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Excavations at Horse Bone Camp (Site 5MT2199), an Archaic-Anasazi limited activity site

by

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ABSTRACT

Horse Bone Camp, Site 5MT2199, is located on a low knoll in the southern portion of the Sagehen Flats Locality. During initial survey the site was described as an extensive lithic scatter. Excavation during the 1979 field season of the Dolores Archaeological Program revealed the only cultural features found at the site, a burned pit and a hearth, neither of which could be dated. The artifact assemblage indicates that both the Archaic and Anasazi traditions are represented at the site. The lack of architecture, types of artifacts recovered, low artifact density, and site location suggest that Horse Bone Camp served as a limited activity locus, possibly associated with hunting activities, during both the Archaic and Anasazi time periods.

INTRODUCTION

Horse Bone Camp, Site 5MT2199, is a limited activity site (Kane [1]) believed to have been occupied during both the Archaic (3000 B.C.-A.D. 500) and Anasazi (A.D. 600-1200) time periods. On the basis of ceramic evidence, use of the site during the latter period appears to have spanned the Sagehen (A.D. 600-850), McPhee (A.D. 850-970), and Sundial (A.D. 1050-1200) phases according to Dolores Archaeological Program (D.A.P.) temporal systematics (Kane [1]). Occupation of the site during both the Archaic and Anasazi periods probably consisted of brief, repeated episodes of use, the duration of which cannot be ascertained given available evidence. The types of artifacts recovered and the location of the site on a knoll overlooking nearby lowland areas suggest that Horse Bone Camp was associated with hunting activities.

Horse Bone Camp was originally surveyed by Breternitz and Martin [2] in 1972. At that time, the site was described as an extensive artifact scatter consisting of flaked lithic, nonflaked lithic, and ceramic materials, and was tentatively assigned to the Pueblo I-Pueblo II time periods.

Horse Bone Camp was chosen for excavation during the 1979 field season of the D.A.P. because, on the basis of its location and a reexamination of the original survey collection, it was thought to contain an Archaic component. Investigation of the site involved two separate stages of fieldwork. The first took place from 14 to 26 June; the second from 21 to 22 September. A total of 86 person-days was spent investigating the site.

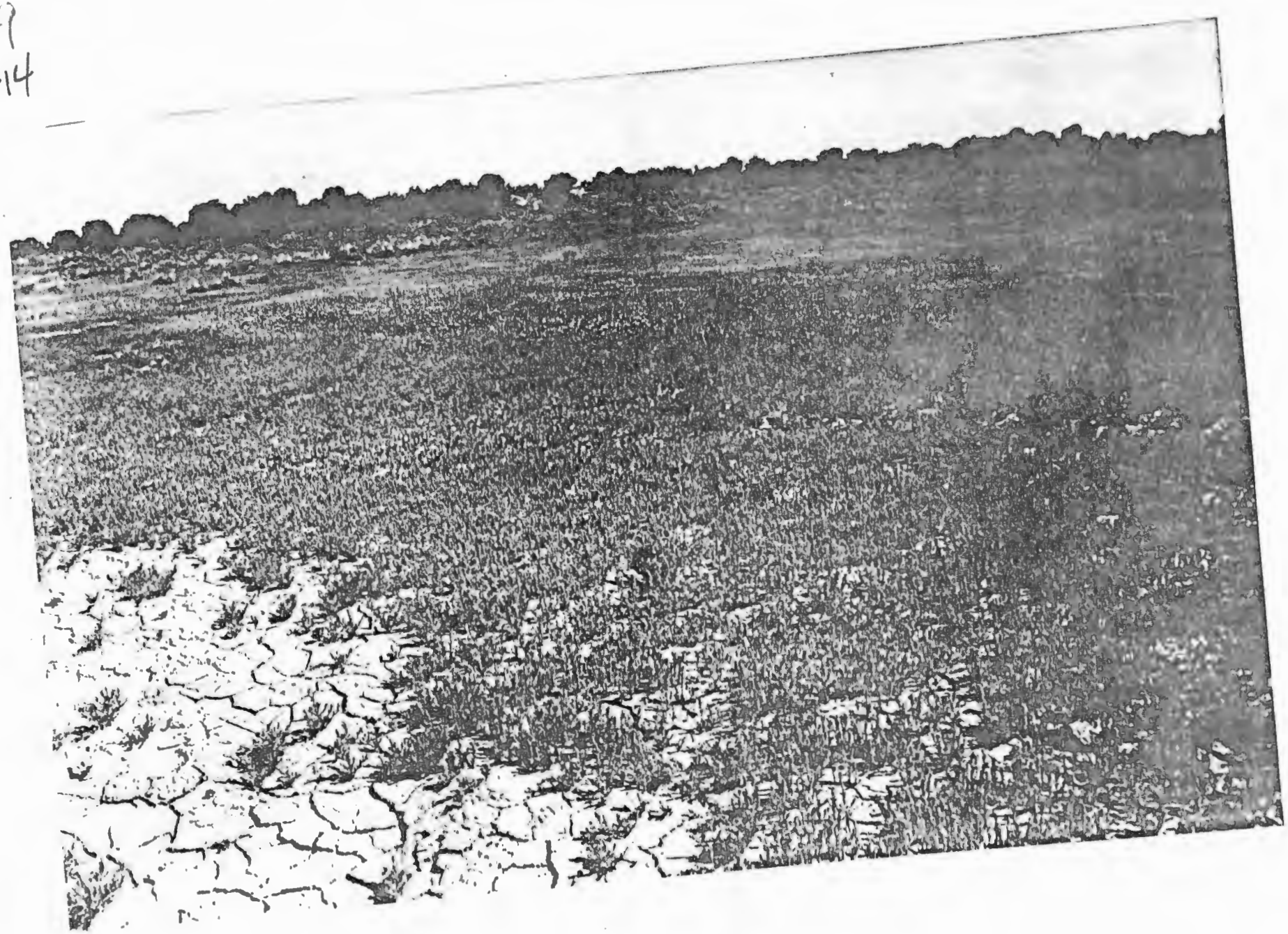
Location

Horse Bone Camp is situated to the west of the Dolores River in the Sagehen Flats Locality of the Escalante Sector of the Yellowjacket District (Kane [1]). The site is located on a low knoll at the southern tip of a north-south ridge overlooking present-day Sagehen Marsh (Figure 14.1). As illustrated on the topographic map (Figure 14.2), the knoll is at an elevation of 2115 m above sea level and affords an excellent view of the marsh and bottomlands of the locality. The Universal Transverse Mercator grid coordinates for Horse Bone Camp are 714,040 mE, 4,154,240 mN, zone 12. The site is located in the Southeast Quarter of the Northeast Quarter of Sec 35, T38N, R16W, on the Trimble Point Quadrangle, Colorado, U.S.G.S. 7.5 Minute Series 1965 Topographic Map.

Acknowledgments

The first stage of investigation at Horse Bone Camp was conducted by Joel Brisbin (crew chief) with a University of Colorado crew including G. Brown, B. King, D. Lux-Harriman, N. Morris, J. Schwenn, A. Stuart, M. Varien, and R. Walkenhorst. Four members of the Youth Conservation Corps also aided in this phase of the investigation. During September, the crew consisted of G. Brown (crew chief), M. Cavanaugh, M. Girton, and T. Hovezak.

The geology and soils section of this report was adapted from information provided by Richard Glaser. Senior Staff comments were provided by Christine K. Robinson.



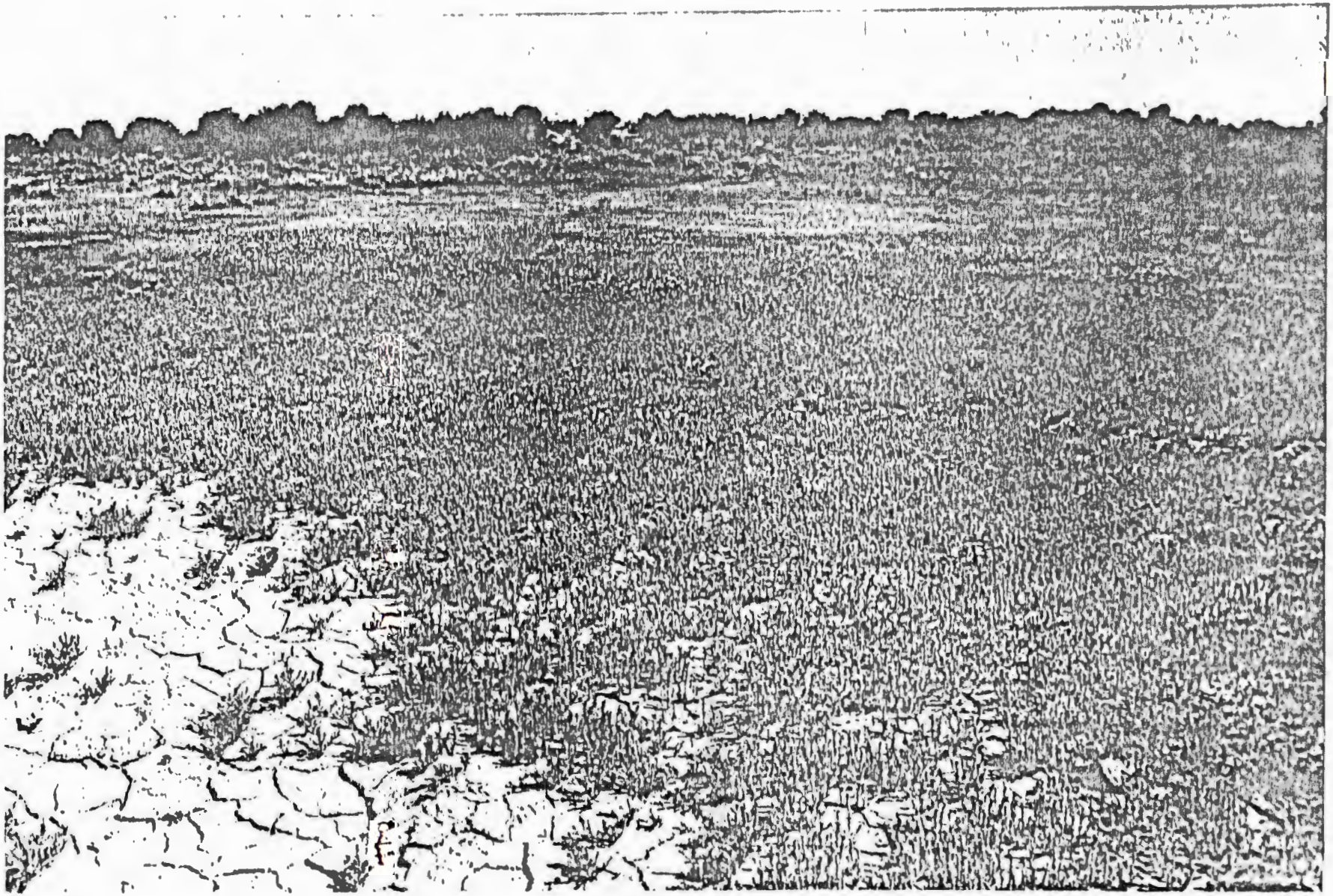


Figure 14.1 Photograph of Horse Bone Camp prior to excavation, facing southeast (D.A.P. 012214).

ENVIRONMENTAL SETTING

Climate

Today, the climate of the project area is characterized by low humidity, wide diurnal temperature change, mild summers, and cold, dry winters. The United States Weather Bureau (U.S.W.B.) station in Dolores, Colorado, located 7.5 km southeast of the site, has recorded an average annual precipitation of 460.5 mm. Most precipitation accumulates from winter snows and late summer thunderstorms (Kane [3]). Records from the U.S.W.B. station in Yellowjacket, Colorado, 13.5 km west of the site, indicate an annual average of 126 frost-free days for this region, allowing an adequate growing season for certain varieties of maize (Carter and Anderson [4]). Prehistoric cultivation within a 1-km radius of the site might have been hampered due to cold air drainage into low areas of the locality. This phenomenon was recorded during the 1920s when bean crops failed because of early frosts (D. Duranceau, personal communication).

