Lekson 1996). This horizon is mostly defined by the widespread distribution of similar Tularosa Black-on-white pottery in widely scattered areas of west-central New Mexico and east-central Arizona. Tularosa phase occupations scattered over a very wide area are characterized by the presence of most of the types noted at LA 53677, even if their overall frequency may vary significantly across space.

Extensive investigations conducted during the Gila Expedition by Harvard University in the 1950s indicated a large population that resided in several settlements from about A.D. 1000 to the mid-1200s (Danson 1957; McGimsey 1980). Differences in the analytical categories and conventions used during analysis of the large amounts of pottery recovered during excavations by the Gila excavations limit the types of comparisons that can be made based on this data (McGimsey 1980). However, examining these reports in conjunction with pottery illustrations indicates that many, if not most, of the assemblages recovered during the Gila Expedition were very similar to that noted at LA 53677. Assemblages indicative of occupations during the Late Tularosa phase appear to dominate the large pueblo villages at Mariano Mesa (McGimsey 1980). In fact, this site was initially thought to be an extension of nearby Site 143, as described during the Gila Expedition

(Marshall and Nelson 1987; Levine 1995). Site 143 consisted of several large pueblos and an extremely large integrative structure (great kiva), which was excavated. Thus, LA 53677 appears to represent the last occupation of Mariano Mesa, and was probably closely integrated into these nearby villages.

Ceramic Exchange and Interaction

Examination of pottery temper and paste from LA 53677 indicates distinct combinations of pottery of various traditions (Table 3). Sherds were dominated by red pastes and volcanic temper similar to those noted for sources and pottery from the Mogollon Highlands. Sherds classified as gray and white wares exhibited buff pastes (Table 4) and sand and/or sherd temper typical of Cibola white and gray wares produced in the Colorado Plateau (Windes 1977). Sherds of White Mountain Redware exhibited buff to reddish pastes and sand tempers typical of pottery produced in the Upper Little Colorado area along the border between New Mexico and Arizona (Carlson 1970). Such associations indicate that large frequencies of pottery from this site reflect at least three major production centers.

Comparison of pottery frequencies for various regional traditions represented at LA 53677 with those noted in surrounding areas may provide clues to the nature of pottery production and exchange. As previously indicated, Tularosa Black-on-white pottery with similar pastes and styles is present in sites scattered over wide areas of the northern Mogollon Highlands and southern Colorado Plateau, encompassing much of west-central New Mexico and east-central Arizona. Such sites have dramatically different frequencies of pottery associated with other traditions, including Mogollon brown wares, Cibola Gray Wares, and White Mountain Redwares. Examining the nature of such distributions and associations may provide clues regarding widespread regional systems, and ties between widely separated groups.

In the northern Mogollon Highlands south of Mariano Mesa, Tularosa Black-on-white is almost exclusively associated with Mogollon brown wares, whereas Cibola Gray Ware and White Mountain Redware are largely absent (Martin and Plog 1973; Wilson 2001). Cibola White Wares become the dominant decorated type during the beginning of the Pueblo period at about A.D. 1000. After this time, they replace Mimbres White Wares and become the dominant white ware type throughout the Mogollon occupation of this area. The joint association of Cibola White Ware and Mogollon brown ware during the Pueblo period has long been interpreted as reflecting population movements and intrusions of Anasazi groups who intermingled with local Mogollon groups (Martin 1979). Such intermingling was assumed to result in the production of both brown wares of the Mogollon tradition and white wares of the Cibola tradition (Danson 1957; Martin 1979). Recent studies involving the collection and characterization of clay sources in the Mogollon Highlands indicate that it would have not been possible to produce Cibola White Ware vessels using local resources (Wilson 2001). Thus, the presence of Cibola White Wares at Pueblo period sites in the Mogollon Highlands dominated by Mogollon brown wares reflects exchange with groups in the Colorado Plateau to the north.

Cibola White Wares appear to have been manufactured in areas of the Colorado Plateau where low-iron shale clays were employed in the production of both local white wares and gray utility wares. Thus, in most areas of the Colorado Plateau in the southern Cibola region, utility ware assemblages are overwhelmingly dominated by gray wares, which occur along with Cibola Gray, White Mountain Red, and Mogollon brown wares (Danson 1957; Dittert 1959; McGimsey 1980; Marshall 1991). In the Mariano Mesa area, Cibola Gray Wares are the dominant decorated type during the early part of the Pueblo III period sites (Danson 1957: McGimsey 1980). The occurrence of small but significant frequencies of gray ware pottery at LA 53677 is also unusual, as gray types tend to be extremely rare or absent at sites dominated by brown utility ware forms.

Despite the abundance of brown wares during the later occupations, given the geology of the Mariano Mesa area, it is unlikely that brown wares were locally produced. The dominance of brown wares at LA 53677 occurs at the same time as the frequency of brown wares increases in other areas of the southern Colorado Plateau, and the frequency of Cibola White Wares increases in the Mogollon Highlands (Wilson 2001). In addition, there is also evidence of increased production and specialization of brown wares at the Hough site in the Mogollon Highlands during the Late Tularosa phase (Wilson 2001).

The widespread movement of distinct and specialized pottery between groups residing in both the northern Mogollon Highlands and Colorado Plateau may reflect the development of a network that was ultimately dependent on the movement of pottery produced in distinct geological provinces in west-central New Mexico and east-central Arizona (Tainter and Gillio 1980; Tainter 1982). Long-term ties between groups residing in different ecological settings in areas of the northern Mogollon Highlands and Colorado Plateau may have been important in the survival of these groups. This is because groups located in different environmental settings would have experienced food shortages and

Table 3. Distribution of temper types

Type	Sand		Highly Micaceous Paste		Sherd		Sherd and Sand		Fine Tuff or Ash		Fine Tuff and Sand		Sand and Mogollon Volcanics		Total	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Plain gray rim	-	-	-	-	-	-	1	0.7	-	-	-	-	-	-	1	0.2
Unknown gray rim	1	2.9	-	-	-	-	-	-	-	-	-	-	-	-	1	0.2
Plain gray body	2	5.9	-	-	-	-	1	0.7	-	-	-	-	-	-	3	0.5
Indented corrugated	19	55.9	-	-	2	1.3	12	9.0	-	-	-	-	-	-	33	5.8
Plain corrugated	3	8.8	-	-	-	-	1	0.7	-	-	-	-	-	-	4	0.7
Smeared plain corrugated	1	2.9	-	-	-	-	-	-	-	-	-	-	-	-	1	0.2
Alternating corrugated	-	-	-	-	-	-	3	2.2	-	-	-	-	-	-	3	0.5
Smeared indented corrugated	1	2.9	-	-	1	0.6	-	-	-	-	-	-	-	-	2	0.3
Unpainted polished white	1	2.9	-	-	22	13.8	31	23.1	-	-	-	-	-	-	54	9.4
Mineral paint undifferentiated	1	2.9	-	-	38	23.8	26	19.4	-	-	-	-	-	-	65	11.3
Reserve Black-on-white	-	-	-	-	-	-	1	0.7	-	-	-	-	-	-	1	0.2
Tularosa Black-on-white	-	-	-	-	54	33.8	27	20.1	-	-	-	-	-	-	81	14.1
Reserve/Tularosa (undifferentiated)	-	-	-	-	4	2.5	6	4.5	-	-	-	-	-	-	10	1.7
Klagetoh Black-on-white	-	-	-	-	1	0.6	-	-	-	-	-	-	-	-	1	0.2
Snowflake Black-on-white	-	-	-	-	1	0.6	-	-	-	-	-	-	-	-	1	0.2
Indeterminate painted White Mountain Redware	-	-	-	-	17	10.6	22	16.4	-	-	-	-	-	-	39	6.8
St. Johns Black-on-red	-	-	-	-	14	8.8	1	0.7	-	-	-	-	-	-	15	2.6
St. Johns Polychrome	-	-	-	-	1	0.6	-	-	-	-	-	-	-	-	1	0.2
White Mountain Redware unpainted	1	2.9	-	-	3	1.9	2	1.5	-	-	-	-	-	-	6	1.0
Springerville Polychrome	-	-	-	-	1	0.6	-	-	-	-	-	-	-	-	1	0.2
Jornada Clapboard	-	-	-	-	-	-	-	-	-	-	-	-	1	0.4	1	0.2
San Francisco Red	1	2.9	-	-	1	0.6	-	-	-	-	-	-	-	-	2	0.3
Alma Plain rim	-	-	-	-	-	-	-	-	-	-	-	-	9	3.7	9	1.6
Alma Plain body	-	-	-	-	-	-	-	-	-	-	-	-	18	7.4	18	3.1
Reserve Plain/Indented Corrugated	-	-	-	-	-	-	-	-	-	-	-	-	12	5.0	12	2.1
Reserve Indented Corrugated	-	-	-	-	-	-	-	-	-	-	-	-	98	40.5	98	17.1
Reserve Indented Corrugated Smudged	1	2.9	-	-	-	-	-	-	1	100.0	1	100.0	58	24.0	61	10.6
Reserve Plain Corrugated	1	2.9	-	-	-	-	-	-	-	-	-	-	32	13.2	33	5.8
Reserve Plain Corrugated Smudged	1	2.9	-	-	-	-	-	-	-	-	-	-	4	1.7	5	0.9
Reserve Smudged	-	-	-	-	-	-	-	-	-	-	-	-	9	3.7	9	1.6
Tularosa Patterned Smudged	-	-	-	-	-	-	-	-	-	-	-	-	1	0.4	1	0.2
Plain Smudged with red slip	-	-	1	100.0	-	-	-	-	-	-	-	-	-	-	1	0.2
Total	34	100.0	1	100.0	160	100.0	134	100.0	1	100.0	1	100.0	242	100.0	573	100.0

Table 4. Refired color by ceramic tradition and ware groups

	Tradition									
	Mogollon Brown Ware		Cibola Gray Ware		Cibola White Ware		White Mountain Red Ware		Total	
Munsell Color	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
2.5YR (red)	11	45.8	-	-	-	-	-	-	11	16.7
5YR (yellow red)	13	54.2	-	-	-	-	3	23.1	16	24.2
7.5YR (pink)	-	-	-	-	-	-	8	61.5	8	12.1
10YR (buff)	-	-	8	100.0	21	100.0	2	15.4	31	47.0
Total	24	100.0	8	100.0	21	100.0	13	100.0	66	100.0

surpluses at different times (Tainter and Gillio 1980; Tainter 1982). While ties between environmentally diverse areas would have been beneficial during times of shortages, such interactions may not have been necessary during periods of plenty. Thus, mechanisms that maintained exchange ties between widely separated groups would have been critical. Such a mechanism may have been the continuous movement and exchange of specifically desired items, including pottery vessels. The production of increasingly elaborate and specialized pottery, using the distinct material resources available in different geological provinces, may have provided much of the basis for regional specialization of specific and widely desired forms. The painted white ware types produced in the southern Colorado Plateau, for example, may have been desirable to potters in the Mogollon Highlands lacking clay resources that could be used in the production of these white ware vessels. Likewise, the elaborately textured and highly smudged utility ware forms that gradually evolved in the northern Mogollon region may have also been sought after by groups in the Colorado Plateau. The distinct characteristics of White Mountain Redware produced in areas of the Little Colorado would also have made it a particularly desirable trade item, as indicated by the very wide geographical distributions of sherds assigned to types of this tradition.

