ANASAZI HERITAGE CENTER
LIBRARY

DOLORES ARCHAEOLOGICAL PROGRAM TECHNICAL REPORTS

Report Number: DAP-108

Excavations at Windy Wheat Hamlet (Site 5MT4644), a Pueblo I habitation

by

Joel M. Brisbin

Prepared for
Cultural Resources Mitigation Program: Dolores Project
Bureau of Reclamation, Upper Colorado Region
Contract No. 8-07-40-S0562

Under the supervision of
David A. Breternitz, Senior Principal Investigator

Final Submission

30 January 1984

TABLE OF CONTENTS

	Page Number
LIST OF FIGURES	iii
LIST OF TABLES	ix
ACKNOWLEDGMENTS	xii
ABSTRACT	xiii
INTRODUCTION	1
Site Setting	1
INVESTIGATIVE STRATEGY	9
Research Objectives	9
SURFACE EVIDENCE	14
Surface Collections	14
Magnetometer Results	33
INTENSIVE EXCAVATIONS	37
Pitstructure 1	37
Pitstructure 2	75
Pitstructure 3	107
Room 1	141
Room 2	146
Room 3	149
Room 4	159
Room 5	162
Room 6	167
Room 7	170
Room 8	173
Possible Ramada	178
Occupation Area	181
Midden	193
MATERIAL CULTURE	197
Flaked Lithic Tools	197
Nonflaked Lithic Tools	198
Ceramics	199
Nonhuman Bone Tools	200
Miscellaneous Items	208
Dating Samples	208
Botanical and Pollen Samples	209

Page Number

SITE SYNTHESIS. 210

Chronology. 210
Integration of Spatial and Temporal Units 213
Paleodemography 218
Social Organization 221
Extraregional Relationships 223
Cultural Process. 225

APPENDIX A - MATERIAL CULTURE, WINDY WHEAT HAMLET 227

APPENDIX B - MAGNETOMETER SURVEY RESULTS FOR WINDY WHEAT HAMLET 257
Robert J. Huggins

APPENDIX C - THE POLLEN RECORD AT WINDY WHEAT HAMLET. 266
Linda J. Scott

APPENDIX D - MACROBOTANICAL REMAINS FROM WINDY WHEAT HAMLET 378
Meredith H. Matthews

APPENDIX E - WORKED VEGETAL MATERIAL FROM WINDY WHEAT HAMLET. 440
Linda P. Hart

APPENDIX F - LITHIC ARTIFACTS FROM WINDY WHEAT HAMLET 446
Thomas H. Hruby

APPENDIX G - FAUNAL REMAINS FROM WINDY WHEAT HAMLET 458
Sarah W. Neusius

REFERENCES CITED. 476

LIST OF FIGURES

		Page Number
Figure 1.	View of area around Windy Wheat Hamlet	2
Figure 2.	View from Windy Wheat Hamlet, looking north	3
Figure 3.	Topographic map of Windy Wheat Hamlet	5
Figure 4.	Pitstructure stain	11
Figure 5.	Site sampling plan	13
Figure 6.	Map of Windy Wheat Hamlet made during 1978 survey	16
Figure 7.	Surface distribution of burned clay	19
Figure 8.	Surface distribution of sandstone	20
Figure 9.	Surface distribution of ceramics	21
Figure 10.	Surface distribution of flaked lithic debitage	22
Figure 11.	Surface distribution of utilized flakes	23
Figure 12.	Surface distribution of flaked lithic tools other than utilized flakes	24
Figure 13.	Surface distribution of nonflaked lithic tools	25
Figure 14.	Spatial relationship of major cultural units	38
Figure 15.	Plan map of Pitstructure 1	39
Figure 16.	Architectural cross-section of Pitstructure 1	40
Figure 17.	Stratigraphic profile of Pitstructure 1	42
Figure 18.	Map of point-located artifacts and activity areas, Pitstructure 1	55
Figure 19.	Map of point-located artifacts behind the east wingwall of Pitstructure 1	56
Figure 20.	Schematic illustration of roof construction of Pitstructures 1 and 2	65
Figure 21.	Vessels from Pitstructure 1	69
Figure 22.	Typical sipapu with paho marks	71

Page Number

Figure 23. Paho fragments from U-Bar Cave, Hidalgo County, New Mexico 74

Figure 24. Feature map, Pitstructure 2. 77

Figure 25. Map of point-located artifacts and activity areas, Pitstructure 2 78

Figure 26. Architectural cross-section of Pitstructure 2. 79

Figure 27. Stratigraphic profile of Pitstructure 2. 80

Figure 28. Slab ventilator tunnel cover (Feature 28), Pitstructure 2 90

Figure 29. Diagram of wingwall remodeling, Pitstructure 2 91

Figure 30. Artist's reconstruction of the east wingwall, Pitstructure 2 93

Figure 31. Artist's reconstruction of roof entryway slabs lying on the hearth, Pitstructure 2. 96

Figure 32. Artist's reconstruction of Pitstructure 2 roof construction. 97

Figure 33. Plan map of Pitstructure 3 108

Figure 34. Architectural cross-section of Pitstructure 3. 109

Figure 35. Stratigraphic profile of Pitstructure 3. 110

Figure 36. Wingwall construction, Pitstructure 3. 121

Figure 37. Pecked designs in sandstone slabs found in upper fill of the ventilator shaft, Pitstructure 3 123

Figure 38. View of alcove (Feature 142) in east wall of Pitstructure 3. 126

Figure 39. Sipapu (Feature 172), Pitstructure 3 131

Figure 40. View of artifact concentration (Feature 158), Pitstructure 3 132

Figure 41. Pitstructure 3 remodeling sequence 137

Figure 42. Plan map of Room 1 142

Figure 43. Plan map of Room 2 148

Page Number

Figure 44. Plan map and stratigraphic profile of Room 3 150

Figure 45. Bone tool production area (Activity Area 52), Room 3 . . . 157

Figure 46. Bone-tool-production toolkit, finished awl, and Abajo Red-on-orange feather box from Activity Areas 52 and 53, Room 3 158

Figure 47. Abajo Red-on-orange seed jar (vessel 19) from Room 3 . . . 160

Figure 48. Plan map and stratigraphic profile of Room 4 161

Figure 49. Plan map and stratigraphic profile of Room 5 163

Figure 50. Plan map of Room 6 169

Figure 51. Plan map of Room 7 171

Figure 52. Plan map of Room 8 174

Figure 53. Stratigraphic profile of Room 8. 176

Figure 54. Plan map of the possible ramada. 179

Figure 55. Examples of awls from Windy Wheat Hamlet 204

Figure 56. Tibia "tinklers" from Windy Wheat Hamlet 205

Figure 57. Spatulate tools from Windy Wheat Hamlet. 206

Figure 58. Beamer, "gaming piece" and beads from Windy Wheat Hamlet. 207

Figure 59. Reconstruction of spatial units used during Element 3. . . 224

Figure B.1 Variable density contour map of magnetic field, Windy Wheat Hamlet 259

Figure B.2 Line contour map of magnetic field showing suggested test squares, Windy Wheat Hamlet 260

Figure C.1 Base map of Pitstructure 1 floor showing the locations of pollen samples that contained sufficient pollen for analysis 272

Figure C.2 Plan map of Pitstructure 1 showing major cultural features and artifact clusters. 317

Figure C.3 Distribution of *Zea mays* pollen on the floor of Pitstructure 1 320

Page Number

Figure C.4 Distribution of Cucurbita pollen on the floor of Pitstructure 1 322

Figure C.5 Distribution of Cleome pollen on the floor of Pitstructure 1. 323

Figure C.6 Distribution of Portulaca pollen on the floor of Pitstructure 1 325

Figure C.7 Distribution of Typha pollen on the floor of pitstructure 1. 327

Figure C.8 Distribution of Opuntia pollen on the floor of Pitstructure 1. 328

Figure C.9 Distribution of Allium pollen on the floor of Pitstructure 1. 330

Figure C.10 Distribution of Sphaeralcea pollen on the floor of Pitstructure 1 331

Figure C.11 Distribution of Nicotiana pollen on the floor of Pitstructure 1 332

Figure C.12 Distribution of Umelliferae pollen on the floor of Pitstructure 1 335

Figure C.13 Distribution of Ephedra pollen on the floor of Pitstructure 1 337

Figure C.14 Occurrence of high-spined Compositae pollen in high frequencies (over 30 percent) on the floor of Pitstructure 1 339

Figure C.15 Occurrence of Cheno-am pollen in high frequencies (over 30 percent) on the floor of Pitstructure 1 340

Figure C.16 Location of suggested "base" samples for minimum pollen sampling of an Anasazi pitstructure. 346

Figure C.17 Base map of Pitstructure 1 roof fall stratum showing the locations of pollen samples that contained sufficient pollen for analysis. 349

Figure C.18 Horizontal distribution of Zea pollen in the Pitstructure 1 roof fall statum. 351

Figure C.19 Horizontal distribution of Cucurbita pollen in the Pitstructure 1 roof fall stratum 352

Figure C.20 Horizontal distribution of Opuntia pollen in the Pitstructure 1 roof fall stratum 353

Page Number

Figure C.21 Horizontal distribution of Cleome pollen in the Pitstructure 1 roof fall stratum 354

Figure C.22 Horizontal distribution of Sphaeralcea pollen in the Pitstructure 1 roof fall stratum 356

Figure C.23 Horizontal distribution of Ephedra pollen in the Pitstructure 1 roof fall stratum 357

Figure C.24 Horizontal distribution of Compositae pollen in the Pitstructure 1 roof fall stratum 358

Figure C.25 Horizontal distribution of Umbelliferae pollen in the Pitstructure 1 roof fall stratum 359

Figure C.26 Horizontal distribution of Sheperdia pollen in the Pitstructure 1 roof fall stratum 361

Figure C.27 Horizontal distribution of Cheno-am pollen in the Pitstructure 1 roof fall stratum 362

Figure C.28 Plan map of Pitstructure 2 showing features, major artifact clusters, and locations of pollen samples. 366

Figure C.29 Occurrence of Pinus pollen in pollen samples from Pitstructure 2 367

Figure C.30 Occurrence of Zea pollen in pollen samples from Pitstructure 2 368

Figure C.31 Occurrence of Cleome pollen in pollen samples from Pitstructure 2 370

Figure C.32 Occurrence of Linum pollen in pollen samples from Pitstructure 2 371

Figure C.33 Occurrence of Onagraceae pollen in pollen samples from Pitstructure 2 372

Figure C.34 Occurrence of Sphaeralcea pollen in pollen samples from Pitstructure 2 373

Figure C.35 Occurrence of Opuntia pollen in pollen samples from Pitstructure 2 374

Figure C.36 Occurrence of Umbelliferae pollen in pollen samples from Pitstructure 2 376

Figure D.1 Example of sampling grid units, Pitstructure 1 386

Figure D.2 Features and activity areas on the floor of Pitstructure 1 399

Page Number

Figure D.3 Distribution of Amaranthus, on the floor of Pitstructure 1 400

Figure D.4 Distribution of Artemisia, on the floor of Pitstructure 1 401

Figure D.5 Distribution of Chenopodium, on the floor of Pitstructure 1 402

Figure D.6 Distribution of Nicotiana attenuata, on the floor of Pitstructure 1 403

Figure D.7 Distribution of Portulaca, on the floor of Pitstructure 1 404

Figure D.8 Distribution of Zea mays, on the floor of Pitstructure 1 405

Figure G.1 Map of the Escalante Sector showing localities and Sites 5MT4544, 5MT2854, 5MT2151, and 5MT4479 471

Figure G.2 Proportions of mammals in the total faunal assemblages from Windy Wheat Hamlet and selected DAP sites 473

Figure G.3 Proportions of mammals in the identifiable faunal assemblages from Windy Wheat Hamlet and selected DAP sites. . . 474

LIST OF TABLES

Page Number

Table 1. Point-located artifacts, Pitstructure 1 44

Table 2. Feature summary, Pitstructure 2 57

Table 3. Occurrence of possible paho marks at DAP sites 73

Table 4. Point-located artifacts, Pitstructure 2 82

Table 5. Feature summary, Pitstructure 2 86

Table 6. Tree-ring sample results, Pitstructure 2 103

Table 7. Point-located artifacts in ~~the~~ Pitstructure 3 113

Table 8. Feature summary, Pitstructure 3 119

Table 9. Point-located artifacts in the ventilator system, Pitstructure 3. 122

Table 10. Point-located artifacts, Room 1 143

Table 11. Feature summary, Room 1 144

Table 12. Point-located artifacts, Room 2 149

Table 13. Point-located artifacts, Room 3 152

Table 14. Feature summary, Room 3 154

Table 15. Point-located artifacts, Room 5 165

Table 16. Feature summary, Room 5 166

Table 17. Feature summary, Room 6 168

Table 18. Feature summary, Room 7 173

Table 19. Feature summary, Room 8 177

Table 20. Feature summary, possible ramada. 180

Table 21. Feature summary, occupation area. 183

Table 22. Worked nonhuman bone. 201

Table 23. Miscellaneous items recovered from Windy Wheat Hamlet . . . 208

Page Number

Table 24. Archaeomagnetic sample results. 211

Table A.1 Ceramic data summary, Windy Wheat Hamlet. 229

Table A.2 Flaked lithic tools, Windy Wheat Hamlet 237

Table A.3 Flaked lithic debitage, Windy Wheat Hamlet. 245

Table A.4 Nonflaked lithic tools, Windy Wheat Hamlet. 250

Table B.1 Magnetic anomalies with possible archaeological affiliations, Windy Wheat Hamlet. 262

Table C.1 Results of analysis of pollen samples from Windy Wheat Hamlet. 273

Table D.1 Presence values for taxa recovered from floor samples in Pitstructure 1. 388

Table D.2 Presence values for taxa recovered from upper control samples, Pitstructure 1 390

Table D.3 Clusters of presence values of taxa on the floor of Pitstructure 1. 392

Table D.4 Bulk soil sample results from features, Pitstructure 1. 393

Table D.5 Vegetal remains from Pitstructure 1 394

Table D.6 Bulk soil remains from Pistructures 2 and 3 414

Table D.7 Vegetal remains from Pitstructures 2 and 3. 423

Table D.8 Bulk soil remains from Room 3, and Nonstructure 3 429

Table D.9 Vegetal remains from rooms. 431

Table D.10 Vegetal remains from other excavation units 434

Table E.1 Worked vegetal material 442

Table F.1 Flaked lithic tool assemblages from Windy Wheat Hamlet and selected DAP sites. 449

Table F.2 Statistical intersite comparisons of flaked lithic tool morpho-use forms for Windy Wheat Hamlet and selected DAP sites 452

Table F.3 Flaked lithic debitage confidently assigned to each element, Windy Wheat Hamlet 453

Page Number

Table F.4 Nonflaked lithic tool assemblages from Windy Wheat Hamlet and selected DAP sites. 455

Table F.5 Statistical intersite comparisons of nonflaked lithic tool morpho-use forms for Windy Wheat Hamlet and selected DAP sites 456

Table G.1 Nonhuman bone collection modes. 460

Table G.2 Composition of the total faunal assemblage. 462

Table G.3 Taxonomic composition of the identifiable faunal assemblage. 466

ACKNOWLEDGMENTS

Fieldwork at Windy Wheat Hamlet (Site 5MT4644) was performed between 6 June and 19 October 1979 under the supervision of Craig F. Woodman. The crew at that time consisted of a six member University of Colorado field crew under the supervision of the Dolores Archaeological Program. The crew members were S. Bass, L. Maness (consecutive assistant crew chiefs), G. C. Nelson, C. Kenoyer, J. Guda, and D. McGettrick. A crew of three YACC (Young Adult Conservation Corps) personnel was also present during the 1979 season. During the latter part of the season, from 7 September until 19 October, a crew headed by Joel Brisbin and Neal Morris excavated Pitstructure 2. The crew members included R. Walkenhorst, B. King, D. Harriman, and M. Varien.

During the 1980 field season, a crew headed by Joel Brisbin returned to Windy Wheat Hamlet to complete excavation of the site. This included the excavation of Pitstructure 3, Rooms 2, 3, 4, 5, and 6, and a possible ramada. Crew members for the 1980 field season were J. Kleidon and N. Morris (assistant crew chiefs), G. Snyder, R. Walkenhorst, W. Manygoats, H. Begay, L. Black and P. Wolf. Excavation at the site was completed on 10 June 1980.

ABSTRACT

Windy Wheat Hamlet (Site 5MT4644) is a Pueblo I habitation site located in the Sagehen Flats Locality of the Dolores Archaeological Program study area. Three elements of occupation, occurring between A.D. 740 and the early 800's, have been recognized at Windy Wheat Hamlet. During the earliest element, which dates to the late Sagehill Subphase, one pitstructure was occupied at the site. No surface rooms were found to be associated with this element, but extensive plowing may have destroyed evidence of such structures. After a brief period of abandonment, the site was reoccupied and one pitstructure and several surface rooms were constructed. This occupation, termed Element 2, began in A.D. 776 (based on tree-ring dates) and has been assigned to the Dos Casas Subphase. In approximately A.D. 800, another pitstructure and several additional surface rooms were constructed. Thus, this final occupation (Element 3), which has been assigned to the Dos Casas Subphase, was manifested by two pitstructures and a series of surface rooms. In the early 800's, the structures at the site were burned and the site was abandoned.

Due to the excellent preservation of Pitstructure 1, an intensive botanical and pollen sampling program was implemented in this structure. The results of this sampling program are provided in appendixes of this report.

INTRODUCTION[1]

Site Setting

Windy Wheat Hamlet is located on a small knoll in the northeast quadrant of Sagehen Flats Locality. Prehistorically, Windy Wheat Hamlet was probably surrounded by pinyon-juniper forest and sagebrush flats. Today, however, the site lies in the center of a large field (fig. 1) that has been under cultivation for over a half century. Windy Wheat Hamlet is at an elevation of 2176 m in the SE 1/4 of the SE 1/4 of the SW 1/4 of the SW 1/4 of sec. 19, T38N, R15W. Universal Transverse Mercator grid coordinates for the site are 4,156,400 mN, 716,300 mE, zone 12. Windy Wheat Hamlet is located within the area designated by the Bureau of Reclamation as borrow area E. The site constitutes approximately 1 ha of this borrow area.

Location

Hist. Land Use

Topography

Windy Wheat Hamlet occupies the southwestern slope of a small ridge or knoll. The local, southeast-trending topography is controlled by the dip slope formed by the underlying Dakota Sandstone. This location gives an excellent panoramic view (fig. 2) in all directions except north. Neighboring sites (Sites 5MT2854 and 5MT2858) occupy similar topographic settings in the rolling uplands of north Sagehen Flats.

Bedrock

The maximum relief across the site is 4 m over a distance of 70 m. The major structural units were built on relatively flat ground near the top of the knoll. The surface structures were built on a 2.5-percent slope along the ridge crest, while the pitstructures were built on a

---

[1]Dolores Archaeological Program senior staff review was provided by Allen E. Kane.

Figure 1. View of area around Windy Wheat Hamlet, looking southwest (DAP 020514).

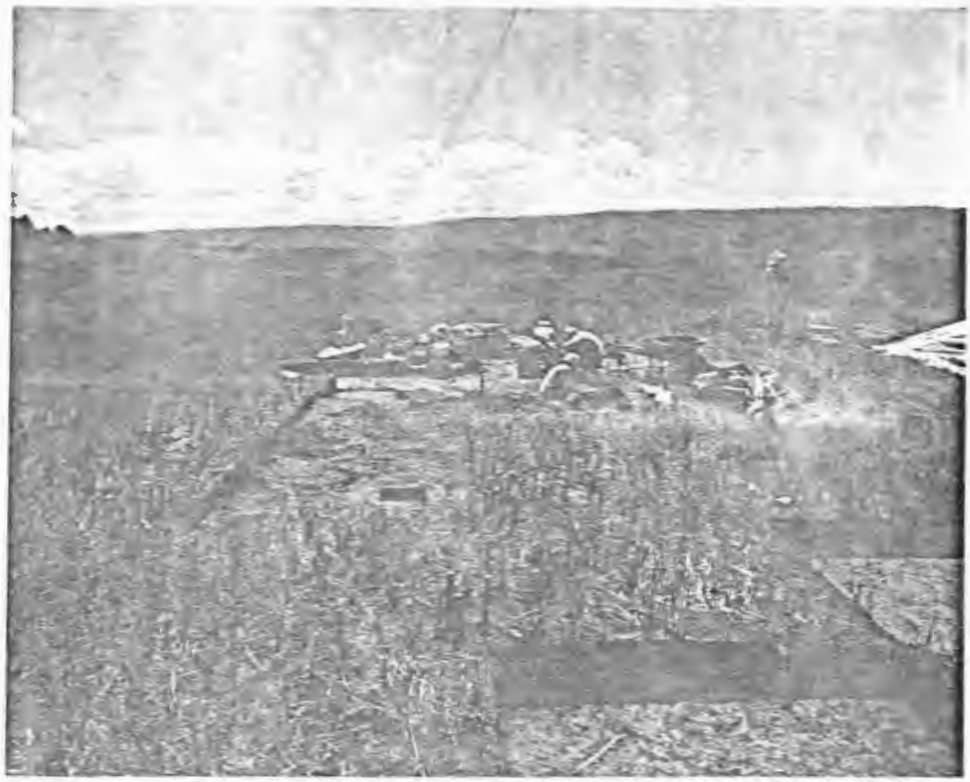


Figure 2. View from Windy Wheat Hamlet, looking north (DAP 016530).

4-percent slope about 15 m from the ridge crest (fig. 3). A midden area is 35 to 55 m southwest of the ridgetop on a 25-percent slope. Due to the gentle slopes of the knoll, topography probably had no affect on the intrasite patterning of structures and features. However, it apparently did affect the location of the midden, which is southwest of the structures on the steepest part of the slope.

There is an intermittent drainage southwest of the site, but this probably was not a reliable source of water for the inhabitants of Windy Wheat Hamlet. Presently, a spring occurs 1 km south of Windy Wheat Hamlet, but its flow depends on seasonal precipitation patterns. The nearest permanent water source is the Dolores River located 1 km southeast of the site.

Climate

The climate is semiarid with summer thundershowers and winter snowstorms providing most of the annual precipitation. The mean annual precipitation at the Yellowjacket Weather Station (elevation 2090 m), located 13.7 km west of the Sagehen Flats Locality, is 376.4 mm (15 in). At the Dolores Weather Station (elevation 2118 m), 6.4 km southeast of the locality, annual rainfall averages 460.5 mm (18.4 in). The average number of consecutive frost-free days is critical to successful farming. Using figures derived from four weather stations within a 50-km radius of the locality, Kane (1981a:15) estimates that the locality averages 120-125 consecutive frost-free days. The locality, then, would seem suitable for agricultural exploitation. This conclusion, however, may be more apparent than real. Examination of the weather station data suggests that local elevation has a major impact on the growing season (Kane 1981a:9).

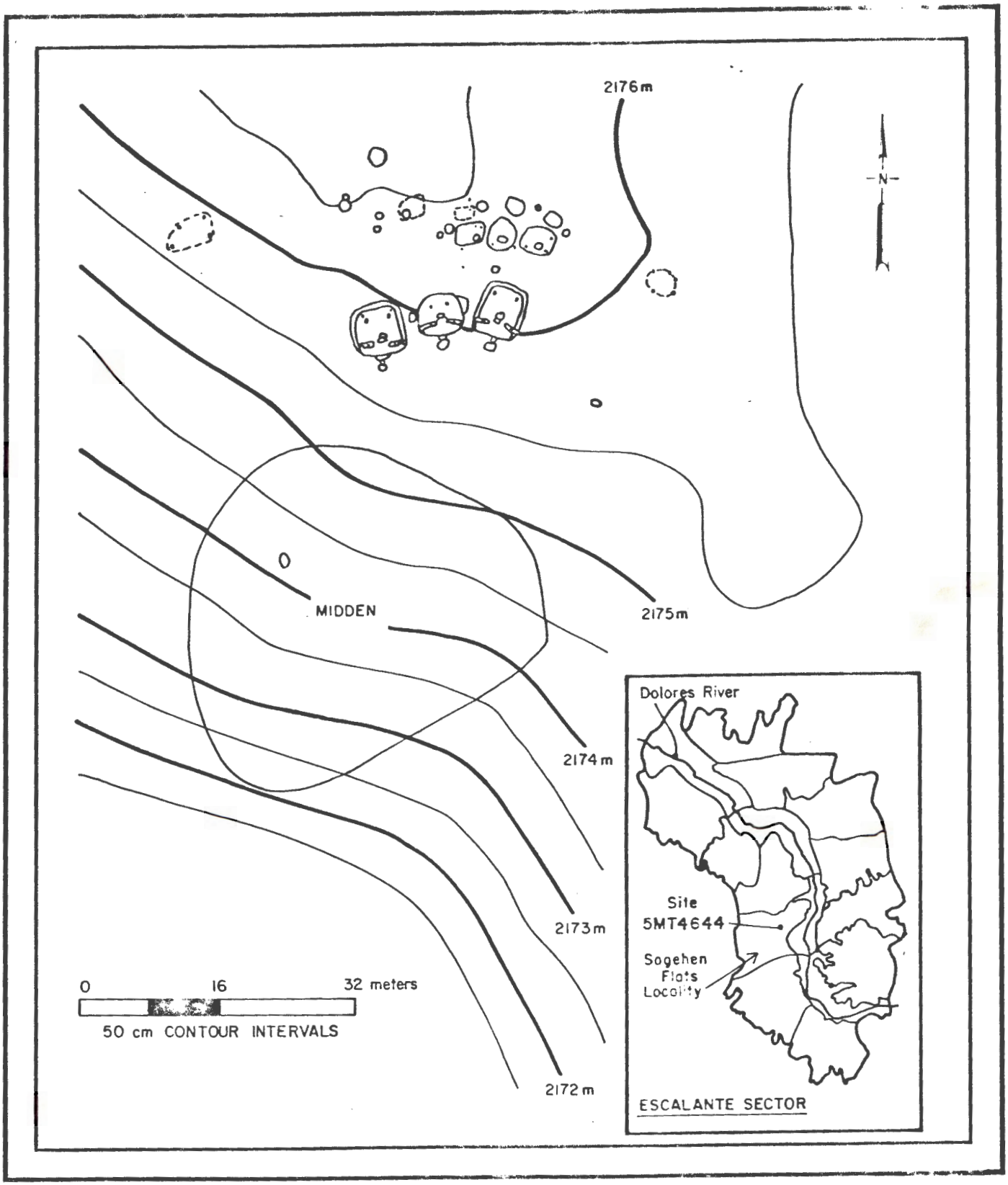


Figure 3. Topographic map of Windy Wheat Hamlet.

In general, an increase in elevation is accompanied by lower annual temperatures, resulting in a shorter growing season. Since Windy Wheat Hamlet is slightly higher in elevation than the nearest weather station, it seems reasonable that somewhat colder temperatures may have rendered the locality less suitable for agriculture (Kane 1981a:15). In this regard, it is notable that Cordell (1975:195-197), using tree-ring data from Mesa Verde, has demonstrated an abrupt shift from hot, dry conditions prior to A.D. 780 to cold, wet conditions by A.D. 850. This shift may have affected the occupants of Windy Wheat Hamlet, who occupied the site between A.D. 740 and 800.

Soils

The site lies within a large expanse or "island" of Witt Loam bounded by a ridge to the west, an unnamed canyon to the north, and the western rim of the Dolores River canyon 1 km to the east. Unlike the rocky, shallow soils bounding it, Witt Loam is one of the best dry-farming soils in the project area. Its depth usually exceeds 1 m, and though it is well drained, it holds moisture throughout the year.

Flora

The uncultivated areas adjacent to Windy Wheat Hamlet exemplify the climax species that were probably present during the prehistoric occupation of the area. These uncultivated areas (ridge tops, canyon rims, and rocky hillocks) are covered with pinyon pine (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), scrub oak (*Quercus gambelii*), Utah serviceberry (*Amelanchier utahensis*), pricklypear (*Opuntia* spp.), rabbitbrush (*Chrysothamnus* spp.), and big sagebrush (*Artemisia tridentata*). Many other shrubs as well as grasses are present. Refer to Bye (1981) for a complete description of all floral species in the DAP study area.

Fauna

A wide variety of exploitable faunal species have been found in the area around Windy Wheat Hamlet. Mule deer (*Odocoileus hemionus*) and American elk (*Cervus elaphus*) both use the Sagehen Flats area as a wintering ground. A certain number of the deer remain year-round. Prehistorically, both bighorn (*Ovis canadensis*) and pronghorn (*Antilocapra americana*) were in the area and were exploited by the inhabitants. Jackrabbit (*Lepus* spp.) and cottontail (*Sylvilagus* spp.) were both extensively exploited by the inhabitants of Windy Wheat Hamlet. Ground squirrels (*Spermophilus* spp.) and prairie dogs (*Cynomys gunnisoni*) are also present and were used prehistorically. Faunal evidence from Windy Wheat Hamlet and other sites in the area indicates that the porcupine (*Erethizon dorsatum*) and beaver (*Castor canadensis*) were also used. Refer to Benz (1981) for a complete listing of faunal species found in the area.

Lithic Resources

In the Dolores River canyon east of the site, ample and various types of lithic resources were available for prehistoric exploitation. The uppermost formation exposed in the canyon is the Mancos Shale. Underlying this formation is the Dakota Sandstone from which building stone and stone for use as metate slabs were procured. This is the formation that outcrops on the canyon rims near the site. Below the Dakota Sandstone, the Burro Canyon and Morrison Formations are found. Both of these layers contain orthoquartzites that were extensively used to make bifacial and unifacial cutting and piercing tools. Leonhardy and Clay (1982) provide a more comprehensive discussion of the geology of the area.

Summary

In sum, the inhabitants of Windy Wheat Hamlet resided in a locale

that is today relatively rich in resources. The soil is agriculturally productive; precipitation is adequate for dry farming; a stable water supply is nearby; and floral, faunal, and lithic resources are abundant and varied. Other than the possibility of periodic climatic shifts, this locality seems well suited for economic exploitation.

INVESTIGATIVE STRATEGY

Research Objectives

The decision to excavate Windy Wheat Hamlet was initially based on the need to mitigate the impact of the excavation of borrow area E by the McPhee Dam project. The sediment in this area had been judged to be of a quality and volume that would be useful in the construction of the earth fill McPhee Dam being constructed in the Dolores River canyon. Since cultural resources in the borrow area would be destroyed by the removal of this sediment, it was desirable to excavate a sample of the numerous cultural resources in this area. Survey teams recorded several Pueblo I sites in borrow area E. Under the DAP (Dolores Archaeological Program) spatial system (Kane 1980), these sites belong to the Milhoan Community Cluster. Three of these sites, including Windy Wheat Hamlet, were chosen for intensive excavation to gather data on this community cluster. Windy Wheat Hamlet was specifically chosen for excavation because there were surface indications that the site had burned. This usually indicates that there is good preservation of structures, surfaces, and organic remains. Four levels of investigation, described as tracks of investigation in the DAP mitigation design (Knudson et al. 1981), were applied to Windy Wheat Hamlet: survey inventory (Track 4); surface collection, topographic mapping, and magnetometer survey (Track 3); initial testing and removal of overburden with heavy machinery (Track 2); and intensive subsurface excavation (Track 1).

Excavations at Windy Wheat Hamlet were aimed at collecting data to help answer the questions proposed in the first three problem domains of the DAP research design (Kane et al. 1981). These problem domains deal

with the economy, paleodemography, and social organization and settlement patterns of the prehistoric people who inhabited the project area.

Investigative Methods

Initially, a 4- by 4-m grid system was superimposed on the site to facilitate spatial control of the intensive surface collection. By plotting artifact densities within the site grid, it was possible to isolate the probable locations of the major architectural features and of the midden. In addition, a magnetometer survey located three anomalies that were attributed to pitstructures. Once these probable areas of cultural significance had been isolated, several 2- by 2-m test squares were excavated. If the fill in a 2- by 2-m excavation unit appeared to indicate a room or pitstructure, the horizontal extent of the "stain" was exposed by excavating the surrounding 2- by 2-m excavation units (fig. 4).

When a structure was detected in this manner, a north-south trench was excavated to define its walls and floor, and the fill sequence exposed in the trench wall was documented. Time restraints precluded screening the fill in most excavation units. Most of the upper fill from the pitstructures was excavated using a backhoe. During excavation, fill artifacts were collected by hand whenever they were observed. Structural surfaces were carefully exposed and documented using a secondary grid system oriented to the structure rather than to the site grid. Floor artifacts or clusters of related floor artifacts were mapped and assigned individual PL (point location) numbers. Features, both inside and outside of structures, were cross sectioned and photographed. Bulk soil samples (for flotation recovery of vegetal remains) and pollen samples were taken from fills, surfaces, and features whenever it was felt that culturally interpretable data could be obtained. In addition, an intensive pollen

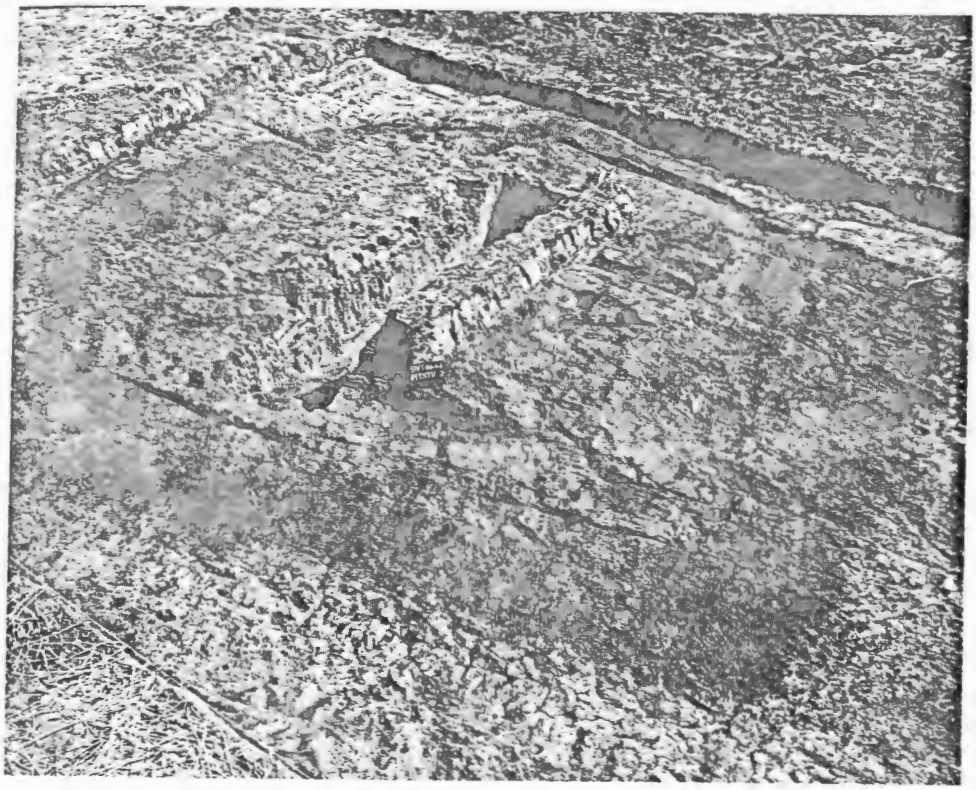


Figure 4. Pitstructure stain, Windy Wheat Hamlet (DAP 023605).

and bulk soil sampling program was instituted in Pitstructure 1 to sample the entire floor. Most of the floor was removed in the process. Pitstructures, surface rooms, and features at the site were numbered consecutively. After a structure was completely excavated, architectural cross sections were drawn. Vertical photography, employing a 30-ft-high bipod, was used to document each structure after it was exposed.

The midden area was tested using both 2- by 2-m excavation squares and a long, north-south backhoe trench. The material from the grid squares in the midden was screened through one-quarter-inch mesh. The purpose of the backhoe trench was to determine whether modern plowing had left any stratification in the midden.

After the surface structures and pitstructures were defined, large areas surrounding these architectural units were exposed by a grader, which stripped away the plow zone. This method revealed numerous isolated features and exposed Room 6 and a possible ramada. Finally, a transit was used to make a site map showing all cultural features and structures as well as the extent of the excavation.

Extensive records of the excavations were kept using a set of computerized forms that were developed for the DAP. The computer system revolves around the Field Provenience Description Form, which assigns a unique FS (field provenience designation) number to each unit of excavation, thereby linking that unit to any artifacts or samples that were removed from it. The FS number accompanies artifacts throughout transportation, analysis, and storage. The FS forms are the basic record of what was dug and what was found. In addition to the computerized forms, written notes and photographs were taken on a daily basis. Figure 5 shows the areas where different sampling procedures were implemented.

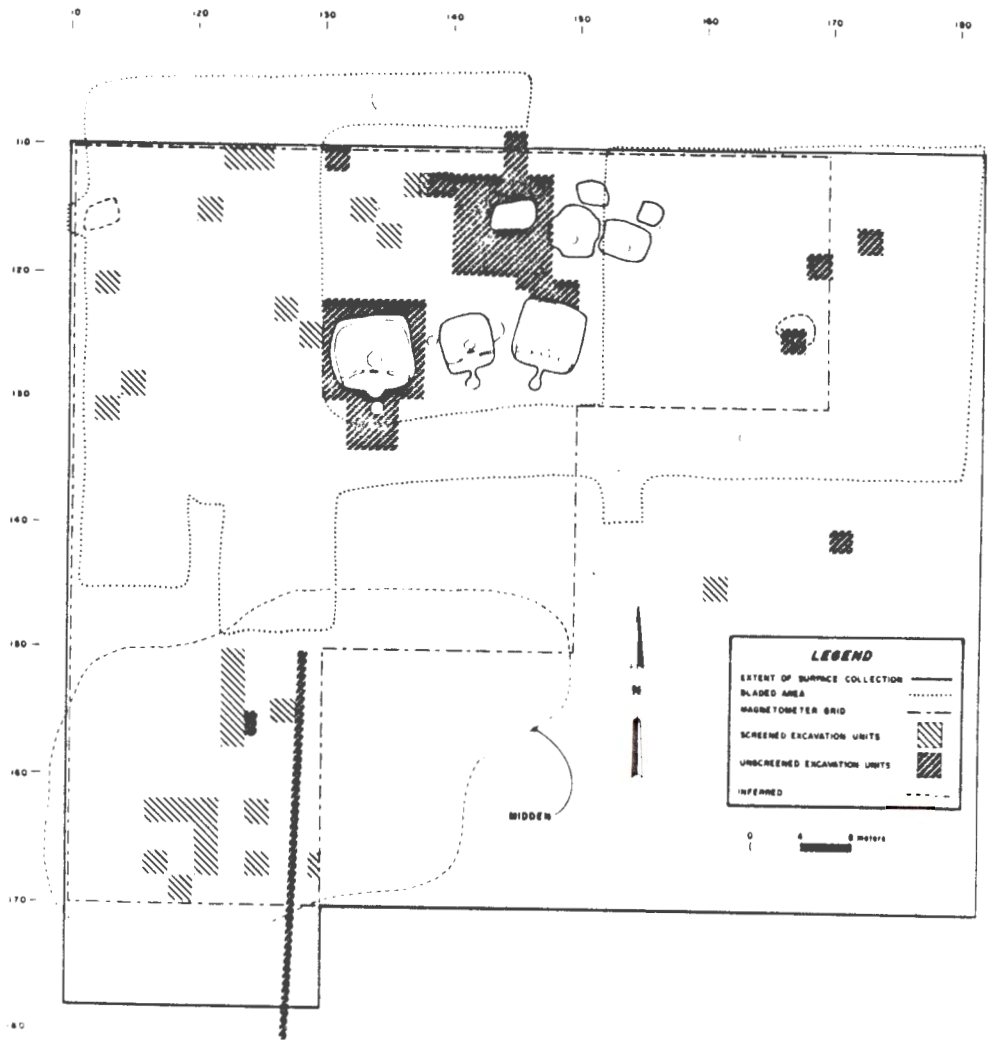


Figure 5. Site sampling plan, Windy Wheat Hamlet.

SURFACE EVIDENCE

The only surface evidence of cultural remains at Windy Wheat Hamlet was a dense scatter of cultural debris in the middle of a wheat field. Small sandstone fragments were scattered across the site, but most of the larger building stones had been removed by local farmers. Plowing of the site left no walls, mounds, or depressions to indicate the locations of prehistoric structures. The plow zone was 25 to 30 cm deep; thus the shallowly buried occupation surfaces, the features, and the surface structures were heavily disturbed or destroyed. The artifacts that were on these shallow surfaces were incorporated into the plow zone, which created the debris scatter recorded by the survey crew.

Two types of surface data were recovered at Windy Wheat Hamlet. First, artifacts collected from the surface of the site were used to suggest a tentative date for the prehistoric occupation of the site and to generate artifact distribution maps showing areas of high artifact density. Second, a magnetometer survey produced a map of the site showing magnetic anomalies, three of which proved to be pitstructures. The combination of these data sets created an excellent picture of the site layout and served as a guide to the placement of excavation units.

Surface Collections

Artifacts were collected from the plowed site surface on two occasions: by the survey crew in October 1978 and by the excavation crew in June 1979. The site had been planted with beans when discovered by the survey crew and with wheat when gridded by the excavation crew. Thus, ground visibility was excellent for both surface collections. The survey

crew only picked up artifacts that they thought might be temporally diagnostic; whereas, the excavation crew made an intensive collection, picking up everything within the site grid.

Based on the types of debris in the surface scatter, the survey report described Windy Wheat Hamlet as a habitation site dating to sometime between A.D. 750 and 900. Figure 6 is the map made by the survey crew using a compass and tape. The map shows the extent of the artifact scatter. Also, near the center of the site is a scatter of burned adobe, which the survey crew correctly interpreted to be the location of the surface structures. Southwest of the adobe scatter, the survey crew mapped a dense artifact scatter and dark stain interpreted as the midden area. The adobe scatter, the dense artifact scatter, and the dark stain are all within the portion of the site that was gridded for excavation in 1979.

The intensive surface collection was controlled by using the site grid, which covered 43 percent of the surface scatter recorded by the survey. The site grid consisted of 4- by 4-m squares oriented to magnetic north. Cultural materials collected from each grid square were sorted by material class. Artifacts were sent to the lab for analysis, while burned clay and sandstone were counted, weighed, and discarded in the field. The artifact analysis permitted plotting of the surface distribution of ceramics, flaked lithic items, and nonflaked lithic tools by count or by weight. This analysis can also be used to plot the surface distribution of any variable such as ceramic type or lithic tool morpho-use. The field-recorded weights of burned clay and sandstone were used to plot the surface distributions of these building materials.

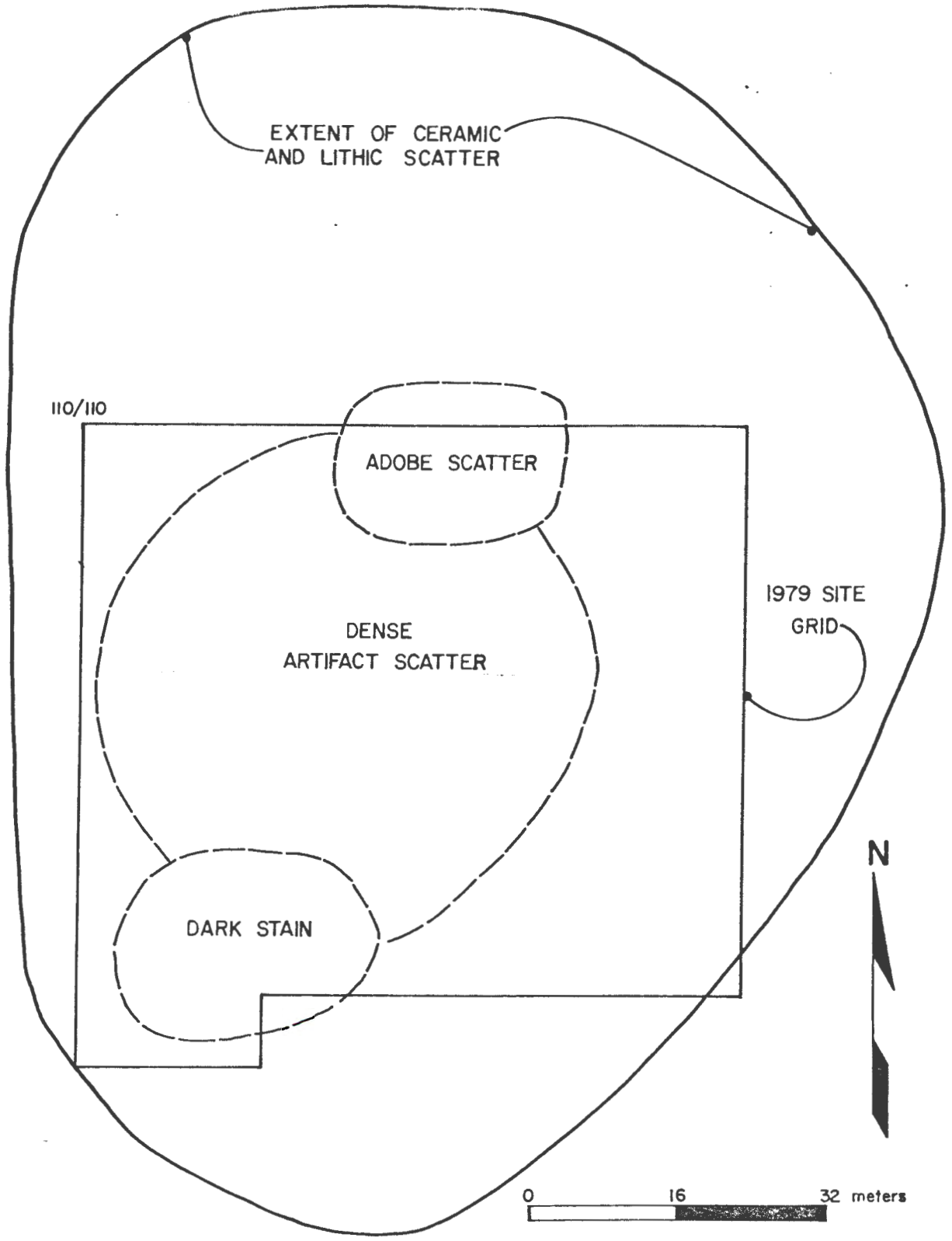


Figure 6. Map of Windy Wheat Hamlet made during 1978 survey.

Composition of Collections

The artifacts from both the survey collection and the intensive surface collection have been combined in tables A.1 through A.4 in appendix A. Ceramic types in the surface collection include Chapin Gray, Moccasin Gray, Chapin Black-on-white, Abajo Red-on-orange, and Bluff Black-on-red (table A.1). The vast majority of gray ware sherds (93.6 percent) are from jars, while the majority of both white and red ware sherds are from bowls (86.2 and 80.9 percent, respectively). Table A.2 describes the morpho-use of the 642 flaked lithic tools from the surface collection. Utilized flakes compose 53 percent of the tools; cores and thick, worked items account for 35.6 percent, while projectile points and thinly worked items total 5 percent. Ninety-eight percent of the debitage and 99 percent of the tools are of very-fine-grained to microscopic-grained material, suggesting that the tools found on the site were also produced on the site. In table A.4, all the surface-collected nonflaked lithic tools are described according to morpho-use categories. Only 42.9 percent of the nonflaked lithic items could be confidently assigned a morpho-use. These items included hammerstones, manos, hafted items, and miscellaneous grinding/abrading stones. The miscellaneous category, which accounts for 23 percent of the nonflaked lithic tools, is primarily comprised of river cobbles that show minimal or questionable abrasion, polish, or pecking. The indeterminate category accounts for 34.1 percent of the nonflaked lithic tools and is comprised mostly of minimally altered or unmodified cobbles.

Distributional/Associational Patterning

Surface distribution maps for burned clay, sandstone, ceramics, flaked lithic items, and nonflaked lithic tools were created based on

either the weight or the number of items per grid square (figs. 7-13). These distribution maps generally show two areas of high artifact density: one is in the northern part of the grid where the survey crew recorded a burned adobe scatter, while the other is in the southwestern corner of the grid where the survey crew recorded an area of dark soil. The northern artifact concentration directly overlies the subsurface structural remains, while the southwestern artifact concentration defines the midden area. Due to plowing, some lateral displacement of artifacts is assumed; but because the surface artifact concentrations are in areas where artifacts were probably deposited aboriginally, the horizontal displacement of artifacts may not be too severe. This presents the possibility that the surface distribution of certain types of artifacts may generally reflect different aboriginal activity areas. Because of this possibility, the surface distributions of different ceramic types and of different lithic tool types were plotted to look for patterns. Only data from the intensive surface collection have been included in these plots. The materials collected by the survey crew have not been plotted (hence the differences between the totals in appendix A and the totals shown in figs. 7 through 13). While different ceramic types generally showed a similar distribution, lithic tool types were differentially distributed. To illustrate the relationship of the subsurface remains to the surface materials, the structures and features discovered by excavation have been superimposed on all of the surface distribution maps.

Building material distribution. Two types of building material (burned clay and sandstone) were scattered across the surface of Windy Wheat Hamlet. The surface distribution for each material is plotted by

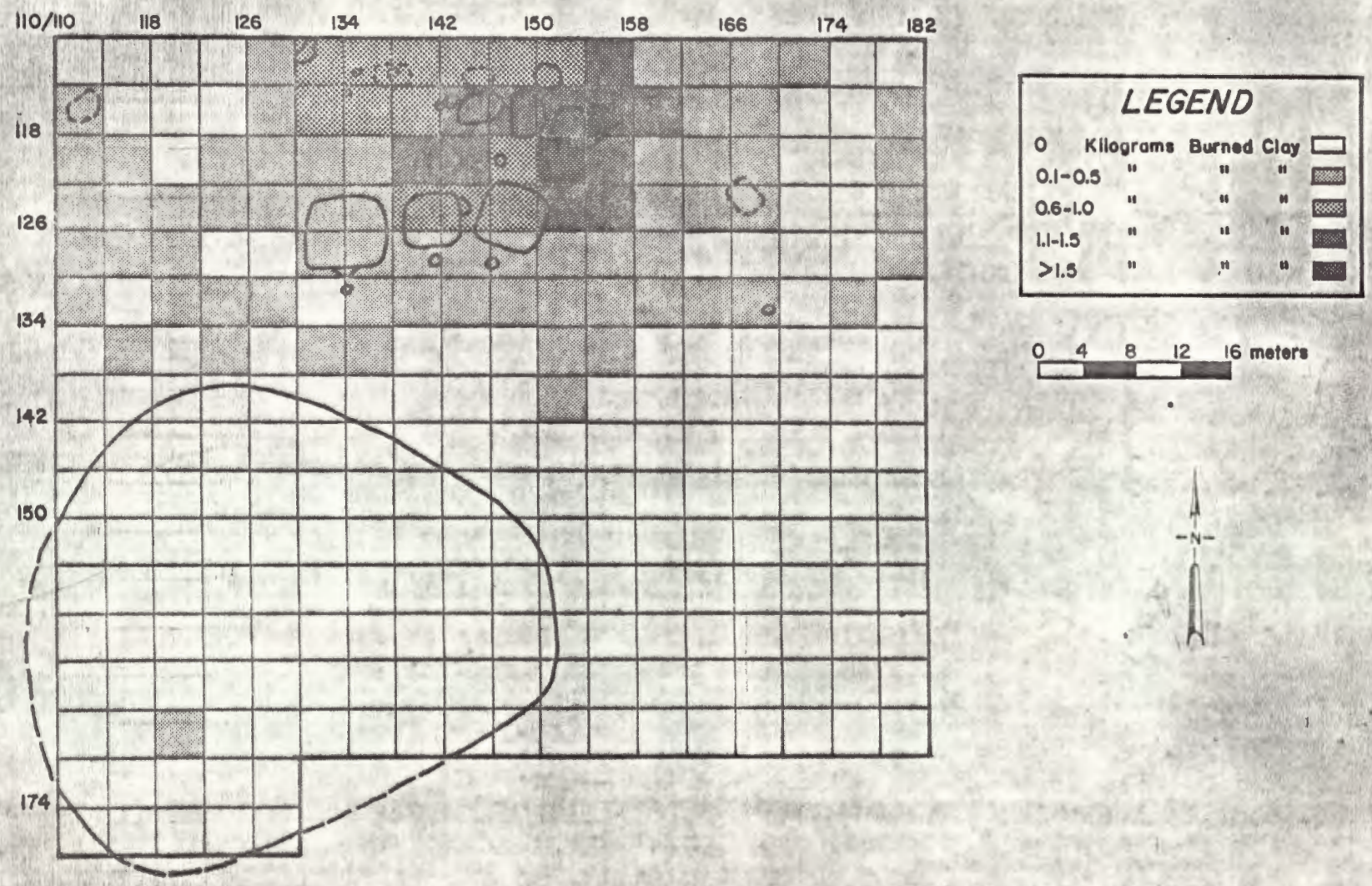


Figure 7. Surface distribution of burned clay, Windy Wheat Hamlet.

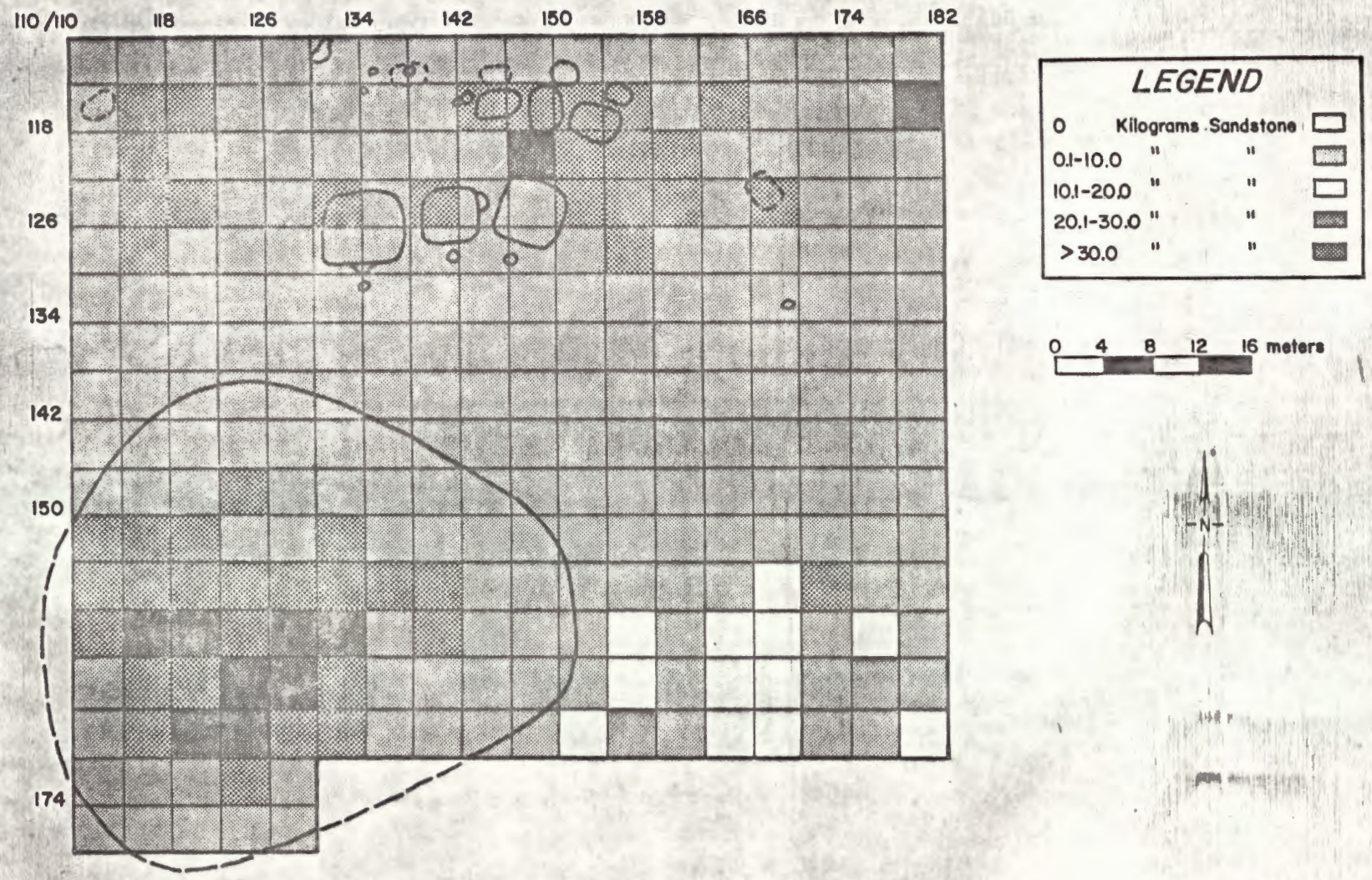


Figure 8. Surface distribution of sandstone, Windy Wheat Hamlet.

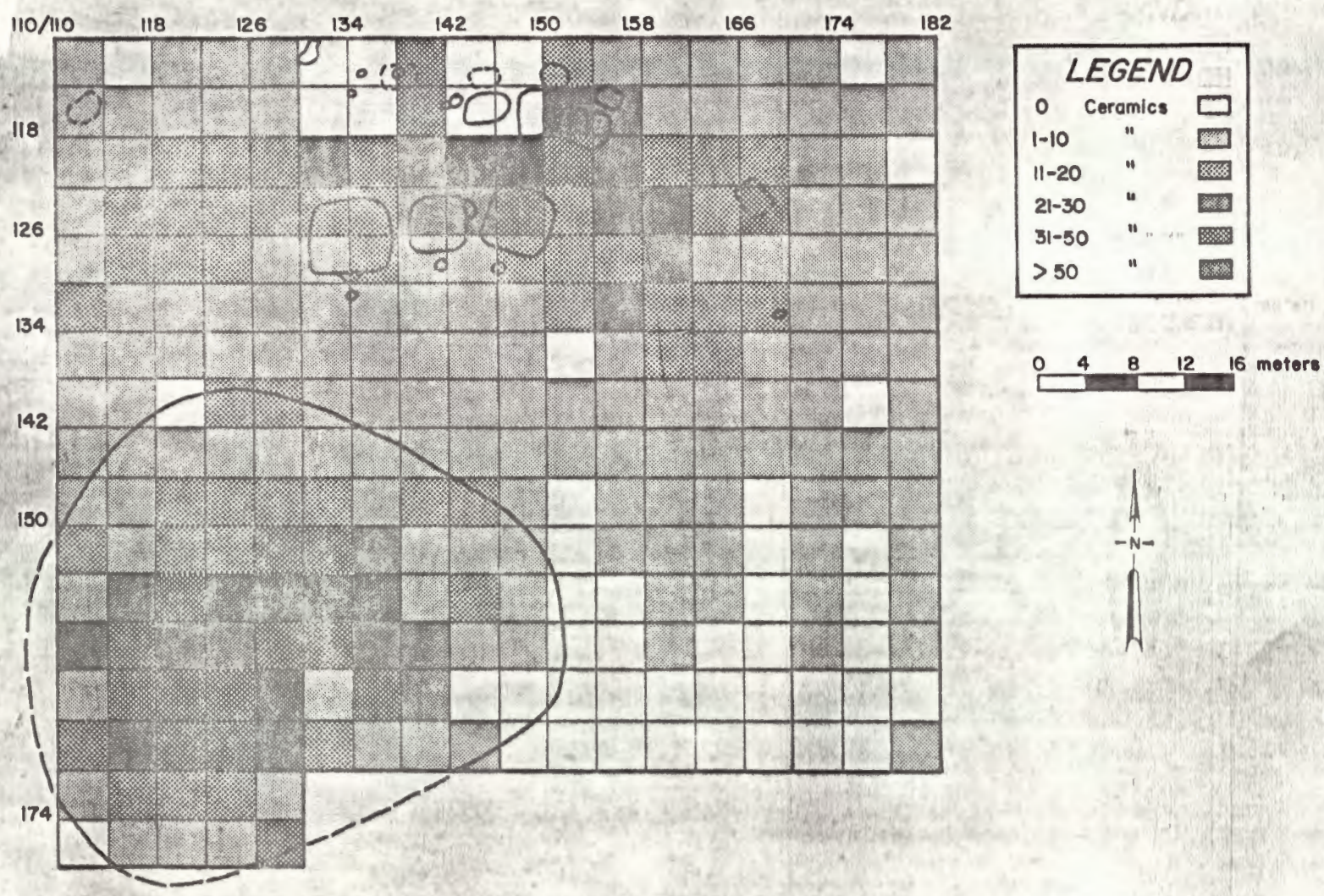


Figure 9. Surface distribution of ceramics, Windy Wheat Hamlet.