Local Geology and Soils

Horse Bone Camp is located on a knoll that is an erosional remnant of the lower Mancos Shale. The shale can be seen in outcrops on the south and west sides of the hill. Soil ranging from loam to clay loam with continuous clay skins in the B horizon covers the north, east, and top of the knoll. An east-west backhoe trench (Test Trench 1) was dug through a shallow arroyo which drains to the southwest. This arroyo cuts into the original B horizon, and appears as a long anomaly on the magnetometer map. There are 30-40 cm of arroyo fill below the present ground surface.

Refer to Leonhardy [5, 6] for a detailed description of the geology and soils of the project area.

Local Resources

Numerous resources which might have been available prehistorically are located within a few kilometers of the site. Clay resources are currently available in the marsh area to the south. W. Lucius (personal communication) states that the entire southern half of the Sagehen Flats Locality is a potential source area for clay used in the production of pottery.

There are outcrops of the Morrison and Burro Canyon formations close to Horse Bone Camp. These formations contain many knappable cherts, quartzites, and chalcedonies that have been identified in prehistoric contexts within the Escalante Sector.

Two major water sources are located south and east of Horse Bone Camp. Currently, Sagehen Marsh is located 0.6 km from the site; if the marsh existed prehistorically, it might have been a good water source. The closest perennial source of water would have been the Dolores River, 2.85 km to the east. Seeps, recorded during the field season in shallow canyons a few kilometers north of the site, may have provided water on a seasonal basis.

Flora

Although Horse Bone Camp is located in the Upper Sonoran vegetation zone, the current vegetation in the vicinity of the site is typical of a disturbed area. Recent farming and grazing practices have been the cause of this change in the local vegetation. Refer to Bye [7] for a more complete discussion of the vegetation of the project area.

Plant species currently growing on or near the site include cheat grass (*Bromus tectorum*), thistle (*Cirsium* sp.), sunflower (*Helianthus*

annuus), big sagebrush (Artemisia tridentata), rabbitbrush (Chrysothamnus nauseosus), cholla (Opuntia fragilis), prickly pear (Opuntia sp.), wild buckwheat (Eriogonum heracleoides), Indian Ricegrass (Oryzopsis hymenoides), lupine (Lupinus sp.), and wild onion (Allium acuminatum).

Although it is believed that the prehistoric occupants of Horse Bone Camp were primarily concerned with hunting activities, there are many plant resources that exist today within a 5-km radius that could have been exploited if similar conditions existed prehistorically. Sagehen Marsh currently supports various edible plants, such as cattail (Typha latifolia) and bulrush (Scirpus sp.); the reedy species can be used for basketry, mats, and other purposes (B. Benz, personal communication).

Xeric species, including prickly pear and yucca (Yucca baccata), might have provided food, fibers, and soap. Edible bulbs from sego lily (Calochortus nuttallii) and wild onion, and seeds from sunflowers, Indian Ricegrass, and other grasses are found in abundance. Fruit, wood, or nuts might have been available from pinyon pine (Pinus edulis), juniper (Juniperus osteosperma), Gambel oak (Quercus gambelii), chokecherry (Prunus virginiana), serviceberry (Amelanchier utahensis), and squawbush (Rhus aromatica ssp. trilobata) (B. Benz, personal communication).

Fauna

Some of the fauna observed in the locality during the field season included the following: mule deer (Odocoileus hemionus), American elk (Cervus canadensis), cottontail rabbit (Sylvilagus sp.), gopher (Thomomys sp.), badger (Taxidea taxus), coyote (Canis latrans), mouse (Peromyscus sp.), Colorado chipmunk (Eutamias quadrivittatus), striped skunk (Mephitis

mephitis), black-tailed prairie dog (Cynomys ludovicianus), porcupine (Erethizon dorsatum), and rattlesnake (Crotalus sp.).

Avifauna observed by crew members in Sagehen Flats Locality included red-tailed hawk (Buteo jamaicensis), American kestrel (Falco sparverius), turkey vulture (Cathartes aura), common raven (Corvus corax), bald eagle (Haliaeetus leucocephalus), golden eagle (Aquila chrysaetos), mourning dove (Zenaidura macroura), common flicker (Colaptes auratus), black-billed magpie (Pica pica), mountain bluebird (Sialia currucoides), great blue heron (Ardea herodias), western meadowlark (Sturnella neglecta), Steller's jay (Cyanocitta stelleri), northern harrier (Circus cyaneus), and unidentified water fowl. A more complete discussion of the fauna of the project area may be found in Emslie [8].

Historic Land Use

Euro-Americans began moving into the area encompassed by Sagehen Flats Locality in the late 1800s and early 1900s. The earliest known development of the land on which Horse Bone Camp is located was by Harry Morgan, who owned 160 acres south of County Road X. When Morgan and others first moved into the area the land was covered with sagebrush, oak, pinyon, and juniper. The area to the north of Horse Bone Camp was plowed once in the 1920s for the cultivation of beans. However, the crop failed due to an early frost and the land was never again used for crops of this kind. In 1953, the Fred A. Cline family bought most of the land in this area. The land was cleared, plowed with a disc harrow, and the sagebrush burned. The land was then planted with wild grasses to provide pastureland for sheep (D. Duranceau, personal communication). In recent

years, the land has not been used for grazing purposes and sagebrush and other weedy plants have reestablished themselves.

SOCIAL SETTING

Although Horse Bone Camp is an Archaic-Anasazi site, this section focuses on selected D.A.P. sites with Archaic components. Refer to Greenwald [9] for a discussion of Anasazi sites in Sagehen Flats Locality.

Within a 1-km radius of Horse Bone Camp there are five sites with Archaic components: Sites 5MT2201, 5MT2202, 5MT4513, 5MT4678, 5MT5110 (Figure 14.3). Of these, only Site 5TM2202 and Site 5MT4513 have been excavated; the remaining sites are believed to have Archaic components on the basis of surface evidence. Sheep Skull Camp (Site 5MT2202) is located 550 m east of Horse Bone Camp on a knoll north of Sagehen Marsh. Sheep Skull Camp, like Horse Bone Camp, has a high percentage of projectile points, bifaces, and chopper/scraper tools, and is interpreted as being a limited activity hunting camp (Schlanger [10]). The Archaic component at Lee Side Camp (Site 5MT4513) is represented by five slab-lined firepits and associated lithic materials (Greenwald [11]). Sheep Skull Camp, Lee Side Camp, and Horse Bone Camp are located on small knolls overlooking present-day Sagehen Marsh. If the marsh existed prehistorically, local bands might have exploited the resources available in such an environment. Based on available evidence, it is difficult to postulate any social relationships between the various groups that occupied these sites. Autonomous bands may have used the sites at such different time periods that the individual occupations did not overlap.

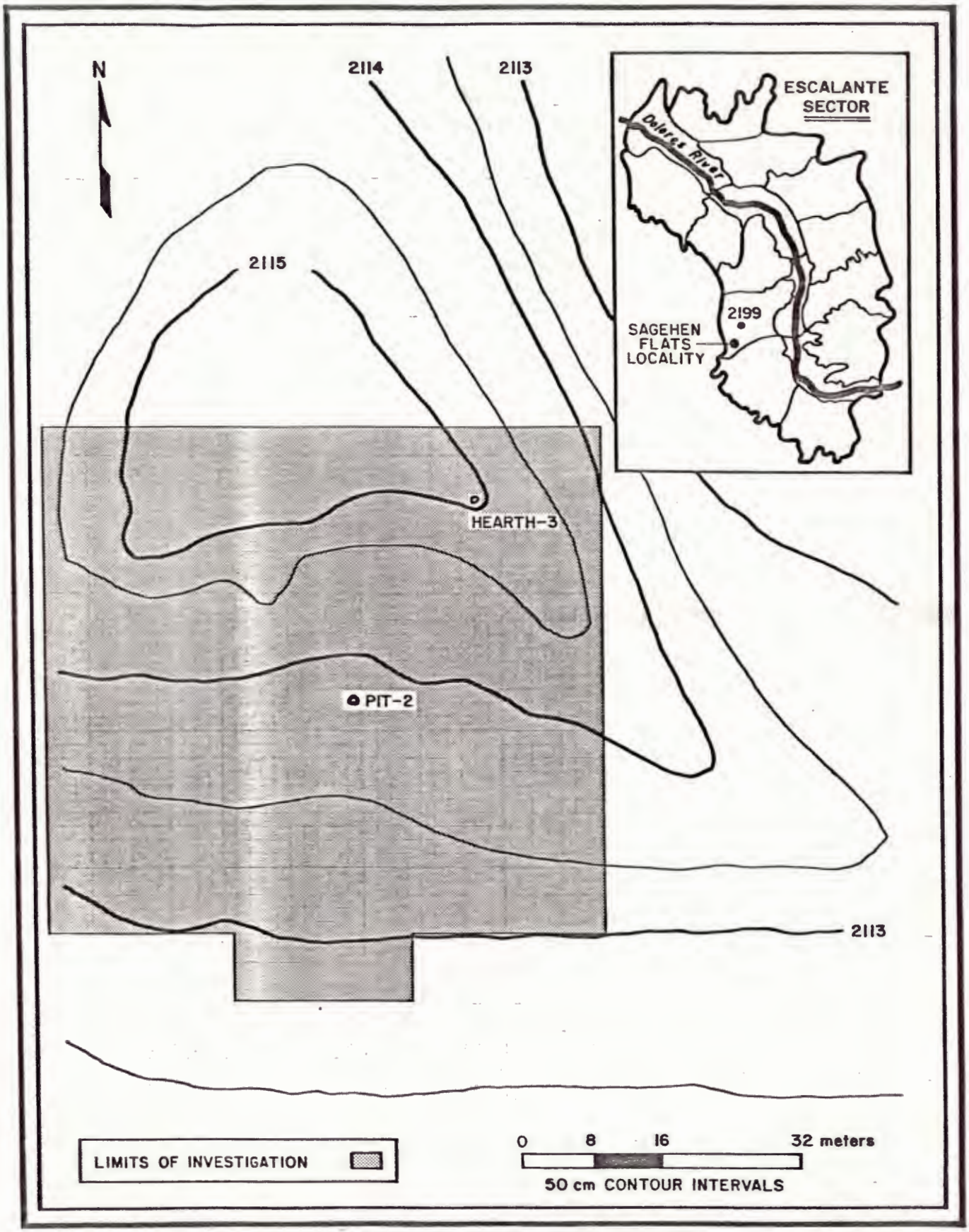
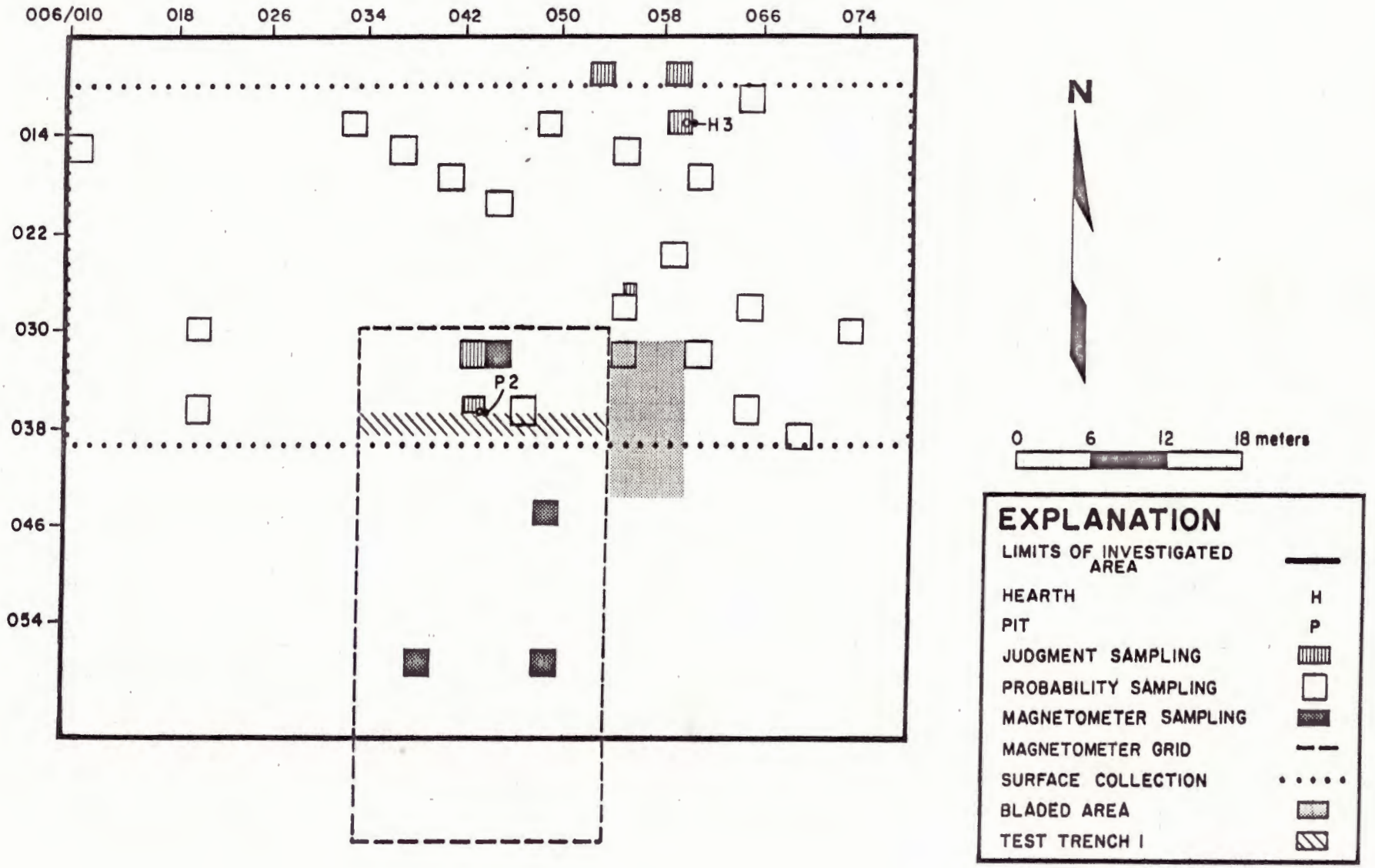