These pottery distributions may indicate that the movement of distinct pottery vessels over wide areas reflects numerous short-distance ties between related groups, rather than a centralized system such as that described for the Chaco area. Thus, the Mogollon-Anasazi transition zone, as previously described, may in fact reflect a widespread network largely fueled by the movement of increasingly specialized pottery forms that include Cibola White Wares, Mogollon brown wares, and White Mountain Redwares. It is difficult to determine the ultimate cause of these preferences for elaborate pottery forms associated with different traditions. The need to acquire such forms would have stimulated the production and exchange of various nonlocal forms between exchange partners in different environments. This would have presented a selective advantage, resulting in the persistence and expansion of such networks. Similar patterns noted in these widely separated areas, involving the association of locally produced Mogollon brown and intrusive Cibola White Wares, may ultimately indicate the value of pottery-reinforced ties between groups in the northern Mogollon Highlands and southern Colorado Plateau.

Ceramic Form and Use

The distribution of pottery wares and forms may also provide important clues concerning the use of pottery vessels in various activities (Table 5). Utility wares included Mogollon brown wares (43.5 percent of all pottery) and Cibola Gray Wares (8.3 percent of all pottery). Decorated wares included Cibola White Wares (37.2 percent of all pottery) and White Mountain Redwares (10.8 percent of all pottery). Thus, the frequencies of pottery assigned to utility ware types (51.8 percent) and decorated types (48 percent) are roughly even. This high frequency of decorated types is unusual in this area of the Southwest, where most assemblages are overwhelmingly dominated by utility ware forms. In fact, in the Mogollon Highlands, utility wares make up about 93 percent or more of all pottery at assemblages dating before the Tularosa phase (Wilson 2001). During

Table 5. Distribution of ceramic vessel form by type

	Vessel Form												
Type	Indeter-minate	Bowl Rim	Bowl Body	Seed Jar	Olla Rim	Jar Neck	Jar Rim	Jar Body	Gourd Dipper	Miniature Pinch Pot Rim	Effigy	Dipper Handle	Totals
Plain gray rim	-	-	-	-	-	-	1	-	-	-	-	-	1
	-	-	-	-	-	-	2.9%	-	-	-	-	-	0.2%
Unknown gray rim	-	-	-	-	-	-	1	-	-	-	-	-	1
	-	-	-	-	-	-	2.9%	-	-	-	-	-	0.2%
Plain gray body	-	-	-	-	-	-	-	3	-	-	-	-	3
	-	-	-	-	-	-	-	1.1%	-	-	-	-	0.5%
Indented corrugated	2	-	-	-	-	13	3	14	1	-	-	-	33
	9.5%	-	-	-	-	16.9%	8.8%	5.1%	100.0%	-	-	-	5.8%
Plain corrugated	-	-	-	-	-	2	-	2	-	-	-	-	4
	-	-	-	-	-	2.6%	-	0.7%	-	-	-	-	0.7%
Smeared plain corrugated	-	-	-	-	-	-	-	1	-	-	-	-	1
	-	-	-	-	-	-	-	0.4%	-	-	-	-	0.2%
Alternating corrugated	-	-	-	-	-	2	-	1	-	-	-	-	3
	-	-	-	-	-	2.6%	-	0.4%	-	-	-	-	0.5%
Smeared indented corrugated	-	-	-	-	-	-	-	2	-	-	-	-	2
	-	-	-	-	-	-	-	0.7%	-	-	-	-	0.3%
Unpainted polished white	5	3	11	-	1	4	-	27	-	-	2	1	54
	23.8%	8.6%	8.9%	-	100.0%	5.2%	-	9.8%	-	-	100.0%	100.0%	9.4%
Mineral paint undifferentiated	-	6	10	-	-	3	1	44	-	1	-	-	65
	-	17.1%	8.1%	-	-	3.9%	2.9%	15.9%	-	100.0%	-	-	11.3%
Reserve Black-on-white	-	-	-	-	-	-	1	-	-	-	-	-	1
	-	-	-	-	-	-	2.9%	-	-	-	-	-	0.2%
Tularosa Black-on-white	-	3	2	1	-	2	-	73	-	-	-	-	81
	-	8.6%	1.6%	100.0%	-	2.6%	-	26.4%	-	-	-	-	14.1%
Reserve/Tularosa (undifferentiated)	-	-	1	-	-	-	-	9	-	-	-	-	10
	-	-	0.8%	-	-	-	-	3.3%	-	-	-	-	1.7%
Klagetoh Black-on-white	-	1	-	-	-	-	-	-	-	-	-	-	1
	-	2.9%	-	-	-	-	-	-	-	-	-	-	0.2%
Snowflake Black-on-white	-	-	-	-	-	-	-	1	-	-	-	-	1
	-	-	-	-	-	-	-	0.4%	-	-	-	-	0.2%
Indeterminate painted White Mountain Redware	1	5	29	-	-	1	1	2	-	-	-	-	39
	4.8%	14.3%	23.6%	-	-	1.3%	2.9%	0.7%	-	-	-	-	6.8%
St. Johns Black-on-red	-	5	7	-	-	-	-	3	-	-	-	-	15
	-	14.3%	5.7%	-	-	-	-	1.1%	-	-	-	-	2.6%
St. Johns Polychrome	-	-	1	-	-	-	-	-	-	-	-	-	1
	-	-	0.8%	-	-	-	-	-	-	-	-	-	0.2%
White Mountain Redware unpainted	1	-	3	-	-	-	-	2	-	-	-	-	6
	4.8%	-	2.4%	-	-	-	-	0.7%	-	-	-	-	1.0%
Springerville Polychrome	-	-	1	-	-	-	-	-	-	-	-	-	1
	-	-	0.8%	-	-	-	-	-	-	-	-	-	0.2%
Jornada Clapboard	-	-	-	-	-	1	-	-	-	-	-	-	1
	-	-	-	-	-	1.3%	-	-	-	-	-	-	0.2%
San Francisco Red	-	-	1	-	-	-	-	1	-	-	-	-	2
	-	-	0.8%	-	-	-	-	0.4%	-	-	-	-	0.3%
Alma Plain rim	1	-	-	-	-	1	7	-	-	-	-	-	9
	4.8%	-	-	-	-	1.3%	20.6%	-	-	-	-	-	1.6%
Alma Plain body	3	-	2	-	-	2	1	10	-	-	-	-	18
	14.3%	-	1.6%	-	-	2.6%	2.9%	3.6%	-	-	-	-	3.1%
Reserve Plain/Indented Corrugated	-	-	2	-	-	4	-	6	-	-	-	-	12
	-	-	1.6%	-	-	5.2%	-	2.2%	-	-	-	-	2.1%
Reserve Indented Corrugated	7	-	1	-	-	27	12	51	-	-	-	-	98
	33.3%	-	0.8%	-	-	35.1%	35.3%	18.5%	-	-	-	-	17.1%
Reserve Indented Corrugated Smudged	-	11	38	-	-	6	4	2	-	-	-	-	61
	-	31.4%	30.9%	-	-	7.8%	11.8%	0.7%	-	-	-	-	10.6%
Reserve Plain Corrugated	-	-	1	-	-	9	2	21	-	-	-	-	33
	-	-	0.8%	-	-	11.7%	5.9%	7.6%	-	-	-	-	5.8%
Reserve Plain Corrugated Smudged	1	-	4	-	-	-	-	-	-	-	-	-	5
	4.8%	-	3.3%	-	-	-	-	-	-	-	-	-	0.9%
Reserve Smudged	-	1	7	-	-	-	-	1	-	-	-	-	9
	-	2.9%	5.7%	-	-	-	-	0.4%	-	-	-	-	1.6%
Tularosa Patterned Smudged	-	-	1	-	-	-	-	-	-	-	-	-	1
	-	-	0.8%	-	-	-	-	-	-	-	-	-	0.2%
Plain Smudged with red slip	-	-	1	-	-	-	-	-	-	-	-	-	1
	-	-	0.8%	-	-	-	-	-	-	-	-	-	0.2%
Totals	21	35	123	1	1	77	34	276	1	1	2	1	573
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

the Tularosa phase, decorated white wares increase in frequency to make up about one-fourth of all pottery. This seems to be even more dramatic at Tularosa phase occupations in the southern Colorado Plateau.

The range of wares is closely related to a wide range of forms and functions associated with the pottery from this site (see Table 5). Gray wares appear to be almost exclusively associated with wide-mouth jars used for cooking. Brown wares appear also to be dominated by sherds from wide-mouth jars, although significant frequencies of sherds also appear to have come from bowls. While most of the white wares are from narrow jars, a significant frequency also appear to derive from bowls. White Mountain Redwares are mostly bowls. Thus, the small sample of pottery from this site is characterized by a wide range of forms that primarily consist of wide-mouth cooking jars, narrow-mouth ollas, and bowls. But also found are dippers, miniature vessels, and effigies (Fig. 20). Such distributions indicate that this pottery was used for a very wide range of tasks, including those relating to cooking, storage, serving, and ceremonial activities.

Figure 20. Possible bird effigy ceramic

CHAPTER 6

LITHIC ARTIFACT ANALYSIS

BYRON HAMILTON

INTRODUCTION

Only 181 lithic artifacts were collected at LA 53677, and all were analyzed. The lithic analysis was conducted using the guidelines and format of the Office of Archaeological Studies Standardized Chipped Stone Analysis Manual (1994), with the following exception. The thermal alteration codes listed in the OAS manual were limited to only three groups: heat-treated, non-heat-treated, and burned.

ATTRIBUTES MONITORED

All lithic artifacts were monitored for material type, material quality (grain size and presence or absence of flaws), morphology (flakes, cores, debitage), function, dorsal cortex (10 percent increments), portion, flake platform type, cortex type (waterworn or nonwaterworn), flake distal termination type, and thermal alteration (as listed above). Edge damage was monitored for this assemblage as a wear pattern type. The edge angle of all formal and informal tools was measured in one-degree increments. The length, width, and thickness of all lithic artifacts were measured in one-millimeter increments.