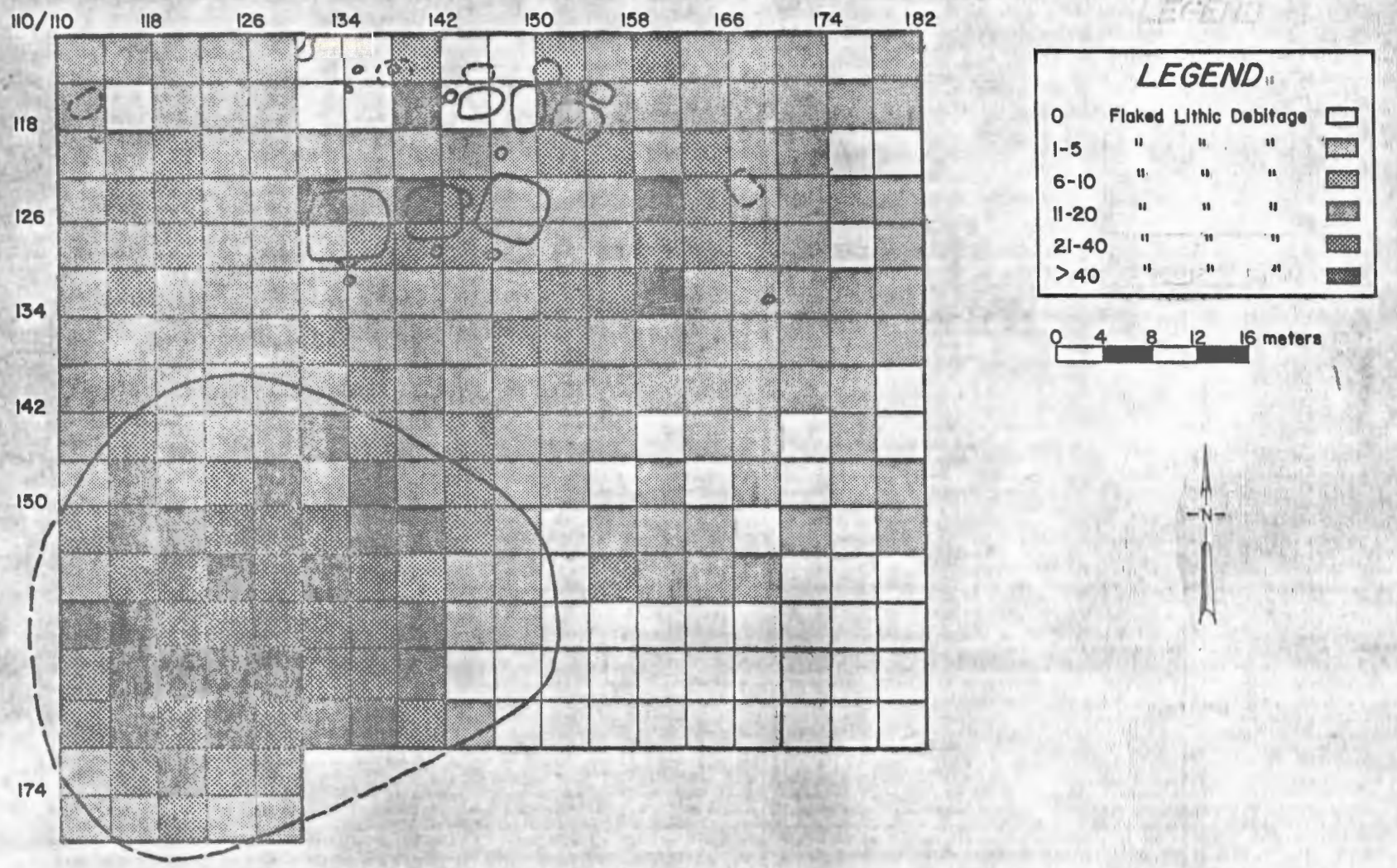


Figure 10. Surface distribution of flaked lithic debitage, Windy Wheat Hamlet.

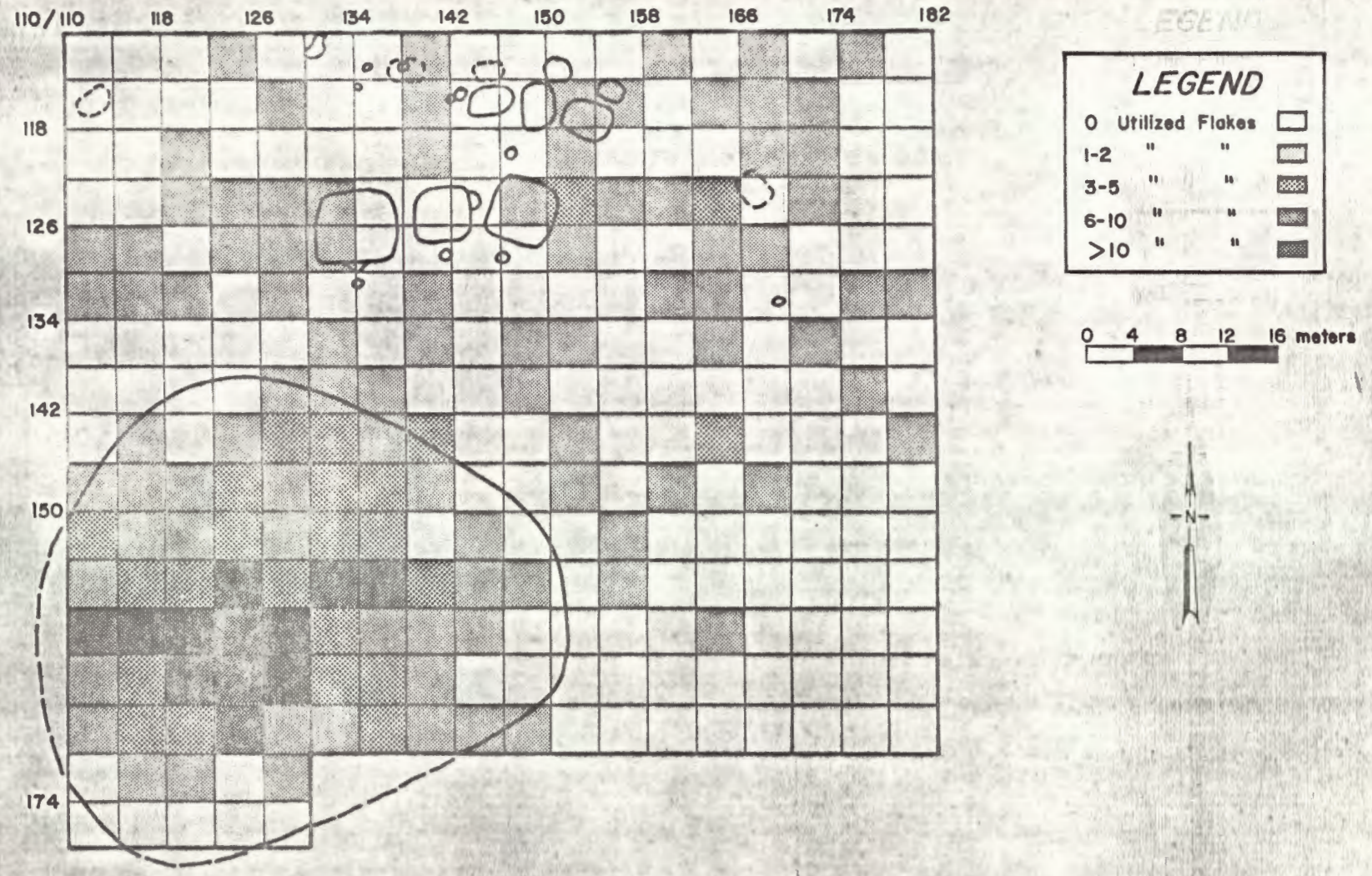


Figure 11. Surface distribution of utilized flakes, Windy Wheat Hamlet.

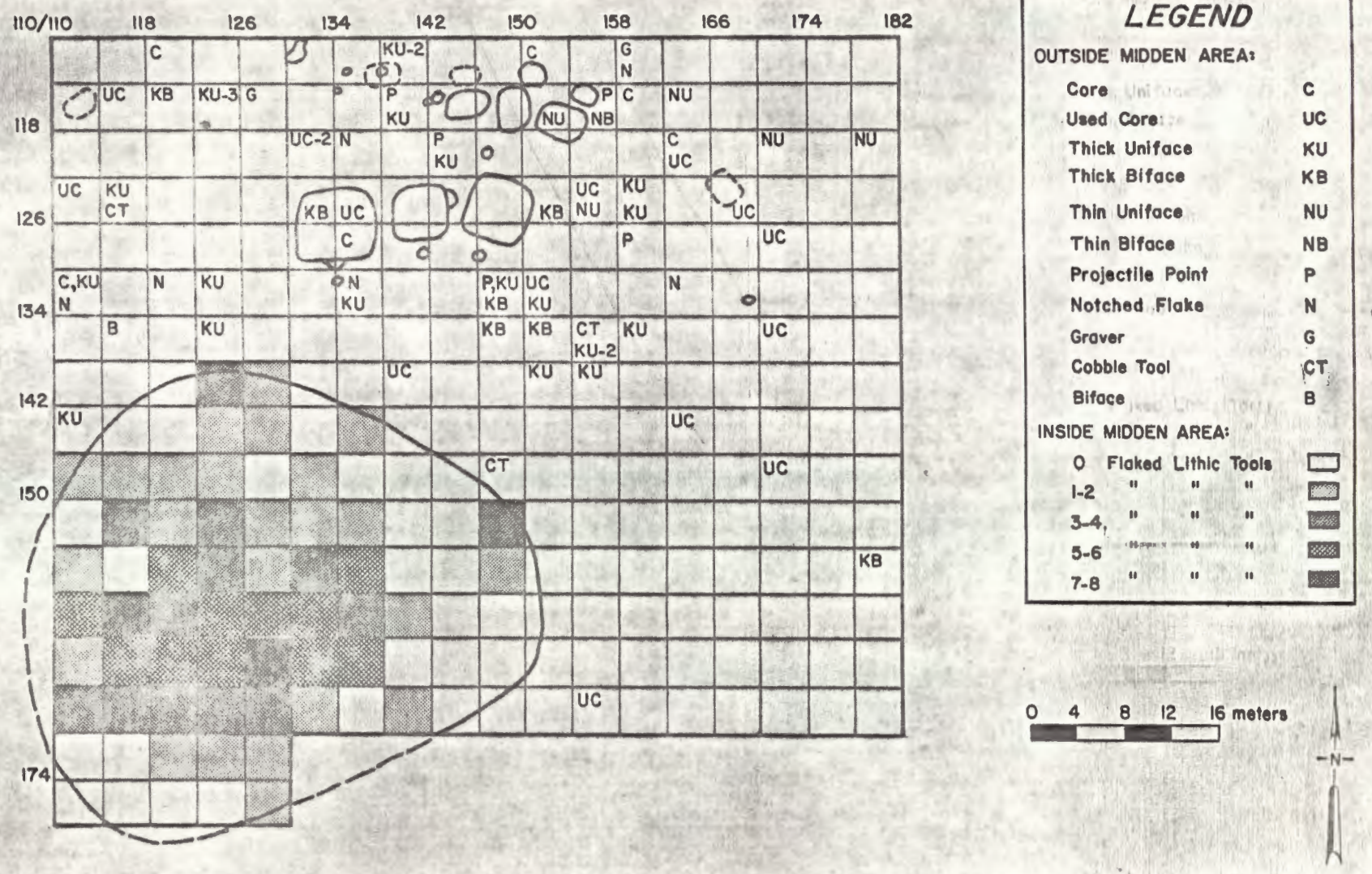


Figure 12. Surface distribution of flaked lithic tools other than utilized flakes, Windy Wheat Hamlet.

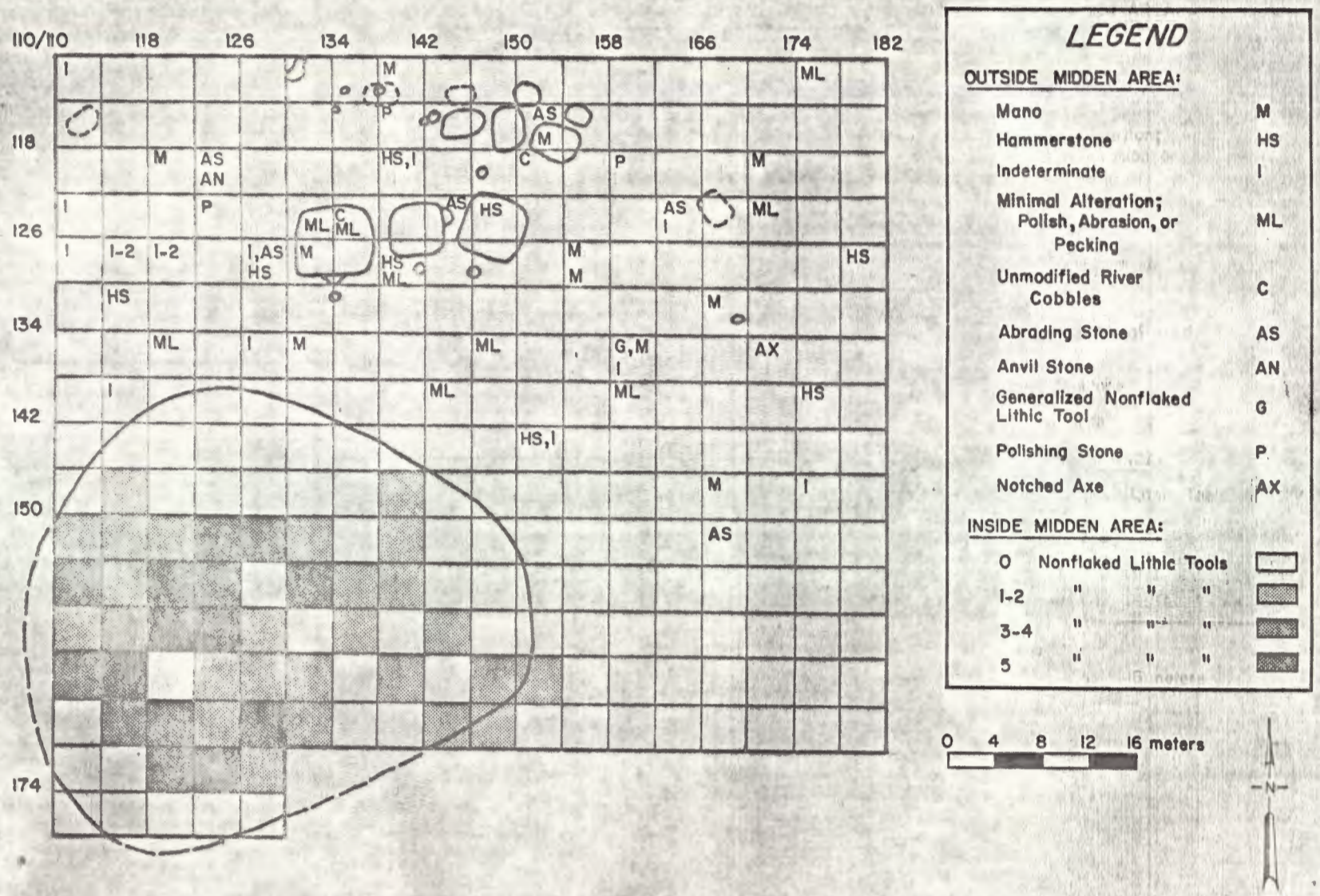


Figure 13. Surface distribution of nonflaked lithic tools, Windy Wheat Hamlet.

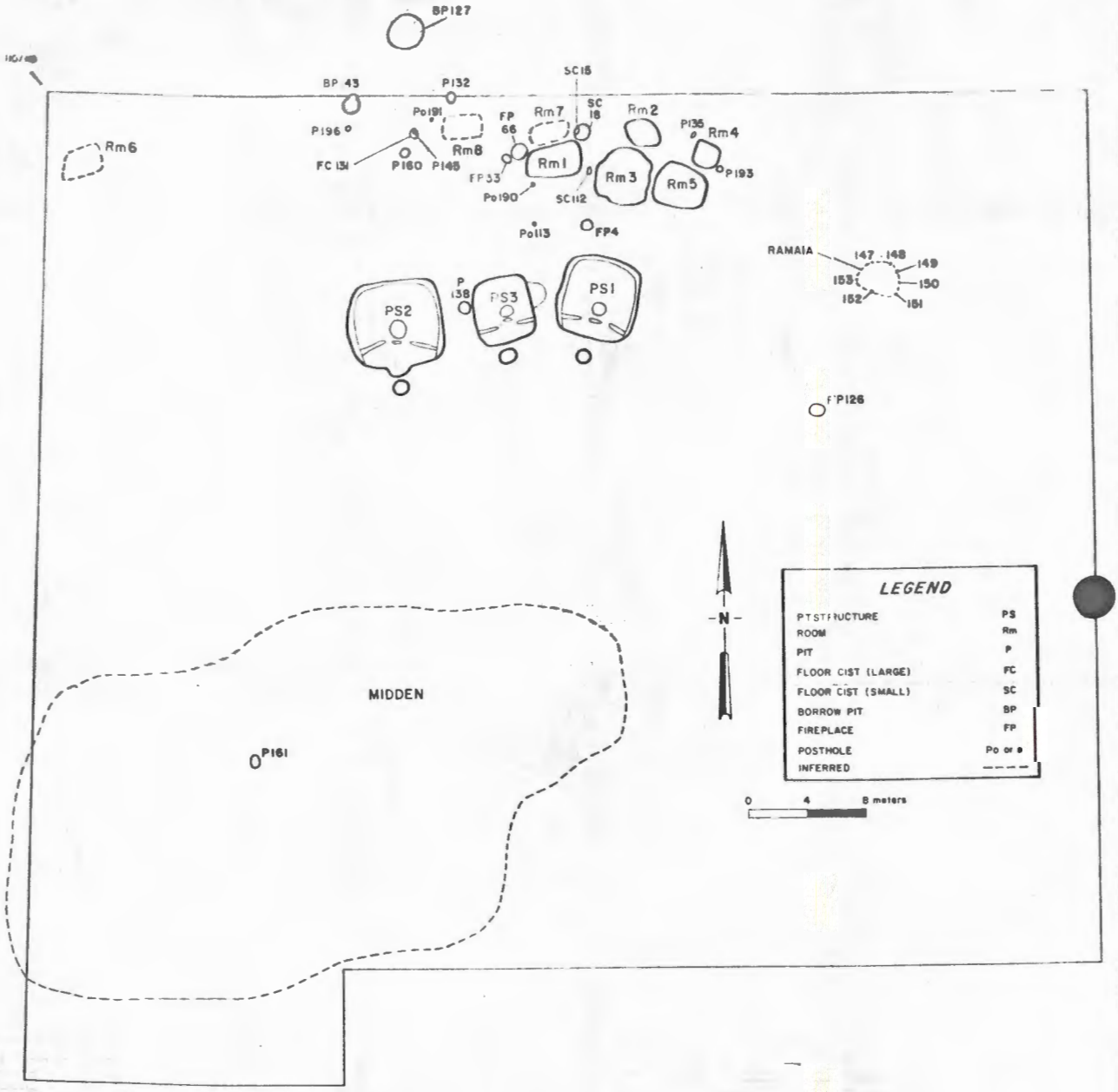


Figure 14. Spatial relationship of major cultural units, Windy Wheat hamlet.

kilograms per grid square. Concentrations of both materials appear to correspond to the location of the surface structures.

Figure 7 shows the surface distribution of burned clay. A light scatter of burned clay covers the northern portion of the grid. The greatest amount of burned clay occurs directly above and adjacent to the surface rooms. Excavation determined that all of the surface rooms were destroyed by fire; thus the burned clay scatter is interpreted to be structural debris from these burned rooms. A distinct absence of burned clay is noted in the southern half of the grid and especially in the midden.

Figure 8 shows that the entire site area is covered by a thin scatter of sandstone and that within this scatter are three concentrations of sandstone. The greatest amount of sandstone by weight is in the midden in the southwest quadrant of the grid. A relatively large amount of sandstone is in the area above and southeast of the surface rooms. The third concentration is 12 m west of the pitstructures, near Room 6. Subsurface excavations found that sandstone was used mainly to construct the lower walls of surface rooms and to line pits and hearths. Shaped sandstone slabs were also used as lids, covers, working surfaces, manos, and metates. The large amount of sandstone in the midden is assumed to be the discarded debris from construction work and from shaping tools. The sandstone concentration over the surface rooms probably represents the fallen and, subsequently, plow-disturbed walls of the rooms. The concentration of sandstone west of Pitstructure 2 is more difficult to interpret. Some of this debris may be associated with Room 6; the walls of this structure were completely obliterated by plowing. This debris may also be a reflection of some type of lithic activity area.

Ceramic distributions. The surface distribution of sherds is shown in figure 9. Outside of the midden area, the greatest number of sherds occurs directly over and between the major structural units. Two explanations for this relationship seem plausible. First, vessels may have been left behind in or near the surface rooms when the site was abandoned. Any vessels that may have been left in the rooms at Windy Wheat Hamlet were shallowly buried when the site was first plowed by modern farmers. Subsurface excavations have revealed plow-disturbed vessels in Rooms 1, 3, 4, and 5. The sherds from these plow-fragmented vessels would have been mixed into the plow zone, and perhaps some of the material gradually moved a few meters downslope from the rooms as the site was repeatedly plowed over the years. The second explanation offered is that vessels were primarily used in and around the structures. Vessel breakage was probably common in this area, and while most of the broken materials were disposed of in the midden, some sherds must have been pressed into the ground surface around the structures. These materials would have been turned up by plowing. Assuming these explanations to be valid, the surface distribution of sherds may reflect prehistoric activity areas that involved the use of pottery.

The numerous ceramic types present within the surface collections are divided into three groups (gray ware, white ware, and red ware) based on similarity of manufacture. The surface distribution of each ceramic type was plotted to check the possibility that types or even wares might be differentially distributed across the site.

Almost 90 percent of the sherds from the surface of Windy Wheat Hamlet are classified as Early Pueblo Gray (untypeable body sherds from gray ware vessels). Thus the gray ware surface distribution is essen-

tially identical to the distribution for the overall ceramic collection (fig. 9). The two types of Mesa Verde Gray Ware jars in the surface collection, Chapin Gray and Moccasin Gray, can only be identified by rim and neck sherds. The surface distributions for Chapin Gray and Moccasin Gray rim sherds both show clustering around the major structures and in the midden. It should be noted that only three Moccasin Gray sherds were found outside of the midden, and all three were just east of Room 5.

White ware is distinguished from gray ware by the presence of paint or polish. White ware generally occurs in the form of bowls, although a few white ware jar sherds are present in the surface collection. Like the gray ware distribution, the white ware sherds are concentrated in the midden and around the surface rooms. A light scatter of white ware covers the site except for the area west of the major structures.

The surface distribution of red ware is also similar to the gray ware distribution. The red ware occurs mainly in bowl form, although a few red ware seed jars also occur. Within the red ware category, two types are distinguished by a difference in paint material and design elements. Only a few of the red ware sherds in the surface collection displayed paint and, thus, could be typed as either Abajo Red-on-orange or Bluff Black-on-red. All of the Abajo Red-on-orange sherds outside of the midden area were concentrated in the area between the surface rooms and the pitstructures. The three Bluff Black-on-red sherds in the surface collection were found immediately south of Room 1.

Several sherds were classified as belonging to wares from outside the Mesa Verde region. These included sand-tempered gray ware sherds and one Mogollon Brown Smudged sherd. Three of these sherds were in the midden, while two clustered in the area between the surface rooms and the pitstructures.

Flaked lithic material distributions. Because the high surface densities of burned clay, sandstone, and ceramics seem to correlate with subsurface structural remains, it is assumed that high densities of lithic materials might also correlate with prehistoric activity areas. Flaked lithic debitage, utilized flakes, and other flaked lithic tools all have similar surface distributions (figs. 10, 11, and 12). Most of the flaked lithic materials are concentrated in the midden. Outside of the midden, the greatest numbers of flaked lithic items occur west, east, and southeast of the pitstructures in areas where excavation revealed no features or structures. This distribution pattern suggests that flaked lithic tools were primarily produced, used, and discarded in the open areas of the site, away from the structural units.

In figure 12, the flaked lithic tools (other than utilized flakes) found outside the midden are individually plotted according to morpho-use. Some of these general tool types have distributions that may be culturally significant, but interpretation of the distributions is difficult. These distributions are presented because they represent the only data available from the areas that were stripped of the plow zone. The morpho-use categories are described beginning with relatively unspecialized tools (cores) and ending with relatively specialized tools (thin bifaces and projectile points).

Seventy-five percent of all cores on the surface of Windy Wheat Hamlet are concentrated in the midden. The few that are outside of the midden are scattered around the periphery of the site and southeast of the pitstructures. Seventy-one percent of the cores in the midden and 77 percent of the cores outside of the midden show some type of wear to indicate use as tools after flakes were initially removed. Many of the

used cores show battering, which suggests that they were used as hammerstones. A distinct absence of used cores is noted around the surface rooms.

Utilized flakes represent 53 percent of the flaked lithic tools in the intensive surface collection. Because of their great numbers, these tools are plotted separately (fig. 11). Seventy percent of the utilized flakes are concentrated in the midden. Outside of the midden a thin scatter of utilized flakes covers the site. The area immediately surrounding the surface rooms averages one utilized flake per 4- by 4-m square. East and west of the pitstructures, two to three utilized flakes per square is typical. In the midden, the count ranges between 0 and 18 utilized flakes per grid square.

The surface distributions of thick bifaces and thick unifaces are discussed together because they represent a similar degree of technological input. Eighty percent of the items in each category are concentrated in the midden. Outside of the midden, thick bifaces and thick unifaces occur together 8 m northwest, east, and southeast of the pitstructures. In each of these groups and in the midden, two thick unifaces are present for each thick biface.

Fourteen notched flakes and nine possible gravers constitute the specialized flaked lithic tools in the surface collection. No drills were found on the surface of the site. The notched flakes consist of flakes of varying size and material with carefully worked, concave notches. Approximately half of the notched flakes were in a cluster in the midden, while the rest were widely scattered across the site. Four of the gravers came from the midden.

Of the 19 thin unifaces recovered by the intensive surface collection, only four were in the midden. The rest were thinly scattered above and east of the structural units. Blading and test pits west of the structures also revealed a few thin unifaces, indicating that thin unifaces are not restricted to the east side of the site as the surface distribution might indicate.

Four thin bifaces were collected from the surface of the site. Three were in the midden, and two of these were incomplete items. One complete thin biface was found above or adjacent to Rooms 4 and 5.

Of the six projectile points in the surface collection, only one fragmentary item was in the midden. Four of the five projectile points outside of the midden were complete items. Three of these complete points were found above or immediately south of the surface rooms. One complete item was within 8 m of Pitstructure 1, and an incomplete item was just south of this pitstructure.

The less specialized items, including cores, used cores, utilized flakes, thick unifaces, and thick bifaces, account for 88.6 percent of the flaked lithic tools in the surface collection. The more specialized items, including notched flakes, thin unifaces, thin bifaces, and projectile points, account for only 8.6 percent. Seventy-five percent of the less specialized tools are in the midden area, while only 44 percent of the more specialized tools are in this area. This indicates that relatively few of the more specialized tools were discarded and suggests that curation and reuse of these tools was common because their production requires a high input of time and energy.

The thick, less specialized tools and the utilized flakes are generally distributed west and southeast of the pitstructures; the thin,

more specialized flaked lithic tools are generally distributed north and northeast of the pitstructures; several appear to be associated with the surface rooms. The differential distribution of these two flaked lithic tool groupings probably reflects distinct activity areas, but specific activities cannot be confidently inferred from these surface distributions.

Nonflaked lithic tool distribution. Figure 13 shows the surface distribution of nonflaked lithic tools, including manos, hammerstones, hafted items, and minimally polished, abraded, or pecked cobbles (miscellaneous nonflaked lithic tools). Two-thirds of the nonflaked lithic tools are clustered in the midden; the remaining items are widely distributed across the rest of the site. Relatively few nonflaked lithic tools are above or near the surface rooms. No metates or metate fragments were collected on the surface. Local farmers may have removed all the metate fragments from the field. Alternatively, metates and mealing activities may have been located mainly in the pitstructures, which escaped disturbance by plowing.

Although no sandstone or gravel occurs naturally on the site, sandstone outcrops and cobble-bearing terrace deposits are easily accessible on adjacent ridgetops. Cobbles and sandstone slabs were both readily available, but sandstone slabs were preferred as construction material for structure walls and fireplace linings. Cobbles were used for construction only in the fill of postholes. It therefore seems likely that the unmodified river cobbles found in great numbers on the site must be tools, building materials, and/or raw materials for cobble tool production. Many of these items are inferred to be tools because of their presence in the midden: they were carried to the site for some purpose and were used and

then discarded, but show little or no wear. An examination of 80 unmodified or minimally altered items found that 12 percent showed discoloration possibly due to burning. However, because these items occurred in a disturbed context, their burning cannot be confidently ascribed to prehistoric activities. West of Pitstructure 2 is an apparent cluster of cobbles, minimally altered items, and hammerstones (fig. 13). Also in this area is a cluster of river cobble fragments that were assigned to the undifferentiated nonflaked lithic tool category. This clustering of unaltered and minimally altered river cobbles and cobble fragments suggests that cobble tool production may have been centered in the open area west of Pitstructure 2.

Magnetometer Results

Prior to the excavation of Windy Wheat Hamlet, a DAP magnetometer crew surveyed 2400 m^2 of the site. The location of the magnetometer grid is shown in figure 5. After the magnetometer data was processed, the excavation crew was supplied with a magnetic contour map and a list of magnetic anomalies that might have archaeological sources (appendix B). Of the 21 anomalies recommended for testing, 5 were directly investigated with excavation units, 9 were indirectly investigated when large strips of plow zone were removed by heavy equipment, and 7 were never investigated.

Magnetic Anomalies Investigated Through Excavation

Three out of the five anomalies that were tested with excavation units proved to be pitstructures. The other two could not be correlated with any specific cultural feature (appendix B). Pitstructures 1 and 2 were both destroyed by fire and both structures created dramatic anomalies (1a and 1b), which were immediately recognized and tested during the 1979

season. Pitstructure 3 was an unburned structure that created a strong, symmetrical anomaly (2e), but this anomaly appeared to be insignificant because it was sandwiched between the intense readings generated by Pitstructures 1 and 2, which were burned. Anomaly 2e was finally tested in 1980 and resulted in the surprise discovery of Pitstructure 3. The fourth anomaly (5d) was tested because it was to the north of the pitstructures in a likely location for a surface room. Excavations in this area revealed several pit features, none of which could be directly related to the anomaly; thus the magnetometer report was probably correct when it attributed anomaly 5d to a geologic feature.

The last anomaly tested (2a) fell within a randomly selected 2- by 2-m excavation unit, 122S/126E. Excavation revealed 20 cm of plow zone over sterile native soil. Thus, no archaeological source for anomaly 2a existed within this 2- by 2-m square. None of the other anomalies were dramatic enough to encourage specific testing.

Magnetic Anomalies Investigated by Blading

After excavation of Windy Wheat Hamlet was essentially complete, a grader stripped the plow zone from large areas surrounding the pitstructures in a search for outlying features and activity areas. Blading of the site removed the plow zone from 75 percent of the magnetometer survey area. This should have exposed the sources of nine anomalies that were recommended for testing, but no features that might correspond to the expected anomalies were recorded in the bladed area. Blading was generally well controlled, but a few features may have been destroyed where the blade cut too deep, or overlooked where the blade left a veneer of the plow zone. Most of the anomalies within the bladed area were

probably related to geologic features rather than to archaeological features that were destroyed or undetected.

Uninvestigated Anomalies

All seven uninvestigated anomalies were in the southwestern corner of the site in the midden area. Fifteen 2- by 2-m squares and one backhoe trench were excavated in the midden, but none was intentionally placed to investigate the anomalies. Two anomalies (4d and 4e) were fortuitously bordered by 2- by 2-m squares, and one anomaly (4f) was cross sectioned by the backhoe trench; however, no features or burned areas that might be linked to the magnetic anomalies were recorded in these excavation units.

Site map overlay. After the 1980 field season was completed, a site map showing all structures and features was overlaid on the magnetometer map to see which features had corresponding anomalies. The three pit-structures and four of the surface structures had corresponding anomalies, while small pit features and hearths generally did not create magnetic anomalies. Only one fireplace (Feature 33) seemed to have a corresponding anomaly. Although the magnetometer survey easily identified the two burned pitstructures by their large, intense magnetic displays, the surface room anomalies had low-intensity readings and were not identified or included on the list of anomalies recommended for testing. In contrast, numerous noncultural anomalies with low-intensity readings were suggested for testing by the magnetometer report. It is suggested that a refinement in magnetometer interpretation will be necessary in order to more accurately predict which low-intensity readings have archaeological sources.

Although the magnetometer survey was unsuccessful in locating features and surface rooms, it did identify the pitstructures, which were the

focal point of the site. This information alone made the magnetometer survey extremely valuable. The field crew was able to excavate the major structures immediately; without the magnetometer survey, valuable field days might have been spent searching for the structures.

INTENSIVE EXCAVATIONS

Architecture

This section of the report is essentially descriptive in nature and concerns all cultural features found at Windy Wheat Hamlet (fig. 14). First to be described are the pitstructures, followed by the rooms and then the possible ramada, the outdoor occupation area, and the midden.

These cultural units are described in numerical order regardless of temporal or spatial position. These units will be separated into temporal elements when they are viewed in a cultural framework (see "Site Synthesis" section).

Pitstructure 1

Dimensions:

North-south length (bench included):	5.23 m
East-west length (bench included):	5.47 m
Wall height:	1.58 m
Area of north room:	22.97 m^2
Area of south room:	5.63 m^2
Total roofed area:	28.60 m^2

Pitstructure 1 is essentially square with slightly rounded corners and sides. It is equipped with a ventilation system, a bench, a wingwall, and a four-post roof support system. Figures 15 and 16 are a plan map and architectural cross section of this structure. Pitstructure 1 was excavated into undisturbed native soil, and the resulting earth walls were smoothed and plastered.

Above the bench the walls curve inward, but the face of the bench is vertical. The wingwall divides the floor area of the structure into a

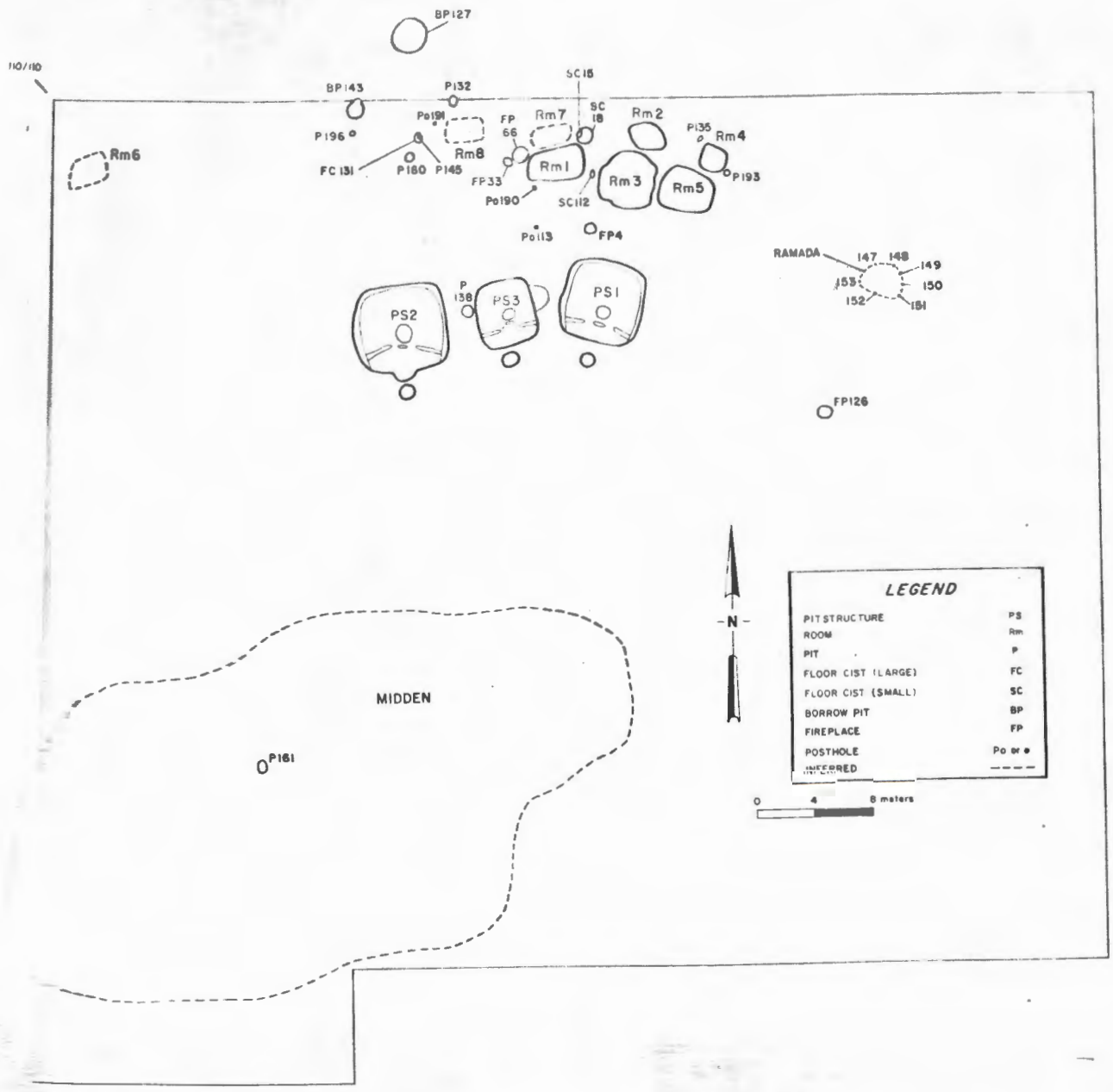


Figure 14. Spatial relationship of major cultural units, Windy Wheat Hamlet.

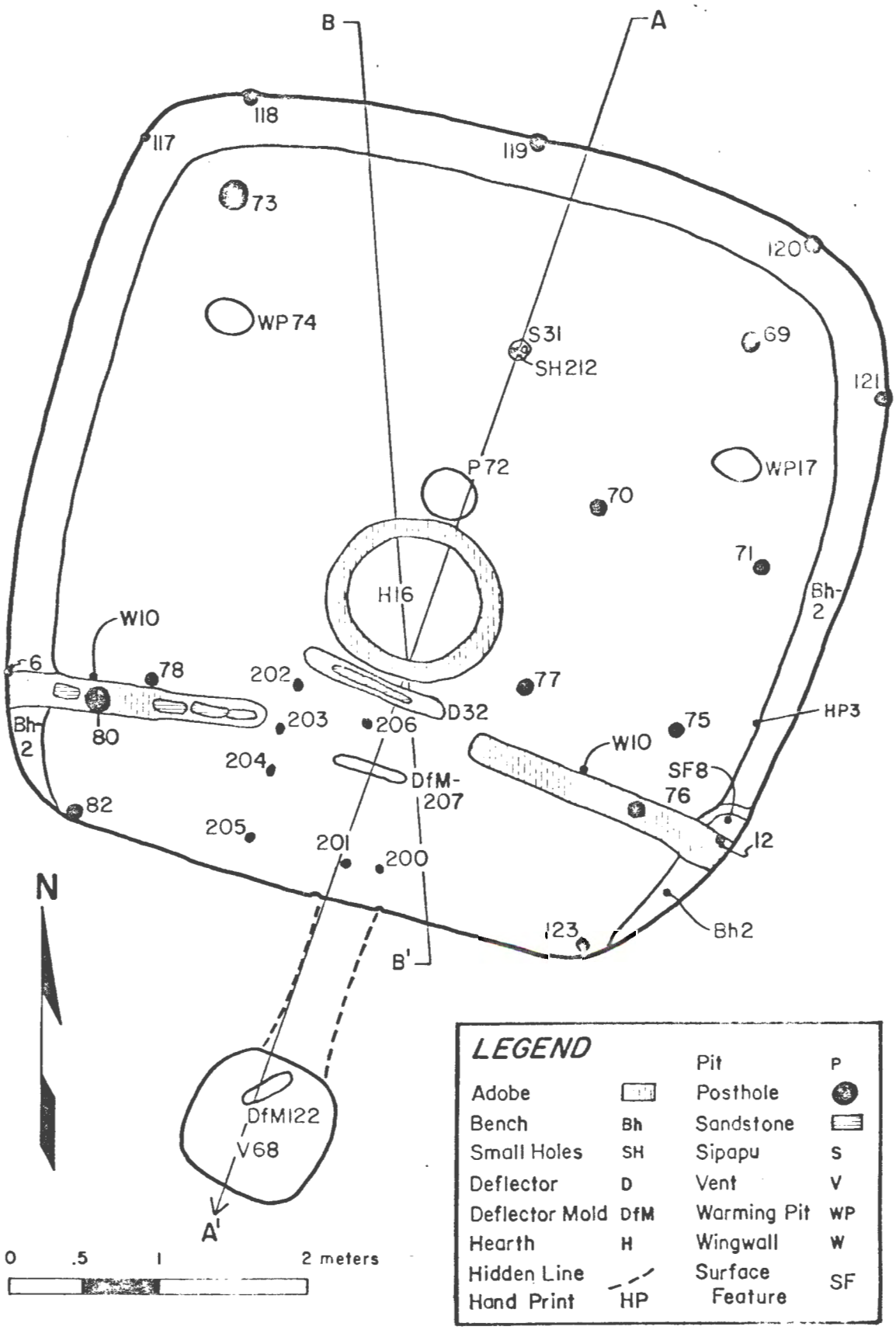


Figure 15. Plan map of Pitstructure 1, Windy Wheat Hamlet. Profiles A and B are shown in figures 16 and 17, respectively.

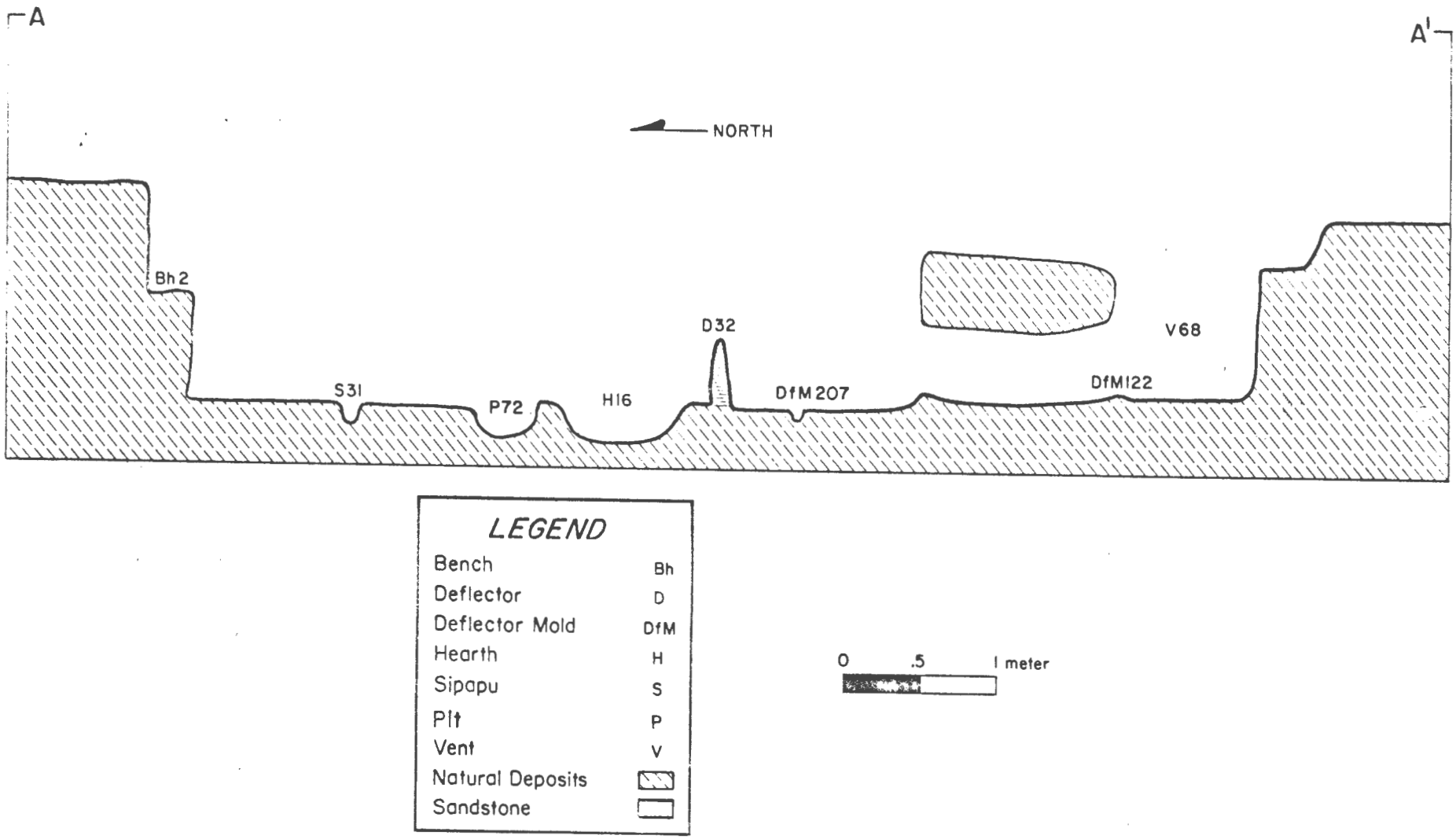


Figure 16. Architectural cross section of Pitstructure 1, Windy Wheat Hamlet. The profile location is shown in figure 15.

north room and a smaller south room. The ventilation tunnel enters the structure through the center of the south wall at floor level. The orientation of the entire structure is 13° east of magnetic north.

Stratigraphy

Seven strata were present within the Pitstructure 1 fill sequence (fig. 17). These strata will be described from bottom to top--following the sequence of deposition. Stratum 7 is composed of burned structural debris, including burned timbers, roof matting, and burned clay with impressions of poles and vegetal material. This material lies directly on the fire-blackened floor of Pitstructure 1 and has preserved the arrangement of the household items left behind in the burning structure. The roof fall was sampled intensively for pollen (appendix C) and bulk soil (appendix D) analysis to allow comparison with intensive sampling of the floor.

Strata 6 through 3 are layers of silty clay loam, silt loam, and loam interpreted as rapidly deposited wind- and water-laid sediments. These deposits were poorly defined where the north wall of the structure had slumped following the fire. Stratum 2 is a dark silt loam that was truncated by the plow zone, Stratum 1. The dark color of Stratum 2 is attributed to the lush vegetation that grew in the moist, pitstructure depression before the site was plowed.

Floor

The floor of Pitstructure 1 is fairly level except where it rises abruptly to meet the walls, the wingwall, and the central hearth. The floor of the south room (i.e., the area south of the wingwall) is 5 cm higher than the floor of the north room. A layer of fine white sand covered most of the northern half of the main chamber and was

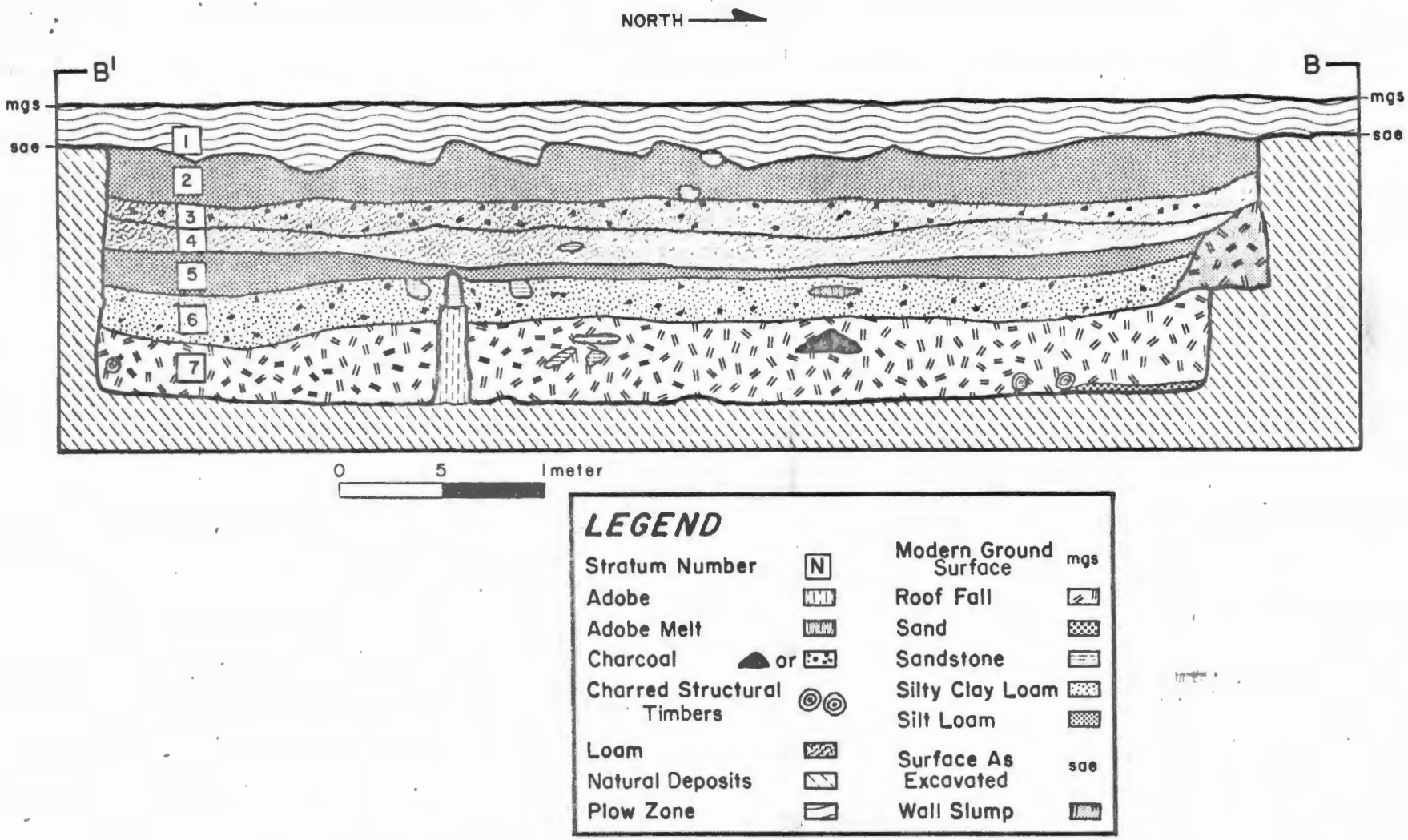


Figure 17. Stratigraphic profile of Pitstructure 1, Windy Wheat Hamlet. The profile location is shown in figure 15.

also found in an arc around the northern edge of the hearth. The layer of sand on the floor was 5 cm deep along the pitstructure walls but thinned toward the middle of the structure. A variety of artifacts rested on the sand floor. The entire floor surface was removed in pollen and bulk soil samples. The results of the analysis of these samples are presented in appendixes C and D.

Floor artifacts. Table 1 lists the 429 artifacts or artifact clusters that were found on the floor and on the bench in Pitstructure 1. Each artifact or artifact cluster was assigned an individual point location (PL) number. Figures 18 and 19 are plan maps of Pitstructure 1 showing the distribution of the point-located artifacts. Ceramics are mostly in the north room along the west and east walls, while most of the nonflaked lithic tools are in the south room. Clusters of flaked lithic items are in the northwest corner of the north room and in the east end of the south room.

Features

The features in Pitstructure 1 (fig. 15) are divided into three categories for descriptive purposes. These categories include major features, postholes, and small pits. The features are listed in table 2.

Major features. The ventilation system, the deflector (and several possible deflector remnants), the wingwall, the bench (and bench features), and the hearth are considered under this heading.

Ventilation system (Feature 68): The ventilation system consists of a vertical air shaft that joins the main chamber of the pitstructure by way of a horizontal tunnel. In profile, the vertical shaft is somewhat bell shaped with the widest diameter at the bottom.

Table 1. Point-located artifacts, Pitstructure 1, Windy Wheat Hamlet

PL No.	Material class	Item description
1	Flaked lithic	Debitage
2	Flaked lithic	Debitage
3	Flaked lithic	Debitage
4	Ceramic	DL Early Pueblo Gray jar sherds (6): vessel 35
5	Flaked lithic	Debitage
6	Vegetal	*Zea mays* kernels (2 g)
7	Ceramic	BL Early Pueblo Red bowl sherd
8	Ceramic	DL Early Pueblo Gray jar sherds (4): vessel 34
9	Ceramic	DL Early Pueblo Gray jar sherd: vessel 35
10	Vegetal	*Pinus ponderosa*, charred (14.8 g)
11	Ceramic	DL Early Pueblo Gray jar sherd: vessel 34
12	Nonhuman bone	Mammalia, large
13	Vegetal	*Zea mays* cob fragments (26)
		Zea mays cupule fragments (2)
		Zea mays kernels (2 g)
14	Flaked lithic	Debitage (2)
15	Flaked lithic	Debitage (2)
16	Flaked lithic	Debitage
17	Flaked lithic	Debitage
18	Nonflaked lithic	Not culturally modified
19	Nonflaked lithic	Curved-surface polishing stone
20	Ceramic	DL Early Pueblo Gray jar sherd: vessel 34
21	Flaked lithic	Debitage
22	Flaked lithic	Debitage
23	Nonhuman bone	Artiodactyla
24	Ceramic	DL Early Pueblo Gray jar sherd: vessel 34
25	Ceramic	DL Early Pueblo Gray jar sherd: vessel 34
26	Flaked lithic	Debitage
27	Ceramic	DL Early Pueblo Gray jar sherd: vessel 34
28	Ceramic	DL Early Pueblo Gray jar sherd: vessel 34
29	Flaked lithic	Debitage
30	Flaked lithic	Debitage
31	Ceramic	DL Chapin Gray jar sherd
32	Nonhuman bone	Mammalia, large (4)
33	Flaked lithic	Debitage
34	Flaked lithic	Debitage
35	Vegetal	*Populus* wood, charred (16.6 g)
36	Nonhuman bone	Mammalia, large--awl fragment
37	Flaked lithic	Debitage
38	Flaked lithic	Drill

NOTES: PL numbers not listed represent items later determined not to be associated with the floor. See figure 18 for artifact locations.

DL - Dolores Manufacturing Tract.
BL - Blanding Manufacturing Tract.
CA - Cahone Manufacturing Tract.
(N) - Number of items.
(g) - Weight of items.