Figure 14.2 Topographic view of Horse Bone Camp, investigated area only. Actual site boundaries, based on limits of artifact scatter, extend beyond area shown on map.

Figure 14.3 Locations of selected sites contemporaneous with Horse Bone Camp.

Figure 14.4 Site sampling plan, Horse Bone Camp.



SURFACE EVIDENCE

Surface Collection

A 4 by 4 m grid was established over the northern portion of the investigated area and all cultural material within this area was collected from the surface (Figure 14.4). Only this small area was included in the intensive surface collection because the limits of the site were believed to be much smaller at this point in this investigation. The majority (602) of surface artifacts were flaked lithic items, comprising 97.9 percent of the total surface artifact assemblage. Figure 14.5 illustrates the surface distribution for the flaked lithic artifacts. Only 12 sherds, representing 1.9 percent of the surface collection, were found; the surface distribution of ceramic items is shown in Figure 14.6. One nonflaked lithic tool was recovered from square 10S, 62E. No rubble mounds indicative of habitational structures were located on the surface and no subsurface structures were found during excavation.

Magnetometer Survey

The magnetometer survey of Horse Bone Camp took place on 7 June 1979. The survey area in the south-central portion of the site covered 800 m^2 (Figure 14.4). Five anomalies were recorded and recommended for intensive testing. Excavation of four of the anomalies failed to reveal cultural remains. Several of these investigated anomalies were associated with an old, shallow drainage that had filled with sediment; it was the contact of the more recent sediment with the drainage, rather than cultural remains, that was recorded by the magnetometer test. The fifth anomaly was not tested. Refer to Huggins and Weymouth [12] for a detailed discussion of magnetometer survey procedures at Horse Bone Camp.

Figure 14.5 Surface distribution of flaked lithic artifacts, Horse Bone Camp.

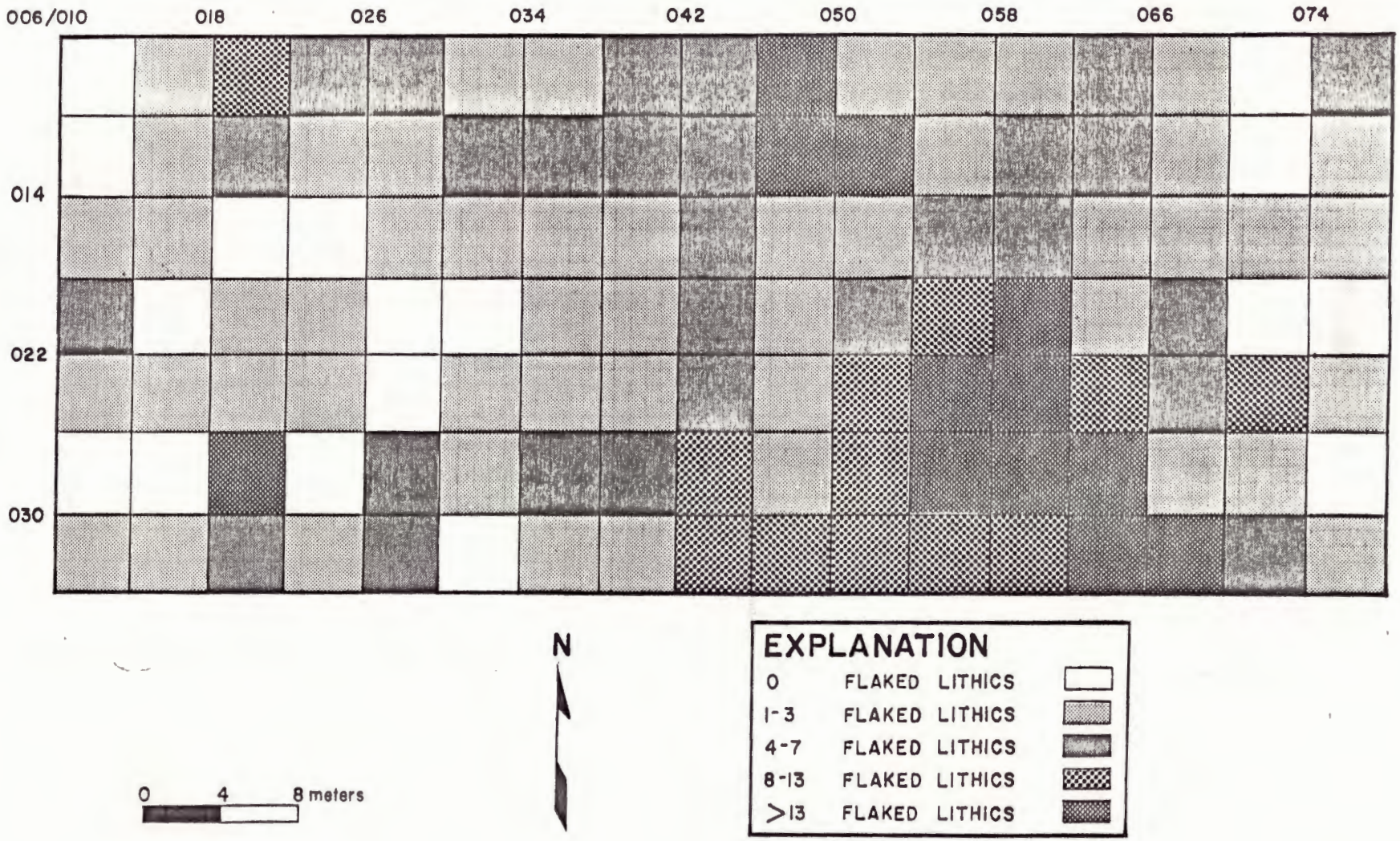
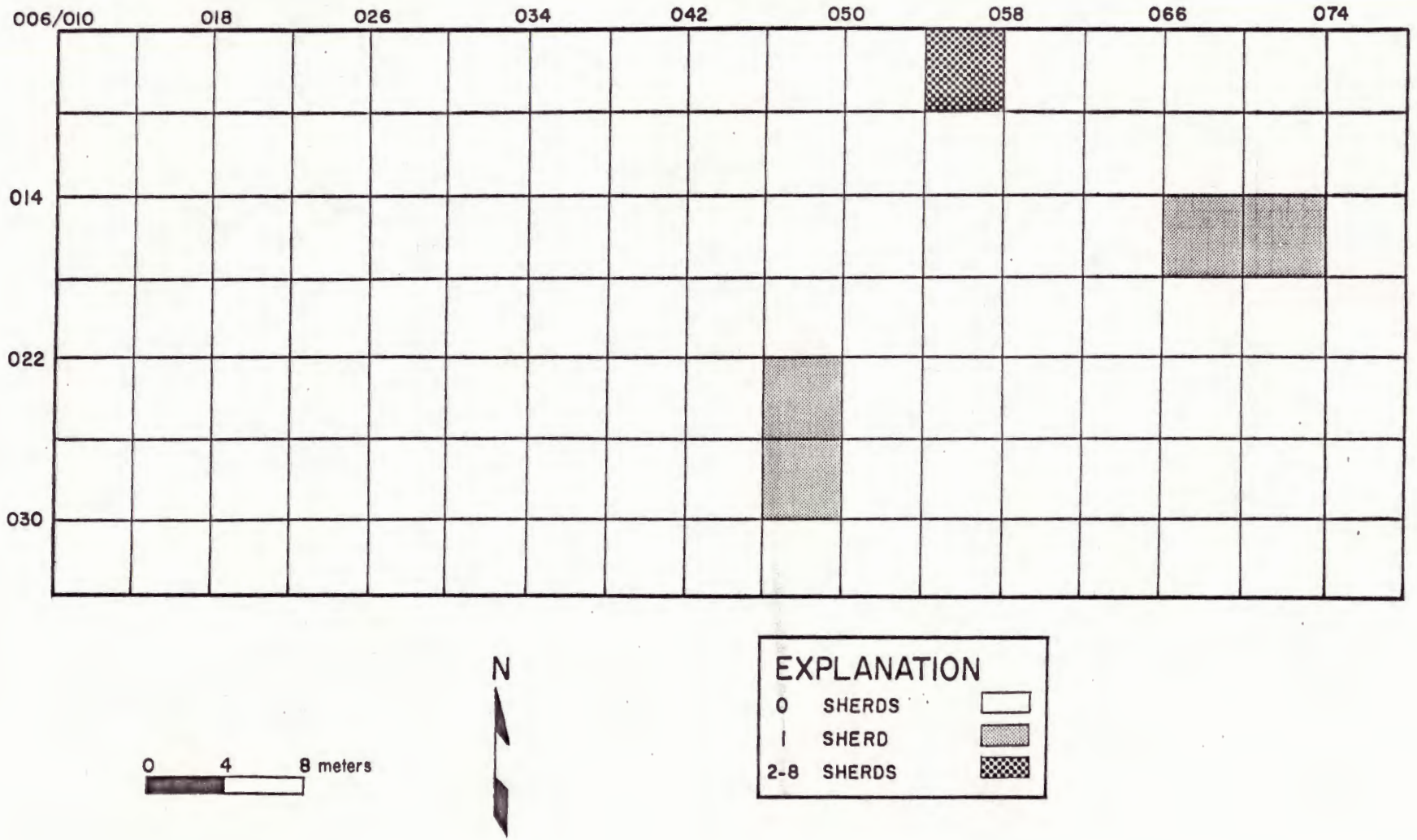


Figure 14.6 Surface distribution of ceramics, Horse Bone Camp.