MATERIAL SELECTION

All material types used to manufacture the lithic artifacts in this assemblage can be obtained within the project region, with one possible exception: a single biface fragment made of obsidian. This artifact (23 mm by 17 mm by 8 mm) is an indeterminate fragment of an early-stage biface exhibiting no edge damage; it is possible that it was broken early in the manufacturing process. The artifact could, however, have come from a source that could be considered local. The Red Hill volcanic plug has been identified as an obsidian source (Camilli et al. 1988), and is within 55 km (34 miles) of the project area. Other material types useable for lithic tool production in the project area include chalcedony, varieties of chert, silicified wood, quartzite, basalt, and rhyolite.

Nonlocal lithic materials (not found at LA 53677) have been identified in other artifact assemblages from the area. These include brown-spotted Chinle chert and Zuni silicified wood (Camilli et al. 1988).

ANALYTICAL RESULTS

Debitage

The largest morphological group (Table 6) of lithic artifacts consisted of core flakes (n=131, 72.4 percent). Other items included angular debris (n=29, 16 percent), biface flakes (n=3, 1.7 percent), and cores (n=10, 5.6 percent). The two material types that dominated the assemblage (n=125, 69.1 percent) were chalcedony and silicified wood.

Flakes

The low ratio of angular debris to flakes, and the low number of cores suggest that the lithic material was transported to the site in a partially reduced state. This was further indicated by the low percentage of dorsal cortex found on the flakes (Table 7). The majority of core flakes (80.9 percent) had no dorsal cortex.

Of the 131 core flakes, 91 were made from the two dominant materials. As is so often the case, the size and shape of the flakes produced during core reduction were determined by the size and quality of the raw materials being used, rather than the needs or desires of the knapper. For instance, the nature of the raw material from this assemblage would not lend itself to blade manufacture.

The chalcedony and silicified wood used were often fine-grained with good conchoidal fracture, but with many internal flaws. As stated above, material quality (grain size and flaws) was monitored during analysis. All of the silicified wood was fine-grained, but 71 percent was flawed. Flaws included coarse, grainy inclusions and cracks in the flakes, angular debris, and cores. The majority of the chalcedony was also flawed. Of this material, 90.2 percent was fine-grained, the remaining 9.8 percent was medium-grained. Flaws were recorded in 58.8 percent of the chalcedony.

The majority of the 74 intact flake platforms recorded had a single facet (n=40, Table 8), two of which were abraded. Multifaceted and abraded platforms are usually associated with flakes produced during tool manufacture. Of the 133 flakes recorded, only the three biface flakes had this platform type. The nature of the flake assemblage indicates an emphasis on the efficient production of core flakes, perhaps for the naturally sharp edges they provide.

Cores

Cores made from chalcedony or silicified wood (six of the 10 cores present) ranged in size from 33 mm by 19 mm by 16 mm to 58 mm by 38 mm by 35 mm. Two cores were quartzite, one was basalt, and one was quartzitic sandstone (Table 6). Material quality also influences the size and shape of cores. This analyst noted that many of the platforms had slightly weathered

Table 6. Analyzed lithic artifacts

Count	Material Type									
Row percent Column percent	Chert	Chalcedony	Silicified Wood	Obsidian	Basalt	Rhyolite	Siltstone	Quartzite	Quartzitic Sandstone	Totals
	2	10	10	-	-	6	-	1	-	29
Angular debris	6.9%	34.5%	34.5%	-	-	20.7%	-	3.4%	-	100.0%
	20.0%	19.6%	13.5%	-	-	30.0%	-	6.7%	-	16.0%
	7	38	53	-	-	14	3	11	5	131
Core flake	5.3%	29.0%	40.5%	-	-	10.7%	2.3%	8.4%	3.8%	100.0%
	70.0%	74.5%	71.6%	-	-	70.0%	100.0%	73.3%	83.3%	72.4%
	-	1	2	-	-	-	-	-	-	3
Biface flake	-	33.3%	66.7%	-	-	-	-	-	-	100.0%
	-	2.0%	2.7%	-	-	-	-	-	-	1.7%
	-	1	2	-	-	-	-	1	1	5
Unidirectional core	-	20.0%	40.0%	-	-	-	-	20.0%	20.0%	100.0%
	-	2.0%	2.7%	-	-	-	-	6.7%	16.7%	2.8%
	-	-	2	-	1	-	-	1	-	4
Bidirectional core	-	-	50.0%	-	25.0%	-	-	25.0%	-	100.0%
	-	-	2.7%	-	100.0%	-	-	6.7%	-	2.2%
	-	-	1	-	-	-	-	-	-	1
Multidirectional core	-	-	100.0%	-	-	-	-	-	-	100.0%
	-	-	1.4%	-	-	-	-	-	-	0.6%
	-	-	-	-	-	-	-	1	-	1
Hammerstone	-	-	-	-	-	-	-	100.0%	-	100.0%
	-	-	-	-	-	-	-	6.7%	-	0.6%
	-	-	1	-	-	-	-	-	-	1
Scraper	-	-	100.0%	-	-	-	-	-	-	100.0%
	-	-	1.4%	-	-	-	-	-	-	0.6%
	-	-	3	1	-	-	-	-	-	4
Early-stage biface	-	-	75.0%	25.0%	-	-	-	-	-	100.0%
	-	-	4.1%	100.0%	-	-	-	-	-	2.2%
	-	1	-	-	-	-	-	-	-	1
Middle-stage biface	-	100.0%	-	-	-	-	-	-	-	100.0%
	-	2.0%	-	-	-	-	-	-	-	0.6%
	1	-	-	-	-	-	-	-	-	1
Projectile point	100.0%	-	-	-	-	-	-	-	-	100.0%
	10.0%	-	-	-	-	-	-	-	-	0.6%
	10	51	74	1	1	20	3	15	6	181
Totals	5.5%	28.2%	40.9%	0.6%	0.6%	11.0%	1.7%	8.3%	3.3%	100.0%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

surfaces, indicating that they were created by internal fractures in the raw material. Thus, these small cores may be angular debris from larger parent material.

Heat Treatment

As might be expected, heat treatment on the lithic materials was limited to the cryptocrystalline sedimentary materials, including chert, chalcedony, and silicified wood (Table 9). Most of the items made of these materials exhibited a high degree of luster. However, high luster over all surfaces of an artifact did not constitute enough evidence to record an item as heat-treated in this analysis. Although heat treatment does produce a luster on surfaces exposed by chipping after the heating process, surfaces exposed to the heat develop a matte finish. Attributes such as higher luster on some, but not

Table 7. Percentage of dorsal cortex by artifact type

Count Row percent Column percent	Material Type						Totals
	Angular Debris	Core Flake	Biface Flake	Unidirectional Core	Bidirectional Core	Multidirectional Core	
Percent cortex							
	24	106	3	1	2	1	137
0	17.5%	77.4%	2.2%	0.7%	1.5%	0.7%	100.0%
	82.8%	80.9%	100.0%	20.0%	50.0%	100.0%	79.2%
	2	3	-	1	-	-	6
10	33.3%	50.0%	-	16.7%	-	-	100.0%
	6.9%	2.3%	-	20.0%	-	-	3.5%
	2	2	-	-	-	-	4
20	50.0%	50.0%	-	-	-	-	100.0%
	6.9%	1.5%	-	-	-	-	2.3%
	-	5	-	1	1	-	7
30	-	71.4%	-	14.3%	14.3%	-	100.0%
	-	3.8%	-	20.0%	25.0%	-	4.0%
	-	5	-	2	-	-	7
40	-	71.4%	-	28.6%	-	-	100.0%
	-	3.8%	-	40.0%	-	-	4.0%
	1	2	-	-	-	-	3
50	33.3%	66.7%	-	-	-	-	100.0%
	3.4%	1.5%	-	-	-	-	1.7%
	-	1	-	-	1	-	2
60	-	50.0%	-	-	50.0%	-	100.0%
	-	0.8%	-	-	25.0%	-	1.2%
	-	2	-	-	-	-	2
70	-	100.0%	-	-	-	-	100.0%
	-	1.5%	-	-	-	-	1.2%
	-	5	-	-	-	-	5
80	-	100.0%	-	-	-	-	100.0%
	-	3.8%	-	-	-	-	2.9%
	29	131	3	5	4	1	173
Totals	16.8%	75.7%	1.7%	2.9%	2.3%	0.6%	100.0%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

all, surfaces (luster variation), and heat-induced color changes were considered sufficient evidence of heat treatment. It is reasonable, therefore, to assume that some of the artifacts recorded as not thermally altered actually may have been heat-treated.

Utilization

Utilization of the debitage was restricted to the two dominant material types, chalcedony and silicified wood. Ten artifacts (six flakes and four pieces of angular debris) exhibited use-wear edge damage. Nine items showed unidirectional utilization; one flake showed bidirectional utilization. The edge angles of the unidirectional flakes and angular debris were steep, indicating that they were used for scraping rather than cutting.

Retouch

One flake had an edge with unidirectional retouch, and an edge angle of 59 degrees. This edge had many tiny projections, indicating that it was not used.

Table 8. Flake platform types by material

Count Row percent Column percent	Material Type Chert	 Chalcedony	 Silicified Wood	 Rhyolite	 Siltstone	 Quartzite	 Quartzitic Sandstone	Totals
Cortical	- - -	- - -	1 8.3% 1.8%	9 75.0% 64.3%	1 8.3% 33.3%	1 8.3% 9.1%	- - -	12 100.0% 9.0%
Single facet	4 10.5% 57.1%	12 31.6% 31.6%	9 23.7% 16.4%	2 5.3% 14.3%	2 5.3% 66.7%	7 18.4% 63.6%	2 5.3% 40.0%	38 100.0% 28.6%
Single facet and abraded	- - -	- - -	- - -	- - -	- - -	- - -	2 100.0% 40.0%	2 100.0% 1.5%
Multifacet	1 7.1% 14.3%	5 35.7% 13.2%	7 50.0% 12.7%	1 7.1% 7.1%	- - -	- - -	- - -	14 100.0% 10.5%
Multifacet and abraded	- - -	1 33.3% 2.6%	2 66.7% 3.6%	- - -	- - -	- - -	- - -	3 100.0% 2.3%
Retouched	1 20.0% 14.3%	1 20.0% 2.6%	3 60.0% 5.5%	- - -	- - -	- - -	- - -	5 100.0% 3.8%
Collapsed	1 4.2% 14.3%	5 20.8% 13.2%	16 66.7% 29.1%	1 4.2% 7.1%	- - -	1 4.2% 9.1%	- - -	24 100.0% 18.0%
Crushed	- - -	1 25.0% 2.6%	3 75.0% 5.5%	- - -	- - -	- - -	- - -	4 100.0% 3.0%
Absent	- - -	13 41.9% 34.2%	14 45.2% 25.5%	1 3.2% 7.1%	- - -	2 6.5% 18.2%	1 3.2% 20.0%	31 100.0% 23.3%
Totals	7 5.3% 100.0%	38 28.6% 100.0%	55 41.4% 100.0%	14 10.5% 100.0%	3 2.3% 100.0%	11 8.3% 100.0%	5 3.8% 100.0%	133 100.0% 100.0%