Table 1. Point-located artifacts,
Pitstructure 1, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
39	Flaked lithic	Item misplaced
49	Flaked lithic	Debitage
50	Flaked lithic	Debitage
51	Vegetal	Indeterminate plant fiber: RV 7*
52	Nonflaked lithic	Not culturally modified
53	Nonflaked lithic	Not culturally modified
54	Flaked lithic	Debitage
55	Flaked lithic	Debitage
56	Flaked lithic	Debitage
57	Flaked lithic	Debitage
58	Flaked lithic	Debitage
59	Flaked lithic	Debitage
60	Flaked lithic	Debitage
61	Flaked lithic	Debitage
62	Flaked lithic	Debitage
63	Flaked lithic	Debitage
64	Flaked lithic	Debitage
65	Flaked lithic	Debitage
66	Flaked lithic	Debitage
67	Flaked lithic	Debitage
68	Flaked lithic	Debitage
69	Flaked lithic	Debitage
70	Flaked lithic	Debitage
71	Flaked lithic	Debitage
72	Flaked lithic	Debitage
73	Flaked lithic	Debitage
74	Flaked lithic	Debitage
75	Flaked lithic	Debitage
76	Flaked lithic	Debitage
77	Nonhuman bone	*Odocoileus hemionus*--awl
78	Vegetal	*Zea mays* kernels, charred (4.5 g)
		Zea mays cob, charred fragments (13)
79	Ceramic	BL Abajo Polychrome sherds (4): vessel 25
80	Ceramic	DL Chapin Gray jar sherds (2): vessel 38
		DL Early Pueblo Gray jar sherds (16): vessel 38
81	Ceramic	DL Early Pueblo Gray jar sherd
82	Ceramic	DL Early Pueblo Gray jar sherd: vessel 27
83	Ceramic	Item misplaced
84	Flaked lithic	Debitage
85	Flaked lithic	Debitage (2)
86	Nonflaked lithic	Shaped stone slab
87	Vegetal	*Pinus ponderosa* wood (2.9 g)
		Populus wood (2.9 g)
		Gymnosperm wood, charred (<1 g)
88	Vegetal	*Pinus ponderosa* wood, charred (9.7 g)
89	Nonhuman bone	*Odocoileus hemionus*
90	Nonflaked lithic	Not culturally modified

Table 1. Point-located artifacts,
Pitstructure 1, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
91	Nonhuman bone	*Odocoileus hemionus*
92	Nonhuman bone	*Odocoileus hemionus*--awl
93	Flaked lithic	Debitage
94	Vegetal	*Pinus ponderosa*, charred (12.4 g)
95	Vegetal	*Pinus ponderosa*, charred (9.7 g)
96	Flaked lithic	Debitage
97	Flaked lithic	Debitage
98	Flaked lithic	Debitage
99	Flaked lithic	Debitage
100	Nonhuman bone	Mammalia, large
101	Ceramic	BL Bluff Black-on-red bowl sherds (2): vessel 8
102	Nonflaked lithic	Two-hand mano
103	Ceramic	BL Bluff Black-on-red bowl sherd: vessel 8
104	Ceramic	DL Early Pueblo Gray jar sherds (2): vessel 32
105	Nonflaked lithic	Metate
106	Ceramic	DL Early Pueblo Gray jar sherd: vessel 32
107	Ceramic	BL Bluff Black-on-red bowl sherd: vessel 8
108	Ceramic	DL Chapin Gray jar sherd: vessel 28
		DL Early Pueblo Gray jar sherds (22): vessel 28
109	Ceramic	DL Early Pueblo Gray jar sherds (3)
110	Ceramic	DL Chapin Gray jar sherd: vessel 37
		DL Early Pueblo Gray jar sherds (5): vessel 37
111	Ceramic	DL Early Pueblo Gray jar sherd: vessel 13
112	Vegetal	*Phaseolus* seeds, charred (74)
		Cotyledons (128)
		Cotyledon fragments (134)
		Zea mays kernels (<1 g)
113	Ceramic	DL Early Pueblo Gray jar sherds (14): vessel 33
114	Flaked lithic	Debitage (4)
115	Ceramic	BL Bluff Black-on-red bowl sherds (2): vessel 8
116	Ceramic	BL Bluff Black-on-red bowl sherd: vessel 8
117	Ceramic	BL Bluff Black-on-red bowl sherds (7): vessel 8
118	Ceramic	BL Bluff Black-on-red bowl sherd: vessel 8
119	Flaked lithic	Debitage
120	Vegetal	*Zea mays* kernel (1.5 g)
		Zea mays ear fragment
		Zea mays cob fragments (4)
		Zea mays cupule fragments (11)
		Pinus sp. (<1 g)
121	Flaked lithic	Debitage
122	Ceramic	DL Chapin Gray jar sherd: vessel 13
123	Ceramic	BL Bluff Black-on-red bowl sherds (6): vessel 8
124	Ceramic	DL Chapin Gray jar sherds (6): vessel 13
125	Ceramic	DL Chapin Gray jar sherd: vessel 13
126	Ceramic	BL Bluff Black-on-red bowl sherds (2): vessel 8
127	Ceramic	DL Chapin Gray jar sherd
128	Ceramic	DL Early Pueblo Gray jar sherd
129	Ceramic	DL Early Pueblo Gray jar sherd

Table 1. Point-located artifacts,
Pitstructure 1, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
130	Nonflaked lithic	Not culturally modified
131	Ceramic	DL Chapin Gray jar sherds (26): vessel 13
132	Ceramic	BL Bluff Black-on-red bowl sherds (2): vessel 8
133	Ceramic	DL Chapin Gray jar sherds (6): vessel 13
134	Ceramic	DL Chapin Gray jar sherd: vessel 13
135	Ceramic	Item misplaced
136	Ceramic	BL Bluff Black-on-red bowl sherd: vessel 8
137	Ceramic	DL Chapin Gray jar sherds (2): vessel 13
138	Ceramic	BL Bluff Black-on-red bowl sherds (2): vessel 8
139	Flaked lithic	Debitage
140	Flaked lithic	Debitage
141	Ceramic	BL Bluff Black-on-red bowl sherds (2): vessel 8
142	Flaked lithic	Debitage
143	Ceramic	BL Bluff Black-on-red bowl sherds (2): vessel 8
144	Ceramic	BL Bluff Black-on-red bowl sherd: vessel 8
145	Ceramic	DL Early Pueblo Gray jar sherd
146	Ceramic	BL Bluff Black-on-red bowl sherds (3): vessel 8
147	Ceramic	BL Bluff Black-on-red bowl sherd: vessel 8
148	Ceramic	BL Bluff Black-on-red bowl sherd: vessel 8
149	Ceramic	BL Bluff Black-on-red bowl sherd: vessel 8
150	Vegetal	*Zea mays* kernels, charred (<1 g)
		Phaseolus sp. seed
		Phaseolus sp. cotyledon, whole (4); fragments (18)
151	Flaked lithic	Debitage
152	Ceramic	DL Early Pueblo Gray jar sherd: vessel 27
153	Ceramic	BL Bluff Black-on-red bowl sherds (4): vessel 8
154	Flaked lithic	Debitage
155	Flaked lithic	Debitage
156	Flaked lithic	Debitage
157	Ceramic	BL Early Pueblo Red bowl sherd
158	Flaked lithic	Debitage
159	Ceramic	DL Early Pueblo Gray jar sherd: vessel 27
160	Ceramic	BL Bluff Black-on-red bowl sherd: vessel 8
161	Flaked lithic	Debitage
162	Ceramic	DL Early Pueblo Red bowl sherd
163	Ceramic	DL Early Pueblo Gray jar sherd: vessel 27
164	Ceramic	DL Early Pueblo Gray jar sherd: vessel 27
165	Ceramic	DL Early Pueblo Gray jar sherd: vessel 27
166	Flaked lithic	Debitage
167	Ceramic	BL Bluff Black-on-red bowl sherd: vessel 8
168	Nonflaked lithic	Not culturally modified
169	Ceramic	DL Early Pueblo Gray jar sherds (3)
170	Nonhuman bone	Mammalia, large (11)
		Mammalia, large--unidentifiable worked item
171	Nonhuman bone	Mammalia, large--awl†
172	Nonhuman bone	Mammalia, large--awl†
173	Nonhuman bone	Mammalia, large--unidentifiable worked item

Table 1. Point-located artifacts,
Pitstructure 1, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
174	Nonhuman bone	Mammalia, large--fragmentary awl
175	Nonhuman bone	Artiodactyla
176	Nonhuman bone	Mammalia, large--fragmentary awl
177	Nonhuman bone	Mammalia, large--awl†
178	Nonhuman bone	Mammalia, large (5)
179	Nonhuman bone	Cervidae
180	Nonhuman bone	Artiodactyla
		Cervidae
181	Nonhuman bone	Mammalia, large
182	Flaked lithic	Debitage
183	Ceramic	DL Early Pueblo Gray jar sherd: vessel 27
		DL Chapin Gray jar sherds (3): vessel 27
184	Ceramic	DL Chapin Gray jar sherd: vessel 27
		DL Early Pueblo Gray jar sherds (18): vessel 27
185	Nonhuman bone	Mammalia, large--unidentifiable worked item
186	Flaked lithic	Debitage
187	Ceramic	DL Chapin Gray jar sherds (3): vessel 28
		DL Early Pueblo Gray jar sherds (2)
188	Flaked lithic	Debitage
189	Ceramic	DL Early Pueblo Gray jar sherd: vessel 27
190	Nonhuman bone	Mammalia, small (3)
191	Flaked lithic	Debitage
192	Nonflaked lithic	Hammerstone
193	Ceramic	DL Early Pueblo Gray jar sherds (22): vessel 10
		BL Bluff Black-on-red bowl sherds (6): vessel 4
		DL Early Pueblo Gray jar sherd: vessel 34
		BL Bluff Black-on-red bowl sherd: vessel 8
		DL Early Pueblo Gray jar sherds (17): vessel 9
194	Ceramic	DL Early Pueblo Gray jar sherd: vessel 40
		DL Early Pueblo Gray jar sherds (2): vessel 31
195	Ceramic	DL Early Pueblo Gray jar sherds (10): vessel 41
		BL Abajo Red-on-orange bowl sherds (4): vessel 3
		DL Early Pueblo Gray jar sherds (5): vessel 39
196	Flaked lithic	Debitage (4)
197	Vegetal	*Populus* sp. wood, charred (49.1 g)
198	Flaked lithic	Debitage
199	Flaked lithic	Debitage
200	Flaked lithic	Debitage (3)
201	Flaked lithic	Debitage
202	Ceramic	DL Early Pueblo Gray jar sherd: vessel 31
203	Flaked lithic	Unused core
204	Ceramic	DL Early Pueblo Gray jar sherds (2): vessel 31
205	Flaked lithic	Debitage (7)

Table 1. Point-located artifacts,
Pitstructure 1, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
206	Flaked lithic	Debitage
207	Nonflaked lithic	Not culturally modified
208	Flaked lithic	Debitage
209	Flaked lithic	Unused core
210	Nonflaked lithic	Hammerstone
211	Flaked lithic	Debitage
212	Ceramic	BL Early Pueblo Red bowl sherd: vessel 8
213	Flaked lithic	Debitage (4)
214	Ceramic	BL Abajo Red-on-orange bowl sherds (6): vessel 3
		CA Chapin Gray jar sherds (7): vessel 1
		CA Early Pueblo Gray jar sherds (71): vessel 1
		DL Chapin Gray jar sherd: vessel 7
		DL Early Pueblo Gray jar sherds (14): vessel 31
215	Flaked lithic	Debitage
216	Nonflaked lithic	Not culturally modified
217	Flaked lithic	Debitage
218	Flaked lithic	Debitage
219	Flaked lithic	Debitage
220	Ceramic	DL Early Pueblo Gray jar sherds (4): vessel 7
221	Ceramic	CA Chapin Gray jar sherds (3): vessel 1
222	Ceramic	DL Early Pueblo Gray jar sherds (3): vessel 7
223	Ceramic	DL Chapin Gray jar sherds (8): vessel 7
		DL Early Pueblo Gray jar sherds (2): vessel 26
		CA Early Pueblo Gray jar sherds (3): vessel 1
224	Flaked lithic	Debitage
225	Flaked lithic	Debitage
226	Flaked lithic	Debitage (31)
227	Flaked lithic	Item misplaced
228	Nonhuman bone	*Erethizon dorsatum*
229	Vegetal	*Zea mays* kernels, charred (9.8 g)
230	Nonhuman bone	Mammalia, large (4)
231	Flaked lithic	Debitage
232	Flaked lithic	Debitage
233	Flaked lithic	Debitage
234	Flaked lithic	Debitage
235	Flaked lithic	Debitage
236	Nonflaked lithic	Metate
237	Flaked lithic	Debitage (2)
238	Flaked lithic	Debitage (2)
239	Ceramic	DL Early Pueblo Gray jar sherds (10): vessel 5
		DL Early Pueblo Gray jar sherds (23): vessel 6
		DL Chapin Gray jar sherds (6): vessel 7
		DL Early Pueblo Gray jar sherds (63): vessel 7
		DL Early Pueblo Gray jar sherds (4): vessel 39
		DL Early Pueblo Gray jar sherds (5): vessel 42
		DL Early Pueblo Gray jar sherds (7): vessel 26

Table 1. Point-located artifacts,
Pitstructure 1, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
240	Flaked lithic	Debitage (not mapped)
241	Ceramic	DL Early Pueblo Gray jar sherds (2)
		DL Early Pueblo Gray jar sherds (6): vessel 39
		BL Abajo Red-on-orange bowl sherd: vessel 3
242	Vegetal	Indeterminate plant fiber: RV 2*
243	Nonflaked lithic	Shaped stone slab
244	Ceramic	Item misplaced
245	Nonhuman bone	Cervidae
246	Vegetal	*Yucca* sp. leaf fiber: RV 3*
247	Ceramic	DL Early Pueblo Gray jar sherds (17): vessel 27
248	Ceramic	DL Chapin Gray jar sherds (3): vessel 27
		DL Early Pueblo Gray jar sherds (6): vessel 27
249	Flaked lithic	Debitage
250	Ceramic	DL Early Pueblo Gray jar sherds (5)
251	Ceramic	DL Early Pueblo Gray jar sherd: vessel 27
252	Flaked lithic	Debitage (2)
253	Flaked lithic	Debitage
254	Flaked lithic	Debitage
255	Flaked lithic	Debitage
256	Flaked lithic	Debitage
257	Ceramic	BL Bluff Black-on-red bowl sherd: vessel 8
258	Nonhuman bone	Mammalia, large (3)
		Erethizon dorsatum (2)
259	Nonhuman bone	Mammalia, medium (4)
260	Ceramic	DL Early Pueblo Gray jar sherds (2): vessel 27
261	Ceramic	DL Early Pueblo Gray jar sherds (4): vessel 27
262	Ceramic	DL Early Pueblo Gray jar sherds (2): vessel 27
263	Ceramic	DL Early Pueblo Gray jar sherd: vessel 5
264	Ceramic	DL Early Pueblo Gray jar sherds (2): vessel 39
		DL Early Pueblo Gray jar sherds (2): vessel 9
		DL Early Pueblo Gray jar sherds (3): vessel 31
265	Nonflaked lithic	Minimally altered item
266	Flaked lithic	Debitage
267	Flaked lithic	Debitage
268	Flaked lithic	Debitage (2)
269	Flaked lithic	Debitage
270	Ceramic	BL Abajo Red-on-orange bowl sherd: vessel 3
271	Ceramic	DL Early Pueblo Gray duck effigy: vessel 2
272	Ceramic	Item misplaced
273	Ceramic	Item misplaced
274	Ceramic	DL Chapin Gray seed jar sherds (39): vessel 10
		DL Early Pueblo Gray jar sherd: vessel 9
275	Ceramic	DL Early Pueblo Gray jar sherds (6): vessel 9
		DL Early Pueblo Gray jar sherds (4): vessel 10
		DL Early Pueblo Gray jar sherds (4)
		DL Early Pueblo Gray jar sherds (8): vessel 26
276	Flaked lithic	Debitage

Table 1. Point-located artifacts,
Pitstructure 1, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
277	Flaked lithic	Debitage (2)
278	Ceramic	DL Early Pueblo Gray jar sherds (2)
279	Flaked lithic	Debitage
280	Flaked lithic	Debitage
281	Flaked lithic	Debitage
282	Flaked lithic	Debitage
283	Ceramic	DL Early Pueblo Gray jar sherd: vessel 27
284	Ceramic	DL Early Pueblo Gray jar sherds (2): vessel 27
285	Ceramic	DL Early Pueblo Gray jar sherds (2): vessel 27
286	Ceramic	DL Early Pueblo Gray jar sherd: vessel 34
		DL Early Pueblo Gray jar sherds (10): vessel 9
287	Flaked lithic	Debitage (2)
288	Flaked lithic	Debitage (2)
289	Ceramic	BL Bluff Black-on-red bowl sherds (3): vessel 11
290	Ceramic	DL Early Pueblo Gray jar sherds (2): vessel 34
291	Nonhuman bone	Lepus californicus (11)
		Mammalia, small (30)
292	Flaked lithic	Debitage
293	Flaked lithic	Used core
294	Flaked lithic	Used core
295	Nonflaked lithic	Not culturally modified
296	Nonflaked lithic	Trough metate fragment
297	Flaked lithic	Utilized flake
298	Flaked lithic	Debitage
299	Flaked lithic	Debitage
300	Flaked lithic	Debitage
301	Ceramic	DL Early Pueblo Gray jar sherd: vessel 27
302	Flaked lithic	Debitage
303	Flaked lithic	Debitage (5)
304	Flaked lithic	Debitage
305	Ceramic	BL Abajo Red-on-orange bowl sherds (5): vessel 11
306	Nonhuman bone	Mammalia, small (9)
		Lepus californicus
307	Flaked lithic	Debitage (2)
308	Ceramic	DL Early Pueblo Gray jar sherds (3): vessel 9
309	Ceramic	DL Early Pueblo Gray jar sherds (5): vessel 10
		DL Early Pueblo Gray jar sherd: vessel 9
310	Flaked lithic	Debitage (2)
311	Ceramic	DL Early Pueblo Gray jar sherds (3): vessel 9
312	Flaked lithic	Debitage
313	Flaked lithic	Debitage
314	Ceramic	BL Abajo Red-on-orange bowl sherds (2): vessel 11
315	Ceramic	DL Chapin Gray jar sherds (6): vessel 9
		DL Early Pueblo Gray jar sherds (4): vessel 9

Table 1. Point-located artifacts,
Pitstructure 1, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
316	Flaked lithic	Debitage
317	Flaked lithic	Debitage
318	Flaked lithic	Debitage
319	Flaked lithic	Debitage
320	Flaked lithic	Debitage
321	Nonhuman bone	Artiodactyla
322	Nonhuman bone	*Odocoileus hemionus*
323	Ceramic	BL Abajo Red-on-orange bowl sherds (2): vessel 11
324	Flaked lithic	Debitage
325	Flaked lithic	Debitage
326	Flaked lithic	Debitage
327	Flaked lithic	Debitage
328	Nonflaked lithic	Hammerstone
329	Flaked lithic	Cobble tool
330	Flaked lithic	Used core
332	Flaked lithic	Used core
333	Nonflaked lithic	Curved-surface abrading stone
334	Nonflaked lithic	One-hand mano
335	Nonflaked lithic	Shaped stone slab
336	Nonflaked lithic	Two-hand mano
337	Flaked lithic	Used core
338	Flaked lithic	Debitage
339	Nonflaked lithic	Two-hand mano
340	Flaked lithic	Used core
341	Ceramic	BL Early Pueblo Red bowl sherd: vessel 8
342	Nonflaked lithic	Minimally altered item
343	Flaked lithic	Debitage
344	Vegetal	*Pinus edulis* seed
345	Vegetal	Salicaceae wood, charred (14.7 g)
346	Flaked lithic	Used core
347	Flaked lithic	Debitage Used core
348	Nonflaked lithic	Trough metate
349	Nonflaked lithic	Trough metate
350	Ceramic	BL Abajo Red-on-orange bowl sherds (2): vessel 11
351	Nonhuman bone	*Lynx rufus*
352	Flaked lithic	Debitage (4)
353	Ceramic	DL Early Pueblo Gray jar sherd: vessel 34
354	Flaked lithic	Debitage
355	Flaked lithic	Debitage
356	Flaked lithic	Debitage (2)
357	Flaked lithic	Debitage
358	Ceramic	DL Early Pueblo Gray jar sherds (3): vessel 26
359	Ceramic	DL Early Pueblo Gray jar sherds (3): vessel 29
360	Nonhuman bone	Mammalia, large
361	Vegetal	*Yucca* sp. leaf fiber: RV 8*
362	Vegetal	*Salix* sp. wood (1 g) Indeterminate fiber: RV 8*

Table 1. Point-located artifacts,
Pitstructure 1, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
363	Ceramic	DL Early Pueblo Gray jar sherds (6): vessel 31
364	Ceramic	DL Early Pueblo Gray jar sherds (2): vessel 31
365	Flaked lithic	Debitage
366	Flaked lithic	Thick biface
367	Flaked lithic	Unused core
368	Flaked lithic	Debitage
369	Flaked lithic	Debitage
370	Nonhuman bone	*Lepus californicus*
371	Flaked lithic	Debitage (30)
372	Ceramic	DL Early Pueblo Gray jar sherds (11): vessel 10
373	Flaked lithic	Debitage
374	Nonflaked lithic	Not culturally modified
375	Flaked lithic	Debitage
376	Nonflaked lithic	Not culturally modified
377	Flaked lithic	Debitage
378	Flaked lithic	Debitage
379	Flaked lithic	Debitage
380	Nonflaked lithic	Mano
381	Nonflaked lithic	Mano
382	Nonflaked lithic	Not culturally modified
383	Flaked lithic	Debitage
384	Flaked lithic	Debitage
385	Flaked lithic	Used core
386	Flaked lithic	Debitage
387	Flaked lithic	Thick uniface
		Debitage (8)
388	Flaked lithic	Debitage
389	Vegetal	*Populus* spp., wood, charred (<1 g)
		Indeterminate fiber, charred: RV 9*
390	Vegetal	Indeterminate fiber, charred: RV 9*
		Rosaceae wood, charred (<1 g)
391	Flaked lithic	Debitage
392	Flaked lithic	Debitage
393	Flaked lithic	Cobble tool
394	Flaked lithic	Thick biface
395	Flaked lithic	Debitage
396	Flaked lithic	Debitage
397	Flaked lithic	Debitage
398	Flaked lithic	Debitage
399	Flaked lithic	Cobble tool
400	Flaked lithic	Debitage
401	Nonflaked lithic	Hammerstone
402	Nonflaked lithic	Not culturally modified
403	Nonflaked lithic	Not culturally modified
404	Nonflaked lithic	Not culturally modified
405	Flaked lithic	Debitage
406	Flaked lithic	Debitage

Table 1. Point-located artifacts,
Pitstructure 1, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
407	Flaked lithic	Debitage
408	Flaked lithic	Debitage
409	Nonflaked lithic	Not culturally modified
410	Nonflaked lithic	Not culturally modified
411	Nonflaked lithic	Not culturally modified
412	Nonflaked lithic	Not culturally modified
413	Nonflaked lithic	Shaped stone slab
414	Flaked lithic	Debitage (4)
415	Flaked lithic	Unused core
		Debitage (7)
416	Flaked lithic	Used core
417	Flaked lithic	Used core
418	Flaked lithic	Debitage (2)
419	Flaked lithic	Debitage
420	Flaked lithic	Debitage
421	Flaked lithic	Debitage
422	Flaked lithic	Debitage
423	Flaked lithic	Debitage
424	Flaked lithic	Used core
425	Flaked lithic	Thick biface
426	Flaked lithic	Unused core
427	Nonflaked lithic	Not culturally modified
428	Nonflaked lithic	Hammerstone
429	Flaked lithic	Thick uniface
430	Flaked lithic	Unused core
431	Flaked lithic	Debitage (8)
432	Ceramic	DL Early Pueblo Gray jar sherd
433	Ceramic	DL Early Pueblo Gray jar sherd
434	Ceramic	DL Early Pueblo Gray jar sherds (4): vessel 30
435	Ceramic	DL Early Pueblo Gray jar sherd
436	Ceramic	DL Early Pueblo Gray jar sherd
437	Nonflaked lithic	Hatch cover (not collected)
438	Nonhuman bone	Mammalia, large (not mapped)
439	Nonhuman bone	Mammalia, large (not mapped)

* RV numbers are assigned to worked vegetal materials on a site-wide basis.

† These items are all part of a single awl.

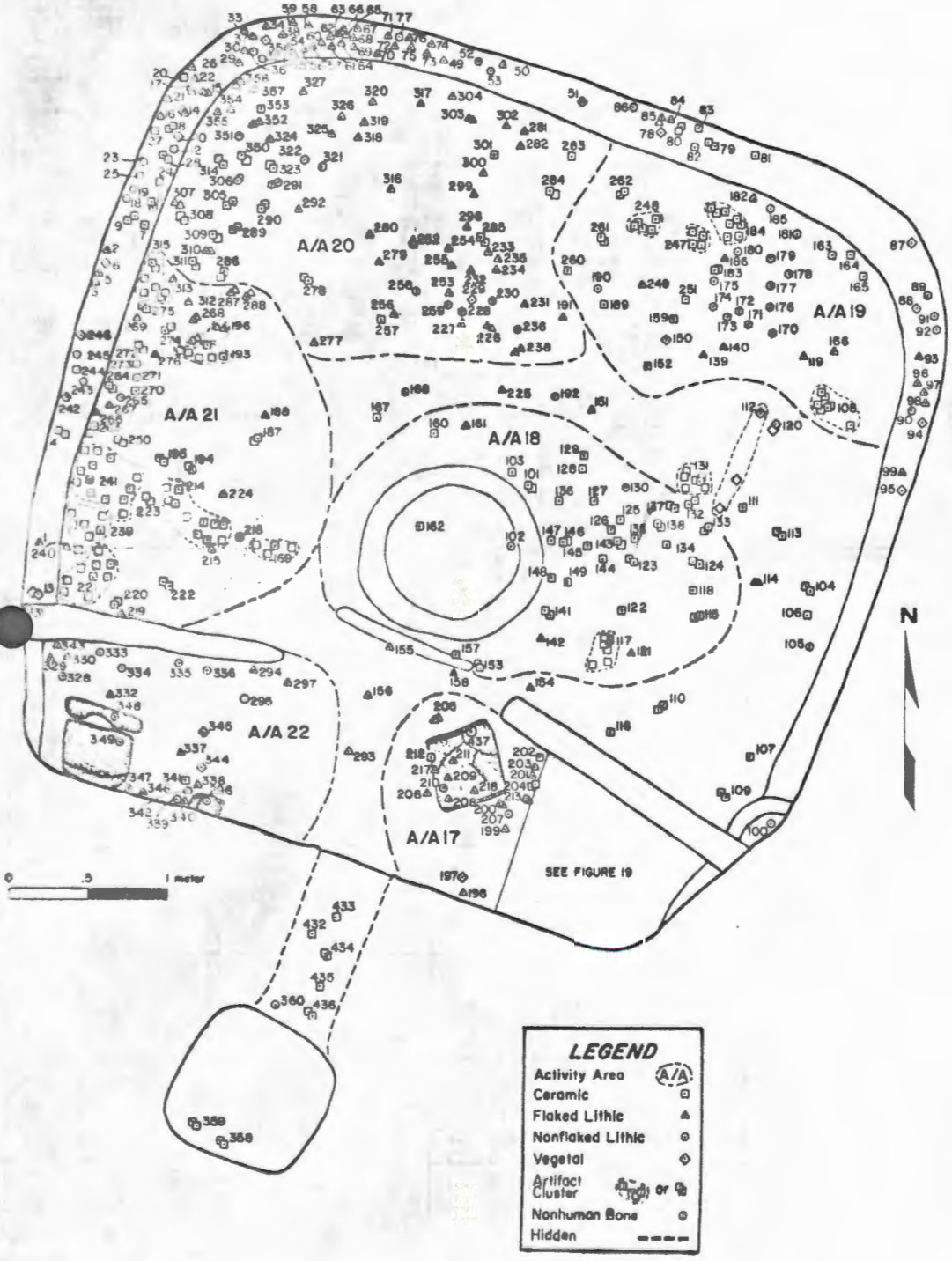


Figure 18. Map of point-located artifacts and activity areas, Pitstructure 1, Windy Wheat Hamlet.

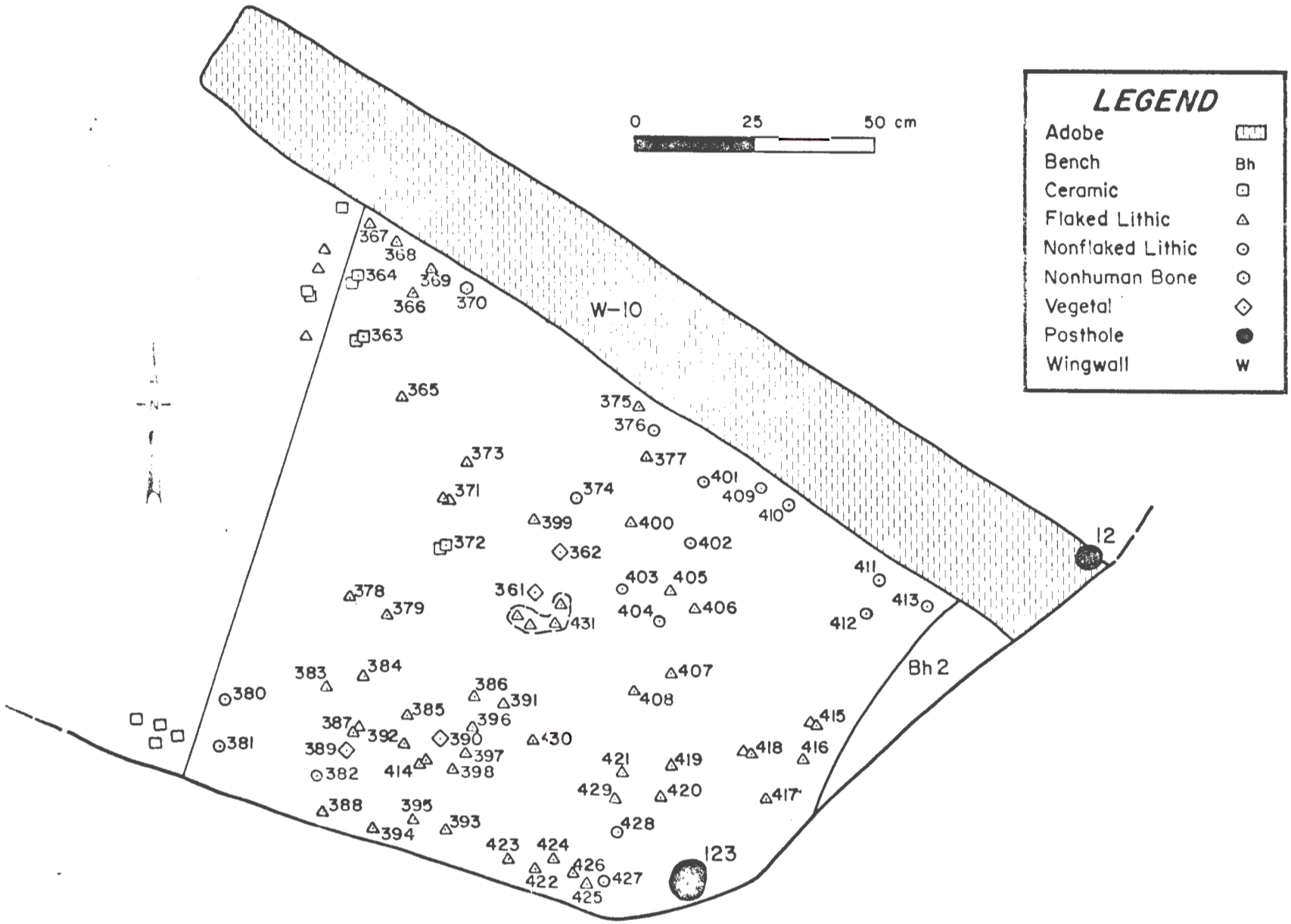


Figure 19. Map of point-located artifacts behind the east wingwall of Pitstructure 1, Windy Wheat Hamlet.

Table 2. Feature summary, Pitstructure 1, Windy Wheat Hamlet

Feature No.	Type	Plan	Profile	Length (cm)	Width (cm)	Depth/ height (cm)
2	Bench	C-shaped	Rectangular	1,250.0	25.0	70.0
3	Hand impression on bench face	n.a.	n.a.	13.5	10.5	5.0
6	Posthole	Round	Cylindrical	7.0	7.0	30.0
8	Surface feature	n.a.	Bell	27.0	25.0	9.0
10	Wingwall	Rectangular	Rectangular	549.0	22.0	48.5
12	Posthole	Round	Cylindrical	7.5	7.0	30.0
16	Hearth	Round	Basin	110.0	110.0	22.0
17	Warming pit	Oval	Basin	32.0	24.0	13.0
31	Sipapu	Round	Complex	12.0	12.0	18.0
32	Deflector	Rectangular	Cylindrical	52.0	43.0	13.0
68	Ventilation system					
	ventilator shaft	Complex	Complex	98.0	99.0	140.0
	ventilator tunnel	Complex	Complex	120.0	40.0	50.0
69	Posthole	Round	Cylindrical	17.0	17.0	49.0
70	Posthole	Round	Cylindrical	10.0	10.0	18.0
71	Posthole	Round	Cylindrical	10.0	10.0	17.0
72	Unburned pit	Round	Bell	38.0	35.0	21.0
73	Posthole	Round	Cylindrical	19.0	18.0	54.0
74	Warming pit	Round	Basin	30.0	22.0	10.0
75	Posthole	Round	Cylindrical	7.0	7.0	15.0
76	Posthole	Round	Cylindrical	13.0	13.0	...
77	Posthole	Round	Cylindrical	10.0	10.0	16.0
78	Posthole	Round	Cylindrical	7.0	7.0	6.0
80	Posthole	Round	Cylindrical	14.0	14.0	93.0
82	Posthole	Round	Cylindrical	11.0	11.0	60.0
117	Posthole	Round	Cylindrical	7.0	7.0	43.0
118	Posthole	Round	Cylindrical	8.0	8.0	48.0
119	Posthole	Round	Cylindrical	9.0	9.0	24.0
120	Posthole	Round	Cylindrical	8.0	8.0	36.0
121	Posthole	Round	Cylindrical	8.0	8.0	34.0
122	Deflector mold	Oval	Basin	30.0	10.0	8.0
123	Posthole	Round	Cylindrical	12.0	12.0	100.0
200	Posthole	Round	Cylindrical	8.0	8.0	9.0
201	Posthole	Round	Cylindrical	8.0	8.0	9.0
202	Posthole	Round	Cylindrical	8.0	8.0	9.0
203	Posthole	Round	Cylindrical	8.0	8.0	9.0
204	Posthole	Round	Cylindrical	8.0	8.0	9.0
205	Posthole	Round	Cylindrical	8.0	8.0	9.0
206	Posthole	Round	Cylindrical	8.0	8.0	9.0
207	Deflector mold	Oval	Basin	...	...	...
212	Cluster of small holes	Round	Irregular	2.0	2.0	12.0

NOTES: See figure 15 for feature locations.

... - Information not available.
n.a. - Not applicable.

The ventilator shaft fill contains burned structural debris and sandstone slabs, while the ventilator tunnel contains little roof fall debris. This indicates that the ventilator shaft was roofed in some manner using beams and some sandstone slabs. A mud collar was applied to the south wall of the pitstructure around the vent opening. This applied collar was apparently used to hold a stone cover when it was desirable to partially or completely block the tunnel opening.

Deflector and deflector molds (Features 32, 122, 207): Feature 32 is a large slab set in a vertical position directly south of the hearth and slightly north of the space between the two portions of the wingwall. To help support the slab, the base was set into a floor groove and mud was pressed around the base. A thick coat of adobe was then applied to both the west and east sides of the slab and a thinner coat applied to the front and back.

A floor groove (Feature 122) was found within the vent at the point where the vertical shaft meets the horizontal tunnel. This possible deflector mold is set perpendicular to the tunnel. Lying nearby is a shaped stone slab of the same length as the floor groove. This stone could have been set into the floor groove to restrict air flow through the ventilator tunnel. Feature 207 is another possible deflector mold located just south of Feature 32.

Wingwall (Feature 10): Two stub walls extend inward from the west and east walls of the pitstructure. The skeleton of each wall is composed of a vertical row of upright slabs set into individual floor grooves and mudded into place. The slabs then were covered with a 5-cm-thick coat of adobe, which was leveled off at the tops of the slabs. A layer of pure adobe added another 25 cm of height. The wingwalls slope upward from a

height of 48 cm at the interior ends to a height of 90 cm where they join the pitstructure walls above the top of the bench. After the walls were constructed, a final layer of plaster was smoothed onto the entire surface. A 1.40 m gap between the two halves of the wingwall allowed access between the main chamber and the small south room.

Bench (Feature 2) and a bench surface feature (Feature 8): The bench, or banquette, extends along all but the south wall. The bench was constructed as part of the initial excavation. A raised rim of adobe was applied to the interior edge of the bench for its entire length. The whole construction was then covered with a smoothed coat of adobe plaster. A complete handprint (Feature 3) was found impressed into this plastered face. A small feature (Feature 8) constructed of adobe was built on the bench surface north of the east wingwall.

Hearth (Feature 16): The hearth is just south of center in Pitstructure 1 and is directly north of the deflector (Feature 32). The hearth is roughly circular in plan and is basin shaped. Around the edge of the hearth, an adobe rim 3 cm high and 12 cm wide forms a raised lip on the pitstructure floor.

The hearth has an unusual fill sequence. The stratigraphy shows that the entire basin became filled with layers of gray ash and sand and that a 50-cm-diameter, 17-cm-deep basin was dug into the ashes. This small, intrusive pit is filled with a homogeneous, compact, bright orange silty clay. This bright orange deposit seems out of place in the hearth because it appears to be an intentional seal or plug. It is possible, however, that the intrusive pit was excavated in preparation for building a new fire and that the orange plug is roof fall material that filled the freshly excavated basin.

The east half of the hearth fill was trowel excavated as a single unit. Artifacts recovered include a two-hand mano (PL 102) on the surface of the fill, a red ware bowl sherd from a vessel that was found just east of the hearth, one small flake, one unmodified nonflaked lithic item, and one unidentified mammal bone. The west half of the hearth was excavated in stratigraphic units, but no artifacts were recovered; however, a 1-L bulk soil sample from the upper level of ash contained four flaked lithic items and five nonhuman bones, and a bulk soil sample from the lower ash contained flaked lithic materials.

Postholes. The superstructure of Pitstructure 1 was supported by 13 vertical posts as indicated by the presence of 13 support postholes, many with the charred wood still in place. Seven of these (Features 6, 12, 117, 118, 119, 120, and 121), found on the bench top, are postholes for vertical auxiliary leaner posts. These seven auxiliary postholes average 8 cm in diameter and are set partially into the wall at the back of the bench. These posts are excavated an average of 35 cm into the surface of the bench. Two other auxiliary postholes (Features 82 and 123) are on the floor in the southwest and southeast corners below the ends of the bench.

The four main support postholes are Features 69, 73, 76, and 80; they average 15 cm in diameter and 67 cm in depth. Features 69 and 73 are in the north end of the pitstructure while Features 76 and 80 are incorporated into the wingwalls at the south end of the structure. At the bottom of all of these main support postholes was a flat stone or stones laid horizontally for added support of the post. Once the posts were set into place, a mixture of sand, ash, and small pebbles was packed around the posts to stabilize them.

Seven other postholes (Features 202, 203, 204, 205, 206 and 78) are found near the wingwall. These small postholes average 8 cm in width and 9 cm in depth. Features 202, 203, 204, and 205 extend in a north-south line from the west edge of the deflector to the south wall of the pit-structure. It is felt that these small holes are all that remains of a wattle-and-daub wall that enclosed a bin behind the west wingwall. The posts seem to have been removed before the structure burned.

Feature 206 may have been part of the deflector system. It was filled with a charcoal-flecked burned sand.

Feature 78 is located north of the west wingwall. Although traces of a post were found in the north, east, and west edges, this feature is too shallow to have held a support post. The fill consisted of a red-brown sandy loam. What this feature was used for is uncertain.

Features 200 and 201 are located 30 cm in front of the mouth of the ventilator tunnel. These small postholes are 8 cm wide, 9 cm deep, and 25 cm apart in an east-west line. They may represent the sides of a brush or jacal deflector that was in use before the more permanent slab arrangement (Feature 32) was installed.

Four additional small postholes (Features 70, 71, 75, and 77) are located east of the hearth and are arranged in a square pattern measuring 1 m on a side. Each posthole was filled with clean sand that contained a few pieces of flaked lithic debitage.

Pits.

Warming pit (Feature 17): The long axis of this floor pit runs east-west. The fill consists of two lenses of tan sand. The upper lens is a lighter color and less compact than the lower lens. This feature is basin shaped and is located 2.3 m northeast of the middle of the central hearth. This feature tentatively has been called a warming

pit. However, it also could have been designated a pot rest. Either interpretation is very tentative.

Warming pit (Feature 74): Feature 74 lies 2.2 m northwest of the center of the hearth and on the opposite side of the pitstructure from a similar feature (Feature 17). The long axis of Feature 74 runs east-west. This basin-shaped pit is filled with a single layer of sand. Like Feature 17, this feature could have been a warming pit or a pot rest.

Unburned pit (Feature 72): Feature 72 is 20 cm north of the north edge of the hearth and 5 cm from the raised rim of the hearth. The feature is somewhat bell shaped and is circular in plan view. The upper 16 cm of fill is roof fall, indicating that the feature was open when the structure burned. The lower 5 cm of fill was clean tan sand.

Feature 72 may have been used as a sand repository. In most pitstructures excavated in the project area thus far, a pit is found directly north of the hearth. This feature is usually called an ash pit because these holes occasionally contain ash and other cultural trash. For example, at Site 5MT2854 (Kuckelman 1983) Feature 48 (an ash pit) in Pitstructure 2 contained ash, flaked lithic debitage, bones, and ceramic sherds. However, because this feature at Site 5MT2854 was sealed with an adobe cap flush with the floor surface, the contents may not represent the fill that was in this feature during its use. Thus, the use of these features as ash pits has not been conclusively proven. Another possibility is that these features served as sand repositories. Most hearths excavated in the project area thus far contain layers of sand mixed with ash. The feature type in question has been observed to contain sand. It is therefore felt that this pit may have served to hold sand that would be used in association with the hearth. This feature type might be expected

to contain varying depths of sand because the level of sand would vary according to how much of the stockpile had been used in the hearth. In Feature 72, only 5 cm of tan sand remained in the feature while a large amount was found in the hearth fill. The fill above the 5 cm of sand was roof fall, indicating that the feature contained no additional fill when the structure burned. On the other hand, Feature 51 in Pitstructure 2 was filled to the top with sand and the stratified fill of the hearth showed little sand but considerable ash. It therefore does seem possible that this feature type was used as a sand repository where sand was stockpiled and used in conjunction with the hearth.

Sipapu (Feature 31): This feature is round but the side walls become irregular and taper as depth increases. The sand fill is almost white at the top and becomes reddish brown toward the bottom. This feature contains small, sand-filled, intrusive holes (Feature 212), which are interpreted to be prayer stick or paho marks. Because the concept of identifiable prayer stick marks is new, a detailed discussion is presented in the interpretations section for Pitstructure 1. The sipapu itself is located 1.80 m north and slightly east of the center of the hearth.

Patterns observed. The arrangement of the major floor features in Pitstructure 1 has bilateral symmetry. The hearth, the possible sand repository (Feature 72), and the sipapu are bisected by the north-south axis of the structure. The postholes and warming pits are divided between the west and east halves of the structure, and the positions of the features are balanced. This same pattern is quite common in project area pitstructures when just the main floor features are considered. The pattern usually breaks down if the smaller features are considered.

Interpretations

Chronology. Unfortunately, although many tree-ring samples were removed from Pitstructure 1, only two samples were datable. These two pieces of timber gave dates of A.D. 787v and A.D. 793vv.[2] It would seem that the most probable construction date for this structure was very near to A.D. 800.

Roof construction. An unusual aspect of the architecture of Pitstructure 1 is the absence of angled postholes on the surface of the bench. Instead of 30 to 50 postholes, which would indicate the presence of sidewall leaner posts, seven vertical postholes are partly set into the wall of Pitstructure 1 at the rear edge of the bench. These postholes do not represent leaner posts, but they do represent the location of secondary vertical support posts. Two other secondary support postholes are present in Pitstructure 1 and functioned in association with the seven located on the bench. One of these postholes (Feature 82) is located just off the southwestern end of the bench and the other (Feature 123) is just off the southeastern end of the bench. These nine secondary support postholes coupled with the four main support postholes gave Pitstructure 1 a roof supported by 13 posts instead of the customary 4. This is an unusual arrangement. The leaners, or side wall posts, therefore, had to rest on the prehistoric ground surface around the periphery of the structure. The schematic illustration in figure 20 shows the standard form of roof construction when a bench is present, and the style of roof construction

---

[2]According to the Laboratory of Tree-Ring Research, University of Arizona, Tucson, the symbol v indicates a subjective judgment that, although there is no direct evidence of the true outside on the specimen, the date is within a very few years of being a cutting date. The vv symbol indicates that there is no way of estimating how far the last ring is from the true outside.

2 page 64

Interpretations

Chronology. Unfortunately, although many tree-ring samples were removed from Pitstructure 1, only two samples were datable. These two pieces of timber gave dates of A.D. 787v and A.D. 793vv.[2] It would seem that the most probable construction date for this structure was very near to A.D. 800.

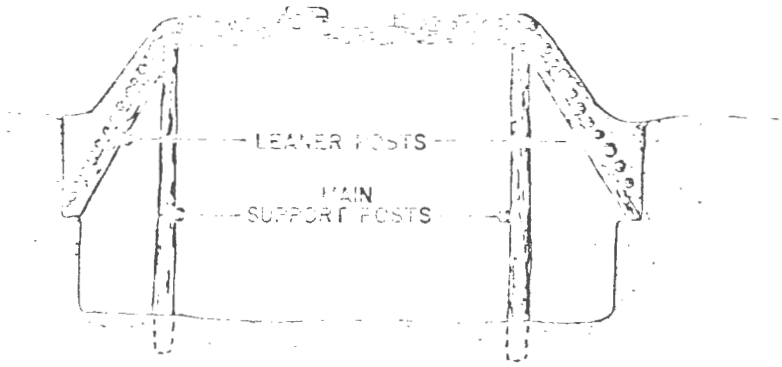
Roof construction. An unusual aspect of the architecture of Pitstructure 1 is the absence of angled postholes on the surface of the bench. Instead of 30 to 50 postholes, which would indicate the presence of sidewall leaner posts, seven vertical postholes are partly set into the wall of Pitstructure 1 at the rear edge of the bench. These postholes do not represent leaner posts, but they do represent the location of secondary vertical support posts. Two other secondary support postholes are present in Pitstructure 1 and functioned in association with the seven located on the bench. One of these postholes (Feature 82) is located just off the southwestern end of the bench and the other (Feature 123) is just off the southeastern end of the bench. These nine secondary support postholes coupled with the four main support postholes gave Pitstructure 1 a roof supported by 13 posts instead of the customary 4. This is an unusual arrangement. The leaners, or side wall posts, therefore, had to rest on the prehistoric ground surface around the periphery of the structure. The schematic illustration in figure 20 shows the standard form of roof construction when a bench is present, and the style of roof construction

---

[2]According to the Laboratory of Tree-Ring Research, University of Arizona, Tucson, the symbol v indicates a subjective judgment that, although there is no direct evidence of the true outside on the specimen, the date is within a very few years of being a cutting date. The vv symbol indicates that there is no way of estimating how far the last ring is from the true outside.

2 page 64/5

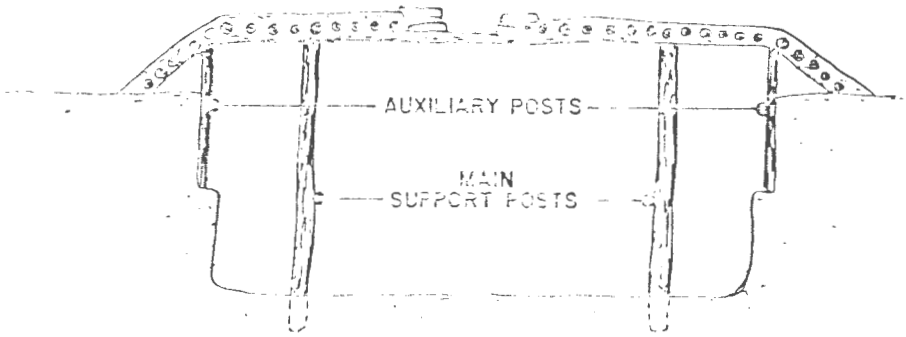
PITSTRUCTURE 2



TYPICAL CONSTRUCTION

NORTH

PITSTRUCTURE 1



CONSTRUCTION USING AUXILIARY SUPPORT POSTS

Figure 20. Schematic illustration of roof construction of Pitstructures 1 and 2, Windy Wheat Hamlet.

used by the builders of Pitstructure 1. The burned remains of the roof indicate that the pole framework was covered with willows, reeds, and brush. This layer in turn was covered with a thick coating of mud.

Remodeling. Some minor remodeling seems to have taken place in Pitstructure 1 in the area south of the wingwall. Evidence for this was present in the form of seven small postholes and one deflector mold. Two of the small postholes (Features 200 and 201) were found on an east-west line in front of the vent opening. These features could have supported a portable stone or a more permanent jacal wind screen but were apparently no longer in use at the time of abandonment. North of these holes was a deflector mold (Feature 207) that was not in use prior to abandonment and was filled with trash. This mold may have contained a fixed deflector slab used in conjunction with the windscreen located a few centimeters in front of the ventilator opening. When the now present deflector (Feature 32) was installed, this air control system was abandoned. The north-south alinement of the other four postholes (Features 202, 203, 204, and 205) suggests that at one time a wall may have segregated the area behind the west wingwall into a bin or some form of enclosed space. The alinement of these postholes is shown in figure 15.

Activity areas. At the time of its destruction, Pitstructure 1 seems to have been occupied. A large quantity of everyday household goods were left in situ this structure. This presented the opportunity to define activity areas within the structure. Activity area numbers were assigned on a site-wide basis.

Activity Area 17 is a storage area located behind the eastern wingwall in the southeast corner of the structure. A large quantity of materials, particularly lithic tools, were found here. The items found in this

FL & NFL

area include 2 hammerstones, 2 manos, 1 shaped slab, 8 cores, 3 thick bifaces, 2 unifacial tools, 83 pieces of debitage, 1 left innominate from a jackrabbit, and the carbonized remains of 2 pieces of twined vegetal material (RV 8 and 9; see appendix E). Also present were several sherds of a large gray ware jar (vessel 31), other sherds of which were found along the west wall. Due to the catastrophic abandonment of the pitstructure, it is belived that these materials are indeed in a use-association with this area. The amount of material would preclude any activities other than storage for the simple reason that the materials left little room in which to maneuver.

Activity Area 18 is defined based on the presence of the central hearth. This hearth (Feature 16) is interpreted to have been used for cooking, heating, and lighting. West of the hearth is a Bluff Black-on-red bowl (vessel 8) that may have been associated with the hearth activity before the structure was destroyed by fire.

Activity Area 19 is located in the northeast corner of the structure around the main support post (Feature 69). Only five items define this area. Three bone awls, a large Chapin Gray jar (vessel 22), and a small Chapin Gray jar (vessel 28) were on the floor around the support post. One more bone awl was located on the bench surface above these items. The number of awls in this area may indicate that basketmaking or weaving occurred here.

Activity Area 20 is located in the northwest corner of Pitstructure 1. The items located on the bench surface are considered to be part of this activity area. The large number of small flakes without cortex or striking platforms suggests that flaked lithic tool maintenance was the major activity in this area. There were 120 pieces of flaked lithic

debitage in this area; 37 were on the bench and 83 on the floor. The only tool was a drill on the bench surface. A number of animal bone fragments and two bone awls (PL's 36 and 77) were also in this area. The remaining bone fragments are mostly from large game animals with smaller mammals such as porcupine and jackrabbit also represented. All the bones from the large mammals represent parts of the lower legs. These long bone fragments may indicate that another activity (e.g., bone tool production) took place in this area. Ceramics in this area consisted of one-half of a Bluff Black-on-red bowl (vessel 11) and two large gray ware sherds (vessels 34 and 36); the latter were both possible saucers located on the bench.

Activity Area 21 is located west of the hearth and north of the west wingwall. Storage of ceramic vessels seems to have been the main use of this area. Sixteen vessels or parts of vessels were clustered in this area when the structure burned. Two large complete Chapin Gray jars were present (vessels 1 and 7) along with a partial Chapin Gray jar (vessel 9) and half of a gray ware jar with a broken and reshaped rim (vessel 39). Also found were an unusual Chapin Gray double seed jar (vessel 10) with burned traces of a cord at the constriction between the upper and lower portions (fig. 21). Vessel 2, a small gray ware bird effigy (fig. 21), was found against the wall. One whole Bluff Black-on-red bowl (vessel 4) was found near the bird effigy, and one-half of an Abajo Red-on-orange bowl (vessel 3) was reconstructed from sherds found closer to the wingwall. In addition to these whole or partial vessels, eight large gray ware sherds were present on the floor or the bench in this area of the pitstructure (vessels 5, 6, 26, 31, 35, 40, 41, and 42). These sherds represent portions of at least six different gray ware

Figure 21. Vessels from Pitstructure 1, Windy Wheat Hamlet. Top, duck effigy (vessel 2); bottom, double seed jar (vessel 10) (DAP 140004).

vessels; their original forms are not reconstructible. All of the sherds are large enough to have been functional as makeshift saucers or bowls. Other items in this storage area included 1 antler fragment and 26 pieces of flaked lithic debitage.

Activity Area 23 is the sipapu and the small holes within its fill, which are interpreted to be evidence of ritual activity. This interpretation is based on the identification of the small holes as paho or prayer stick marks (Parsons 1974). The prayer stick concept comes from ethnographic data on the Hopi. To date, these small holes have been documented in 11 pitstructures in the DAP area.

Groupings of small holes were first documented at Windy Wheat Hamlet in Pitstructures 1, 2, and 3. This new feature type was described as tightly grouped, sometimes overlapped, sand-filled holes located in and around the sipapu. The grouping of small holes shown in figure 22 typifies this feature type. Because of their location, shape, and project-wide occurrence, these small holes have been interpreted as the marks left in the floor and/or sipapu fill when prayer sticks or plume holders have been removed after some sort of ritual observance.

In Pitstructures 1, 2, and 3 at Windy Wheat Hamlet these small holes range from 1 to 4 cm in diameter with a mean diameter of 2 cm. In depth they range from 3 to 12 cm. In profile there are two basic types--cone shaped, and cylindrical with concave bottoms.

At Windy Wheat Hamlet, these holes only occur in or immediately around the sipapu. However, another arrangement does occur in the project area at Sites 5MT23, 5MT4475, and 5MT4477. Pitstructures at these three sites contain a unique floor feature not found in other smaller struc-

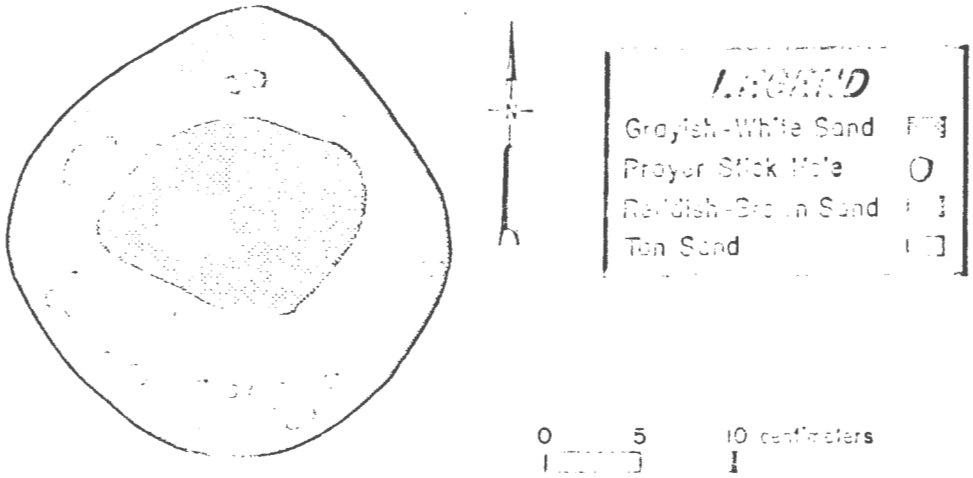
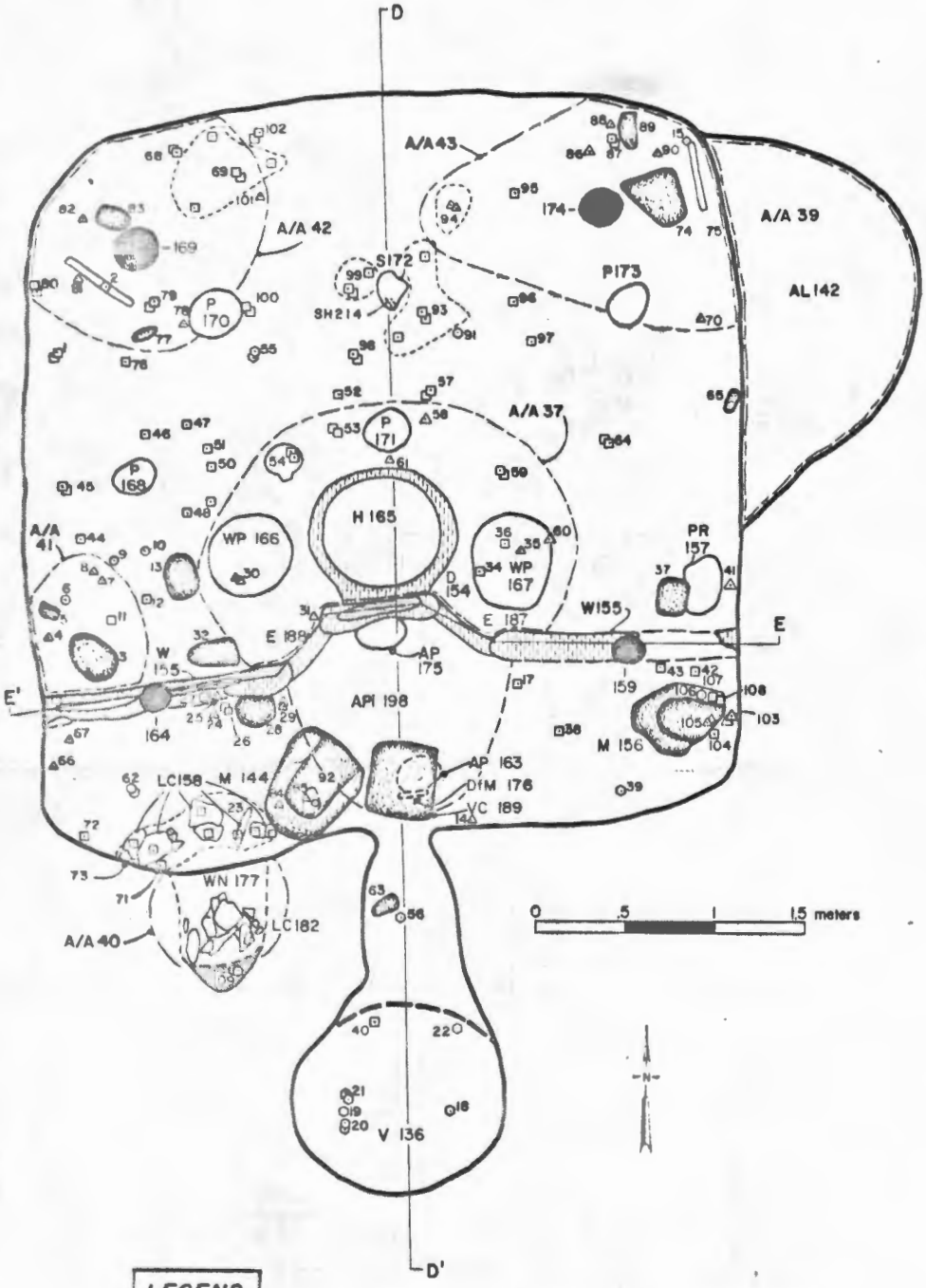


Figure 22. Typical sipapu with paho marks. (From Feature 48, Pitstructure 2, Windy Wheat Hamlet.)



LEGEND

Adobe		Hearth	H	Wall Niche	WN
Sandstone		Lithic Concentration	LC	Warming Pit	WP
Activity Area	(A/A)	Metate	M	Wingwall	W
Alcove	AL	Pit	P	Artifact Cluster	or
Ash Pit	AP	Posthole		Ceramic	
Ash Pile	APi	Pot Rest	PR	Flaked Lithic	
Deflector	D	Sipapu		Nonflaked Lithic	or
Deflector Mold	Dfm	Vegetal		Nonhuman Bone	
Entry	E	Vent	V	Rodent Disturbance	
Small Holes	SH	Vent Cover	VC	Hidden	
				Inferred	

Figure 33. Plan map of Pitstructure 3, Windy Wheat Hamlet. The architectural cross section and the stratigraphic profile along line D are shown in figures 34 and 36, respectively.