EXCAVATION METHODS AND OBJECTIVES

Several sampling strategies were employed at Horse Bone Camp. The most intensively used was probability sampling. Twenty 2 by 2 m squares were randomly selected for excavation (Figure 14.4). The sample was not stratified. Each square was excavated to sterile deposits and fill was screened through one-quarter-inch mesh. The goal of probability sampling is to estimate the total population of artifacts and features at a site on the basis of the excavated sample. Results of the probablity sample conducted at Horse Bone Camp are presented in Kohler [13].

Four of the magnetometer anomalies were tested with 2 by 2 m grid squares (Figure 14.4). Fill from some of these units was screened through one-quarter-inch mesh; fill from others was not screened. No cultural features were observed in these squares.

Several judgment squares were excavated in an attempt to find cultural features and architecture (Figure 14.4). Four of these squares were 2 by 2 m grid units located in areas thought to be most likely to yield cultural remains; however, no features or architectural remains were found. A 1 by 1 m judgment square was excavated to investigate a stain initially observed in probability square 22S, 54E. Although this stain was designated "Feature 1," it proved to be a rodent disturbance rather than a cultural feature.

An east-west trench (Test Trench 1) was excavated by backhoe in the central portion of the site. Feature 2 was discovered and excavated according to standard D.A.P. procedure after excavating a 1 by 2 m judgment square around it's remaining portion. A grader was used to remove topsoil from a north-south strip in the eastern portion of the site. Feature 3

was discovered during this operation. The locations of Test Trench 1 and the bladed area are shown in Figure 14.4.

A single archaeomagnetic sample was taken from Feature 1 and a radiocarbon sample was collected from Feature 2. Results are discussed in Appendix A and the material culture section of this report, respectively. No pollen samples were recovered at the site; however, nine bulk soil samples were taken from Features 2 and 3. Results of the bulk soil analysis are presented in Appendix B. Several sediment samples were taken at Horse Bone Camp, but have not yet undergone analysis.

CULTURAL UNITS

Horse Bone Camp is discussed in terms of two activity areas which were defined on the basis of the two features. Refer to Kane [1] for a discussion of the activity area concept as it pertains to D.A.P. spatial systematics.

Activity Area 1

Activity Area 1 is the area in which the hearth (Feature 3) is located. The area may extend beyond the limits of the hearth, but its full extent is not known.

Hearth (Feature 3)

Dimensions:

Length:	51.0 cm
Width :	51.0 cm
Depth:	17.0 cm

Feature 3, a shallow, circular, basin-shaped, hearth (Figures 14.7 and 14.8), had been excavated into sterile soil. Fill within the hearth was a homogeneous gray brown clay loam, mottled with charcoal flecks. Features such as this are generally considered food-processing and/or heating areas. The surface of the hearth was heavily oxidized and Archaeomagnetic Sample 1 was taken from this surface.

Activity Area 2

Activity Area 2 has been defined on the basis of the burned pit (Feature 2) which was detected as a stain in the north wall of the backhoe trench. As with Activity Area 1, the area may extend beyond the limits of this pit, but again, the exact boundaries remain conjectural.

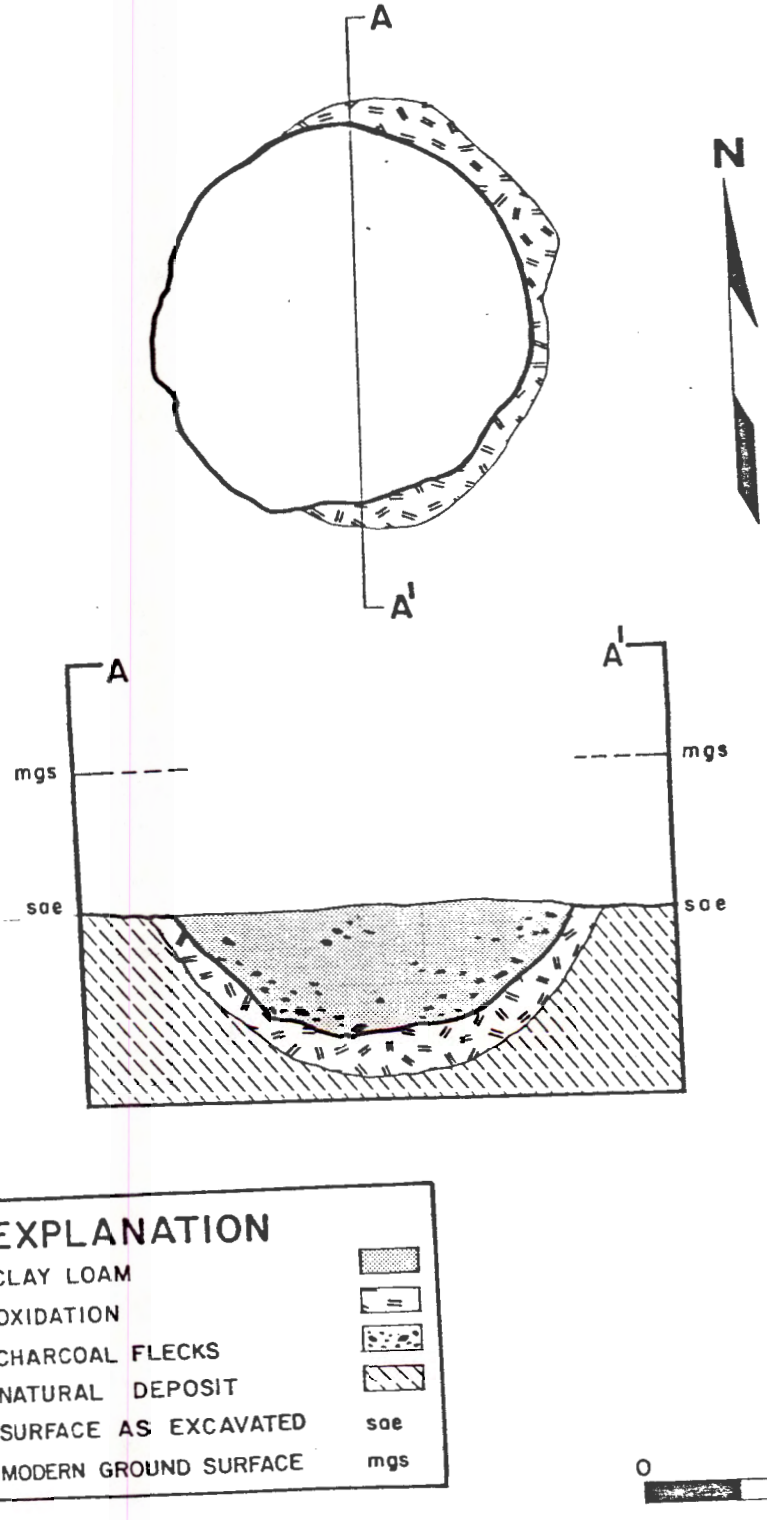
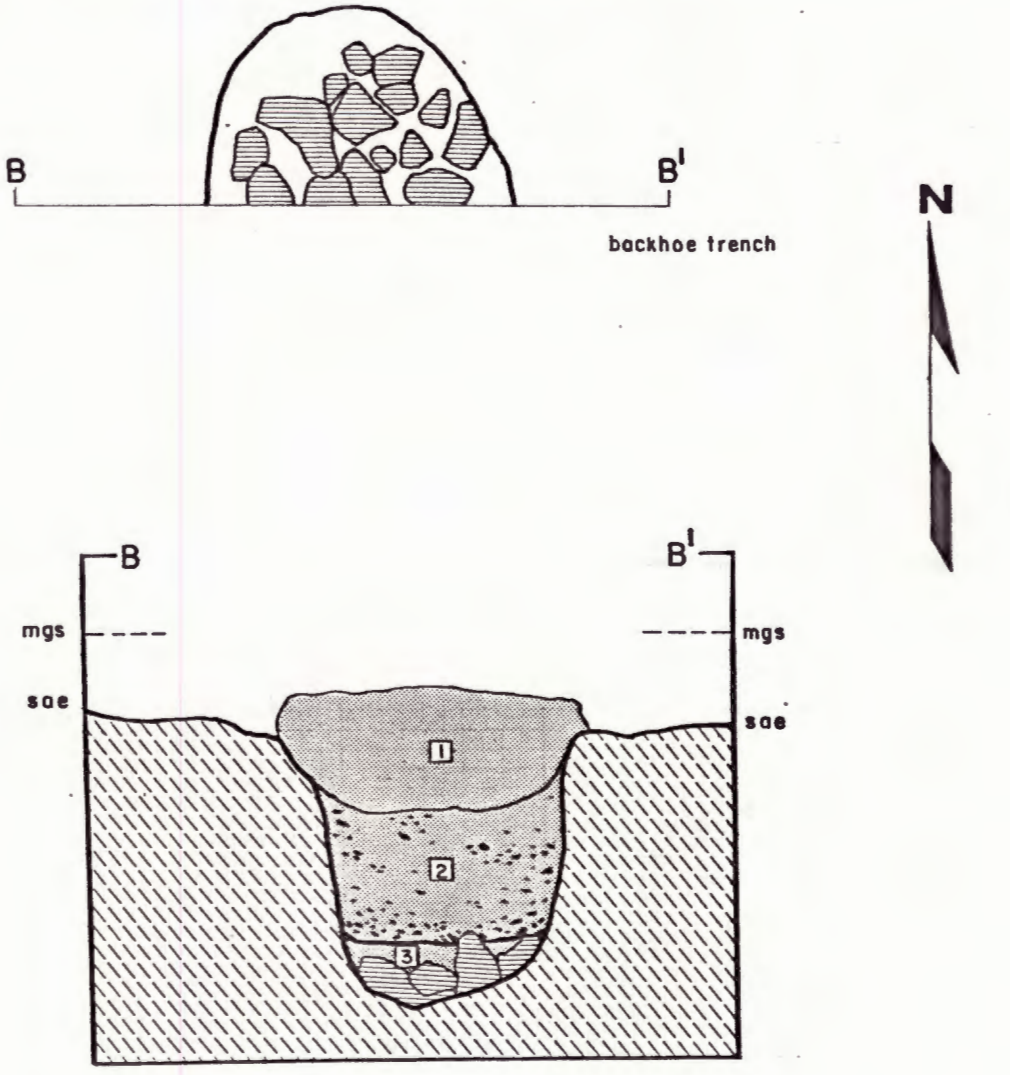


Figure 14.7 Plan view and profile of hearth (Feature 3), Horse Bone Camp.

Figure 14.8 Photograph of hearth (Feature 3), Horse Bone Camp (D.A.P. 025226).

Figure 14.9 Plan view and profile of pit (Feature 2), Horse Bone Camp. Refer to text for an explanation of Strata 1-3.



