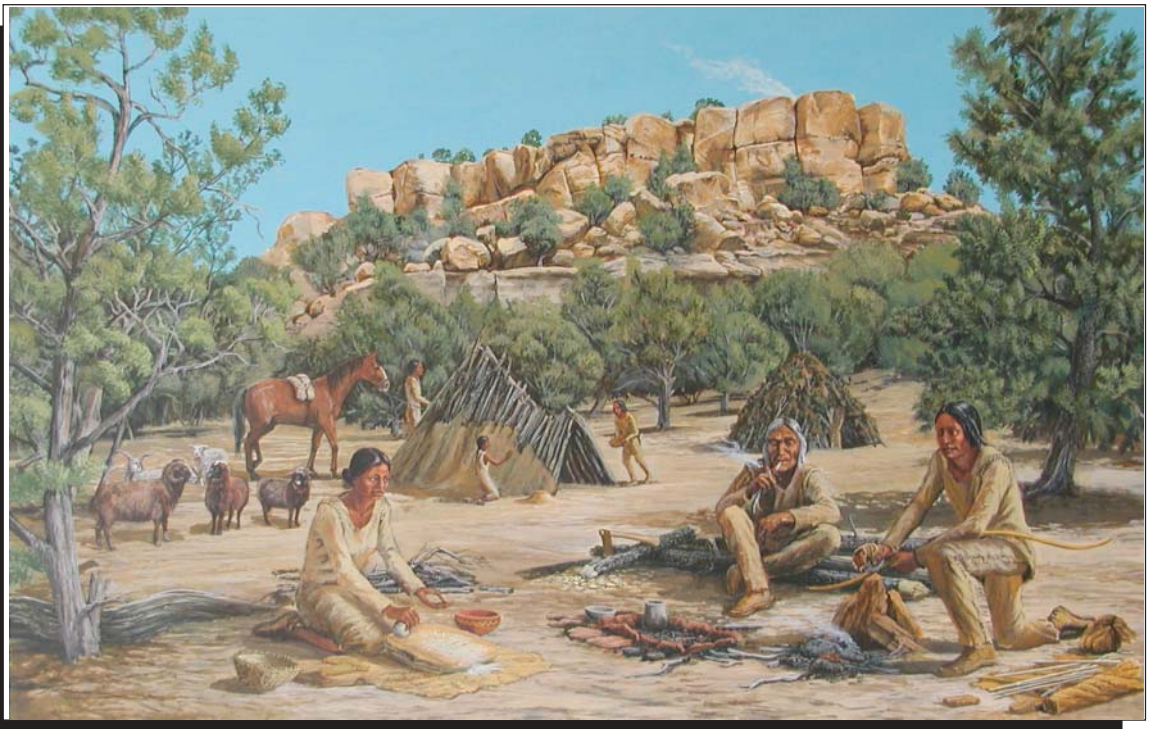
NAVAJO



Artist's concept of the Navajo occupation of site LA80316 at the base of the Butte Site, LA46147 (by Cory Dangerfield 2000).

NAVAJO SYNTHESIS

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Chapter 6

NAVAJO: 1500-1800

by Marian Rohman, Jerry Fetterman and Linda Honeycutt

INTRODUCTION

Project Area Sites

A total of 18 Navajo sites were located in the project area. As can be seen from Figures 6-1 and 6-2, all 18 were situated in northwestern New Mexico, in an area referred to by the Navajo people as the Dinetah, their homeland. The Dinetah is generally bounded by the Continental Divide to the east, Chaco Canyon to the south, the Animas River to the west and the Colorado-New Mexico border to the north (Copeland and Rogers 1996).

Fourteen of the sites were initially discovered and investigated during 1990 and 1991 Arkansas Loop (AL) project. During the current (MAPL) archaeological investigations, six of these 14 sites were revisited and Navajo components were identified at four additional sites. Table 6-1 summarizes these 18 sites.

Previous Archaeological Work

Archaeological investigations have been carried out in this area since the early 1900's. Of particular relevance here are seven projects: the Navajo Reservoir Project, between the confluences of the Los Pinos and Piedra rivers with the San Juan river (Eddy, et al. 1966); the Navajo Pueblito Project (Marshall and Hogan 1991); the La Plata Mine Project in the La Plata River Valley (Brown 1991); the Arkansas Loop Pipeline Corridor excavations (Honeycutt and Fetterman 1994); the Morris 1 Early Navajo Land Use Studies (Dykeman and Wharton 1996); the Frances Mesa Alternative Treatment Project, northeast of Gobernador Canyon (Wilshusen et al., 2000), and the Fruitland Project, covering much of the Dinetah north of Largo Canyon (Sesler and Hovezak, in prep.)

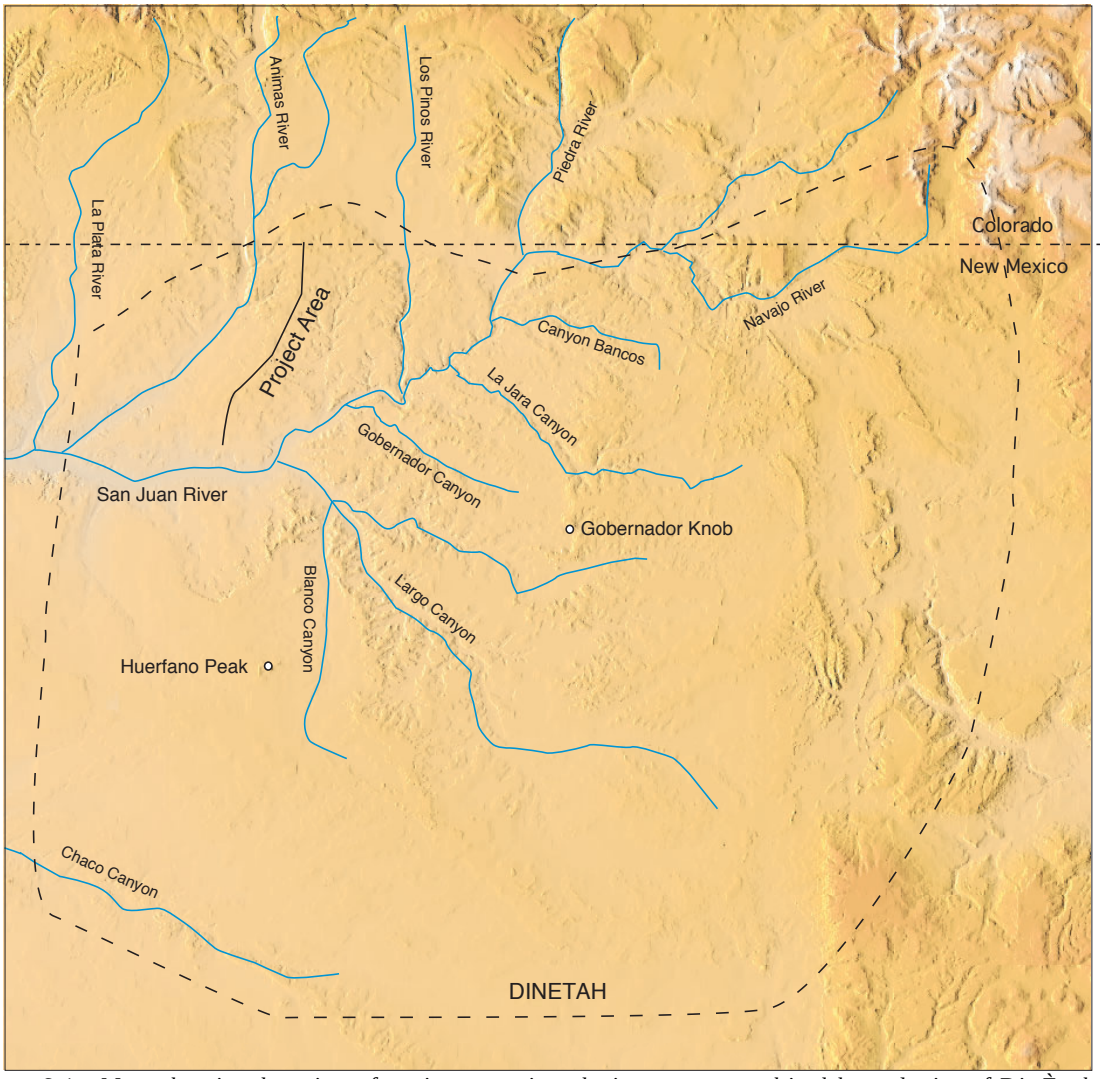

Figure 6-1. Map showing location of project area in relation to geographical boundaries of DinÈtah.

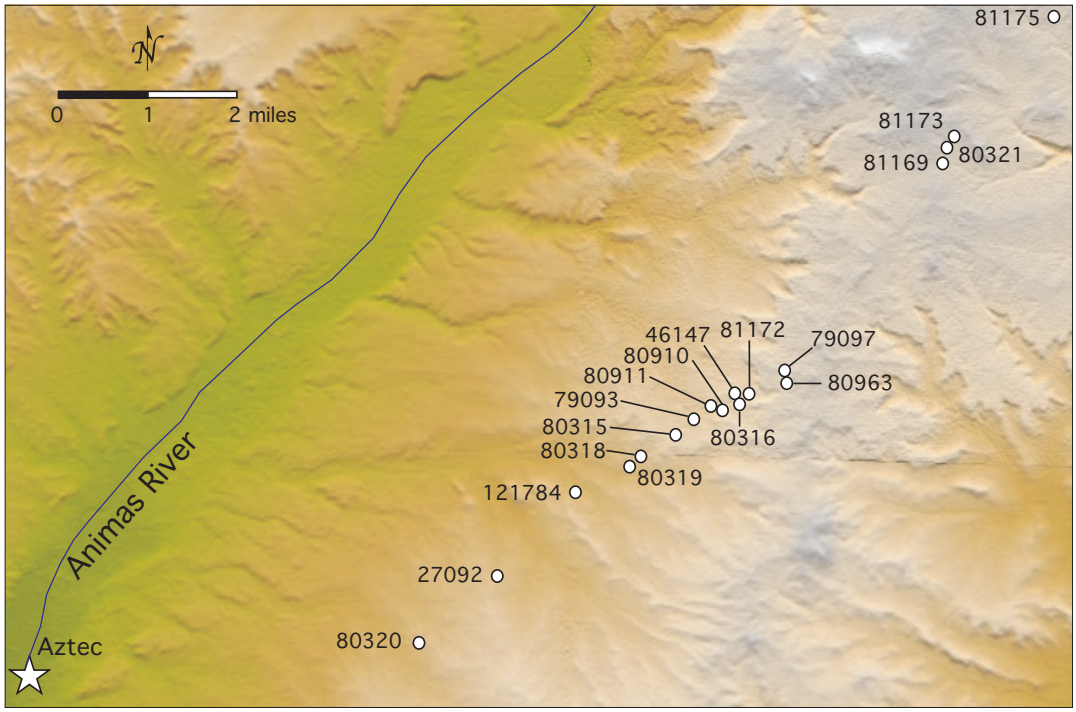

Figure 6-2. Close-up map showing location of Navajo sites in relation to project area in New Mexico.

Table 6-1. Sites with Navajo Components

Site #	Project	Site Type	Phase or Subphase
LA27092	MAPL	field camp	Gobernador
LA46147	MAPL	field camp	Early Gobernador
LA79093	AL	field camp	unknown
LA79097	AL	residential base	Gobernador
LA80315	AL	field camp	Dinetah or Early Gobernador
LA80316	AL, MAPL	residential base	Early Gobernador
LA80318	AL	field camp	unknown (Dinétah?)
LA80319	AL, MAPL	residential base	Dinetah or Early Gobernador
LA80320	MAPL	field camp	unknown
LA80321	AL, MAPL	field camp	Late Gobernador
LA80910	AL	residential base	Gobernador
LA80911	AL	field camp	unknown (Dinétah?)
LA80963	AL	residential base	unknown (Dinétah?)
LA81169	AL, MAPL	field camp	unknown (Dinétah?)
LA81172	AL, MAPL	residential base	Early Gobernador
LA81173	AL	field camp	unknown
LA81175	AL, MAPL	residential base	Early Gobernador
LA121784	MAPL	field camp	Gobernador

CHRONOLOGY

Introduction

The Navajo presence in DinÈtah is divided into two major phases – the DinÈtah phase (ca.1500-1630), encompassing the entrance and settling of the Navajo people in the area, and the Gobernador phase (ca. 1630-1800), during which time the Navajo culture became fully defined. The division (1630) between the Dinetah and Gobernador phases is based on the recovery of Gobernador Polychrome sherds from securely dated sites (Reed and Reed 1996). Recently, archaeologists have proposed separating the Gobernador into Early and Late subphases, based roughly on the time of the Spanish reconquest and construction of pueblitos; Brown (1996) suggests 1700, and Reed and Reed (1996) suggest 1721.

Project Area Sites

Dendrochronological Dating

Four sites produced dendrochronological dates. The dates and the phase they indicate for each site are listed in Table 6-2.

Table 6-2. Dendrochronological Dates from Navajo Contexts

LA46147	LA80321	LA81172	LA81175
Early Gobernador	Late Gobernador	Early Gobernador	indeterminate
1200-1615+vv	879-1364++vv	1453-1540+vv	763-1065vv
1350-1632++vv	1390-1580+vv	1501-1600vv	976-1096vv
1338-1651++vv	1575-1673++vv	1428-1627GB	883-1141vv
1359-1678+vv	1608-1691+vv	1384-1629vv	
1597-1680v	1635-1713+vv	1469-1629vv	
1333-1680GB	1525-1738++vv	1394-1630vv	
1559-1680G	1646-1741+vv	1583-1631vv	
1561-1681v	1614-1750vv	1491-1634vv	
	1549-1760++vv	1465-1634vv	
		1447-1647vv	
		1634-1762v	

LA46147

The samples from LA46147 were taken from culturally modified trees ringing the known borders of the site. These samples yielded the most definitive results, with four cutting or near-cutting dates in 1680 and 1681. While these samples are not directly related to the structure or features on the site, they do pinpoint its period of use. Of special note is the presence of steel ax marks on some of these trees, dating the use of steel tools in the area.

LA80321

Samples taken from two large pit features yielded only noncutting dates. Dates from one feature were 1364 and 1580, indicating that this feature dated after 1580. Dates from the other feature ranged from 1673 through 1760, indicating that the feature was used after 1760. Since these two features were both of an unusual deep cylindrical style and they originated at the same stratigraphic level, they are presumed to be contemporaneous. Therefore, the site was placed in the Late Gobernador subphase dating to post-1760.

LA81172

The interpretation of the dendrochronological dates from this site is problematic. Of the eleven samples (all from the same pit), seven yielded non-cutting dates that clustered between 1629-1647, one yielded a cutting date of 1627 and one yielded a near-cutting date of 1762.

For the purposes of this chapter, the primary author had chosen to interpret these data as meaning that this feature dates to the 1600's, and that the 1762 date is the result of lab error, probably before the sample was submitted for analysis. There are additional reasons for considering this feature, and therefore the site, as dating in the mid-to-late 1600's. It is a habitation site typical of that time period located in close proximity to two other habitation sites that are securely dated to 1680-81 (LA46147) and 1658-1675 [±27 years] (LA80316). . The ceramic assemblage contains Rio Grande Glaze E and Sityatki Polychrome sherds, dating to 1515-1625 (Reed and Reed 1992) and 1400-1625 (Blinman and Wilson 1994) respectively. The lithic assemblage is more similar to those of LA46147 and LA80316 than it is to that of LA80321, the only Late Gobernador site in the study area. For these reasons, LA81172 is considered a probable Early Gobernador subphase site.

LA81175

All three of the dates were early non-cutting dates. Since these samples were all from the roof fall of Structure 3, a clearly Navajo structure, they are assumed to be related to the use of very old wood.

Thermoluminescence Dating

Thermoluminescence dates were obtained on five sherds from two sites in the study area (see Table 6-3). As can be seen from this table, the dates place both sites in the Early Gobernador subphase. (The sherd that yielded the 1400's date range was from a non-Navajo, disturbed context.)

Table 6-3. Thermoluminescence Dates from Navajo Contexts

Site #	Date ± standard deviation	Phase
LA80316	1653 ± 24	Early Gobernador
LA81175	1459 ± 61	pre-Navajo
	1658 ± 36	Early Gobernador
	1661 ± 47	Early Gobernador
	1675 ±27	Early Gobernador

Archaeomagnetic Dating

A single archaeomagnetic sample, taken from LA81175, Feature 101, yielded three date ranges: pre-600-675, 1450-1550, and 1675-1850. The last date range overlaps one of the thermoluminescence dates obtained for the site and supports its assignment to the Early Gobernador subphase.

Radiocarbon Dating

Radiocarbon dates were obtained from 11 of the 18 Navajo sites. Most of these dates were obtained from wood charcoal samples which appear to reflect an "old wood" problem. Seven of these dates were obtained from annual plant remains. Table 6-4 presents the 2-sigma calibrated date ranges, and the phase or subphase indicated for each site by interpreting these dates at face value. Dates within the Navajo phase occupation are in **bold**.

Table 6-4. Radiocarbon Dates from Navajo Contexts

LA79093	LA79097	LA80315	LA80316	LA80318	LA80319	LA80910	LA80911	LA81169	LA81172	LA81175
pre-Navajo	Navajo	Early Gobernador	Early Gobernador	Navajo	Early Gobernador	Early Gobernador	Navajo	Early Gobernador	Early Gobernador	Navajo
1220-1450	1270-1440	1220-1450	1290-1440	650-990	670-1030	1270-1420	680-990	**1420-1650**	1260-1410	670-960
	900-1154	1327-1476	**1450-1650**	1030-1280	1030-1290	1270-1430	1270-1440	**1480-1955**	1290-1440	1020-1270
	1000-1200	**1430-1660**	**1450-1660**	1057-1400	1210-1384	**1400-1624**	**1290-1617**		1310-1455	1040-1290
	1010-1260	**1470-1955**		**1280-1617**	1047-1389	**1280-1633**			**1327-1640**	1220-1400
	1020-1260			**1430-1955 J**	1220-1389	**1440-1650**			**1400-1650**	1230-1410
	1000-1270				1230-1400	**1520-1955 C**			**1440-1660**	1290-1450
	1040-1270				1200-1410				**1250-1955**	1290-1450
	1047-1280				1270-1430					1290-1450
	1054-1280				1290-1450					1321-1470
	1160-1280				**1322-1633**					**1316-1640**
	1170-1280				**1440-1640 J**					**1440-1955 B**
	1170-1280				**1290-1650**					**1523-1955**
	1056-1290				**1460-1655 C**					
	1160-1290				**1520-1955 C**					
	1258-1395									
	1260-1400									
	1260-1400									
	1160-1410									
	1280-1440									
	1420-1955 G									

Note: B = bark, C = corn, G = goosefoot seeds; J = juniper fruits

Ceramic Chronology

by Lori Reed

Ceramics representing ancestral Navajo occupations in the MAPL project area were identified at 10 sites, comprising an assemblage of 2,759 sherds. Ninety-nine percent of the sherds are Dinetah Gray. Gobernador Polychrome, Jemez Black-on-white, Jeddito Yellow Ware, Rio Grande Glaze Ware, and Zuni/Acoma Glaze Ware comprise the decorated assemblage. Dating of Navajo assemblages in the Dinetah has been problematic due to long manufacturing ranges for Dinetah Gray and many of the Puebloan trade wares. Until recently (see Langenfeld 2002; L. Reed and P. Reed 1992; P. Reed and L. Reed 1996), Gobernador Polychrome was regarded as an 18th century decorated ware whose manufacture may have begun in the 1680's. As discussed below, the MAPL assemblages provide an opportunity to further evaluate the temporal patterning of ceramic types on Navajo sites.