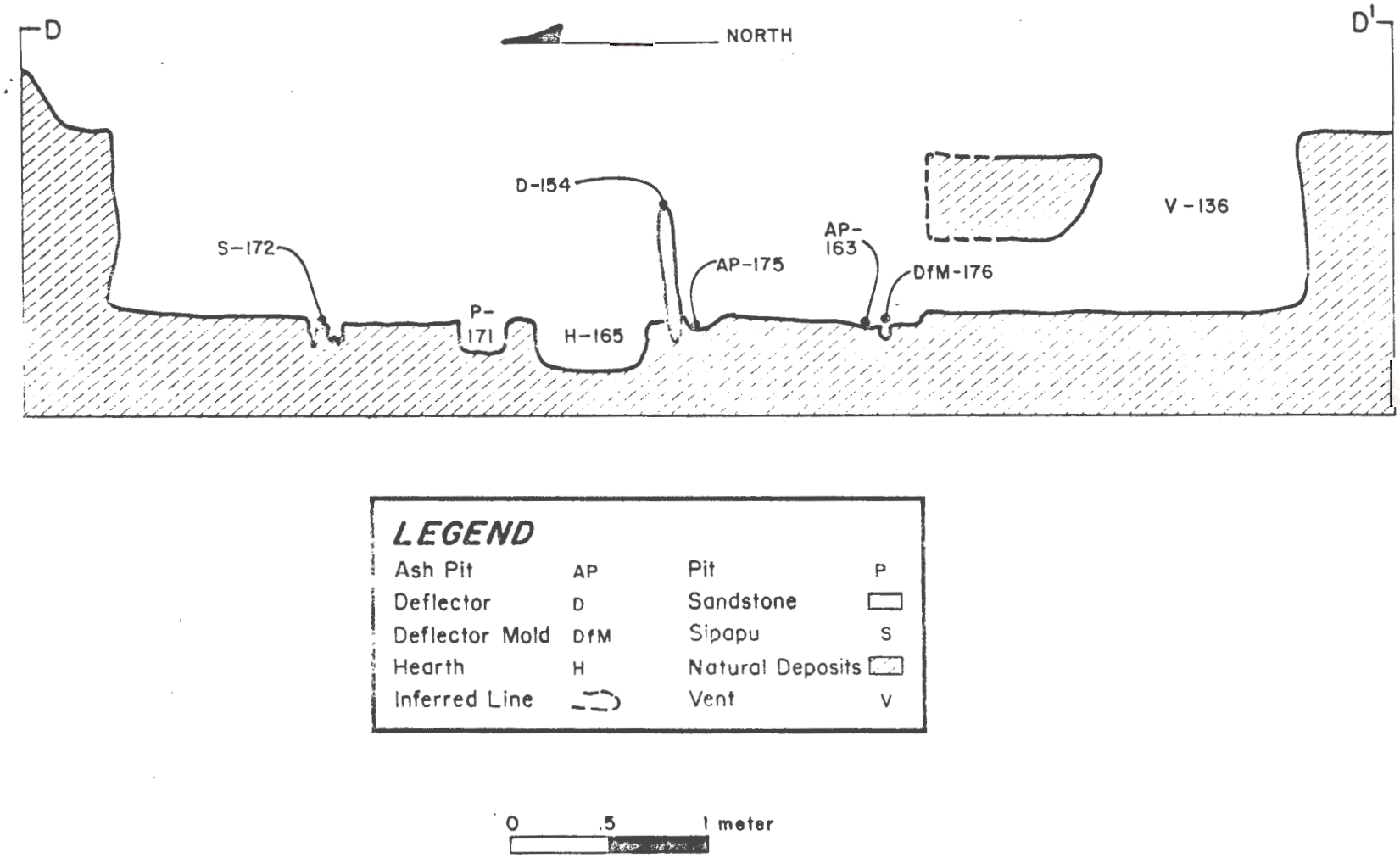


Figure 34. Architectural cross section of Pitstructure 3, Windy Wheat Hamlet. The location of the cross section is shown in figure 33.

tures. This feature consists of a large rectangular or squarish pit (termed a ceremonial vault) located immediately north of the central hearth. The size of this pit varies according to the size of the pit-structure. The evidence at the time of this writing indicates that these subfloor structures were roofed flush with the floor surfaces. Around these large pits, prayer stick/paho marks have been found. They occur in clusters on the west, north, and east sides of these large pits.

Because these small sand-filled holes are hard to see and because their presence was not fully documented until the 1980 field season, it is felt that they were probably present in some of the other previously excavated pitstructures but were simply overlooked. This would be especially true in those structures that had burned and, therefore, had blackened and oxidized floors.

At present, these small holes, either arranged in and around the sipapu or clustered around the large pit features as already described, have occurred at 10 sites other than Windy Wheat Hamlet. Among these 10 sites, 13 pitstructures contained these features, as shown in table 3.

It is believed that these groupings of small holes, whether in the sipapus or around the large floor pits, represent the area within a pit-structure where families (in domiciliary pitstructures) or larger groups (in communal pitstructures) set up prayer sticks or plume holders for ritual observances. If this is the case, these features may also represent an evolutionary step in the development of the elaborate altars of the protohistoric and historic periods.

An altar (shrine) with arrows and prayer sticks was found at U-Bar Cave in Hidalgo County, New Mexico in approximately 1917. It is fortunate that the discoverer photographed the arrangement of arrows and pahos,

because when Marjorie Lambert and Richard Ambler excavated the cave in 1960, the shrine was gone (Lambert and Ambler 1961:fig. 10). It is this sort of arrangement that would probably occur if the small holes in the pitstructure floors still contained the prayer sticks, plume holders, or other paraphernalia used by the inhabitants. Fragments of pahos recovered from U-Bar Cave are illustrated in figure 23.

Table 3. Occurrence of possible paho marks at DAP sites

Site	Provenience	Area of occurrence	Ceramic date range (A.D.)
5MT23	Pitstructure 3	Near rectangular central pit	...
5MT2182	Pitstructure 1	Sipapu	750-850
5MT2320	Pitstructure 1	Sipapu	775-900
5MT2854	Pitstructure 1	Sipapu	700-800
5MT4475	Pitstructure 3	Near ceremonial vault	ca. 750
	Pitstructure 5	Near ceremonial vault	ca. 750
5MT4477	Pitstructure 2	Surface 1 near ceremonial vault	ca. 850
		Surface 2 near ceremonial vault	ca. 850
5MT4479	Pitstructure 1	Sipapu	ca. 850
5MT5106	Pitstructure 3	Surface 1 near oval central pit	...
		Surface 2, central area	...
	Pitstructure 4	Surface 1, central area	...
5MT5107	Pitstructure 2	North of hearth	...
	Pitstructure 9	Near ceremonial vault	...
5MT5108	Pitstructure 2	Central area	...

NOTE: ... - Information not available.

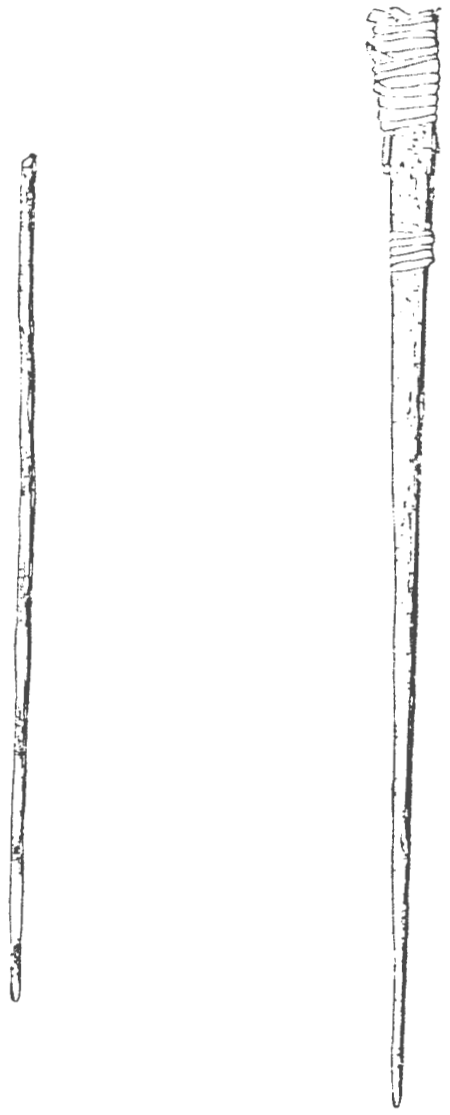


Figure 23. Paho fragments from U-Bar Cave, Hidalgo County, New Mexico. Adapted from Lambert and Ambler (1961: figure 49). The paho on the left is painted. The one on the right has cordage attached to it.

Watson Smith (1952:189) in his comments concerning prayer sticks or pahos states,

> In addition to the use of birds or bird skins in ceremonial paraphernalia and of isolated feathers as such, feathers comprise the significant ritual element in several other items, of which the most numerous and important are prayer-sticks, or in the Hopi language pahos. Pahos are made at all the Pueblo villages, and in a variety of forms, but are always composed of one or more feathers attached to some small object such as a piece of string, a long stick, two short sticks, a small cylinder, annulet, or the like. The feathers used, the decoration of the sticks, the arrangement, and disposition of the pahos vary widely, but it can be said with assurance that no Pueblo ceremony could be effective without the use of pahos in some form.

Some of the pahos portrayed in the Awatovi kiva murals are illustrated by Smith (1952:fig. 13). It is believed that the "paho marks" noted at DAP sites reflect the shapes of the lower ends of the paho sticks.

It is hoped that researchers in areas outside the DAP will look for the clusters of small holes and will provide data that will either strengthen or refute the hypothesis that these features are paho marks.

Activity Area 22 is located behind the west wingwall and contains items associated with mealing activities. Three trough metates, three manos, one hammerstone, one cobble tool, one grinding/abrading stone, one utilized flake, seven used cores, and three debitage flakes were found in this area. Fragments of carbonized matting were also found here. A mealing area behind the wingwall either on the west or east side of a pitstructure is a common phenomenon in the project area. NFL

Pitstructure 2

Dimensions:

North-south diameter (bench included)	5.85 m
East-west diameter (bench included)	5.90 m
Total depth	1.55 m
Total roofed area	34.52 m^2

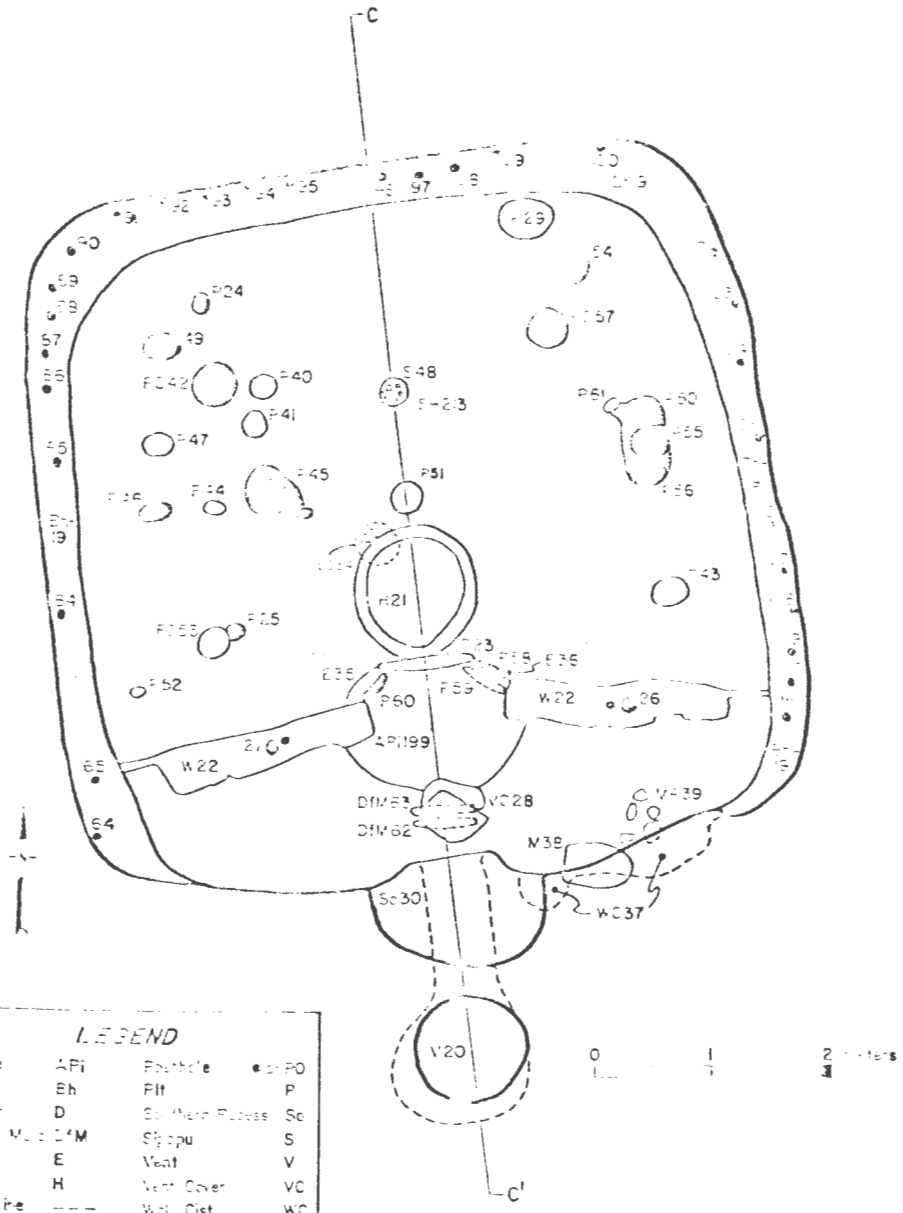
Pitstructure 2 is square with rounded corners; it has a bench around three-quarters of the wall. Other main features include the central hearth, the wingwall, the deflector, and four main support sockets. Maps of the features and point located artifacts are provided in figures 24 and 25. An architectural cross section is shown in figure 26.

Stratigraphy

The Pitstructure 2 fill sequence, illustrated in figure 27, is described from bottom to top. Strata 6, 5.1, and 5.2 are all deposits of the initial roof fall when the structure burned and collapsed. Stratum 6 represents an area of unburned roof fall. Stratum 5.2 consists of partially burned roof fall and Stratum 5.1 consists of heavily burned material containing most of the combustible roof elements. Stratum 4 is a noncultural, tan, silt loam that represents the initial sediment deposited after burning. The presence of silty laminae indicates some alluvial deposition. Strata 3.1 and 3.2 are similar to Stratum 4 but contain more clay and cultural material in the form of small pieces of charcoal and burned clay. These strata are inferred to represent erosion that took place at the site before a vegetation cover was reestablished. The color of Stratum 2 is darker than that of Strata 3.1 and 3.2, indicating that more organic material was deposited as vegetation became reestablished. Stratum 1 is an eolian deposited loess. This stratum is well mixed as a result of modern agricultural plowing and harrowing.

Floor

The surface in Pitstructure 2 is hard, smooth, and well defined. It is slightly dish shaped because it curves upward around the perimeter where it meets the walls. The floor level south of the wingwall is 4 cm higher than the main chamber floor. In Pitstructure 2, like many pit-



LEGEND

Ash Pile	API	Foothole	PO
Pitch	Bh	Pit	P
Deflector	D	Stillwater Pulses	Sc
Deflector Mud	DfM	Slippu	S
Entry	E	Veat	V
Hearth	H	Vent Cover	VC
Hidden Line	— — —	Wall Cist	WC
Mate	M	Wingwall	W
Mate Rest	MR	Small Holes	SH
Floor Cist	FC	Used Only Prior To Remodeling	[ ]
Lithic Concentration	LC		

Figure 24. Excavation map of Structure 2, Hardy Knoll Site. The architectural cross section and the stratigraphic profile along line C are shown in Figures 25 and 27 respectively.

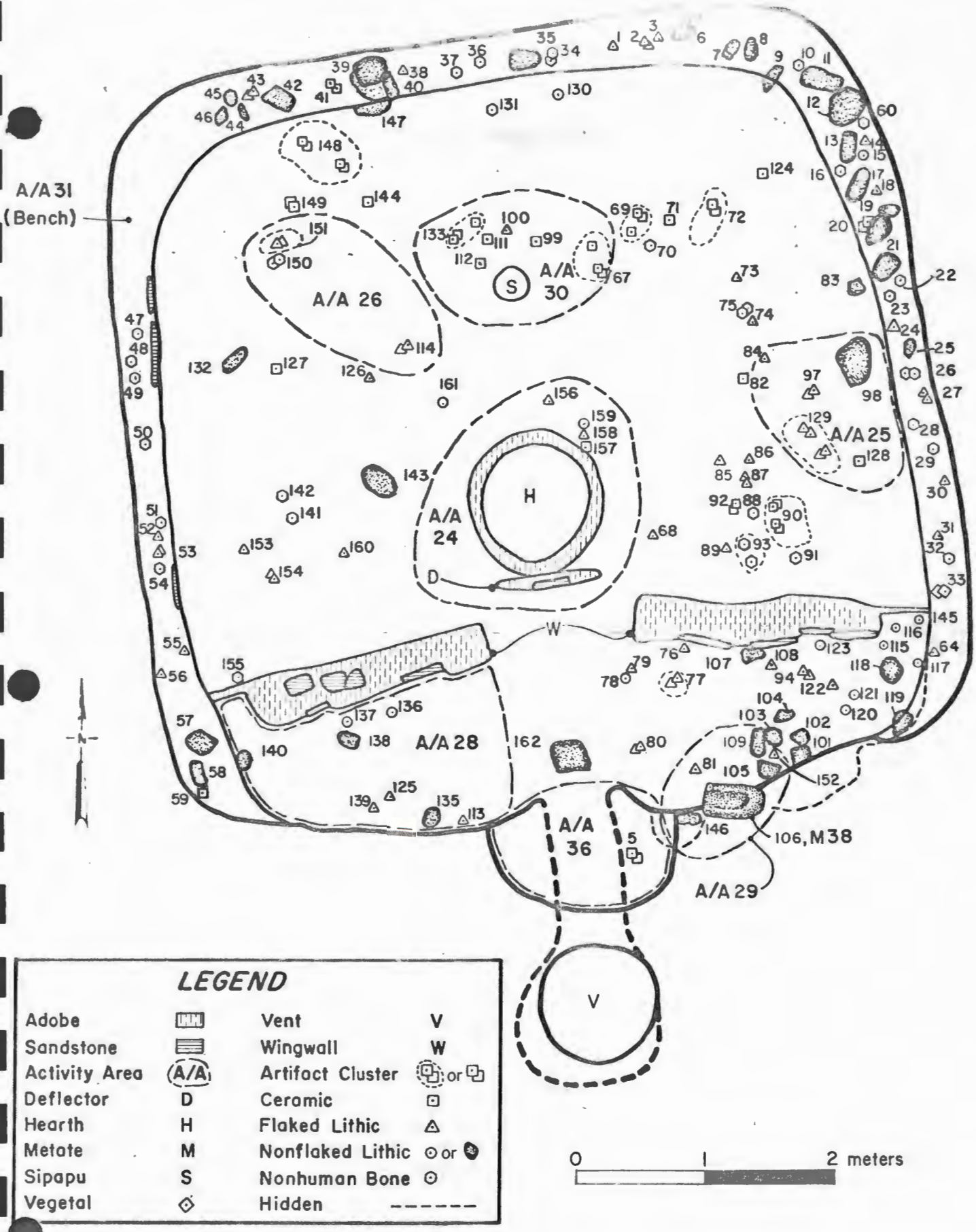
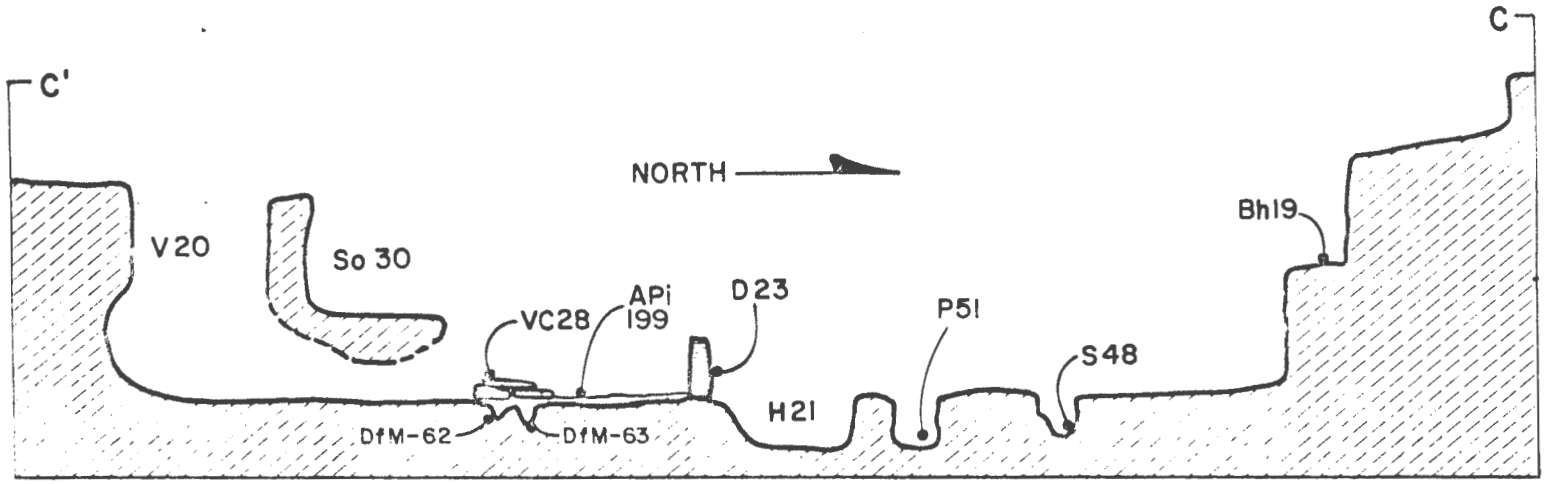


Figure 25. Map of point-located artifacts and activity areas, Pitstructure 2, Windy Wheat Ha let.



LEGEND			
Sandstone		Pit	P
Ash Pile	APi	Sipapu	S
Bench	Bh	Southern Recess	So
Deflector	D	Vent	V
Deflector Mold	DfM	Vent Cover	VC
Hearth	H	Inferred	
		Natural Deposits	

0 1 2 meters

Figure 26. Architectural cross section of Pitstructure 2, Windy Wheat Hamlet. The profile location is shown in figure 24.

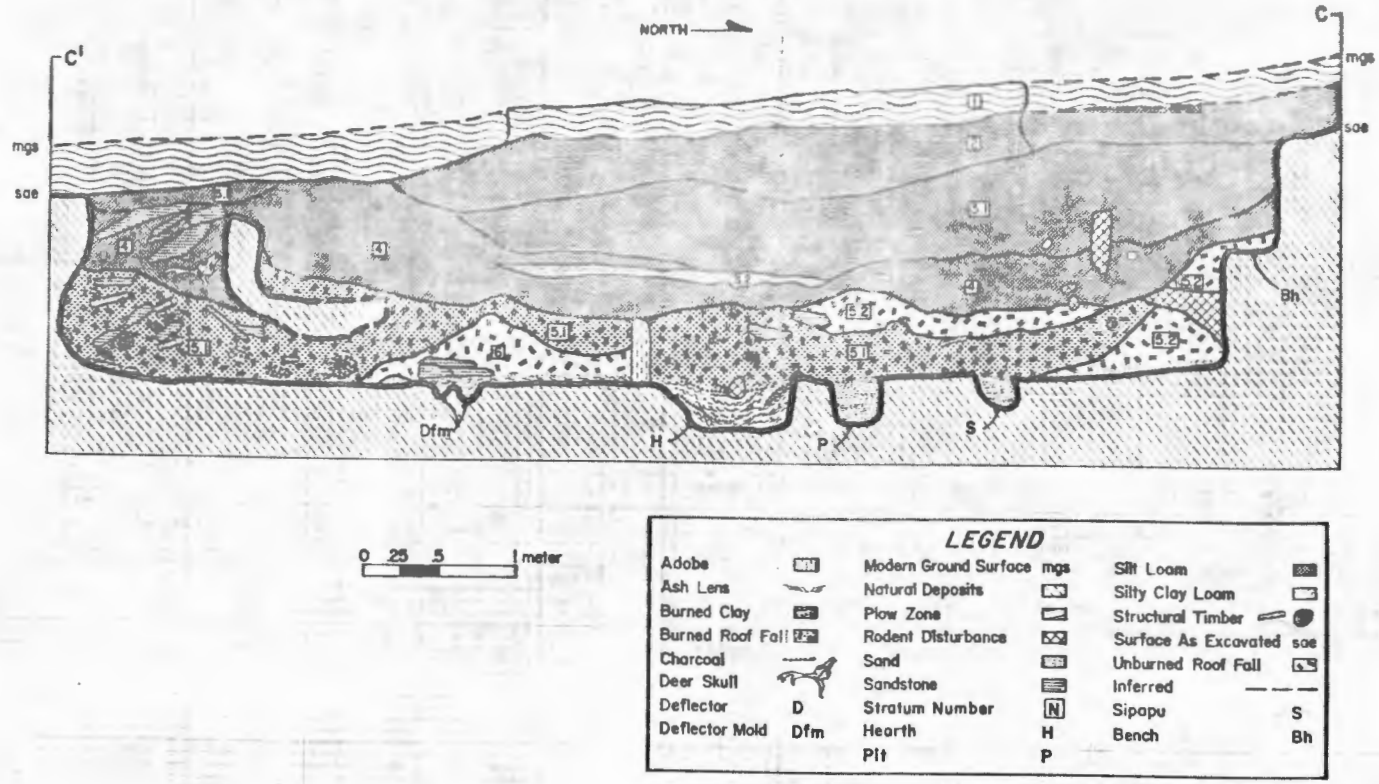


Figure 27. Stratigraphic profile of Pitstructure 2, Windy Wheat Hamlet. The profile location is shown in figure 24.

structures in the project area, sand is an integral part of the surface preparation. The white, fine-grained sand on the floor in Pitstructure 2 is 5 cm thick against the walls but thins to less than 1 cm thick toward the center of the floor. The stratigraphic evidence indicates that this sand is cultural rather than natural. Small household items such as beads and flakes are commonly found in this sand layer.

Floor artifacts. All artifacts and clusters of artifacts on the pitstructure floor and bench were assigned point location numbers. Table 4 lists and describes these artifacts, while figure 25 shows their spatial distribution.

In general, the larger stone artifacts such as manos, metates, lapstones, and anvils are found either behind the wingwalls or arranged on the top of the bench in the northern one-third of the structure. Most of the flaked lithic material (mostly debitage) is found either in the northwestern corner of the structure or in the southeastern corner north of the wingwall. Very few ceramics occur in the structure. Those that are present are found in the northern half of the main room and the southeastern corner north of the wingwall. Most of the nonhuman bone debitage and tools are found on the surface of the bench and in the southeastern corner north of the wingwall.

Features

Pitstructure 2 underwent major remodeling. Fifteen of the floor features are only associated with the floor before remodeling. Many of these features were sealed with adobe, flush with the floor surface. Features 49 and 54 were constructed during the remodeling. The 74 features (fig. 24; table 5) found in Pitstructure 2 fall into three categories: major features, postholes, and pits.

Table 4. Point-located artifacts, Pitstructure 2, Windy Wheat Hamlet

PL No.	Material class	Item description
1	Flaked lithic	Debitage
2	Flaked lithic	Debitage (3)
		Used core
3	Flaked lithic	Debitage
4	Nonflaked lithic	Not culturally modified
5	Ceramic	DL Early Pueblo Gray jar sherds (7)
		DL Early Pueblo Gray jar sherds (15): vessel 44
6	Nonflaked lithic	Not culturally modified
7	Nonflaked lithic	Notched axe
8	Nonflaked lithic	Two-hand mano
9	Nonflaked lithic	Not culturally modified
10	Nonhuman bone	Cervidae sp.
11	Nonflaked lithic	Abrading/grinding stone
12	Nonflaked lithic	Shaped stone slab
13	Nonflaked lithic	Mano
14	Flaked lithic	Debitage
15	Nonflaked lithic	Polished/polishing stone
16	Nonhuman bone	Mammalia, small
		Erethizon dorsatum
17	Nonflaked lithic	Two-hand mano
18	Flaked lithic	Debitage (2), thin uniface
19	Nonflaked lithic	Not culturally modified
20	Ceramic	BL Bluff Black-on-red bowl sherds (8): vessel 14
21	Nonflaked lithic	Not culturally modified
22	Nonhuman bone	Artiodactyla--gouge-scraper
23	Nonhuman bone	Artiodactyla
24	Flaked lithic	Thin uniface
25	Nonflaked lithic	Not culturally modified
26	Nonhuman bone	Lepus californicus
		Mammalia, small--indeterminate item
27	Flaked lithic	Debitage (35)
		Thick uniface
28	Nonhuman bone	Mammalia, small--indeterminate high-production-input item
29	Nonhuman bone	Artiodactyla--simple awl
30	Flaked lithic	Item misplaced
31	Flaked lithic	Debitage
32	Nonhuman bone	Mammalia, large--indeterminate item
33	Vegetal	Zea mays kernels (4 g)
		Zea mays cob fragments, charred (3)

NOTES: PL numbers not listed represent items later determined not to be associated with the floor. See figure 25 for artifact locations.

DL - Dolores Manufacturing Tract.
BL - Blanding Manufacturing Tract.
CA - Cahone Manufacturing Tract.
SJ - San Juan Manufacturing Tract.
(N) - Number of items.
(g) - Weight of items.

Table 4. Point-located artifacts, Pitstructure 2, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
34	Nonhuman bone	Mammalia, large (7)
		Artiodactyla
35	Nonflaked lithic	Shaped stone slab
36	Nonhuman bone	*Odocoileus hemionus*
37	Nonhuman bone	Cervidae
38	Flaked lithic	Debitage
39	Nonflaked lithic	Shaped stone slab
40	Nonflaked lithic	Shaped stone slab
41	Ceramic	DL Early Pueblo Gray jar sherds (6): vessel 43
42	Nonflaked lithic	Not culturally modified
43	Flaked lithic	Debitage (10)
44	Nonflaked lithic	Abrading/grinding stone
45	Nonflaked lithic	Abrading/grinding stone
46	Nonflaked lithic	Not culturally modified
47	Nonhuman bone	*Sylvilagus* sp.
48	Nonhuman bone	*Odocoileus hemionus*
49	Nonhuman bone	*Sylvilagus* sp.
50	Nonhuman bone	Mammalia, small
51	Nonhuman bone	Artiodactyla--indeterminate item
52	Flaked lithic	Debitage
53	Flaked lithic	Debitage
		Thick uniface
54	Nonhuman bone	Mammalia, small
55	Flaked lithic	Debitage
56	Flaked lithic	Debitage (2)
57	Nonflaked lithic	Not culturally modified
58	Nonflaked lithic	Not culturally modified
59	Ceramic	DL Early Pueblo Gray jar sherd
60	Nonhuman bone	Artiodactyla
		Mammalia, medium
64	Flaked lithic	Debitage
67	Ceramic	DL Early Pueblo Gray jar sherds (9)
68	Flaked lithic	Debitage
69	Ceramic	DL Early Pueblo Gray jar sherds (4)
70	Nonhuman bone	Mammalia, large--minimally altered item
71	Ceramic	DL Early Pueblo Gray jar sherd
72	Ceramic	BL Bluff Black-on-red bowl sherds (6): vessel 15
73	Flaked lithic	Debitage
74	Flaked lithic	Debitage
75	Nonhuman bone	Mammalia, small (2)
76	Flaked lithic	Debitage (2)
77	Flaked lithic	Debitage
78	Nonflaked lithic	Hammerstone
79	Flaked lithic	Debitage
80	Flaked lithic	Debitage (2)
81	Flaked lithic	Used core
82	Ceramic	DL Early Pueblo Gray jar sherd

Table 4. Point-located artifacts, Pitstructure 2, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
83	Nonflaked lithic	Mano
84	Flaked lithic	Thick uniface
85	Flaked lithic	Debitage
86	Flaked lithic	Debitage
87	Flaked lithic	Debitage (2)
88	Nonhuman bone	Artiodactyla
89	Flaked lithic	Debitage
90	Ceramic	DL Early Pueblo Gray jar sherds (41) DL Chapin Gray jar sherds (2)
91	Nonhuman bone	Odocoileus hemionus
92	Ceramic	DL Early Pueblo Gray jar sherds (12): vessel 47 DL Early Pueblo Gray jar sherds (3)
93	Nonhuman bone	Odocoileus hemionus
94	Flaked lithic	Debitage (3)
95	Flaked lithic	Debitage (2) (not mapped)
97	Flaked lithic	Debitage (12)
98	Nonflaked lithic	Metate
99	Ceramic	DL Polished White bowl sherd
100	Flaked lithic	Debitage
101	Nonflaked lithic	Not collected
102	Nonflaked lithic	Not collected
103	Nonflaked lithic	Not collected
104	Nonflaked lithic	Not collected
105	Nonflaked lithic	Not collected
106	Nonflaked lithic	Trough metate
107	Nonflaked lithic	Not collected
108	Flaked lithic	Unused core
109	Nonflaked lithic	Two-hand mano
111	Ceramic	SJ Polished White bowl sherd: vessel 17
112	Ceramic	DL Early Pueblo Gray jar sherd
113	Flaked lithic	Debitage
114	Flaked lithic	Debitage (2)
115	Nonflaked lithic	Not collected
116	Nonflaked lithic	Not collected
117	Nonflaked lithic	Not collected
118	Nonflaked lithic	Minimally altered item
119	Nonflaked lithic	Not collected
120	Nonflaked lithic	Not collected
121	Nonflaked lithic	Not collected
122	Flaked lithic	Used core
123	Nonflaked lithic	Not collected
124	Ceramic	DL Early Pueblo Gray jar sherd
125	Flaked lithic	Debitage
126	Flaked lithic	Debitage
127	Ceramic	DL Early Pueblo Gray jar sherd
128	Ceramic	DL Early Pueblo Gray jar sherd
129	Flaked lithic	Debitage (4)

Table 4. Point-located artifacts, Pitstructure 2, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
130	Nonflaked lithic	Abrading/grinding stone
131	Nonhuman bone	Mammalia, small
132	Nonflaked lithic	Abrading/grinding stone
133	Ceramic	SJ Polished White bowl sherds (19): vessel 17 DL Polished White bowl sherd
135	Nonflaked lithic	Abrading/grinding stone
136	Nonflaked lithic	Hammerstone
137	Nonflaked lithic	Hammerstone
138	Nonflaked lithic	Polished/polishing stone
139	Flaked lithic	Thick biface
140	Nonflaked lithic	Abrading/grinding stone
141	Nonhuman bone	*Antilocapra americana*
142	Nonhuman bone	Mammalia, large--fragmentary awl
143	Nonflaked lithic	Minimally altered item
144	Ceramic	DL Early Pueblo Gray jar sherd
145	Nonflaked lithic	Minimally altered item
146	Nonflaked lithic	Mano
147	Nonflaked lithic	Lapstone
148	Ceramic	DL Early Pueblo Gray jar sherds (7): vessel 43 DL Early Pueblo Gray jar sherds (18)
149	Ceramic	DL Chapin Gray bowl sherds (8): vessel 46
150	Nonhuman bone	Mammalia, large (4)--simple awl
151	Flaked lithic	Debitage (21)
152	Flaked lithic	Debitage
153	Flaked lithic	Debitage
154	Flaked lithic	Debitage (2)
155	Nonhuman bone	Mammalia, large
156	Flaked lithic	Unused core
157	Ceramic	DL Polished White bowl sherd
158	Flaked lithic	Debitage
159	Nonflaked lithic	Not culturally modified
160	Flaked lithic	Debitage
161	Nonflaked lithic	Polished/polishing stone
162	Nonflaked lithic	Trough metate
163	Flaked lithic	Corner-notched projectile point (not mapped)
164	Nonflaked lithic	Shaped stone slab (not mapped)
165	Nonflaked lithic	Trough metate (not mapped)
166	Nonflaked lithic	Metate fragment (not mapped)
167	Nonflaked lithic	Not culturally modified (not mapped)
168	Nonhuman bone	*Lepus californicus*--indeterminate item (not mapped)

Table 5. Feature summary, Pitstructure 2, Windy Wheat Hamlet

Feature No.	Type	Plan	Profile	Length (cm)	Width (cm)	Depth/ height (cm)
19	Bench	Square	Rectangular	1600	30	76
20	Ventilation system					
	ventilator tunnel	Complex	Complex	225	41	30
	ventilator shaft	Complex	Complex	120	85	149
21	Hearth	Round	Basin	110	102	30
22	Wingwall	Rectangular	Rectangular	465	30	80
23	Deflector	Rectangular	Rectangular	80	10	42
*24	Unburned pit	Round	Cylindrical	16	20	10
*25	Unburned pit	Round	Basin	17	21	5
26	Posthole	Round	Cylindrical	34	35	51
27	Posthole	Round	Cylindrical	32	32	70
28	Ventilator cover	n.a.	n.a.	50	50	15
29	Unburned pit	Oval	Basin	46	34	3
30	Wall feature: southern recess	D-shaped	Rectangular	145	90	70
34	Lithic concentration	n.a.	n.a.	130	130	35
35	Wall feature: entry	n.a.	...	31	50	...
36	Wall feature: entry	n.a.	...	34	50	...
37	Wall cist	Complex	Other	162	30	30
38	Metate	n.a.	n.a.	58	40	12
39	Nonflaked lithic tool rest	n.a.	n.a.	55	35	5
40	Unburned pit	Round	Basin	22	21	5
41	Unburned pit	Round	Basin	20	20	4
42	Posthole	Round	Cylindrical	42	39	78
43	Unburned pit	Round	Basin	33	26	16
44	Unburned pit	Oval	Basin	16	13	3
*45	Unburned pit	Round	Basin	57	42	35
*46	Unburned pit	Oval	Basin	29	19	6
47	Unburned pit	Oval	Basin	25	20	8
48	Sipapu	Round	Cylindrical	23	22	21
49	Posthole	Round	Cylindrical	35	27	48
*50	Unburned pit	Oval	Basin	70	38	15
51	Unburned pit	Round	Cylindrical	27	27	29
52	Unburned pit	Oval	Basin	11	7	7
53	Small floor cist	Round	Basin	28	23	17
54	Posthole	Round	Cylindrical	28	30	41
*55	Unburned pit	Oval	Basin	33	26	12
*56	Unburned pit	Oval	Basin	34	19	7
57	Posthole	Round	Cylindrical	36	30	65
58	Pit	Oval	Basin	25	9	6

NOTE: See figure 24 for feature locations.
n.a. - Not applicable.
... - Information not available.

Table 5. Feature summary, Pitstructure 2, Windy Wheat Hamlet--Continued

Feature No.	Type	Plan	Profile	Length (cm)	Width (cm)	Depth/ height (cm)
59	Pit	Oval	Basin	40	9	5
60	Pit	Oval	Basin	30	7	5
61	Unburned pit	Round	Basin	13	10	2
62	Deflector mold	Oval	Basin	54	14	9
63	Deflector mold	Oval	Basin	53	9	12
64	Posthole, leaner	Round	Cylindrical	5	5	8
65	Posthole, leaner	Round	Cylindrical	5	5	8
84	Posthole, leaner	Round	Cylindrical	7	7	8
85	Posthole, leaner	Round	Cylindrical	6	6	8
86	Posthole, leaner	Round	Cylindrical	5	5	5
87	Posthole, leaner	Round	Cylindrical	5	5	8
88	Posthole, leaner	Round	Cylindrical	7	7	8
89	Posthole, leaner	Round	Cylindrical	6	6	6
90	Posthole, leaner	Round	Cylindrical	5	5	3
91	Posthole, leaner	Round	Cylindrical	5	5	7
92	Posthole, leaner	Round	Cylindrical	6	6	14
93	Posthole, leaner	Round	Cylindrical	5	5	8
94	Posthole, leaner	Round	Cylindrical	7	7	3
95	Posthole, leaner	Round	Cylindrical	7	7	5
96	Posthole, leaner	Round	Cylindrical	7	7	6
97	Posthole, leaner	Round	Cylindrical	5	5	6
98	Posthole, leaner	Round	Cylindrical	6	6	6
99	Posthole, leaner	Round	Cylindrical	6	6	9
100	Posthole, leaner	Round	Cylindrical	9	9	6
101	Posthole, leaner	Round	Cylindrical	10	10	4
102	Posthole, leaner	Round	Cylindrical	6	6	25
103	Posthole, leaner	Round	Cylindrical	5	5	5
104	Posthole, leaner	Round	Cylindrical	5	5	5
105	Posthole, leaner	Round	Cylindrical	5	5	5
106	Posthole, leaner	Round	Cylindrical	5	5	8
107	Posthole, leaner	Round	Cylindrical	5	5	5
108	Posthole, leaner	Round	Cylindrical	7	7	6
109	Posthole, leaner	Round	Cylindrical	5	5	3
110	Posthole, leaner	Round	Cylindrical	5	5	5
111	Posthole, leaner	Round	Cylindrical	7	7	14
199	Ash pile	Oval	Other	120	160	5
213	Cluster of small holes	Round	Cylindrical	3	3	10

* Sand filled and capped with adobe.

Major features. The major features discussed under this heading include the bench, southern recess, wall cist, ventilation system, wingwall, deflector, hearth, and entryway liner stones.

Bench (Feature 19): Feature 19 is a bench (banquette) that runs continuously along the west, north, and east walls of Pitstructure 2. The bench surface is hard-packed earth. Thirty leaner postholes are located along the back of the bench at intervals ranging from 1.35 m to 20 cm. These postholes held posts that formed the framework for the slanting sidewalls of the structure. The face and surface of the bench are covered with a coat of smoothed mud plaster. Sixty-two artifacts were on the surface of the bench. Of these artifacts, 35.5 percent are nonflaked lithic tools, 27.4 percent are flaked lithic items, 30.6 percent are nonhuman bones, and only 4.8 percent are ceramics.

Southern recess (Feature 30): Feature 30 is excavated into the south wall of the pitstructure 57 cm above the floor. The floor of this wall feature formed the top (or roof) of the underlying vent tunnel. The floor and walls of Feature 30 are hard-packed native earth; the inward curvature of the walls indicates that, at one time, a natural earth roof probably extended over this feature, forming a wall recess. The feature type "southern recess" usually refers to a feature in a Pueblo III kiva. Thus, this feature is highly unusual for this time period. The basal portion of an Early Pueblo Gray jar (PL 5) is the only artifact associated with the surface of this feature.

Wall cist (Feature 37): Feature 37 is a wall cist located at floor level directly east of the ventilation tunnel opening. This cist is bilobed and is probably associated with a metate (Feature 38). A mano was in the cist and the metate was leaning against the bulge that separates the two lobes of the feature.

Ventilation system (Feature 20) and ventilator cover (Feature 28): The ventilator system is composed of a horizontal tunnel connected to a vertical shaft that extends to the prehistoric ground surface. The horizontal tunnel emerges through the center of the south wall of the pitstructure. Most pitstructure ventilator openings in the Mesa Verde District had some mechanism whereby the opening into the structure could be closed; Pitstructure 2 is no exception. An adobe collar, strengthened by a vertical post on either side, occurs around the tunnel opening. This collar acted to hold a slab in place over the opening. The slab (Feature 28) was lying on the floor in front of the vent opening. This arrangement is illustrated in figure 28.

Rock slabs and burned beams found at the bottom of the vertical shaft indicate that some form of cover was constructed over the top of the ventilation system at ground level. Above the roof fall layer in the ventilator shaft is a layer of mottled silt that contains a mule deer skull lying upside down against the north wall of the shaft. Overlying the skull were numerous large sandstone slabs. It seems possible that the skull and stones were deliberately placed in the shaft as some form of offering after the structure burned. The slabs and skull also could be trash, but there is no evidence that the site was occupied after Pitstructure 2 burned.

Wingwall (Feature 22): The wingwall in Pitstructure 2 underwent intensive remodeling as illustrated in figure 29. The pattern of slab molds discovered while investigating the floor of the pitstructure indicates that the original wingwall consisted of a single row of vertical slabs, probably covered with a layer of adobe. The wingwall ran east-west from wall to wall and partitioned the pitstructure into two separate

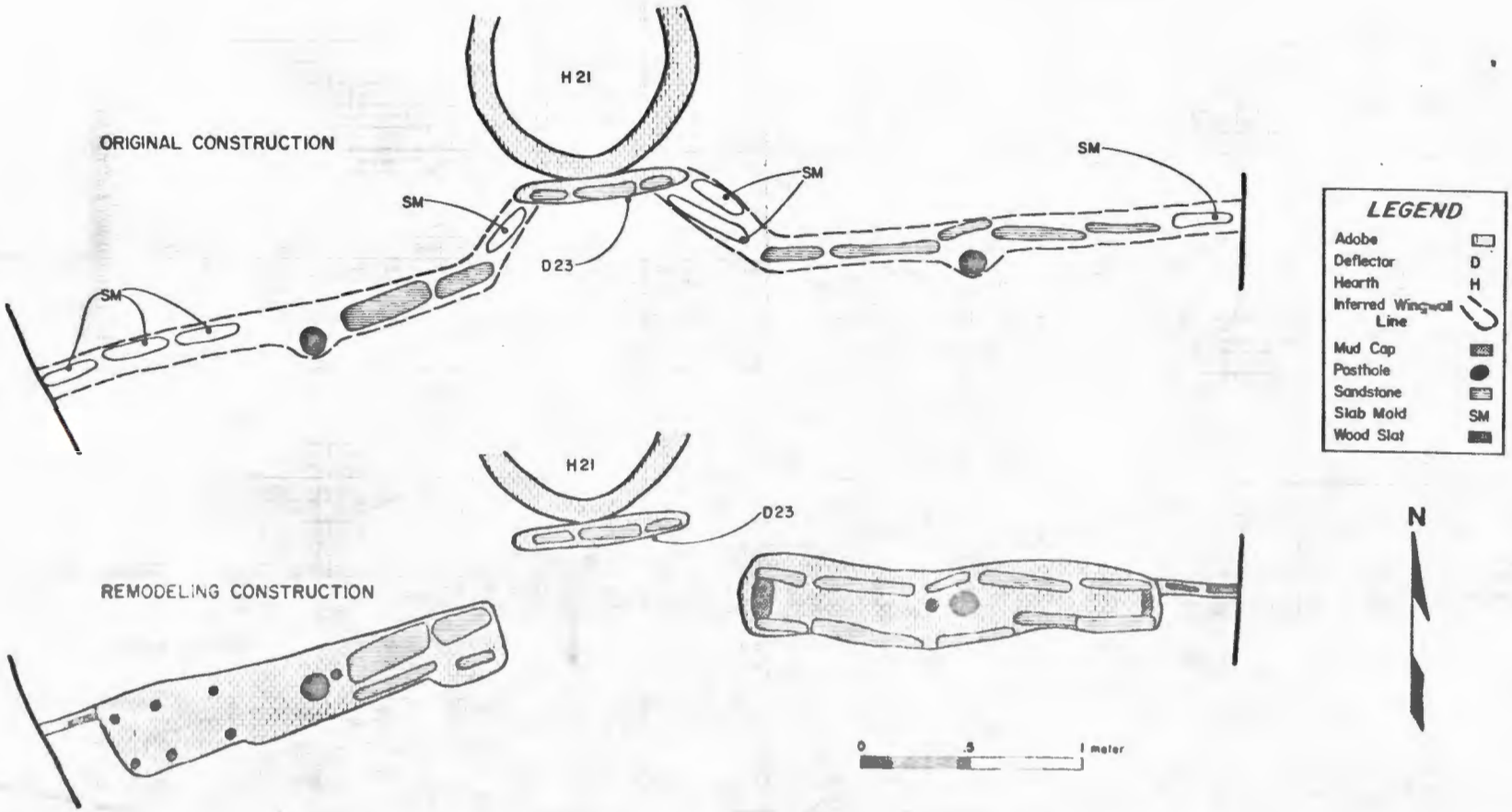


Figure 25. Diagram of wingwall remodeling, Pitstructure [illegible] Wheat Hamlet.

Figure 28. Slab ventilator tunnel cover (Feature 28), Pitstructure 2, Windy Wheat Hamlet (DAP 031634).

areas. The excavators did not discover~~ed~~ any deliberately filled postholes in the alinement of this original wingwall. Hence, the two southern main roof supports were located in the same position throughout the life of the structure. The height of the original wingwall is unknown, but the thickness is estimated to have been 15 cm. It was probably fairly low on either side of the deflector slab to allow easy access between the north room (the main chamber) and the smaller south room.

When Pitstructure 2 was excavated, the remodeled wingwall was still standing. The remodeling was extensive; first, the length of the original wall was shortened. One vertical slab was removed at each end of the wall so that it no longer abutted the pitstructure walls. Then the wall was widened. This was accomplished on the east side by simply adding another row of five upright slabs parallel and south of the existing slabs. These new slabs were an average of 12 cm from the existing stones except around the main support postholes where the slabs were 25 cm apart. The west side was widened in much the same way except vertical poles and two worn out metates were used in place of slabs. After the internal framework was complete, a thick coat of adobe mud was applied over the whole construction. The top of the remodeled wingwall stepped up at both the west and east ends where additional courses of mud and horizontal sandstone slabs had been constructed immediately beyond the main support posts. The stepped effect is illustrated in figure 30, a schematic reconstruction of the east half of the wingwall.

The north face of the new wingwall, as well as the face of the bench, was finished with a coat of pink, clay plaster. Further remodeling is revealed by a series of plaster coatings on top of this pink plaster on

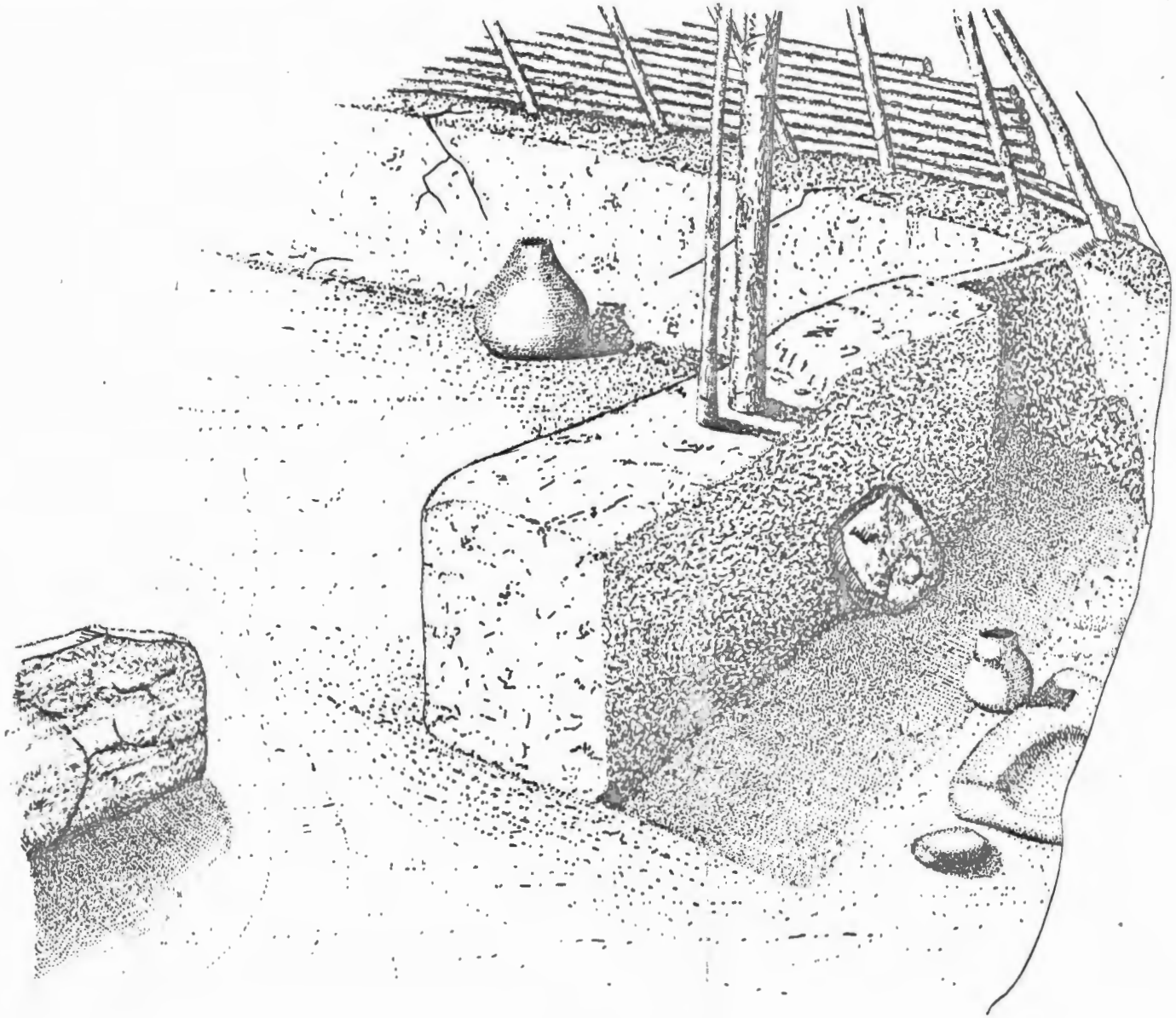


Figure 30. Artist's reconstruction of the east wingwall, Pitstructure 2, Windy Wheat Hamlet.

the north face of the wingwall. First, a layer of green plaster covered the pink wingwall and bench face. Then the gaps at each end of the wingwall were closed with mud-coated vertical wooden slats or bark. These small wall additions were finished with a layer of green plaster, which overlapped and blended into the green plaster already on the face of the more massive section of wingwall.

Deflector (Feature 23): The original deflector was connected to the original wingwall. When the wingwall was remodeled, a slab on either side of the deflector was removed, detaching it from the wingwall. The ragged edges were trimmed and the deflector was replastered with adobe mud.

Deflector molds (Features 62 and 63): Two deflector molds (Features 62 and 63) were found south of the deflector (Feature 23) in front of the ventilator tunnel opening. These grooves indicate that upright slabs were present at one time; perhaps these grooves held portable slabs that could be used for additional air flow control. It is doubtful that both were ever used together because one is directly in front of the other. This arrangement used together would seem to serve no purpose. It does seem apparent that when Pitstructure 2 burned, both "portable deflectors" had been out of use for some time because they were filled with cultural debris. It is surmised that they were used in conjunction with the pre-remodeling episode in Pitstructure 2.

Hearth (Feature 21): The central hearth is located directly north of the deflector (Feature 23). It is basin shaped with steep sides. Around the periphery of this feature is an applied adobe collar 3 cm high and 12 cm wide. The fill is fairly typical of many of the hearths found in pitstructures within the project area. That is, it contains sandy ash lenses from top to bottom interspersed with lenses of almost pure ash.

It has been noted that hearths act as catchalls for numerous bits and pieces of household debris, particularly food scraps. Hearth fill can often provide information concerning faunal species that have been used for food by the inhabitants of the house. A large quantity of material, including 211 pieces of debitage, 1 red ware bowl sherd, 2 gray ware jar sherds, 2 Lepus bones, 12 other small mammal bones, and a large amount of vegetal material, was recovered from the fill of Feature 21. Unfortunately most of the faunal material from this hearth was too fragmentary for identification.

Lithic concentration (Feature 34): During excavation of Pitstructure 2, a large number of sandstone slabs were found lying partially over and north of the hearth. These slabs were incorporated into the burned roof fall and were underlain by structural timbers. Figure 31 is a drawing of these stones showing the position of the slabs relative to the structural roof timbers. This feature is interpreted to be a collapsed, stone-lined hatchway that originally provided entry to the pitstructure through the roof. The slab lining is assumed to have prevented erosion of the hatchway.

Postholes and superstructure. The superstructure over Pitstructure 2 was composed of 4 primary support posts and 30 inward leaning posts that were socketed in the bench (fig. 32). At some point two of the main support postholes were replaced with two new postholes just north of each original. These posts constitute the primary support elements for the rest of the walls and roof. The secondary support elements consist of horizontally placed poles that tied the four main vertical support posts together and supplied support for the upper ends of the leaner posts. This framework was then covered with brush and reeds, and a final layer of

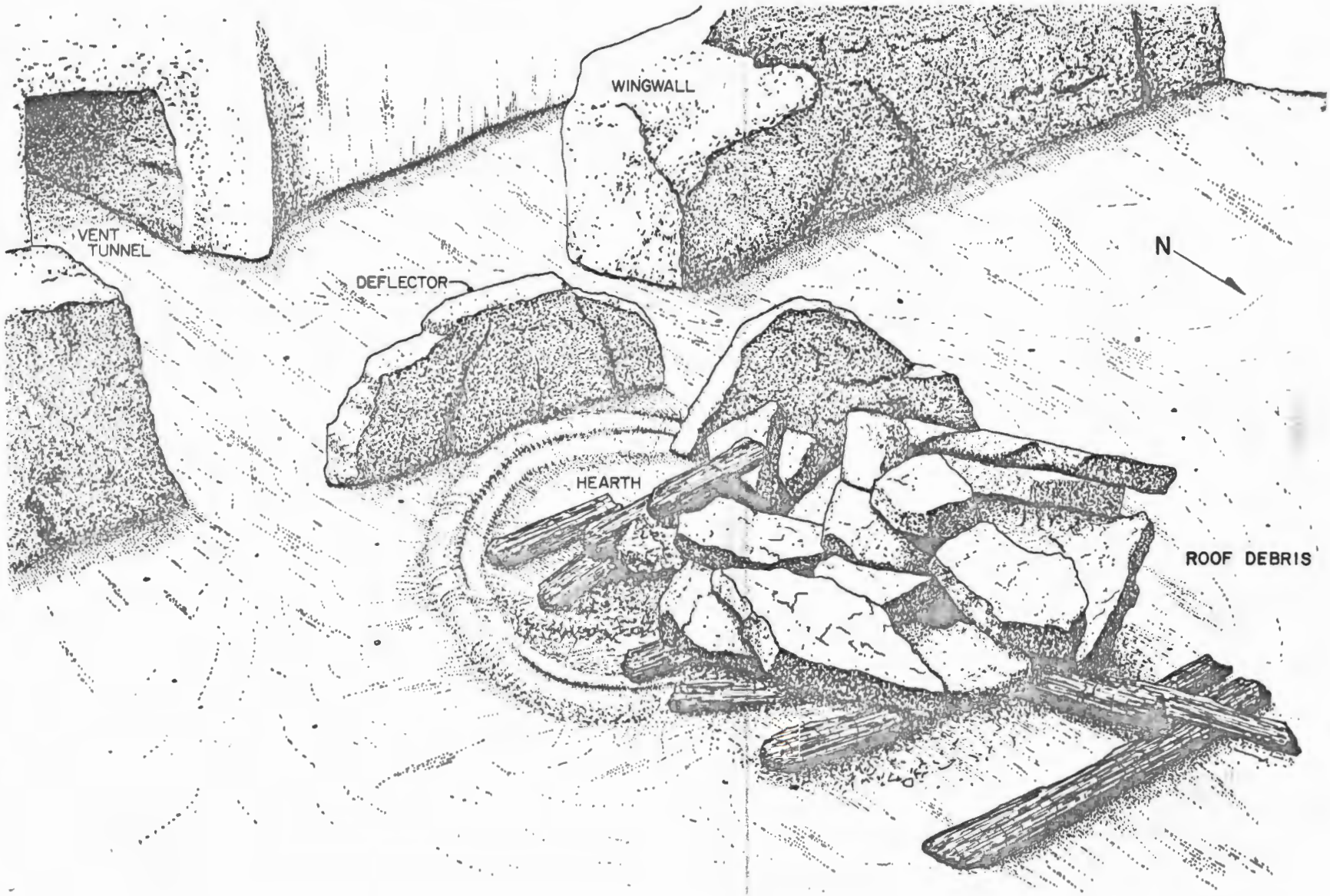


Figure 31. Artist's reconstruction of roof entryway slabs lying on the hearth, Pitstructure 2, Windy Wheat Hamlet.