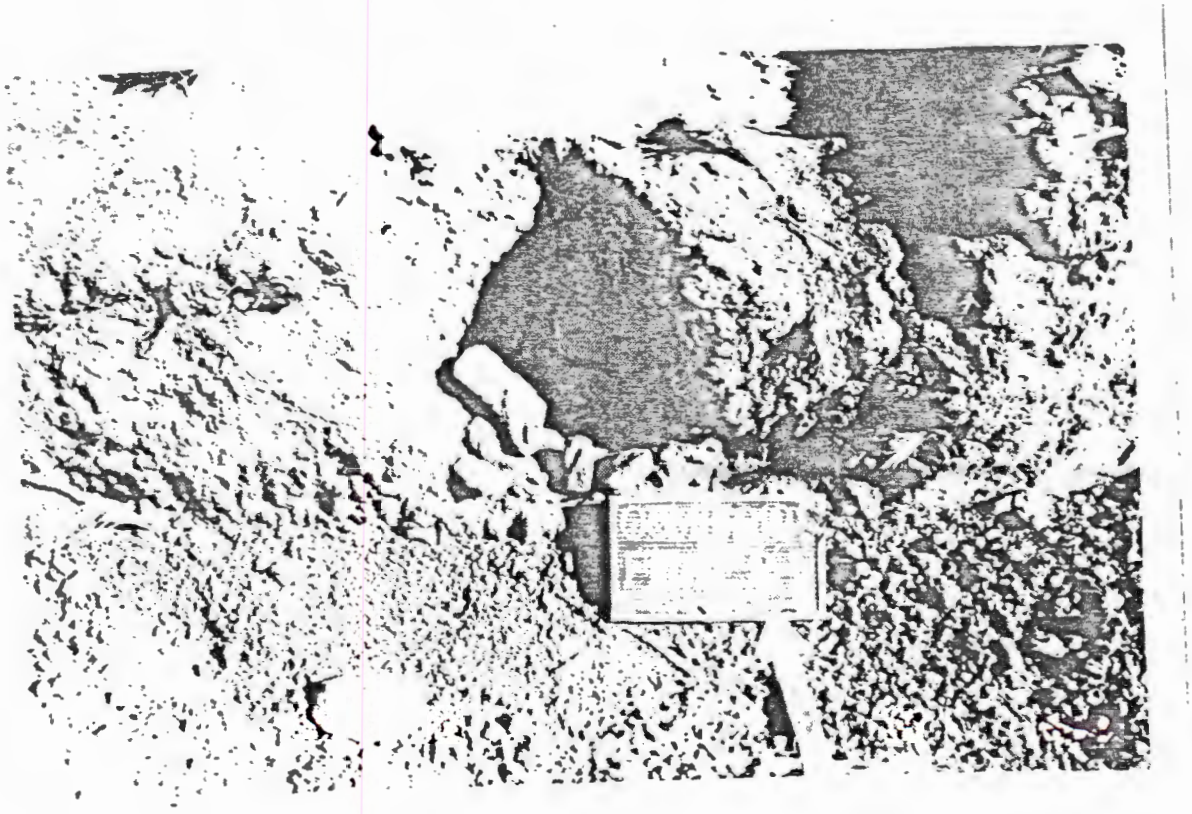


Figure 14.10 Photograph of pit (Feature 2), Horse Bone Camp (D.A.P. 025221).

Pit (Feature 2)

Dimensions (inferred):

Length:	45.0 cm
Width:	41.0 cm
Depth:	42.0 cm

Feature 2 was was rectangular in profile and is inferred to have been oval in plan (Figures 14.9 and 14.10). The southern portion of the feature was removed during the excavation of Test Trench 1, so the dimensions are inferred. Excavation of the pit continued until sterile soil was reached at 46 cm below modern ground surface. Three strata existed within the feature. The uppermost stratum (Stratum 1) consisted of a dark gray clay loam with no ash or charcoal deposits. Stratum 2 was a red-brown clay loam with some dark gray stains and occasional charcoal fragments. At the contact of Strata 2 and 3, there was an alluvial deposit of charcoal and clay loam a few centimeters thick. Stratum 3, below the alluvial deposit, was composed of a layer of burned sandstone cobbles and an underlying layer of unburned cobbles. The bottommost layer of cobbles appeared to have been intentionally placed to line the pit and then covered with other cobbles used for heating purposes. There was no evidence of burning on the cobbles used to line the pit, whereas the cobbles above were charred from fire.

MATERIAL CULTURE

Ceramics

The date ranges presented in this section are from Breternitz et al. [14], with some adjustments based on the results of D.A.P. ceramic analysis, as described in Lucius [15].

A total of 33 sherds was collected during investigations at Horse Bone Camp (this figure includes ceramics recovered during initial survey). Early Pueblo Gray sherds, which can be dated no more precisely than A.D. 600-900, account for 87.9 percent of the assemblage. Moccasin Gray is the next most abundant type, accounting for 6.1 percent of the collection. Late Pueblo Gray and Mancos Black-on-white each account for 3.0 percent of the assemblage. Although the Late Pueblo material can only be dated generally to the post-A.D. 900 time period, the Moccasin sherds indicate a range of approximately A.D. 775-900, and the Mancos sherd suggests a range of A.D. 1000-1150. In terms of D.A.P. temporal systematics, the former date range falls within that established for the Sagehen and McPhee phases; the latter overlaps with the Sundial Phase. Ceramic type frequencies are listed by general provenience in Table 14.1.

Flaked Lithic Artifacts

Horse Bone camp has a combined total of 1463 flaked lithic artifacts; 83 items are tools and the remaining 1380 items are debitage (these figures exclude items collected during initial survey). Totals and general proveniences for these artifacts are presented in Appendix C.

The flaked lithic materials were distributed across the entire surface of the site as well as in buried contexts. Forty-one percent of

Table 14.1 Summary of Ceramic Type Frequencies at Horse Bone Camp

Ware Traditional Type	Modern Ground Surface*			Excavated Units			Total Site		
	N	%Wt	%Ct	N	%Wt	%Ct	N	%Wt	%Ct
Mesa Verde Gray Ware									
Early Pueblo Gray	22	83.0	84.6	7	100.0	100.0	29	84.9	87.9
Moccasin Gray	2	11.2	7.7				2	10.0	6.1
Late Pueblo Gray	1	2.1	3.8				1	1.8	3.0
Mesa Verde White Ware									
Mancos Black-on-white	1	3.7	3.8				1		3.0
Total	26	100.0	100.0	7	100.0	100.0	33	100.0	100.0
Total Weight (grams)	183.9			23.0			206.9		

* - Includes original survey materials.

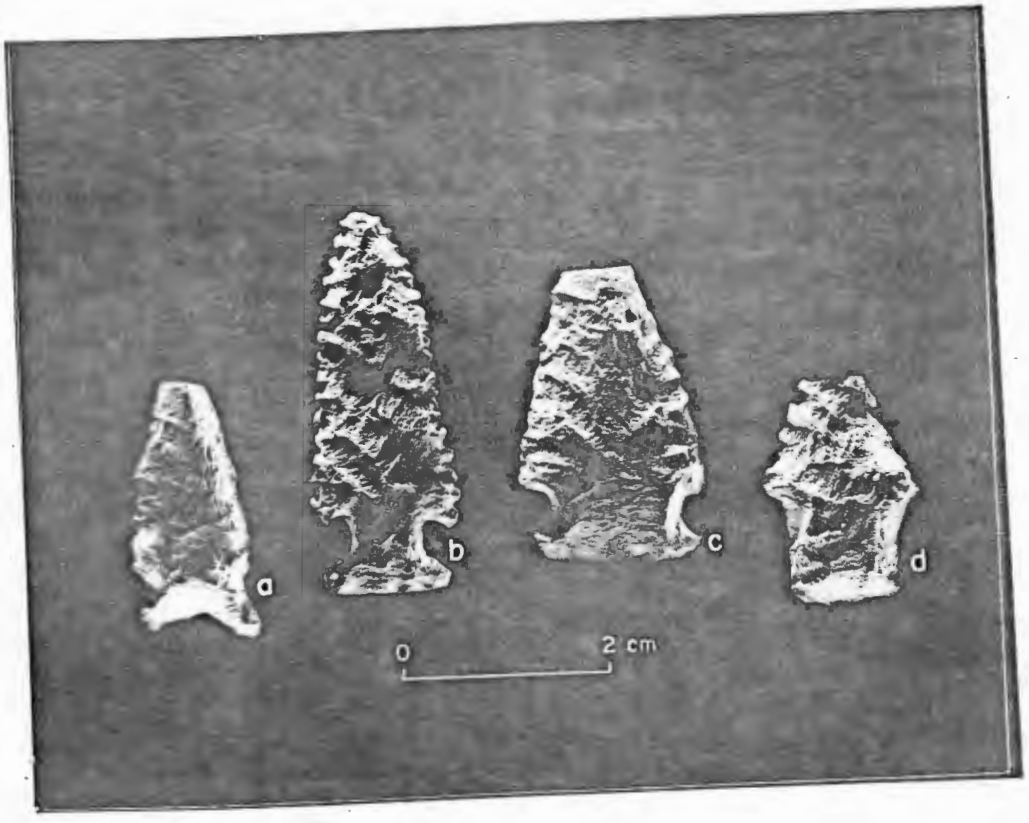


Figure 14.11 Selected whole or nearly whole projectile points recovered at Horse Bone Camp: (a) from probability square 14S, 44E, Stratum 1; (b) from intensive surface collection; (c) from probability square 30S, 46E, Stratum 1; (d) from probability square 22S, 64E, Stratum 1 (U.A.P. ~~116682~~). 118801

the total flaked lithic assemblage, including 51 percent of the total number of tools, was located on modern ground surface.

The Flaked lithic assemblage is notable in that the implements are predominantly utilized flakes. The high proportion of this "expedient" tool type is characteristic of an Anasazi assemblage. On the other hand, the projectile points, bifaces, and scrapers recovered from the site are examples of "high-input" items in terms of tool production; such items may indicate the presence of an Archaic component at the site. Although none of the projectile points are actually temporally diagnostic, some exhibit characteristics generally thought to be "Archaic" (Appendix C). Selected projectile points from Horse Bone Camp are shown in Figure 14.11.

The six specialized forms recovered from Horse Bone Camp consist of four notches and two graver/perforators. No cores were recovered from the site, indicating that the groups using the area may have arrived with lithic preforms and fashioned the tools to their own particular needs.

Nonflaked Lithic Artifacts

Seven ground stone tools were recovered at this site; they represent only 7.8 percent of the lithic tools. The seven items include five manos, one metate fragment, and one item which was classified as indeterminate in terms of morpho-use. Nonflaked lithics are generally associated with food-processing activities; therefore, this small assemblage suggests that plant processing was not a major activity at the site. The nonflaked lithic tools recovered at Horse Bone Camp are discussed in Appendix C.

Table 14.B.1 Botanical Remains from Horse Bone Camp

Taxon	FS 172 Feat 2 Upper Control BS 4	FS 174 Feat 2 Fill BS 5	FS 174 Feat 2 Lower Control BS 6	FS 175 Feat 3 Upper Control BS 7	FS 177 Feat 3 Fill BS 8
Amaranthaceae					
Amaranthus sp.					
Seed				9/N	
Chenopodiaceae					
Chenopodium sp.	6/C			10/N	1/C
Fruit					
Compositae					
Artemisia sp.					
Leaf				X/C	
Wood				X/C	
Equisetaceae					
cf. *Equisetum* sp.					
Stem				X/C	
Gramineae					
Fruit				1/C	
Pinaceae					
Pinus sp.					
Wood	X/C	X/C			X/C
Pinus ponderosa					
neddle				X/C	
Polygonaceae					
Polygonum sp.					
Fruit				8/N	
Flower				X/N	
Salicaceae					
Populus sp.					
Wood		X/C	X/C		
Solanaceae					
Solanum sp.					
Seed				2/N	

Key:
1/ - reproductive part (seed, fruit, cone) quantity
X/ - nonreproductive part, present
/C - charred
FS - field provenience designation
BS - bulk soil
Feat - feature
/N - noncharred

No Change Comments

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Reference to reports which define the terms in question has been provided. It would be redundant to provide definitions for them in each fieldwork report.