From a ceramic chronometry standpoint, the MAPL Navajo assemblages correlate well with the general trends identified for other assemblages from the Dinetah (see Langenfeld 2002; Wilson 2000). Table 6-5 identifies the MAPL sites having Navajo components, their ceramic types, ceramic data ranges, and absolute chronometric dates (dendrochronology and thermoluminescence). Some of these sites also have radiocarbon date ranges, but these dates are not presented as part of the ceramic chronometry assessment. For this assessment, the most accurate dating techniques with the shortest ± ranges are compared with ceramic types and ceramic date ranges.

Table 6-5. Correlation of Ceramic Dates and Absolute Dates for MAPL Navajo Sites

Site #	Ceramic Types	Sherd Count	Ceramic Date	Absolute Date
LA27092	Dinetah Gray, Gobernador Polychome, Jeddito Yellow	41	1625-1760	None
LA46147	Dinetah Gray, Gobernador Polychrome	131	1625-1760	1680-1681*
LA80316	Dinetah Gray, Gobernador Polychrome, indet. Glaze ware, Jeddito Yellow	116	1625-1760	1653±24**
LA80321	Dinetah Gray	12	1500-1760	post-1760*
LA81169	Dinetah Gray, Jemez Black-on-white	48	1500-1760	None
LA81170	Dinetah Gray	4	1500-1760	None
LA81172	Dinetah Gray, Jemez Black-on-white	62	1500-1760	post-1647*
LA81175	Dinetah Gray, indet. Glaze ware, Gobernador Polychrome, Jemez Black-on-white, Rio Grande Glaze F, Zuni/Acoma glaze ware	2248	1625-1760	1658±36 to 1675±27**
LA121784	Dinetah Gray, Gobernador Polychrome	97	1625-1760	None

* Dendrochronological dating; ** Thermoluminescence dating

Beginning with assemblages having only Dinetah Gray and no decorated ware, LA 80321 and LA 81170 are the only MAPL sites containing only utility ware. If it is assumed that Gobernador Polychrome is indicative of a 17th or 18th century occupation, then the absence of the type would indicate a Dinetah phase assemblage. Unfortunately, this logic does not work for Navajo ceramic assemblages as demonstrated by the post-1760 tree-ring date obtained for LA 80321. In this case, a small assemblage of Dinetah Gray sherds is associated with a post-1760 tree-ring date falling well within the latest occupation of the Gobernador phase. As for LA 81170, absolute chronometric dates were not obtained from the site, resulting in a ceramic date range for the site spanning the entire early Navajo sequence, 1500-1760.

Several possible scenarios come to mind for explaining the sporadic occurrence of ceramic assemblages containing only Dinetah Gray during the Gobernador phase. These scenarios include functional and social contexts for which the presence of decorated ceramics was not required. In Langenfeld's (1999) examination of ceramics, site function, and household pottery distributions from the Morris 1 Block Survey, she identified a range of Gobernador phase site types lacking ceramics altogether, including single and multiple habitations, special activity camps and resource procurement sites, and sweat lodges. It is conceivable that pottery was used at these sites (e.g., a Dinetah Gray jar to carry water for a sweat lodge), but unfortunately for archaeologists the folks using the site were fortunate enough not to break a pot. This explanation may be applicable to some Gobernador phase sites having assemblages comprised only of Dinetah Gray. Decorated pots or tools produced from decorated sherds may have been used at the site, but were not left behind after the site was abandoned or last used. Site function or pottery breakage rates may dictate the presence or absence of decorated wares on Gobernador phase sites.

Social explanations for the absence of decorated wares on Gobernador phase sites may be proposed as well. For example, Gobernador Polychrome may have been made and used by limited groups comprising one or more clans who had kinship ties to Puebloans or who wished to emphasize their alliance with Puebloan peoples in general. As discussed by Brugge (2000), the Jemez Clan (*Ma'ii Deshgiizhnii*, "Coyote Pass People") has historical ties to the Jemez Pueblos. Reichard (1928) documents two clans, Many Huts Clan (*Hooghan l·ni*) and the Reed People Clan (*LÛk'aa dine'È*), as having ancestral ties to Hopi. At the same time, it is conceivable that other clans remained more traditional in their material culture and relationships to the Pueblos, choosing not to align themselves with non-Navajo people or not to outwardly display their relationships with the Pueblos. In this case, the absence of Gobernador Polychrome and Puebloan wares could be explained in a social context in which within-group obligations or pressures dictated the prohibition of Puebloan alliances or possession of decorated pottery (a symbol of Puebloan culture). Not only would an explanation of this sort be applicable to the Gobernador phase, but it also would provide some reasoning behind the import of Pueblo trade ware during the Dinetah phase and its appearance in some assemblages but absence in others.

MAPL sites yielding Dinetah Gray and Puebloan trade ware include LA 81169 and LA 81172. Both sites have only Dinetah Gray and Jemez Black-on-white in their ceramic assemblages. With a manufacturing date range of AD 1350 to 1700 for Jemez Black-on-white, the

presence of this trade ware does not provide any temporal control with which to evaluate the site's placement in the Navajo phase sequence. For LA 81169, the lack of absolute chronometric dates forces the occupation of the site to remain in temporal limbo, with only a ceramic date range of AD 1450 to 1760 to rely on. A tree-ring date of post-1647, however, was obtained from LA 81172 indicating that the ceramic assemblage dates to either the early or late Gobernador phases. Again, the lack of Gobernador Polychrome is not a temporal factor in dating this assemblage. Given that Jemez Black-on-white is the most common Pueblo ceramic type found in Navajo assemblages (Reed and Reed 1992), its consistent presence in assemblages from the early 1500s to the 1700s represents the significance of social and economic ties between the Navajo and the Jemez Pueblos.

Finally, five sites (LA 27092, LA 46147, LA 80316, LA 81175, and LA 121784) yielded ceramic assemblages with Gobernador Polychrome, Dinetah Gray, and an assortment of Puebloan trade ware (see Table 6-5). The ceramic assemblage from LA 27092 includes Dinetah Gray, Gobernador Polychrome, and Jeddito Yellow Ware. Based on the presence of Gobernador Polychrome, the assemblage dates between AD 1625 and 1760, but it is unclear if the assemblage is early or late Gobernador phase. Jeddito Yellow Ware from the Hopi Mesas, in general, is not temporally sensitive unless a ceramic type can be identified, such as Sityatki Polychrome (a late Gobernador phase type). With the absence of absolute chronometric dates, a ceramic date range of AD 1625 to 1760 is the best range that can be proposed for the Navajo component at LA 27092.

The assemblage from LA 46147 includes Dinetah Gray and Gobernador Polychrome, but lacks any Puebloan trade ware. Obviously, Puebloan influence is evident at the site with the presence of Gobernador Polychrome, a local Navajo ceramic type greatly influenced by Puebloan ceramic technology and designs (see Reed and Reed 1999). Relying solely on ceramic dating, this assemblage indicates a range of AD 1625 to 1760. Tree-ring dates from the site narrow this time range to the 1680s (Table 6-5), placing the assemblage within a transitional early to late Gobernador phase. LA 121784 yielded an identical assemblage of Dinetah Gray and Gobernador Polychrome. The lack of absolute chronometric dates from LA 121784 precludes assignment of a more narrow date range other than early through late Gobernador phase.

A thermoluminescence date of AD 1653±24 for LA 80316 indicates an early Gobernador phase ceramic assemblage. The presence of Dinetah Gray, Gobernador Polychrome, indeterminate glaze ware, and Jeddito Yellow Ware and a lack of later matte paint polychromes (e.g., Tewa Polychrome, Ashiwi Polychrome) corresponds well with a 17th century occupation. The lack of later matte paint polychromes, however, is not in itself a temporal indicator. Many sites dating to the 18th century have these types, but many also lack decorated ceramics as demonstrated by LA 80321.

LA 81175, yielding the largest MAPL Navajo assemblage, dates to the early to late Gobernador phase based on ceramic date ranges. The presence of Gobernador Polychrome indicates a post-1625 date, but there are no ceramic distinctions for which an Early or Late Gobernador phase affiliation can be determined. Thermoluminescence dates of 1658±36 and 1675±27, however, clearly place the site in the 17th century. This being the case, the ceramic assemblage fits well within this time frame. Rio Grande Glaze F has a manufacturing range of AD 1625 to the early decades of the 1700s (Mera 1933, 1940; Honea 1967; Hawley 1936), dating well within the Early Gobernador phase occupation of the site. Jemez Black-on-white has a long manufacturing range spanning approximately 400 years, but the late end of the range is within the thermoluminescence age for LA 81175. The Acoma/Zuni glaze ware could not be assigned a specific ceramic type, but the timing of glaze paint tradition in the Acoma and Zuni area falls within the occupational range for the site. Thus, all of the ceramics fall within an Early Gobernador phase date range, but as discussed above are not mutually exclusive to this period. Without the thermoluminescence dating, the ceramics would have provided a much longer range of potential site occupation.

Ironically, the only MAPL site having absolute chronometric dates in the 1700s, Late Gobernador phase, lacks all of the diagnostic ceramic types for that phase. LA 80321 yielded 12 Dinetah Gray sherds associated with a tree-ring data of post-1760. Sample size may be a factor in the absence of decorated ceramics, but assemblages containing only Dinetah Gray dating to the Late Gobernador phase are not unheard of. Langenfeld (2002) identifies one single unit habitation from the Morris Site 1 Block Survey dating in the early 1750s (tree-ring data), but having only Dinetah Gray ceramics. Four sites dating to the 1720s (tree-ring data) and later with only Dinetah Gray ceramics were identified during the Frances Mesa Alternative Treatment Project (Sesler et al. 2000). These sites are all habitations ranging from one or more hogans lacking any decorated ceramics. If it had been assumed that the lack of Gobernador Polychrome on the these sites indicated a Dinetah phase occupation, all five of these sites in the Frances Mesa and Morris Site 1 areas would have been misplaced chronologically. With the increase in tree-ring and thermoluminescence dates, Navajo ceramic chronology has been refined, but also other areas of caution have been identified. Assumptions concerning chronometry of assemblages containing only Dinetah Gray or Dinetah Gray with Pueblo trade ware having a long manufacturing range must be reconsidered. The presence or absence of certain decorated wares is not only a factor of time, but is probably more related to larger social, economic, and political issues yet to be explored in the context of Navajo pottery.

Projectile Point Stylistic Dating

The Navajo produced at least two styles of stone projectile points: the unnotched Cottonwood Triangular point and the side- and basal-notched Desert side-notched point.

These point styles are pan-western and are not culturally sensitive. In the project area side-notched points appear during the Pueblo II period and continue through the 1800's.

Of the 35 complete or mostly complete Navajo projectile points, 15 came from four sites that were reliably dated to the Early Gobernador subphase (see Figure 6-3). As can be seen from this figure, four of the points are Desert Side-notched points. Three are side-notched (and possibly reused Pueblo II-III) points and three are Cottonwood Triangular points. The remaining five are either too fragmentary to classify or appear to be reused Archaic points.

Eleven more points were recovered from three sites that were reliably dated to the Gobernador phase (see Figure 6-4). As can be seen from this figure, five of these points are Desert Side-notched points and two are Cottonwood Triangular points. The remaining four are either too fragmentary to classify or appear to be reused Archaic points.

Finally, nine point were recovered from three sites of undetermined phase; that is, the sites could date to either the Dinetah or Gobernador phase (see Figure 6-5). As can be seen from this figure, five of these points are Desert Side-notched points and one is a Cottonwood Triangular point. The remaining three appear to be reused Archaic points.

Data from other excavations in northwestern New Mexico have shown no apparent change in the morphology of projectile points from the Dinetah to the Gobernador period. Both Cottonwood Triangular and Desert Side-notched points have been found on Dinetah (see Brown and Hancock 1992) and Gobernador (see Brown 1992) phase sites. Our data appear to support these previous findings.

Summary

Based on these various dating methods, phase designations have been assigned for most of the Navajo sites in the study area and are shown in Table 6-6. The various dating methods employed to produce a chronological record of the sites in this area were only partially successful. Nine were assigned to a specific phase or subphase - four to the Gobernador, four to the Early Gobernador and one to the Late Gobernador. Of the remaining sites, two probably date to the Dinetah or Early Gobernador, and the other seven are of unknown phase (although Dinetah is suspected for four).

The above data suggest that the project area was occupied by Navajo people during the Dinetah phase. By the Early Gobernador subphase, the Navajo were established in

Figure 6-3. Illustrations of projectile points from Early Gobernador subphase sites, actual size.

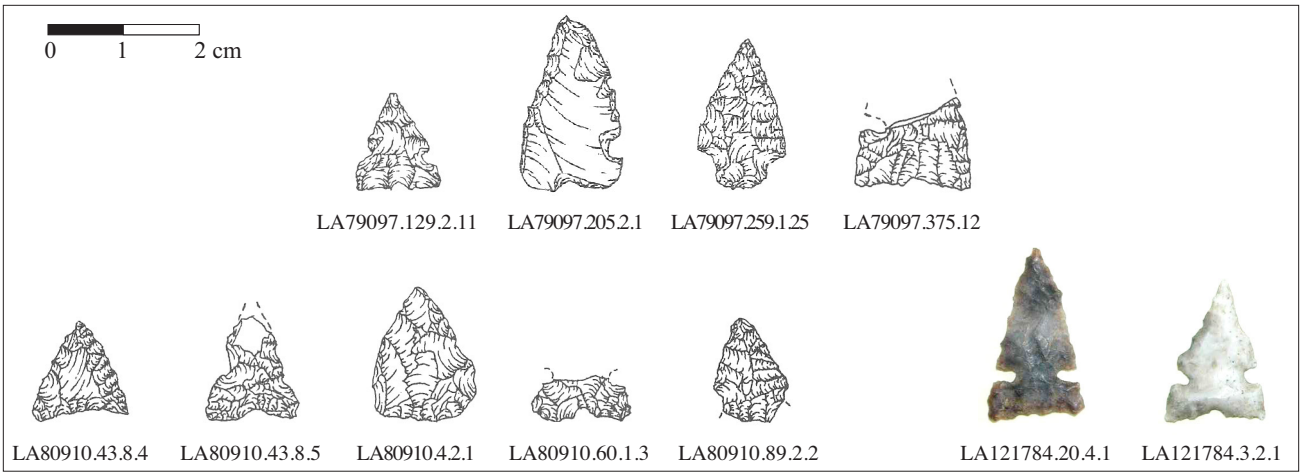

Figure 6-4. Illustrations of projectile points from Gobernador phase sites, actual size.

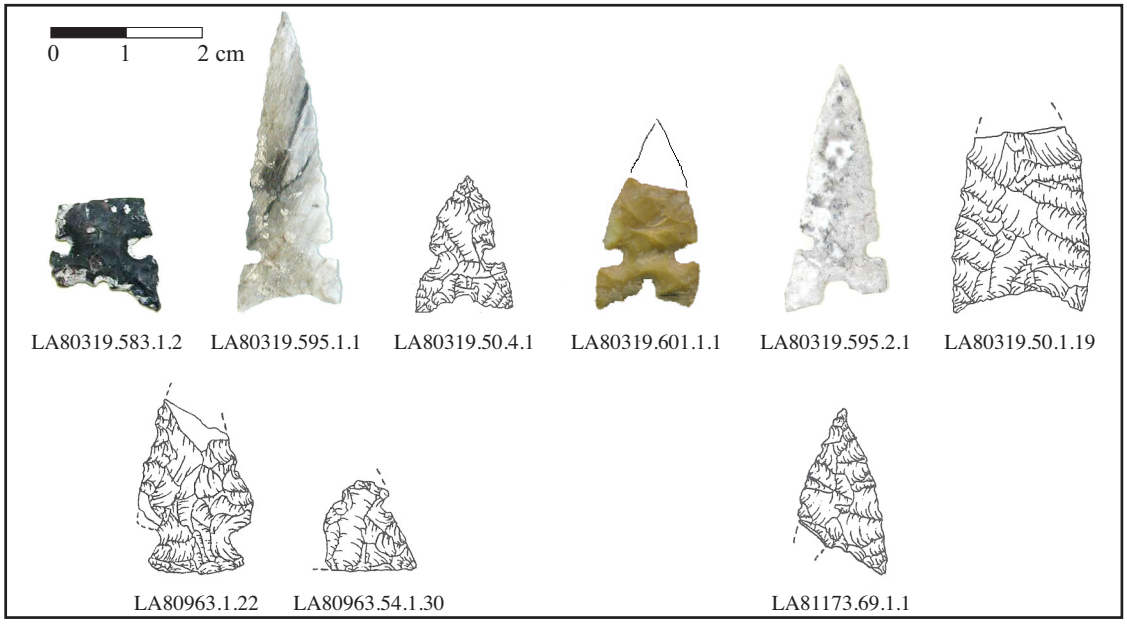

Figure 6-5. Illustrations of projectile points from undetermined phase sites, actual size.

Table 6-6. Dating of Navajo Components

Site #	Phase or Subphase	Date	Dating Method
LA80315	Dinétah or Early Gobernador?	post-1470	ceramics (Zia Glaze present, Gobernador Poly absent); radiocarbon dating
LA80319	Dinétah or Early Gobernador?	within 1520-1655	radiocarbon dating; ceramics (Gobernador Poly absent, Jeddito Black-on-yellow present)
LA46147	Early Gobernador	1680-1681	dendrochronological dating
LA80316	Early Gobernador	1653±24	thermoluminescence dating, radiocarbon dating
LA81172	Early Gobernador	post-1647	dendrochronological dating; ceramics (Rio Grande Glaze E and Sityatki Poly)
LA81175	Early Gobernador	1658±36-1675±27	thermoluminescence dating
LA27092	Gobernador		ceramics (Gobernador Poly)
LA79097	Gobernador	post-1420	ceramics (Gobernador Poly); radiocarbon dating
LA80910	Gobernador	post-1520	ceramics (Gobernador Poly); radiocarbon dating
LA121784	Gobernador		ceramics (Gobernador Poly)
LA80321	Late Gobernador	post-1760	dendrochronological dating
LA79093	Unknown	post-1450	radiocarbon dating
LA80320	Unknown		stratigraphy (above Pueblo I horizon)
LA81173	Unknown	post-1523	radiocarbon dating
LA80318	Unknown: (Dinétah?)	post-1430	ceramics (Gobernador Poly absent); radiocarbon dating
LA80911	Unknown: (Dinétah?)	post-1440	ceramics (Gobernador Poly absent, Jemez white and Jeddito yellow present); radiocarbon dating
LA80963	Unknown: (Dinétah?)		ceramics (Gobernador Poly absent, Northern Rio Grande glaze present)
LA81169	Unknown: (Dinétah?)		ceramics (Gobernador Poly absent, Jemez Black-on-white and Jemez white present)

the area and remained until at least 1680. At this time some, and perhaps all, of them left. Approximately 80 years later a single individual or group of (probably) Navajo people returned to the area for a brief time.

This proposed reconstruction correlates well with findings from 31 Navajo sites excavated on the Fruitland Project (Sesler and Hovezak in prep.) The occupation of the Fruitland Project area generally began after 1550 and lasted until 1680. A single structure might have been occupied in the 1700's.

By contrast, Frances Mesa, south of the San Juan River, was apparently first occupied by the Navajo around 1640. Population increased markedly after 1710, but approximately 40 years later, around 1750, the mesa was abandoned (Wilshusen et al., 2000) The chronometric and settlement data from both the Fruitland excavations and the Frances Mesa survey suggest that much of the Navajo population shifted south of the San Juan River between the mid-1600's and the early 1700's (ibid).

The abandonment of both of these areas, and the current study area as well, was probably related to Ute raiding, first on the sites north of the San Juan River and later on the sites south of the San Juan River.

CULTURAL AFFILIATION

Introduction

It has been proposed that Athapaskan groups migrating through the High Plains of eastern Colorado split into the Navajo and Apache groups upon reaching the Southwest (Dittert et al. 1961). The Apaches retained a Plains orientation while the Navajos evolved a new culture adapted to the Southwest.