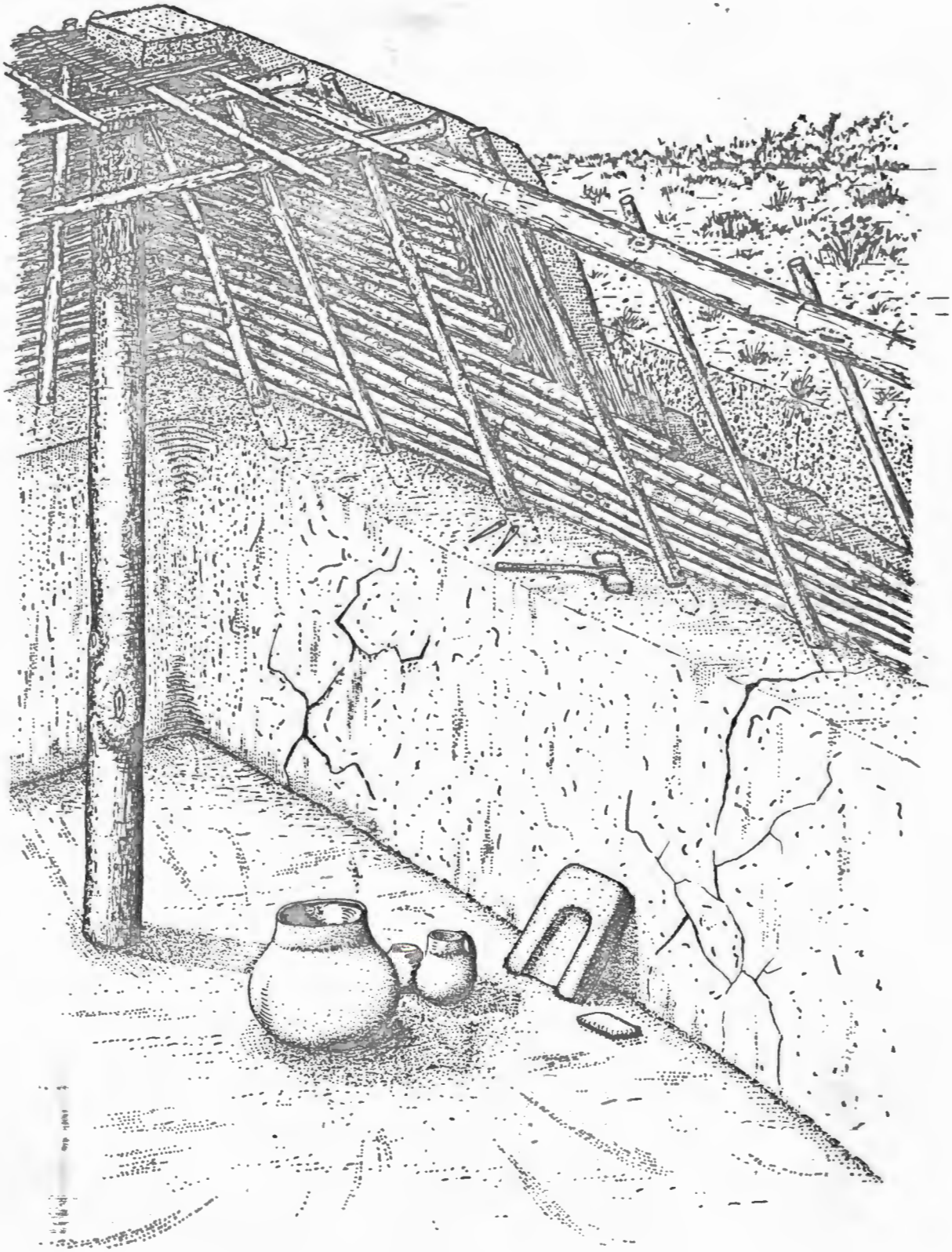


Figure 32. Artist's reconstruction of Pitstructure 2 roof construction, Windy Wheat Hamlet.

adobe was added to complete the superstructure. Burned beams, mud casts of the beams, and carbonized remains of brush and reeds were found during excavation and suggested this sequence of construction. The main support postholes are discussed individually; all postholes are listed in table 5.

Feature 42: Feature 42 is located in the northwest quadrant of Pitstructure 2 and probably held the original northwest main roof support. Except for a 6-cm-deep extension at the bottom of the hole, this posthole is twice as wide as the 20 cm diameter post that it contained. The base of the posthole is just wide enough to accept the butt of the post; it held the post firmly against the northwest side of the posthole. The posthole was filled with native earth and had only a few remnants of the post in the base. There was no indication that the post had burned, suggesting that the post had been removed and the hole filled prior to abandonment, probably during a major remodeling of the structure.

Feature 57: Feature 57 is opposite Feature 42 in the northeastern quadrant of Pitstructure 2, and probably held the original northeast main roof support. It is identical to Feature 42 except that the posthole at the bottom is located so that the post rested against the northeastern side of the hole. The posthole appeared to have been deliberately filled and the post moved, probably during the major remodeling of the structure.

Feature 49: When Pitstructure 2 was remodeled, Feature 49 was dug as the new northwest main roof support. This feature is slightly northwest of the original posthole, Feature 42. The packing around the new post was ashy sand and river pebbles. The post itself was leaning against the northeast side of the posthole and "footed" on a river cobble lying flush on the bottom of the posthole. The post was still in place and had burned in the fire that destroyed the structure.

Feature 54: This posthole was also dug during pitstructure remodeling and replaced Feature 57 in the northeast quadrant of the structure. The new post was set 22 cm northeast of the old post. The base of the posthole contains a river cobble. The post rested on this cobble and leaned against the east side of the posthole with small stones packed around it. Like Feature 49, the post was found burned and in place.

Feature 26: Feature 26 is the post and posthole that were incorporated into the east half of the wingwall. The posthole was originally dug through the sterile subsoil into the underlying calcium carbonate zone. The hole around the post was filled with small rocks and pebbles mixed with ashy sand--the same fill that was observed in Features 49 and 54. This suggests that these postholes may have been replaced and refilled when the northern main support posts were replaced.

Feature 27: Feature 27 is the post and posthole that are incorporated into the west half of the wingwall. The construction history of this posthole is probably identical to that of Feature 26.

Pits. Twenty-two pit features were excavated into the floor of Pitstructure 2. Nine of these deserve individual discussion while the remaining 13 are discussed as a group.

Sipapu (Feature 48) and a cluster of small holes (Feature 213): Feature 48 has been called the sipapu because of its spatial position within the pitstructure. It is located midway between the hearth and the central portion of the north wall. This is the traditional location of the sipapu in prehistoric southwestern pithouses and kivas.

Three colors of sand constitute the fill of the sipapu. The original sand fill was tan. Later, a hole was excavated in the top of this tan

sand and was filled with a grayish-white sand. Extending down through the grayish-white sand and 5 cm into the tan sand is a second intrusive hole filled with reddish-brown sand. The cross section of the second intrusive hole indicates that it was created by a cone-shaped object. There are 12 other small, intrusive, sand-filled holes (Feature 213) in the sipapu fill. These have been interpreted to be paho/prayer stick marks like those described for Pitstructure 1.

Unburned pits (Features 51, 50, 55, and 56): Cylindrical Feature 51 is 10 cm from the north rim of the central hearth. This feature is entirely filled with sand with small charcoal bits and pieces of flaked lithic debitage throughout. Feature 51, like the spatially identical feature in Pitstructure 1, is thought to be a sand repository used in conjunction with the hearth. For a thorough discussion of sand repositories refer to the description of Feature 72 in Pitstructure 1.

Feature 50 is located midway along the east side of the house 60 cm from the bench. This feature contains three distinct colors of sand. The main oblong portion of the feature was originally filled with clean red sand. At some time during its use, two basins were scooped into this sand (Feature 56) at the extreme south end and one (Feature 55) in the middle. Feature 56 is filled with clean white sand and Feature 55 is filled with a brownish-gray sand. These features went out of use at an unknown time and were capped with adobe. The function of these features is unknown.

Pits (Features 58, 59, and 60): These three features are floor grooves containing a sand fill. Features 58 and 59 are located between the deflector and the east wingwall, and Feature 60 is located between the deflector and the west wingwall. These pits possibly contained slabs from

the original wingwall; during remodeling the slabs were removed and the grooves were filled with sand and floored over.

Other pits: With the exception of Feature 53 (a small floor cist), the remaining 13 sand-filled pits have had no particular function assigned to them. They may have acted as receptacles for the round bottomed vessels. During his 1939 La Plata excavations, Earl Morris found a round bottomed vessel in one of these sand-filled features (Morris 1939:60). There is no way to determine whether most of these small, basin-shaped pits were used for this purpose, but no other hypothesis can be offered.

Patterns Observed. The side walls of Pitstructure 2, unlike those of Pitstructure 1, were formed by placing the butts of the leaner posts on the bench instead of on the prehistoric ground surface. This is the more typical method of construction for pitstructures containing benches. The two sets of main support posts associated with Pitstructure 2 (before and after remodeling) each have observable patterns. For instance, the two original main support postholes in the northern part of the pitstructure (Features 42 and 57) are filled with native earth and average 71 cm in depth; whereas, the postholes (Features 49 and 54) associated with the remodeling of Pitstructure 2 (Features 49 and 54) are packed with ashy sand and river pebbles and average only 41 cm in depth. This depth differential may reflect the result of using a superior stabilizing material around the post. The earlier posts were stabilized by placing the post against one side of the posthole instead of centering the post in the hole. Another difference in posthole construction is that the four original postholes contain no footing stones in the bottom, but the two new shallower holes do.

The dimensions of the sand-filled pits are listed in table 5. As in Pitstructure 1, these features seem to be located symmetrically around the north-south axis of the house.

Interpretations

Chronology. Sixteen datable tree-ring samples were recovered from the burned superstructure of Pitstructure 2. All datable samples are Ponderosa pine and ranged from 39 to 84 years of age when they died. The average age of these trees was 55 years. As shown in table 6, only 1 of the 16 dates is an absolute cutting date. However, this A.D. 776r date is supported by eight "v" or "vv" samples with the same date. If A.D. 776 is taken to represent the construction date, then the samples with dates of A.D. 775vv probably are missing only the outside ring. The remaining four dates range from A.D. 747 to 768 and are all "vv" dates. Thus it can be inferred that Pitstructure 2 was built in A.D. 776. The four earlier dates could be reused timbers or may be missing many of their outside rings.

Roof construction. Evidence found within Pitstructure 2 indicates that the structure had inward leaning sidewalls and a flat roof composed of poles, brush, reeds, and mud. This superstructure was supported by four vertical posts tied together by interconnecting poles. Entry through this superstructure into the house interior was through a slab-lined hatchway located in the roof above the hearth.

Remodeling. When Pitstructure 2 was remodeled, the southern postholes were retained in their original positions. The posts in the two northern main postholes (Features 42 and 57) were removed and the postholes were filled. Two new postholes (Features 49 and 54), located further north and closer to the bench face, were constructed to replace

Table 6. Tree-ring sample results, Pitstructure 2, Windy Wheat Hamlet

Sample No.	Provenience	Taxon	Inside date (A.D.)	Outside date (A.D.)
233 (DAR-120)	Feature 36 (entry)	Pinus ponderosa	688p	747vv
176 (DAR-110)	Segment 2, Level 3	Pinus ponderosa	713p	758vv
124 (DAR-101)	Feature 20 (ventilator)	Pinus ponderosa	684p	768vv
147 (DAR-107)	Segment 2, Level 3	Pinus ponderosa	701p	768vv
205 (DAR-114)	Segment 3, Level 3	Pinus ponderosa	723p	775vv
212 (DAR-116)	Segment 3, Level 3	Pinus ponderosa	725p	775vv
213 (DAR-117)	Segment 3, Level 3	Pinus ponderosa	725p	775vv
194 (DAR-113)	Segment 3, Level 3	Pinus ponderosa	728p	776vv
208 (DAR-115)	Segment 3, Level 3	Pinus ponderosa	716p	776vv
215 (DAR-118)	Segment 3, Level 3	Pinus ponderosa	714p	776vv
235 (DAR-121)	Surface 1	Pinus ponderosa	734p	776vv
130 (DAR-102)	Segment 2, Level 3	Pinus ponderosa	720p	776v
141 (DAR-105)	Segment 3, Level 3	Pinus ponderosa	720fp	776v
167 (DAR-109)	Segment 2, Level 3	Pinus ponderosa	737fp	776v
220 (DAR-119)	Segment 3, Level 3	Pinus ponderosa	726p	776v
135 (DAR-103)	Segment 2, Level 3	Pinus ponderosa	722p	776r

NOTE: DAR numbers, taxa, dates, and the following tree-ring symbols were provided by the Laboratory of Tree-ring Research, University of Arizona, Tucson:

r - Less than a full section is present, but the outermost ring is continuous around available circumference.

v - A subjective judgment that, although there is no direct evidence of the true outside on the specimen, the date is within a very few years of being a cutting date.

vv - There is no way of estimating how far the last ring is from the true outside.

the abandoned postholes. Concurrent with remodeling was a major revamping of the existing wingwall. The new wingwall was shorter and more massive than the original. Stones were removed from either end of the original wingwall and another row of stones and poles was added south of the remaining original stones (fig. 29).

Activity areas. Many of the artifacts in Pitstructure 2 appear to be neatly stored or set aside, indicating that the structure may not have been occupied when it was destroyed by fire. Taking this into account, the following activity areas are based on the pitstructure features and on the spatial distribution of the floor and bench artifacts.

Activity Area 24 centers around Feature 21, the central hearth. It is inferred that the hearth was used for cooking and heating, and to some

degree as a light source. Artifacts associated with this feature are two mule deer bones (PL's 91 and 93) and six pieces of flaked lithic debitage (PL's 68, 85, 86, and 89). A number of sherds are also present. These sherds represent one-half of a small gray ware jar (PL 92, vessel 47) and smaller portions of at least three different gray ware jars (PL 90). All of these items are located in a cluster 1.30 m east of the hearth. It is possible that this artifact cluster is not associated with hearth activities but represents another isolated activity area.

Activity Area 25, located in the southeast quarter of the main room, consists of two clusters of flaked lithic debitage. One group, containing 16 pieces of debitage, is found on the floor 35 cm south of Feature 50. The other cluster (PL 27), containing 35 pieces of debitage and one thick uniface, is located on the surface of the bench directly above the other group of items. Also associated with this activity area is a large flat cobble possibly used in the reduction process of tool manufacturing. Few of the flakes present display cortex, indicating that the initial stages of tool manufacture did not take place in the structure. However, the flakes are not extremely small pressure flakes as would be expected if finished tools were being maintained in this area. This suggests that this is a tool production area rather than a tool maintenance area.

Activity Area 26 is in the northwest corner of Pitstructure 2, between the wall and the northwest main support post (Feature 42). The artifact assemblage is the main criterion used to determine that tool manufacturing is the activity that took place in this area. Most of the items that have been assigned to this activity area are found on the surface of the main chamber. The material on the bench above this area would not necessarily be used in tool manufacture or maintenance. The

items found on the floor include a cluster (PL 151) of 21 pieces of debitage, 18 of which are microscopic-grained chert while the other 3 are fine-grained quartzite. A large lapstone (PL 147) and a bone awl (PL 150) are also present in this grouping.

Activity Area 28 is south of the western wingwall. The definition of this area depends on both artifactual content and spatial location. The stone tools found in this area, with the exception of a thick biface (PL 139), are all of the pounding and/or grinding variety. These artifacts include two abrading/grinding stones (PL's 135 and 140), one polishing stone (PL 138), and two hammerstones (PL's 136 and 137), but no metates. NFL

It has been noted in DAP pithouses that two types of activity areas generally occur south of the wingwall. A mealing area complete with metate(s), manos, and hammerstones is usually found on one side of this area. On the opposite side there is usually an area containing numerous nonflaked stone tools such as manos and hammerstones. This same spatial relationship is found in Pitstructure 2 and Pitstructure 1. This pattern of tool distribution in Pitstructure 2 is exemplified by Activity Area 28, a lithic tool storage area and by Activity Area 29, a mealing area.

Activity Area 29 is a mealing area south of the east wingwall; it is defined by a group of stone tools. The tool assemblage includes two manos (PL's 109 and 146), one hammerstone (PL78), two used cores (PL's 81 and 122), ten pieces of flaked lithic debitage (PL's 76, 77, 79, 80, 94 and 152), one unused core, four metate support stones, a trough metate (PL 106), and a polished river pebble. The hammerstones probably had many different uses, one of which may have been to roughen the surface of the metate when, through use, it became too smooth. NFL

Activity Area 30 is a ritual activity area consisting of the sipapu (Feature 48) and the paho/prayer stick marks (Feature 213) within the sipapu. For a thorough discussion concerning paho/prayer stick marks refer to Pitstructure 1.

The entire bench (Feature 19) in Pitstructure 2 constitutes Activity Area 31. Besides acting as the foundation for the side wall leaner posts, the bench was a convenient shelf for storing small items. The materials associated with the bench surface are mostly nonflaked lithic tools including four shaped slabs (PL's 12, 35, 39, and 40), one polishing stone (PL 15), three abrading/grinding stones (PL's 11, 44, and 45), three manos (PL's 8, 13, and 17), and one notched axe (PL 7). Part of a large gray ware jar sherd (vessel 43) was found on the northeast corner of the bench. The remainder of the jar sherd was found on the floor below this part of the bench. This sherd is large enough to have served as a saucer or platter. Only five flaked lithic tools were found on the bench. Four of these are unifacial tools (PL's 18, 24, 27, and 53) and one is a used core (PL 2). Twenty-eight pieces of nonhuman bone were found on the bench surface. Six of these bones are worked and the remainder are not modified. The six worked items include one high-production-input item (probably a gaming piece), one bone awl, one gouge scraper, and two bones too fragmentary for functional identification. Fourteen of the unworked bones are from large mammals such as mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), and antelope (*Antilocapra americana*). The remainder is from small game such as cottontail and jackrabbit.

Activity Area 36 is defined by a recess (Feature 30) in the south wall of the pitstructure. The basal portion of a gray ware jar (PL 5,

vessel 44) is the only floor artifact found in this feature. Storage is assumed to have been the primary function of this feature.

Pitstructure 3

Dimensions:

North-south length:	4.08 m
East-west length:	3.97 m
Wall height:	1.25 m
Area of north room:	12.5 m^2
Area of south room:	3.7 m^2
Total roofed area:	16.2 m^2

Pitstructure 3 is square with rounded corners and is oriented 9° east of true north. This pitstructure was prehistorically excavated entirely into undisturbed native soil. Modern plowing destroyed the prehistoric ground surface and trimmed the height of the pitstructure walls to 1.25 m, but an original wall height of no greater than 1.50 m can be inferred. A green, sandy plaster coats the earth walls of Pitstructure 3. Major architectural features of the structure include a use-compacted floor, a wingwall, a ventilator, an alcove, and evidence of a four-post roof support system. Figure 33 is a plan map of Pitstructure 3 showing features and floor artifacts. A north-south architectural cross section is illustrated in figure 34.

Stratigraphy

After defining the horizontal extent of Pitstructure 3 by stripping away the plow zone, a north-south trench was excavated through the center of the structure. The profile exposed in the trench wall shows that the structure filled rapidly to a depth of 75 cm (fig. 35). Above this level, wash lenses indicate gradual filling. The following description of the

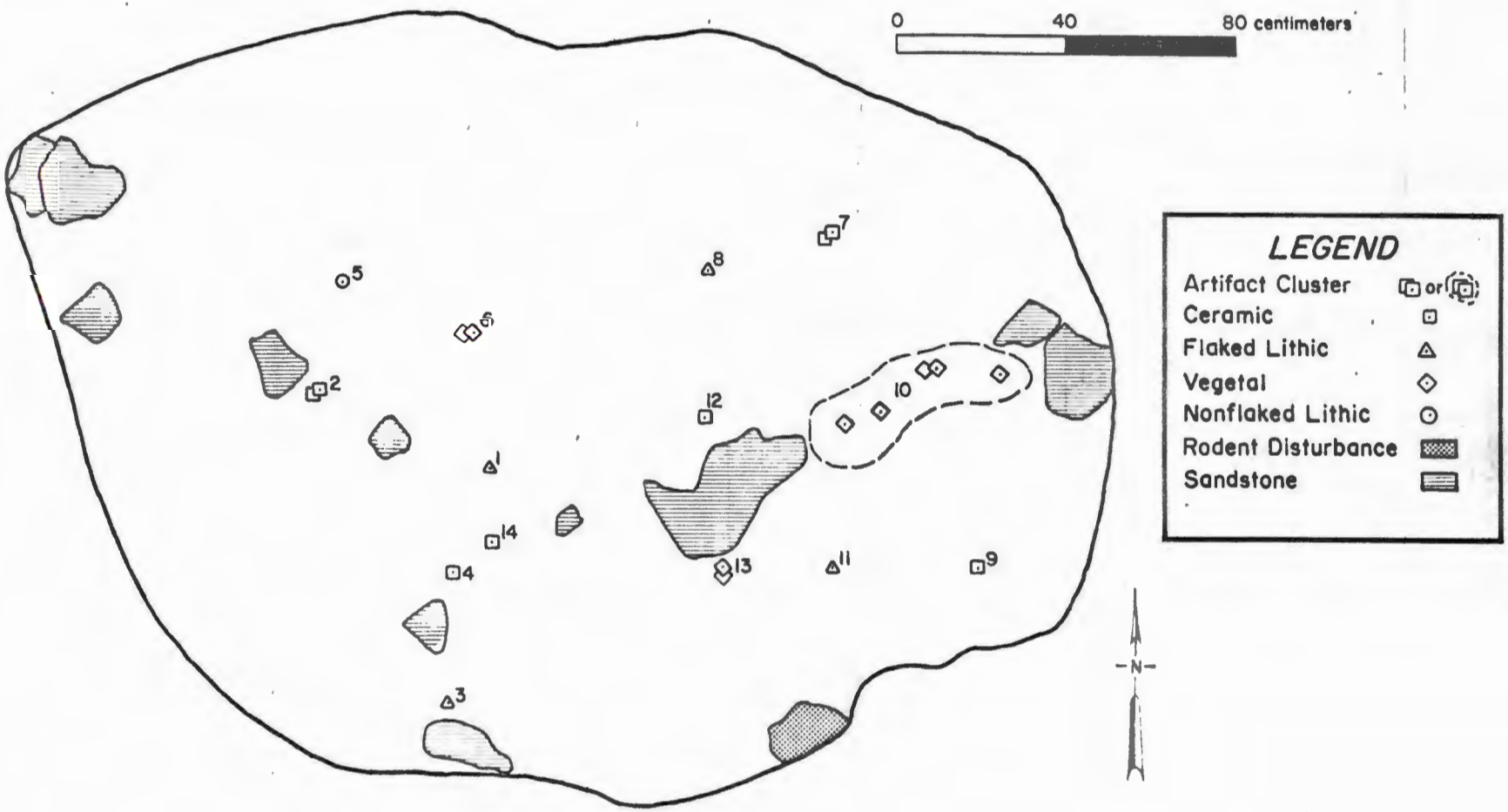
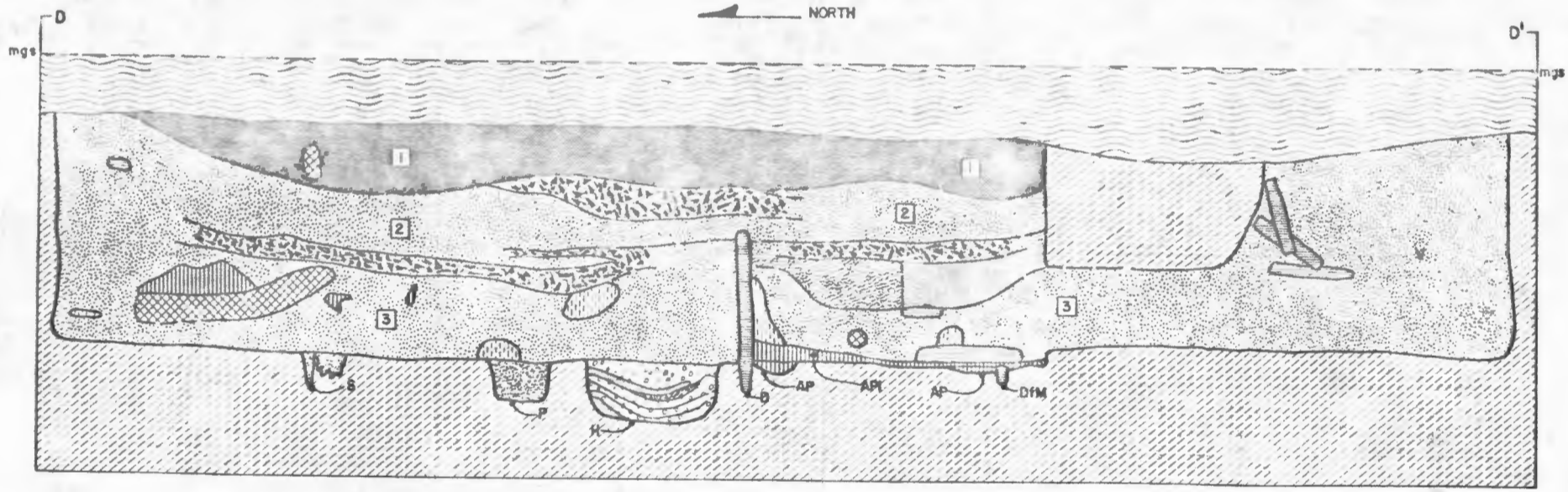


Figure 43. Plan map of Room 2, Windy Wheat Hamlet.



LEGEND

Adobe		Modern Ground Surface	mgs	Ash Pile	APi
Ash		Natural Deposits		Ash Pit	AP
Charcoal		Plow Zone		Deflector	D
Loam		Sandstone		Deflector Mold	DfM
Disturbance		Sandy Loam		Hearth	H
Inferred Line		Silty Clay Loam		Pit	P
Clay Loam		Silt		Sipapu	S
Sand		Stratum Number	N	Vent	V

0 .5 1 meter

Figure 35. Stratigraphic profile of Pitstructure 3, Windy Wheat Hamlet. The location of the profile is shown in figure 33.

stratigraphic sequence begins at the bottom of the profile. Stratum 3 is a 35-cm-deep layer of mottled, dark brown silty clay loam containing numerous cultural inclusions including artifacts, ash lenses, burned clay, and scattered charcoal fragments. Stratum 3 is capped with a 5- to 10-cm-thick layer of charcoal. Above the charcoal lens is Stratum 2, a 30-cm-thick layer of dark brown silt loam flecked with charcoal. Stratum 2 contains fewer cultural inclusions than Stratum 3. Part of Stratum 2 is capped with a 15-cm-thick deposit of charcoal. The uppermost deposit, Stratum 1, is a dark reddish-brown silt that is banded with wash lenses and dotted with occasional, tiny inclusions of charcoal and burned clay. Stratum 1 was truncated by the plow zone.

Strata 2 and 3 are interpreted to be a mixture of backfill and trash that was deposited during the construction of Pitstructure 2. Stratum 1 is interpreted to be wind- and water-deposited silt. The fill in Pitstructure 3 was excavated in a single arbitrary level that crosscut all three strata. Fill artifacts, therefore, cannot be compared by strata. In general, all three strata contained artifacts, and the number of artifacts increased with increasing depth. One artifact feature (Feature 197) was in the structure fill 50 cm above the floor.

Feature 197 is a cluster of artifacts from a 50 cm diameter area in the fill of Pitstructure 3 at the midpoint of the north wall of the structure. Artifacts in the cluster include the following: an antler tine; a bone awl; three corner-notched projectile points (one of which is made of obsidian); a projectile point fragment; a hematite pendant; and two pieces of turquoise, one of which has multiple, striated facets. This artifact cluster is interpreted to be a cache that is intrusive into the pitstructure fill. However, the outline of an intrusive pit could not be seen in the fill.

Floor

Pitstructure 3 has only one floor. This surface is use compacted and roughly level but has no other finishing or surfacing treatment. A 1-cm-deep cultural layer of sand and silt covers small areas of the floor; this layer is interpreted to be material that accumulated while the structure was in use. Along the base of the north wall is a discontinuous accumulation of yellow sand that appears to be the remains of plaster. This yellow plaster may have originally joined the floor to the wall.

Floor artifacts. The floor of Pitstructure 3 was excavated as a level rather than as a surface. The pitstructure fill was leveled off at 5 cm above the floor and then divided into 1- by 1-m squares to insure horizontal control of artifact proveniences. Point-location numbers were assigned primarily to items that were in direct contact with the floor and could be reliably associated with the surface. However, a few point-location numbers were assigned to items resting in the 5 cm of fill above the floor and not associated with the occupation surface.

Table 7 lists the point-located artifacts found during the excavation of the floor. Figure 33 shows the spatial relationship of the point-located artifacts.

Artifact patterns. Pitstructure 3 was deliberately abandoned; thus the prehistoric inhabitants removed many of the household items. The floor artifacts that remain are de facto refuse: usable materials that were left behind by choice. Patterns within the de facto refuse are described, but they are difficult to interpret because most of the associated household tools and furnishings are gone.

Ceramics: Most of the sherds in the central and western portion of the structure belong to a Mesa Verde Chapin Gray jar (vessel 24) that

Table 7. Point-located artifacts, Pitstructure 3, Windy Wheat Hamlet

PL No.	Material class	Item description
*1	Ceramic	CA Early Pueblo Gray jar sherd
		BL Black-on-red bowl sherd
*2	Vegetal	Pinus sp. wood, noncharred (19.2 g)
3	Nonflaked lithic	Abrading/grinding stone
4	Flaked lithic	Unused core
5	Nonflaked lithic	Not culturally modified
*6	Nonflaked lithic	Not culturally modified
7	Flaked lithic	Debitage
8	Flaked lithic	Debitage
9	Nonflaked lithic	Not culturally modified
10	Nonflaked lithic	Not culturally modified
11	Ceramic	DL Early Pueblo Gray jar sherd
12	Ceramic	DL Chapin Gray jar sherd
13	Nonflaked lithic	Abrading/grinding stone
14	Flaked lithic	Debitage
*15	Vegetal	Pinus sp. wood, noncharred (14.7 g)
17	Ceramic	DL Chapin Gray jar sherd
23	Ceramic	DL Early Pueblo Gray jar sherds (25)
24	Flaked lithic	Unused core
25	Flaked lithic	Angular debris
26	Ceramic	BL Early Pueblo Red bowl sherds (2)
27	Nonhuman bone	Sylvilagus sp.
		Mammalia or Aves
28	Nonflaked lithic	Item misplaced
29	Flaked lithic	Angular debris (2)
30	Flaked lithic	Debitage (2)
31	Flaked lithic	Thick uniface
32	Nonflaked lithic	Not culturally modified
34	Ceramic	Item misplaced
35	Flaked lithic	Debitage
36	Ceramic	Item misplaced
37	Nonflaked lithic	Shaped stone slab
38	Ceramic	DL Early Pueblo White bowl sherd
39	Nonhuman bone	Mammalia, medium
41	Flaked lithic	Debitage
42	Ceramic	Item misplaced
*43	Ceramic	DL Chapin Gray jar sherd
44	Ceramic	DL Early Pueblo Gray jar sherd
45	Ceramic	DL Early Pueblo Gray jar sherds (4)
		DL Chapin Gray jar sherd

NOTES: PL numbers not listed represent items either located in the vent (table 9) or later determined not to be associated with the floor. See figure 33 for artifact locations.

DL - Dolores Manufacturing Tract.
BL - Blanding Manufacturing Tract.
(N) - Number of items.
(g) - Weight of items.

Table 7. Point-located artifacts, Pitstructure 3, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
46	Ceramic	DL Early Pueblo Gray jar sherd
47	Ceramic	DL Early Pueblo Gray jar sherd
48	Ceramic	DL Early Pueblo Gray jar sherd
49	Ceramic	DL Chapin Gray jar sherd
50	Ceramic	Item misplaced
*51	Ceramic	DL Early Pueblo Gray jar sherd
52	Ceramic	BL Early Pueblo Red bowl sherd
53	Ceramic	DL Chapin Gray jar sherds (2)
54	Ceramic	DL Chapin Gray jar sherds (13): vessel 24
*55	Nonhuman bone	*Lepus californicus*--pierced tubes (2)
57	Ceramic	DL Chapin Gray jar sherds (13): vessel 24
58	Flaked lithic	Utilized flake
59	Ceramic	DL Early Pueblo Gray jar sherds (2)
60	Flaked lithic	Unused core
61	Flaked lithic	Debitage
*62	Nonhuman bone	Mammalia, small (13)
		Sylvilagus sp. (4)
		Lepus californicus (5)
		Rodentia (2)
		Cynomys gunnisoni (7)
		Marmota flaviventris (2)
		Artiodactyla
		Mammalia, medium (2)
		Grus canadensis
64	Ceramic	DL Early Pueblo Gray jar sherds (9): vessel 24
		DL Chapin Gray jar sherds (5): vessel 24
65	Nonflaked lithic	One-hand mano
66	Flaked lithic	Angular debris
67	Flaked lithic	Utilized flake
*68	Ceramic	BL Black-on-red bowl sherds (20)
69	Ceramic	DL Early Pueblo Gray jar sherds (3)
70	Flaked lithic	Corner-notched projectile point
71	Ceramic	DL Early Pueblo Gray jar sherd
72	Ceramic	DL Early Pueblo Gray jar sherd
73	Ceramic	BL Bluff Black-on-red bowl sherd
74	Nonflaked lithic	Minimally altered item
75	Flaked lithic	Unused core
76	Ceramic	DL Early Pueblo Gray jar sherd
*77	Nonflaked lithic	Hammerstone
78	Flaked lithic	Debitage
79	Ceramic	DL Early Pueblo Gray jar sherds (3)
80	Ceramic	DL Early Pueblo Gray jar sherds (2)
81	Flaked lithic	Debitage
82	Flaked lithic	Debitage
*83	Nonflaked lithic	Not culturally modified
84	Flaked lithic	Utilized flake
85	Flaked lithic	Unused core

Table 7. Point-located artifacts, Pitstructure 3, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
86	Flaked lithic	Used core
87	Ceramic	DL Early Pueblo Gray jar sherds (2)
88	Flaked lithic	Debitage
		Unused core
*89	Nonflaked lithic	Not culturally modified
90	Flaked lithic	Debitage
91	Nonhuman bone	Mammalia, small
92	Nonflaked lithic	Axe
93	Ceramic	DL Early Pueblo Gray jar sherds (18)
94	Flaked lithic	Utilized flake
		Debitage
95	Ceramic	DL Early Pueblo Gray jar sherd
96	Ceramic	DL Early Pueblo Gray jar sherd
97	Ceramic	DL Early Pueblo Gray jar sherd
98	Ceramic	DL Early Pueblo Gray jar sherds (11): vessel 24
		DL Early Pueblo Gray jar sherds (11)
99	Ceramic	DL Early Pueblo Gray jar sherds (12)
100	Ceramic	DL Early Pueblo Gray jar sherds (3)
101	Flaked lithic	Debitage
102	Ceramic	DL Early Pueblo Gray jar sherds (2)
103	Flaked lithic	Used cores (2)
104	Ceramic	DL Early Pueblo Gray jar sherd
105	Flaked lithic	Debitage (2)
106	Nonhuman bone	*Lepus californicus*
107	Ceramic	Item misplaced
108	Ceramic	Item misplaced
109	Nonhuman bone	Mammalia, small (3)
		Sylvilagus sp. (5)
		Lepus californicus (6)
		Cynomys gunnisoni (2)
		Sciuridae (2)
		Erethizon dorsatum

* Found in the fill above the floor.

appears to have been dropped or thrown to the floor when the house was abandoned. Half of this vessel (PL 54) was found intact lying directly on the floor 20 cm northwest of the hearth. Also, PL's 57, 98, and 64 were part of this vessel and were scattered as far as 2 m east of PL 54. Another cluster of gray ware sherds (PL's 93, 98, and 99) was found on the floor around the sipapu and appears to be the basal portion of a Early Pueblo Gray jar.

Two partial vessels were found in the fill just above the floor. One of these was a fragmented Bluff Black-on-red bowl, PL 68; the fragments were scattered along the base of the north wall 1 to 2 cm above the floor. The other partial vessel was a gray ware jar (PL 23), which was broken on top of a pile of rocks (Feature 158) in the southwest corner of the structure. Both of these vessels are inferred to be postoccupational trash because of their positions in the fill.

The rest of the sherds on the floor are small and widely scattered. Most of these are gray ware jar sherds, although a couple of white ware and red ware bowl sherds are also present. These isolated sherds could be debris from vessels that were broken and discarded during the occupation of the structure; however, it is more likely that they were introduced with the initial postoccupational fill and were in contact with the floor only by chance.

Flaked lithic items: Relatively few flaked lithic items were found on the floor of the structure, and it is impossible to say how many of these were introduced with the initial postoccupational fill. Most of the flaked lithic items are debitage, which suggests that some lithic tool production or maintenance may have occurred inside the structure. Flaked lithic tools on the floor include a utilized flake, cores, a thick uni-

face, and a projectile point. Most of the flaked lithic items were found in the corners of the structure or near the wingwall.

A cluster of flaked lithic items may have been left in the southwest corner of the structure at the time of abandonment, but a postoccupational trash dump in this area (Feature 158) makes it impossible to separate the floor artifacts from the trash.

Nonflaked lithic tools: Several nonflaked lithic tools including two abrading/grinding stones (PL's 3 and 13), a minimally altered cobble (PL 74), shaped and unshaped sandstone slabs, an axe (PL 92), and a mano (PL 65) were on the floor of the north room in Pitstructure 3. These items were in the corners and along the walls of the structure. The two abrading/grinding stones and a minimally altered cobble (PL's 3, 13, and 74) are large items that were probably left in or near the original location of use or storage at the time of abandonment. A shaped sandstone slab (PL 37) is large enough to cover a floor cist, but is not associated with any of the floor features that were in use at the time of abandonment. A thick slab (PL 32) that lies next to the wingwall just west of the hearth was not modified and was probably a building stone. Another unmodified sandstone slab (no PL number) is a thin, tabular piece that lies near the east wall adjacent to Feature 173, a sand-filled pit. Near this tabular slab against the east wall of the house was a mano (PL 65). Most of these items are probably de facto refuse, but it is possible that some of them were introduced with the initial postoccupational fill.

In the south room of the structure are two metates and numerous cobble tools, but none of these items can definitely be called de facto refuse. Feature 156 is a partial trough metate in the southeast corner of

the structure; it is interpreted to be part of the fallen wingwall construction. Feature 144 is a trough metate that was found in fill 5 cm above the floor just west of the ventilator tunnel opening. This metate, if it is a floor artifact, has been moved from its original location in the structure. Adjacent to this metate on the floor next to the wingwall are a river cobble (PL 28) and a metate fragment, but these items may be related to a nearby postoccupational trash dump (Feature 158) in the southwest corner of the structure.

Nonhuman bone: Three nonhuman bones (PL's 27, 39, and 91) are directly associated with the floor of the structure. Two worked jackrabbit bones (PL 55) were in the northwest quadrant of the structure in fill 5 cm above the floor; a large number of bones (PL 62) were in a postoccupational dump (Feature 158) in the southwest corner of the structure. Other nonhuman bones were recovered from features in Pitstructure 3.

Vegetal material: Other than charcoal flecks in the thin sandy floor deposit, no observable vegetal remains are directly associated with the floor of Pitstructure 3. Two rotted post fragments were found lying horizontally in the fill 10 cm above the structure floor. These fragments were 40 cm long and 5 cm in diameter. One lay near a posthole in the northwest corner of the structure, and the other was near a posthole in the northeast corner of the structure. These fragments are inferred to be remnants of the roof support system.

Features

The features in Pitstructure 3 are divided into four categories: major features, postholes, smaller pits, and artifact features. The features are summarized in table 8.

Table 8. Feature summary, Pitstructure 3, Windy Wheat Hamlet

Feature No.	Type	Plan	Profile	Length (cm)	Width (cm)	Depth/ height (cm)
136	Ventilator system					
	ventilator shaft	Complex	Complex	105.0	105.0	90.0
	ventilator tunnel	Complex	Complex	96.0	53.0	36.0
142	Alcove	D-shaped	Other	216.0	106.0	30.0
144	Metate	n.a.	n.a.	62.0	49.0	8.0
154	Deflector	Rectangular	Rectangular	55.0	12.0	66.0
155	Wingwall	Complex	Rectangular	405.0	15.0	57.0
156	Metate	n.a.	n.a.	43.0	39.0	6.5
157	Pot rest	Round	Basin	26.5	22.5	2.4
158	Lithic concentration	n.a.	n.a.	72.0	44.0	17.0
159	Posthole	Round	Cylindrical	18.0	17.0	50.0
163	Ash pit	Oval	Basin	25.0	19.0	2.0
164	Posthole	Round	Cylindrical	18.5	18.0	41.5
165	Hearth	Round	Basin	64.0	58.0	24.0
166	Warming pit	Round	Basin	45.0	44.0	2.0
167	Warming pit	Round	Basin	50.0	45.0	2.0
168	Unburned pit	Oval	Basin	24.5	17.5	5.5
169	Posthole	Round	Cylindrical	25.0	23.0	52.0
170	Unburned pit	Oval	Basin	28.0	25.0	6.0
171	Unburned pit	Round	Cylindrical	29.4	25.3	15.5
172	Complex sipapu	Irregular	Irregular	21.0	17.0	15.0
173	Unburned pit	D-shaped	Basin	26.0	23.0	10.0
174	Posthole	Round	Cylindrical	23.0	24.0	56.0
175	Ash pit	Oval	Other	28.0	18.0	5.0
176	Deflector mold	Rectangular	Rectangular	18.0	2.0	7.0
177	Wall niche	D-shaped	Other	66.0	46.0	37.0
182	Lithic concentration	n.a.	n.a.	46.0	38.0	16.0
187	Wall feature: entry	Rectangular	Rectangular	30.0	10.0	50.0
188	Wall feature: entry	Rectangular	Rectangular	30.0	10.0	50.0
189	Ventilator cover	n.a.	n.a.	42.0	38.0	4.0
*197	Mixed artifact concentration	n.a.	n.a.	50.0	50.0	50.0
198	Ash pile	Oval	Other	50.0	110.0	6.0
214	Cluster of small holes	Irregular	Irregular	2.0	2.0	10.0

* Located in postoccupational fill.

NOTES: See figure 33 for feature locations. Feature 197 is not mapped because it was not associated with the floor.

n.a. - Not applicable.

Major features. The major architectural or floor features include the wingwall, ventilation system, hearth, warming pits, ash pits, ash pile, deflector, deflector mold, alcove, and wall niche.

Wingwall (Feature 155): The wingwall is a partition that divides the pitstructure into a north room and a south room. The wingwall is constructed of a single row of vertical sandstone slabs set into floor grooves, mortared into place, and completely covered with a layer of adobe and a layer of plaster. The midsection of the wingwall is created by the deflector (Feature 154). Access from the north room to the south room is through one of the two entries (Features 187 and 188) that are gaps in the wingwall on either side of the deflector. A 5-cm-high ridge of adobe runs across the floor below each entry and attaches the deflector to the rest of the wingwall. Also incorporated into the wingwall construction are two roof support posts (Features 159 and 164). Figure 36 illustrates the construction of the wingwall. The easternmost vertical slab in the wingwall was not in place at the time of excavation, but is believed to have been the fragmentary metate (Feature 156) that was found lying adjacent to the gap in the wingwall on the floor of the south room.

Ventilation system (Feature 136): The ventilation system consists of a vertical shaft that is connected to the main chamber by a low, 1-m-long tunnel. The ventilator tunnel opens into the center of the south wall, and the floor of the ventilation system is level with the floor of the structure. No postholes or other features were found within the ventilation system, but a shaped sandstone slab (Feature 189) was found lying on the floor directly in front of the ventilator tunnel. This rectangular slab is probably a ventilator tunnel cover.

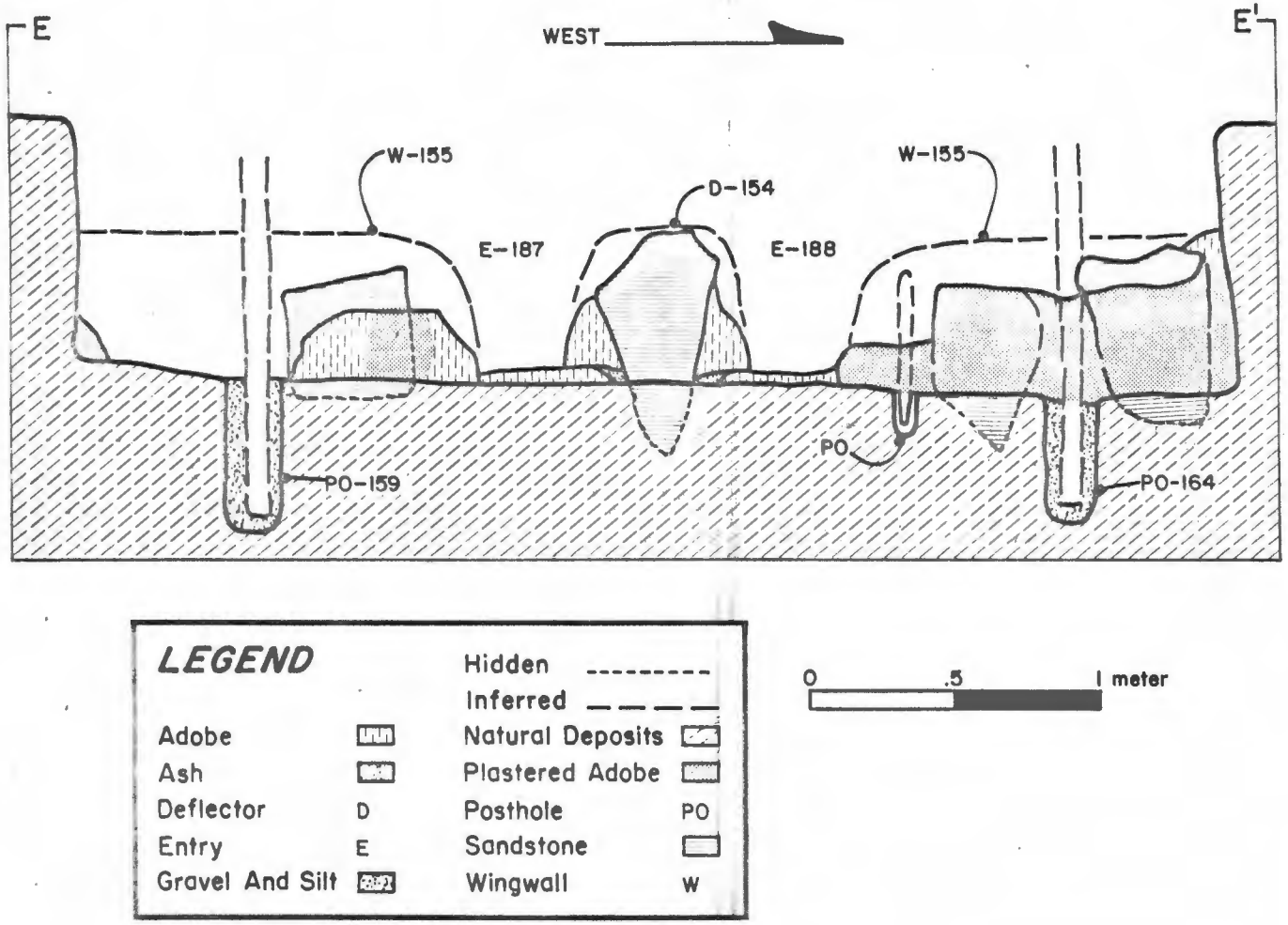


Figure 36. Wingwall construction, Pitstructure 3, Windy Wheat Hamlet.

The ventilator fill appears to have been rapidly deposited and contains several layers of large sandstone slabs. There is no indication that the slabs in the fill were part of a collapsed shaft lining. Both faces of one of the sandstone slabs in the upper shaft fill were decorated with elaborate pecked designs consisting of perpendicular lines and small circular pits (fig. 37).

Few artifacts were found in the fill of the ventilation system. The artifacts found on the floor were given point-location numbers (table 9); however, all of these items appear to be postoccupational trash rather than floor materials left behind by the occupants of the structure. The base of an Early Pueblo Gray jar (PL 40) was found in the fill several centimeters above the floor.

Table 9. Point-located artifacts in the ventilator system, Pitstructure 3, Windy Wheat Hamlet

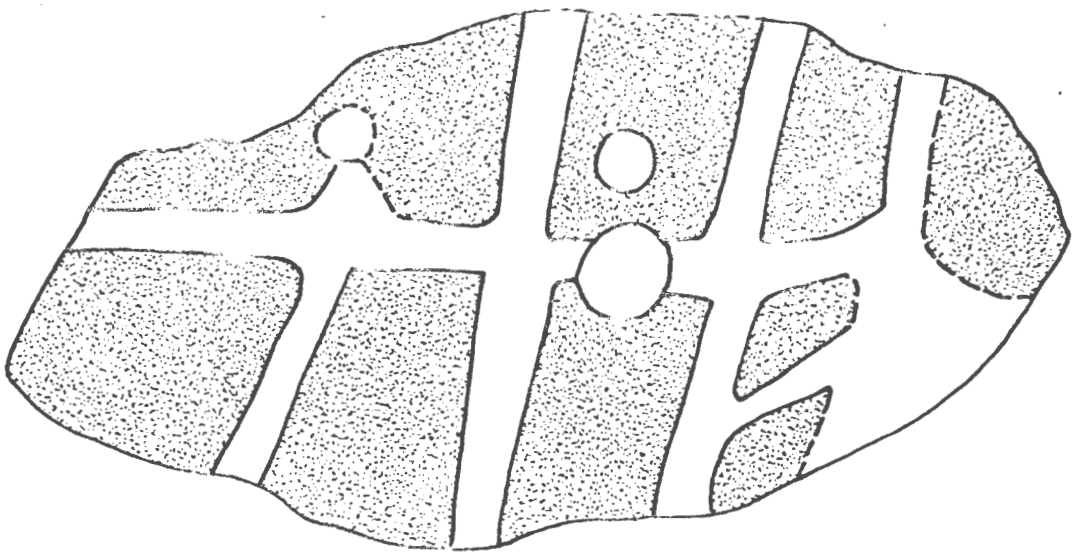
PL No.	Material class	Item description
18	Nonhuman bone	*Sylvilagus* sp.
19	Nonhuman bone	*Falco sparverius*
20	Nonhuman bone	Mammalia, small
		Falco sparverius
21	Nonhuman bone	*Falco sparverius* (2)
22	Nonhuman bone	Mammalia, medium
*40	Ceramic	DL Early Pueblo Gray jar sherds (14)
56	Nonhuman bone	Sciuridae
63	Nonflaked lithic	Abrading/grinding stone

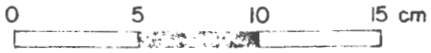
* Found in fill slightly above the floor.

NOTES: See figure 33 for artifact locations.

DL - Dolores Manufacturing Tract.
(N) - Number of items.

Hearth (Feature 165): The hearth is slightly south of the centerpoint in Pitstructure 3 and is the most prominent floor feature in the





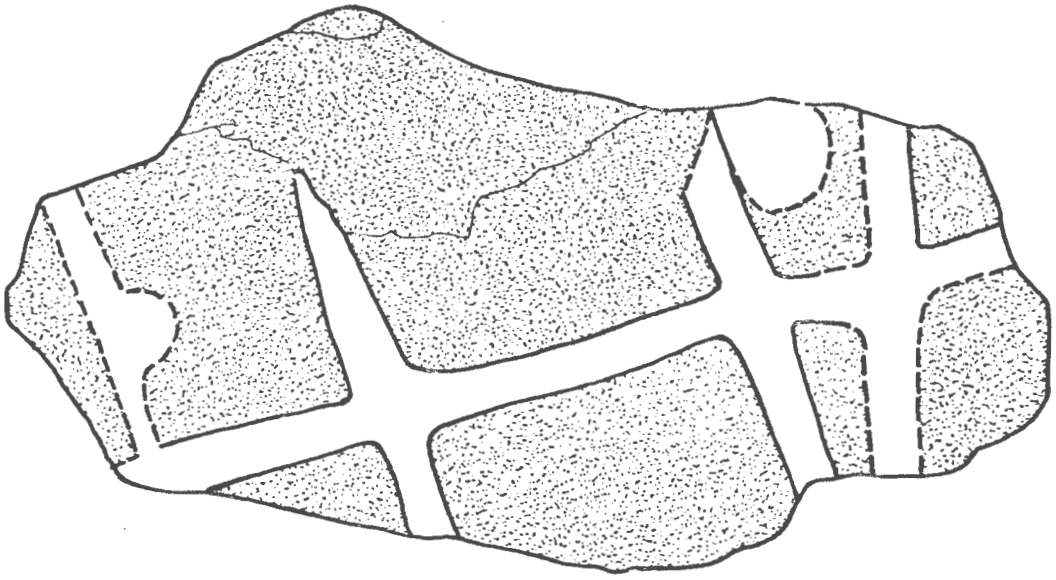


Figure 37. Pecked designs in sandstone slabs found in upper fill of the ventilator shaft, Pitstructure 3, Windy Wheat Hamlet.

structure. A 2-cm-high, 5-cm-wide band of adobe forms a raised rim that completely encircles the hearth. Repeated fires have turned the walls and rim of the hearth a bright orange. The hearth fill consists of a repeated sequence of brown sandy loam and charcoal lenses. This sequence indicates that the hearth fire was periodically smothered with a thin layer of sediment. The hearth fill was wet screened through one-sixteenth-inch mesh screen. A total of 41 nonhuman bones were recovered, including 29 unidentifible small mammal bones, 10 rodent bones, and 2 cottontail bones. These bones are believed to represent food scraps from meals prepared and eaten in the structure.

Warming pit (Feature 166): Feature 166 is a shallow, basin-shaped depression located immediately west of the hearth. This feature contains a shallow deposit of sand and ash. Because of its proximity to the hearth, this feature is interpreted to be a warming pit.

Warming pit (Feature 167): Feature 167 is a shallow, basin-shaped depression located immediately east of the hearth. This feature contains a shallow deposit of sand and ash. Because of its proximity to the hearth, Feature 167 is interpreted to be a warming pit.

Deflector (Feature 154): The deflector is between the hearth and the ventilator tunnel opening. The deflector consists of a vertical sandstone slab that is set into a narrow trench and covered with a thick coat of adobe. The construction of Feature 154 and its position within the wingwall are shown in figure 36. The adobe coating on the deflector partially covers earlier floor features, indicating that this deflector was not part of the original construction.

Ash pile (Feature 198): Feature 198 is a deposit of ash and sand--presumably redeposited hearth material--located immediately south of the

deflector (Feature 154). Lying on top of the pile is the ventilator tunnel cover (Feature 189). The ash pile is flecked with charcoal and contains tiny sherds, flaked lithic items, and nonhuman bone fragments. This ash pile buried several floor featues.

Deflector mold (Feature 176): Feature 176 appears to be the remnants of a deflector. A vertical sandstone slab, broken at floor level, is still embedded in a narrow floor groove directly in front of the ventilator tunnel opening. This feature is buried beneath the ash pile (Feature 198).

Ash pit (Feature 175): Feature 175 is a shallow pit located 20 cm south of the hearth (Feature 165). This feature is filled with a mixture of ash, charcoal, and brown sand, all of which are inferred to be refuse from the hearth. The inhabitants apparently stopped using this feature since a deflector (Feature 154) was built on top of it. Even after the ash pit was partially covered by the deflector, ash continued to accumulate over the ash pit, creating an ash pile (Feature 198).

Ash pit (Feature 163) and deflector mold (Feature 176): Feature 163 is a shallow pit located directly north of a deflector mold (Feature 176) and 18 cm north of the ventilator tunnel opening. This pit is filled with a mixture of ash and sand, which is inferred to be refuse from the hearth. Feature 163 and its associated deflector mold (Feature 176) were both abandoned and buried under an accumulation of ash and sand (Feature 198).