Table 9. Thermal alterations

Count / Row percent / Column percent	Chert	Chalcedony	Silicified Wood	Obsidian	Basalt	Rhyolite	Siltstone	Quartzite	Quartzitic Sandstone	Totals
	Material Type									
Heat treated	2	10	28	-	-	-	-	-	-	40
	5.0%	25.0%	70.0%	-	-	-	-	-	-	100.0%
	20.0%	19.6%	37.8%	-	-	-	-	-	-	22.1%
Absent	8	38	42	1	1	20	3	15	6	134
	6.0%	28.4%	31.3%	0.7%	0.7%	14.9%	2.2%	11.2%	4.5%	100.0%
	80.0%	74.5%	56.8%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	74.0%
Burned	-	3	4	-	-	-	-	-	-	7
	-	42.9%	57.1%	-	-	-	-	-	-	100.0%
	-	5.9%	5.4%	-	-	-	-	-	-	
Totals	10	51	74	1	1	20	3	15	6	181
	5.5%	28.2%	40.9%	0.6%	0.6%	11.0%	1.7%	8.3%	3.3%	100.0%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Tools

Formal tools found at LA 53677 included five biface fragments, one small scraper, one hammerstone, and the distal portion of a projectile point. The hammerstone was a medium-grained quartzite cobble measuring 68 mm by 56 mm by 37 mm, with 90 percent waterworn cortex. The scraper was whole, measured 34 mm by 30 mm by 10 mm, and was made of silicified wood. The working edge was formed by unidirectional retouch; the edge angle was 91 degrees. This artifact was crudely fashioned and the morphology of the edge clearly shows that this tool was not used.

All of the biface fragments were indeterminate portions. Four of the five were crudely made, exhibiting no edge wear, and were probably broken very early in the manufacturing process. These early-stage biface fragments included three made from silicified wood, with the remaining fragment representing the only obsidian artifact in the assemblage. The lone middle-stage biface fragment was made from chalcedony, and exhibited thermal alteration (color change, potlids, and severe crazing). This artifact was apparently burned.

Two of the early-stage biface fragments were found within the roomblock. The other two were found within 2 m of this feature. The burned middle-stage biface fragment was uncovered 40 m south of the feature.

The lone projectile point found at LA 53677 was the distal portion of an Archaic side-notched dart point (Fig. 21). This artifact was well made from fine-grained chalcedonic chert containing many black dendritic inclusions and some coarse-grained flaws. The projectile point fragment measured 36 mm by 29 mm by 6 mm. It was found on the surface 18 meters southeast of the exterior hearth.

This artifact can be described as a "high" side-notched point. Brown et al. (1993) define this as a point with high horizontal notches creating a stem at least 10 mm long. Holmer (1986) has named this form the "Sudden side-notched point." It is similar to the Chiricahua point, an Archaic side-notched dart point identified in New Mexico, but described in both Holmer (1986) and Brown et al. (1993) as a point notched low on the blade and having a concave base, sometimes with a basal notch. The Sudden side-notched point is characterized by a straight base.

Holmer (1986) dates the Sudden side-notched point between 4400 and 2500 B.C. and states that its distribution occurs in the southern half of the Inter-Mountain West. Brown's area of distribution includes the Great Basin and southwestern Colorado. A similar type of point has also been documented in the Chama Valley in northern New Mexico (James L. Moore, personal communication, 2000).

An Archaic dart point does not, of course, belong to the time period assigned to LA 53677. It is possible that the inhabitants of the site were never aware of the existence of the point, or they may have found and curated it.

Figure 21. Sudden side-notched point

Figure 22. Multipurpose tool

A modest amount of unidirectional use wear was recorded on one blade edge during analysis. This use wear begins 7 mm above the notch and continues up the blade 19 mm to the fracture point, suggesting the point may have been used as a knife at some time.

Multipurpose Tool

The remaining formal tool in this assemblage was a fragment of gray rhyolite with a deep notch on one edge (Fig. 22). This item measured 41 mm by 38 mm by 5 mm thick. It was broken on three sides. All remaining original surfaces were smoothed by grinding. The notch was 6 mm wide and 12 mm deep.

Notched lithic tools are often described as spokeshaves, but that designation does not apply to this item. All surfaces inside the notch itself were very smooth from use or grinding. There was no sharp edge with which to shave. McGimsey (1980) reports that all surfaces of the shaft smoothers from nearby Site 616 were smoothed by grinding. The high level of wear in this notch indicates that the tool was used to smooth or polish small diameter items such as wooden arrow shafts, or perhaps a harder substance such as bone. Aiding in the production of cordage was also a possible use for this tool.

Discussion

An assemblage containing 181 chipped stone artifacts provides only a snapshot of the lithic manufacturing process at LA 53677. Many of the attributes identified in this analysis are, however, similar to patterns found in comparable sites recorded near the project area. These patterns include a range of raw materials that are all locally available, silicified wood as the dominant material type, very low incidence of obsidian, low percentage of cortex, and an emphasis on the production of core flakes for use as informal tools.

CHAPTER 7

BRUSHY PUEBLO GROUND STONE

DOROTHY A. ZAMORA

INTRODUCTION

The ground stone assemblage from Brushy Pueblo consisted of a very small collection of ground artifacts (n=13). These artifacts were analyzed using the OAS Standardized Manual (1994). The variables selected for the analysis monitored function, shape, material selection, manufacturing techniques, and specific processing activities. Each artifact was measured in centimeters and weighed in kilograms. The ground surfaces were measured using a template of squares in 1-cm increments, which was placed over the ground surface and the squares counted.

ARTIFACT DESCRIPTIONS

The ground stone artifacts recovered from Brushy Pueblo contained a variety of items (Table 10). The most common material selected by site occupants for the ground artifacts was sandstone, although all of the materials used are readily available in the area. As shown in Table 10, the two-hand manos (n=4) and polishing stones (n=3) made up most of the assemblage, suggesting that food preparation and possibly pottery polishing occurred on the site.

There are different interpretations of usage for one-hand and two-hand manos; however, for this project, one-hand manos are identified as hand stones that fit in a hand comfortably without the aid of the other hand. A two-hand mano is referred to as a hand stone around which two hands are placed side by side in order to move the stone across a metate. The two-hand manos were further categorized as used on a slab metate (or flat grinding stone) or trough metate. The difference between the two is that the trough manos are ground along the edges of the trough, giving it a slightly convex shape. Two-hand manos are commonly thought to have been used for the grinding of corn.

The manos recovered from Brushy Pueblo were all well worn and used on both sides, with both surfaces ground down to a smooth, almost polished state. In some instances, these artifacts were used as building material, probably after their use-life was finished. Found in the fill of Room 1 was a two-hand trough mano (Fig. 23); however, no trough metate was recovered. Slab manos were found in Room 2 in the fill and to the west outside of Room 1 within wall fall. Another two-hand mano from the fill of Room 2 was made of vesicular basalt (Fig. 24). Oval in shape, this mano exhibited heavy use, with the vesicles and high spots ground down almost flat.

One possible paint palette was found 2 m north of Room 1 between the roomblock and the slab-lined hearth (Fig. 25). The palette was formed from a quartzite stone that had been ground on the exterior, and which had a very shallow bowl-like depression. The interior cavity had a depth of only 1.9 cm with a yellow mineral stain found on the bottom of the depression.

Table 10. Ground stone recovered

Count / Row percent / Column percent	Material Type: Sandstone	Quartzite	Vesicular Basalt	Siltstone	Silicified Wood	Totals
Two-hand slab mano	2 100.0% 40.0%	- - -	- - -	- - -	- - -	2 100.0% 15.4%
Two-hand trough mano	1 100.0% 20.0%	- - -	- - -	- - -	- - -	1 100.0% 7.7%
Two-hand mano	- - -	- - -	1 100.0% 50.0%	- - -	- - -	1 100.0% 7.7%
Mano	- - -	1 100.0% 25.0%	- - -	- - -	- - -	1 100.0% 7.7%
Slab metate	1 100.0% 20.0%	- - -	- - -	- - -	- - -	1 100.0% 7.7%
Palette	- - -	1 100.0% 25.0%	- - -	- - -	- - -	1 100.0% 7.7%
Polishing stone	- - -	2 66.7% 50.0%	- - -	- - -	1 33.3% 100.0%	3 100.0% 23.1%
Abrading stone	- - -	- - -	1 100.0% 50.0%	- - -	- - -	1 100.0% 7.7%
Indeterminate	1 50.0% 20.0%	- - -	- - -	1 50.0% 100.0%	- - -	2 100.0% 15.4%
Totals	5 38.5% 100.0%	4 30.8% 100.0%	2 15.4% 100.0%	1 7.7% 100.0%	1 7.7% 100.0%	13 100.0% 100.0%

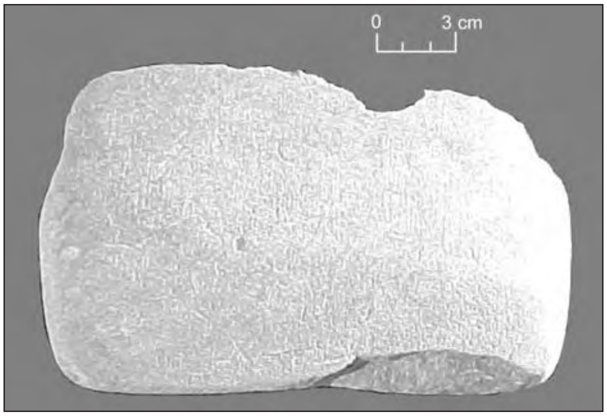

Figure 23. Two-hand trough mano from Room 1

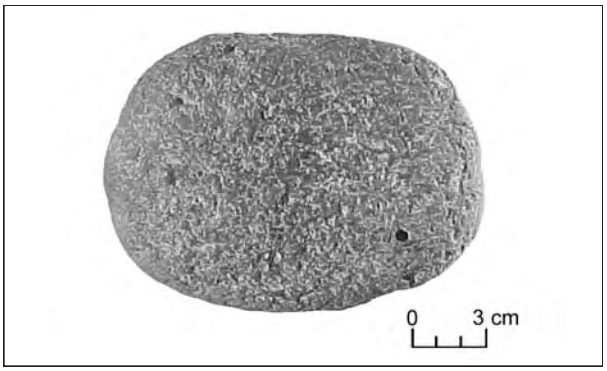

Figure 24. Vesicular basalt two-hand mano from Room 2

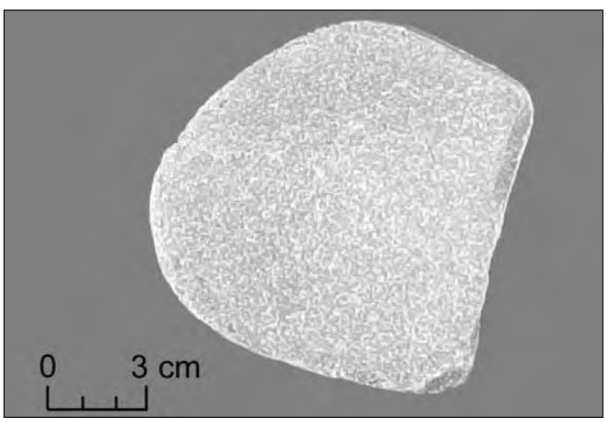

Figure 25. Paint palette from between roomblock and hearth

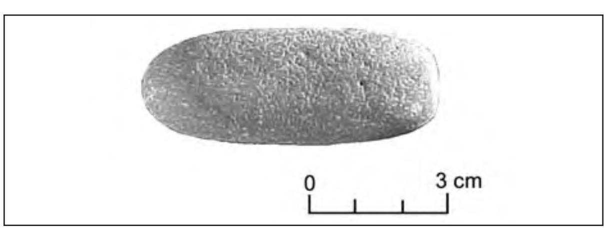

Figure 26. Quartzite polishing stone from Room 1 fill

The polishing stones recovered were elongated cobbles that exhibited striations and polishing (Fig. 26). These artifacts were recovered from several areas on the site. One was found in the fill of Room 1, a second one north of the roomblock, and the third west of Room 2.