The makeup of the Navajo people has subsequently incorporated many diverse groups of people. According to the Gathering of the Clans, a Navajo creation story, the first Navajo group was created from two ears of corn, but was soon and repeatedly joined by other groups of people (Zolbrod 1984). Groups specifically named are from various eastern pueblos, the Zuni, the Utes, the Apache, and a Pacific-coast tribe speaking a language similar to Navajo. While these groups chose to join the growing Navajo nation, other clans were formed from the offspring of captured slaves, including people taken from several native populations and at least one Spanish woman. With these new groups of people came new or improved skills, including the making of earthen pots, wicker water bottles, buckskin clothing and efficient weapons. All of these traits were incorporated into the developing Navajo culture.

While this Athapaskan origin of the Navajo is generally well accepted, the time frame for the arrival of the Navajo in the Southwest, particularly in DinÈtah, is still not firmly dated. Most researchers believe the Navajo arrived in the area prior to the early 1500's, and were definitely present by 1541 (Hancock 1997). At least one researcher (Schaafsma 1996), however, believes that the Navajo did not move into the area until after 1700, after the Pueblo Revolt and Reconquest; in this scenario archaeological remains dating prior 1700 are attributable to Ute people moving through the area.

Project Area Sites

While some researchers argue that ethnicity is not determinable from the archaeological record (Stiger 1998), several others have suggested that Navajo sites can be differentiated from Ute sites based on pottery styles (Reed and Reed 1996), lithic assemblages (Kearns 1996; Brown 1996), and structural characteristics (Brown 1996; Reed 2001). In addition, Navajo creation traditions are centered in the area known as DinÈtah.

Ceramics

Locally made ceramics found on pre-1700 sites in northwestern New Mexico have been separated into two types: DinÈtah Gray and Gobernador Polychrome. DinÈtah Gray has been found in association with a typical Navajo hogan on a site securely dated to 1541 (Hancock 1997), and occurs consistently on sites dating through the 1600's and well into the 1700's.

Of the 18 Navajo sites in our study area, DinÈtah Gray sherds were found on 16 sites, with absolute chronometric dates ranging from the mid-1600's through the mid-1700's. Figure 6-6 illustrates several examples of this pottery type.

Gobernador Polychrome ceramics have been found on sites dating as early as 1630 and as late as 1720 (Reed

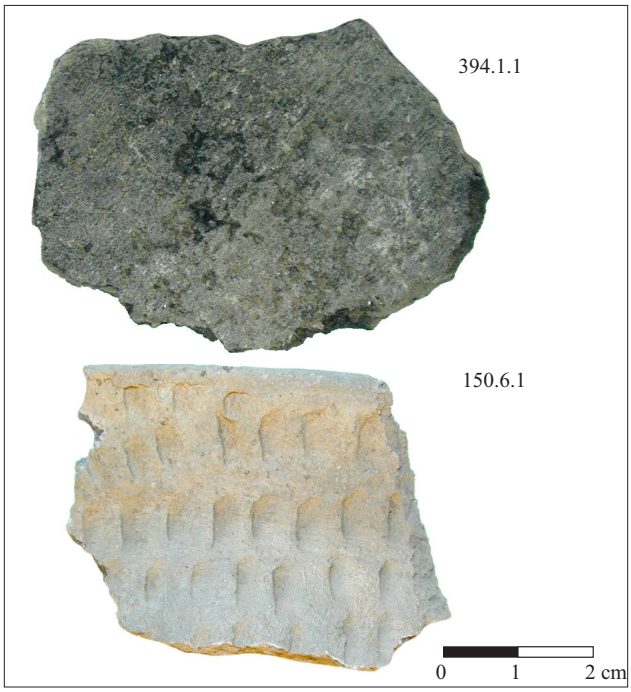

Figure 6-6. Photograph illustrating Dinetah Gray and Dinteah Gray Indented sherds, actual size.

and Reed 1996). This type is believed to represent a Navajo interpretation of Pueblo ceramics (ibid). Of the 18 Navajo sites in our study area, Gobernador Polychrome sherds were found on four; examples from LA81175 are presented in Figure 6-7.

Lithics

Several lithic tool types have been identified as being "indicative of ...early historic Navajo groups and their protohistoric... ancestors in the Dinetah" (Kearns 1996:136). These tool types include microcores, elongated flake knives, arrow shaft straighteners and abraders, and piki stones (*ibid*). A tool typically present on Ute, but not Navajo, sites is the Shoshonean knife (*ibid*).

On Navajo sites in our study area, 13 microcores, one arrow shaft abrader, two arrow shaft straighteners, three flake knives and a piki stone were found (see Figure 6-8). No Shoshonean knives were found on the sites.

Structures

According to a study on early 1800's Navajo and Ute structures (Sanfilippo 1998), several traits can be used to separate the two types of structures. Three of these traits appear particularly useful in evaluating the structures found in our study area. Typically, a Navajo structure (1) was constructed over an excavated, basin-shaped floor, (2) covered with earth, and (3) had a rectangular entry either flush with or extended beyond the wall. The characteristics for a Ute structure included (1) an unexcavated, ground-level floor, (2) walls and roof only rarely covered with earth and (3) an unelaborated entry that never extended beyond the walls.

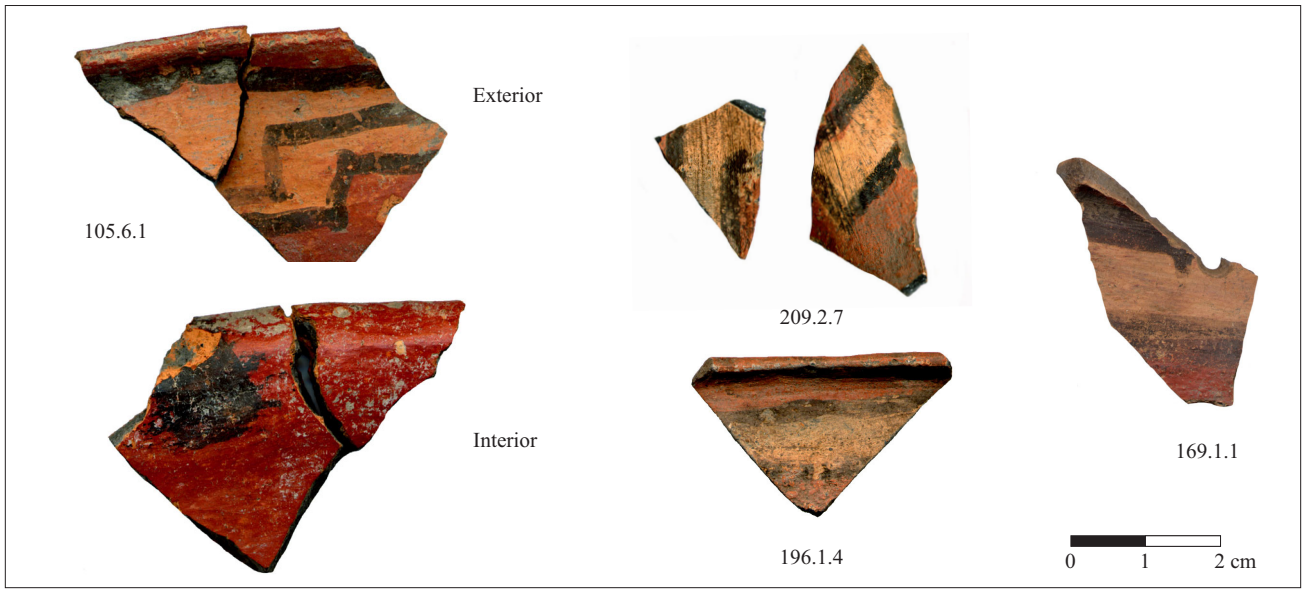

Figure 6-7. Photograph illustrating Gobernador Polychrome sherds, actual size.

Figure 6-8. Photograph illustrating selected Navajo tools: arrow shaft straightener (239.1.1), arrow shaft abrader (239.7.1) and flake knife (679.2.2, actual size).

Taken as a group, the structures in our study area fit within those typically defined as Navajo: they all had excavated floors, one had good evidence of an earth covering and four were thought to have had extended entries.

Creation Traditions

The creation traditions of the Navajo people, particularly the gathering of the clans, are centered in DinÈtah. Sacred mountains border the area (see Figure 6-9) where the creation of the Navajo took place, and most are visible from within DinÈtah. These mountains have been identified as Sierra Blanca Peak (to the east in Colorado), Mount Taylor (to the south in New Mexico), San Francisco Peak (to the west in Arizona) and the La Platas (to the north in Colorado).

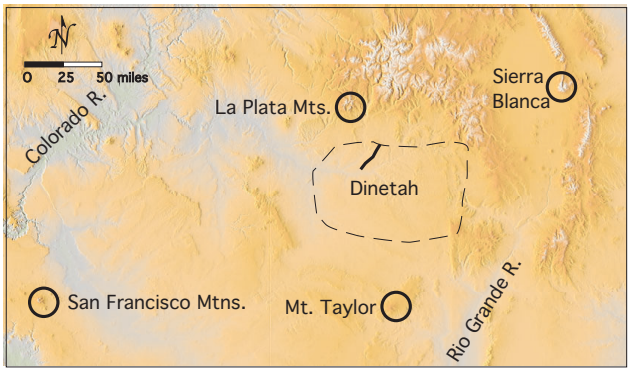

Figure 6-9. Map illustrating relationship of Dinetah to Navajo sacred mountains.

Within DinÈtah are two additional sacred mountains: Gobernador Knob and Huerfano Mountain (see Figure 6-1). The confluence of the Los Pinos and San Juan Rivers also holds much importance in Navajo tradition and the gathering of the clans (Wilshusen et al., 2002).

The strong identification of the Navajo people with the DinÈtah landscape suggests a long residence in this area. The creation stories do not include elements of Spanish or Christian influence and probably originated before the Navajo had strong contacts with the Spanish, rather than after, suggesting that they moved into the area prior to 1700.

PALEOENVIRONMENT

Introduction

According to the *Climate of New Mexico* (Tuan et al. 1973), the current climate of the area is semi-arid with an annual average precipitation of 10-12 inches with weakly summer dominant precipitation. July is the wettest month with May and June having the greatest drought/ heat stress. The average length of the frost-free season in the northwest part of the state is 140 days. This climate supports an open juniper-pinyon woodland with sagebrush meadows and Ponderosa pine at the higher elevations. Currently, Ponderosa pine is only present in the northern part of the study area at LA81175 and possibly in small pockets on north-facing slopes near LA80321 and LA81169.

Overall climate and particularly precipitation were quite variable during the Navajo occupation of the study area (Towner 1997). The tree-ring record documents low precipitation through the 1500's, with severe droughts for the period between 1570 and 1600. Over the next half-century, conditions improved, with a notable increase in precipitation between 1600 and 1640. This time is probably when the first sites in our area were occupied and allowed the Navajo to take advantage of the good agricultural land available to them. During the latter half of the 17th century precipitation was more variable, with a prolonged drought in the 1660's and 1670's and subsequent higher annual precipitation during the remainder of the century and well into the 1700's.

Project Area Sites

Pollen and Flotation Results

Archaeological flotation and pollen samples from sites in the study area yielded juniper, pinyon, oak, and several shrubs and forbs present in the current environment. Ponderosa pine pollen was present at four sites (LA80319, LA80321, LA81172, and LA81175), with spruce pollen also present at LA80321 and LA81175 and Douglas fir pollen at LA81172. Analysis of the macrobotanical remains also shows species of the juniper-pinyon woodland and sagebrush areas with Ponderosa pine cone scales, needles, and one seed, and Douglas fir needles present at LA80321. The presence of these coniferous tree species indicate that the climate was probably cooler or moister during the Navajo occupation than at present.

Cooler temperatures during most of the 1600's do not appear to have restricted agriculture to lower elevation zones, as LA81175, one of the highest elevation sites in our area, dated to the mid-late 1600's and had both corn and corn pollen present as well as large roasting/storage features.

SITE ELEMENTS: STRUCTURES AND ACTIVITY AREAS

Structures

Thirty-four structures were identified on 13 of the 18 Navajo sites in the study area. Table 6-7 briefly summarizes the major characteristics of these structures. As can be seen from this table, all of the structures were fairly simple, having wooden superstructures and lacking masonry. They were generally less than 4 m in diameter and 30 cm in depth. Almost all of them contained a central hearth, but this hearth was often represented only as a spot of oxidized sand.

Table 6-7. Characteristics of Navajo Structures

Site #	Structure #: Style	Diameter (m)	Depth (cm)	Floor Area (m^2)	Interior Features	Condition at Abandonment
LA46147	Str. 2: hogan with minimal wood	3.25	9	8.3	formal central hearth, 3 unburned pits	collapsed
LA79093	Feature 2: possible structure, unexcavated	18 m @ mgs	~15		-	unknown
LA79097	Str. 1: hogan with minimal wood	2.3+-2.6	15	~5.3	informal central hearth, possible entry	burned
	Feature 34: probable brush shelter, unexcavated	1.3+-2.45	10	~4.7	formal central hearth, unburned pit	probably burned
LA80315	Str. 1: brush shelter	2.25+-4.25	20	~14.18	informal central hearth, burned rock conc., unburned pit	burned
	Feature 3: possible structure, profile only	3 m long	~25		probable formal central hearth	probably burned
	Feature EP-3: possible structure, profile only	4 m long	~14		possible central hearth	probably burned
LA80316	Str. 9: hogan with minimal wood	3.2+ -4.2	11	~13.85	informal central hearth, roasting pit, burned pit, possible entry	burned
	Feature 176: possible structure, unexcavated	3.1-3.45	20	8.42	possible informal central hearth	probably burned
LA80318	Str. 1: brush shelter	2.3-2.5	15	4.52	informal central hearth	burned
	Str. 2: brush shelter	~4	20	~12.57	formal central hearth, 1 unburned pit	burned
LA80319	Str. 1: brush shelter	2.15+ - 2.85		~6.38	possible informal central hearth	burned
	Str. 2: brush shelter	3.3		8.55	informal central hearth	burned
	Str. 3: brush shelter	3.5-4.3		11.95	formal central hearth	burned
	Str. 6: brush shelter	3.5-6		17.72	formal central hearth	unburned
	Str. 11: brush shelter	2.3-2.6	20	4.7	no features	burned
	Str. 13: brush shelter	1.9-2.7	20	4.15	formal central hearth, ash dump, probable entry	burned
	Str. 14: brush shelter	2.75-3	20	6.49	informal central hearth, ash dump	burned
	Str. 15: brush shelter	2.1-2.4	25	3.98	informal central hearth	burned
	LAC Discovery 1, probable structure, profile only	2.5 m long			possible central hearth	unknown
	LAC Discovery 3, possible structure, profile only	2.1 m long			possible central hearth	unknown
	LAC Discovery 4, possible structure, profile only	2.2 m long			possible central hearth	unknown
LA80321	Structure 3[1]	~4.5	30	~15.90	formal central hearth	unburned
LA80910	Str. 1: brush shelter	3.29-3.61	20	9.35	formal central hearth	burned
	F.7: possible structure, unexcavated	~2	~15		-	unknown
	F.9: possible structure, unexcavated	~3.5 – 5	5+		-	unknown
LA80911	Str. 1: brush shelter	3.2	10	8.04	formal central hearth, informal hearth	burned
LA81169	Str. 1: hogan with moderate wood, unexcavated	.75+ - 1.95+	~15		-	burned
LA81172	Str. 5: brush shelter	~1.5 - ~2.5	~30	>3.14	no features	partially burned
	Str. 7: brush shelter	~3.25	10	~8.30	formal central hearth	burned
LA81175	Str. 1: brush shelter	2.78-3.53	15	7.82	formal central hearth, hearth, ash dump	burned
	Str. 2: hogan with minimal wood	2.2+ - 4.1	15	~13.20	formal central hearth, possible entry	burned
	Str. 3: hogan with minimal wood	4.1 – 4.3	17	13.85	formal central hearth, dismantled mealing bin, informal hearth	burned
LA121784	probable brush shelter[2]				formal central hearth	burned

1=for the purposes of this chapter, the primary author has chosen to reinterpret Structure 3 as being Navajo, not Pueblo II Anasazi
2=for the purposes of this chapter, the primary author has chosen to interpret Activity Area 1 as being a structure

Construction

The floors of most of the Navajo structures were shallow basins that typically ranged from 2.4-4.3 m in diameter and 9-30 cm in depth. The basins tended to be circular, but did vary to oval, subrectangular or irregular in shape.

The superstructures were made of wood, usually juniper. Several of the structures had poorly defined possible postholes ranging from shallow depressions to several centimeters in depth. In no case was a complete set of postholes found around a structure.

In both historic (Jett and Spencer 1981) and prehistoric (Brown and Hancock 1992) times, Navajo structures were covered with a layer of adobe. However, very little evidence of a mud covering was found on the structures in the study area. Only one structure had any indication of an earthen covering; this evidence consisted of large pieces of burned adobe in the burned roof fall. A few of the structures had a thin layer of clay above the floor, but these deposits were more likely post-occupational laminae rather than dissolved adobe roofing. It therefore appears that many of the structures were finished with either brush or hide covers.

Floor Area

As can be seen from Figure 6-10, there is a continuum in size of the excavated Navajo structures from small to large. Within this continuum, three size groups can be identified: 6.5 m^2 or less (nine sites); 8-9.5 m^2 (seven sites); and greater than 12 m^2 (eight sites). Coincidentally, each of these groups contains approximately one-third of the total excavated structures.

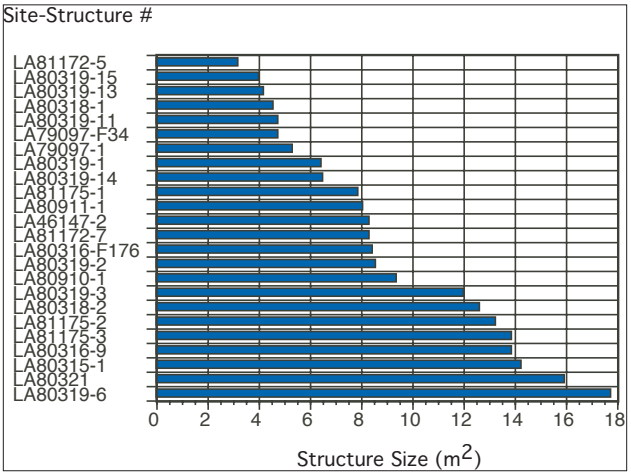

Figure 6-10. Graph illustrating sizes of excavated Navajo structures.

For Navajo structures in the Fruitland area (Hovesak and Sesler 1999) three somewhat different size groupings were identified: small (<10 m^2) structures; medium (>10 but < 17 m^2) structures; and large (>17 m^2) structures.

Sixteen (67%) of the structures in our study area fit in the Fruitland "small structure" group, while seven (29%)

fit in the Fruitland "medium structure" group. Only one (4%) fits in the Fruitland "large structure" group based on size; however, it lacks the other characteristics of prominent post sockets, woven-juniper-bark-and-earth covering and formally constructed entryway.

Internal Features

A central hearth was present in all but two of the excavated structures, and indicated in most of the profiled possible structures. The hearth was frequently located in the center of the structure, but could be offset in any direction, most often to the northwest, west, and east.

Other features found within the structures consisted of secondary hearths, burned and unburned pits, ash dumps, one roasting pit, one burned rock concentration and one dismantled mealing bin. These features were most often located in the south half of the structure.

No features were located along the north or northeast walls or in the northeast third of the structures. Perhaps these areas were traditionally reserved for sleeping or other specific activities. Figure 6-11 presents floor plans and a composite map of eight structures, showing the absence of features from the north-northwest to the northeast portion of the structures.