Alcove (Feature 142): Feature 142 is a D-shaped recess in the east wall of the pitstructure, 30 cm above the pitstructure floor (fig. 38). The north wall of the pitstructure is almost continuous with the north wall of the alcove. No features or artifacts were found within the alcove

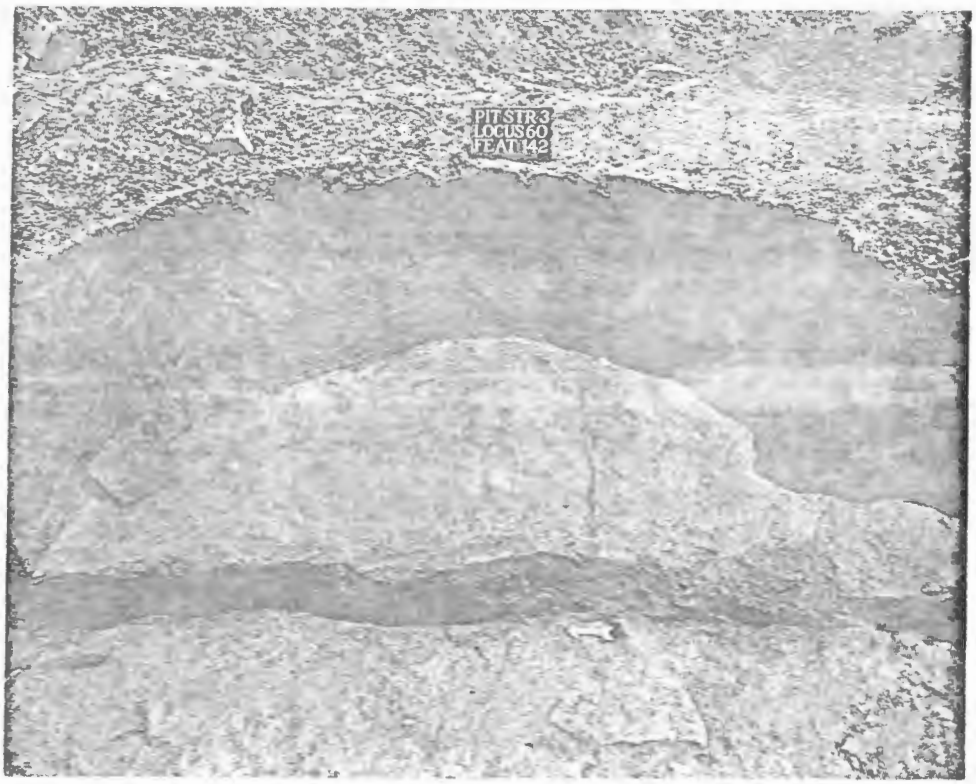


Figure 38. View of alcove (Feature 142) in east wall of Pitstructure 3, Windy Wheat Hamlet (DAP 041309).

to indicate its function, but at nearby McPhee Pueblo (Site 5MT4475) a similar alcove (Feature 267) in Pitstructure 5 contained cobble tools and a mortar (Brisbin 1983).

Alcoves above floor level are also documented in Pithouse B and Pithouse C at Mesa Verde National Park and are described as storage niches by Lancaster and Watson (1943:190-198). An alcove below floor level is documented in Pithouse A at Alkali Ridge in southeastern Utah (Brew 1946:176-179). The alcoves at Mesa Verde National Park are in the southwest and northwest corners of the pithouses, while the alcoves at Alkali Ridge and McPhee Pueblo are in the northeast corners, the same location as the alcove in Pitstructure 3 at Windy Wheat Hamlet. These alcoves are large enough to contain a person but were probably used for specialized storage rather than as work areas.

Wall niche (Feature 177): Feature 177 is located in the south wall of the south room slightly above floor level and slightly west of the ventilator tunnel opening. The niche is deeper than it is wide and is roughly rectangular in outline. No artifacts were found on the floor of the niche, but after 5 cm of postoccupational silt accumulated within the niche, the remaining space was filled with cobbles, sandstone slabs, and nonhuman bones (PL 109). This postoccupational lithic concentration has been designated Feature 182.

Postholes (Features 159, 164, 169, and 174): Four postholes were found in the floor of Pitstructure 3. Features 169 and 174 are in the northwest and northeast corners of the structure, 50 cm away from the walls. Features 164 and 159 are in the southwest and southeast corners of the structure, 75 cm from the south wall, and incorporated into the construction of the wingwall. All four postholes are similar in construc-

tion, except that the two northern holes are 24 cm in diameter while the two southern holes are 18 cm in diameter. The four postholes range in depth from 41 to 56 cm, and each has a large, flat, river cobble at the bottom. Smaller stones and a black sediment filled the postholes to within 15 cm of the pitstructure floor; the upper fill was a charcoal-flecked, brown silt. The posts apparently rested on the large, flat river cobbles, and the smaller stones were pressed into the holes to hold the posts in place. The northeastern posthole was capped with clay, leaving a 12-cm diameter opening or post mold after the post rotted. The dark fill within the postholes is further evidence that the posts rotted in place. Segments of rotted posts (PL's 2 and 15) are found in the floor fill adjacent to the northern postholes.

Smaller pits. Six small, sand-filled pits, including Features 157, 168, 170, 171, 172, and 173, are located in the floor of Pitstructure 3.

Pot rest (Feature 157): Feature 157 is a shallow, circular basin in the southeast corner of the north room. The fill is laminated and consists of a basal layer of coarse, brown sand beneath a thin layer of gray ash, which is capped by a layer of orange clay. Covering the clay cap is the charcoal-flecked silt that accumulated on the floor while the structure was occupied. This fill sequence indicates that the feature was abandoned and sealed sometime during the occupation of the structure. Based on its shape, this feature is interpreted to have been a pot rest. One flake, two unidentifiable mammal bones, and five unidentifiable rodent bones were recovered from the fill. These artifacts probably came from the sand in the bottom of the feature.

Unburned pit (Feature 168): Feature 168 is a shallow, oval, basin-shaped pit located 100 cm west of the hearth and 50 cm east of the pit-

structure wall. The lower fill is 2 cm of gray, coarse sand, while the upper fill is brown silt. The sand is a cultural deposit containing three unidentifiable small mammal bones and four pieces of debitage. The silt accumulated in the feature after the structure was abandoned. No function can be determined for Feature 168.

Unburned pit (Feature 170): Feature 170 is a shallow, slightly oval basin, located in the northwest quadrant of the pitstructure, 90 cm from the west wall and 95 cm from the north wall. This pit was filled with a light brown sand that contained flecks of charcoal and a few small pieces of clay. A few tiny flaked lithic items were observed in the fill. A 1-cm-deep, laminated deposit of silt covered the sand within the feature. The sand is a cultural deposit, whereas the silt layer accumulated after the structure was abandoned. No function can be determined for Feature 170.

Unburned pit (Feature 171): Feature 171 is a round, cylindrical pit located 10 cm north of the hearth in the middle of the pitstructure. The fill is a gray-brown, charcoal-flecked sand mottled with brown earth. At a depth of 10 cm, this homogeneous sand fill is interrupted by a 5-mm-thick lense of clean, coarse-grained sand. No ash is present within this feature. This feature is thought to represent a sand repository used in conjunction with the hearth. Similar features are found in Pitstructures 1 and 2. For a discussion of sand repositories, refer to Feature 72, Pitstructure 1.

Sipapu (Feature 172) and a cluster of small holes (Feature 214): Feature 172 is located 90 cm north of the hearth, 100 cm south of the north wall of the pitstructure, and on a north-south line with the hearth, the deflector, and the ventilation system. Feature 172 is comprised of

two connected pits. The northern pit has a 10-cm diameter opening that quickly narrows to a 4-cm diameter shaft and then narrows again to a 1.5-cm diameter shaft before reaching a depth of 15 cm. The southern pit is 10 cm wide and 10 cm deep; in the bottom of this pit is Feature 214, a series of small holes averaging 2.0 cm in diameter and ranging in depth from 1.5 to 10.0 cm (fig. 39). The entire feature was filled with a gray sand that was occasionally flecked with charcoal. No artifacts were recovered from the fill. Based on its location within the structure, Feature 172 is interpreted to be a sipapu. Sipapus riddled with small holes are also documented in Pitstructures 1 and 2 in this report. These small holes are interpreted to be evidence of ceremonial activities during which sharpened sticks (possibly pahos) were inserted into the fill of the sipapu. This idea is also presented by Kuckelman (1983), who describes a figure-eight, hole-riddled sipapu (Feature 23) at Aldea Sierritas (Site 5MT2854), a nearby Sagehen Phase Hamlet.

Unburned pit (Feature 173): Feature 173 is a D-shaped basin located in the northeast quadrant of the structure, 45 cm from the east wall and 100 cm from the north wall. The lower fill is a 3-cm-thick layer of light brown sand, while the upper fill is a 7-cm-thick deposit of brown, charcoal-flecked sand. The lower fill is basin shaped and reaches almost to the top of the feature's south wall, indicating that some of the lower fill was scooped out of the feature. The depression in the lower fill was preserved when the upper fill was deposited. One piece of debitage was recovered from the fill. No functional interpretation of this feature is offered.

Artifact features. Artifact features associated with the floor of Pitstructure 3 include two metates (Features 144 and 156), two lithic

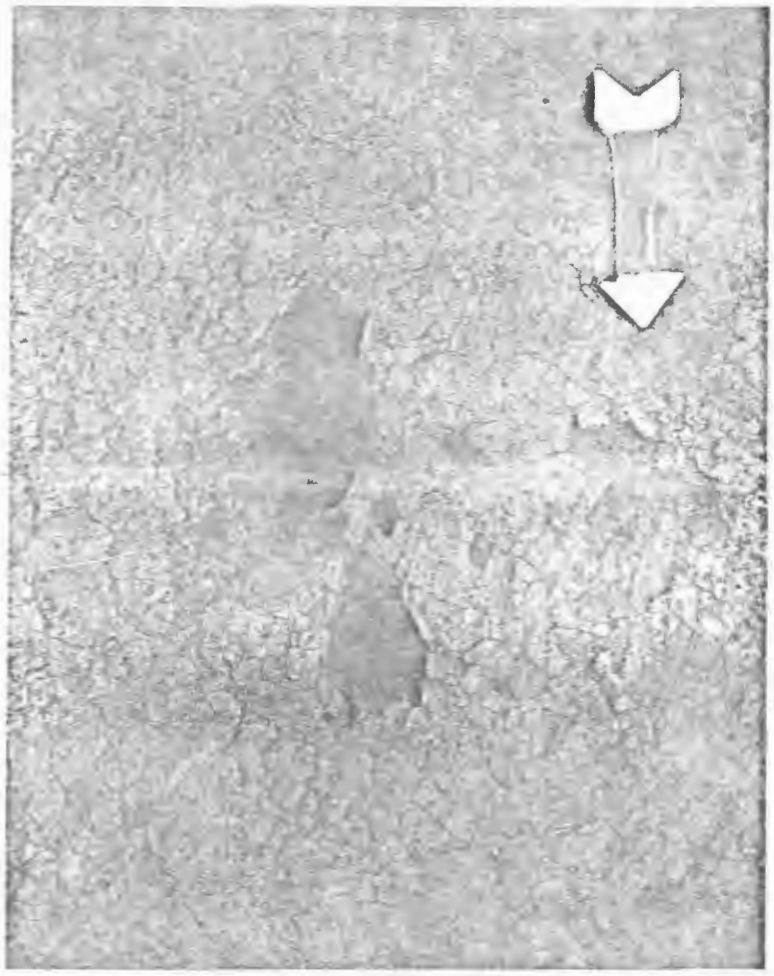


Figure 39. Sipapu (Feature 172), Pitstructure 3, Windy Wheat Hamlet (DAP 043220).

concentrations (Features 158 and 182), and the vent tunnel cover (Feature 189).

Metate (Feature 144): Feature 144 is a trough metate located in the south room just west of the vent tunnel opening. The metate lies "trough up," but is separated from the structure floor by several centimeters of fill, indicating that the metate is not in its original position within the structure and possibly that the metate was thrown into the abandoned structure.

Metate (Feature 156): Feature 156 is an incomplete trough metate in the east end of the south room. The metate lies "trough up" and is separated from the structure floor by only a thin layer of silt. The missing fragment from the metate is not in the fill on the floor around the metate. A gap in the wingwall adjacent to this broken metate suggests that this metate may be a fallen wingwall construction slab rather than an "in situ" mealing tool.

Lithic concentration (Feature 158): Feature 158 is a jumbled pile of flaked lithic items and sandstone slab fragments in the southwestern corner of the south room (fig. 40). The materials in the bottom of the pile lie directly on the floor, but much of the debris appears to be refuse that was deposited when the structure was abandoned or shortly thereafter. Artifacts within Feature 158 include 2 hammerstones, 3 used cores, 15 unused cores, 1 cobble tool, 1 utilized flake, and 2 pieces of flaked lithic debitage.

Lithic concentration (Feature 182): Feature 182 is a jumbled pile of manos, river cobbles, and small sandstone slabs that were found within Feature 177, a wall niche in the southwest corner of the structure. These materials rest on 6 cm of silt rather than on the floor of the niche,

Figure 40. View of artifact concentration (Feature 158), Pitstructure 3, Windy Wheat Hamlet (DAP 041331).

suggesting that the stones are postoccupational refuse. Artifacts found in Feature 182 include two two-hand manos, one minimally altered nonflaked lithic item, one used core, and one thick uniface.

Ventilator tunnel cover (Feature 189): Feature 189 is a shaped, sandstone slab that lay on top of an ash pile directly in front of the ventilator tunnel opening. The edges of the slab are flaked so that the slab perfectly fits the ventilator tunnel opening, thus the slab is inferred to be a cover for the ventilator tunnel.

Patterns observed. All features within Pitstructure 3 are listed in table 8. A prominent pattern among the floor features is the square formed by the postholes, Features 159, 164, 169, and 174. These postholes are 2.5 m apart north-south and 2.6 m apart east-west. All four postholes are identical in construction.

Another prominent pattern is the alinement of features on the north-south axis of the structure. The 10 features in this line include (north to south) the sipapu (Feature 172), an unburned sand-filled pit (Feature 171), the hearth (Feature 165), the deflector (Feature 154), two ash pits (Features 175 and 163), a deflector mold (Feature 176), an ash pile (Feature 198), the ventilator tunnel cover (Feature 189), and the ventilation system (Feature 136). All of these features, with the exception of the sipapu, appear to be interrelated. The ash pits and the ash pile contain material presumably removed from the hearth. The deflectors are set between the ventilator and the hearth to prevent direct air currents from hitting the hearth, and the ventilator tunnel cover could be used to shut off incoming air completely. The unburned sand-filled pit is thought to be functionally related to the hearth as a repository for sand used to smother fires, but this relationship has not

been clearly demonstrated. A stratigraphic profile through these features clearly shows that the deflector mold and the two ash pits predate the deflector and the ash pile. Also related to the hearth, but not actually in the north-south line, are the two shallow warming pits (Features 166 and 167) that flank the hearth.

Two unburned sand-filled pits are on the west side of the structure and two are on the east side; however, the arrangement lacks bilateral symmetry. Two of these pits, Feature 170 on the west side and Feature 173 on the east side, appear to be related. Both features are similar in shape and size, both are completely filled with sand, and both are 30 cm south or southeast of a main support post. The function of these floor features is unknown.

Interpretations

Chronology. Pitstructure 3 did not burn, so no structural timbers were preserved to provide tree-ring dates. The pitstructure can be tentatively dated based on ceramic typology and stratigraphy. Mesa Verde Early Pueblo Red sherds, which are present on and near the floor of Pitstructure 3, do not appear in the project area prior to A.D. 725 (Blinman 1982). It is also assumed (based on the presence of trash in Pitstructure 3), that Pitstructure 2, which was built in A.D. 776, postdates Pitstructure 3. Based on these assumptions, Pitstructure 3 must have been abandoned after A.D. 725 and before A.D. 776. For a more complete discussion about the construction date of Pitstructure 3 refer to the section on chronology.

Roof construction. Four postholes and two sections of rotted post are the only remnants of the roof construction. The four posts probably supported a pole frame covered with vegetal material and adobe. No

evidence remains of the framework or vegetal roofing because the structure did not burn. The structure did not have a bench, but a shallow shelf into which the framework poles were set, may have encircled the structure at ground level. Plowing would have destroyed any evidence of this shelf and its shallow postholes. This leaner pole shelf is inferred by the presence of a shelf around a nearby, contemporaneous pitstructure (Pitstructure 1 at Site 5MT2193 [Brisbin et al. 1981]). No evidence could be found to indicate the mode of entry into the structure, but the entrance was probably a hatchway in the roof.

Remodeling. At some point during the occupation of Pitstructure 3 the original floor features between the hearth and ventilator were replaced with a new set of features. Figure 41 illustrates the remodeling sequence. The original features included two ash pits (Features 163 and 175) and a deflector (Feature 176). The main goal of remodeling seems to have been relocation of the deflector. The original deflector was set close to the vent tunnel opening over 1 m south of the hearth. This feature was dismantled and a new deflector (Feature 154) was built immediately south of the hearth. The new deflector was partially built over a low ridge of adobe and ash deposits in Feature 175. This was discovered by the excavators when Feture 154 was dismantled to determine its method of construction. After relocation of the deflector, the positions of the original adobe ridge to the east and west of the deflector were built up to form an extended wingwall joining the new deflector. After the new deflector was built, the original two ash pits were no longer used, but ash and sand continued to be deposited in this area until a 5-cm-deep ash pile (Feature 198) had completely buried the old floor features.

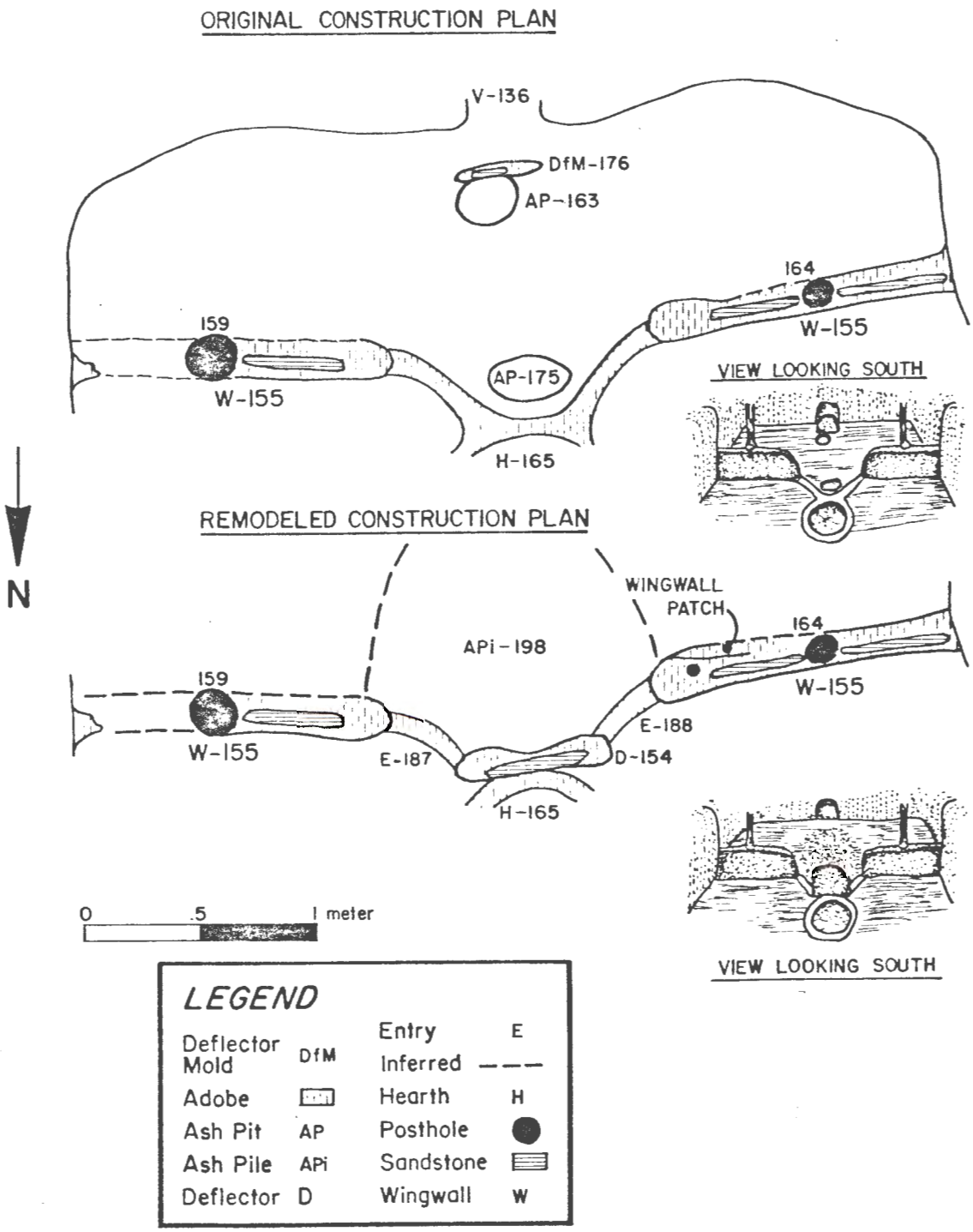


Figure 41. Pitstructure 3 remodeling sequence, Windy Wheat Hamlet.

The south face of the wingwall also underwent slight modification. A 5-cm-thick layer of adobe was applied to the wall between the west entry and the main support post. This application of adobe preserved a narrow strip of burned floor, indicating that a localized fire occurred in the south room prior to remodeling of the wingwall. A connection between the small house fire and the deflector relocation cannot be demonstrated, but a correlation of the two events is suggested.

Activity areas. An attempt has been made to define activity areas within Pitstructure 3. Three factors make household activity areas difficult to define: (1) no vegetal materials were preserved on the structure floor, (2) many of the household items were removed when the structure was abandoned, and (3) an unknown percentage of the floor artifacts may have been deposited in the structure in the initial postoccupational fill. The household activity areas that have been defined are therefore tentative.

Activity Area 37 includes the hearth (Feature 165), two warming pits (Features 166 and 167), and an unburned sand-filled pit (Feature 171). The assumed functions of the hearth include cooking as well as heating and lighting. Numerous nonhuman bones in the ash fill of the hearth are interpreted to be residue from the meals cooked in this area. Presumably, the warming pits flanking the hearth were used to heat food. The unburned sand-filled pit north of the hearth has been interpreted as a reservoir for sand that was periodically placed in the hearth for an undetermined purpose. The only nearby floor artifact that might be related to cooking activities is a Chapin Gray jar (PL 54, *vessel 24*).

Activity Area 38 consists of a single sand-filled pit (Feature 172) that is interpreted to be a sipapu. The bottom of the sipapu is riddled

with small holes (Feature 214), which could have been produced when plume holders and prayer sticks were inserted into the sand fill of the feature.

Activity Area 39 consists of a D-shaped wall recess (Feature 142). This alcove is interpreted to be a storage area, but no evidence of the contents was discovered. Activity Area 40 consists of a wall niche (Feature 177) that is by definition a storage area. No materials were found on the floor of this feature.

Activity Area 41 is defined by a cluster of four artifacts in the southwest corner of the north room. These artifacts include a large, flat, abrading/grinding stone (PL 3) that is pecked on both sides, an unused core (PL 4), and two large pieces of debitage (PL's 7 and 8) of similar material; the flakes look as if they were produced from the same core. The vertical force indicated by the pecking on the abrading/grinding stone and the identical flakes around the abrading/grinding stone suggest that some type of tool production occurred in this area.

Activity Area 43 is defined by a cluster of lithic artifacts in the northeast corner of the structure. These artifacts include a large, flat, minimally altered river cobble (PL 74), a used core (PL 86) and two unused cores (PL's 75 and 88) of identical material. The cobble is very heavy and probably was used on the floor in or near its present location. This cobble shows no cultural wear on either surface. A core is found on either side of the cobble, and all of these items are between the northeast roof support post and the wall of the structure. Just south of the cobble is an unburned sand-filled pit (Feature 173) and a stemmed, orthoquartzite projectile point (PL 70). Although some type of economic activity area is suggested by this grouping of materials, no specific activity can be determined.

After Pitstructure 3 was abandoned, it was used as a discard pit for a short period of time. The discard activity (Activity Area 44) occurred after 2 to 5 cm of fill had accumulated on the floor of the structure. At this level in the fill of both the main chamber and the ventilator three partial vessels (PL's 23, 40, and 68), a metate (Feature 144), a worked bone cluster (PL 55), a cluster of nonhuman bones (PL 62) mixed with a pile of cores and hammerstones (Feature 158), and a pile of lithic material (Feature 182) in the fill of a wall niche (Feature 177) are found. This material may have been deposited when Pitstructure 2 was under construction.

Activity Area 45 is defined by a cluster of artifacts (Feature 197) found in the fill of Pitstructure 3, 50 cm above the floor of the structure and adjacent to the midpoint of the north wall. This intrusive feature includes tools and exotic lithic materials. Feature 197 is interpreted to be a cache that was stored in the fill of Pitstructure 3 by the occupants of either Pitstructure 1 or Pitstructure 2.

Abandonment. Pitstructure 3 was intentionally abandoned and many of the household items were removed at abandonment. An indeterminate length of time passed before renewed activity on the site resulted in trash deposition in the structure. This renewed activity is inferred to be the construction of Pitstructure 2. It is possible that Pitstructure 3 was dismantled at this time to salvage usable materials for the new structure. The northern roof support posts in Pitstructure 3 appear to have rotted in place, but the southeast main support post may have been salvaged, which would explain why the wingwall was torn apart in this area. The removal of salvageable materials from Pitstructure 3 resulted in the deposition of a layer of mixed fill and some artifacts on the

floor. Pitstructure 3 was then partially backfilled with earth excavated from the new pitstructure. The depression that remained was eventually filled with wind- and water-deposited silt.

Room 1

Dimensions:

North-south	2.40 m
East-west	3.80 m
Depth	0.03 m
Total roofed area	9.12 m^2

The definition of Room 1 was made rather difficult by the fact that the plow zone had reached the floor of the burned structure in two places. The room was defined by the presence of one remaining upright slab in the northwest corner and by the horizontal extent of the burned structural remains. Four floor features within the boundaries of the roof fall also helped to define this room. Like all other surface structures at the site, a wattle and daub (jacal) type of construction is indicated. Figure 42 illustrates the plan of Room 1, its associated floor artifacts, and its interior features and exterior associated features.

Stratigraphy

The fill overlying Room 1 consisted of the plow zone, which was a homogeneous mixture of postoccupational loess deposits and carbonized structural remains. The plow left only a thin layer of undisturbed fill on the floor of the room. This fill contained burned sage, burned adobe, and charcoal, as well as the remains of burned clusters of corn and beans. One whole Chapin Gray jar (vessel 48) was found in the fill.

Floor

The floor is flat in profile and use compacted. To level the floor,

Figure 42. Plan map of Room 1, Windy Wheat Hamlet. Clusters of vegetal materials were mapped but were not assigned point-location numbers. Features outside of Room 1 are associated with the occupation area.

the room was probably excavated into the prehistoric ground surface to a depth of 5 to 10 cm until a level area was created. Although evidence in Room 1 for shallow excavated walls has been destroyed by plowing, excavated walls are preserved in some of the adjacent rooms. Numerous artifacts are associated with this surface. These are listed in table 10. On the floor surface there were a total of 342 ceramic sherds, including a gray ware jar, an Abajo Red-on-orange bowl, and an Early Pueblo Red jar.

Table 10. Point-located artifacts, Room 1, Windy Wheat Hamlet

PL No.	Material class	Item description
1	Flaked lithic	Corner-notched projectile point
2	Ceramic	DL Early Pueblo Gray jar sherds (261)
		DL Early Pueblo Gray jar sherds (4)
		BL Early Pueblo Red jar sherd
		BL Abajo Red-on-orange bowl sherd
3	Nonhuman bone	Mammalia, small (38)
4	Ceramic	BL Abajo Red-on-orange bowl sherds (3)
5	Ceramic	DL Early Pueblo Gray jar sherd
6	Ceramic	DL Early Pueblo Gray jar sherds (5)
7	Flaked lithic	Utilized flake
8	Ceramic	DL Early Pueblo Gray jar sherds (52)
		BL Abajo Red-on-orange bowl sherds (9)
		BL Early Pueblo Red jar sherd
9	Ceramic	DL Early Pueblo Gray jar sherd
10	Nonflaked lithic	Anvil stone
11	Flaked lithic	Utilized flake
12	Ceramic	DL Early Pueblo Gray jar sherd
13	Ceramic	DL Chapin Gray jar sherd
14	Flaked lithic	Utilized flake
15	Nonflaked lithic	Not culturally modified
16	Flaked lithic	Debitage
17	Ceramic	DL Early Pueblo Gray jar sherd
18	Nonflaked lithic	Two-hand mano
19	Flaked lithic	Debitage
20	Vegetal	Gymnospermae wood

NOTES: See figure 42 for artifact locations.

DL - Dolores Manufacturing Tract.
BL - Blanding Manufacturing Tract.
(N) - Number of items.

In the flaked lithic category were three utilized flakes (PL's 3, 11, and 14), one projectile point (PL 1), and two cores (PL's 16 and 19). The nonflaked lithics were represented by a mano (PL 18) and an anvil (PL 10). Four sandstone slabs were also present; some of these may have been used as stable work surfaces, while others were simply stones that formed part of the superstructure. Also present on the floor were 6 clusters of carbonized beans and/or corn, and 38 small mammal bones.

Features

Table 11 provides the dimensions of all four features in the room.

Table 11. Feature summary, Room 1, Windy Wheat Hamlet

Feature No.	Type	Plan	Profile	Length (cm)	Width (cm)	Depth/ height (cm)
5	Burned pit	Oval	Basin	52	36	12
67	Hearth	Circular	Basin	56	63	15
186	Posthole	Circular	Cylindrical	16	16	15
114	Indeterminate cultural feature	n.a.	n.a.	15	15	2

NOTE: See figure 42 for feature locations.

n.a. - Not applicable.

Hearth (Feature 67). The hearth is circular and basin shaped and lies in the southeast quadrant of the room. There were no slabs used in the construction of Feature 67. Portions of the walls and bottom of the feature show light oxidation indicating in situ burning, but not at high temperatures. The fill of this feature was a homogeneous black loamy earth with a few charcoal inclusions. It is possible that most of this fill was deposited when Room 1 burned.

Unburned pit (Feature 5). Feature 5 is an oval depression located 1.80 m northwest of Feature 67. The fill of this feature consisted of

dark, loose earth with of burned roof casts, beans, and burned wood. Within the immediate area of Feature 5 are four clusters of beans. The few beans found in the fill of Feature 5 probably came from these four areas. The nature of the fill suggests that Feature 5 was open and empty when the house was destroyed.

Indeterminate cultural feature (Feature 114). Feature 114 is an adobe pad that sits above the floor level 30 cm west of the hearth. On the interior of this circular adobe pad is a shallow, basin-shaped depression. The use of this feature is unknown. It may have been built to hold a round-bottomed vessel when the hearth was being used.

Posthole (Feature 186). This posthole may represent the main support post for the northeastern corner of Room 1. It is circular in plan and cylindrical in shape. Feature 190 is a similar posthole located outside the southwestern corner of the room; this feature may or may not belong to Room 1.

Interpretations

Based on the burned remains in the fill, Room 1 is interpreted to have been a wattle-and-daub structure. The floor artifacts and features suggest that, just prior to its destruction, the structure was used for food processing activities. Although this structure is relatively small, it is conceivable that at various times during its existence the structure may have been used for habitation, but its use at the time of its destruction seems to have been food processing. Two food processing activity areas and one domestic activity area have been defined in Room 1.

Activity areas. Activity Area 46 is located in the northeastern corner of Room 1. It is defined by two utilized flakes (one of which is

hand sized), and a large cluster of beans. These items suggest that some stage of food processing took place in this area.

In the southwestern corner of Room 1 an activity area similar to Activity Area 46 was found. Activity Area 47 is defined by a large, flat anvil (PL 10) flanked on both the north and the south by two sandstone slabs. A mano (PL 18) is found in the southern part of this area 55 cm away from the anvil stone. Three clusters of beans and/or corn are also associated with these tools. This group of artifacts and food stuffs also suggests a food processing area.

Located midway between Activity Areas 46 and 47 and toward the back of the room is another area that contained the remains of a Chapin Gray jar (PL 2), a projectile point (PL 1), three clusters of beans, and a piece of debitage (PL 19). This area was not given a specific activity area number because it was felt that it was probably associated with Activity Areas 46 and 47.

Activity Area 48 is based primarily on the presence of the hearth (Feature 67) located in the southeast quadrant of the room. The few artifacts located in this area are either from the roof fall (a small Chapin Gray jar was apparently on the roof when the structure collapsed) or possibly scattered from other areas in the room. The hearth was probably used in conjunction with the domestic food processing activities taking place within the room.

Room 2

Dimensions:

East-west:	2.45 m
North-south:	1.75 m
Depth:	0.10 m
Total roofed area:	4.28 m^2

Room 2 is a small, oval, featureless room (fig. 43) located directly north of Room 3.

Stratigraphy

Historic plowing destroyed any upper stratigraphy that may have been present in this room. The only remaining undisturbed fill was lying on the floor itself. This fill was composed of fire-hardened adobe and fragments of burned poles. Some of the adobe chunks showed reed impressions. Also found in this roof fall lens were a few pieces of tabular sandstone that were probably incorporated into the wall and roof construction. The undisturbed fill and the plow zone material plainly indicate that Room 2 was of the wattle-and-daub form of construction and was destroyed by fire.

Floor

The floor of Room 2 is use-compacted native earth with no further modifications or floor features. This surface was excavated to at least 10 cm below the prehistoric ground surface. Only 11 artifacts and 3 clusters of burned corn were found on the surface of this room; these are listed in table 12. No patterning or clustering can be seen among the flaked lithic and ceramic items. These artifacts appear to be random trash and do not indicate the function of this room. The three clusters of burned corn (PL's 6, 10, and 13), on the other hand, probably are indicators of the function of the room.

Interpretations

The small size of Room 2, its lack of features, as well as the clusters of burned corn on its floor, indicate that the structure probably served as a storage room. Its position directly north of Room 3 suggests that these two rooms are related. They may have been contiguous but no clear evidence remained to demonstrate this.

Table 12. Point-located artifacts, Room 2, Windy Wheat Hamlet

PL No.	Material class	Item description
1	Flaked lithic	Used core
2	Ceramic	DL Early Pueblo Gray jar sherds (2)
		DL Chapin Gray jar sherd
3	Flaked lithic	Utilized flake
4	Ceramic	DL Early Pueblo Gray jar sherd
5	Nonflaked lithic	Not culturally modified
6	Vegetal	*Zea mays* kernels, charred (52)
		Zea mays cob fragments, charred (6)
		Zea mays inflorescence fragments, charred (5)
7	Ceramic	DL Early Pueblo Gray jar sherds (2)
		CA Early Pueblo Gray jar sherd
8	Flaked lithic	Corner-notched projectile point,
9	Ceramic	DL Chapin Gray jar sherd
10	Vegetal	*Zea mays* kernels, charred (23)
		Zea mays cob fragments, charred (11)
		Zea mays cupules, charred (10)
		Prunus virginia wood, charred (<1 g)
		Pinus sp. wood, charred (<1 g)
11	Flaked lithic	Utilized flake
12	Ceramic	DL Early Pueblo Gray jar sherd
13	Vegetal	*Zea mays* kernels, charred (30)
	Vegetal	*Zea mays* cupules, charred (7)
		Yucca sp. leaf fragment, charred
14	Ceramic	DL Early Pueblo Gray jar sherd

NOTES: See figure 43 for artifact locations.

DL - Dolores Manufacturing Tract.
CA - Cahone Manufacturing Tract.
(N) - Number of items.
(g) - Weight in grams.

Room 3

Dimensions:

North-south	3.90 m
East-west	3.70 m
Depth	0.14 m
Total roofed area	14.43 m^2

Room 3 is one of two large contiguous rooms located north and slightly east of Pitstructure 1. This room is associated with Room 2, a small

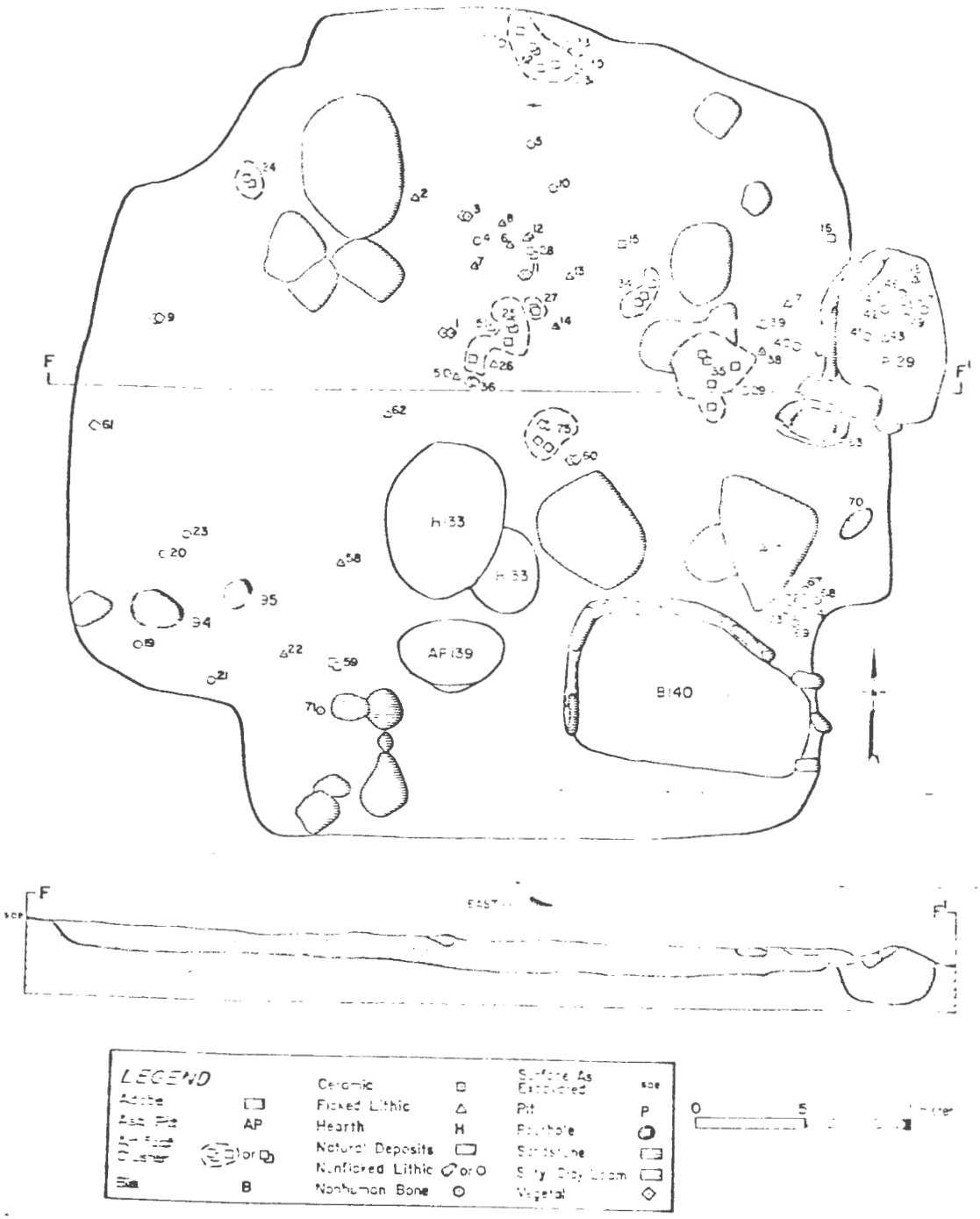


Figure 44. Plan map and stratigraphic profile of Room 3, Kinny Wheat Hamlet.

storage room directly north of Room 3. In plan view the room is irregular but has a generally four-sided appearance and the floor is slightly basin shaped. The plan view and profile of the room are shown in figure 44.

Stratigraphy

The fill sequence for Room 3 duplicates that for Room 2. Historic plowing has destroyed all stratigraphy except in the lower 14 cm. The burned construction timbers in Room 3 averaged 5 cm in diameter indicating a heavier construction than that found in Room 2.

Floor

The surface in Room 3 was fairly level with the exception of the edges, which turn up sharply to form the outer walls. To form this surface the existing ground surface was excavated until a level area was created. This surface was then use compacted but exhibited no other form of preparation. The surface features were dug into this leveled area and the superstructure erected over it. In addition to the six subfloor features found in Room 3, a number of shaped, sandstone slabs were lying flat on the floor. These slabs very likely served as work surfaces for various activities. Refer to figure 44 for their placement.

Sixty-seven artifacts or artifact clusters were point located on the floor of this room (table 13). Of these 67 PL's, 14.9 percent are vegetal material (corn and beans), 17.9 percent are nonhuman bone, and 31.3 percent are flaked lithic items (mostly debitage), while nonflaked lithic tools account for 19.4 percent and ceramics for 16.4 percent of the total. A more detailed analysis of these artifacts is presented in the description of individual activity areas in Room 3.

Table 13. Point-located artifacts, Room 3, Windy Wheat Hamlet

PL No.	Material class	Item description
1	Vegetal	*Zea mays* kernels, charred (4)
2	Flaked lithic	Corner-notched projectile point
3	Vegetal	*Phaseolus* sp. cotyledons, charred (2)
4	Nonflaked lithic	Not culturally modified
5	Nonhuman bone	*Odocoileus hemionus*
6	Flaked lithic	Debitage
7	Flaked lithic	Angular debris
8	Flaked lithic	Unused core
9	Vegetal	*Zea mays* kernels, charred (2)
10	Nonhuman bone	*Odocoileus hemionus*
11	Vegetal	*Phaseolus* sp. cotyledons, charred (8)
12	Flaked lithic	Debitage (3)
13	Flaked lithic	Debitage
14	Flaked lithic	Debitage
15	Ceramic	Item misplaced
16	Ceramic	BL Early Pueblo Red jar sherd
17	Flaked lithic	Angular debris
18	Flaked lithic	Angular debris (not mapped)
19	Nonflaked lithic	Not culturally modified
20	Nonflaked lithic	Not culturally modified
21	Nonflaked lithic	Not culturally modified
22	Flaked lithic	Unused core
23	Nonflaked lithic	Not culturally modified
24	Ceramic	DL Chapin Gray jar sherds (2)
		DL Early Pueblo Gray jar sherds (3)
25	Ceramic	BL Abajo Red-on-orange seed jar sherds (37): vessel 19
		BL Early Pueblo Red jar sherd
26	Flaked lithic	Debitage
27	Ceramic	DL Early Pueblo Gray jar sherds (5)
28	Ceramic	BL Early Pueblo Red bowl sherd
		BL Early Pueblo Red jar sherds (4)
29	Nonflaked lithic	Not culturally modified
30	Vegetal	*Zea mays* kernels, charred (7)
		Phaseolus sp. cotyledons, charred (7)
31	Vegetal	*Populus* sp. wood, charred (1 g)
32	Ceramic	DL Early Pueblo Gray jar sherds (3)
		DL Chapin Gray seed jar sherd
		DL Chapin Gray jar sherds (85): vessel 21

NOTES: PL numbers not listed represent items later determined not to be associated with the floor. See figure 44 for artifact locations.

DL - Dolores Manufacturing Tract.
BL - Blanding Manufacturing Tract.
(N) - Number of items.
(g) - Weight of items.

Table 13. Point-located artifacts, Room 3, Windy Wheat Hamlet--Continued

PL No.	Material class	Item description
33	Nonhuman bone	Odocoileus hemionus--simple awl
34	Ceramic	BL Abajo Red-on-orange feather box sherds (48): vessel 18
35	Ceramic	BL Abajo Red-on-orange feather box sherds (48): vessel 18
36	Vegetal	Zea mays kernels, charred (17)
		Zea mays cob fragment, charred
37	Nonflaked lithic	Two-hand mano
38	Flaked lithic	Debitage
39	Nonhuman bone	Odocoileus hemionus (3)
40	Nonhuman bone	Odocoileus hemionus--minimally altered item
41	Nonhuman bone	Mammalia, medium
42	Nonhuman bone	Odocoileus hemionus--minimally altered item
43	Flaked lithic	Debitage
44	Flaked lithic	Debitage
45	Nonhuman bone	Artiodactyla--minimally altered item
46	Nonhuman bone	Odocoileus hemionus
47	Nonhuman bone	Odocoileus hemionus
48	Flaked lithic	Cobble tool
49	Nonflaked lithic	Hammerstone
50	Flaked lithic	Utilized flake
51	Flaked lithic	Angular debris
58	Flaked lithic	Debitage
59	Ceramic	DL Early Pueblo Gray jar sherds (3)
60	Vegetal	Zea mays kernels, charred ( )
		Zea mays cob fragments, charred ( )
		Zea mays cupules, charred ( )
61	Vegetal	Pinus sp. wood, charred (3.7 g)
62	Flaked lithic	Utilized flake
63	Nonflaked lithic	Trough metate
67	Nonhuman bone	Odocoileus hemionus--simple awl
68	Nonflaked lithic	Hammerstone
69	Nonflaked lithic	Not culturally modified
70	Nonflaked lithic	Notched axe
71	Nonflaked lithic	Mano fragment
72	Flaked lithic	Thick biface
		Utilized flake
73	Ceramic	BL Abajo Red-on-orange feather box sherds (24): vessel 18
74	Nonhuman bone	Mammalia, medium
75	Vegetal	Zea mays kernels, charred (30)
		Zea mays cob fragment, charred
		Rosaceae wood, charred (<1 g)
76	Flaked lithic	Thick biface

Features

There are six floor features associated with Room 3. All but one of these features are located in the southern half of the room. The features within Room 3 are listed in table 14.

Table 14. Feature summary, Room 3, Windy Wheat Hamlet

Feature No.	Type	Plan	Profile	Length (cm)	Width (cm)	Depth/ height (cm)
129	Slab-lined pit	D-shaped	Basin	72	60	22
133	Hearth	Round	Basin	74	60	19
139	Ash pit	Oval	Basin	50	33	3
140	Bin	Oval	Basin	120	73	17
194	Posthole	Round	Cylindrical	26	20	42
195	Posthole	Round	Cylindrical	15	14	49

NOTE: See figure 44 for feature locations.

Hearth (Feature 133). The hearth and ashpit are located south of the east-west axis of Room 3 but are directly on the north-south axis. The hearth is basin shaped with no stone lining. The fill consists of fine white to gray ash with small charcoal inclusions throughout.

Ash pit (Feature 139). The ash pit is 10 cm south of the hearth and separated from the hearth by a low adobe coping. The ashpit is oval in plan view and is basin shaped. The fill consists of fine gray ash and charcoal bits.

Bin (Feature 140). Southeast of the hearth and ash pit, in the corner of the room, a partially slab-lined storage bin is found. This feature is lined with vertical stones along the north and west sides. Midway along the west row of stones is a 20-cm gap. This could be an aperture to allow access into the feature. The upright slabs all extend above the floor surface. The fill consists of a brown silt loam flecked with charcoal. The fill indicates rapid, if not intentional, filling of this feature prior to abandonment. No artifacts were found in this bin.

Slab-lined pit (Feature 129). Located 1.1 m north of Feature 140 is a slab-lined pit. This feature lies partially inside and partially outside the east wall of Room 3. The portion lying inside the room is slab lined in the same manner as Feature 140. Unlike Feature 140, this feature contained artifacts (PL's 41 through 49). These artifacts are described in the discussion of Activity Area 52.

Postholes (Features 194 and 195). Two postholes are found in the southwest corner of Room 3. The dimensions of these two features are listed in table 14. Both postholes contained postabandonment fill, and no construction materials were noted within either feature.

Interpretations

Because of the size of this room (14.43 m^2), the types of features present, and the activities suggested by the features and artifact associations, Room 3 has been designated a living room. Room 3 appears to be spatially associated with Pitstructure 1, and Rooms 5, 4, and 2.

Activity areas. Using the features, shaped stone slabs, and floor artifacts, four activity areas have been defined within Room 3.

Activity Area 50 consists of Feature 140, a storage bin. Since no materials were found within the bin it is impossible to determine the type of storage that took place there.

Activity Area 51 is defined primarily based on the hearth (Feature 133) and its associated ash pit (Feature 139). Adjacent to the hearth, some corn and a shaped slab were found, suggesting that one activity carried out here was food preparation. It is inferred that the hearth was also used to heat and light the structure.

Activity Area 52, located along the east wall, was defined based on artifact content as well as on the presence of a slab-lined pit

(Feature 129). This feature and the floor area in front of it are the spatial limits of this activity area. The type of activity that took place in this area seems to have been all but the final shaping stages of bone tool production. Within the pit a large unifacially flaked cobble (PL 48) was found. This tool could have been used to groove a long bone in preparation for longitudinal splitting. Alternatively, after the bone was grooved on two sides this flaked cobble could have acted as a wedge to separate the halves. A hammerstone (PL 49) was also found in the pit. This tool may have been used to split bones or to fracture long bones into the desired shape to be ground into the final product. Also within the pit were three mule deer long bones (PL's 42, 46, and 47). Two of these bones (PL's 46 and 47) are fragmentary and unused. The other one, however, is a longitudinally split half of a metapodial. Lying just outside the feature are two other mule deer long bones (PL's 39 and 40). One of these is a right tibia (PL 40) that has had one face longitudinally grooved and the other side barely worked. The remaining bone (PL 39) is a metatarsal that was unworked. A finished bone awl (PL 33) made from the tibia of a mule deer was found northwest of the other bones and has been assigned to Activity Area 53. This awl is apparently an end product of Activity Area 52. Figure 45 shows Activity Area 52 with the bones in place. Figure 46 shows this tool-making kit as well as the finished awl that was found in Activity Area 53. Two shaped sandstone slabs and an Abajo Red-on-orange feather box (vessel 18) are also associated with this area. The reconstructed feather box is shown in figure 46.

Activity Area 53, located north of the hearth, consists of an artifact cluster including seven pieces of flaked lithic debitage (PL's 6, 12, 13, 14, and 26), one utilized flake (PL 50), one core (PL 8), and one

Figure 45. Bone tool production area (Activity Area 52), Room 3, Windy Wheat Hamlet (DAP 040031).

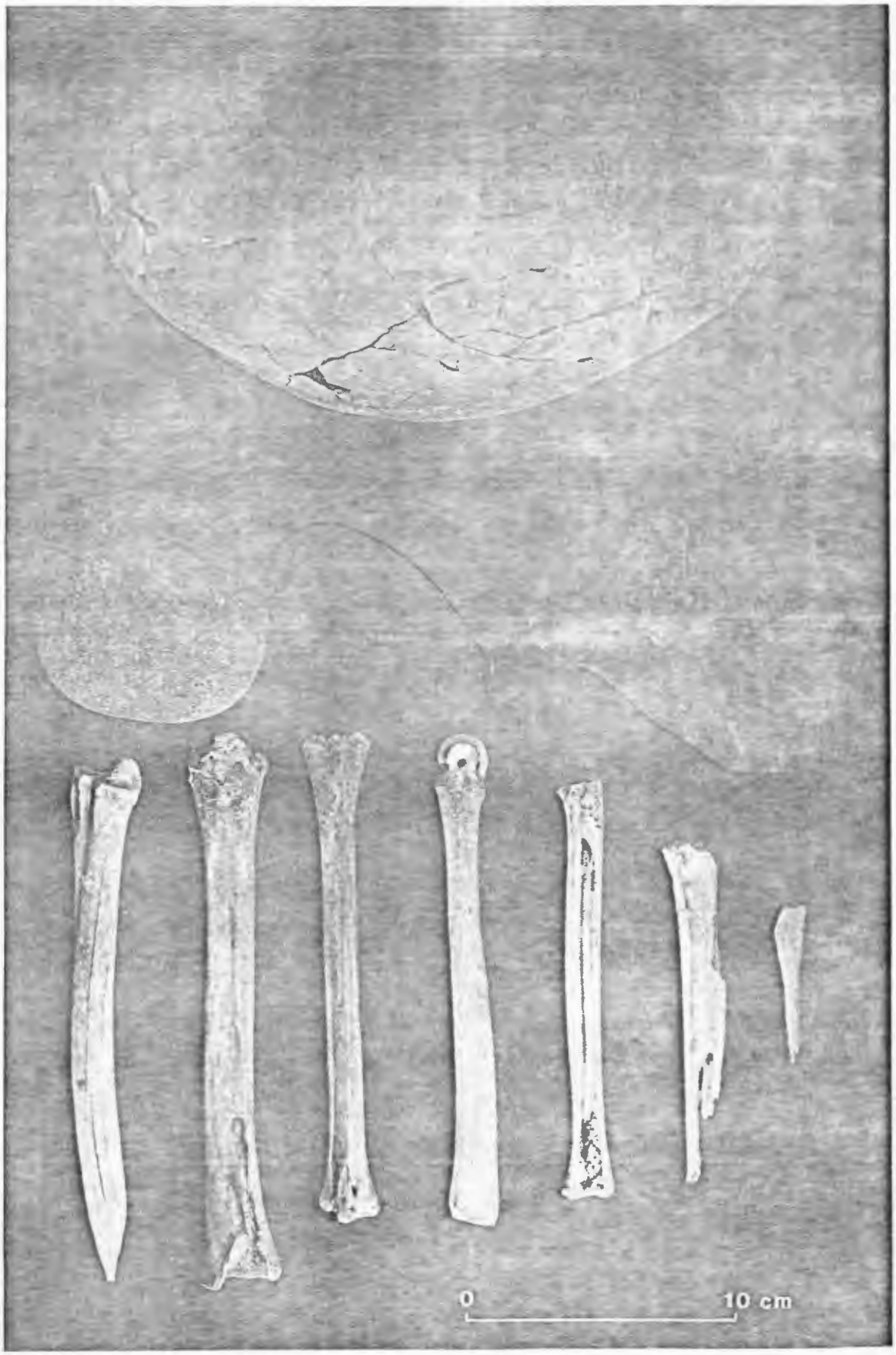


Figure 46. Bone-tool-production toolkit, finished awl, and Abajo Red-on-orange feather box from Activity Areas 52 and 53, Room 3, Windy Wheat Hamlet (DAP 136121).

corner-notched projectile point (PL 2). Also in this area are one Chapin Gray jar (PL 32, vessel 21), one Abajo Red-on-orange seed jar (PL 25, vessel 19; shown in fig. 47), a large bone awl (PL 33) made from the right tibia of a mule deer, two unmodified pieces of mule deer bone (PL's 5 and 10), and a mano (PL 37). The projectile point was a complete item, but it was not made from any of the material found within the room.

No single activity can be inferred from this cluster of artifacts. Activity Area 53 is therefore designated an economic activity area with no further specification.

Room 4

Dimensions:

East-west:	1.80 m
North-south:	1.50 m
Depth:	0.11 m
Total area:	2.70 m^2

Room 4 is directly north of Room 5. In plan view the room is rectangular with rounded corners. The profile shows a fairly level floor that slopes upward steeply to form the excavated portion of the walls. Figure 48 shows Room 4 in plan view and profile.

Stratigraphy

The fill of Room 4 is similar to that in the other surface rooms. The plow zone is a nonstructured mix of postabandonment silt and burned debris. On the floor of Room 4 is an average of 10 cm of undisturbed fill. This undisturbed fill consists of burned chunks of adobe (roof casts) and one carbonized pole. A fairly heavy sprinkling of burned corn kernels is noted throughout the undisturbed roof fall and on the floor.

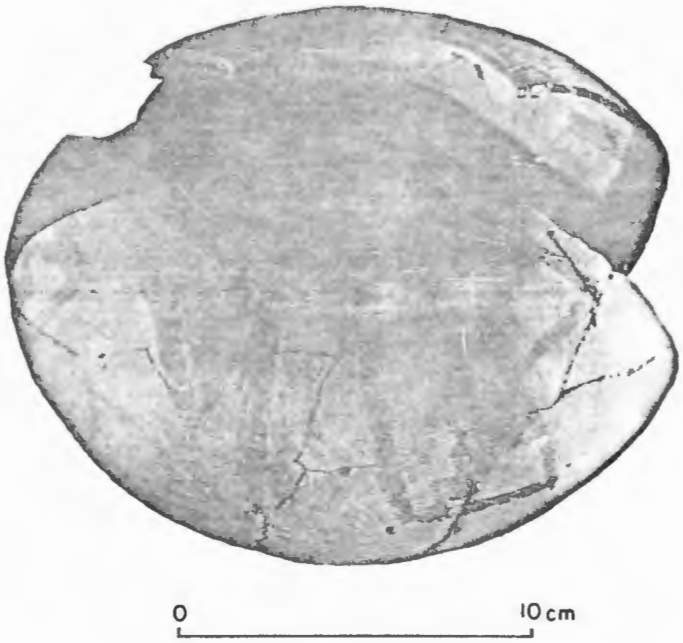


Figure 47. Abajo Red-on-orange seed jar (vessel 19) from Room 3, Windy Wheat Hamlet (DAP 140002).

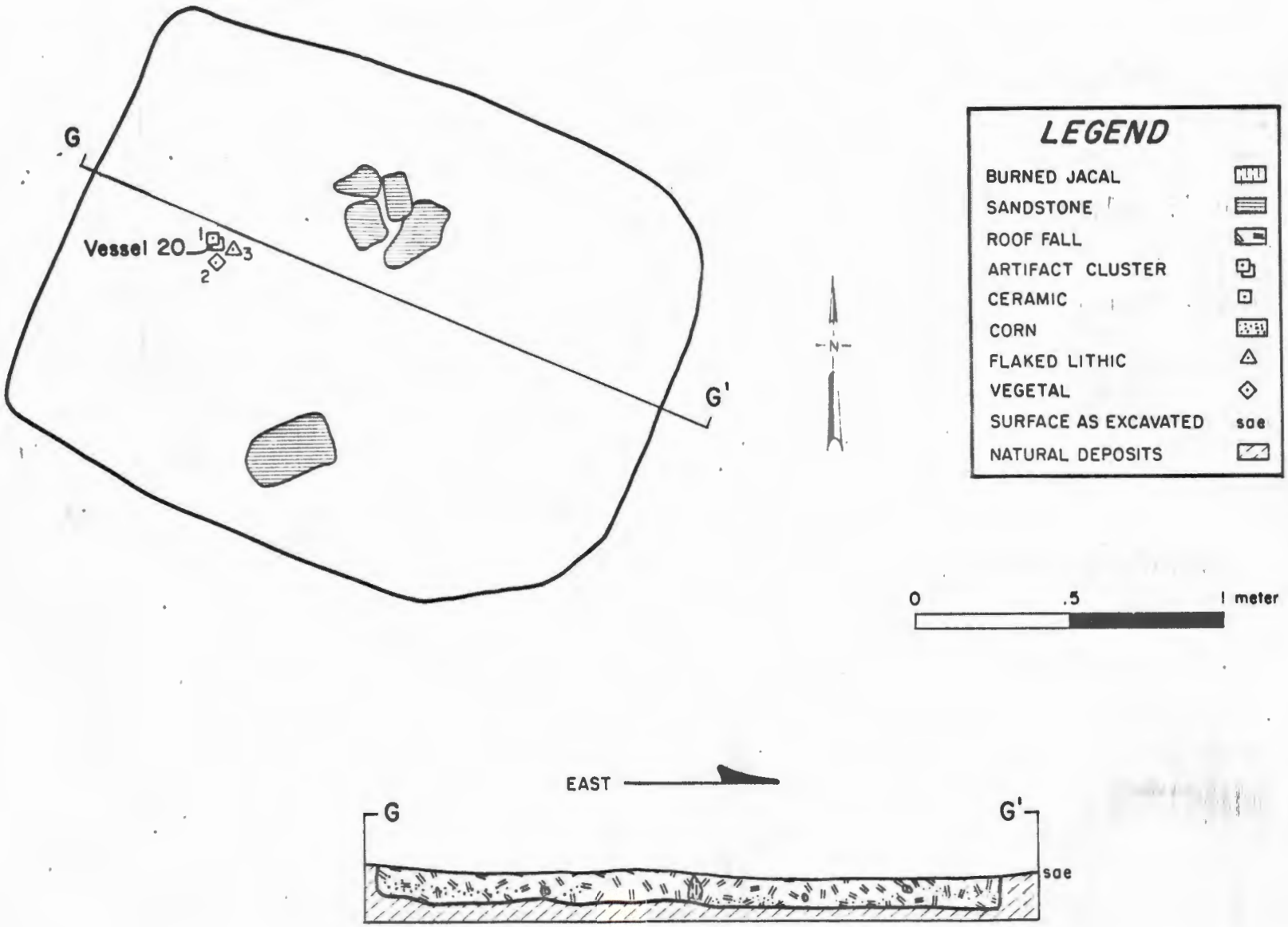


Figure 48. Plan map and stratigraphic profile of Room 4, Windy Wheat Hamlet. Vessel 20 (PL 1) is a Chapin Gray jar. PL's 2 and 3 were located within the jar. All three PL's constitute Feature 128.