One vesicular basalt abrader, found west of Room 1, was small and oval shaped. Lengthwise striations were present on the surface, and the vesicles showed wear (not as heavy as that found on the basalt mano). The high spots and the edges of the vesicles were flattened.

A small slab metate was recovered from Room 1. It was a thin, fine-grained sandstone slab exhibiting wear on both surfaces. Also included in the ground stone assemblage were two small ground fragments that could not be identified as to type.

Summary

Only a portion of the site was excavated, explaining why the ground stone assemblage was so small. Based on the ground stone recovered, it can be assumed that food was processed at the site. A pollen sample collected in Room 2 from a partial vessel did produce corn pollen, and, together with the presence of two-hand manos, it can be concluded that corn was used.

Comparative studies with Hard's (1990) dependency model yielded a mean mano length for whole artifacts (n=3) of 15.60 cm, with a standard deviation of 5.05 cm. The mean ground surface was 144.17 square centimeters, with a standard deviation of 67.27 square centimeters. Both fall within Hard's range for signifying dependency on corn; however, it is impossible to state whether or not the occupants of Brushy Pueblo were strongly dependent on corn because of the lack of data from the small ground stone assemblage, single pollen sample, and flotation sample. The most effective source of corn processing data at other sites has been pollen washes from the interior of sherds and ground surfaces of manos and metates (Zamora 2000).

Adams (1996), Wright (1993), and T. Stone (1994) all take different approaches to interpreting ground stone. They believe that processing strategies and differing techniques are the reasons for variation in manos and metates, and that tool morphology is not a good predictor of subsistence strategies. Therefore, the Brushy Pueblo ground stone data seem to suggest a reliance on corn, but the degree of that dependence is impossible to determine.

CHAPTER 8

MISCELLANEOUS ARTIFACTS

Only three miscellaneous artifacts (one bead and two pieces of freshwater shell) and four adobe casts were recovered from Brushy Pueblo (Table 11). Although small in number, the artifacts hint at a site population that may have made jewelry, although the shell fragments are too small to determine their function. The adobe casts from Room 2 found just above the floor are probably from small latillas or matting used in roof construction. The wood impressions are very small, averaging only 1.2 cm in width and 0.4 cm in depth. No large roof beam fragments were found.

The travertine used for the manufacture of the bead is available state-wide as mineral-spring water deposits (Northrup 1959:163). The freshwater shell is also available in numerous drainages of western New Mexico, and may have been a short-distance trade commodity.

Table 11. Miscellaneous artifacts recovered

Artifact	Locus	Description	Measurements
Bead	Surface (Grid 158N/196E)	Travertine heshi	0.4 cm diameter 0.2 cm opening
Shell	Disturbed area	Freshwater fragments	L=1.3 cm by 1.0 cm by 0.5 cm L=1.7 cm by 1.8 cm by 0.5 cm
Adobe casts	Room 2 above floor	Roof matting?	L=5.5 cm by 1.1 cm by 0.5 cm L=7.8 cm by 2.0 cm by 0.4 cm L=5.7 cm by 0.9 cm by 0.4 cm L=4.8 cm by 0.8 cm by .3 cm

CHAPTER 9

FAUNAL REMAINS

Fourteen pieces of faunal remains were recovered from excavations at Brushy Pueblo (Table 12) and analyzed by Susan Moga of the OAS. Over 85 percent were from either jackrabbit or cottontail, found in only two proveniences on the site: just below the loose surface sands, and within the shallow pit unit. The pit structure contained 10 animal bones comprising a variety of whole skeletal parts, which suggests they died after abandonment of the pit or were placed whole into the unit. No evidence of burning or human utilization was present, however. One long bone of a small- to medium-sized mammal was also recovered from the loose surface sands; it did display burning, but no thermal features were nearby. A large portion of a deer humerus was recovered from the floor of Room 1 within the pueblo, indicating that the site occupants probably placed it there.

The use of deer and, possibly, rabbits as food sources is well within the expected parameters for Quemado area subsistence adaptations. Both species are plentiful within the zonal interface in the site vicinity. Because of the small numbers present, however, it is impossible to determine the degree of dependency upon faunal resources by site occupants.

Table 12. Faunal remains

Taxon	Provenience	Element	Portion	Comments
Sylvilagus sp. (cottontail)	Shallow pit unit	Left radius	Proximal and shaft	Young adult, heavily pitted
		Left femur	Proximal shaft fragment	Young adult, heavily pitted
		Right tibia	Distal and half shaft	Young adult, heavily pitted
Lepus sp. (jackrabbit)	Shallow pit unit	Left scapula	Glenoid fragment	Mature (?), heavily pitted
		Left humerus	Distal end and shaft	Mature (?), two pieces, heavily pitted
		Right metatarsal 3	Proximal and shaft	Young adult, heavily pitted
		Right metatarsal 4	Proximal and shaft	Young adult, heavily pitted
		Right metatarsal 2	Complete	Young adult, heavily pitted
		Right metatarsal 5	Complete	Young adult, heavily pitted
		Foot phalanx 1	Complete	Young adult, heavily pitted
	Grid 176N/196E (0 to 5 cm)	Right femur	Proximal shaft fragment	Mature (?), sun bleached and eroded
		Right femur	Distal end and shaft	Young adult, heavily pitted
Small to medium mammal	Grid 178N/196E (0 to 5 cm)	Long bone	Shaft fragment	Young adult (?), burned black, pitted
Odocoileus sp. (deer)	Room 1, floor	Right humerus	Distal end and shaft	Young adult, heavily pitted

CHAPTER 10

ANALYSIS OF POLLEN FROM LA 53677

RICHARD G. HOLLOWAY

INTRODUCTION

A single pollen sample from LA 53677 was submitted to Quaternary Services for analysis. The pollen sample was taken from a large ceramic sherd from the fill of Room 1, which contained several manos. It was originally thought that the site possibly represented a fieldhouse.

METHODS AND MATERIALS

Chemical extraction of the pollen sample was conducted at the Palynology Laboratory at Texas A&M University, using a procedure designed for semi-arid Southwestern sediments. The method specifically avoids use of such reagents as nitric acid and bleach, which have been demonstrated experimentally to be destructive to pollen grains (Holloway 1981).

From the pollen sample, 25 g of soil were subsampled. Prior to chemical extraction, three tablets of concentrated *Lycopodium* spores (Batch No. 307862, Department of Quaternary Geology, Lund, Sweden; 13,500 ± 500 marker grains per tablet) were added to each subsample. The addition of marker grains permits calculation of pollen concentration values and provides an indicator for accidental destruction of pollen during the laboratory procedure (Holloway and Bryant 1983).

Polliniferous residue was then chemically created, and a drop was mounted on a microscope slide for examination under an 18-x-18-mm cover slip sealed with fingernail polish. The slide was examined using 200x or 100x magnification under an aus-Jena Laboval 4 compound microscope. Occasionally, pollen grains were examined using either 400x or 1,000x oil immersion to obtain a positive identification to either the family or genus level.

Abbreviated microscopy was performed on the sample, of which either 20 percent of the slide (approximately four transects at 200x magnification) or a minimum of 50 marker grains were counted. If warranted, full counts were conducted by counting to a minimum of 200 fossil grains. Regardless of which method was used, the uncounted portion of the slide was completely scanned at a magnification of 100x for larger grains of cultivated plants such as *Zea mays*, cactus, and other large pollen types, such as members of the Malvaceae or Nyctaginaceae families.

Total pollen concentration values were computed for all taxa. In addition, the percentage of indeterminate pollen was also computed. Statistically, pollen concentration values provide a more reliable estimate of species composition within the assemblage. Traditionally, results have been presented as relative frequencies (percentages), where the abundance of each taxon is expressed in relation to the total pollen sum (200+ grains) per sample. With this method, rare pollen types tend to constitute less than 1 percent of the total assemblage. Pollen concentration values provide a more precise measurement of the abundance of even these rare types. The pollen data are reported here as pollen concentration values using the following formula:

$$PC = \frac{K * \Sigma_p}{\Sigma_L * S}$$

where: PC = pollen concentration
K = *Lycopodium* spores added
Σ_p = fossil pollen counted
Σ_L = *Lycopodium* spores counted
S = sediment weight

The following example explains this approach. Taxon X may be represented by a total of 10 grains (1 percent) in a sample consisting of 1,000 grains, and by 100 grains (1 percent) in a second sample consisting of 10,000 grains. Taxon X is 1 percent of each sample, but the difference in actual occurrence of the taxon is obscured when pollen frequencies are used. The use of "pollen concentration values" is preferred because it accentuates the variability between samples in the occurrence of the taxon. The variability, therefore, is more readily interpretable when comparing cultural activity to noncultural distribution of the pollen rain.

Variability in pollen concentration values can also be attributed to natural deterioration of the grains. In his study of sediment samples collected from a rockshelter, Hall (1981) developed the "1000 grains/g" rule to assess the degree of pollen destruction. This approach has been used by many palynologists working in other contexts as a guide to determine the degree of preservation of a pollen assemblage and, ultimately, to aid in the selection of samples to be examined in greater detail. According to Hall (1981), a pollen concentration below 1000 grains/g indicates that forces of degradation may have severely altered the original assemblage. However, a pollen concentration below 1000 grains/g can also indicate restriction of the natural pollen rain. Samples from pit structures or floors within enclosed rooms, for example, often yield pollen concentrations below 1000 grains/g.