Botanical Remains

Most of the bulk soil samples recovered from Horse Bone Camp failed to yield plant materials which could be definitely associated with the prehistoric use of the site. Possible exceptions to this are the Pinus sp., Populus sp., and Chenopodium sp. remains recovered from Features 2 and 3; these remains may reflect prehistoric use of these plant species. For a complete description of botanical remains recovered from Horse Bone Camp, refer to Appendix B.

Dating Samples

Two samples, one from each cultural feature, were taken to yield dates for Horse Bone Camp. A C-14 sample (TX-3872) taken from the pit (Feature 2) was dated to 5680 ± 2350 years B.P. The error factor is too large to confidently use the results to date the feature.

One archaeomagnetic sample (Sample 1) was taken from the hearth (Feature 3); results could not be plotted on the Southwest master curve. Results of archaeomagnetic analysis are discussed in Appendix A.

CONCLUSIONS

The artifacts recovered from Horse Bone Camp indicate that the site was used during both the Archaic and Anasazi time periods. The presence of an Archaic component is suggested by the high ratio of flaked lithic tools to nonflaked lithic tools. The projectile points, bifaces, and other specialized forms recovered from Horse Bone Camp are considered high-production-input-items which are also generally associated with Archaic assemblages (Appendix C).

Use of the site during Anasazi times is evidenced by the high proportion of utilized flakes in the flaked lithic tool assemblage. Anasazi groups used a high proportion of generalized tools in order to increase efficiency and productivity; utilized flakes reflect the increased expediency with which many activities were probably approached (Appendix C).

The presence of Anasazi ceramics in the artifact assemblage from Horse Bone Camp also supports an Anasazi interpretation of the site. The majority of the ceramic material from Horse Bone Camp consists of Early Pueblo Gray sherds; however, Moccasin Gray and Mancos Black-on-white ceramics were also present in small quantities. Based on the date ranges associated with these ceramic types, use of Horse Bone Camp appears to have spanned the Sagehen, McPhee, and Sundial phases during the Anasazi period. The duration of particular periods of use or occupation cannot be determined from available evidence.

Functional interpretations of Horse Bone Camp are tenuous, at best. The scarcity of nonflaked lithic tools suggests that little food processing took place at the site. Horse Bone Camp is located on top of a knoll providing a view of the lowlands where game was potentially

available. This, considered jointly with the types of artifacts recovered, low artifact density, and lack of architecture, suggests that Horse Bone Camp was a limited activity site, possibly associated with hunting activities.

APPENDIX A

ARCHAEOMAGNETIC REPORT FOR HORSE BONE CAMP

by

J. Holly Hathaway and Jeffrey L. Eighmy

Archaeomagnetic dating is a relatively recent chronometric method employed by archaeologists. Archaeomagnetism is based on the fact that burned material can record the direction of the earth's magnetic field at the time of incineration at that location. By using the Southwest master curve (DuBois [16]) of independently dated magnetic poles and other known pole positions for the area under study, the magnetic orientations of cultural contexts can be relatively dated. For a complete discussion of laboratory and field methods employed by the D.A.P., as well as an evaluation of the applicability of the current Southwest master curve to the Dolores area, see Hathaway and Eighmy [17].

Sampling and Methods

Horse Bone Camp is located at 37.52°N latitude and 251.42°E longitude in the Sagehen Flats Locality of the D.A.P. One archaeomagnetic sample (Sample 1) was collected from Horse Bone Camp during the 1979 field season. This sample was collected from a hearth located in grid square 8S,58E. Twelve specimens were collected for the sample. Each specimen (an estimated 3.4 cm^3) was encased in a 2.5 cm plaster cube (15.6 cm^3). The orientation of the cube was maintained by leveling the cube and measuring the magnetic declination of one cube side. To control for present magnetic declination, North Star was sighted on 2 September 1978. The average magnetic declination was 13.5°, one-half degree different than the U.S.G.S. 1965 geological map, and in substantial agreement with expected values estimated from the National Oceanic and Atmospheric Administration Map, "Magnetic Declination in the United States--Epoch 1975.0.0."

Results from Sample 1 are included in Table 14.A.1. The sample was demagnetized at 25 oersteds. Demagnetization is a laboratory process used to eliminate effects from secondary components such as viscous or low temperature thermoremanent magnetizations.

The sample was not plotted on the Southwest master curve due to a large alpha 95 value. Alpha 95 is defined as the radius of a circle centered on the observed mean direction within which the true mean will fall 95 percent of the time. Small values indicate tighter clustering about the mean. A good archaeomagnetic sample is defined by alpha values of less than 3.5°. Two other tests of reliability were calculated for the sample: precision parameter and mean sample vector. The precision parameter (k) is estimated by Fisherian statistics and values increase geometrically with internal consistency. The mean sample vector indicates internal consistency as the value approaches the number of specimens used for determination of the mean. Error along the great circle (EP) and perpendicular to the great circle (EM) are functions of the alpha 95 which has an oval distribution when plotted, with a short axis that runs along the great circle between the collecting site and paleopole position. The long axis is perpendicular to the short axis; both are centered on the paleopole.

A hydrometer test conducted by the Colorado State University (Fort Collins, Colorado) on the soil collected from Feature 3 indicates a ratio of 42 percent sand, 28 percent silt, and 30 percent clay. This soil was classified as a clay. Clays and clay-based soils are optimum for recording and retaining the ancient pole position. Sand is less conducive to good archaeomagnetic results due to the size of the grain particles ($\pm$ .02 mm). The presence of clay is but one characteristic necessary for good

Table 14.A.1 Archaeomagnetic Results from Horse Bone Camp

Archaeomagnetic Designation	Sample 1
Feature and Provenience	Feature 3 Square 8S, 58E
Specimens used in final analysis/total collected	12/12
Degauss level	25 oersted
Mean Inclination	60.33
Mean Declination	35.31
Mean Intensity	$.190 \times 10^{-4}$
Mean Sample Vector	11.84
Precision Parameter (k)	68.56
Alpha 95	5.28
Paleolatitude	62.65
Paleolongitude	322.41
Error along great circle (EP)	6.09
Error perpendicular to great circle (EM)	8.02

results. The firing atmosphere, maximum attained temperature, type of affected ferrous minerals, and amount of intrusive material all contribute to the resultant thermoremanent magnetizations.

APPENDIX B

BOTANICAL REMAINS FROM HORSE BONE CAMP

by

Bruce F. Benz

During excavation of Horse Bone Camp, recovery of bulk soil samples from archaeological contexts was accomplished according to the sampling design specified by W.L. Litzinger [18]. Of nine samples collected, six have undergone preliminary analysis. One of the six (Sample 9), collected from beneath Feature 3, produced no identifiable plant remains. The remaining five samples produced identifiable botanical items which are listed in Table 14.B.1.

Plant parts representing nine genera (and one species) of nine vascular plant families were retrieved from Horse Bone Camp. All nine genera are currently represented by a variety of species in the plant communities found in the D.A.P. area. Noncharred plant parts of four genera were present in one sample (Sample 7).

Parts of the inflorescence (flower buds) and fruits of Polygonum sp. were recovered from a soil horizon immediately overlying Feature 3 (Sample 7). This plant is a common herbaceous element of the sagebrush shrubland zone that currently covers the Sagehen Flats Locality. Because the uppermost portion of this feature was removed during blading operations, it is very possible that these plant parts were introduced into the feature. Thus, they are probably not associated with the cultural context of the feature.

The occurrence in Sample 7 of two seeds representing the nightshade family (Solanaceae) might be explained in a similar manner. The genus Solanum spp., which contains a small number of species, occurs on disturbed lands in the project area today. Although this herb was not noted growing on the site today, it may have grown there recently and left its seeds in the uppermost soil horizon. Seeds of Amaranthus sp. in

Table 14.B.1 Botanical Remains from Horse Bone Camp

Taxon	FS 172 Feat 2 Upper Control BS 4	FS 174 Feat 2 Fill BS 5	FS 174 Feat 2 Lower Control BS 6	FS 175 Feat 3 Upper Control BS 7	FS 177 Feat 3 Fill BS 8
Amaranthaceae					
Amaranthus sp.					
Seed				9/N	
Chenopodiaceae					
Chenopodium sp.	6/C			10/N	1/C
Fruit					
Compositae					
Artemisia sp.					
Leaf				X/C	
Wood				X/C	
Equisetaceae					
cf. *Equisetum* sp.					
Stem				X/C	
Gramineae					
Fruit				1/C	
Pinaceae					
Pinus sp.					
Wood	X/C	X/C			X/C
Pinus ponderosa					
neddle				X/C	
Polygonaceae					
Polygonum sp.					
Fruit				8/N	
Flower				X/N	
Salicaceae					
Populus sp.					
Wood		X/C	X/C		
Solanaceae					
Solanum sp.					
Seed				2/N	

Key:
1/ - reproductive part (seed, fruit, cone) quantity
X/ - nonreproductive part, present
/C - charred
FS - field provenience designation
BS - bulk soil
Feat - feature
/N - noncharred

Sample 7 may also represent recent intrusions, following the logic regarding the occurrence of the Solanum spp. seeds.

Chenopodium sp. fruits recovered from Sample 7 do not seem to follow the same pattern. Although these fruits occur in a noncharred condition immediately above Feature 3, the sample (Sample 8) retrieved from within this feature contained one charred fruit of this genus. It seems plausible that this plant was present near the locus of cultural activity (Activity Area 1, Feature 3) at the time this hearth was used. A single fruit could have been accidentally introduced into this feature during use, while the remaining seeds were deposited somewhat later. Although addi- tional investigation of these seeds may prove beneficial, the possibility of associating a single burned fruit with 10 noncharred fruits or with the proposed plant population, is very low.

Six charred fruits of Chenopodium sp. occur in Sample 4. This sample was taken adjacent to Feature 2 from a thin stratum through which this feature had been dug. During excavation the provenience unit from which this sample was extracted was designated as a noncultural unit (culturally sterile). A small amount of charred pine wood (Pinus sp.) was also present in Sample 4. The presence of charred plant material in a bulk soil sample derived from a noncultural stratum is difficult to interpret. It is possible however, that these plant materials were originally part of Feature 2 and were somehow displaced through either cultural or non-cultural activities. The inference that plant remains from Sample 4 are possibly derived from Feature 2 is based in part on the presence of charred pine wood in Sample 5. Sample 5 was taken from Stratum 2 in Feature 2. Although pine wood occurs in Samples 4 and 5 there is no direct proof that these two deposits are of similar origin. Since no

samples were taken from Statum 1 of this feature, there is no way of knowing how the strata within the feature and outside of the feature are related.

Charred cottonwood (Populus sp.) wood was also recovered from Stratum 2 of Feature 2 (Sample 5). A small quantity of wood of Populus sp. was also retrieved from Sample 6. Sample 6 was extracted from the culturally sterile matrix directly beneath Feature 2. It is possible that the presence of charred Populus sp. wood in an otherwise culturally sterile stratum is due to insect activity or pedoturbation (see Wood and Johnson [19], Keepax [20]).

Charred parts of four plant genera recovered in Sample 7 are difficult to interpret. This sample was also extracted from a culturally sterile stratum that overlies the entire site. Sample 7 was obtained as an upper control sample for Feature 3 as directed by sampling guidelines. Remains of horsetail (Equisetum sp.), sagebrush (Artemisia sp.), ponderosa pine (Pinus ponderosa), and an unidentified grass (Gramineae) tend to suggest that this sample can be associated with prehistoric activities at the site; that is, two of the specimens recovered (Equisetum sp. and Pinus ponderosa) do not occur on the site today, nor did they historically. Consequently, the presence of these two plants suggest that they were introduced to the site sometime in the prehistoric past. The presence of charred sagebrush and grass fruit is not as easily interpreted. It is possible that historic land-clearing activities could have introduced these charred remains into the surface soil horizon. The occurrence of plant remains stemming from historic land-clearing actions with potentially prehistoric plant remains suggest that some mixing of deposits has taken place. The presence of other noncharred plant remains in this

sample, which has already been discussed, also suggests some mixing. Consequently, little can be said concerning the cultural importance of plant remains recovered from Sample 7.