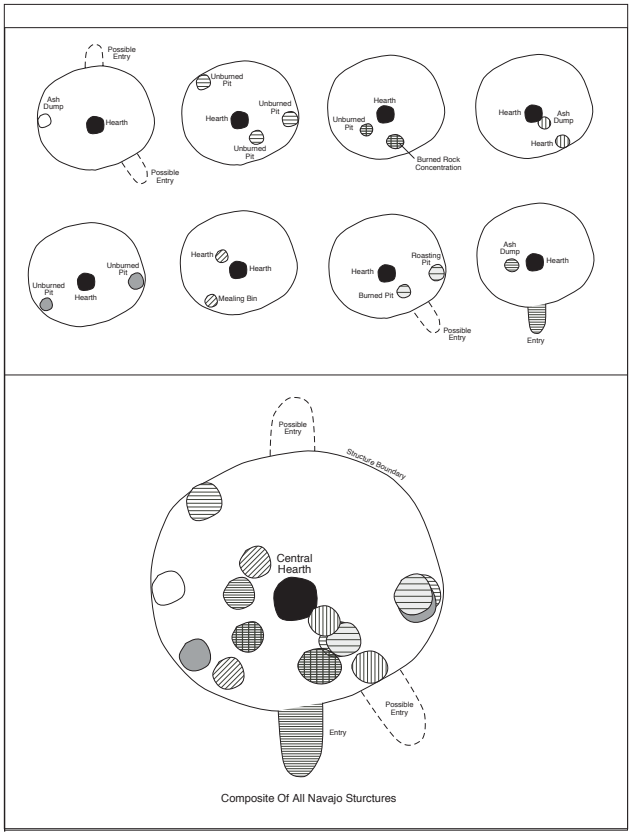

Figure 6-11. Floor plans and composite map of eight Navajo structures, showing floor features and possible entries.

Abandonment

Most (73%) of the structures were burned. In most cases the stratigraphic evidence suggested that the burning was an abandonment-related event.

This is similar to findings by Hovezak and Sesler (1999): most of their excavated structures appeared to have been "cleaned" of usable artifacts and then intentionally burned. If a structure was dismantled, it was probably used to make another structure; unburned structures were the latest structures on a site.

Activity Areas

A total of 34 activity areas were located on 17 of the Navajo sites (see Table 6-8). No activity area has been identified on LA27092. Eight activity areas contained no features; they were just cultural horizons, usually indicated by charcoal-stained soil.

Table 6-8. Navajo Activity Areas

Site #	Associated Activity Area(s)	
LA46147	AA4: no features	
LA79093	AA1: no features	AA2: 3 CS, 1 FCRC
LA79097	AA1: M, 2 CS	AA2: 6H, 3pH, 1 BSP w/HB, CS, GL, RCwFCR, RSwFCR, 3pUP, 4UP, 2M, RD + PD
LA80315	AA1: H, FCRC	AA2: H
	AA3: no features	AA4: no features, BT
LA80316	AA13: no features	AA16: H, RP; AA10: 2H, BSP, M, 2pUP
	AA19: 2UP, M	AA (no #): H (in profile)
LA80318	AA1: RP	AA2: CS, BT
	AA3: 2CS	AA4: no features, 1 PD
LA80319	AA1: H, BSP, UP, M, pPH, UP, RD, BT	(AA2: 12 possible features)
	AA3: H	AA4: no features
	AA5: RP, 2pUP	AA6: H, RD
	AA7: no features	(AA8: 2 features)
	AA21: BS, 2 BT	AA23: 2RP, BS, UP
	AA24: 3H	AA28: no features
	AA34: H	
	AA (no #): UP	
LA80320	AA7: no features	
LA80321	AA4: 3CP, PD	AA5: PD, RP
LA80910	AA1: M	AA2: H, 2pH, H
	AA3: pRP, 2CS	AA5: H, PD
LA80911	AA1: pUP, M	AA2: M
LA80963	AA3: pH	
LA81169	AA2: pRP	AA3: 2H, pH, BSP, M, H
LA81172	AA3	AA9: BSP, RP
	AA10: RP, 2FCRC	AA11: H, UP
	AA11: H, BSP	AA12: pH
	AA14: M	
LA81173	AA13: BSP, UP	
LA81175	AA1: M, UP, 8PH, pPH	AA2: 2H
	AA3: H, 2BSP	AA4: BSP
	AA5: 2H, 2RP, M, BP, 2UP, 2CS, PH	AA6: M
	AA7: M	
LA121784	AA1: BS, CS	

AA=activity area, BS=burned surface, BSP=bell-shaped pit, BT=burned tree, CP=cylindrical pit, CS=charcoal stain, F=Feature, FCR=fire-cracked rock, FCRC=fire-cracked rock concentration, GL=grinding locus, H=hearth, HB=human burial, M=midden, p=possible, PD=pot drop, PH=posthole, RC=rock concentration, RD=refuse deposit, RP=roasting pit, RS=rock scatter, UP=unburned pit

Features

Features in these activity areas were primarily associated with food processing and secondarily associated with food storage. Such features included bell-shaped pits, roasting pits, hearths and fire-cracked rock concentrations.

Postholes were uncommon, but present. An alignment of seven postholes was found on a large habitation site, LA81175. This group of postholes might have been associated with a windbreak or ramada, loom, or drying rack for corn or meat.

Unburned pits were found on five of the residential bases and one of the field camps. Only two residential bases lacked unburned pits. The function of this feature type is unknown.

Large Pits

Thirteen large pits were found in the Navajo activity areas. Based on their morphology, these can be divided into two types: bell-shaped and cylindrical More than half of the pits were heavily oxidized and several contained burned plant material, suggesting that their last use was for roasting. The pits that were unoxidized were typically empty or contained very little burned plant material, indicating that they were most likely used for long-term storage. It is quite possible that the oxidized pits had been used for storage before the last roasting episode, perhaps even with multiple episodes of storage, roasting, and then storage again after being cleaned out.

Bell-shaped Pits. Ten bell-shaped pits were found on six sites (see Table 6-9). The contents of three of the pits were distinctive. Feature 63 (LA79097) contained abundant faunal material within waterlain laminae predominantly at the base of the pit. Both the pit and the bones were unburned and it appeared that the feature had been left open and acted as an unintentional trap for numerous small mammals. Immediately above this natural deposit was a human burial. Feature 101 (LA81175) contained several dozen goosefoot/pigweed seeds and numerous pieces of burned and fire-cracked rock. Feature 11 (LA81172) had been used for roasting green corn. The macrobotanical sample taken from this pit contained more than 100 pieces of burned cornhusks, kernels, cobs, and stems.

Table 6-9. Bell-shaped Pits on Navajo Activity Areas

Site, Feature	Size (m)	Depth (m)	Oxidation	Plant and Faunal Remains
LA79097, F63	top: 2.1, base: 1.8, narrowest: 1.1	1.9	none	numerous unburned small mammal skeletons, mostly immature
LA80316, F 116	top: ~.45, base~1.08	~1.1	6 cm thick	1 burned bone, 1 corn cob fragment
LA80319, F9	opening: ~.80, base: ~1.08, narrowest: ~.57	~1.02	none	6 seeds: 4 goosefoot/pigweed, 1 juniper, 1 corn
LA81169, F5	diameter: ~.85	.30+	yes	
LA81172, F11	widest: ~1.61-2.17	~1.75	20cm thick	~100 pieces of corn, 43 seeds: 39 juniper, 4 goosefoot/pigweed
LA81172, F31	widest: 1.1-1.2	1.0+	none	several unburned small mammal bones, mostly immature
LA81172, F125	widest: 1.36	.70+	yes	3 corn cupules, 2 juniper seeds
LA81175, F1	1.75	.50+	heavy	
LA81175, F5	neck: .55, widest:.70	.65	10cm thick	
LA81175, F101	1.6-1.8	1.15	heavy	48 seeds: 47 goosefoot/pigweed, 1 dropseed

The number of bell-shaped pits found on our study area sites is higher than that typically found on Navajo sites in DinÈtah in general (Leslie Sesler, personal communication). Two possible interpretations for this exist. (1) The Navajo in the study area created a higher level of storage capacity than the Navajo elsewhere in the Dinetah. (2) The excavation techniques used in the study area resulted in the discovery of more pits than are discovered elsewhere in the Dinetah. Along the study area pipelines, Woods Canyon frequently excavated deep backhoe trenches; these trenches were the source of discovery for most of the bell-shaped pits. The depth of the pits (typically greater than 1 meter, as deep as 1.9 meters) and the nature of the fill (charcoal-rich deposits typically present only at the base) would make discovery of the pits by other excavation strategies more difficult.

Cylindrical Pits. Three large, deep, irregularly cylindrical pits were found on one site, LA80321 (see Table 6-10). These pits were very similar, each being over 2 meters deep with a tendency to narrow towards the base. Two contained the remnants of posts or post sockets set into their side walls about three-quarters of the way down into the features; these are assumed have been used for access into the pits (see Figure 6-12).

Table 6-10. Cylindrical Pits on LA80321

Fea. #	Size (m)	Depth (m)	Oxidation	Plant and Faunal Remains
86	1.37x 2.20	2.14	minimal	seeds: 8 goosefoot, 4 sunflower, 12 rice-grass, 1 globemallow, 4 juniper, 1 saltbush, 1 pinyon, 1 rose family, 1 figwort family; wood: sagebrush, juniper, pinyon, Ponderosa, oak; needles: 100 pinyon, 100 Ponderosa, 51 Douglas fir; 1 cactus spine
151	1.75x 1.80	2.30	heavy	fruits: 1096 sagebrush; seeds: 138 goosefoot/pigweed, 140 dropseed, 68 purslane, 10 spurge, 6 sunflower, 3 oak acorns, 6 juniper, 1 Ponderosa pine; several clumps of partially burned grass and pinyon duff; needles: 2300+ Ponderosa pine, 35 pinyon pine; 250+ bark pieces; several burned and unburned large mammal bones
169	0.75x 1.50	2.15+	none	pollen: extremely high oak value (13.5%) with aggregates, minimal maize and beeweed

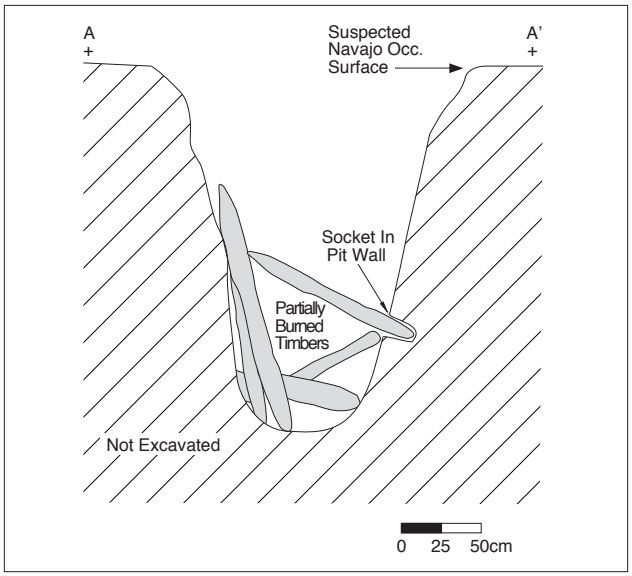

Figure 6-12. Architectural profile of Feature 151, showing beam still mounted in wall socket.

Two of the features contained numerous charred wild plant seeds, while the third was essentially empty, although a pollen scrape of the base showed an unusually high amount of oak pollen. These features are assumed to be roasting and/or storage pits.

This type of feature is unusual, and has not apparently been found on other Navajo sites. Furthermore, the near-cutting dendrochronological date of 1760 (obtained from one of the features) indicates that this portion of LA80321 post-dates all other known Navajo sites in the area. These features may represent a specialized activity associated with the post-1760's occupation of the area.

Summary

In the study area, the 18 Navajo sites contained primarily simple brush shelters and activity areas with features related to food cooking and storage. Masonry was absent from the structures, and even evidence for an earthern covering was found on only one structure. It is inferred from this that waterproofing of the structures, if done at all, was accomplished by covering the wood superstructures with large animal hides of deer or elk.

In Navajo structure style there appears to be a continuum from a minimal-wood framework with abundant brush cover, through a moderate-wood framework with brush-filled spaces, ending with a moderate-wood framework filled with logs and wood splits. In this discussion, those structures that had very little or no wood remaining were presumed to have been constructed predominantly of brush and are referred to as "brush shelters". Those structures that had moderate amounts of preserved wood are presumed to have had moderate amounts of wood in their frameworks and are termed "hogans". The framework in all cases was probably based on a forked-stick design, with poles leaning in to rest in the forked top of one of the poles. However, as preservation in our structures was minimal, the exact nature of the framework could not be determined. Within our study area, no evidence suggested that the structures had wood-filled frameworks, so it has been assumed that our hogans contained a moderate amount of brush in their construction.

While this system may not fully account for the differential preservation of structural wood at all of the sites, it is believed that the results are representative of the proportion of structure styles within the area. Of the 23 excavated structures, 17 were classified as brush shelters, and six were classified as hogans.

SITE LAYOUT

Structures

For the purposes of this discussion, estimates have been made of the total possible number of Navajo structures located on the 18 Navajo sites. This total number is calculated by adding together the number of excavated structures, suspected structures and inferred structures (see Table 6-11). A total of 23 structures have been excavated. A total of 11 structures are suspected, based on large charcoal stains present either in plan view on modern ground surface or in profile in trench walls. A total of 14 structures are inferred, based either on the presence of activity areas or the reinterpretation of existing data. A total of 48 possible structures are therefore proposed for 15 of the 18 Navajo sites. Three sites (LA27092, LA80320 and LA81173) are thought to lack structures.

As can be seen from Table 6-11, the "typical" Navajo site in our study area contains at least two, but not more than five, structures. Figure 6-13 presents plan maps of ten Navajo sites known, or thought, to contain multiple structures. (Note: the apparent southwest-northeast alignment of structures merely reflects the angle of the pipelines along which these sites were discovered.)

The spatial separation of the structures within a site was noticeably patterned. Structures were spaced either 3-16 meters apart, or 35-53 meters apart; very few were spaced either closer to or farther away from the next nearest structure.

The closely spaced (3-16 m) structures were found on six sites: three sites each had a single pair of structures, the fourth site had two pairs, the fifth site had a group of three structures, and the sixth site had a pair and a group of three structures. It is probable that these sites' closely spaced structures represented contemporaneous structures of a single extended family unit, as suggested by historic and modern Navajo home sites (Jett and Spencer 1981).

The distantly spaced (35-53 m) structures were found on five sites. This distance may represent the "proper" amount of space to be maintained between structures of unrelated people, whether they occupied the site contemporaneously or sequentially.

Activity Areas

Patterning is apparent on the sites in the general distribution of activity areas and associated features and artifacts.

More than half of the features were placed within 10 meters of a structure. This included features of all types: hearths, roasting pits, bell-shaped pits and small unburned pits. Almost half of the remaining features were within 10-20 meters of a structure. The remaining features were located as far as 70 meters away from the nearest known structure.

A cluster of three or more features was almost always directly associated with a structure. Features located more than 20 meters away were typically isolated features or associated with only one other, often functionally related, feature, such as a hearth associated with a concentration of fire-cracked rock.

Artifact middens were present on one-third of the activity areas. They were typically located to the south and southwest of the structures. (Since most sites were some degree of south-facing, this usually placed the middens downhill of the structures.) Middens were less commonly

Table 6-11. Structures and Associated Activity Areas on Navajo Sites

Site #	Structure (**excavated**, suspected, or *inferred*)	Max. # of Structures	Associated Activity Area
LA27092	-	0	component based on Dinetah Gray sherds in site ceramic assemblage
LA46147	**hogan (Str. 2)**	1	AA4
LA79093	possible structure, unexcavated (F. 2)	1	AA2
			AA1
LA79097	**hogan (Str. 1)**	3	AA1
	probable structure		*inferred from midden in AA1*
	probable brush shelter (F. 34)		AA2
LA80315	**brush shelter (Str. 1)**	3	AA1
	possible structure, seen in profile (F. 3)		AA3
	possible structure, seen in profile (F. EP-3)		AA4
			AA2
LA80316	**hogan (Str. 9)**	4	AA16
	possible structure		*inferred from AA10*
	possible brush shelter (F. 176)		AA13
	probable structure		*inferred from AA19*
			unnumbered AA
LA80318	**brush shelter (Str. 1)**	2	AA1
	brush shelter (Str. 2)		AA2
			AA3, AA4
LA80319	**brush shelter (Str. 1)**	12	
	brush shelter (Str. 2)		AA1
	possible structure		*inferred from AA1*
	brush shelter (Str. 3)		AA4
	brush shelter (Str. 6)		unnumbered activity area
	brush shelter (Str. 11)		AA21
	brush shelter (Str. 13)		AA23
	brush shelter (Str. 14)		
	brush shelter (Str. 15)		AA28
	probable structure (LAC Disc. 1), in profile		
	possible structure (LAC Disc. 3), in profile		
	possible structure (LAC Disc. 4), in profile		
	AA2, AA3, AA5, AA6, AA24, AA34, AA35		
LA80320		0	AA7
LA80321	*Structure 3*[1]	1	AA4, AA5
LA80910	**brush shelter (Str. 1)**	4	AA2
	possible structure:		*inferred from AA1*
	possible structure (F. 7), unexcavated		AA3
	possible structure (F. 9), unexcavated		
LA80911	**brush shelter (Str. 1)**	2	AA1
	possible structure		*inferred from AA2*
			AA3
	LA80963 *possible structure*	*1*	*inferred from AA2*
LA81169	forked-stick hogan, unexcavated (Str. 1)	2	AA3
	possible structure		*inferred from AA3*
LA81172	**brush shelter (Str. 5)**	3	AA11
	brush shelter (Str. 7)		AA11
	possible structure		*inferred from AA14*
			AA9, AA10, AA12, AA13
LA81173	-	0	component based on Dinetah Gray sherds in site ceramic assemblage
LA81175	**brush shelter (Str. 1)**	5	AA2
	fork-stick hogan (Str. 2)		AA1
	Str. 3: fork-stick hogan (Str. 3)		AA5
	possible structure		*inferred from AA6*
	possible structure		*inferred from AA7*
			AA3, AA4
LA121784	*probable brush shelter*[2]	1	AA1

1=for the purposes of this chapter, the primary author has chosen to reinterpret Structure 3 as being Navajo, not Pueblo II Anasazi

2=for the purposes of this chapter, the primary author has chosen to interpret Activity Area 1 as being a structure

located to the west, southeast and east of structures, but none were found to the north of any apparently associated structure.

Summary

Seventeen sites (94%) are estimated to contain between zero and no more than five structures. Only one site is estimated to contain more than five structures, and this site (LA80319) is estimated to contain 12 structures.

Each structure tended to be located either close to (3-16 m) or far from (35-53 m) the next nearest structure. The closely spaced structures are interpreted as belonging to related families, while the distantly spaced structures are interpreted as belonging to non-related families.

Approximately 75% of the extramural features in activity areas were within 20 meters of a structure. The

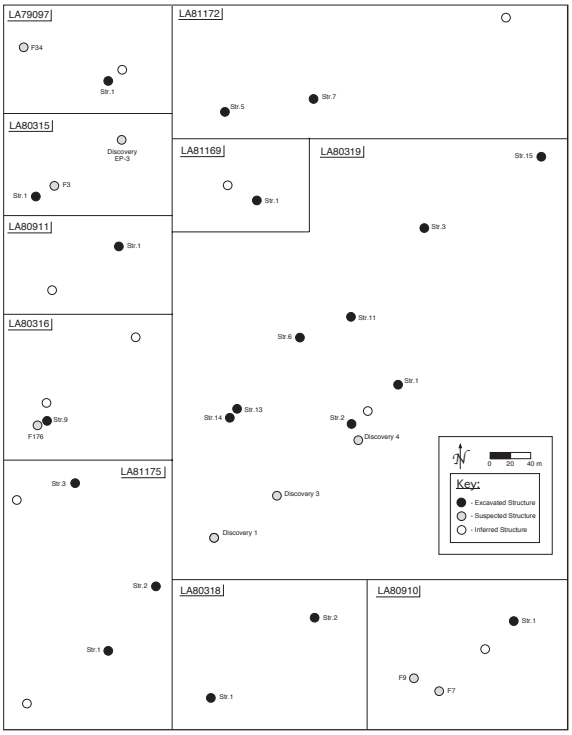

Figure 6-13. Plan maps of ten selected Navajo sites showing known and suspected structures.

remaining features appeared to be isolated, or were associated with a functionally related feature.