Pollen degradation also modifies the pollen assemblage because pollen grains of different taxa degrade at different rates (Holloway 1981, 1989; Holloway and Bryant 1983). Some taxa are more resistant to deterioration than others and remain in assemblages after other types have deteriorated completely. Many commonly occurring taxa degrade beyond recognition in only a short time. For example, most (ca. 70 percent) Angiosperm pollen has either tricolpate (three furrows) or tricolporate (three furrows each with pores) morphology. Because surfaces erode rather easily, once deteriorated, these grains tend to resemble each other and are not readily distinguishable. Other pollen types (e.g., cheno-am) are so distinctive that they remain identifiable even when almost completely degraded.

Pollen grains were identified to the lowest taxonomic level whenever possible. The majority of these identifications conformed to existing levels of taxonomy with a few exceptions. For example, cheno-am is an artificial pollen morphological category that includes pollen of the family Chenopodiaceae (goosefoot) and the genus *Amaranthus* (pigweed), which are indistinguishable from each other (Martin 1963). All members are wind pollinated (anemophilous) and produce very large quantities of pollen. In many sediment samples from the American Southwest, this taxon often dominates the assemblage.

Pollen of the Poaceae (grass) family are generally indistinguishable below the family level, with the single exception of *Zea mays*, identifiable by its large size (ca. 80 µm), relatively large pore annulus, and the internal morphology of the exine. All members of the family contain a single pore, are spherical, and have simple wall architecture. Identification of non-corn pollen is dependent on the presence of the single pore. Only complete or fragmented grains containing this pore were tabulated as members of the Poaceae.

Clumps of four or more pollen grains (anther fragments) were tabulated as single grains to avoid skewing the counts. Clumps of pollen grains (anther fragments) from archaeological contexts are interpreted as evidence for the presence of flowers at the sampling locale (Bohrer 1981). This enables the analyst to infer possible human behavior.

Finally, pollen grains in the final stages of disintegration but retaining identifiable features, such as furrows, pores, complex wall architecture, or a combination of these attributes, were assigned to the indeterminate category. Potentially, pollen grains without identifiable characteristics may not be counted. For example, a grain that is so severely deteriorated that no distinguishing features exist, closely resembles many spores. Pollen grains and spores are similar in size and are composed of the same material (sporopollenin). So that spores are not counted as deteriorated pollen, only those grains containing identifiable pollen characteristics are assigned to the indeterminate category. Thus, the indeterminate category contains a minimum estimate of degradation for any assemblage. If the percentage of indeterminate pollen is between 10 and 20 percent, relatively poor preservation of the assemblage is indicated, whereas indeterminate pollen in excess of 20 percent indicates severe deterioration to the assemblage.

In those samples where the total pollen concentration values are approximately at or below 1000 grains/g, and the percentage of indeterminate pollen is 20 percent or greater, counting was terminated at the completion of the abbreviated microscopy phase. In some cases, the assemblage was so deteriorated that only a small number of taxa remained. Statistically, the concentration may have exceeded 1000 grains/g. If the species diversity was low (generally these samples contained only pine, cheno-am, members of the Asteraceae [sunflower] family, and indeterminate pollen), counting was also terminated after abbreviated microscopy, even if the pollen concentrations slightly exceeded 1000 grains/g.

Results and Discussion

Table 13 presents the raw pollen counts and calculated pollen concentrations from this single sample. The individual results are presented below.

The total pollen concentration value for the sample from the sherd was 1417 grains/g, which was based on a pollen sum of 85 grains. *Pinus* pollen (733 grains/g) was low, as was cheno-am pollen (566 grains/g). Low spine Asteraceae, Cactaceae, and *Ephedra* pollen were all low to moderate (17 grains/g each); *Zea mays* was fairly high (67 grains/g). The adjusted pollen concentration value for *Zea mays*, based on the total number of grains in both the counts and the low magnification scan of the slide, was still significant at 16.1 grains/g. *Polygonum* (2.3 grains/g) was observed only in the low-magnification scan of the slide.

The number of taxa recovered from this sample was fairly low. The concentration values of *Pinus* suggest that pines were not locally available. At least some of this pollen may have been derived from roof construction, but this is speculative. Both *Pinus* and cheno-am pollen are low, which is expected from a room sample. The walls and roof block normal pollen deposition, thus reducing the pollen concentration values from within these rooms. *Zea mays* pollen from the counts (67 grains/g) was fairly high, which suggests that corn materials may have been stored within the ceramic vessel. Alternatively, the room contained a number of manos, so the corn pollen may have been from a room in which corn materials were processed.

The pollen concentration values for *Zea mays* are not great enough to suggest that the room was used for storage of large amounts of corn, as a granary. This pollen assemblage probably reflects storage of corn materials within the ceramic artifact because using the manos for mealing would have produced somewhat higher pollen concentration values.

While *Zea mays* pollen was perhaps the most diagnostic of the economic pollen types, other taxa were present although in much smaller quantities. Cactaceae pollen and a single grain of *Polygonum* were present in the assemblage, which suggests that the room was used for either storage or processing. Because the masonry room blocked normal pollen deposition, Cactaceae and *Polygonum* pollen were likely introduced to the assemblage via cultural vectors. Both taxa are insect pollinated; Cactaceae produce relatively little pollen. Thus, it is unlikely that these grains were accidentally incorporated into the assemblage by the mere presence of these plants in the vicinity. The lower pollen concentration values of these taxa suggest that the ceramic artifact may have stored plant materials of these types at one time.

Table 13. Raw pollen counts and concentration values

	Raw Count	Concentration Value (grains/g)
Pinus	44	733
Cheno-am	34	566
Low-spine Asteraceae	1	17
Cactaceae	1	17
Ephedra	1	17
Zea mays	4	67
Sum	85	1417
Marker	81	
% indeterminate	0	
Transects examined	4	
Total transects	29	
Marker/slide	587.25	
Lycopodium added	27,000	
Weight (g)	20	
Adjusted values (maximum estimated potential concentration)		
Zea mays	7	16.1
Cactaceae	2	4.6
Polygonum	1	2.3

Conclusions

The pollen assemblage contained very low concentrations of taxa normally thought to reflect natural deposition. Both *Pinus* and cheno-am pollen were present in low concentrations, along with very low amounts of low spine Asteraceae and *Ephedra* pollen. Poaceae and high spine Asteraceae were absent from the assemblage, which is consistent with decreased ambient pollen deposition.

The sample was taken from a large ceramic sherd and contained a moderate to high concentration *Zea mays* pollen along with small amounts of Cactaceae and a single grain of *Polygonum*. This suggests that the ceramic artifact was likely used to store primarily corn materials but also other plant materials. While it is possible that this pollen assemblage reflects corn processing within the room, such processing is unlikely to have occurred because it would have produced higher corn pollen concentration values.

CHAPTER 11

ARCHAEOBOTANICAL REMAINS

Pamela J. McBride

At Bushy Pueblo, LA 53677, two flotation samples were taken from the interior rooms of the small pueblo, and one from an exterior hearth (Table 14).

The extramural hearth yielded an unidentifiable charred seed and six unknown plant parts. One unknown, noncultural leaflet was also recovered. Two of the unknown plant parts closely resembled corn kernel fragments, but were too small to positively identify. In Room 1 of the pueblo structure, archaeobotanical remains yielded a charred cheno-am seed and two uncharred seeds of goosefoot and globe mallow, which are probably noncultural. From a partial ceramic vessel in Room 2, only noncultural material was recovered, including goosefoot, purslane, and dropseed grass seeds.

The few remains recovered from Bushy Pueblo could represent plant processing or possibly charred plant parts tracked into the site. Two-hand manos used for plant processing were found in the pueblo rooms, and corn was recovered from the palynological analyses, indicating that corn processing probably took place

Table 14. Flotation plant remains

	FS No.		
Feature	126 Extramural Hearth	410 Room 1 Floor	503 Room 2 Partial Vessel
Cultural			
Annuals: cheno-am		1[1]	
Other: unidentifiable	1[1]	3[1]	
Unknown	6[1] plant part		
Noncultural			
Annuals: goosefoot		1	15
Purslane			7
Grasses: dropseed			1
Other: unknown	leaflet[2]		
Perennials: globe mallow		1	

[1]Charred.

[2]One to ten per liter.

CHAPTER 12

CONCLUSIONS

Introduction

Brushy Pueblo (LA 53677) was a late prehistoric site consisting of a three-unit roomblock, a shallow pit structure or outside work area, and an exterior hearth. Approximately half of the roomblock was outside of the project limits, restricting the amount of data collected to about 50 percent of what was probably present. Several radiocarbon dates were obtained for the site, with the most likely being ca. A.D. 1300, placing it in the late Pueblo III/Early Pueblo IV period.

The data recovery plan for the site was limited in scope because of the small portion of the site within the right-of-way, and the few remains found during the testing program. The plan basically called for the examination of three research domains: obtaining an accurate chronometric assessment of the site; placing the site within a cultural context, particularly with regard to the Mogollon and/or Anasazi origins of sites in the Quemado area and its potential relationship with the Hubbell Corner site (LA 8112); and evaluating the subsistence adaptations of the site occupants (Oakes 2000).

Chronometric Placement of Site

Few sites in the Quemado area have been dated by absolute means. Early work by McGimsey (1980) provided almost half of all dates obtained. The result is a very low number of sites that can be accurately associated with a specific point in time, due primarily to the concentration on survey projects within the region rather than excavation. Instead, ceramic cross-dating has been heavily relied on within the region to assign temporal periods. Yet absolute dating of sites could play an important role in examining the cultural affinity of sites. For example, do sites with a preponderance of Mogollon ceramics and/or architecture date to a specific time period as opposed to sites with mostly Anasazi characteristics?

Sites in the area that have been dated by radiocarbon analysis or dendrochronology are shown in Table 15, which shows that only nine sites in the entire region have firm dates associated with them, from no earlier than A.D. 600 and none from Archaic and Pueblo I sites. This is a very poor representation of regional occupation. Brushy Pueblo is one of the few sites in the area that have been excavated since McGimsey's extensive work. The presence of numerous Middle to Late Archaic projectile points found on surveys indicates a fair number of hunter-gatherer occupations in the region, but we have no idea when this occupation began or for how long it continued.