Charred remains of two genera occur in Feature 3 (Sample 8). The presence of a single charred Chenopodium sp. fruit has been discussed. Its presence may indicate accidental introduction during use of Feature 3. Since Pinus sp. wood was not present in control samples above or below Feature 3, is seems likely that this resource was used as fuel during use of this feature.

In sum, the majority of plant remains recovered from bulk soil samples at Horse Bone Camp cannot be directly associated with the prehistoric occupation of the site. However, it is likely that wood of Pinus sp., Populus sp., and a fruit of Chenopodium sp. were burned in the site's features prehistorically.

APPENDIX C

LITHIC REPORT FOR HORSE BONE CAMP

by

Carl J. Phagan and Thomas H. Hruby

The data presented in Tables 14.C.1, 14.C.2, and 14.C.3 represent part of the lithic reductive-technology analysis completed for Horse Bone Camp. From a 12-attribute Flaked Lithic Tool (FLT) analysis system, 4 attributes were selected to illustrate general technological, functional, and raw-material variablity. A traditional morphological-use classification, a ranked estimation of production technology input for dorsal and ventral surfaces, and a grain-size evaluation are included. Six variables are included from the Flaked Lithic Debitage (FLD) analysis system: grain-size ranking, classification of items with cortex, items which retain a striking platform, obsidian items, mean weight, and total number of debitage items. The Nonflaked Lithic Tool (NFLT) analysis system is represented by four variables: traditional morphological-use item classification, production-input-evaluation, indication of item completeness, and raw-material grain-size evaluation. The complete lithic-analysis systems are described elsewhere in D.A.P. publications (Phagan [21]).

During 1980, the D.A.P. lithic-laboratory personnel have repeatedly reviewed the utility and reliability of the lithic-analysis systems. In this review, a number of analysis variables have been modified, particularly the item morphological-use variables on both the FLT and NFLT systems. Analytical perspectives change as information accumulates and as models of tool production and use improve. In order to minimize the effects of this analytical modification on interpretation, the observed values of these variables have been regrouped into larger categories within which analytic consistency is reliable.

For comparative purposes, in addition to the individual site data, the tables include data for a grouping of temporally and functionally

Table 14.C.1 Lithic Analysis Data Summary for Horse Bone Camp, Flaked Lithic Tools

	Surface Collection (N = 42)		Excavated Units (N = 41)		Site Total (N = 83)		5MT2202 & 5MT2242 Total (N = 304)		Anasazi Group (N = 7048)
	#	%	#	%	#	%	#	%	%
MORPHO-USE FORM									
Indeterminate	2	4.8	4	9.8	6	7.2	14	4.6	0.5
Utilized flakes	23	54.8	13	31.7	36	43.4	45	14.8	43.6
Cores							12	3.9	19.0
Choppers, scraper	3	7.1	5	12.2	8	9.6	68	22.4	10.4
Thick scrapers	1	2.4			1	1.2	18	5.9	6.4
Thin scrapers	3	7.1	5	12.2	7	8.4	23	7.6	10.1
Bifaces	2	4.8	3	7.3	6	7.2	53	17.4	3.9
Projectile points	5	11.9	8	19.5	13	15.7	54	17.8	3.7
Specialized forms	3	7.1	3	7.3	6	7.2	17	5.6	2.3
THINNING STAGE: DORSAL									
Indeterminate			1	2.4	1	1.2			0.3
Nonfacial item							11	3.6	19.8
Unthin item, w/ cortex	9	21.4	3	7.3	12	14.5	27	8.9	31.7
Unthin item, no cortex	15	35.7	12	29.3	27	32.7	48	15.8	31.4
Prelim shap, w/ cortex							22	7.2	3.7
Prelim shap, no cortex			2	4.9	2	2.4	43	14.1	2.6
Primary thinning	1	2.4	1	2.4	2	2.4	17	5.6	1.2
Secondary thinning			1	2.4	1	1.2	20	6.6	1.1
Well-shaped	12	28.6	20	66.7	32	38.6	108	35.5	7.5
Highly stylized	5	11.9	1	2.4	6	7.2	8	2.6	0.7
THINNING STAGE: VENTRAL									
Indeterminate			1	2.4	1	1.2			0.2
Nonfacial item							7	2.3	19.5
Unthin item, w/ cortex			1	2.4	1	1.2	9	3.0	1.9
Unthin item, no cortex	32	76.2	1	2.4	53	63.9	109	35.9	64.4
Prelim shap, w/ cortex			21	51.2			2	0.7	1.4
Prelim shap, no cortex			2	4.9	2	2.4	42	13.8	3.4
Primary thinning							16	5.3	1.2
Secondary thinning							19	6.3	1.0
Well-shaped	5	11.9	15	36.6	20	24.1	92	30.0	6.4
Highly stylized	5	11.9	1	2.4	6	7.2	8	2.6	0.7
GRAIN SIZE									
Medium (coarse)	4	9.5			4	4.8	8	2.6	2.1
Fine	2	4.8	1	2.4	3	3.6	16	5.3	6.2
Very fine (detrital)	23	54.8	25	61.0	48	57.8	158	52.0	65.3
Miscroscopic (nongranular)	13	30.1	15	36.6	28	33.7	122	46.1	26.3

Table 14.C.2 Lithic Analysis Data Summary for Horse Bone Camp, Flaked Lithic Debitage

	Surface Collection (N =560)		Excavated Units (N=820))		Site Total (N = 1380)		5MT2202, & 5MT2242 Total (N = 6364)		Anasazi Group (N=66095)
	#	%	#	%	#	%	#	%	%
GRAIN SIZE									
Medium (coarse)	21	3.8	5	.6	26	1.9	90	1.4	3.2
Fine	39	7.0	147	17.9	186	13.5	496	7.8	21.4
Very Fine (detrital)	275	49.1	399	48.7	674	48.8	3543	55.7	51.6
Microscopic (nongranualr)	225	46.2	269	32.8	494	35.8	2235	35.1	23.7
Items with Cortex	94	16.8	125	15.2	219	15.9	654	10.3	25.9
Items with Platform	320	57.1	375	45.7	695	50.4	3119	49.0	38.8
Obsidian Items							6	0.1	18
Mean Weight (grams)	1.49		0.97		1.15		1.61		7.93
Total Debitage	560		820		1380		6364		66095

Table 14.C.3 Lithic Analysis Data Summary for Horse Bone Camp, Nonflaked Lithic Tools

	Surface Collection (N = 1)		Excavation Units (N = 6)		Site Total (N = 7)		5MT2202 & 5MT2242 Total (N = 283)		Anasazi Group (N=4318)
	#	%	#	%	#	%	#	%	%
MORPHO-USE FORM									
Indeterminate					1	14.3	146	51.6	9.2
Generalized, unhafted			1	16.7			5	1.8	24.0
Hammerstones							5	1.8	9.9
Manos	1	100	4	66.7	5	71.4	77	27.2	33.5
Slab metates							7	2.5	2.1
Trough metates									9.4
Unspecified & frag metates			1	16.7	1	14.3	40	14.1	5.2
Generalized, hafted							1	0.4	2.5
Miscellaneous specialized							2	0.7	4.0
PRODUCTION EVALUATION									
Indeterminate			2	33.3	2	28.6	160	56.5	8.4
Nodule							79	27.9	53.5
Minimally shaped	1	100	3	50.0	4	57.1	20	7.1	16.7
Well-shaped					1	14.3	24	8.5	21.1
Highly stylized			1	16.7					0.1
ITEM COMPLETENESS									
Indeterminate							1	0.4	0.9
Small fragment			1	16.7	1	14.3	140	49.5	3.3
Partial implement	1	100	4	66.7	5	71.4	103	36.4	45.6
Complete (+ or -) implement			1	16.7	1	14.3	39	13.8	50.8
GRAIN SIZE									
Indeterminate							2	0.7	8.1
Coarse			1	16.7	1	14.3	45	15.9	16.5
Medium	1	100	4	66.7	5	71.4	220	77.7	39.4
Fine			1	16.7	1	14.3	15	5.3	34.5
Nongranular							1	0.4	1.2

similiar D.A.P. sites, and percentage data for all D.A.P. Anasazi sites analyzed prior to the 1980 field season. These latter "Anasazi group" data have been generated from computer files which have not undergone complete editing, and final figures may differ slightly from those presented. Comparisons and interpretations presented here, partially those of an intersite nature, are based on a qualitative assessment of lithic profile variation, since significance has not been statistically established.

Analysis of the lithic data from Horse Bone Camp revealed an Anasazi component and a possible Archaic component. The materials are inseparable as to provenience, and the site must be interpreted as having a mixed assemblage. Site 5MT2202 and Site 5MT2242 have similar mixed assemblages representing more than one component.

The 83 flaked lithic tools from Horse Bone Camp comprise 92 percent of all lithic tools at the site, as compared to 52 percent of the similar-site group and 62 percent for the Anasazi group. The similar-group figure is unusually low, partially due to the large number of very fragmentary NFLT items at Site 5MT2242.

The unusually high ratio of flaked lithic tools to nonflaked lithic tools at Horse Bone Camp may indicate an Archaic representation in the assemblage; the scarcity of nonflaked tools suggests that plant processing was not a major activity conducted at the site. However, the high percentage of utilized flakes (43 percent) is identical to the Anasazi group, suggesting an Anasazi representation at the site. The Anasazi profile is interpreted as representing an expedient technology, with an assemblage characterized by a large percentage of utilized flakes. Similar "contradictions" occur when comparing Horse Bone Camp with its

similar-site group. There are difficulties inherent in interpreting temporally mixed assemblages involving the wide range of functional variability and the concomitant content variability, in small, seasonally-used sites.

At Horse Bone Camp the relatively high proportions of bifaces, projectile points, and various specialized forms, all high-input items in terms of production technology, are consistent with a high-curation model of Archaic tool production. Such a high-curation model is also characterized by high proportions of smaller items; low proportions of cortex-bearing items; a greater variety of raw materials, including those of better flaking quality and of nonlocal origin; greater proportions of broken tools; and smaller mean debitage size. With the exception of a high proportion of ventrally unthinned items--which is generally associated with the high proportion of utilized flakes--the lithic assemblage from Horse Bone Camp follows this high-curation model, and indicates an Archaic element. A high-curation model with relatively high production input per tool should produce a low ratio of tools to total flaked stone items. This ratio is 5.7 tools per 100 flaked stone items for Horse Bone Camp. For the similar-site group the ratio is 4.6 and for the Anasazi group 9.6 flaked tools per 100 flaked stone items.

Although a temporally-sensitive projectile point typology has not yet been developed, several of the points from Horse Bone Camp are rather large and have either strongly indented bases, very broad stems, and/or low side-notches. These characteristics contribute to a generally Archaic appearance for at least some of the items.

The few ground stone items recovered from Horse Bone Camp are impossible to interpret reliably. Only 7.8 percent of the lithic tools

are ground stone, suggesting that at no time during the site's occupation did the site serve as a significant plant-processing location.

REFERENCES CITED

[1] Kane, Allen E. 1981. Introduction to field investigations and analysis. In Field investigations: 1978. Dolores Archaeological Program Technical Reports I(1). First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

[2] Breternitz, David A. and Daniel W. Martin 1973. Report of the Dolores River Project archaeological reconnaissance, 1972-1973. Ms. on file, Midwest Archaeological Center, National Park Service, Lincoln, Nebraska.