SITE TYPE

Of the five site types defined by Binford (1980), only two seem to be applicable to the 18 Navajo project sites discussed here. As can be seen from Table 6-12, these two types are field camps and residential bases.

Table 6-12. Site Types Assigned to Navajo Components

Site #	Type	# of Structures		# of AA Features	# of Artifacts
		excavated, ***suspected/inferred***	total		
LA27092	field camp	0	0		41
LA46147	field camp	**1**	1		815
LA79093	field camp	*1*	1	4	1+
LA80315	field camp	**1**, *2*	3	3	244
LA80318	field camp	**2**	2	4	148
LA80320	field camp	0	0		3
LA80321	field camp	*1*	1	4	85
LA80911	field camp	**1**, *1*	2	4	108
LA81169	field camp	**1**, *1*	2	5	116
LA121784	field camp	*1*	1	2	135
LA81173	field camp	0	0		37
LA79097	residential base	**2**, *1*	3	27	2085
LA80316	residential base	**1**, *3*	4	12	238
LA80319	residential base	**8**, *4*	12	25	703
LA80910	residential base	**1**, *3*	4	8	620
LA81172	residential base	**2**, *1*	3	13	243
LA81175	residential base	**3**, *2*	5	30	3210
LA80963	residential base	*1*	1	1	539

Residential Bases

As suggested by Table 6-12, the Navajo constructed seven of the project sites as residential bases or year-round habitations. These seven sites typically contained several structures, activity areas with several extramural features, and a relatively large and diverse artifact assemblage. [One site, LA80963, has been included in this group even though no structures were defined and only one extramural feature was discovered. Its inclusion is based on its large and diverse artifact assemblage and the realization that the site was both incompletely excavated and partially destroyed by previous pipeline construction.]

Of the seven residential bases, six are assignable to the Gobernador phase. The seventh, LA80963, is currently undated.

Field Camps

Eleven sites in the study area were classified as field camps. The field camp category included all but one of the sites with only one structure, plus four sites with two or three structures. Typically, there were fewer and less diverse artifacts and fewer features on these sites. With all of these sites, there is evidence of year-round usage, but the number of artifacts and features could be related to numerous seasonal occupations, rather than one longer-term occupation. This difference would not be discernible archaeologically.

The 11 field camps are assignable to the unknown (possibly Dinetah) and Gobernador phases and the Early and Late Gobernador subphases.

Site Utilization

Based on the features and artifacts found on the sites, three types of site utilization are indicated: hunting, food processing and ceremony. Based on the environmental setting of the sites, a fourth type of site utilization is sometimes indicated: agriculture. Table 6-13 shows these activities by site. As expected, residential bases exhibited a greater number and variety of activities than field camps.

Hunting

Hunting-related site utilization appears well correlated with residential bases, but not well correlated with field camps.

Projectile points were found on all seven residential bases, but only three field camps. Put another way, the residential bases (39% of the sites) contained 76% of the projectile points; the field camps (61% of the sites) contained 24% of the projectile points.

Interestingly, the projectile points recovered from the field camps were more often complete (four) or nearly complete (2) than incomplete (three); see Figures 6-3, 6-4 and 6-5 for examples. While the residential bases also contained projectile points that were complete (12), many more were incomplete (23). This suggests that residential bases received as debris broken projectile points recovered either from the ground (i.e., a missed shot) or from killed animals.

Other associated hunting tools (shaft abraders, etc.) were found on four of the residential bases, but only two of the camps.

Some of this bias towards residential base hunting can probably be explained by the fact that the residential bases were occupied by larger numbers of people (potentially more hunters) for longer periods of time (potentially more hunting) than were the field camps.

Food Processing

Food-processing site utilization appears very well correlated with residential bases, but only moderately well correlated with field camps.

As can be seen from Table 6-13, manos, and often metates, were found at all the residential bases, while they were found at only six of the field camps. Two-hand manos were found on three of the residential bases and one of the field camps, indicating that corn grinding was more likely to take place on year-round habitations.

Features were present on six of the seven residential bases, and seven of the eleven field camps. Some of the

Table 6-13. Activities Indicated on Navajo Sites

Site #	Hunting Preparation	Food Processing		Ceremonial Activities	Farming (Agricultural Potential)
		Artifacts	Features		
LA27092		39 DGs			good nearby: floodplain of Mud Creek
LA46147	6 pp, 2 ppp	manos: 3 1-h; 1 metate; 124 DGs			none – top of small butte; good below: floodplain of Arch Rock Canyon
LA79093			1 FCRC		none: heavy erosion, exposed bedrock, cobbles
LA80315		204 DGs	1 FCRC; 2 hearths		none: sandstone outcrops; high erosion; corn pollen present
LA80318		1 mano frag; 106 DGs	1 roasting pit	pipes: 1 stone, 1 ceramic	good: deep soil, heavy deposition, exposed rock above site, corn pollen present
LA80320			1 FCRC		good: deep soil
LA80321		1 mano frag; 31 DGs; 2 mif	2 cylindrical pits; 1 hearth		good: deep silty loam on alluvial fan of small drainage; corn pollen present
LA80911	1 abrading stone	manos: 1 1-h, 1 frag; 79 DGs	1 hearth		good nearby: deep soils in floodplain of Arch Rock Canyon
LA81169		1 mano frag; 48 DGs	2 bell-shaped pits; 2 hearths		good: deep silty loam on alluvial fan of small drainage
LA81173	1 pp	28 DGs			none: shallow soil with bedrock outcrops
LA121784	1 pp	manos: 2 2-h; 97 DGs	1 burned surface		good: deep soil
LA79097	6 pp. 1 spoke shave	manos: 15 1-h, 3 2-h, 1 frag; 1 basin metate; 1,338 DGs	2 FCRC; 6 hearths; 1 bell-shaped pit	1 ceramic pipe; human burial in pit	poor: very slow deposition; moderate erosion; corn pollen present
LA80316	2 pp	mano: 1 1-h; 1 mif; 164 DGs	pits: 1 roasting, 1 bell-shaped; 4 hearths		good nearby: deep soils, in floodplain of Arch Rock Canyon
LA80319	6 pp	mano: 1 1-h; metate: 1 slab; 151 DGs	pits: 1 bell-shaped, 4 roasting; 2 burned surfaces; 8 hearths	2 ceramic pipes	good: deep soil, heavy deposition
LA80910	6 pp, 3 abrading stones	manos: 3 1-h, 1 frag; 413 DGs	2 hearths	47 Puebloan sherds (possible trading locus?)	good nearby: deep soils in floodplain of Arch Rock Canyon; corn pollen present
LA80963	2 pp	manos: 2 1-h, 1 frag; 196 DGs			poor: very slow deposition; erosion
LA81172	2 pp, 2 ppp	manos: 2 1-h, 2 frags; 91 DGs	pits: 2 roasting, 2 bell-shaped; 2 FCRC; 2 hearths		good nearby: deep soils in floodplain of Arch Rock Canyon
LA81175	13 pp, 6 ppp, 1 shaft abrader, 2 shaft straighteners	manos: 4 1-h, 3 2-h, 3 frags; metates: 3 slab, 8 frags; 25 mif; 2 comals; 2,444 DGs	pits: 2 roasting, 3 bell-shaped, 1 burned; 5 hearths	1 ceramic pipe	good: deep soil on alluvial fans at base of two drainages; corn pollen present

DGs = Dinetah Gray sherd; FCRC = fire-cracked rock concentration; mif = milling implement fragment; pp = projectile point; ppp = projectile point preform; 1-h = 1-hand; 2-h = 2-hand

bell-shaped and cylindrical pits may be indicative of storage, as well as, or instead of, food processing.

Ceremonial Activities

For our purposes here, we are assuming that pipes represent the ceremonial, not recreational, smoking of tobacco. Of the four sites with pipes found on them, three are residential bases and one is a field camp.

Interestingly, the field camp (LA80318) is located immediately northeast of one of the residential bases (LA80319). Between them, these two sites had four of the six pipes recovered from Navajo contexts. Perhaps these sites were functionally related through ceremonial activities.

Only one site (LA790997) was found to contain a human burial. This individual (a young man) had been interred in a large, bell-shaped pit, apparently accompanied by a bobcat leg. His body was covered by a deposit of soil containing wood, non-human bones and artifacts, and the upper walls of the pit were collapsed to seal it. The pit was subsequently covered with a midden deposit.

Prior to the burial, the pit had been unused for a long enough time so that more than 30 cm of wind- and water-lain sediments had been deposited in the base. Although undated, it is possible that this burial was the last use of the site if the protohistoric Navajo held the same beliefs as the historic and modern Navajo against living near the dead.

The presence of corn pollen may actually be indicative of ceremonial activities, rather than farming (see below). This idea is reinforced by the fact that three of the four sites containing pipes also contained corn pollen. In particular, LA79097 contained a pipe, a human burial, and corn pollen, yet was rated as having poor agricultural potential.

Farming (Agricultural Potential)

An additional activity that probably took place on or near at least some of the sites was agriculture. For our purposes here, we are using the presence of corn pollen (rather than kernals and cobs) as being indicative of actual corn farming.

Corn pollen was present at six sites: three were residential bases and three were field camps. At both the bases and camps, the corn pollen was recovered from one site with poor agricultural potential and two sites with good agricultural potential. It therefore appears that either corn pollen on a site is not necessarily indicative of corn cultivation by site occupants (see Ceremonial Activities), or our understanding of what constitutes an acceptable distance between sites and corn fields needs revision.

With regard to agricultural potential in general, the site types were fairly similar: 71% of the residential bases and 73% of the field camps were rated as having good potential.

Burned tree stumps were found on three sites (LA80315, LA80318, and LA80319). It has been suggested that these resulted from clearing for agricultural fields. This could well be the case for the two sites (LA80318 and LA80319) with good agricultural potential. However, at LA80315 (a site containing corn pollen) the soil was evaluated as having poor agricultural potential. This then raises the question: was the burning done for some other reason, or did the Navajo grow corn there even though we don't think the soil looks cultivable?

Defense

Only one site appears to occupy a defensive location. LA46147 is situated on top of Arch Rock Butte, a small butte overlooking Arch Rock Canyon. The location of this site may indicate a strategy of defensive positioning, possibly in response to Ute raiding.

Although LA46147 is not a pueblito, its Navajo component dates to the same general time as the construction of the two earliest known pueblitos: Buffalo Mask Pueblito dates to the 1680's (Towner 1997) and Tapacito Pueblito dates to the 1690's (Marshall 1991). Although both of these pueblitos are some distance from the Arch Rock Butte site, there may have been some exchange of ideas or a common need for defense.

Summary

Seven of the sites in the study area were determined to be year-round residential bases, with two of these, LA79097 and LA81175, more heavily used than the other five. Because of their long-term occupations, these sites all showed evidence of hunting, lithic tool production, food processing and cooking, with some of the sites also having food storage capacity and ceremonial activities. Three of the sites with no well-defined food storage facilities, did have oxidized bell-shaped pits with charcoal and/or burned stone that were interpreted as food processing features, but which could have been used previously or alternately for storage. Five of the sites were well situated for agriculture either on-site or in the immediate area.

The remaining eleven sites were all classified as field camps and contained smaller artifact assemblages associated with a more limited range of activities.

LENGTH OF SITE OCCUPATION

Evidence indicates that the Navajo sites were occupied for only short periods of time, probably no more than five years. This is based on the insubstantial nature of the structures, the small number of artifacts (and frequently, the absence of middens), the general lack of remodeling, and the tree ring data.

This is similar to the findings on Frances Mesa, where "the combined analysis of midden accumulation rates, tree-ring dating, structural attributes, and assemblage size would indicate that the majority of early Navajo sites in the DinÈtah were occupied for 5 years or less" (Wilshusen et al., 2000:220).

TECHNOLOGY

Lithics

Flaked Lithics

Formal Tools

Eight categories of formal tools were present in the Navajo flaked lithic assemblage (see Figure 6-14). As can be seen from this figure, of the 104 formal tools, projectile points were the most numerous. On almost all of the sites, projectile points were the most common type of formal tool, with the next most common types being bifaces, preforms, and scrapers.

The numbers and frequency of projectile points indicates that hunting was an important aspect of subsistence. Defense may also have been an issue, as the Navajo are known to have been the focus of Ute raiding parties during the 1600 and 1700's.

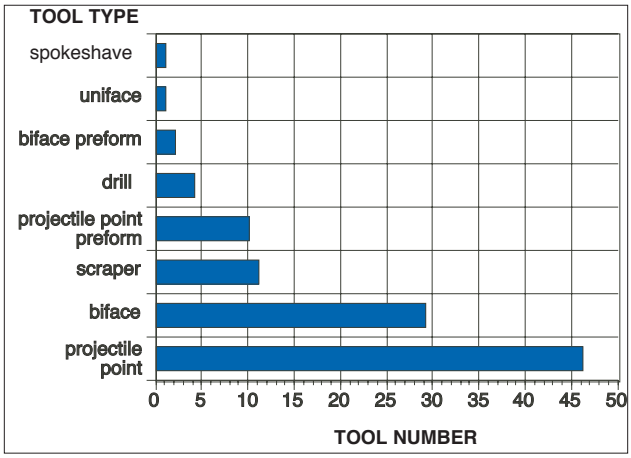

Figure 6-14. Bar graph illustrating types and numbers of Navajo formal flaked lithic tools.

Informal Tools

Eight categories of informal tools were present in the Navajo flaked lithic assemblage (see Figure 6-15). As can be seen from this figure, most of the 123 informal tools were modified flakes.

Debris

Cores

Eight core types were identified on the Navajo sites, as shown in Figure 6-16. Of the 30 cores, multidirectional cores were the most common. Kearns (1988) has suggested that multidirectional microcores are a Navajo cultural trait. The 1999 analysis identified only two unidirectional microcores, while the 1990 analysis did not utilize a microcore category.

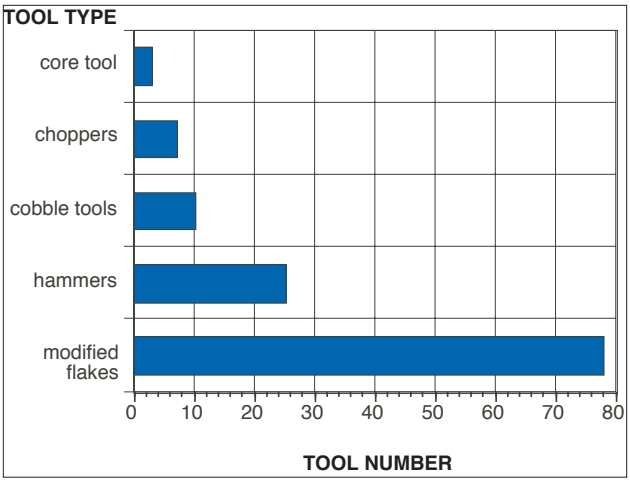

Figure 6-15. Bar graph illustrating types and numbers of Navajo informal flaked lithic tools.

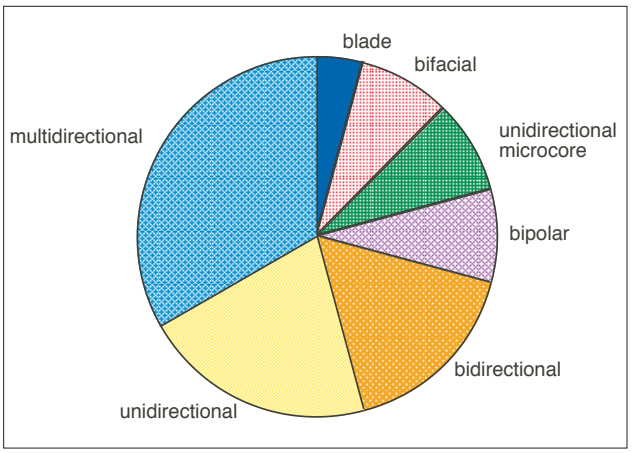

Figure 6-16. Core types identified on Navajo sites.

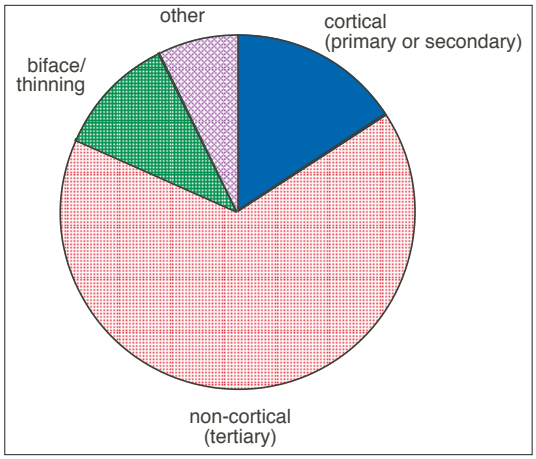

Figure 6-17. Debitage flake types identified on Navajo sites.

Debitage

A total of 3,191 debitage flakes have been recovered from the Navajo sites in the study area. As can be seen from Figure 6-17, non-cortical flakes dominated (66%) the assemblage, with cortical flakes at 16%, biface and biface thinning flakes at 11%, and other flakes (including shatter) at 7%.

The biface flake data suggest that formal tool manufacture occurred on the sites. This finding contrasts with earlier conclusions based on just the 1990 analysis. The 1990 debitage analysis identified 16% cortical flakes, 72% non-cortical flakes, 3% biface flakes, and 9% other flakes. These percentages suggest that formal tools were primarily finished off-site. The 1999 analysis identified 16% cortical flakes, 59% non-cortical flakes, 20% biface thinning flakes and 5% other flakes. These percentages suggest that all phases of tool manufacture occurred at the sites.

The percentages of cortical flakes from the two projects are the same (16%), and the percentages of non-cortical and biface/biface thinning flakes from each project are very similar (75% for 1990, 79% for 1999). The difference between the assemblages relates primarily to the definitions used on the two projects regarding biface and biface thinning flakes. The data from 1999 appear to more accurately reflect the actual types of flakes on Navajo sites in the area, as compared with data from other Navajo sites in DinÈtah (Kearns 1996).

Raw Materials

In 1999, near LA79097, a sample of naturally occuring cobbles was analyzed and found to contain 72% quartzite, 14% siltstone, 8% diorite, 2% (poor quality) chert, 1% mudstone, 1% andesite, 1% schist, and 1% hornfels. This suggests that the Navajo could have readily acquired quartzite, siltstone and diorite, but probably needed to obtain cherts and other cryptocrystalline materials from other residual terraces or outwash gravel deposits within 15-30 miles (R. Moore, personal communication, 2001).

Tools

In manufacturing their flaked lithic tools, the Navajo used three types of material: fine-grained rock, cryptocrystalline rock and jet (see Figure 6-18). Almost two-thirds of their tools were manufactured from cryptocrystalline materials such as chalcedony, chert, jasper, obsidian and silicified wood; typically, the formal tools were made of these materials. The remaining third of their tools were manufactured from fine-grained materials such as limestone, quartzite, siltstone, mudstone, basalt, diorite and schist. A single tool was made of jet.

Given that cryptocrystalline materials were probably not readily available in the local gravels, this indicates that the Navajo travelled (and/or traded) for much of their flaked stone tool materials.