Brushy Pueblo, at A.D. 1300, appears thus far to be the latest dated site in the region, although it is not necessarily the latest site. Some of the larger pueblos occu-

Table 15. Sites with absolute dates in the study region

Site	Date (A.D.)	Site Type	Dating Method	References
Cerro Colorado	604 to 737	BM III	tree ring	Bullard 1962; Robinson and Cameron 1991:22
	1128 to 1134	PII	tree ring	Bullard 1962; Robinson and Cameron 1991:22
CEB:3:19-A	Early 1000	PII	tree ring	Bannister et al. 1970
Williams Ranch	1015	PII	tree ring	Smith 1973; Robinson and Cameron 1991:22
LP:2:35-D	1031 to 1034	PII	tree ring	Bannister et al. 1970
Site 188	1071	PII	tree ring	McGimsey 1980; Hogan 1985:122
Site 494	1191	PIII	tree ring	McGimsey 1980; Robinson and Cameron 1991:22
Horse Mill Camp	1236 to 1286	PIII	tree ring	McGimsey 1980; Robinson and Cameron 1991:22
Site 481	1248 to 1271	PIII	tree ring	McGimsey 1980; Robinson and Cameron 1991:22
Brushy Pueblo	1300	PIII/PIV	carbon-14	Documented in this report

Table 16. Comparison of regional decorated wares

	Site 494		Site 481		Hubbell Corner		Brushy Pueblo		Site 616	
Types	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Red Mesa Black-on-white	-	-	304	6.3%	3	0.3%	-	-	-	-
Gallup Black-on-white	6	0.9%	434	9.1%	-	-	-	-	-	-
Puerco Black-on-white	27	4.0%	-	-	-	-	-	-	-	-
Reserve Black-on-white	556	81.4%	1173	24.5%	133	14.1%	1	1.0%	409	4.7%
Tularosa Black-on-white	13	1.9%	1604	33.5%	399	42.4%	81	80.2%	5576	63.8%
Snowflake Black-on-white	-	-	-	-	-	-	1	1.0%	-	-
Wingate Black-on-red	81	11.9%	803	16.8%	32	3.4%	-	-	914	10.5%
Wingate Polychrome*	-	-	-	-	7	0.7%	-	-	38	0.4%
St. Johns Black-on-red	-	-	-	-	-	-	15	14.9%	-	-
St. Johns Polychrome	-	-	473	9.9%	366	38.9%	1	1.0%	1121	12.8%
Klagetoh Black-on-white	-	-	-	-	-	-	1	1.0%	-	-
Springerville Polychrome	-	-	-	-	-	-	1	1.0%	94	1.1%
Pinedale Polychrome	-	-	-	-	-	-	-	-	147	1.7%
Heshotauthla Polychrome	-	-	-	-	-	-	-	-	447	5.1%
Total	683	100.0%	4791	100.0%	940	100.0%	101	100.0%	8746	100.0%

*Includes Hauck Polychrome and Querino Polychrome.

pied in the late A.D. 1200s (dates derived from ceramic dating) should be tested for datable tree-ring samples. Questions regarding sequentiality of occupied sites and, ultimately, abandonment of the region are difficult, if not impossible, to answer without confirmed dates for sites.

The wide variety of ceramic types present within this region alleviates the chronometric problem somewhat. The ability to place many pottery types within a tight temporal framework allows for a reasonable assumption that correct time periods are represented in site assessments. However, sequence of site occupations from one site to another remains difficult to determine.

Cultural Context of Site

There are two issues regarding the placement of Brushy Pueblo within a cultural context. One involves the relationship of this small roomblock to the much larger Hubbell Corner site, only 300 m to the northwest. The other issue is more complex: assessing whether this site is Mogollon or Anasazi (or both, or neither).

Relationship to Hubbell Corner Site

The Hubbell Corner site is a quite large, late Pueblo III roomblock with a great kiva and several other small, integrative units. Its size is estimated at 220 rooms; it dates to the A.D. 1200s, possibly extending to A.D. 1300. No tree-ring dates were obtained, so dating is based on the presence of Tularosa Black-on-white and several late polychrome ceramic types. Because the end dates for some of the ceramics extend somewhat beyond A.D. 1300, it is a possibility that Brushy Pueblo was constructed toward the end of the occupation at Hubbell Corner. The small roomblock could represent an outlying fieldhouse for the larger pueblo; however, the variety of materials found suggests that a full complement of activities was carried out by a group perhaps the size of an extended family. We propose, instead, that Brushy Pueblo could have splintered off from Hubbell Corner, removing itself from within pueblo confines for unknown reasons, or it could have been constructed just after Hubbell Corner was abandoned, with its occupants remaining in the Hubbell site area.

To further examine potential relationships between the two sites, ceramic assemblages and other aspects of the sites were compared. Basically, the major decorated wares were the only tabulated ceramic types available for comparison. These are presented in Table 16 along with the few available comparative assemblages from nearby sites. Sites are ordered from earliest to latest. Frequency of utility wares was not recorded on earlier excavated sites and can only be compared in very gross terms (see following section).

According to Table 16, Brushy Pueblo does not appear to be the latest occupied site in the region. The large, enclosed-walled pueblo of Horse Mill Camp (Site 616) contains later ceramics, mostly polychromes. Two other large pueblos (Sites 494 and 481) have similar architectural formats and ceramic assemblages to Horse Mill Camp, and are, therefore, probably later in time also. From an examination of the ceramic assemblages, it does not seem that Brushy Pueblo and Hubbell Corner are contemporary. Brushy Pueblo contains several late ceramic types not found at Hubbell, suggesting a slightly later occupation. A greater proportion of Tularosa Black-on-white, in particular, also indicates a later date for Brushy Pueblo.

Architectural similarity could not be evaluated because only the great kiva was excavated at Hubbell Corner (McGimsey 1980), where sandstone and basalt blocks were set into the face of the interior walls. Ground stone artifacts at both sites include wedge-shaped manos and slab metates; however, Hubbell Corner had several other types of manos. The five projectile points from Hubbell do not conform to the style of the single projectile point from Brushy Pueblo. Three pieces of shell were found at Hubbell Corner, one similar to the type recovered at Brushy Pueblo. In general, however, the artifact assemblages are too small to accurately assess continuity in types or styles between the two sites.

Mogollon or Anasazi Associations?

The Quemado area has always been identified as a mix of Mogollon and Anasazi cultures. This assessment is based primarily on the finding of both gray wares of the Anasazi tradition and brown wares of the Mogollon tradition, often on the same site. Dittert (1959) noted that this area was on the southern border of the Acoma Culture Province, and, because gray wares seemed to dominate, he considered it to be Anasazi. He concluded that the brown wares present at Quemado area sites were intrusive even though they outnumbered gray wares at many sites.

Dittert (1959) believes that the brown wares were brought to the area by actual migrations of Mogollon peoples from the south. Others would contend that gray wares were introduced to the area by Anasazi populations moving south. However, as Stuart and Gauthier (1981) indicate, it would be highly unlikely for migration to have occurred simultaneously from both the north and south. Tainter and Gillio (1980) suggest that the areal population may have consisted of local groups participating in an economic interaction sphere that included areas to both the north and south. Crown (1980) looked at the composition of the gray and brown wares for the area and concluded that gray wares dominated and were thus probably local, whereas brown wares varied more in composition, were fewer in number, and, therefore, were probably traded into the area. Hogan's (1985) interesting belief was that the basic occupation was Anasazi, but when brown wares dominated, both Mogollon and Anasazi peoples were present, and the Mogollon population continued to make brown wares. Camilli et al. (1988) maintain that the area was a transitional zone between the Mogollon and the Anasazi.

First, it should be noted that since the 1980s there has been a major advance in our understanding of the composition of brown wares. While most agree that Mogollon peoples made brown wares, the belief has continued that sometimes they were also made in the Quemado area by immigrant Mogollon populations, which accounts for their presence there. The fact is that brown wares are made from a brown volcanic paste available in southwestern New Mexico, specifically the Mimbres area and the Mogollon Highlands, and into southeastern New Mexico; it is not available in the Quemado area or in nearby regions to the north. Any brown wares found in the Quemado area were not made locally, but were imported from somewhere to the south. Likewise, gray wares were probably locally made, or at least produced in the region around Quemado and to the north. Therefore, even the Reserve Black-on-white and Tularosa Black-on-white ceramics, originally thought to have been produced in the Reserve area of the Mogollon Highlands, are gray wares, geologically derived from the gray pastes of the Quemado region or nearby. We can, therefore, rule out the probability of Mogollon peoples making the vast numbers of brown ware utility pots in the Quemado area. While researchers have not yet pinpointed the exact origins of the Reserve-Tularosa series, it is certain that it is regionally produced because it decreases in frequency towards both Zuni and Acoma, where Puerco Black-on-white takes its place.

What must be addressed, however, is the fact that in the Quemado area there are both gray and brown utility wares present at the same site and at different sites in varying proportions. There seems to be only one plausible explanation for this finding in light of the above conclusions: differing degrees of trading partnerships with Mogollon people to the south. Actual migration of Mogollon populations would not have allowed them to continue to produce brown wares without a reliable and plentiful source of brown clays, of which there are none in the Quemado area. Yet there is a marked increase in brown wares at sites over time (Fig. 27). The premise that sites were involved heavily in trading partnerships was examined by charting all Quemado area sites where brown and gray utility wares could be tabulated, noting the percentages of each. The result was a data base of 208 sites, ranging from Basketmaker III to late Pueblo III. These were then plotted by time period and by percentage of brown wares present, which ranged from 0 to 100 percent (Fig. 27). The data were somewhat skewed by their derivation primarily from survey sources, but the surveys were large-scale, which made the data relatively comparable.