Floor

Like the surface rooms already described, the floor in Room 4 is shallow, fairly level, and use compacted. No constructed floor features are associated with this structure. The three floor artifacts include a Chapin Gray jar (PL 1, vessel 20), which is designated Feature 128. Associated with and possibly stored in the Chapin Gray jar are a large quantity of beans and some corn (PL 2), and a corner-notched projectile point (PL 3). The sandstone slabs shown on the plan map are probably stones incorporated into the superstructure of the room.

Interpretations

Room 4 is a small room constructed directly behind Room 5. The only sign of activity is the large quantity of burned beans and corn scattered throughout the room. These vegetal items may have been scattered when a jar containing them was broken by the collapsing walls and/or roof. From these observations it would seem that Room 4 served as a storage room. The entire room has been interpreted as a storage activity area (Activity Area 54). A look at the site plan map (fig. 14) shows the relationship among Rooms 2, 3, 4, and 5; there appears to be one storage room per living room.

Room 5

Dimensions:

East-west:	4.0 m
North-south:	2.6 m
Depth:	0.10 m
Total roofed area:	10.45 m^2

Room 5 in plan view is rectangular with rounded corners. The plan map (fig. 49) shows the layout of this room, its features, and its floor

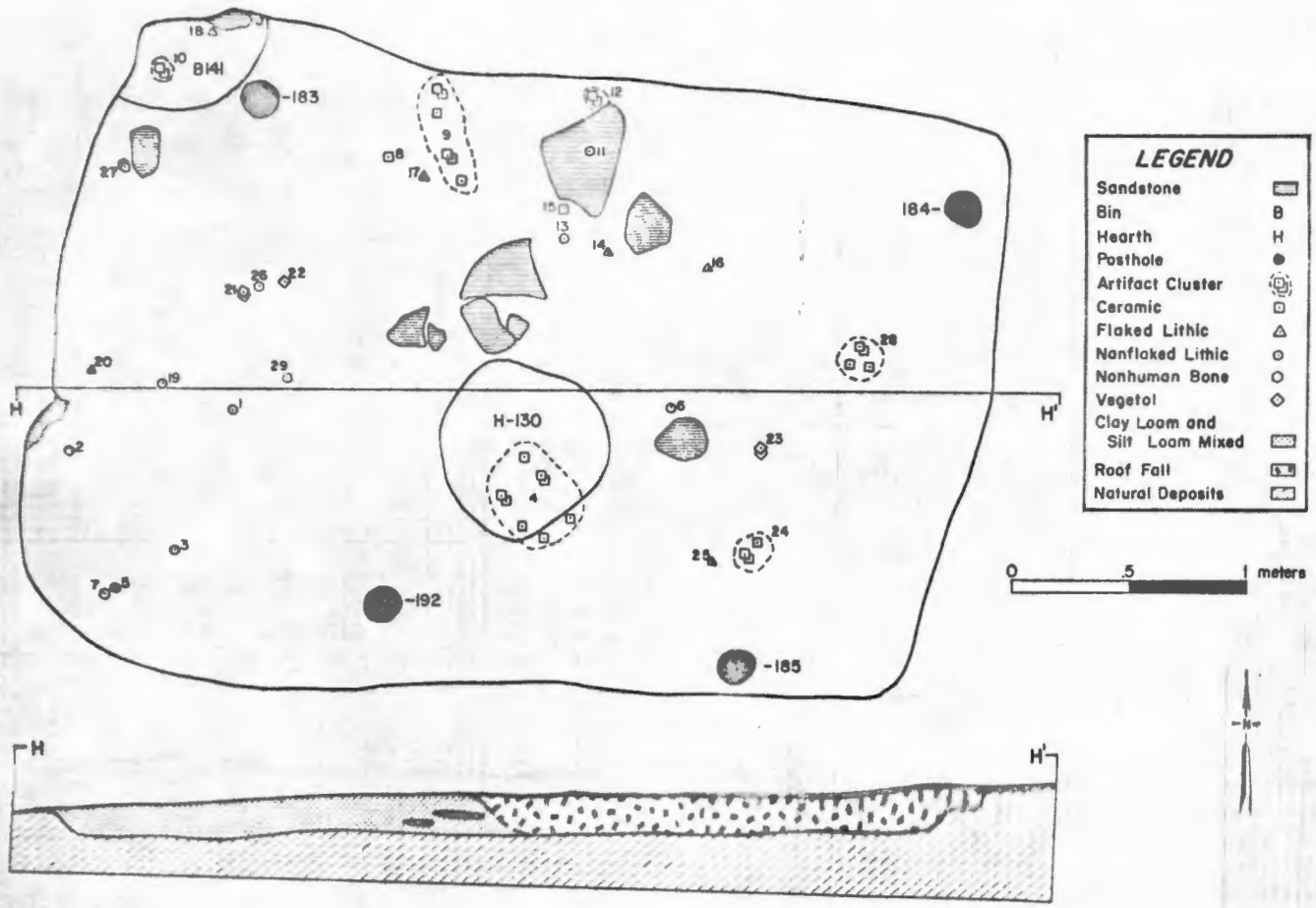


Figure 49. Plan map and stratigraphic profile of Room 5, Windy Wheat Hamlet.

artifacts. Room 5 is probably contiguous with Room 3, which lies immediately to the west. The burned debris found within Room 5 suggests that the walls were of wattle and daub construction.

Stratigraphy

In Room 5 the undisturbed fill below the plow zone averages 10 cm in depth, as did the fill in Room 4. In the case of Room 5, the major portion of the burned structural debris is localized on the eastern side of the room (fig. 49). The fill on the western side is a mixture of yellow clay loam and brown silt loam. This pattern suggests that Room 5 was only partially destroyed by the extensive fire that destroyed most of the structures on the site.

Floor

The floor of Room 5 is fairly level and use-compacted and was excavated at least 10 cm below the prehistoric ground surface. Twenty-nine artifacts were on the floor of Room 5 (table 15). These items include nine nonflaked lithic items, six flaked lithic items, three nonhuman bones, two isolated ceramic sherds, six ceramic clusters, one concentration of burned beans and corn, and three fragments of charred wood.

Features

Six subsurface features were found in the floor of Room 5. Refer to table 16 for their dimensions.

Hearth (Feature 130). The central hearth in Room 5 is in the same area as the one in Room 3, just south of center along the north-south axis. The fill of Feature 130 consisted of fine, gray ash interspersed with bits and pieces of charcoal.

Table 15. Point-located artifacts, Room 5, Windy Wheat Hamlet

PL No.	Material class	Item description
1	Nonflaked lithic	Notched or grooved haftable item
2	Nonflaked lithic	Mano fragment
3	Nonflaked lithic	Polishing stone
4	Ceramic	DL Early Pueblo Gray jar sherds (19)
		DL Chapin Gray jar sherds (4)
5	Nonflaked lithic	Not culturally modified
6	Nonflaked lithic	Shaped stone slab
7	Nonhuman bone	*Lepus californicus*
8	Ceramic	DL Early Pueblo Gray jar sherd
9	Ceramic	DL Early Pueblo Gray jar sherds (9)
		SJ Polished White bowl sherds (3)
10	Ceramic	CA Early Pueblo Gray jar sherds (39): vessel 49
11	Nonflaked lithic	Item misplaced
12	Ceramic	SJ Chapin Gray bowl sherds (2)
		DL Polished White bowl sherd
		DL Early Pueblo Gray jar sherd
13	Nonflaked lithic	Not culturally modified
14	Flaked lithic	Debitage
15	Ceramic	DL Early Pueblo Gray vessel handle
16	Flaked lithic	Debitage
17	Flaked lithic	Debitage
18	Flaked lithic	Debitage
19	Nonflaked lithic	Notched axe
20	Flaked lithic	Thick uniface
21	Vegetal	*Phaseolus* sp. cotyletons, charred ( )
		Zea mays kernels, charred ( )
22	Vegetal	*Pinus* sp. wood, charred (<1 g)
23	Vegetal	*Pinus* sp. wood, charred (3.5 g)
		Populus sp. wood, charred (2.7 g)
24	Ceramic	DL Early Pueblo Gray jar sherds (5)
25	Flaked lithic	Debitage
26	Nonhuman bone	Mammalia, small
27	Nonhuman bone	Mammalia, large--spatulate tool
		Lepus californicus (3)
28	Ceramic	DL Early Pueblo Gray jar sherds (7)
29	Nonflaked lithic	Hammerstone

NOTES: See figure 49 for artifact locations.

DL - Dolores Manufacturing Tract.
CA - Cahone Manufacturing Tract.
SJ - San Juan Manufacturing Tract.
(N) - Number of items.
(g) - Weight of items.

Table 16. Feature summary, Room 5, Windy Wheat Hamlet

Feature No.	Type	Plan	Profile	Length (cm)	Width (cm)	Depth/ height (cm)
130	Hearth	Round	Basin	82.5	74.0	20.0
141	Bin	Oval	Basin	78.0	56.0	10.0
183	Posthole	Round	Cylindrical	17.0	16.0	8.0
184	Posthole	Round	Cylindrical	16.0	15.0	15.0
185	Posthole	Round	Cylindrical	17.0	17.0	17.0
192	Posthole	Round	Cylindrical	15.0	14.0	20.0

NOTE: See figure 49 for feature locations.

Bin (Feature 141). This storage bin is somewhat oval in plan and is in the northwest corner of the room. It appears that upright slabs at one time formed the boundaries of this feature. At the time of excavation, only two upright slabs remained along the northern rim. The clay that apparently held other slabs in place is still present in places around the edge of the feature. A large gray ware jar sherd (PL 10, vessel 49) was broken into many pieces on the floor of this feature. One piece of debitage (PL 18) was also found on the floor.

Postholes (Features 183, 184, 185, 192). One posthole is located in each of the four corners of the room. All but the posthole in the southwest corner (Feature 192) have stones placed in the bottom to act as "footers" for the posts.

Interpretations

The varied artifacts found in this room, as well as the features and the size of the room (10.40 m^2), suggest a domiciliary function.

Activity areas. Four activity areas have been defined on the floor of Room 5 based either on artifact groupings, features, or a combination of the two.

North of the hearth is Activity Area 55, which is defined by an artifact cluster consisting of three pieces of flaked lithic debitage, portions of two Chapin Gray jars, and a white ware bowl. Also on the floor within Activity Area 55 are three sandstone slabs. These artifacts indicate economic activity, but the type of activity can not be specified.

Activity Area 56 includes the hearth and a small group of artifacts east of the hearth. The artifacts consist of three clusters of gray ware jar sherds (PL's 4, 24, and 28), one piece of flaked lithic debitage (PL 25), and one shaped sandstone slab (PL 6). This area was used for cooking and for providing heat and light. The sandstone slab could have served as a work surface in conjunction with cooking activities.

Activity Area 57 lies west of the hearth and occupies the southwest quadrant of the room. This is the area of Room 5 where most of the ground stone tools were found. These include one mano fragment (PL 2), one notched axe (PL 19), and one hammerstone (PL 29). The only other item in the area is a thick uniface (PL 20). Although some type of economic activity is indicated, this tool inventory is not complete enough to suggest any specific activity.

Activity Area 58 is in the northwest corner of the room. A corner storage bin (Feature 141) defines this as a storage area. Within the bin is a piece of flaked lithic debitage (PL 18) and a large sherd that could have been used as a bowl. These artifacts provide no indication of the use of this bin, but it is assumed that it was used for storage.

Room 6

Dimensions:

North-south:	2.15 m
East-west:	2.65 m
Depth:	indeterminate
Total area:	5.6 m^2

Room 6 is the westernmost structure at the site. It lies 29 m west of Room 1 and 24 m northwest of Pitstructure 2.

Room 6 has been almost totally destroyed by plowing. However, the basal portions of four rock-lined postholes were preserved to indicate the four corners of this structure and its basic size and shape. The plan view (fig. 50) shows the placement of these postholes with dotted lines representing the hypothesized walls.

Stratigraphy

In Room 6 no stratigraphy remained because the plow zone was removed during blading operations. However, in and around the postholes were pieces of charred wood and burned jacal, indicating that Room 6 was probably destroyed by fire.

Floor

The floor of Room 6 had been entirely removed by the historical farm activity that damaged much of the site.

Features

The only features remaining were the basal portion of the four corner postholes. The dimensions for these features are listed in table 17. All four postholes had been lined with tabular pieces of stone and had a basal slab placed horizontally in the bottom to act as a "footer" for the post.

Table 17. Feature summary, Room 6, Windy Wheat Hamlet

Feature No.	Type	Plan	Profile	Length (cm)	Width (cm)	Depth/ height (cm)
178	Posthole	Round	Cylindrical	23	25	18
179	Posthole	Round	Cylindrical	24	21	16
180	Posthole	Oval	Cylindrical	27	22	16
181	Posthole	Round	Cylindrical	29	26	10

NOTE: See figure 50 for feature locations.

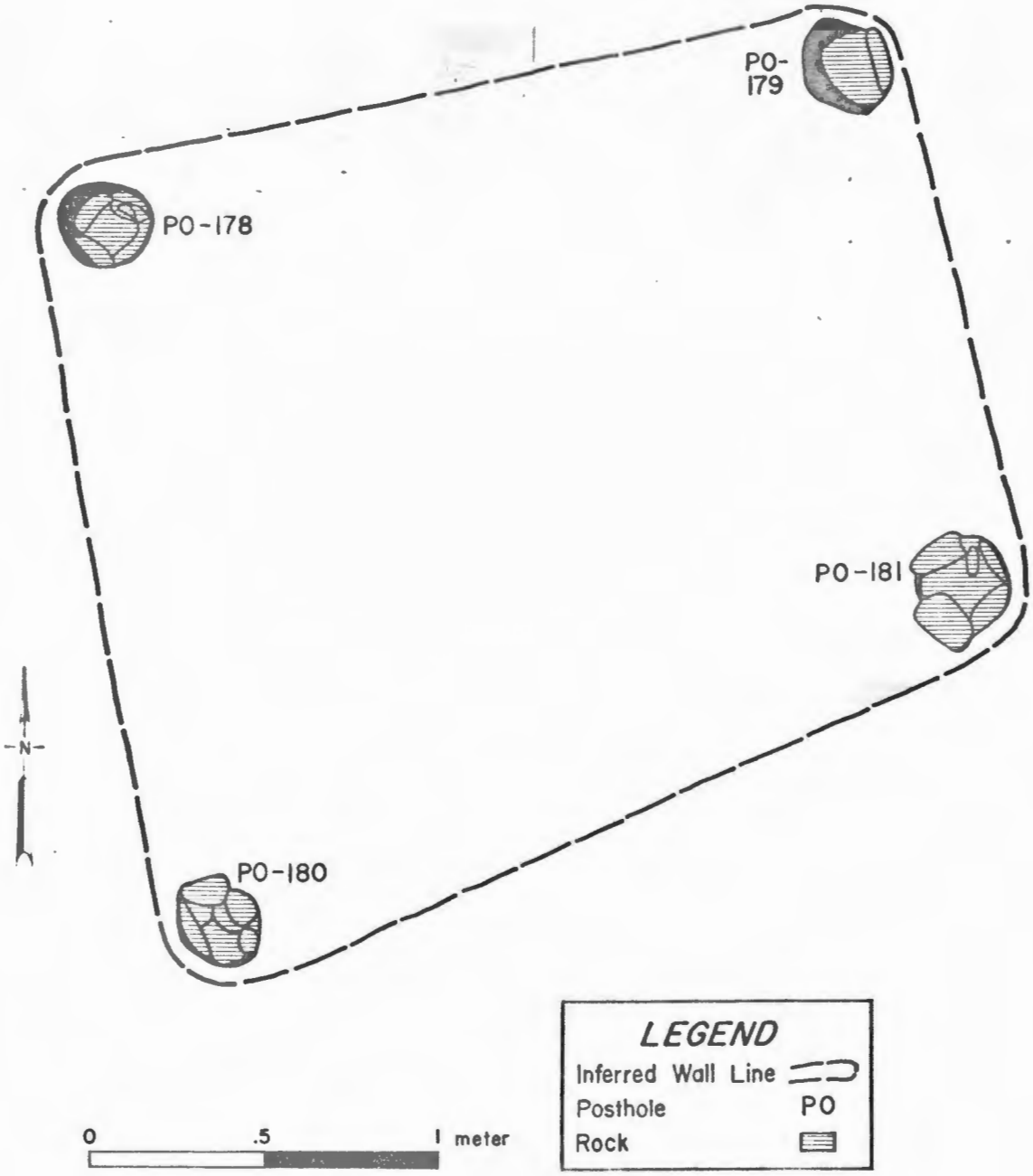


Figure 50. Plan map of Room 6, Windy Wheat Hamlet.

Interpretations

Because of the lack of interpretable materials remaining, little can be said of this room. However, the four-post support system and the apparent solidity of the posthole construction indicates that a permanent type of structure was present, not a simple ramada.

Room 7

Dimensions:

East-west length:	2.00 m
North-south length:	1.20 m
Total area:	2.40 m^2

The identiiication of Room 7 is tentative because it is based on the 1979 field notes and grid square maps. These notes and maps have been combined to make figure 51, a plan map of the structure. The 1979 field crew excavated this structure as part of two 2- by 2-m grid squares because they were unable to define any structural surfaces or walls. They did record one posthole and two possible postholes in a rectangular pattern that suggests a small room with a roof supported by four posts. The area defined by these possible postholes contained a dark cultural fill with inclusions of burned cultural debris including charcoal, adobe, and corn. There was an intensely burned area in the southwest corner of the structure along the inferred wall line. Also in the southwest corner of the structure was a vertical sandstone slab, which may be the basal remnant of the west wall. Room 7 appears to have been destroyed by fire.

Stratigraphy

The fill sequence of Room 7 was reconstructed from the field notes. The upper 20 cm of the soil profile was plow zone, a homogeneous brown

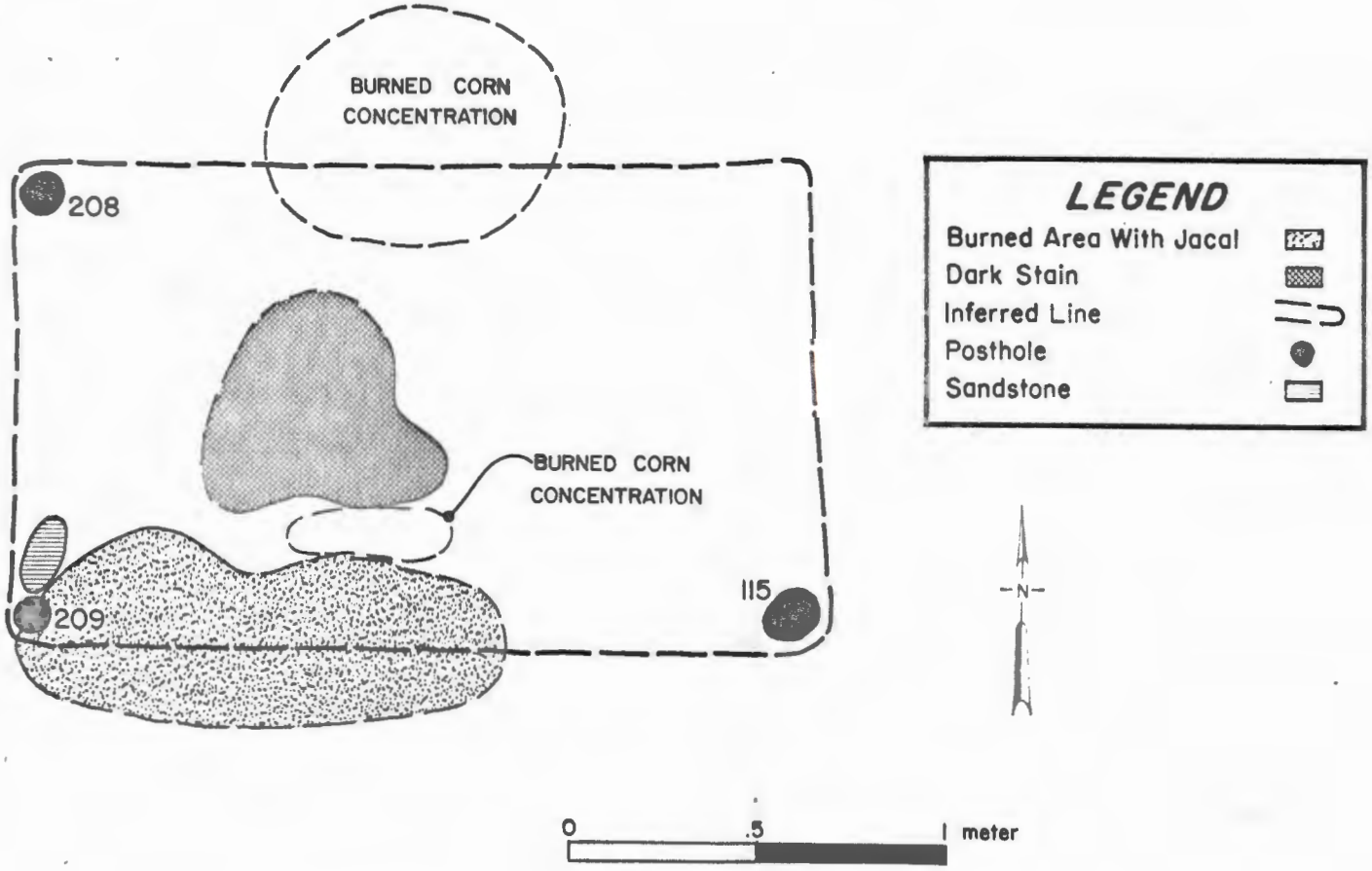


Figure 51. Plan map of Room 7, Windy Wheat Hamlet.

loam containing charcoal and burned clay but few artifacts. The artifacts from the plow zone include a core, gray ware jar sherds, red ware bowl and seed jar sherds, and white ware bowl and jar sherds. At 20 to 25 cm below modern ground surface, a dark brown fill containing burned cultural debris was encountered. Also between 20 and 25 cm in depth, a black shiny surface was encountered, but the surface appeared in discontinuous patches at various depths. These shiny, discontinuous surfaces are interpreted to be plow or wheel scars. Only a single sherd was found in association with this surface. The dark brown fill extended to a depth of 30 cm where the sterile subsoil was encountered, but no undisturbed cultural surface was discovered. The entire profile down to undisturbed sterile soil is interpreted to be plow disturbed; thus the floor surface of this structure was apparently destroyed.

Features

Three postholes are associated with Room 7. One of the postholes (Feature 115) was excavated; the other two (Features 208 and 209) were drawn on a 1979 field map but apparently were not excavated. Table 18 lists the dimensions of these postholes. Feature 115 contained a burned post that was too fragmentary for tree-ring dating. Features 208 and 209 are described as possible posthole stains that contain wood fragments. These three postholes define the southeast, northwest, and southwest corners of Room 7. No evidence of a posthole was recorded in the inferred northeast corner of the structure.

Interpretations

Although Room 7 is poorly defined, its existence is believable in order to complete a row of three small rooms, Rooms 4, 2, and 7, which are attached to the north side of three larger rooms, Rooms 5, 3, and 1. The

larger rooms have been interpreted as living rooms or work areas with small attached storage rooms. Based on this pattern of storage rooms, Room 7 is interpreted to be a storage room that was similar in construction to Rooms 4 and 2. The burned maize found in the disturbed fill of Room 7 suggests that the function of the room was food storage. Based on this inference, Room 7 was designated Activity Area 1, a food storage area. Room 7 appears to have burned in the intense fire that destroyed the rest of the surface rooms. The postoccupational fill sequence and the floor of the structure have been destroyed by plowing.

Table 18. Feature summary, Room 7, Windy Wheat Hamlet

Feature No.	Type	Plan	Profile	Length (cm)	Width (cm)	Depth/ height (cm)
115	Posthole	Oval	Cylindrical	16	13	15
208	Posthole	Round	...	11	10	...
209	Posthole	Round	...	10	10	...

NOTES: See figure 51 for feature locations.

... - Information not available.

Room 8

Dimensions:

East-west length:	2.65 m
North-south length:	1.55 m
Total Area:	4.10 m^2

The identification of Room 8 is tentative and is based on the 1979 field notes and on the map shown in figure 52. The 1979 field crew excavated the structure as part of two 2- by 2-m grid squares. Structural surfaces or walls were never defined and the possibility that the area might be within a structure was never recognized. The postholes and possible

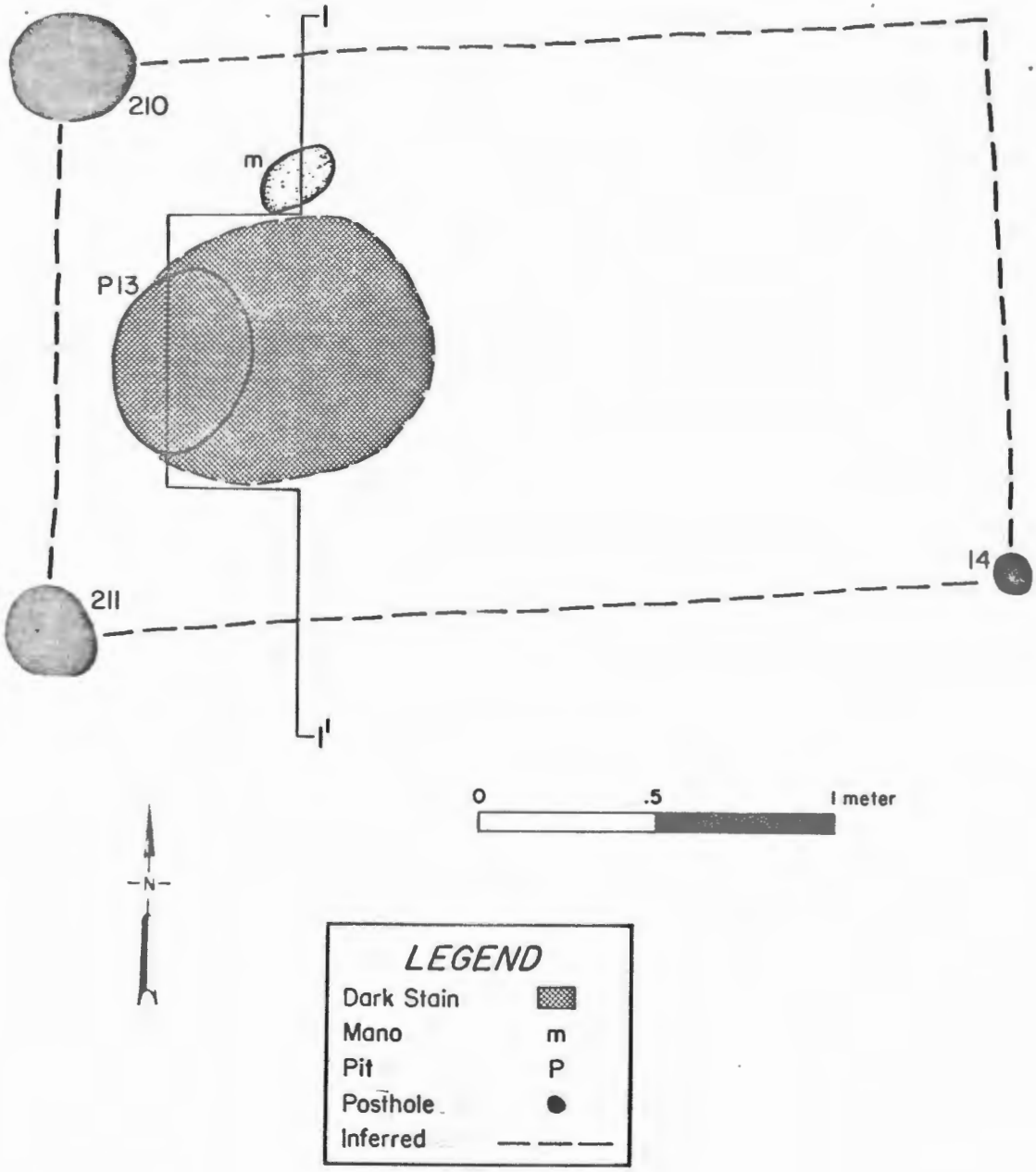


Figure 52. Plan map of Room 8, Windy Wheat Hamlet. The stratigraphic profile of this room is shown in figure 53.

postholes that were recorded in 2- by 2-m grid squares 112S/136E and 112S/138E form a rectangular pattern that suggests a small room with a roof supported by four posts. Within the area defined by the possible postholes (Features 14, 210, 211) was a dark cultural fill that contained charcoal, burned adobe, and other cultural debris. The fill was highly disturbed by plow scars and rodent burrows such that no occupation surfaces or walls were preserved. Two burned, vertical sandstone slabs were found in the north-central portion of the possible structure. These slabs might define the north wall of Room 8, but they are alined with the plow scars rather than with the inferred wall lines.

Stratigraphy

The fill sequence is similar in both of the 2- by 2-m squares that were excavated to reveal Room 8. The upper 25 cm of the soil profile is the plow zone, a homogeneous, brown loam. This level contained numerous potsherds, including red ware bowl sherds and gray ware jar sherds. At the base of the plow zone in the east half of 112S/136E and in the west half of 112S/138E, a dark brown soil was encountered. This fill contained charcoal, burned jacal, burned sandstone, a burned bean, a specialized flaked lithic tool, a one-hand mano, gray ware jar sherds, red ware bowl sherds, and a few bones from a cottontail and from a wood rat. This dark brown deposit was 10 cm deep in 112S/136E and 5 cm deep in 112S/138E. At a depth of 30 to 35 cm below the modern ground surface the culturally sterile subsoil was encountered. This subsoil was disturbed by rodent activity and several plow scars. Figure 53 shows a stratigraphic profile of Room 8. The layer of dark soil between the plow zone and sterile subsoil is interpreted to be a highly disturbed cultural fill that accumulated within Room 8 after it was abandoned.

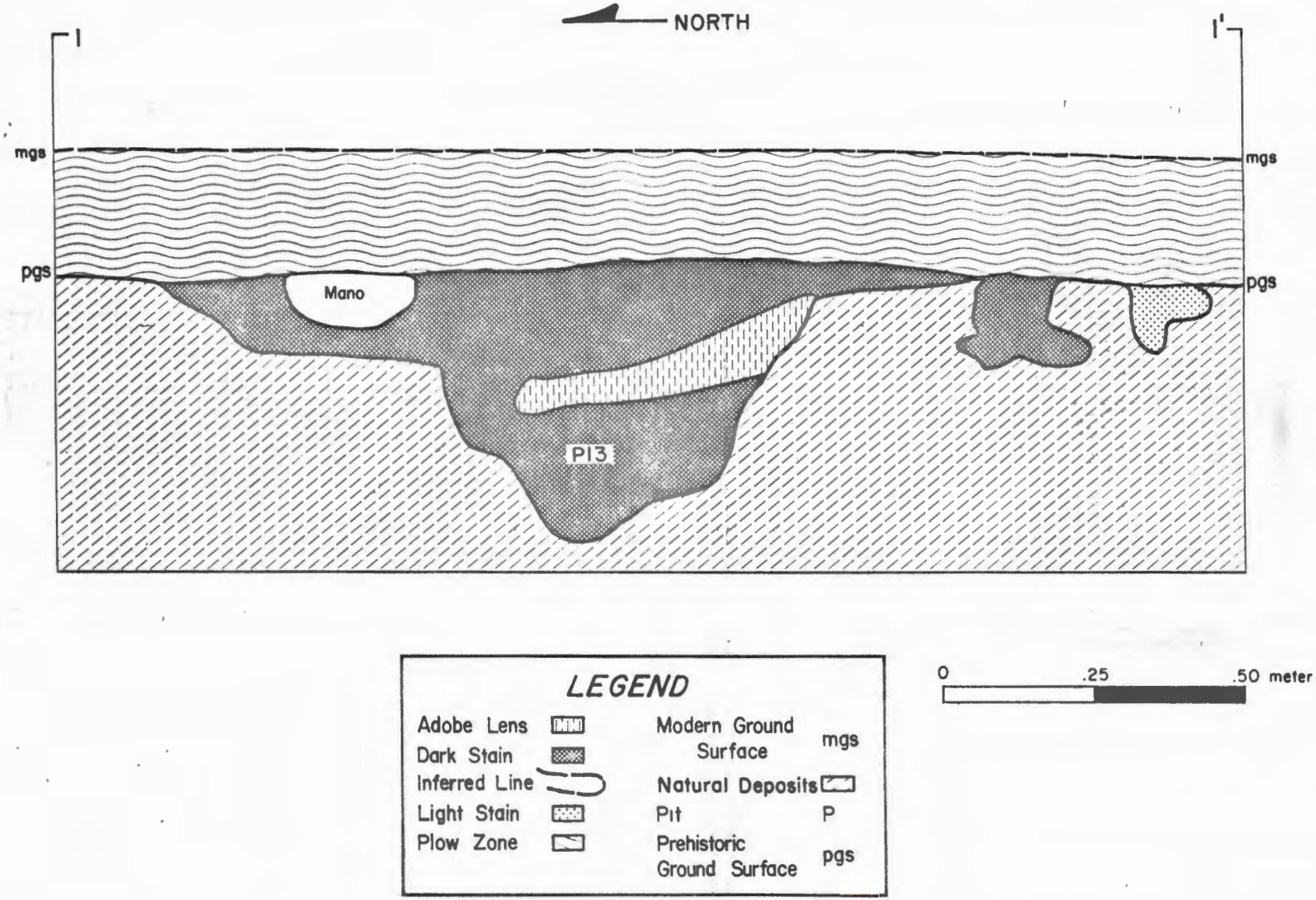


Figure 53. Stratigraphic profile of Room 8, Windy Wheat Hamlet. The profile location is shown in figure 52.

Features

The features in Room 8 are listed in table 19. A large pit feature (Feature 13) is centered near the west end of the possible structure.

Table 19. Feature summary, Room 8, Windy Wheat Hamlet

Feature No.	Type	Plan	Profile	Length (cm)	Width (cm)	Depth/ height (cm)
13	Unburned pit	Oval	Basin	*50	35	75
14	Posthole	Round	Cylindrical	10	*10	16
210	Posthole	Round	...	30	30	...
211	Posthole	Round	...	23	23	...

* Inferred dimension.

NOTES: See figure 52 for feature locations.

... - Information not available.

Feature 13. Feature 13 is circular in plan and has an irregular, basin shape. The east wall of Feature 13 is poorly defined due to rodent activity, and the rim of the feature has been disturbed by plowing. The fill in the west half of the pit contains various burned materials including wood, jacal with pole impressions, corn, beans, a shaped sandstone slab, and gray ware and red ware sherds. A prominent lens of burned clay was found near the top of the fill. The east half of the feature fill is described as being heavily disturbed by rodents.

Interpretations

Burned materials in the two grid squares suggest that the tentative structure had walls consisting of vertical sandstone slabs and jacal and that the structure was destroyed by fire. The existence of Room 8 is at best questionable since it is based largely on a rectilinear pattern that is formed by unexcavated stains. A structure at this location within the site would fall into an arc with three other storage rooms (Rooms 4, 2,

and 7). The spatial relationship to nearby rooms and the dark cultural fill within the inferred wall lines are both arguments in favor of the existence of Room 8.

The burned corn and beans in Feature 13 fill are probably food items that were stored in Room 8 when it burned. Although this structure falls into a lineation of storage rooms, there is no evidence for an attached front room like those associated with the other three storage rooms. West and south of Room 8, plowing appears to have been deep enough to destroy all evidence of shallow pit features. A front room adjacent to Room 8 may also have been completely destroyed by plowing.

Possible Ramada

Dimensions:

North-south	2.50 m
East-west	3.00 m
Depth	3.0 m
Total Area	7.50 m^2

A possible ramada was found 12 m southeast of Room 5 and 14 m east of Pit-structure 1. It is characterized by a series of seven shallow postholes arranged in a rough circular pattern as shown in figure 54.

Stratigraphy

Most of the soil overlying this structure consisted of a homogeneous, plow disturbed sediment. This disturbed plow zone contained cultural material such as flaked stone, ceramics and ground stone fragments. Bits and pieces of charcoal were also present. The undisturbed fill directly above the floor contained essentially the same unstratified fill assemblage.

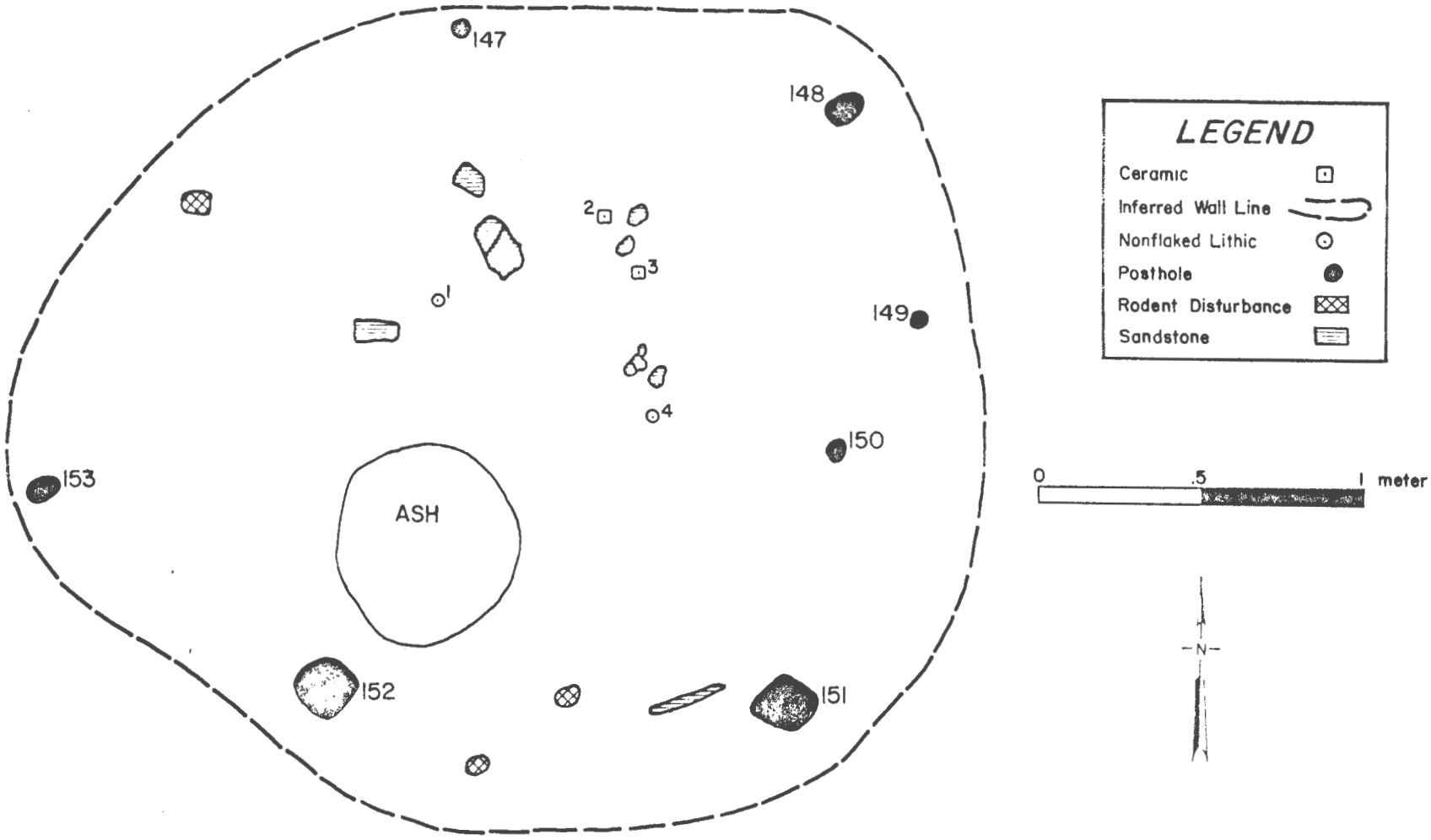


Figure 54. Plan map of the possible ramada, Windy Wheat Hamlet.

Floor Surface

An ash filled depression and four artifacts were the criteria by which the floor was defined. The floor artifacts consisted of two gray ware sherds (PL's 2 and 3), one mano fragment (PL 1), and one nonflaked lithic item that was not culturally modified (PL 4). The seven shallow postholes were used to define the limits of this surface.

Features

The seven postholes are the only features assigned to this unit. All of these postholes were constructed by simply digging a shallow hole. No basal or lining stones were used in the construction of any of these holes. Dimensions for all of these features are listed in table 20.

Table 20. Feature summary, possible ramada, Windy Wheat Hamlet

Feature No.	Type	Plan	Profile	Length (cm)	Width (cm)	Depth/ height (cm)
147	Posthole	Round	Cylindrical	8.0	9.0	6.5
148	Posthole	Round	Cylindrical	15.0	12.0	11.0
149	Posthole	Round	Cylindrical	8.0	8.0	3.5
150	Posthole	Oval	Basin	8.0	12.0	5.0
151	Posthole	Round	Cylindrical	18.5	20.0	17.0
152	Posthole	Round	Basin	22.0	20.0	4.5
153	Posthole	Oval	Irregular	11.0	16.0	6.0

NOTE: See figure 54 for feature locations.

Patterns Observed

Like Room 6, this possible ramada is isolated from the major block of structures by more than 10 m. However, based on posthole size and construction as well as patterning this unit seems to have been of a different type construction than Room 6.

Interpretation

The artifact assemblage found on the floor of this unit is too scanty

to be used in an interpretive manner. However, the insubstantial nature of the postholes indicates a structure of light construction. This, plus the circular shape, may indicate a ramada-type structure used to provide shade during the performance of various daily activities.

Occupation Area

Dimensions:

North-south length:	128 m
East-west length:	96 m
Areal extent:	8936 m^2
Area surface collected:	3308 m^2
Area excavated:	2033 m^2

The occupation area is defined as the unformalized, open area of the site surrounding the major structural units and the midden. The area of this unit is estimated by subtracting the combined areas of the structures and the midden from the area of the surface artifact scatter that was mapped by the 1978 survey (fig. 6). This estimate assumes that the surface scatter of cultural debris reflects the area that was occupied or used by the inhabitants of the site.

Excavation Strategy

Three levels of investigation (surface collection, preliminary test excavations, and broad scale stripping with heavy machinery) were applied to the occupation area. The intensive surface collection covered only 37 percent of the occupation area. It included the areas east, south, and west of the structures, but skipped the area north of the structures. Many of the inferences about activities in the occupation area must be based on the surface collection, because subsurface data is limited. During test excavations, the soil was screened from twelve 2- by 2-m test squares, 11 of which were located to the northwest of Pitstructure 2 and

one to the southeast of Pitstructure 1. Additionally, twenty-one 2- by 2-m squares surrounding Room 1 were carefully excavated but not screened. These initial test squares determined that plowing had destroyed the prehistoric occupation surface. The emphasis was therefore shifted from shovel excavation to mechanized excavation. A grader was used to strip away the plow zone to look for pit features. This blading exposed 23 percent of the occupation area, extending 8 m north of the surface rooms and 30 m east, 8 m south, and 18 m west of the pitstructures. Numerous pit features and postholes were located.

Stratigraphy

No intact cultural deposits were found on the occupation area surface after plowing. The stratigraphy consisted of a 25- to 30-cm deep plow zone of homogeneous brown loam overlying an undisturbed subsoil of yellowish-brown clay loam. The plow zone contained cultural debris while the undisturbed subsoil did not.

Floor

The surface of the occupation area is the noncultural stratigraphic contact between the plow zone and the undisturbed subsoil.

Features

Twenty pit features are associated with the surface (table 21, fig. 14). These features are truncated to various degrees by plowing. The original depth of many features is therefore impossible to determine. The features are placed into the following general categories: fireplaces, floor cists, slab-lined pits, borrow pits, small basin-shaped pits, and postholes.

Fireplaces. Four slab-lined hearths, referred to as fireplaces, were found in the occupation area. Three of these fireplaces (Features 4, 33,

and 66) are adjacent to the surface rooms, while the other fireplace (Feature 126) is isolated 12 m southeast of the surface rooms.

Table 21. Feature summary, occupation area, Windy Wheat Hamlet

Feature No.	Type	Plan	Profile	Length (cm)	Width (cm)	Depth/ height (cm)
4	Fireplace	Round	Basin	71.0	63.0	16.0
15	Small floor cist	Oval	Basin	21.3	15.5	11.2
18	Small floor cist	Round	Bell	105.0	95.0	77.0
33	Fireplace	Round	Basin	65.0	60.0	20.0
66	Fireplace	Oval	Basin	124.0	112.0	32.0
112	Small floor cist	Oval	Basin	70.0	50.0	40.0
113	Posthole	Round	Cylindrical	29.0	24.0	26.0
126	Fireplace	Round	Basin	98.0	90.0	29.0
127	Borrow pit	Oval	Irregular	272.0	200.0	90.0
131	Large floor cist	Round	Bell	125.0	125.0	100.0
132	Unburned pit	Round	Basin	55.0	45.0	9.1
135	Slab-lined pit	Round	Cylindrical	33.0	30.0	20.0
138	Unburned pit	Round	Basin	148.0	122.0	20.0
143	Borrow pit	Complex	Complex	200.0	150.0	75.0
145	Unburned pit	Round	Cylindrical	14.0	14.0	10.5
160	Unburned pit	Round	Basin	64.0	64.0	7.0
190	Posthole	Round	Cylindrical	30.0	20.0	40.0
191	Posthole	Round	Cylindrical	21.0	21.0	11.0
193	Unburned pit	Round	Basin	50.0	50.0	14.0
196	Slab-lined pit	Oval	Basin	66.0	53.0	6.0

NOTE: See figure 14 for feature locations.

Feature 4: Feature 4 is a circular fireplace situated midway between Pitstructure 1 and Rooms 1 and 3. The basal portion of the feature is completely lined with sandstone slabs that have been fire reddened. Impressions in the fireplace wall indicate that the vertical slabs that formed the walls and rim of the feature were removed by plowing. The fireplace fill is an unstratified silt that does not contain artifacts.

Feature 33: Feature 33 is a circular fireplace adjacent to the west end of Room 1 (fig. 42). The walls of the feature are lined with sandstone slabs and two one-hand manos, but the floor of the feature is unlined. The rock lining is partially discolored by fire. Two distinct

layers of fill are present within the fireplace. The upper fill is a mixture of ash and silt containing scattered charcoal and burned clay, two pieces of flaked lithic debitage, gray ware jar sherds, white ware bowl sherds, a cottontail bone, and an unidentifiable small mammal bone. The lower fill is similar to the upper fill but lacks ash.

Feature 66: Feature 66 is an oval fireplace adjacent to the west end of Room 1 (fig. 42). The bottom of the feature is completely lined with sandstone slabs. The wall of the feature was originally lined with sandstone slabs, but few of these remain in place. Two layers of fill are present. The upper fill is silt containing charcoal, burned clay, and numerous sandstone slabs; the lower fill is a thin lens of charcoal (possibly burned sagebrush) covering the basal slabs of the feature. The slabs in the upper fill appear to be stacked directly on top of the charcoal lens. This suggests that the missing wall slabs were dismantled and used to intentionally fill the feature. Only one unidentifiable mammal bone was recovered from the fill.

Feature 126: Feature 126 is a circular fireplace located 14 m southeast of Pitstructure 1 and 8 m south of the possible ramada. Large sandstone slabs line the floor and the walls of the feature. The fill is stratified. The upper 18 cm is a charcoal-flecked silt choked with sandstone slabs, while the lower 8 cm is a black layer of charred organic material that rests on top of the slab floor. The slabs lining the pit are fire blackened and fire cracked. Some of the wall slabs are missing but not enough to account for the large number of sandstone fragments in the upper feature fill. Artifacts in the upper fill include two cores, a utilized flake, a thick biface, a flat abrading stone, and a two-hand mano.

Floor cists. Four floor cists were found in the occupation area--three are adjacent to the surface rooms and the other is located west of the surface rooms.

Feature 18: Feature 18 is a small, bell-shaped floor cist adjacent to the northeast corner of Room 1 (fig. 42). The opening is over 100 cm wide but quickly narrows to a 65-cm-wide neck before widening into a chamber that is 90 cm wide and 40 cm high. This cist contains four basin-shaped layers of fill that are a mixture of wall collapse, wind- and water-deposited silt, and cultural debris. Stratum 4, the lowest lens of fill, contains burned corn. Resting on top of Stratum 4 is a shaped stone slab that is large enough to have been a cover for the pit before the walls collapsed. Strata 1 through 3 contain numerous artifacts, including a reconstructible red ware seed jar, gray ware jar sherds, white ware and red ware bowl sherds, three utilized flakes, six pieces of debitage, a notched maul, a notched axe, rodent bones, one bird bone, and carbonized maize, beans, and squash.

Feature 15: Feature 15 is a small, oval, basin-shaped floor cist adjacent to the east end of Room 7 and intrusive to the fill of a bell-shaped floor cist (Feature 18). The fill of Feature 15 contains carbonized maize (whole cobs) and a few kidney beans (*Phaseolus vulgaris*). The few loose kernels of corn in the fill are probably present due to decomposition of the burned cobs. A plow scar runs through the middle of the burned vegetal material, indicating that the upper portion of the feature has been destroyed.

Feature 112: Feature 112 is a small, oval floor cist adjacent to the west end of Room 3. The bottom of the feature was disturbed by rodent activity. The pit fill is stratified; the lower 6 cm of fill are water-

deposited sediments while the upper fill is a layer of trash. Artifacts recovered from the fill include numerous gray ware jar sherds and two manos.

Feature 131: Feature 131 is a large, circular, bell-shaped floor cist located 10 m north of Pitstructure 2 and 10 m west of Room 1. The pit opening narrows slightly before expanding into a large chamber. The feature fill is an unstratified dark brown silt mixed with sterile material from wall slump. The fill also contained a large amount of cultural debris including charcoal, burned clay, a partial gray ware jar, numerous gray ware sherds, white ware bowl and jar sherds, red ware bowl, jar, and seed jar sherds, a utilized flake, ten pieces of debitage, a thick uniface, a corner-notched projectile point, a flat abrading stone, a large, shaped sandstone slab, rabbit bones, and unidentifiable small, medium, and large mammal bones. A dozen small sherds on the floor of the pit were assigned point location numbers, but all of these sherds are part of the trash that was introduced after the feature was abandoned.

Slab-lined pits. Two slab-lined pit features with no evidence of burning are located in the occupation area.

Feature 135: Feature 135 is a circular pit adjacent to the northwest corner of Room 4. Sandstone slabs line the west, north, and east walls of the feature. The fill is mottled silt containing no artifacts or cultural debris.

Feature 196: Feature 196 is a shallow, basin-shaped pit located 12 m west of Room 1 and 10 m north of Pitstructure 2. Four sandstone slabs on the bottom of the feature appear to be the remnants of a slab lining that has been disturbed by plowing. Plowing also removed the feature fill

except for a dark stain, and no artifacts can be associated with the pit. The sandstone slabs show no evidence of burning.

Borrow pits. Two borrow pits in the occupation area are north of Pitstructure 2 and northwest of the surface rooms.

Feature 127: Feature 127 is an oval pit with an irregular bottom; the feature is located 16 m north of Pitstructure 2. The pit is excavated in the clay loam subsoil. The south end of the pit has nearly vertical walls and is the deepest part of the feature, while the bottom of the pit rises in gradual steps to form a gently sloping north wall. Two distinct layers of fill are present. The lower half of the fill is composed of redeposited subsoil containing very few artifacts. The upper half of the fill is a dark brown silt that contains a large amount of cultural debris including lenses of ash and charcoal. Both levels of fill were excavated as a single unit. Artifacts recovered included numerous sherds, flaked lithic tools and debitage, nonflaked lithic tools, and nonhuman bones.

Feature 143: Feature 143 is an oval pit located 12 m north of Pitstructure 2. This feature is excavated into the clay loam subsoil. The walls of the feature slope steeply into two basins, the larger, deeper basin being on the south end of the pit. Several vertical sandstone slabs were found along the south rim of the pit, but these slabs do not appear to be part of the feature construction. The feature fill is an unstratified, brown silt that contains scattered charcoal, burned clay, and artifacts. The fill artifacts include red ware bowl sherds, gray ware jar sherds, flaked lithic tools, a mano, rodent bones, a corn cob, and corn kernels.

Small unburned basin-shaped pits. Five small, basin-shaped pits were found in the occupation area. These pits vary greatly in diameter and depth, but all of them are near the major structural units.

Feature 132: Feature 132 is a roughly circular, basin-shaped pit located 6 m northwest of Room 7. The fill is composed of charred maize, beans, and squash. Almost no charred wood fragments are noted in the fill, and no artifacts are associated with the feature. The margins of the pit are partially destroyed by rodent activity, but the fill appears to be an undisturbed cultural deposit.

Feature 138: Feature 138 is a round, basin-shaped unburned pit located 25 cm west of ~~Pithouse~~ Pitstructure 3. The bottom of the pit is irregular and slopes gently to the east toward the pitstructure. The fill is a light brown silt that contains scattered charcoal, burned clay, and a few gray ware sherds.

Feature 145: In the east-central area of the floor of Feature 131 (a bell-shaped pit) is a small unburned pit (Feature 145) 14 cm in diameter and 10.5 cm deep. The fill in this small pit was identical to the fill of the bell-shaped pit, but contained no artifacts. The function of Feature 145 is undetermined.

Feature 160: Feature 160 is a round, basin-shaped unburned pit located 9 m north of Pitstructure 2. The west half of the feature contained a dark fill and a single burned sandstone slab, but no fill remained in the plow-disturbed eastern half. The burned slab and dark fill suggest that the feature may have been a hearth, but the feature is too badly disturbed to make this judgment. No artifacts are associated with Feature 160.

Feature 193: Feature 193 is a round, basin-shaped unburned pit. This pit is adjacent to the southeast corner of Room 4. The walls of the feature are heavily disturbed by rodents but appear to be unburned. The feature fill is a mixture of burned clay and carbonized maize, which are

interpreted to be debris from the adjacent surface structures that were destroyed by fire. No artifacts are associated with this feature.

Postholes. Three miscellaneous postholes have been documented in the occupation area.

Feature 113: Feature 113 is a circular, cylindrical posthole located 4 m south of Room 1 and 4 m north of Pitstructure 3. The fill within this pit is silt with charcoal and burned clay mottling. In the bottom of the pit are small burned wood fragments, three metate fragments, a hammerstone, a mano, and five sandstone slab fragments.

Feature 113 is interpreted to be a posthole. The nonflaked lithic materials in the fill were probably jammed into the hole after the post was set in place. The burned wood fragments indicate that the post was destroyed by fire. This posthole cannot be associated with any structure.

Feature 190: Feature 190 is a cylindrical posthole adjacent to the southwest corner of Room 1. The south wall of the posthole is vertical, but the north wall slopes at a 45° angle before joining the 20-cm diameter main shaft of the pit. The fill is a brown, charcoal-rich silt mottled with sterile subsoil and ash. The fill contained a piece of debitage and an unidentified small mammal bone. No stones were found in the base. This feature is interpreted to be a posthole but cannot be associated with any structure.

Feature 191: Feature 191 is a cylindrical posthole located 25 cm northeast of Feature 131 (a large bell-shaped floor cist) and 7 m northwest of Room 1. The fill is silt with no artifacts. This feature is interpreted to be a posthole based on its cylindrical shape, but it cannot be related to any structure.

Occupation Area Feature Summary

Table 21 lists the 20 features that were deep enough to escape plow destruction in the occupation area. All of these open area features are within 15 m of a structure, either a pitstructure, surface room, or ramada; and 77 percent (17) are within 8 m of a surface room. Because only the central portion of the site was exposed by blading, the types of pit features on the periphery of the site, if any, are unknown.

Interpretations

Temporal relationships of features. In this section, an attempt is made to establish the temporal relationship among the features in the occupation area. This temporal placement simply divides the features into three groups: (1) relatively early features that were abandoned during the course of the occupation, (2) relatively late features that were in use at the time of site abandonment, and (3) features whose relative temporal placement is indeterminate.

Features abandoned during the course of the occupation: The primary criterion for placing a feature in this category is the presence of trash fill. It is assumed that pit features that were abandoned during an occupation were often used as convenient refuse dumps. Six features (Features 18, 112, 127, 131, 143, and 145) in the occupation area were trash-filled. A sixth pit (Feature 66) is placed in this category because it was intentionally dismantled and sealed during the occupation.

Features in use at the time of site abandonment: When the site was abandoned, six surface rooms and Pitstructures 1 and 2 were destroyed by fire. Features that are near these burned structures and contain burned structural materials are assumed to have been open or in use when the site burned. Features 113 and 193 contain burned structural debris. Placed in

this category with less confidence are Features 15 and 132, which both contain charred debris. The contents are assumed to have burned in the general fire that swept the site.

Features of indeterminate temporal placement: At any time during the occupation an abandoned feature could have become filled with silt through natural processes; thus, the nine silt-filled features in the occupation area cannot be confidently placed in either the early or the late categories. The silt-filled pits include Features 4, 33, 126, 135, 138, 160, 190, 191, and 196. However, five of the nine might be inferred to be late features based on their proximity to the burned structures. These five are Features 4, 33, 126, 135, and 190.

Activity areas. Plowing has destroyed any evidence of activity areas that may have existed on the prehistoric occupation surface. Thus the features must be used alone in an attempt to define activity areas in the occupation area. Based on the functional interpretations of these features and on the interpretations of the feature fills, four types of activities are recognized in the open area of the site. These activity areas are food storage areas, borrow areas, pit discard areas, and domestic and economic areas (not further specified).

Construction-borrow activities: Two features are classified as borrow pits. These include Activity Area 12 (Feature 127) and Activity Area 14 (Feature 143). Both features are relatively deep, basin-shaped pits with irregular floors. It is assumed that the soil was mined from these pits for use as construction material in the nearby surface rooms. Feature 143 actually consists of two connected basins. The smaller and shallower of the two has been interpreted as a possible puddling basin where the mined soil was mixed with water to make construction mud.

Features 127 and 143 are interpreted to belong to two different building episodes because of their different fill sequence and different artifact contents.