Cores

It has been suggested that the weight of a discarded core was inversely proportional to the distance from the core's original source. That is, a locally obtained core was

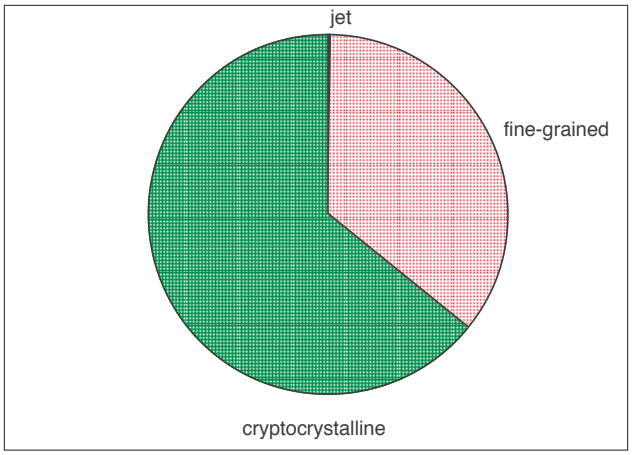

Figure 6-18. Pie chart illustrating types of materials used for Navajo flaked lithic tools.

typically discarded at a larger size (because it could more easily be replaced), while a core from a distant source was typically discarded at a smaller size.

The 30 cores from the project area certainly appear to support this hypothesis. As can be seen from Figure 6-19, the largest cores are made of materials known to be locally available in the cobble beds of the study area. The smaller cores are made of materials known or suspected to be available only from more distant sources. The two exceptions to this appear to be the siltstone core and the smallest quartzite core, both of which were probably locally obtained.

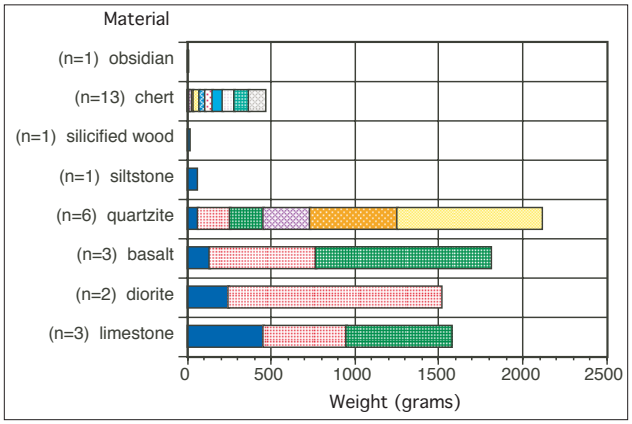

Figure 6-19. Bar chart illustrating weights and materials of Navajo cores.

Debitage

The debitage assemblage reflects the preference for non-local cryptocrystalline materials (see Figure 6-20) similar to that reflected in the tool assemblage (see Figure 6-18). The category "Other" contains, in addition to jet, two materials not present in the tool assemblage: granite and igneous rock.

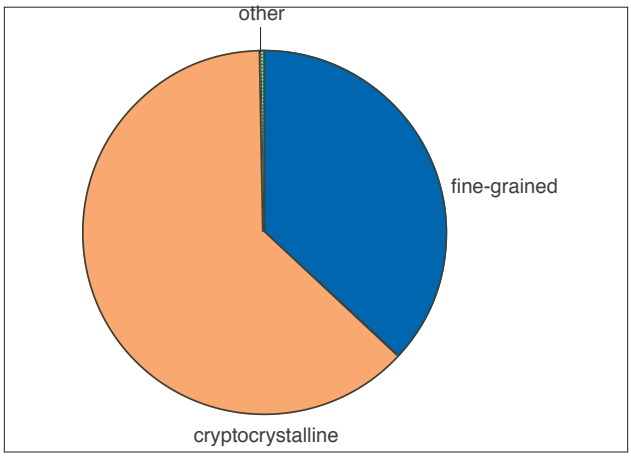

Figure 6-20. Pie chart illustrating types of materials present in Navajo debitage assemblage.

For any given material, a high percentage of cortical flakes is usually thought to indicate that the material was acquired near the site. Conversely, a low percentage of cortical flakes and a high percentage of non-cortical flakes is thought to indicate that the material was acquired at some distance from the site.

Data from the study area support these ideas. The data show high percentages of cortical flakes for basalt, quartzite, diorite, siltstone and silicified wood. These materials are readily available within the study area, with the possible exception of high-quality silicified wood. Conversely, the data show high percentages of non-cortical biface thinning flakes for chert, jasper, chalcedony and obsidian.

The data also suggest that most of the tools found in the study area were produced there. This can be inferred from Table 6-14, which uses chert as a proxy for non-local materials and quartzite as a proxy for local materials. The percent of chert in the tool, core and debitage classes ranges between 30-40%; the percent of quartzite in the same three classes ranges between 22-34%. Therefore, it appears that the tools were produced in the area, whether or not the material used was locally available.

Table 6-14. Percentages of Chert and Quartzite in Tool, Core and Debitage Classes

	Chert	Quartzite
Tools	30%	22%
Cores	33%	20%
Debitage	38-40%	24-34%

Non-flaked Lithics

The non-flaked lithic assemblage contained 153 artifacts, of which 119 were identifiable as tools or ornaments. As can be seen from Figure 6-21, most of these items were related to vegetal-food grinding activities, with one-hand manos being the most common tool.

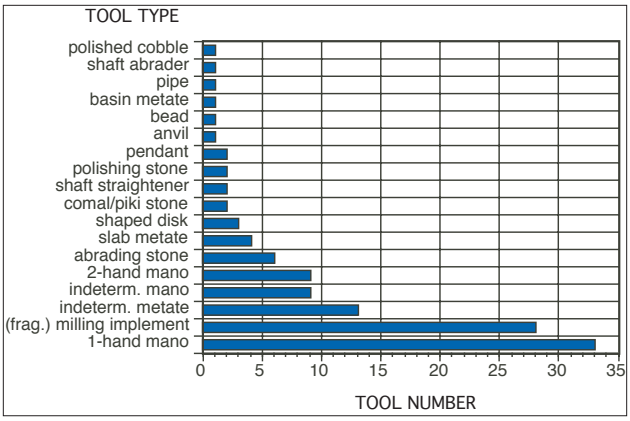

Figure 6-21. Bar graph illustrating the types and numbers of non-flaked lithic items.

Most of the non-flaked lithic items were made of sandstone and quartzite (see Figure 6-22). However, some were made of less common materials such as hematite (pendant) and jet (bead and pipe).

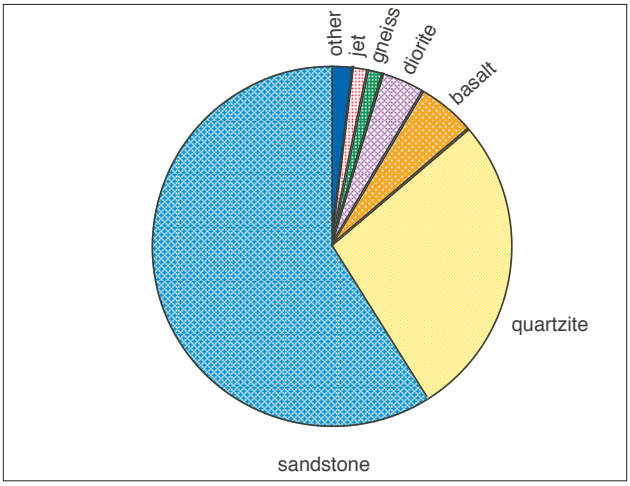

Figure 6-22. Pie chart illustrating materials present in Navajo non-flaked lithic assemblage.

Ceramics *by Lori Reed and Kathy Hensler*

Oxidation analyses were used to compare ceramic raw materials use in the Navajo MAPL site assemblages. The bulk of the refired sherds derive from LA 81175, but sherds from LA 27092, LA 46147, LA 81169, LA 81172, and LA 121784 were included. Based on principles of clay mineralogy, iron content, and the reaction of clays to high temperatures in an oxidizing atmosphere (see Shepard 1956), by consistently oxidizing sherds and raw clays (e.g., 900∞ C for 30 minutes), homogenized colors classified as buff, yellowish red, or red may be compared to discuss clay selection in general terms. A total of 86 sherds were selected for oxidation analysis from the Navajo MAPL assemblages including the Navajo utility ware, Dinetah Gray, and the Puebloan imports, Jemez Black-on-white, and Zuni/Acoma and Rio Grande Glaze Ware. After the oxidized colors were recorded using a Munsell Soil Chart, Munsell colors were sorted into buff firing (color groups 1, 2, and 3), yellowish red (color groups 4 and 5), and red firing (color groups 6 and 7).

As expected most of the Dinetah Gray sherds refired to either yellowish red or red color groups with only a few sherds refiring to lighter colors. Previous research in the Upper San Juan area has established that Dinetah Gray and Gobernador Polychrome sherds generally refire to yellowish red and red colors (see Blinman and Wilson 1994; Langenfeld 1996; Wilson 2000). Following this general pattern, the Jemez Black-on-white, Gobernador Polychrome, and Rio Grande Glaze Ware sherds also fell into yellowish red color groups. One Gobernador Polychrome sherd from LA 80316, however, did refire to the buff color group 2, while the single Zuni/Acoma Glaze Ware sherd fired to the buff color group 1.

In order to extend this analysis, Dinetah Gray from the MAPL sites were compared to other refired Navajo assemblages from the Navajo Reservoir, Cedar Hill, Counselor, and NIIP areas (Table 2). McKenna and Windes (1977:557) noted an abundance of reddish and reddish yellow refired sherds from the lower Chaco River, although they distinguish only three color groups. Their sample of 27 Navajo Utility sherds was derived from buff (25.9%), reddish yellow (44.4%), and red (29.6%) firing clays. Langenfeld and Wittke (1997) reported two yellowish red sherds from the Fruitland area but noted that sherds from red-firing clays predominate at other sites in the region. Langenfeld and Wittke drew attention to differences in temper type that correspond with color in Blinman and Wilson's 1994 study of Gobernador and DinÈtah phase sites on the Arkansas Loop, but temper-based color associations have not been noted by other researchers. Thus, differences in refired sherd color, specifically that between yellowish red and red-firing clays, are not yet well understood over the larger Navajo occupational area. To provide a tentative look at how proportions of refired Dinetah Gray ceramics vary between sites located in the heartland of the DinÈtah, refired ceramic assemblages from 16 sites and assemblages were compared with three clay collections from the Counselor and Fruitland areas (Table 6-15).

Table 6-15. Clay and Ceramic Assemblages Contrasted

Assemblage Type	Site	Project	General Locale	Reference
Ceramic	LA 27092	MAPL	Fruitland	this volume
Ceramic	LA 46147	MAPL	Fruitland	this volume
Ceramic	LA 81169	MAPL	Fruitland	this volume
Ceramic	LA 81172	MAPL	Fruitland	this volume
Ceramic	LA 81175	MAPL	Fruitland	this volume
Ceramic	LA 121784	MAPL	Fruitland	this volume
Ceramic	LA 79097	Loop	Fruitland	Blinman and Wilson 1994
Ceramic	LA 72353	Fruitland	Fruitland	Ayers and Reed 1993
Ceramic	LA 78481	Fruitland	Fruitland	Ayers and Reed 1993
Ceramic	LA 55979	Fruitland	Fruitland	Reed et al. 2001
Ceramic	LA 77105	Fruitland	Fruitland	DeMar et al.1995
Ceramic	LA 79834	Fruitland	Fruitland	DeMar et al.1995
Ceramic	LA 84945	Fruitland	Fruitland	DeMar et al. 1995
Ceramic	LA 16257	N46	Counselor	Goff and Hensler 2001
Ceramic	Morris 1	Morris 1	Fruitland	K. Langenfeld personal communication 2001
Grouped	Block IV-V	NIIP	Gallegos Canyon	Brett 1984
Clay		Fruitland	Fruitland	DeMar et al. 1995
Clay		N46	Counselor	Goff and Hensler 2001

In this study, differences between localities did not appear to dictate clay resource color proportion. Instead, multiple analyses indicate that proportional differences between color groups 5 (yellowish red) and 6 (red) are statistically more significant than difference in locale. In Figure 6-23, a two cluster k-means solution shows that the MAPL sites LA 81175, LA 121784, and LA 81169 are sorted from LA 27092, LA 46147, and LA 81172. However, certain of these sites are more closely related than others. LA 27092 and LA 46147, for example, are tightly clustered in both principle component and k-means cluster analyses. Moreover, it may also be seen that clay collections tend to be closely associated with nearby sites, this being true both for the Counselor and Fruitland areas.

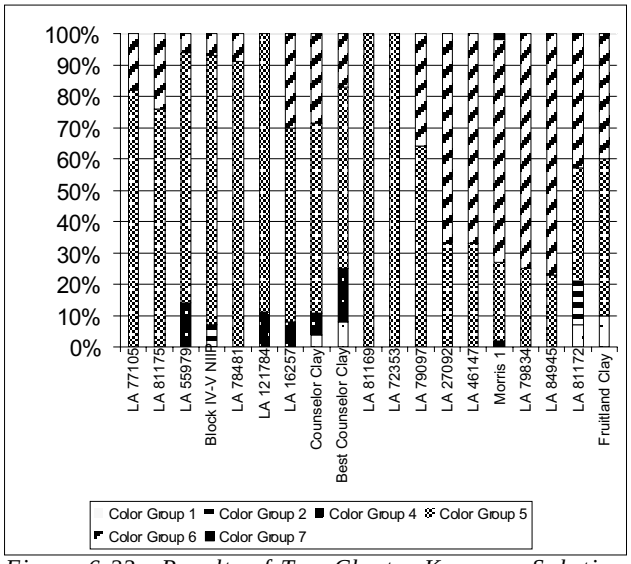

Figure 6-23. Results of Two Cluster K-means Solution

The best explanation for intersite color variability may be microregional clay resource differences. Comparison between Dinetah Gray sherds from LA 16257, a habitation site located south of Counselor, New Mexico (Reed and Hensler 2001), and two sets of clays gathered nearby indicates a very close match (see Figure 6-23 above). This is the case for both the clay collection as a whole and the group of 12 best clays. This fit between local clay and Navajo ceramic color has been observed in other studies. McKenna and Windes (1977) prompted many later clay studies when they suggested that Navajo potters were not using local geological clays in the lower Chaco River area, but were collecting alluvial clays from farther afield. Although these conclusions were based on color, petrographic, and technological characteristics of the Navajo sherds, no comparative clay survey was undertaken to determine actual clay availability. In the adjacent Gallegos Canyon area, Brett (1984) matched 10 geological and alluvial clays with 108 Navajo sherds and could not distinguish between geological and alluvial clays using color alone. Moreover, temper characteristics led her to believe that on-site manufacture of Navajo ceramics with geologic clays was occurring. In five separate site-based studies in the Fruitland area, DeMar et al. (1995) and Ayers and Reed (1993) successfully matched local clays with Navajo ceramic assemblages based on refired color. Geochemical and petrographic analyses of these same clays reinforced these conclusions while suggesting a great deal of underlying variability in temper and clay characteristics.

Although a geologic source was not reported in the studies just mentioned, placement of the clay collections described, in consultation with the USGS Aztec quad geologic map (Manley et al. 1987), shows association with the Nacimiento Formation (Brett 1984) and the Regina and Cuba Mesa members of the San Jose Formation (Ayers and Reed 1993; DeMar et al. 1995). These are the same formations that would have provided clays for MAPL Project sites, if the potters were using local resources.

In addition to sourcing studies of Navajo pottery, deciphering the construction techniques employed in the production of Dinetah Gray has proved informative. Reed and Hensler (2000) have recently described a distinctive Navajo vessel formation technique as part of an ongoing study of the origin of Navajo ceramics. MAPL Navajo assemblages examined as part of this study were critical in establishing the extent of the technique. When asked to describe Navajo pottery, archaeologists working in the DinÈtah will indicate that sherds and whole vessels have thin vessel walls, dark gray to black pastes, deeply striated to bumpy exterior surfaces, and extremely friable pastes. Those who have not worked extensively with DinÈtah archaeology generally ask the question—how is this pottery different from protohistoric and historic Puebloan, Ute, and Apache pottery? Yet based on statistical analyses of metric and textural and traits, Hensler and Reed argue that Navajo vessel formation techniques are not southwestern in origin but likely derived from northern ceramic traditions.

Reed and Hensler's technological analysis of Dinetah Gray included (1) replication of vessel formation techniques described in the ethnographic literature; (2) comparison of the replicated surface textures to Dinetah Gray pottery from DinÈtah and Gobernador phase sites; (3) recordation of textural attributes and coil morphology on Dinetah Gray pottery; and (4) comparison of the subsequent Dinetah Gray construction signature with early historic Puebloan, Gallina Anasazi, and Ute utility wares. While many of the details noted in ethnographic descriptions had direct correlates in the Dinetah Gray surficial textures, the most distinctive aspect was the downward sliding motion of the grouped fingers and thumb or single thumb that is unique to Navajo potters. When this sliding movement was replicated, the effect was a series of long linear, dragged finger marks, and a ruffled petticoat-like edge that was found to coincide with marks on many Dinetah Gray vessels.

The sliding-finger construction technique has been identified to date in the ceramic assemblages of 14 sites from the Fruitland, Navajo Reservoir, Cedar Hill, Frances Mesa, and Sisnathyel Mesa areas. A total of 21 vessels and 142 individual sherds from these sites were found to show evidence of the construction technique. The majority of both vessels and sherds are from DinÈtah

phase sites and all but a few predate 1655. The earliest are found at the Navajo reservoir site LA 55979, which dates to 1541 (Hancock 1997). Four of the MAPL Navajo assemblages were found to show clear evidence of this vessel formation technique, including fifteen sherds from sites LA 80136, LA 81169, LA 81172, and LA 81175.

Faunal Bone

A total of twelve faunal bone tools were recovered from seven Navajo sites (see Figure 6-24). Bone artifacts were not limited to long-term, year-round sites, but were more abundant on them, being found on LA79097, LA80319, LA81172, and LA81175. Interestingly, all of the non-functional items were found on these more settled sites.

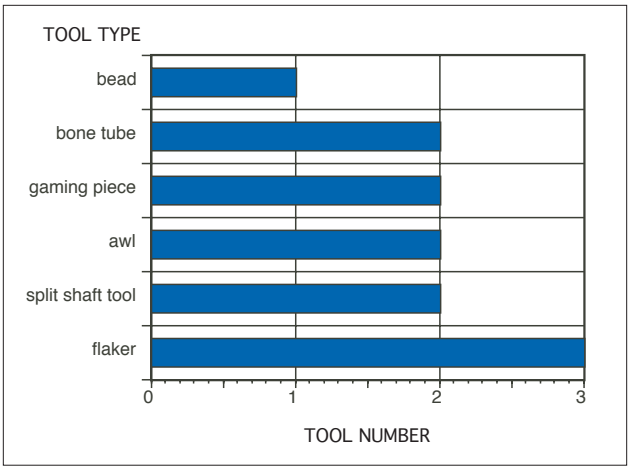

Figure 6-24. Bar graph showing numbers and types of faunal bone tools from Navajo sites.

Most (75%) of the tools were made from the bones of large-size mammals which could be deer, sheep, elk or pronghorn. Only three items were from smaller animals: the 2 bone tubes were from jackrabbit and the cylindrical bead was from a medium-size bird.

Summary

The 18 Navajo sites in the study area yielded almost 9,400 artifacts, consisting of flaked and non-flaked lithic, ceramic, and faunal bone artifacts. These artifacts were found in quantities ranging from 1 to 3,212 artifacts per site. Indirect evidence for Spanish trade artifacts was recovered in the form of steel axe-marks on trees which were dendrochronologically dated to the 1680's.

The structures on these sites typically contained fewer artifacts than Navajo structures excavated in either the La Plata valley or the Fruitland Project area. On sites in the La Plata valley, a structure averaged 80-100 pieces of debitage (Brown and Hancock 1992) and 20 flaked lithic tools (Brown 1991). In the Fruitland Project area, a structure averaged 435 artifacts on fully excavated sites (Sesler et al. 1999).

Based on the faunal and botanical remains found on the sites within our study area, the Navajo practiced a diverse economy that included wild plant gathering, hunting, and at least minimal agriculture.

Faunal Remains

A total of 4,744 faunal bones, representing approximately two dozen species, was recovered from the Navajo component.

Of these, only about 15% had been burned (see Figure 6-25). The largest number of identifiable bones were from large-size mammals, a trend previously noted in the faunal bone tool assemblage. Although there are approximately 700 burned bones in the assemblage, very few of them were recovered from hearths or roasting pits; most of the bones were found in middens or in structure fill.