[3] Kane, Allen E. 1981. Sagehen Flats Archaeological Locality. In Field investigations: 1978. Dolores Archaeological Program Technical Reports I(3). First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

[4] Carter, G.F. and E. Anderson 1945. A preliminary survey of maize in the southwestern United States. Annals of the Missouri Botanical Garden 32:88-89.

[5] Leonhardy, Frank C. 1981. Geology of the Dolores Project area. In Laboratory analysis: 1979. Dolores Archaeological Program Technical Reports VI(9). First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

[6] Leonhardy, Frank C. 1979. Reconnaissance soils map of the Dolores Archaeological Project area. Ms. on file, Bureau of Reclamation, Upper Colo. Region, Salt Lake City.

[7] Bye, Robert A., Jr. 1981. Environmental studies report. In Laboratory analysis: 1979. Dolores Archaeological Program Technical Reports VI(6). First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

[8] Emslie, Steven D. 1981. Faunal studies - 1979. In Laboratory analysis: 1979. Dolores Archaeological Program Technical Reports VI(7). First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

[9] Greenwald, David H. 1981. Sagehen Flats Locality. In Field investigations: Sagehen Flats Locality, 1979. Dolores Archaeological Program Technical Reports V(1). First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

[10] Schlanger, Sarah H. 1979. Excavations at Sheep Skull Camp (Site 5MT22[illegible]), a multiple occupation site. In Field investigations: 1978. Dolores Archaeological Program Technical Reports I(4). First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-4[illegible]-S0562.

[11] Greenwald, David H. 1981. Excavations at Lee Side Camp (Site 5MT45[illegible]). In the 1979 site testing program: operations in the Sagehen Flats Locality, 1979. Dolores Archaeological Program Technical Reports V(13.5). First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

[12] Huggins, Robert J. and John Weymouth 1980. Magnetometer results. In Laboratory analysis: 1978. Dolores Archaeological Program Technical Reports II(7). First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

[13] Kohler, Timothy A. 1979. Probability samples. Ms. on file, Dolores Archaeological Program, Dolores, Colorado.

[14] Breternitz, David A., Arthur H. Rohn, and Elizabeth A. Morris 1974. Prehistoric ceramics of the Mesa Verde Region. Museum of Northern Arizona Ceramic Series 5.

[15] Lucius, William A. 1981. Additive technologies - 1979. In Laboratory analysis: 1979. Dolores Archaeological Program Technical Reports VI(2). First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

[16] DuBois, Robert L. 1975. Secular variation in southwestern United States as suggested by archaeomagnetic studies. In Takesi Nagata conference, magnetic field: past and present, edited by R.M. Fischer, H. Fuller, V.A. Schmidt, and P.J. Wasilewski. Goddard Space Fight Center, Greenbelt, Maryland.

[17] Hathaway, J. Holly and Jeffrey L. Eighmy 1981. Archaeomagnetism. In Laboratory analysis: 1979. Dolores Archaeological Program Technical Reports VI(11). First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

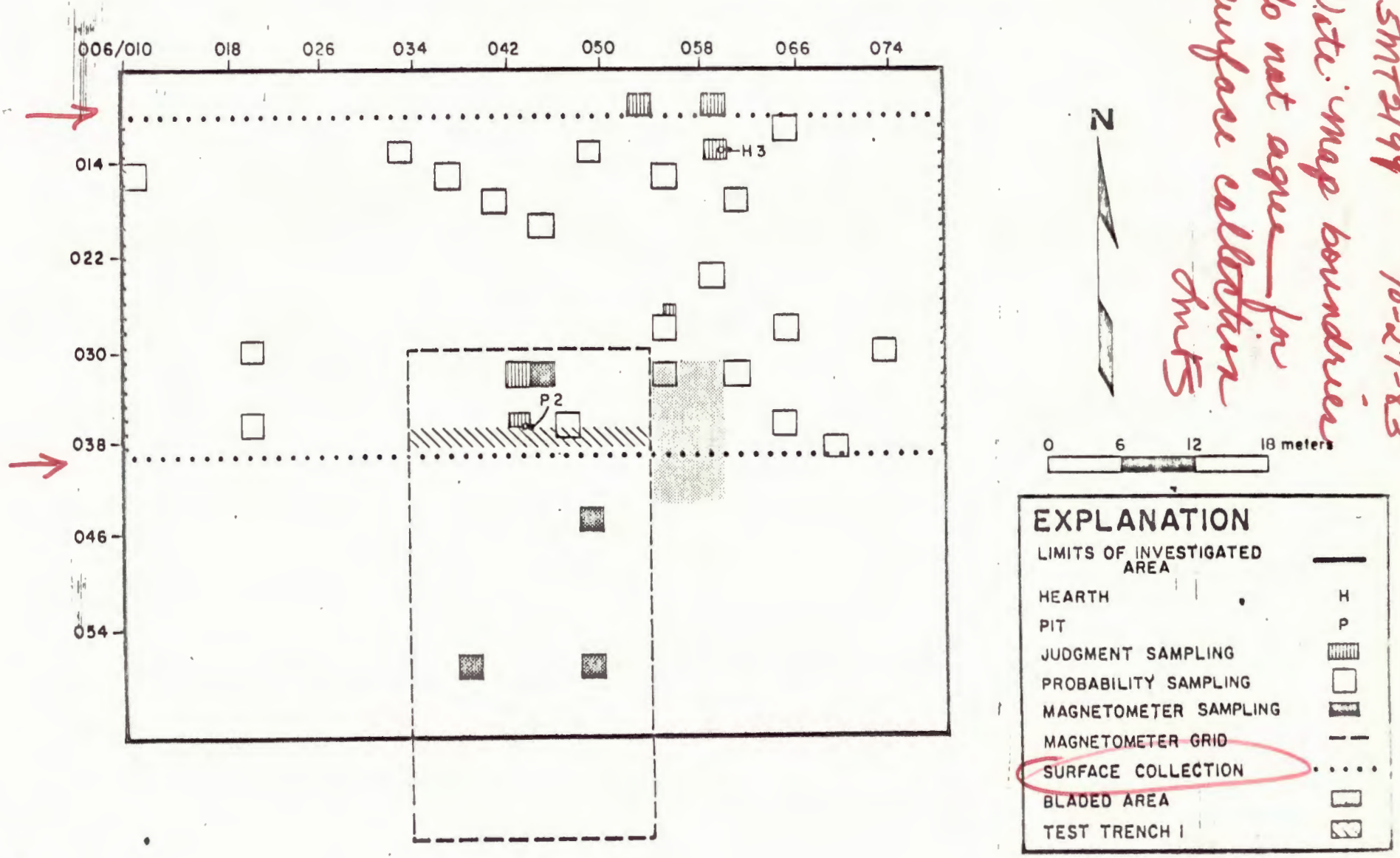
[18] Litzinger, William J. 1979. Guidelines for bulk soil and pollen sampling. Ms. on file, Dolores Archaeological Program, Dolores, Colorado.

[19] Wood, W. Raymond and Donald Lee Johnson 1978. A survey of disturbance processes in archeological site formation. In Advances in archeological method and theory 1, edited by Michael B. Schiffer, pp. 315-381. Academic Press, New York.

[20] Keepax, Carole 1977. Contamination of archaeological deposits by seeds of modern origin with particular reference to the use of flotation machines. Journal of Archaeological Science 4:221-229.

[21] Phagan, Carl J. 1981. Reductive technologies. In Laboratory analysis: 1979. Dolores Archaeological Program Technical Reports VI(3). First draft submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Figure 14.4 Site sampling plan, Horse Bone Camp.



SMT 2/99 10-27-83
Write: map boundaries do not agree for surface collection units

Figure 14.5 Surface distribution of flaked lithic artifacts, Horse Bone Camp.

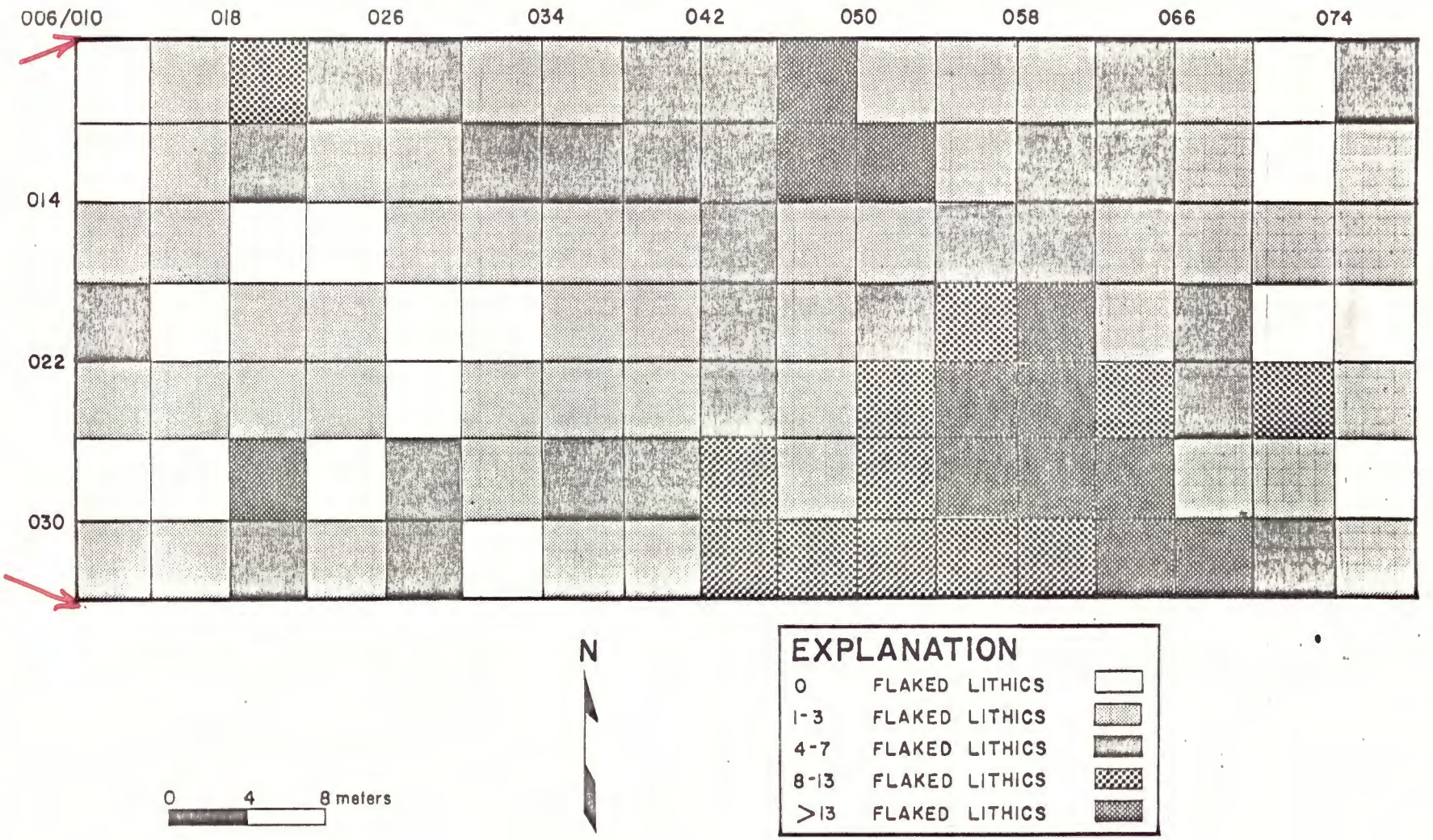


Figure 14.6 Surface distribution of ceramics, Horse Bone Camp.