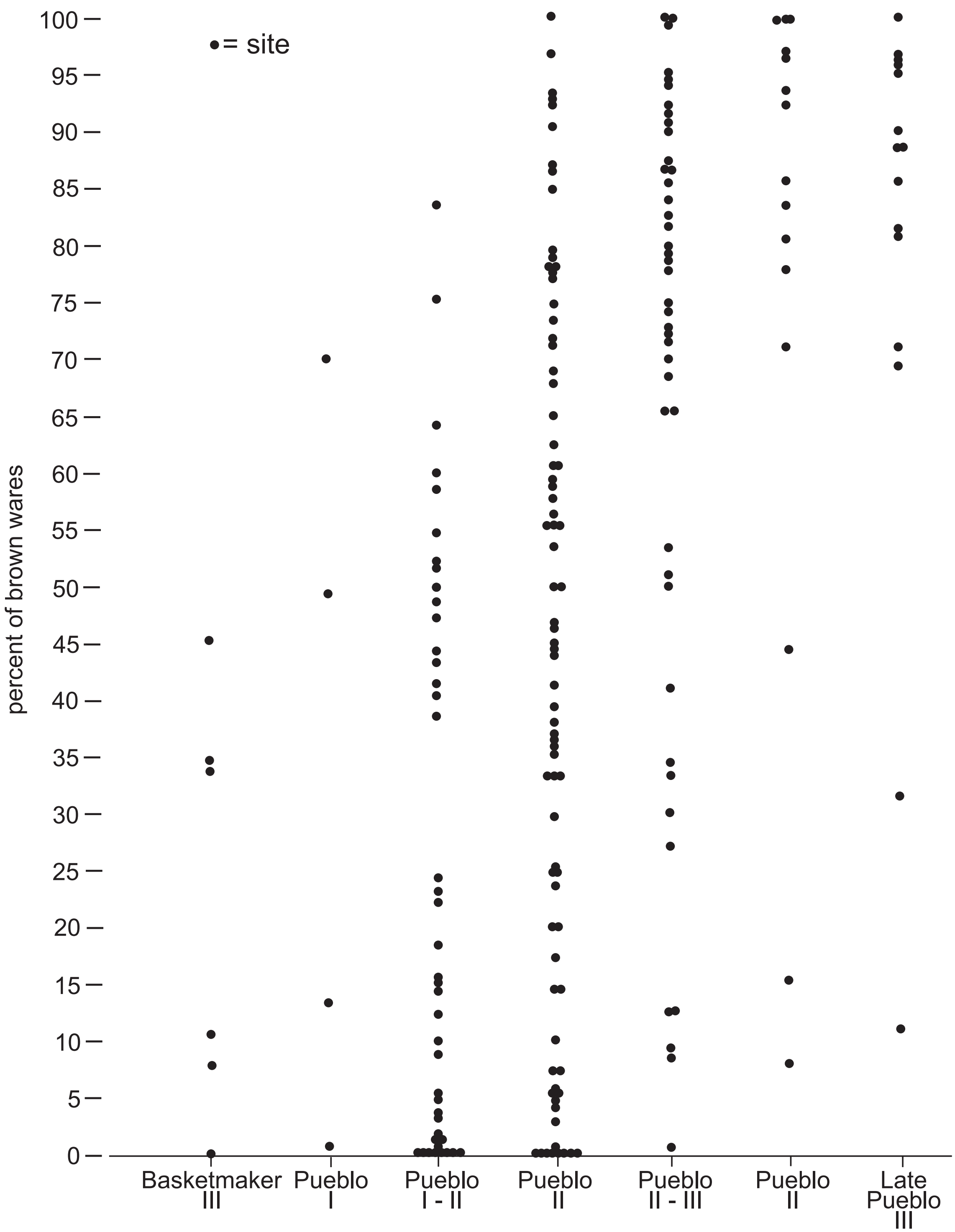

Figure 27. Increasing presence of brown utility wares in the Quemado area

The results in Fig. 27 were somewhat surprising. First, most sites contained both gray and brown wares; only seven sites (3.4 percent) contained exclusively brown wares, and 17 sites (8.2 percent) contained exclusively gray wares. Second, sites were almost evenly divided in terms of dominance by either brown or gray wares: gray wares dominated in 48 percent of sites, brown wares dominated in 52 percent. Larger sites tended to be dominated by brown wares, with the exception of two late Pueblo III sites that showed a marked decrease in brown ware presence: LA 48056 (New Cox Ranch Pueblo) and LA 48031, both with over 120 rooms (site-size data are not included in Fig. 27). Most interesting was the increasing dominance of brown wares over time. While data are scant for the Basketmaker III and Pueblo I periods, evidence seems to point to the dominance of gray wares at this early time. Then, in the Pueblo I-Pueblo II period, brown wares occurred in greater numbers, frequently on the larger sites. By Pueblo II times, the shift was more marked, and lasted until Pueblo II-Pueblo III, when most sites were dominated by brown wares (usually with corrugated sherds); they remained that way until abandonment.

An explanation for the above results is the establishment of a progressively intensive trade network that acquired Mogollon brown utility wares from the Mogollon Highlands (because it is the closest brown ware area to the Quemado region). But why trade for Mogollon brown utility wares? The main reason is the exceptional quality of Mogollon brown wares versus pottery (including gray wares) made anywhere in the Southwest at that time. Brown ware clay is mostly self-tempered, of high plasticity, very malleable, can be fired at low temperatures, can be easily coiled and corrugated, and produces vessels of superior craftsmanship (Wilson 2001). In contrast, Anasazi gray wares are coarser and more porous. It appears that sometime after A.D. 700, trade in brown wares became part of increasing relations with the Mogollon Highlands or populations to the south. These relations never waned, even up to abandonment of the area, with the two exceptions noted above (which could be a sign of changing alliances, but it is impossible to determine from the limited data). The many sites throughout the Quemado area at which gray wares dominate are overwhelmingly small sites, and may have been out of the trading loop because of geographic location or remoteness from larger trading centers, if such entities existed. Unfortunately, exact locations of many sites could not be determined from report data and, therefore, the issue could not be further addressed.

What would the Quemado people have traded for such a large quantity of brown utility vessels? We suggest the answer to be "more pots". The Mogollon Highlands population produced outstanding brown wares, but it did not manufacture any brown decorated wares after about A.D. 900, which saw the production of Three Circle Red-on-white, a sparsely produced item. Instead, they relied on, and actually came to be associated with, Reserve Black-on-white and Tularosa Black-on-white, although these were gray wares not made in the Highlands. Both were imported into the area. But from where? Our supposition is that they came from the Quemado area or the surrounding region in exchange for the excellent Mogollon brown utility wares. Their presence in the Reserve area around A.D. 1000 coincides nicely with the increasing occurrence of brown wares in Quemado at that time. Utility gray wares show up rarely in the Mogollon country and are obviously not a trade item. Other trade goods such as shell, obsidian, minerals, and jewelry are low in frequency in both areas, which indicates some trade activity with other groups, but not in amounts that would account for the large masses of pottery being exchanged. White Mountain Redwares enter both the Mogollon and Quemado areas at about A.D. 1200, and do not seem to have influenced the exchange of pottery between the Mogollon people and those from Quemado, which was established much earlier.

Does the presence of a strong trading partnership between the Highlands and Quemado indicate separate cultural entities or systems? Not necessarily. The Quemado area, while filled with sites after about A.D. 1100, is geographically isolated. Much larger groups existed to the north, west, and south. With which were the Quemado people affiliated, or were they strictly a local development? The numerous Anasazi decorated wares also present at Quemado sites point to a gray ware, or Anasazi, tradition. Architecturally, the few sites excavated also suggest an Anasazi orientation, exemplified by predominantly circular kivas, several D-shaped units, some Chaco-style wall coursing, and quadrangular-walled pueblos with large interior plazas. Fowler et al. (1987) have recorded what they believe to be Chacoan great houses with great kivas and remnants of roadways not far from Brushy Pueblo. Tainter and Gillio (1980) proposed examining burial populations for clues to cultural affiliation, but samples are few and difficult to obtain for testing.

If Quemado peoples were affiliated with the Anasazi, can that be assumed to tie them into the Chacoan system as an outlier group living on the southernmost boundary of the system? Several researchers would place this area in the Chaco sphere of influence (LeBlanc 1989:347; Tainter and Plog 1994), although the dynamics of the Chaco boundary system to the south are not well understood (Neitzel 1994). Through time, however, boundaries change, expand, loosen, and even

Table 17. Subsistence resources noted on Quemado sites

Resource	Site 494	Site 481	Hubbell Corner	Brushy Pueblo	Site 616	Site 188	Site 482
Mule deer	2	12	2	1	18	-	present
Pronghorn	3	12	3	-	34	-	-
Bison	-	1	1	-	8	-	-
Bighorn sheep	-	-	-	-	1	-	-
Coyote	-	-	-	-	4	-	-
Dog	-	5	-	-	3	-	-
Wolf	-	-	-	-	1	-	-
Bobcat	-	2	-	-	1	-	-
Fox	-	-	-	-	-	-	present
Rabbit	54	45	5	12	21	2	present
Turkey (large bird)	1	45	1	-	45	1	-
Skunk	1	-	-	-	-	-	-
Prairie dog	1	1	-	-	-	-	-
Unidentified	237	250	-	1	370	21	-
Corn	-	present	-	present	present	present	-
Red bean	-	-	-	-	-	present	-
Cheno-am/cactus	-	-	-	present	present	-	-
Ephedra	-	-	-	present	-	-	-

disappear. The importation of brown utility wares and exportation of decorated gray wares in progressively increasing amounts do not seem to be superficially affected by the waxing and waning of the Chaco system within the occupation span of the Quemado area. The trading partnership appears to be strictly a matter of economics (whether derived from Chacoan influences or not), with both areas benefitting from the exchange of better quality pottery than they could make themselves.

Subsistence Adaptations

At Brushy Pueblo, the hope was to be able to evaluate subsistence resource use by pueblo occupants in order to examine evidence of resource stress as a possible cause of the population moving to the higher elevations surrounding Mariano Mesa by Pueblo III times. Evidence of food processing on the site was hoped for, and macrobotanical, palynological, and faunal materials were collected whenever possible. Unfortunately, the few subsistence resources recovered were not sufficient to analyze the issues of subsistence stress.

Subsistence data (from McGimsey's 1980 report) from other excavated sites in the region were examined. At that time, data were usually presented in lists that frequently omitted exact counts. The resultant summary table (Table 17) indicates the materials that were at least present at surrounding sites and at Brushy Pueblo. Corn is well represented as a subsistence commodity, the common red bean less so. Other than cheno-ams, cactus, and *Ephedra*, no other vegetal materials were found.

A variety of faunal species are represented, including deer, pronghorn, bison, bighorn sheep, and turkey. Bison could have been found on the nearby plains, and bighorn sheep in the Datil Mountains, if not in the Gallo Mountains to the south. Turkey domestication is suggested by frequent mention. Although counts are low, a comparison of available artiodactyls (deer, pronghorn, bighorn sheep, and bison) and leporids (rabbits) was made to determine whether there was any trend towards resource depletion. The operating premise was that an imbalance in the proportions of artiodactyls and rabbits at a site produces a low artiodactyl index, which is a possible indicator of resource stress (Szuter and Bayham 1989).

Table 18 compares artiodactyl indices of sites with suitable data (earliest on the left, latest on the right). Of the five site indices presented, three are probably more accurate because of their higher counts (Sites 481, 494, and 616). Unexpectedly, the artiodactyl index increases over time, indicating increasing use of deer, pronghorn, etc. The provocative conclusion here is that faunal resources were not dwindling in the Quemado area late in prehistory, as they were in other areas of the Southwest, including the Mogollon Highlands to the south (Oakes 2001). We strongly believe that more data are needed, however, before adhering to this conclusion. An extensive excavation of a larger site in the region with careful attention to the collection and analysis of subsistence items would better address this issue.

Table 18. Artiodactyl indices for Quemado sites

Fauna	Site 494	Site 481	Hubbell Corner	Brushy Pueblo	Site 616
Artiodactyls (A)	5	25	6	1	61
Leporids (L)	54	45	5	12	21
Index: A/(A+L)	0.08	0.36	0.55	0.08	0.74

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