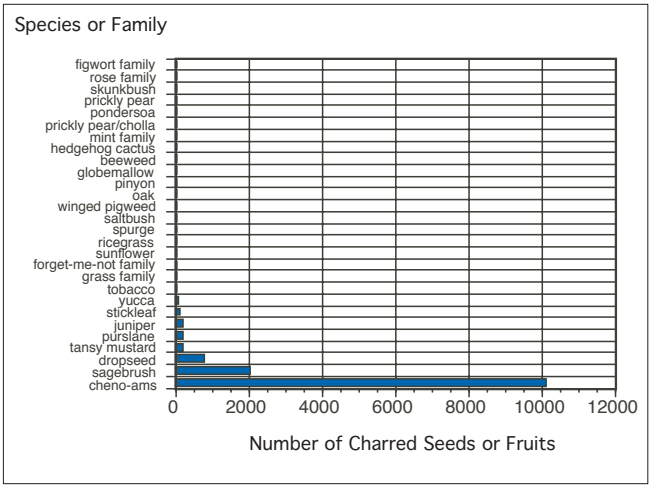

Figure 6-25. Bar graph illustrating culturally modified faunal bone from Navajo contexts.

Unmodified bones were found in a variety of contexts. Most of the unmodified bones were recovered from pits at LA79097 and LA81172. These pits had apparently been left open at site abandonment and served as traps for dozens of animals, mostly young cottontail rabbits. Other unmodified bones include those of a bobcat and snake, found in apparent association with a human burial at LA79097. Unmodified turkey bone was found at one site, while unmodified bovidae/cow bones were found at two sites; it is not known whether these were domesticated and associated or feral and unassociated with the Navajo occupation of the sites. While some of the remaining unburned bones are certainly of non-cultural origin, many are probably related to the use of animals, especially small animals, in stews where the bones would not show evidence of burning even though the animals had been cooked.

Another indication of the use of faunal material is the presence of blood residue on artifacts. The results from the two artifacts submitted for analysis from the study area suggested that elk was present on a sherd from LA46147 and antelope was present on a projectile point from LA80319. The presence of antelope could be related to hunting in an area more likely to support this species.

Botanical Remains

Wild Plants

Over two dozen wild plant species were identified through charred seeds and fruits in the 165 flotation and vegetal samples taken from the Navajo sites (see Figure 6-26).

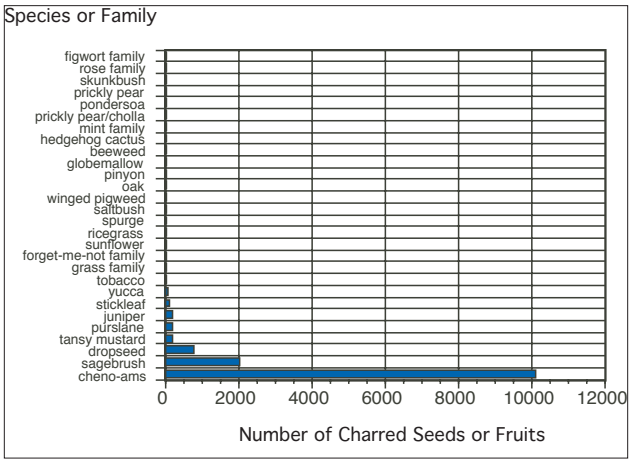

Figure 6-26. Bar graph illustrating numbers and types of wild plant charred seeds and fruits from Navajo contexts.

By far the most common type of seed was from the cheno-am family. Other wild food plants with a notable number of recovered seeds include sagebrush, juniper, dropseed,tansy mustard, purslane, and stickleaf. The remaining plant species were each represented by less than 40 seeds. Taken as a whole, these plants emphasize the importance of wild plant foods in the Navajo diet.

Several of the species recovered are weedy taxa that prefer disturbed soil, notably pigweed, goosefoot, beeweed, winged pigweed, tansy mustard, spurge, sunflower, and purslane. The presence of these plants could be be an indicator of more than just their use as a food plant. They may indicate disturbed soil associated with agriculture, although corn was never present in large amounts.

Fourteen locations were found to contain abundant charred wild plant seeds (see Table 6-16). One feature contained over 7,000 charred dropseed and goosefoot or pigweed seeds. These burned seeds were presumably leftover, probably intentionally discarded, after milling the parched seeds. Only five of the 14 locations had corn present, usually in minimal amounts. This suggests that the processing of these two types of plant resources typically did not occur at the same time.

Of the 42 pollen samples taken from Navajo contexts in the study area, every one contained pollen of at least one species with the potential to be used as a food plant (see Figure 6-27). Almost every taxon shown can be used for food, although the presence of pollen does not necessarily indicate its use as such. Of particular note are the results for goosefoot/pigweed plants and corn (the only domesticate for which pollen was recovered). The results

Table 6-16. Locations Containing Abundant Charred Wild Plant Seeds

Site #	Feature #	Feature Type	# of Seeds	Corn Present?
LA81175	115	mealing bin	7460	10 pieces
LA80321	86	cylindrical pit	40	
LA80321	151	cylindrical pit	1489	
LA81172	11	bell-shaped pit	43	~100 pieces
LA80316	172	roasting pit	598	1 piece
LA121784	structure?	floor fill	1135	
LA79097	Str.1	floor and floor fill	116	
LA46147	22	central hearth	164	
LA79097	14	central hearth	133	
LA80910	4	central hearth	378	37 (and 2 squash rind)
LA81172	132	central hearth	158	2 pieces
LA121784	8	central hearth	197	
LA81175	106	hearth	283	
LA81175	27	midden	168	61 pieces

for goosefoot/pigweed pollen were high on seven of the ten sites sampled, with pollen aggregates present on three of them. This may indicate cultural usage (Adams and Bohrer 1977). Although corn pollen was present on six sites, its presence was always very low.

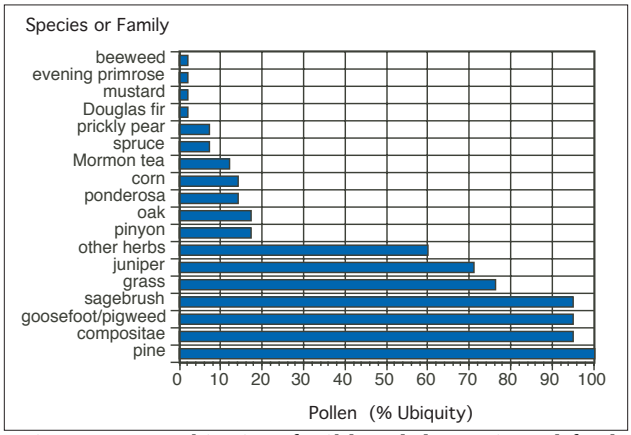

Figure 6-27. Ubiquity of wild and domesticated food plant pollen in Navajo contexts.

Domesticated Plants

Evidence for the consumption and possible cultivation of corn, and to a lesser extent, beans and squash, was recovered from the project sites (see Figure 6-28).

As can be seen from this figure, the evidence for beans and squash was fairly minimal. In fact, the indeterminate legume seed could not be positively identified as *Phaseolus vulgaris* and the two small pieces of squash rind could have been from a wild gourd. Therefore, these remains might not represent domesticated species at all.

The relationship between corn cultivation and corn consumption at the sites is not clear. Four of the nine sites yielded charred corn but no corn pollen, which would be expected if corn was cultivated nearby. Conversely, two of the six sites yielded corn pollen but no charred corn. Four sites yielded both charred corn and corn pollen, suggesting that corn was grown at or near these sites.

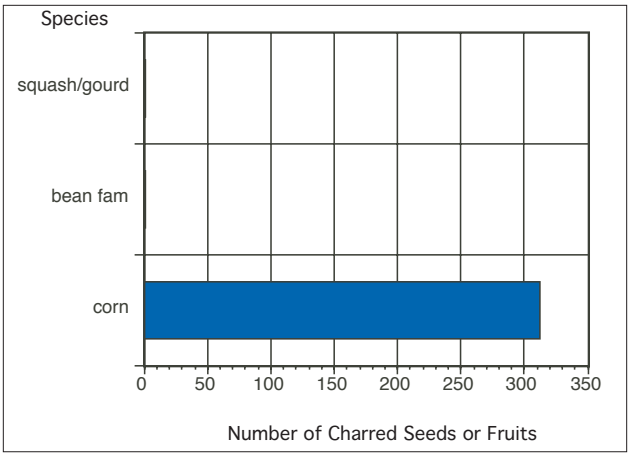

Figure 6-28. Bar chart illustrating the numbers of charred seeds or fruits of domesticated plants from Navajo contexts.

Our best evidence for agriculture is provided by four of the large bell-shaped pits, three of which were used for roasting. One pit was used to roast green corn – there were several pieces of burned husks, stems, and cobs as well as abundant corn kernels in the fill at the base of the pit. This corn was almost certainly grown nearby, even though no corn pollen was recovered from the pollen samples for this site. It would be very cumbersome to transport whole ears of corn from a distant field or to trade for it. The other bell-shaped pits contained minimal amounts of corn. The pits could easily have been used for storage of corn, or other plant resources, before being used for roasting, and could even have been used alternately for storage, then roasting and again for storage after cleaning.

Corn (and/or corn pollen) was present at 11 sites, but two-hand manos were found at only three sites. This could either reflect a failure to locate two-hand manos on some sites, or that one-hand manos were used by the Navajo to grind corn.

Summary

The subsistence of the Navajo people during the occupation of the study area appears to have been based on a combination of hunting large animals and use of small ones, probably obtained by snares or traps, gathering of a variety of wild plants, and a limited use of agricultural products. This pattern is consistent with that seen in other parts of DinÈtah previously excavated, such as the La Plata Mine area (Brown and Hancock 1992) and the area covered by the Fruitland project (Wilshusen, Hovezak, and Sesler 2001). Dykeman (1999) suggests that this varied economy, along with trading and raiding permitted the Navajo to lead a stable and relatively sedentary existence.

SEASONALITY

Introduction

The season(s) of site use can be suggested by the presence of several types of information: seasonally limited pollen and plants, immature animal bones, processing and storage features, food processing artifacts, and the size of structures and middens. However, seasonal indicators only act in a positive manner – the absence of an indicator for a particular season cannot rule out the occupation of a site during that season (Monks 1981). An additional factor limiting the accurate assessment of seasonality is the possibility of transport and storage of items. The presence of storable foodstuffs, such as corn, does not assure that the site was occupied during the plants growing or harvest season, as the items could have been stored for future use, possibly after having been brought to the site from a different location or acquired through trade (Monks 1981, Adams and Bohrer 1977).

Project Area Sites

Using the various types of information listed above, the Navajo sites were evaluated as to their likely season(s) of use. Thirteen of the 18 sites could reasonably be assigned to one or more seasons of use (see Figure 6-29). As can be seen from this figure, approximately half of the sites are believed to have been occupied for at least one full year, while most of the other half are thought to have been occupied only during the warmer months of the year.

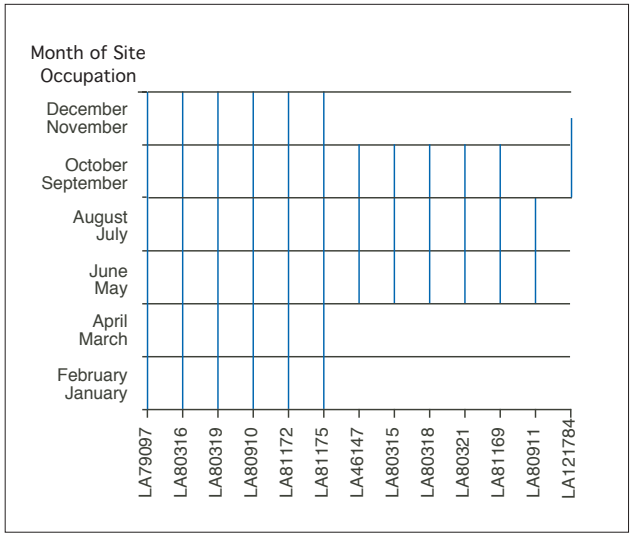

Figure 6-29. Season(s) of Navajo site occupations.

Unfortunately, it is not really possible to say much about how these sites related to each other, because we lack knowledge of contemporaniety. It appears, however, that both types of sites (i.e., year-round and seasonal) cluster in the vicinity of the Hart Canyon-Arch Rock area (see Figure 6-30). The three exceptions are all located to the north of this cluster: one year-round habitation is located near Pipeline Springs and two seasonally occupied sites are located at the head of Pine Canyon.

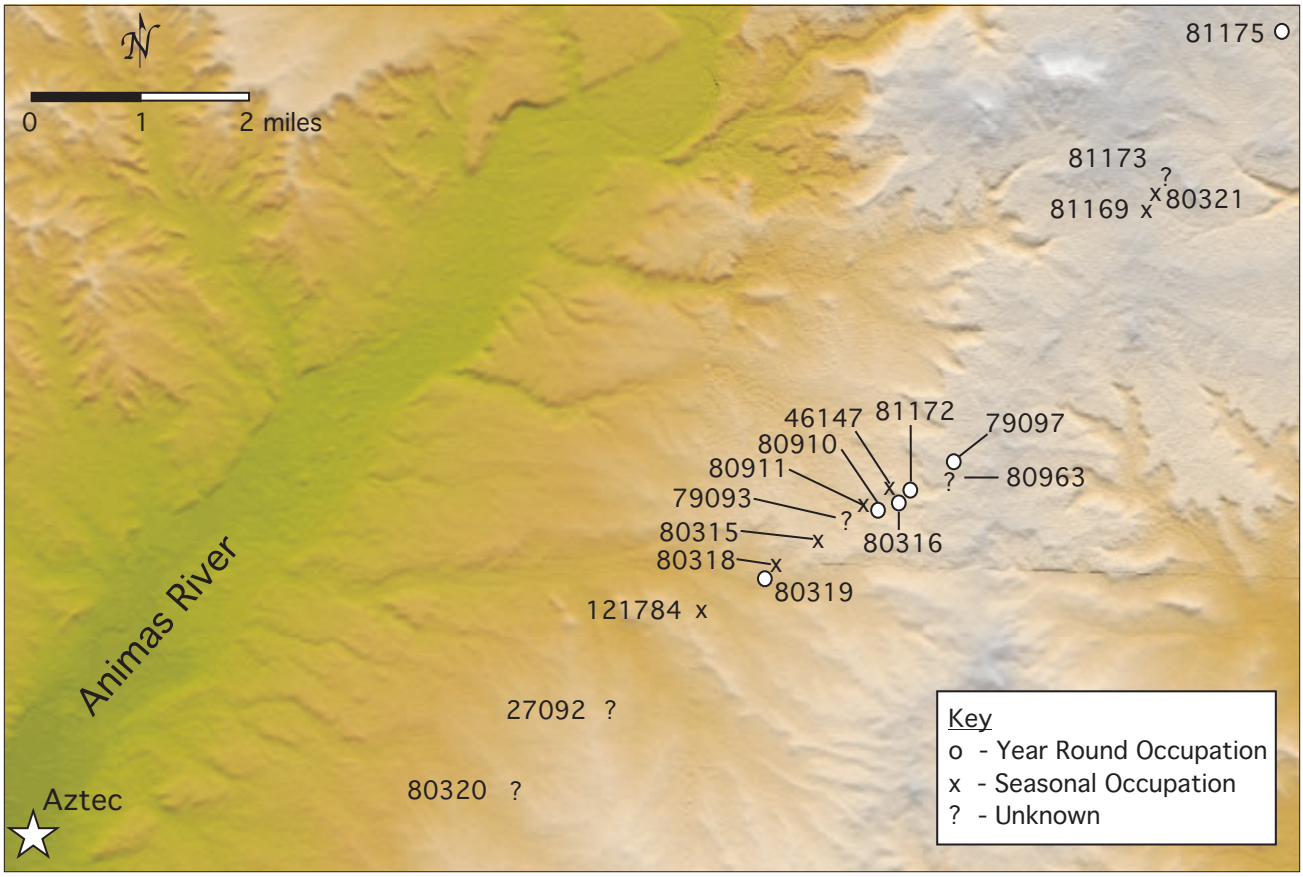

Figure 6-30. Map illustrating distribution of year-round and seasonally occupied Navajo sites.

EXTRA-REGIONAL RELATIONSHIPS

Introduction

The Navajo people established trading networks within a very short time of their arrival in Dinetah: tradeware ceramics and imported obsidian have been found on the earliest securely dated Navajo site excavated thus far, LA55979, which dated to 1541 (Hancock 1997). In addition to ceramics and obsidian, the Navajo also had use of steel axes by 1629 (Dykeman and Wharton, 1996). They may also have traded for perishable artifacts, such as baskets or specialized clothing, but these items would not have been preserved in the archaeological record. In all likelihood, the ceramics and obsidian were obtained predominantly through direct trading; however, the steel axes were most likely acquired through indirect trading or raids. Early Spanish documents (Hester 1962) make reference to the Navajo raiding of pueblo, and later Spanish, people, beginning as early as 1608 and continuing through the 1600's, the period when most of our sites were occupied. Items obtained by raiding would be archaeologically indistinguishable from those obtained by trading.

Assuming that these items were obtained through trade, we can only guess what items the Navajos were trading with. Navajo pottery is not found in areas where the tradewares originated, indicating that they were not trading their own ceramic wares. The earliest Spanish document to mention trade is by Espejo in 1582, which describes trade between the Querechos, thought to be an early Spanish name for the Navajos, and Acoma pueblo. The Querecho trade goods were salt, deer, rabbits, and tanned skins (Worcester, 1947, discussed in Hester 1962). A later document, the Rabal document, recorded from 1706-1743, specifically mentions that buckskin, basketry and woolen blankets were common trade items from the Navajo (Hill 1940, discussed in Hester 1962). Although there is no evidence of sheep on the sites in our study area, basketry, buckskin and meat could have been trade items to the pueblos through the occupation period of our study area. A 1663 decree restricting trade between the Navajos and puebloan peoples implies that trade between them was a common practice (Reeves 1957 as discussed in Dykeman 1999).

Project Area Sites

Almost all (16/18) of the Navajo sites had non-local materials on them. As can be seen from Table 6-17, half of the sites had both ceramics and obsidian.

Most of these items are believed to have originated to the south and east of the Dinetah (see Figure 6-31). One item (obsidian) was identified as originating from the San Francisco Mountains, one of the four traditionally sacred mountains (see Cultural Affiliation).

Table 6-17. Non-local Materials Found on Navajo Sites

Site #	Non-local Materials
LA27092	ceramics
LA46147	obsidian, steel ax (cut marks)
LA79093	obsidian
LA79097	obsidian
LA80315	ceramics, obsidian
LA80316	ceramics, obsidian, sandstone (pendant)
LA80318	obsidian
LA80319	ceramics, obsidian
LA80320	obsidian
LA80321	-
LA80910	ceramics, obsidian
LA80911	ceramics, obsidian
LA80963	ceramics, obsidian
LA81169	ceramics, obsidian
LA81172	ceramics, obsidian
LA81173	-
LA81175	ceramics, obsidian
LA121784	obsidian

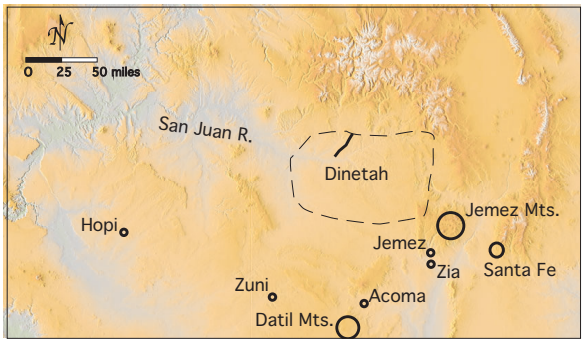

Figure 6-31. Map of northern New Mexico showing points of origination for artifacts from project area sites in Dinetah.

Two items may have come into the area in unusual ways. The sandstone pendant (LA80316) was sourced to the Datil Mountains in central New Mexico. This is well south of any trading networks involving ceramics or obsidian and might have been obtained from a secondary source rather than directly with people from that area. The second item is at least one steel ax. No axes were recovered from the study area, presumably because they were prized and remained with their owners; however, several ax-cut tees were present on the edge of LA46147. Samples from these trees were submitted for dendrochronological analysis and yielded cutting dates of 1680 and 1681, presumably the occupation dates of the site. Axes might have been acquired directly from the Spanish, either by trading or raids, but were probably more likely acquired in trade with the eastern pueblos when trading for either pottery or obsidian.

Ceramics *by Lori Reed*

The presence of trade ware on Navajo sites from various Pueblos to the east, south, and west has long been a topic of intensive research and interpretation. In general, research using Puebloan trade ware data has covered a broad range of topics, including temporal, demographic, and social issues (e.g., Hogan 1991; Marshall 1995; Reed and Reed 1992). Because Puebloan ceramics are highly visible on Navajo sites, they are frequently a focus of intensive analysis and research. Kidder's (1920) visits and initial documentation of pueblito sites in Gobernador and Largo Canyons documented Puebloan ceramics and an unusual Puebloan-like polychrome (later named Gobernador Polychrome) that he attributed to a Pueblo Refugee occupation of the area probably by Jemez people. He noted the presence of hogan structures, but suggested that it was indicative of Jemez refugee contact with Navajo people. For the next 70 years, Kidder's observations and interpretations influenced archaeological research in the DinÈtah. Gobernador Polychrome and Puebloan trade ware were examined in the context of Pueblo refugees rather than as material culture correlates of the Navajo.

Recently, through significant debate, the combination of Gobernador Polychrome, Puebloan ceramics, and pueblitos as indicative of Pueblo refugees has come under greater scrutiny. Towner's (1996) synthesis of tree-ring data from pueblito sites clearly indicates that construction of these rock habitations dates almost exclusively to the 1700s, after the Pueblo Revolt and during periods of relative peace between the Pueblos and the Spanish. Confirming Jacobsen et al.'s (1992) supposition that the pueblitos were constructed for defense of Navajo settlements from Ute raiding, Towner (1996:169) states, "no longer can archaeologists and anthropologists rely on a simple model of immigration to explain the abundant Puebloan influence in Navajo culture." As a result, Puebloan influence on Navajo culture appears much more complex, for which ceramic data will contribute significantly to interpreting the intricate social, economic, and political relationships among Navajo and Pueblo.

Reed and Reed (1992) proposed that the presence and distribution of trade ware on Navajo sites is more complex than previously thought. They suggested alliance formation (e.g., Plog 1984; Upham 1982) to interpret the distributions of Pueblo pottery on Navajo sites. Given the early appearance of Puebloan wares in Navajo assemblages, it appears that the Navajo had trading relationships with Pueblos to the east and west during the Dinetah phase. Data from LA 55979 (Hancock 1997), tree-ring dated to 1541, clearly show that ties with the Jemez and Tewa Pueblos were established soon after 1500. With exchange of material goods and formation of social alliances beginning in the Dinetah phase, the stage was set for the influence of Pueblo culture on the Navajo by means of pottery technology and design imitation (e.g., Gobernador Polychrome), intermarriage (e.g., Navajo clans with Pueblo ancestry), and economic integration (e.g., adoption of sheep and blanket weaving), to name a few.

Compared to other Navajo ceramic assemblages dating to the early Gobernador phase, the MAPL trade ware includes many of the most common Puebloan ceramic types. As indicated by Reed and Reed's (1992) study of pottery distributions, Jemez Black-on-white is the most common non-Navajo ware found on DinÈtah sites. Similar to many Navajo assemblages, the presence of Puebloan trade ware from the MAPL sites is represented

by only a few sherds, rather than significant portions of vessels. The assemblage from LA 81175 (Table 6-18), for example, includes five fragments from a single Rio Grande Glaze F shouldered bowl. Although these sherds represent one vessel, the small size of the fragments brings into question whether these sherds actually represent the use of a shouldered bowl or sherds that were brought to the site for a secondary function. Langenfeld (2002) discusses this same issue in the context of the Morris Site 1 Early Navajo Land Use Study, suggesting that a fragment of trade ware may have social, economic, or ritual contexts beyond its original function as part of a whole vessel. Although the Glaze F sherds from LA 81175 represent the best evidence of a whole trade ware pot from the MAPL sites, the number of sherds and their combined weight fall far short of confidently identifying them as representing a vessel. Trade ware from the remaining MAPL sites pose the same problem, calling into question their function as whole vessels at these sites.

Table 6-18. Frequency of Pueblo Trade Ware in MAPL Navajo Assemblages

Ceramic Type	Site	Total
Indeterminate glaze ware	LA80316	1
	LA81175	1
Jeddito Yellow Ware	LA27092	1
	LA80316	2
Jemez Black-on-white	LA81169	3
	LA81172	1
	LA81175	1
Rio Grande Glaze F	LA81175	5
Zuni/Acoma glaze polychrome	LA81175	1
Total		16

As shown in Table 6-18, Puebloan trade ware from the Jemez, Rio Grande, Hopi, and Zuni/Acoma areas is present in the MAPL assemblages. Given the evidence from LA 55979 (see Hancock 1997), it is clear that the Navajo had long-standing trade relations with their Pueblo neighbors by the early 1500s. At the time the MAPL sites were occupied, trade relationships with the Pueblo had been cultivated and enriched for 100 to 150 years. Contact with Puebloan groups during the 1600s is evident at the MAPL sites, suggesting that possession or display of Pueblo wares was important for the Navajo living in the area just east of the Animas River. As discussed in the ceramic chronometry section, the presence of Pueblo wares on some sites and not others may be some indication of differing relationships with the Pueblo among the Navajo clans (e.g., traditional versus progressive ideologies). The significance of Puebloan influence on Navajo culture is demonstrated by the technology and design styles of Gobernador Polychrome (Reed and Reed 1999). Although many researchers have attributed Gobernador Polychrome to Pueblo refugees, it has become clear that production of the type cannot be explained with such a simple model of immigration. The combination of Puebloan trade ware, technology and design of Gobernador Polychrome, and the influence of Puebloan technology on Dinetah Gray offers further opportunities to explore the complexities of culture change in the DinÈtah, for which the MAPL assemblages will make a contribution.

Lithics

Many of the lithic materials used by the Navajo people were locally available either as cobbles or as outcropping bedrock. Despite the availability of these local resources, however, almost every site assemblage contained artifacts of identifiably non-local lithic materials, presumably obtained from trade or travel. Most of the non-local lithics were obsidian from the Jemez area, immediately to the southeast of the Dinetah (see Figure 6-31). Other non-local items were a sandstone pendant sourced to the Datil Mountains in central New Mexico, and items of jet that may have come from coal seams along the San Juan River west of Farmington, New Mexico.

Obsidian

Obsidian was a significant trade item for the Navajo people. Despite its source location some 100 miles from the project area, obsidian represents 9% of the flaked lithic assemblage. While the source was within the range of travel of the Navajo people, it was probably acquired by trade since the obsidian sources were probably strictly controlled by the people at Jemez Pueblo (Winter 1983, as discussed in Baugh 1997).

Sourcing of the 25 obsidian pieces from Navajo contexts revealed that 22 came from the Cerro del Medio source in the Jemez Montains, two came from the Polverdera Peak source in the Jemez Mountains, and one came from the Government Mountain source in the San Francisco Peaks of Arizona. This high frequency for obsidian derived from the Cerro del Medio source has been seen in other Dinetah Navajo sites (Vierra 1993). It is not known if this indicates that the Navajo had access to only this source or that it was their preferred obsidian source.

Summary

The Navajo people traded with many other peoples throughout their occupation of DinÈtah. It is obvious, based on the high incidence of Jemez obsidian and Jemez ceramic tradewares, that the Navajo had a close relationship with the people of Jemez Pueblo. This probably is due, at least in part, to the proximity of the pueblo to the Dinetah. In addition to the contact with the Jemez people and other Pueblo people to the east, the Navajo had contact to the south with the people from the Zuni or Acoma Pueblos and to the west with people of the Hopi Pueblos.

SETTLEMENT PATTERNS

Introduction

The choice of settlement locations can be influenced by a number of factors, including vegetation zone, elevation, distance to water, aspect, access to water, plant and animal resources, and the agricultural potential of an area.

Vegetation Zone

The study area is entirely within an open pinyon-juniper zone ranging in elevation from 6180-6750 ft. There are two moderate jumps in elevation: the First Rim is a low sandstone cliff north of LA80318, and the Second Rim is a higher sandstone cliff north of LA81172. The pipeline corridor that defines the study area runs southwest to northeast through the area, following the natural slope, so that the sites at the northeastern end of the study area are typically higher than those at the southwestern end.

It has been proposed that during the DinÈtah phase, the Navajo followed a biseasonal model of settlement with the winter habitations in the upland pinyon-juniper zone and summer habitations in lower zones (Winter and Hogan 1992). Our data does not support this model. None of the sites have been securely dated to the DinÈtah phase; however, all but one of the potentially winter-occupied sites appears to have been occupied year-round, rather than only during the winter. Six out of the seven larger sites, determined to be residential bases, date to the Gobernador phase, with the seventh site not dated, suggesting that either we have no DinÈtah phase sites or that they were not occupied during the winter.

Distance to Water/Springs

Investigations in other parts of DinÈtah have determined that sites are usually located within 0.5 km of a seep or spring, and never more than 1.5 km from water (Fruitland). Generally our sites hold with this pattern. Interestingly, there appear to be clusters of potentially contemporaneous sites centered on several of the springs (see Figure 6-32). Each potential community may represent one extended family, or a small group of families that wintered together, even if some of the community members spent part of the year away hunting animals or gathering plants.

Non-spring Sites

In the southern third of the study area, south of Hart Canyon, there are noticeably fewer springs and fewer sites. The two sites located here, LA80320 and LA27092, are 2.7 and 3.5 km, respectively, from the nearest known water source, Thurston Spring. These are two of the most ephemeral sites in the study area. There may be closer springs that are currently unmapped, but the minimal nature of the sites suggest that people were traveling through the area rather than staying, even seasonally, and were not limited by the need to be near to water.

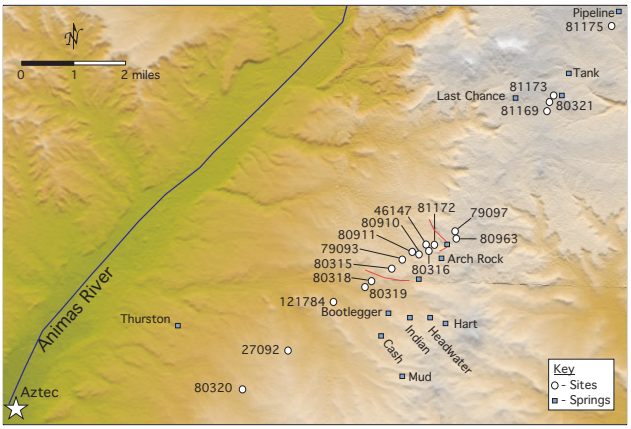

Figure 6-32. Map illustrating location of possible Navajo communities.

Hart Canyon Community

The two Hart Canyon sites (LA80319 and LA80318), are approximately 1.5 km from Bootlegger and Indian Springs to the southeast, and slightly farther from an unnamed springs to the east. In addition, Hart Canyon occasionally holds water. LA80319 was probably occupied year-round, and the two sites potentially contain 14 structures. LA121784 is somewhat peripheral to these two sites, but is located approximately 1.5 km from Bootlegger Springs.

First Rim Community

The two First Rim sites (LA80315 and LA79093) are located 0.46 km west of Arch Rock Spring, above the first rim. These sites could have been contemporaneous and may have formed a loose community with a maximum of four structures.

Arch Rock Butte Community

Five sites (LA80910, LA80911, LA80316, LA46147, and LA81172) form the Arch Rock Butte Community. These sites are located 0.5-0.8 km from Arch Rock Spring, the nearest known water, with all but one more than 0.5 km from the spring. ALSO UNNAMED SPRING TO NORTHEAST, PROBABLY ON CLIFF ABOVE? The northernmost site of the potential Arch Rock Spring community is equidistant from this spring (see second rim) and Arch Rock Spring, but was more likely to be associated with the lower sites than the two sites above the rim.

The attraction of living near the butte either for defensive, ceremonial or aesthetic reasons apparently influenced the occupants to locate slightly further than usual from a reliable water source. At least three of the five sites are probably contemporaneous and formed a loose community, with a maximum of fourteen structures on the five sites.

Second Rim Community

The two sites (LA80963 and LA79097) in the Second Rim Community were less than 0.25 km west of an unnamed spring. These sites contained a maximum of four structures that were potentially contemporaneous.

Pine Canyon Community

Located at the head of Pine Canyon Community are three springs: Last Chance, Tank and an unnamed spring. This unnamed spring was the closest, and was probably used by the occupants of three sites. These sites, LA81169, LA80321, and LA81173, are located 0.24-0.38 km from the spring. Only one of these sites is dated and the others are presumed not to be associated with it. Since there is no dating for the other two sites, they are not being treated as a potential community. There was a maximum potential of three structures on these sites.

Pipeline Spring Community

Only one site (LA81175) comprises the Pipeline Spring Community, located at the northern end of the study area. This site is located very close to the spring, only 0.12 km away.

This was the most heavily used site, based on the size and diversity of the artifact assemblage and the number of extramural features. The maximum number of structures potentially present on the site is only five at this time; however, much of the site remains unexcavated.

Aspect

Aspect was certainly taken into consideration by the Navajo when choosing a site location. Most (14/18) of the sites are located on south to southwest facing slopes. Only one of the seven residential bases is set on a northeast-facing slope.

Soil

Most of the sites were set in locations with good agricultural potential, even though there is not strong evidence that corn was a major component of the subsistence of the Navajo during this time.

Summary

While all of the structures may not have been occupied at the same time, there probably is a continuity of use by the same or related people in each area. These potential communities represent clustering of structures in specific site areas around springs rather than in a continuous scattered band, thus suggesting that each site had a reason for remaining self-contained. The fact that two or more groups of people shared the use of a spring would at least imply cooperation over access to an important resource and probably implies other social contacts as well. The occupants of the separate sites around a particular spring might have been members of one extended family or clan.

SOCIAL ORGANIZATION

Introduction

In order to estimate the Navajo population of the study area sites, three different methods were used. These three methods derive population estimates based on the floor area (square meters) of excavated structures. For the current project, 14 residential sites were examined.

Table 6-19 presents the results of these three methods. As can be seen from this table, the three methods produced three very different estimates for the number of occupants in each excavated structure.

Table 6-19. Total Estimated Population of Navajo Component

Site #	Structures			Total Site Population		
	Excavated, area (m^2)	Unexcavated (est. #)	Total	Fruitland Method	La Plata Method	Current Method
LA46147	8.3	0	1	4	2	3
LA79093		1	1	4	2	3
LA79097	5.3	1	3	12	4	6
	4.7					
LA80315	14.18	2	3	12	6	10
LA80316	13.85	2	4	16	7	12
	8.42					
LA80318	4.52	0	2	8	3	5
	12.57					
LA80319	6.38	4	12	48	18	30
	8.55					
	11.95					
	17.72					
	4.7					
	4.15					
	6.49					
	3.98					
LA80910	9.35	3	4	16	7	11
LA80911	8.04	1	2	8	4	6
LA80963		1	1	4	2	3
LA81169		2	2	8	3	5
LA81172	>3.14	1	3	12	5	7
	8.30					
LA81175	7.82	2	4	20	9	15
	13.20					
	13.85					
LA121784		1	1	4	2	3
Total				180	82	124

For the 14 sites, a second figure was obtained for the number of occupants in each potential structure (i.e., unexcavated structures either evident as stains or inferred from the presence of middens). For each potential structure, a floor area of 8.67 m^2 was used, based on the average floor area of all of the excavated structures.

La Plata Mine Method

The La Plata method is based on the work done at the La Plata Mine sites to the west of the study area (Brown 1991). In this method it is assumed that a person utilized 6 m^2 of floor space within a structure. The total roofed

floor area is divided by 6 m^2 and the estimated number of occupants is found.

This method does not appear to work for our sites. Using this method, seven of our structures would have been occupied by less than one person. Since this made little sense, the La Plata method was modified by rounding the structure occupancy numbers up to the nearest whole number if the decimal was greater than 0.33. Based on the modified La Plata method, the total occupancy of the 14 residential sites in the study area through time was 82 people.

Fruitland Project Method

The Fruitland method assumes that a structure housed a nuclear family of 4-7 people, and assigns an occupancy of four people to each structure (Sesler et al 1999).

Using this method, many of our structures would have been very crowded, and ten of our structures would have allowed less than 2 m^2 of floor space per person. Based on the Fruitland method, the total occupancy of the 14 residential sites in the study area through time was 180 people.

Current Method

The current method is based on the 23 Navajo structures excavated in the study area. The size of the smallest structure, 3.98 m^2, was taken as a starting point as the minimum area needed by a single occupant. Since some of this space was taken up by a central hearth, and additional space around the edge would not have been usable, 1 m^2 was subtracted from the floor area to give the space utilized by one person, or 2.98 m^2, which was rounded up to 3 m^2 per occupant. While this space is much smaller than that used in previous studies, it seems a reasonable number, assuming that the numerous small structures present on the sites were used as residences. Using this method, and again rounding up structure results to the nearest whole number when greater than 0.33, the number of occupants for each excavated structure was estimated.

The average structure size of 8.67 m^2 yielded an average occupancy of 2.56 persons per unexcavated structure. After the number of occupants of the unexcavated structures on a site was estimated, the figure was rounded up to the nearest whole number if greater than 0.33. Using this method, the total occupancy of the 14 residential sites in the study area through time was 124 people.

Summary

The Navajos in the project area lived in relatively small structures, compared to the La Plata Mine and Fruitland structures. For example, excavated Fruitland structures averaged 15.1 m^2 of floor space, while project area structures averaged only 8.67 m^2 of floor space. It seems necessary to conclude, therefore, that either our structures were used differently or, more likely, the project area occupants needed less room.

As suggested in the previous Settlement section, several communities may have existed in the study area. As shown in Table 6-20, the residential size of these potential communities varied from four to fifteen structures, and the population of these potential communities varied from five to forty occupants.

Table 6-20. Estimated Residential Size of Potential Navajo Communities Through Time

Community	Sites	# of Structures	# of Occupants
Pipeline Spring	LA81175	4	15
Pine Canyon	LA81169	2	5
Second Rim	LA79097, LA80963	4	9
Arch Rock Spring	LA46147, LA80316, LA80910, LA80911, LA81172	14	40
First Rim	LA79093, LA80315	4	14
Hart Canyon	LA80318, LA80319, LA121784	15	37

These figures compare well with the information recovered from the Frances Mesa sites (Sesler et al 1999). On Frances Mesa, residential clusters (comparable to the potential communities discussed here) typically consisted of five to more than fifteen households, with an estimated 20 to 100 people in each cluster (Frances Mesa). The larger size of the Mesa structures probably accounts for the potentially larger residential size.

Dating was much more complete on the Frances Mesa sites and useful observations could be made about their residential clusters (Sesler, et al 1999). It was found that individual dwellings had short use-lives and could be either abandoned, dismantled or relocated on a site. Each cluster could contain structures that have been occupied and abandoned at differing times, even during intervals as short as ten years. In most cases the larger clusters with more than four structures represented sequential occupations. On Frances Mesa, each residential cluster appeared to have been occupied repeatedly over at least a 25-40 year period.

On the Fruitland sites, it was estimated that an individual site would have been occupied for five years or less, based on the combined analysis of midden accumulation rates, tree-ring dating, structural attributes, and assemblage size (Fruitland). However, it appears that the residential cluster, or community, would persist longer.