Pit discard activities: Discard activity is indicated by the trash fill in five features. These include Activity Area 9 (in Feature 18), Activity Area 10 (in Feature 131), Activity Area 13 (in Feature 127), Activity Area 15 (in Feature 143), and Activity Area 59 (in Feature 112). All of these features are interpreted to be pits that were abandoned during the occupation and then used as convenient trash dumps.

Unspecified domestic and/or economic activities: This type of activity area is assigned to the isolated fireplaces in the occupation area. These include Activity Area 3 (Feature 4), Activity Area 4 (Feature 126), Activity Area 5 (Feature 66), and Activity Area 6 (Feature 33). Possible domestic and/or economic functions for fireplaces include cooking and food processing, but the materials found in association with the fireplaces do not permit the identification of specific activities. Features 33 and 66, which spatially appear to be paired fireplaces, are not included in the same activity area because they are not contemporaneous. Feature 66 is interpreted to have been dismantled and subsequently replaced by Feature 33. Activity Areas 3, 5, and 6 are all within 2 m of a surface room, but Activity Area 4 is 8 m from the nearest structure. Feature 126, the fireplace that defines Activity Area 4, is more intensely burned than the other fireplaces in the occupation area. This observation indicates that larger, hotter fires were built in this isolated feature than in the fireplaces immediately adjacent to the surface rooms. Different types of domestic and/or economic activities involving fireplaces are suggested. One interpretation of the isolated, intensely burned fireplace is that it

functioned as a pottery kiln; however, no ceramics are associated with this feature as might be expected of a kiln.

Food storage activities: Four pit features are interpreted to be food storage areas. Activity Area 7 (Feature 18), Activity Area 8 (Feature 131), Activity Area 16 (Feature 15), and Activity Area 32 (Feature 132) are called food storage pits based on the carbonized corn, beans, and squash in their fills. Features 18 and 131 are bell-shaped floor cists in which none of the original contents remain, but they are inferred to be food storage pits because of their form. The bell-shaped pits were abandoned at some point during the occupation, while the two basin-shaped pits were in use when the site was abandoned. One basin-shaped floor cist (Feature 15) was superimposed on an abandoned bell-shaped cist (Feature 18).

Midden Area

Dimensions:

Diameter:	36 m
Area:	1120 m^2

The midden is defined by a dense surface scatter of cultural debris and by a dark stain in the southwest quadrant of the site downslope from the major cultural units (fig. 3). The concentration of cultural debris is clearly visible in the surface collection distributions as shown in figures 7 through 13. The artifact density on the surface of the midden is very high when compared to the artifact density across the rest of the site. For example, the surface density of flaked lithic items in the midden ranges from 0 to 95 items per 4- by 4-m grid square and averages 20 items per square. The flaked lithic density across the rest of the site

ranges from 0 to 19 items per 4- by 4-m grid square and averages only 5 items per square. The soil in the area of the midden was much darker than the soil across the rest of the site. This dark stain was even mapped by the survey crew (fig. 6). The distance from the pitstructures to the perimeter of the midden varies from 10 to 20 m, while the distance from the rooms varies from 25 to 30 m. The greatest amount of trash is in the center of the midden, a distance of 40 to 50 m from the major structural units.

Stratigraphy

The entire midden deposit had been plowed, leaving a plow zone that varies in depth from 25 to 30 cm. The midden (plow zone) is a homogeneous dark brown loam that contains numerous artifacts. The undisturbed soil beneath the plow zone is described as a yellowish-brown clay loam that contains no artifacts. Plow scars are visible where the undisturbed soil is encountered. The plow scars run northwest to southeast, perpendicular to the slope of the midden. All excavation units in the midden, including a 31-m-long backhoe trench, revealed similar stratigraphy.

Excavation Strategy

The combined excavations of 1979 and 1980 provided only a 2 percent sample of the total area that is defined as the midden; however, these excavation units are clustered in the center of the midden where the highest density of artifacts is indicated by the surface collection. The combined excavations give a 15 percent sample of this high density area. The site sampling plan (figure 5) shows the location of the midden excavation units. The intent in 1979 was to excavate a random sample of the midden, but only one-and-one-half 2- by 2-m squares were completed. In 1980 a backhoe trench was placed to determine the depth and stratigraphy

of the midden. After discovering that the plow zone reached through the total depth of the midden deposits, thirteen 2- by 2-m squares were excavated to recover a sample of the trash deposit and to look for pit features that might have escaped destruction by the plow. The plow zone in each 2- by 2-m square was excavated in a single level down to culturally sterile subsoil, and the fill was dry screened through one-quarter-inch mesh. Artifact recovery was high, but only one pit feature was discovered.

Features

A single feature was found beneath the midden.

Feature 161.

Dimensions:

Diameter:	51 cm
Depth:	8 cm

Feature 161 is a shallow, circular pit located near the center of the midden at grid coordinates 156S/124E. Only the basal portion of Feature 161 escaped destruction by plowing, and the surviving pit walls were highly disturbed by rodent burrows so that the original form and function of the feature cannot be determined. The walls and floor of the feature are not burned. The ash and artifacts in the feature are, therefore, interpreted to be trash fill.

Interpretations

The midden is interpreted to be a formal midden, an area where the occupants of the site disposed of their trash. Because of the amount of debris in this area and because no other major discard areas are present on the site, the midden is inferred to have been used as a trash dump throughout the occupation of the site. For each element, or major building episode on the site, the midden is designated as an activity

area. The midden is inferred to have been a low trash mound prior to destruction by plowing. The dark stain in the area of the leveled mound indicates that organic debris accumulated in the midden as well as sandstone, flaked lithic items, nonflaked lithic items, ceramics, nonhuman bones, and ash. The amount of debris indicates that an effort was made to keep the site clean. Even the debitage from tool production was collected and deposited in the trash pile.

MATERIAL CULTURE

Flaked Lithic Tools

A total of 1251 flaked lithic tools were recovered from Windy Wheat Hamlet. This total represents both surface and subsurface collections. Table A.2 in appendix A lists these artifacts by grain size, morpho-use, item condition, and dorsal face evaluation.

It is apparent from table A.2 that the inhabitants very much preferred expedient tools over those items that required a greater degree of time and effort to produce. For instance, 86.3 percent of the flake lithic tools (including utilized flakes, used cores, cores, thick unifaces, and thin unifaces) required a minimum amount of time or skill to produce.

Of the materials used to produce the tools, all but the obsidian are found within a 40-km radius of Windy Wheat Hamlet and most of the material is found within a 3-km radius, especially in the Dolores River canyon to the east of the site.

A word may be said here about what "tool morpho-use" implies. Morpho-use does not attempt to specify the use or function of a class of tools. Morpho-use is simply a category used to describe a class of tools based on shared characteristics. Too often, tool morpho-use is used for functional interpretations rather than as a descriptive mechanism for discussing tool categories.

Listed in table A.2 under tool morpho-use is a category called specialized forms. Items that fall into this category include notched flakes, denticulate flakes, perforators, gravers, drills, and flaked axes. Fifty-seven specialized tools were found at Windy Wheat Hamlet;

notches, and graver/perforators are the most common. These artifact types represent tools that require a large amount of labor to produce.

The flaked lithic tool assemblage as a whole represents a fairly unspecialized flaked lithic tool technology where locally available raw material resources were heavily used. The flaked lithic tools from Windy Wheat Hamlet are described further in appendix E.

Nonflaked Lithic Tools

There were 331 nonflaked lithic tools recovered from the site. This figure represents both surface and subsurface collections. Table A.4 lists the 10 morpho-use categories that describe these 331 tools. A total of 68 of the items or 20.5 percent of the total were unclassifiable as to use either because of the fragmentary nature of the specimen, or because its function simply could not be ascertained due to a lack of cultural modification. Another tool found in this category has no cultural modification but is defined as cultural because of its context. In other words, the material is not indigenous to the area and had to have been deliberately brought to the site. Unworked river cobbles make up most of this indeterminate category.

If the manos, metates, and hammerstones are considered to be part of a food processing assemblage, then 46.8 percent of all nonflaked lithic tools were created for this specific use.

The greatest number (93 items or 28.1 percent) of tools are low-input items such as polishing stones or cobbles, which may have grinding surfaces but have no readily identifiable function. Tools such as these are usually multifunctional in nature and do not aid in the determination of subsistence practices except in a general manner. That is, an

assemblage belonging to a nomadic group is not likely to contain numerous large stones, whereas a sedentary group could find several uses for pebbles and stones of this nature, and they would not be an encumbrance to such a group. A more complete analysis of the Windy Wheat Hamlet nonflaked lithic tool assemblage is provided in appendix E.

Ceramics

A total of 10,939 ceramic sherds were recovered from Windy Wheat Hamlet during the 1979-1980 field season. These ceramics are presented in table A.1. As can be seen in the table, Chapin Gray accounts for a large portion of the indigenous wares and Moccasin Gray accounts for only a small portion. These relative proportions support the dating of the primary period of occupation to A.D. 750-800. Moccasin Gray first appears in the project area around A.D. 760 but does not become more common than Chapin Gray until after A.D. 825 (Blinman 1982). Many of the body sherds of gray ware vessels cannot be assigned to a particular type and were simply classed as Early Pueblo Gray.

The nonidigenous wares represented at the site seem to come primarily from the south or the west in southeastern Utah. At Windy Wheat Hamlet, Mesa Verde region ceramics from the San Juan, Cahone, Sandstone, and Blanding Manufacturing Tracts are represented. The majority of these are red wares, which are believed to originate in southeastern Utah. Only a few sherds appear to have been manufactured outside the Mesa Verde region, including examples from the Cibola, Kayenta, and Mogollon regions.

As a whole, jars were the most common vessel form found at the site. Jars were followed by bowls with the remainder grouped under a category labeled as other. At Windy Wheat Hamlet, this category is primarily made

up of seed jars. One bird effigy vessel from Pitstructure 1 is also in this category.

In sum, the ceramic inventory from Windy Wheat Hamlet generally reflects the period of primary occupation of the site (A.D. 750-800) with its overwhelming amount of Chapin Gray as opposed to any other type. The date of the termination of the occupation is reflected by the introduction of Moccasin Gray, which appears in the project area in the late eighth century. It is interesting to note that almost 14 percent of the ceramics deposited at the site are nonindigenous types originating to the south or west in southeastern Utah. No trade ware from the east (Animas Tract) was recovered. It is unknown whether it is the ceramics or their contents that were the object of trade. However, the superior quality of the red wares as compared to their indigenous counterparts suggests that they may have been the trade objects themselves.

Nonhuman Bone Tools

Of the 1291 nonhuman bones recovered from Windy Wheat Hamlet, 52, as shown in table 22, have been fashioned into tools. Only 25 of these items are complete enough to assign a specific morpho-use. The following discussions concern only the 52 worked nonhuman bones; for a complete discussion of all bone recovered, refer to appendix G.

Awls

The most common bone tools recovered at the site were bone awls. Twelve of these items were recovered at Windy Wheat Hamlet. These awls are formed from the long bones of large mammals or Artiodactyla. Of the remainder, mule deer (*Odocoileus hemionus*) accounts for 38 percent, while the remaining 8 percent are classified as Artiodactyla. The preferred

Table 22. Worked nonhuman bone, Windy Wheat Hamlet

	Room 3		Room 5		Pitstructure 1	
	N	%	N	%	N	%
Total tools:	5	100.0	1	100.0	16	100.0
Taxon						
Aves						
Mammalia, small						
Mammalia, large			1	100.0	11	68.7
Artiodactyla	5	100.0			5	31.2
Lagomorpha						
Tool morpho-use						
Indeterminate	3	60.0			10	62.5
Awl	2	40.0			5	31.2
Beamer						
Spatulate tool			1	100.0		
Tube						
Ornament					1	6.2
Blank type						
Indeterminate					12	75.0
Broken bone	1	20.0	1	100.0	2	12.5
Split bone	2	40.0			2	12.5
Cut bone	1	20.0				
Split and cut bone	1	20.0				
Production evaluation						
Indeterminate					4	25.0
Some evidence					7	43.7
Not shaped	1	20.0				
Minimally shaped	2	40.0				
Moderately shaped	1	20.0	1	100.0	4	25.0
Well-shaped	1	20.0			1	6.2
Completely shaped						
Item condition						
Indeterminate					4	25.0
Broken						
Orientation unknown						
No orientation						
Proximal present					1	6.2
Medial present					6	37.5
Distal present					1	6.2
Proximal & medial present						
Distal & medial present						
Complete/nearly complete	5	100.0	1	100.0	4	25.0

Table 22. Worked nonhuman bone, Windy Wheat Hamlet--Continued

	Pitstructure 2		Pitstructure 3		Other units		Total	
	N	%	N	%	N	%	N	%
Total tools:	~~5~~ 22	100.0	~~1~~ 3	100.0	~~16~~ 5	100.0	52	100.0
Taxon								
Aves	1	4.5					1	1.9
Mammalia, small	3	13.6					3	5.8
Mammalia, large	7	31.8	1	33.3	5	100.0	25	48.1
Artiodactyla	8	36.4					18	34.6
Lagomorpha	3	13.6	2	66.7			5	9.6
Tool morpho-use								
Indeterminate	10	45.5			4	80.0	27	51.9
Awl	4	18.2	1	33.3			12	23.1
Beamer	1	4.5					1	1.9
Spatulate tool	2	9.1			1	20.0	4	7.7
Tube	3	13.6	2	66.7			5	9.6
Ornament	2	9.1					3	5.8
Blank type								
Indeterminate	13	59.1			5	100.0	30	57.7
Broken bone	1	4.5	1	33.3			6	11.5
Split bone	5	22.7					9	17.3
Cut bone	3	13.6	2	66.7			6	11.5
Split and cut bone							1	1.9
Production evaluation								
Indeterminate	3	13.6					7	13.5
Some evidence	9	40.9			4	80.0	20	38.5
Not shaped	1	4.5					2	3.8
Minimally shaped	1	4.5	2	66.7			5	9.6
Moderately shaped	6	27.3					12	23.1
Well-shaped	1	4.5	1	33.3			4	7.7
Completely shaped	1	4.5			1	20.0	2	3.8
Item condition								
Indeterminate							4	7.7
Broken								
Orientation unknown	4	18.2			1	20.0	5	9.6
No orientation	2	9.1					2	3.8
Proximal present	2	9.1					3	5.8
Medial present	3	13.6			2	40.0	11	21.1
Distal present	1	4.5					2	3.8
Proximal & medial present	1	4.5					1	1.9
Distal & medial present	1	4.5			1	20.0	2	3.8
Complete/nearly complete	8	36.4	3	100.0	1	20.0	22	42.3

bone for these tools appears to be the metapodial bones or the tibia. Examples of awls found at Windy Wheat Hamlet are shown in figure 55.

The next most common bone tool is the pierced tube; these are most frequently referred to as "tibia tinklers" (figure 56). This artifact type, according to Hayes and Lancaster (1975:170) seems to be indigenous to the northern San Juan drainages and is not found in sites south of the San Juan River. The pierced tubes of "tinklers" also seem to be a Pueblo I phenomenon and are not reported from earlier or later sites.

To construct a "tinkler" the articular surface of the proximal joint was removed by grinding at right angles to the axis and a reamer was used to remove the cancellous tissue. A small hole was then drilled through a wall of the shaft near the distal end. Of the five specimens recovered from Windy Wheat Hamlet, four were made from jackrabbit tibias and one from the tibiotarsas bone of a sandhill crane.

Only 4 of the 25 bone tools were of the spatulate variety. Spatulates were made from the split long bones of large mammals (figure 57). Functionally, this type of tool would have been ideal for scraping pulpy material from yucca leaves in preparing fiber for cordage (Osborne 1965), or for scraping or gouging other relatively soft materials.

A beamer recovered from Windy Wheat Hamlet consists of a mule deer radius that was split, leaving half of both the proximal and distal epiphyses (fig. 58). The ventral portion of the bone was then ground thin until it was fairly sharp, while the dorsal edge was unmodified to provide strength. The tool looks like a prehistoric version of a draw knife. It may have been used in the leather tanning process.

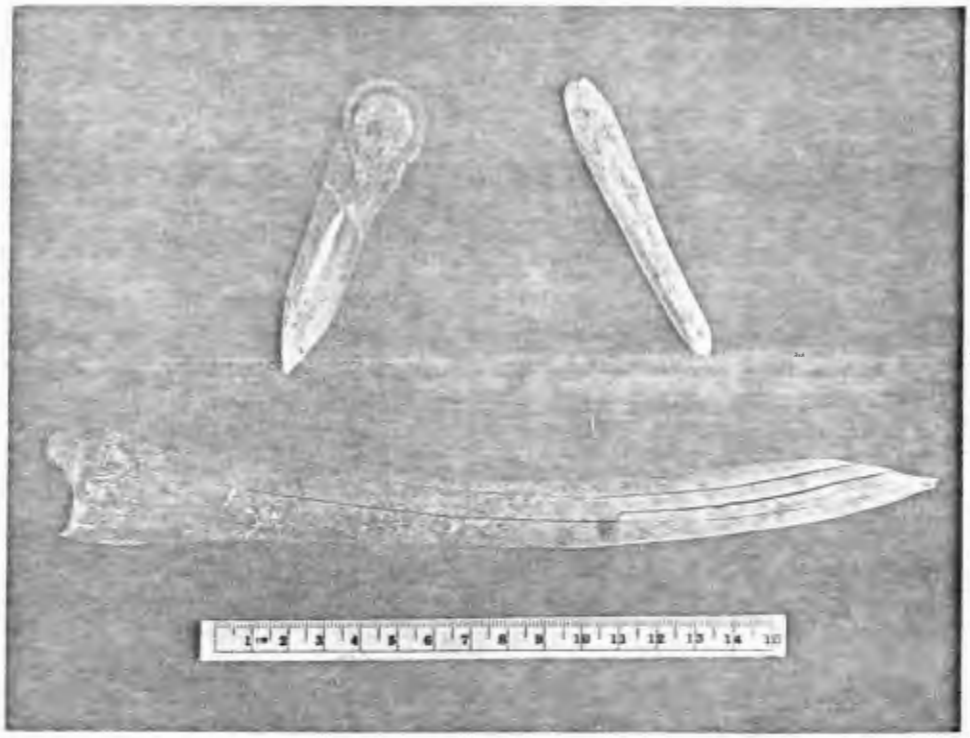


Figure 55. Examples of awls from Windy Wheat Hamlet (DAP 127434).

Figure 56. Tibia "tinklers" from Windy Wheat Hamlet (DAP 136104).

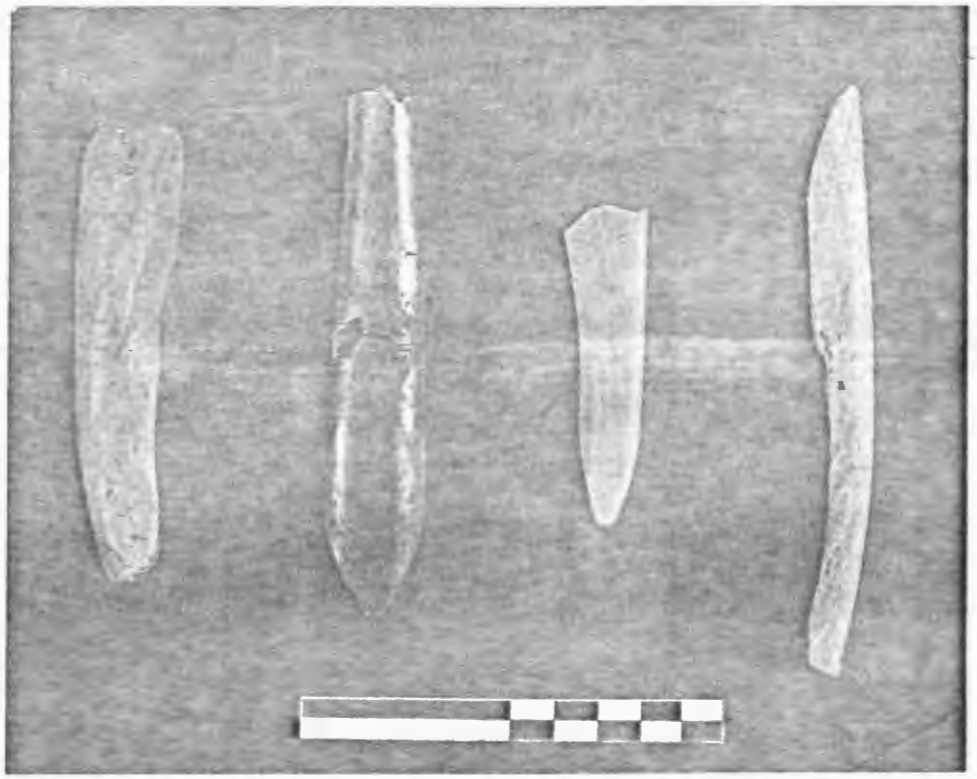


Figure 57. Spatulate tools from Windy Wheat Hamlet (DAP 136101).

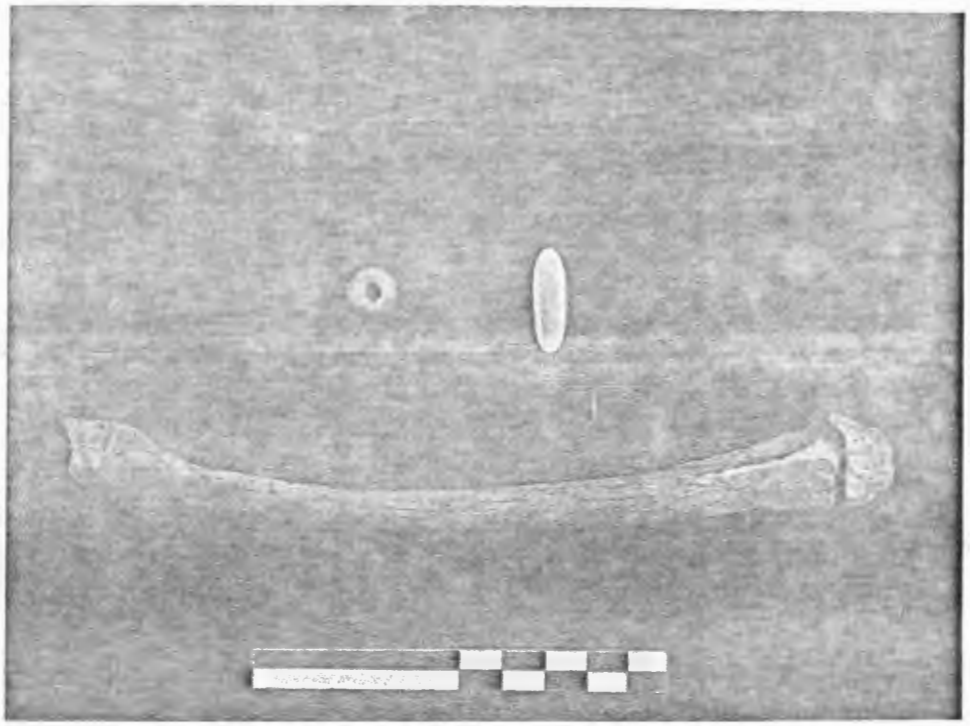


Figure 58. Beamer, "gaming piece," and beads from Windy Wheat Hamlet (DAP 136107).

The remaining three items from Windy Wheat Hamlet have been classified as ornaments. One of the bone artifacts was a bone bead (fig. 58). This bead is round with a central, biconically drilled hole. The edges along the dorsal face have been beveled. This bead is fashioned from a long bone fragment of a large mammal. The remaining two ornaments have been classified as high-production-input ornaments traditionally called "gaming pieces" (Hayes and Lancaster 1975:171). They were manufactured from bone fragments that then received considerable modification to produce the desired morphology. The function of these items is unknown.

Miscellaneous Items

A number of materials that do not fit into DAP analytical systems were recovered from Windy Wheat Hamlet. These miscellaneous items are listed in table 23.

Table 23. Miscellaneous items recovered from Windy Wheat Hamlet

Provenience	Material description
Pitstructure 1, west half, fill	Fossilized pelecypod
	Fossilized pelecypod fragment
Occupation area, Feature 112	Malachite (2) (0.6 g)
2- by 2-m grid unit (124S/148E), fill	Rabbit fur (0.1 g)
Pitstructure 2, Feature 35	Gastropod shell (0.1 g)
Pitstructure 3, Feature 197	Turquoise (2)
Pitstructure 2, fill	Calcite
4- by 4-m grid unit (130S/150E), fill	Coal
2- by 2-m grid unit (162S/118E), fill	Copper minerals

NOTE: (N) - Number of items.
(g) - Weight in grams.

Dating Samples

Dating samples taken from Windy Wheat Hamlet are of two types. The first, and the best for absolute dating purposes, are tree-ring samples.

All of the tree-ring samples (a total of 278) are from Pitstructures 1 and 2. Trees represented were Pinus ponderosa (252 specimens), Populus (17 specimens) and Juniperus (9 specimens). The other dating samples were archeomagnetic samples, which are discussed further in the "Chronology" section.

Botanical and Pollen Samples

Intensive botanical and pollen sampling programs were instituted in Pitstructure 1 at Windy Wheat Hamlet. The results of these special studies are presented in appendixes C and D along with the results of samples from Pitstructure 2.

SITE SYNTHESIS

Chronology

Two absolute dating methods were employed at Windy Wheat Hamlet: tree-ring dating and archaeomagnetic dating.

Two of the three pitstructures had been destroyed by fire and could be dated by tree-ring analysis. The tree-ring specimens from Pitstructure 2 (table 6) yielded 12 dates which clustered at A.D. 775-776. Thus, it is concluded that Pitstructure 2 was constructed in A.D. 776 or possibly a year later. Pitstructure 1 yielded two dates, A.D. 787v and A.D. 793vv. Kane (1983:table 9) suggests that the A.D. 793vv date is within 15 years of a true cutting date. Therefore, it appears highly likely that Pitstructure 1 was constructed in the A.D. 790's. Though burned, none of the surface rooms yielded datable specimens.

A total of nine archaeomagnetic samples were recovered from three structures at the site (Pitstructures 1 and 2, and Room 5) and were analyzed at Colorado State University. Five of the samples were used to develop the Dolores modification of the Southwest United States master curve of virtual geomagnetic pole positions (Hathaway et al. 1983; Dubois 1975). To avoid analytical circularity, possible dates from these samples are not reported here. Of the remaining four samples, two did not yield plots interpretable in terms of dates. The other two (sample 6 from the central hearth of Pitstructure 2 and sample 9 from the hearth in Room 5) did yield plots interpretable in terms of dates from the Dolores Southwest master curve. The dates from the Room 5 sample seem aberrant given the other dating evidence from the site. The A.D. 880 $\pm$ 50 date from the central hearth of Pitstructure 2 appears to be a reasonable date and may

suggest that occupation of Pitstructure 2 continued into the 830's or 840's. The archaeomagnetic dating information from Windy Wheat Hamlet is summarized in table 24.

Table 24. Archaeomagnetic sample results, Windy Wheat Hamlet

Sample No.	Provenience	Date
1	Pitstructure 1, west wall	Used for Dolores modification
2	Pitstructure 2, Feature 21	Used for Dolores modification
3	Pitstructure 2, north wall	Used for Dolores modification
4	Discarded in field	
5	Pitstructure 1, north wall	Used for Dolores modification
6	Pitstructure 2, Feature 21	A.D.700 ± 50 or A.D. 880 ± 50 or A.D. 930 ± 50
7	Occupation Area, Feature 126	*
8	Pitstructure 3, Feature 165	Used for Dolores modification
9	Room 5, Feature 130	A.D. 950 ± 50 A.D. 1425 ± 50

* The sample paleopole plot does not occur near the current interpretations of the Southwest curve (A.D. 700-1425).

Certain relative methods were also used to date architectural construction and use of the site. Use of the main structures at the site could be dated to within a relatively short time span based on the presence, absence, and relative frequencies of various ceramic types. The ceramic floor assemblage in Pitstructure 3 contains a few red ware sherds but no Moccasin Gray, indicating that use of the structure probably occurred between A.D. 725 and 780. The floor assemblages for Pitstructures 1 and 2 contain greater proportions of red wares and a low percentage of Moccasin Gray, suggesting use after A.D. 775 but before A.D. 825. Ceramics recovered from floor assemblages in the surface rooms were similar in content to this last characterization. The DAP ceramic analysis staff has developed a relative dating method based on coil measurements from neck-banded vessels (Blinman 1981). This method was applied to a reconstructible vessel from the roof fall stratum of Pitstructure 2, and a

date of A.D. 794 was derived.[3] This date can be interpreted as representing the construction date for the vessel; the archaeological context of the vessel probably dates to a number of years after its manufacture.

The physical characteristics and the feature complement of Pitstructures 1 and 2 are consistent with those noted for Dolores area pitstructures constructed ~~during~~ between A.D. 760 and 840 ~~the period span~~. Pitstructures that date to between A.D. 760 and 840 generally have a relatively square shape, a depth of about 1.5 m, a bench that serves as a footing for the roof leaner posts, a ventilator rather than an antechamber, a sipapu rather than a ceremonial vault, no above floor bins, and a wingwall constructed of vertical slabs, posts, and adobe rather than coursing (Hewitt et al. 1981:table 3; Kane 1983). These diagnostic attributes were consistently present in Pitstructures 1 and 2 at Windy Wheat Hamlet.

Stratigraphic evidence observed at the site is also useful for determining the sequence of events. Although the ceramics on the floor of Pitstructure 3 suggest that the structure was built after A.D. 725, trash and backdirt in the fill indicate that Pitstructure 3 had not been long abandoned when Pitstructure 2 was built. Since Pitstructure 2 was constructed in A.D. 776, Pitstructure 3 was probably abandoned close to this date. Although it is possible that Pitstructure 3 was constructed around A.D. 725 and abandoned around A.D. 776, a 50-year use-life for a pitstructure might be too long. Kane (1981b:80) has suggested that the use-life of a pitstructure might be closer to 25 years; therefore, a reasonable construction date for Pitstructure 3 might be A.D. 750.

In summary, it appears that Pitstructure 3 was the original structure built at the site about A.D. 750; no surface rooms found were assignable to this

---

[3]Eric Blinman, DAP, personal communication.

initial construction. Pitstructure 3 was abandoned after 10-25 years of use and the site was deserted for a short period of time (long enough for 5 to 10 cm of fill to accumulate on some parts of the floor and in several features). In A.D. 776 the site was reoccupied and Pitstructure 2 and possibly Rooms 1, 6, and 7 were constructed, followed 20 years later by the construction of Pitstructure 1 and Rooms 2, 3, 4, 5, and 8. Pitstructures 1 and 2 and the associated rooms probably were then occupied simultaneously until abandonment of the site.

A slightly different interpretation is that Pitstructure 2 and the associated surface structures were abandoned some years before Pitstructure 1 was abandoned. This alternative reconstruction is suggested by documented abandonment modes. Pitstructure 1 apparently burned catastrophically during occupation while Pitstructure 2 burned after abandonment. If there was a period during which Pitstructure 1 was being used and Pitstructure 2 was not, it was probably relatively short (5 years) because there were no refuse deposits in the fill of Pitstructure 2. Use of abandoned structures for refuse middens was a common practice of the Dolores Anasazi; Pitstructure 3 at Windy Wheat was used by the later occupants for this purpose. Total abandonment of the site probably occurred in the 820's or 830's.

Integration of Spatial and Temporal Units

General Setting According to Program Systematics

At Windy Wheat Hamlet, three major elements (refer to Kane 1980) are recognized; these elements represent three temporal divisions that are spatially related, but are not contemporaneous, at least not entirely. The elements will be discussed in chronological order from the earliest to the

latest. This section is a descriptive justification for why different structures or features within the site were placed within a particular element as opposed to another.

Element 1. The best estimate, given the chronological data, is that Element 1 represents the first prehistoric use of Windy Wheat Hamlet and probably lasted for 25 years (from approximately A.D. 750 to 776). Pitstructure 3 and one fireplace (Feature 66) in the occupation area have been assigned to Element 1. The fill sequence in the pitstructure suggests that it is the earliest structure at the site; this is consistent with interpretation of the ceramic assemblage recovered from the floor of the structure. Feature 66 is too close to later surface rooms to permit effective use and appears to have been deliberately filled before the existing surface rooms were used; this suggests that the feature is associated with Element 1.

Conspicuously missing from the element are surface structures. The architectural data for the project area indicate that habitation sites of the Sagehen Phase (A.D. 600-850), or more specifically the Sagehill Subphase (A.D. 600-770), are characterized by one or two pithouses with associated storage rooms, and occasionally, associated seasonal living rooms (Kane 1980). This pattern should be expected to occur at Windy Wheat Hamlet during Element 1. However, as was noted during excavation, historic plowing was deeper on the west side of the ridge on which the site is built. It is on this west side where the rooms associated with Pitstructure 3 should be located. Thus, historic plowing probably obliterated all traces of any surface structures associated with Pitstructure 3. Alternatively, the structures associated with Element 1 may have been reused by occupants of the site during Element 2. This could have obliterated all evidence of their earlier use.

In summary, Element 1 dates to sometime between A.D. 750 and A.D. 776 and probably consisted of a single pithouse dwelling unit with associated surface structures and features. These spatial units constituted a single household cluster (Kane 1981b, 1983) that was probably used by a single nuclear family household.

Element 2. Following the abandonment of Pitstructure 3, Windy Wheat Hamlet was unoccupied. The reoccupation of the site and the construction of Pitstructure 2 initiated the temporal unit referred to as Element 2.

Pitstructure 2 is the most securely placed structure in this element. When Pitstructure 2 was abandoned it was burned. The resultant preserved charred roof timbers gave tree-ring dates related to the construction of Pitstructure 2. These place the beginning of Element 2 at A.D. 776. Three surface structures (Rooms 1, 6 and 7) and three surface features (Features 143, 131, and 18) have also been tentatively assigned to Element 2.

Historic plowing at Windy Wheat Hamlet has resulted in the destruction of virtually all prehistoric floor surfaces and room architecture associated with Pitstructure 2 and Element 2. In addition, the original Element 2 surface rooms were probably refurbished and modified by the subsequent Element 3 occupation. Thus, the original Element 2 pattern of surface structures is impossible to reconstruct through interpretation of available excavation data; the assignment of surface room units to Element 2 must be tentative and is based on analogy with other contemporaneous Dolores area settlements and extrapolations from the DAP architectural model (Kane 1981b, 1983). "Normal" architectural patterns for the A.D. 760-850 period (Dos Casas Subphase) are that habitation sites usually consist of one or two pithouses, each of

which is associated with two to four surface dwelling units (household clusters). Excavations north of Pitstructure 2 revealed numerous features including hearths, postholes, and storage pits, but no surfaces or room walls. Most of these features (7 of the 10 recorded) contained burnt wood fragments and adobe casts almost certainly from collapsed walls and roofs. The features containing roof or wall material are arranged in a linear fashion and extend approximately 15 m west of the last defined surface structure (Room 1). Relatively high concentrations of burnt adobe (0.6-1.0 kg per 4-m grid square, see fig. 7) were recorded north of Pitstructure 2 during surface investigations. These relatively high concentrations also extend approximately 15 m west of Room 1, suggesting the former presence of surface structures. The three front rooms to the north of Pitstructure 1 measured approximately 17 m from east to west. Based on this information, 15 m of linear architectural space suggest that three front rooms may have been present north of Pitstructure 2.

If the spatial component of Element 2 was congruent with a normal pattern, then a total of 6 to 12 contiguous surface rooms representing 2 to 4 household clusters may have been present. The surface room complement for Element 2 may have included Rooms 1 and 7 (which were also used during Element 3) and Room 6 (on the western extremity of the site).

Several features were also assigned to Element 2 based on their location and fill characteristics: they contained refuse deposited during the prehistoric use of the site and hence their original use predates the final occupation. These features include a small borrow pit (Feature 143) north of Pitstructure 1, and two storage cists (Features 18 and 131).

In summary, Element 2 occurred between A.D. 776 and 800. The surface rooms probably associated with the element are impossible to reconstruct

due to destruction by later prehistoric use of the site and by historic plowing. By applying the DAP architectural model as an analogy, it is suggested that Element 2 consisted of a pitstructure and 6 to 12 surface rooms arranged in 2 to 4 contiguous household clusters. This suggests an entire architectural complement composed of one interhousehold cluster representing two to four cooperating households.

Element 3. Element 3 constituted the terminal occupation of the site. It is the easiest element to define spatially because no subsequent occupation occurred to obscure the record.

Temporally, Element 3 is estimated to have existed for approximately 30 years, from A.D. 800 to 830. The estimate for the beginning of the element is based on the 787v and 793vv tree-ring dates from roof beams in Pitstructure 1. The estimate for abandonment is based on the approximate lifespan for a pitstructure (25 years [Kane 1981b]) ~~plus the archaeomagnetic date of A.D. 880 ± 50 from Pitstructure~~ 2 and the proportion of Moccasin Gray in the ceramic assemblages for the two pitstructures.

Pitstructure 1 was apparently constructed around A.D. 800. Use of Pitstructure 2 perhaps continued uninterrupted through Element 3. It is possible that the extensive remodeling in Pitstructure 2, including rebuilding of the wingwall and movement of the northern main support posts, corresponds with the beginning of Element 3. Because of the lack of dates associated with the remodeling, this suggestion remains speculative. Pitstructure 1 is believed to have been abandoned catastrophically; that is, the structure apparently burned during use. Pitstructure 2 was apparently abandoned in a more leisurely fashion and the roof burned and fell a few years after abandonment. This difference in abandonment mode

might suggest different times of abandonment for the two structures, but the difference, if real, may have been only a few years.

Rooms assigned to Element 3 include two living rooms (Rooms 3 and 5), two storage rooms (Rooms 2 and 4), a processing room (Room 1), and two rooms with undefined functions (Rooms 7 and 8). The assignment of these rooms to Element 3 was based on general site spatial relationships and stratigraphy, and on the archaeological context of the rooms (they were burned during use and show no evidence of subsequent reuse). Rooms 2 and 3 and Rooms 4 and 5 apparently represent two household clusters. Other Element 3 dwelling units, later destroyed by historic plowing, were probably present north of Pitstructure 2.

Features assigned to Element 3 are two slab-lined fireplaces (Features 4 and 126), a storage pit (Feature 15), a large borrow pit (Feature 127), and three features (Features 18, 112, and 131) originally used during Element 2 and then used as trash receptacles during Element 3.

In total, the spatial and architectural complement at Windy Wheat Hamlet during Element 3 probably consisted of two interhousehold clusters with 4-6 household clusters (comprised of 12 to 25 total rooms), a shared refuse midden, and features in an outdoor occupation area. The space and facilities at the site were probably used by 4 to 6 households cooperating in interhousehold social units associated with each pithouse.

Paleodemography

On a site-specific basis, paleodemography can only be addressed with regard to the site population or the physical stature and well-being of the inhabitants. The latter can be addressed only if human remains are present. As no human remains were recovered from Windy Wheat Hamlet, the

only question to be examined here is population. Because the prehistoric occupation at Windy Wheat Hamlet is divided into three temporally distinct elements, the population for each element will be estimated.

Dolores Archaeological Program reports (c.f. Wilshusen 1983; Kleidon 1983) have generally approached population estimates through either a habitation space approach or a household cluster approach. The former involves calculating total living space (usually assumed to be roofed space) for each occupation and using a constant multiplier to convert to actual population figures. The constants usually employed range from 10 m^2 per person (Narroll 1962) to about 14 m^2 total for the first six people and 9.3 m^2 of living space for each additional person (Cook 1972). The household cluster approach assumes 5-6 persons per identified household cluster or pitstructure. This assumption is based on archaeological work done by Rohn (1971) and ethnographic comparisons done by Hill (1970) in his Broken K Pueblo monograph. The habitation space approach is of limited utility when considering the Windy Wheat data because much of the prehistoric roofed space at the site has been destroyed by historic plowing.

Pitstructure 3 is assumed to represent the total habitation space (16 m^2) for Element 1. Converting inhabitable space to population numbers yields a low estimate of less than two persons and a high estimate of over six persons. The household cluster approach yields a figure of five to six persons.

For Element 2, the habitation space approach cannot be used due to historic destruction of the surface rooms. If the analog to the project architectural model is valid, then two to four household cluster units were originally present during Element 2, and a maximum population of 10

to 24 individuals can be estimated (assuming coeval occupation of all household clusters); mean population levels were probably somewhat less, probably ranging from 8 to 15 individuals.

To estimate the population during Element 3, the habitation approach can perhaps be applied to the eastern interhousehold cluster (i.e., that associated with Pitstructure 1). A minimum estimate of total roofed space (Pitstructure 1 and Rooms 1, 2, 3, 4, 5, and 7) during Element 3 is 72.5 m^2. Applying the conversions yields a minimum population of seven individuals (Narroll's formula) and a maximum of 13 (Cook's formula). Using the household cluster method the estimated population is 10 to 12 individuals. The habitation space approach cannot be used for the western interhousehold cluster. The household cluster approach figures do not vary from those estimated for Element 2: 2 to 4 household clusters and 10 to 24 individuals. Combining the household cluster method figures for both interhousehold clusters suggests a maximum momentary population (assuming coeval use of all household clusters) of 20 to 36 individuals during Element 3; mean population levels were probably somewhat less, perhaps ranging from 15 to 25 individuals.

Summary

The population of Windy Wheat Hamlet was computed using habitation area formulas, which allot so many square meters of living space per person, and household cluster estimates. These two methods yielded population estimates for the three elements at the site.

These estimates suggest that the site was initially occupied by a single nuclear family group of 4 to 6 individuals. After a short period of abandonment, the site was reoccupied by a larger group of 8 to 15 individuals. After Pitstructure 2 had been occupied for 20 years, Pit-

structure 1 and additional household clusters were added. These structures were used to house more people at the site. The mean population during Element 3 was perhaps 15-25 individuals.

Social Organization

As has already been stated, the prehistoric occupation at Windy Wheat Hamlet was composed of three distinct elements that were not entirely contemporaneous. It is therefore difficult to compare elements to determine presence or absence of cultural change through time since each succeeding occupation obliterated in part the archaeological record of the previous occupants. Thus, organizational inferences are largely based on the number of people present during each element, and on the surviving architecture.

Artifact and feature distributions reflecting interhousehold organization are evident in all three pitstructures; a division between male- and female-related activities can be seen from artifact placement within the houses. Judging from the usual pattern of artifacts found on pitstructure floors, the whole southern end of the structure would seem to be more female oriented than the northern half. Usually found in the southern half are domestic items such as cooking and serving vessels, manos, metates, and other nonflaked lithic tools used in food processing (e.g., pecking stones and hammerstones).

On the other hand, tools such as blades and projectile points are found in the north end of the structure especially along the walls. Also found in this northern area are many reduction flakes, indicating that flaked lithic tools were being made or repaired there. These artifacts, if ethnographic analogies (Beaglehole 1937:18-19) can be applied, repre-

sent the male-related activities of hunting and flaked lithic tool manufacture. This seemingly male/female structuring of the domicile can best be observed in Pitstructure 1, which burned while in use leaving many everyday articles in place.

General spatial organization of the site according to social groupings seems evident in the arrangement of surface structures and pitstructures during Elements 1 and 3. Element 1 apparently consisted of a single domestic pithouse dwelling unit (Pitstructure 1) and associated surface structures. Because the pitstructure was used primarily as a domicile, it is interpreted as a pithouse. The features and artifacts recorded in archaeological context assigned to Element 1 are consistent with this interpretation.

The archaeological data for Element 3 consist of two pitstructures (Pitstructures 1 and 2), two pairs of living rooms and associated storage rooms (3 and 2, 5 and 4) and two rooms whose functions are more ambiguous. Kane (1981b, 1983) in a presentation of DAP spatial systematics, suggests that Dolores Anasazi groups during the 760-840 period (Dos Casas Subphase) were organized by interhousehold groups each usually including several households. If group organization and associated spatial patterning at Windy Wheat Hamlet corresponds to the normative patterns described by Kane, then the following is the most plausible reconstruction of spatial organization during Element 3. Pitstructures 1 and 2 represent domestic and integrative loci for two interhousehold groups. The western interhousehold group probably consisted of two to four households based in surface dwelling units, but these have been destroyed by plowing. The eastern interhousehold group consisted of two households based in the two dwelling units represented by Rooms 3 and 2,

and Rooms 5 and 4. Rooms 1 and 7 are thought to represent processing and storage areas shared by members of both households. This reconstruction of the site during Element 3 is illustrated in figure 59.

Because of the flimsy construction of the surface rooms, it is suggested that these living rooms were primarily warm weather abodes and that the pithouses were the winter domiciles as well as centers for integrative and domestic activities at the interhousehold level. It is speculated that if, like those of Element 3, all units of Element 2 were intact, a similar organizational set-up would have existed; this element would have consisted of one interhousehold cluster with three dwelling units.

These inferences concerning social organization as seen at Windy Wheat Hamlet are of course speculative. The division of the pitstructure into unbounded male and female work areas, however, is fairly well founded because it is based on artifactual evidence. The household definitions are also well established by the site layout and by the functional interpretation of the different structural units of this layout during Element 3.

Extraregional Relationships

It is always interesting to discover with whom the occupants of any one site were trading. The ceramic analysis has shown, for instance, that the inhabitants of Windy Wheat Hamlet traded quite extensively with people to the south. Most exchanged ceramics were red ware items manufactured in southeastern Utah. On the other hand, not a single shell item was recovered from the site, and trade or exchange of exotic stone is also almost nonexistent. Of the 1249 flaked stone tools and 5520 pieces of

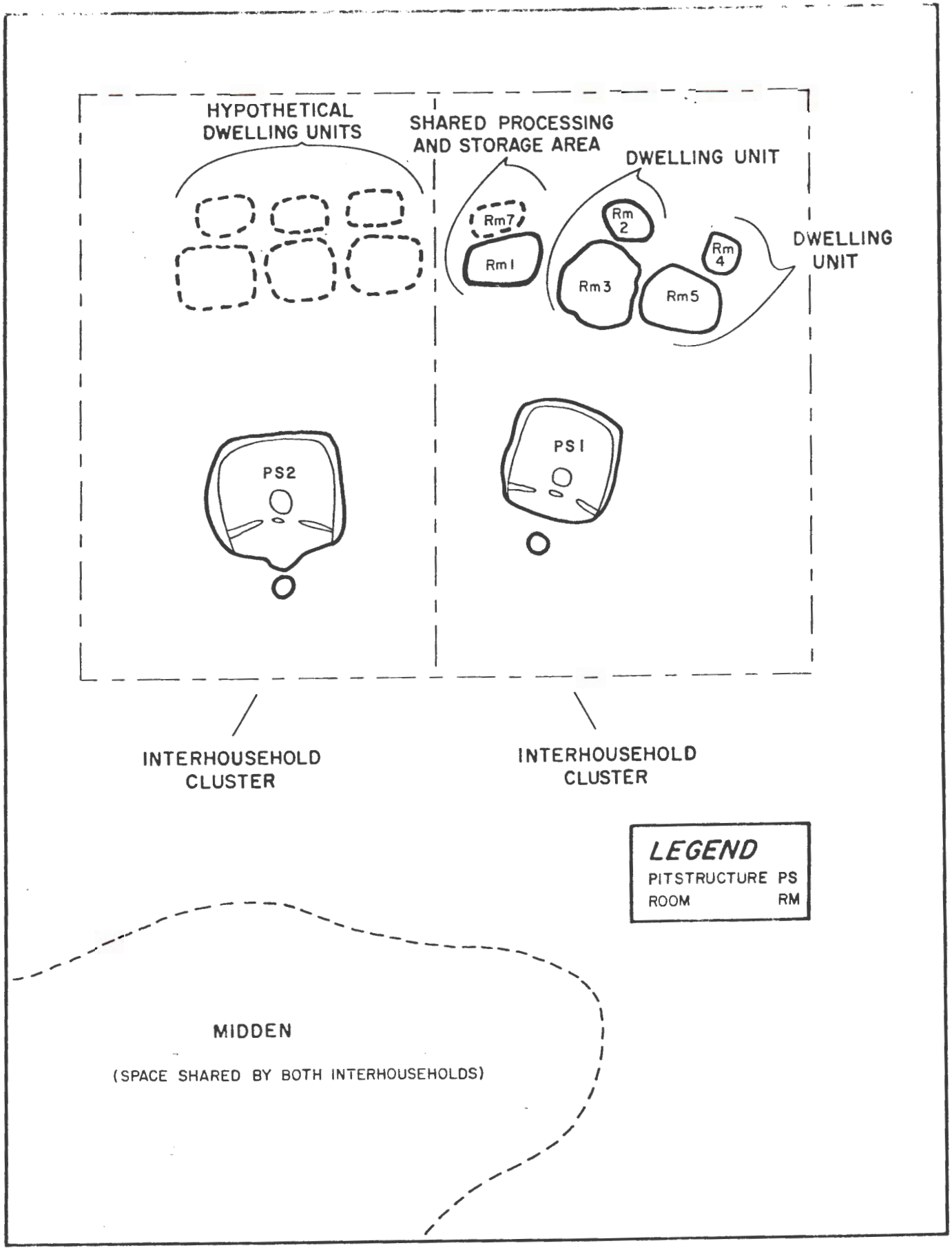


Figure 59. Reconstruction of spatial units used during Element 3, Windy Wheat Hamlet.

flake debitage, less than 1 percent are geologically foreign to this area and thus could possibly represent trade. It is also possible that these few items could have been picked up from Archaic or aceramic lithic scatters located at higher elevations within the project area. Therefore, it would seem that the majority of the subsistence requirements for the inhabitants at Windy Wheat Hamlet were met by locally available resources.

Cultural Process

Altogether, Windy Wheat Hamlet was occupied for approximately 60-90 years albeit perhaps not continuously. The initial occupation, consisting of a single pitstructure and an unknown number of surface structures, lasted from sometime around A.D. 750 until a few years prior to A.D. 776. During this initial occupation a single small family unit was in residence. Their pitstructure was fairly shallow and lacked a bench, but had internal storage space available in the form of a large alcove in the east wall. After a short period of site abandonment, the site was reoccupied by a larger resident group. Stylistically, the new pitstructures (Pitstructures 1 and 2) are quite different from the older pitstructure.

Chron:

The new style is deeper and the wingwall is much more substantial and angles toward the hearth instead of being straight. Also, and more significantly, both pitstructures 1 and 2 have a three-quarter bench, whereas Pitstructure 3 had no bench. There is a pattern in the DAP study area of appearance and disappearance of the bench through time. This appearance and disappearance happens more than once. For instance, during the Basketmaker III period benches are present, but by A.D. 700 they basically disappear. By A.D. 760 they are back, only to disappear again by A.D. 840

and not to reappear again until kivas replace pitstructures after A.D. 900 (Hewitt et al. 1981:7-8). The reasons for this phenomenon are as yet unknown, but it does illustrate cultural processes that were in action and ongoing.

Because of the relatively short span of occupancy at Windy Wheat Hamlet, no major cultural upheaval is evident. The change of pitstructure style and the population fluctuations (possibly changes in social organization) already noted are the only indications of culture change at the site.

APPENDIX A

MATERIAL CULTURE, WINDY WHEAT HAMLET

Tables A.1 through A.4 present the material culture from Windy Wheat Hamlet. These data were used in the writing of the main body of this report and in the preparation of the other appendixes.

ANASAZI HERITAGE CENTER
LIBRARY

Table A.1 Ceramic data summary, Windy Wheat Hamlet

Culture category: Tract / Ware / Type	Modern ground surface N	Modern ground surface %wt	Room 6 total N	Room 6 total %wt	Room 1 Floor N	Room 1 Floor %wt	Room 1 Fill N	Room 1 Fill %wt
Mesa Verde:								
Dolores Tract								
Gray Ware								
Chapin Gray	120	3.1			5	7.2	8	4.1
Moccasin Gray	15	0.4						
Mancos Gray								
Dolores Brown								
Early Pueblo Gray	2,870	89.8	1	100.0	324	86.5	240	95.5
Late Pueblo Gray								
White Ware								
Chapin Black-on-white	1	0.1						
Piedra Black-on-white								
Painted White	9	0.2						
Polished White	59	1.5					1	<0.1
Smudged Ware								
Smudged								
San Juan Tract								
Gray Ware								
Chapin Gray								
Early Pueblo Gray	2	0.1						
White Ware								
Piedra Black-on-white								
Painted White	1							
Polished White	2							
Cahone Tract								
Gray Ware								
Chapin Gray	1							
Early Pueblo Gray	31	0.5					1	0.1
White Ware								
Piedra Black-on-white								
Polished White	6	0.1						
Red Ware								
Early Pueblo Red	6	0.1						
Sandstone Tract								
Gray Ware								
Chapin Gray								
Moccasin Gray	1							
Early Pueblo Gray	4	0.1						
White Ware								
Painted White								
Polished White	1							
Red Ware								
Early Pueblo Red								
Blanding Tract								
Red Ware								
Abajo Red-on-orange	28	0.9			13	6.2		
Abajo Polychrome								
Bluff Black-on-red	6	0.3						
Dolores Red								
McPhee Black-on-red								
Early Pueblo Red	109	2.1			2	0.1	5	0.4
Slipped Red	8	0.2						
Cibola:								
Gray Ware								
Lino Gray								
Early Pueblo Gray	1							
Quartz Sand:								
Gray Ware								
Early Pueblo Gray	5	0.1						
White Ware								
Early Pueblo White	1							
Late Pueblo White								
Mogollon:								
Brown Ware								
Brown Smudge	1							
Indeterminate:								
Gray Ware								
Unclassifiable Gray	1							
Gray Body Sherds								
Total ceramics	3,289	100.0	1	100.0	344	100.0	255	100.0
Total wt (g)	15,738.7		6.4		4,821.5		3,336.5	
Vessel form:								
Gray Ware								
Bowl	6	0.2						
Jar	3,043	93.6	1	100.0	329	93.7	249	99.5
Other	2	0.5						
White Ware								
Bowl	69	1.9						
Jar	10	0.2					1	<0.1
Other	1							
Red Ware								
Bowl	127	2.9			13	6.2	5	0.4
Jar	29	0.7			2	0.1		
Other	1							
Brown Ware								
Bowl								
Jar	1							
Smudged Ware								
Jar								

NOTE: Each category (i.e., column) includes artifacts from features that are associated with that context.

Table A.1 Ceramic data summary, Windy Wheat Hamlet--Continued

Culture category: Tract / Ware / Type	Room 1 Total N	Room 1 Total %wt	Room 2 total N	Room 2 total %wt	Room 3 Floor N	Room 3 Floor %wt	Room 3 Roof fall N	Room 3 Roof fall %wt
Mesa Verde:								
Dolores Tract								
Gray Ware								
Chapin Gray	13	5.9	2	16.4	89	41.8	1	2.4
Moccasin Gray								
Mancos Gray								
Dolores Brown								
Early Pueblo Gray	564	90.1	12	76.7	16	6.9	71	93.4
Late Pueblo Gray								
White Ware								
Chapin Black-on-white								
Piedra Black-on-white								
Painted White								
Polished White	1							
Smudged Ware								
Smudged							2	1.3
San Juan Tract								
Gray Ware								
Chapin Gray								
Early Pueblo Gray								
White Ware								
Piedra Black-on-white								
Painted White								
Polished White								
Cahone Tract								
Gray Ware								
Chapin Gray								
Early Pueblo Gray	1		1	1.1				
White Ware								
Piedra Black-on-white								
Polished White								
Red Ware								
Early Pueblo Red								
Sandstone Tract								
Gray Ware								
Chapin Gray								
Moccasin Gray								
Early Pueblo Gray								
White Ware								
Painted White								
Polished white								
Red Ware								
Early Pueblo Red								
Blanding Tract								
Red Ware								
Abajo Red-on-orange	13	3.7	1	5.8	157	49.9		
Abajo Polychrome								
Bluff Black-on-red							1	2.7
Dolores Red								
McPhee Black-on-red								
Early Pueblo Red	7	0.2			7	1.4	1	0.2
Slipped Red								
Cibola:								
Gray Ware								
Lino Gray								
Early Pueblo Gray								
Quartz Sand:								
Gray Ware								
Early Pueblo Gray								
White Ware								
Early Pueblo White								
Late Pueblo White								
Mogollon:								
Brown Ware								
Brown Smudge								
Indeterminate:								
Gray Ware								
Unclassifiable Gray								
Gray Body Sherds								
Total ceramics	599	100.0	16	100.0	269	100.0	76	100.0
Total wt (g)	8,158.0		157.3		3,410.8		563.8	
Vessel form:								
Gray Ware								
Bowl								
Jar	578	96.1	15	94.2	104	48.5	71	93.4
Other					1	0.3	1	2.4
White Ware								
Bowl								
Jar	1							
Other								
Red Ware								
Bowl	18	3.8			1	0.2	1	0.2
Jar	2		1	5.8	6	1.2		
Other					157	49.9	1	2.7
Brown Ware								
Bowl								
Jar								
Smudged Ware								
Jar							2	1.3

Table A.1 Ceramic data summary, Windy Wheat Hamlet--Continued

Culture category: Tract / Ware / Type	Room 3 Total N	Room 3 Total %wt	Room 4 Floor N	Room 4 Floor %wt	Room 4 Roof fall N	Room 4 Roof fall %wt	Room 4 Total N	Room 4 Total %wt
Mesa Verde:								
Dolores Tract								
Gray Ware								
Chapin Gray	90	36.2	4	10.5			4	10.2
Moccasin Gray								
Mancos Gray								
Dolores Brown								
Early Pueblo Gray	87	19.2	34	89.5	5	100.0	39	89.8
Late Pueblo Gray								
White Ware								
Chapin Black-on-white								
Piedra Black-on-white								
Painted White								
Polished White								
Smudged Ware								
Smudged	2	0.2						
San Juan Tract								
Gray Ware								
Chapin Gray								
Early Pueblo Gray								
White Ware								
Piedra Black-on-white								
Painted White								
Polished White								
Cahone Tract								
Gray Ware								
Chapin Gray								
Early Pueblo Gray								
White Ware								
Piedra Black-on-white								
Polished White								
Red Ware								
Early Pueblo Red								
Sandstone Tract								
Gray Ware								
Chapin Gray								
Moccasin Gray								
Early Pueblo Gray								
White Ware								
Painted White								
Polished White								
Red Ware								
Early Pueblo Red								
Blanding Tract								
Red Ware								
Abajo Red-on-orange	157	42.8						
Abajo Polychrome								
Bluff Black-on-red	1	0.4						
Dolores Red								
McPhee Black-on-red								
Early Pueblo Red	8	1.2						
Slipped Red								
Cibola:								
Gray Ware								
Lino Gray								
Early Pueblo Gray								
Quartz Sand:								
Gray Ware								
Early Pueblo Gray								
White Ware								
Early Pueblo White								
Late Pueblo White								
Mogollon:								
Brown Ware								
Brown Smudge								
Indeterminate:								
Gray Ware								
Unclassifiable Gray								
Gray Body Sherds								
Total ceramics	345	100.0	38	100.0	5	100.0	43	100.0
Total wt (g)	3,974.6		428.1		15.3		443.4	
Vessel form:								
Gray Ware								
Bowl								
Jar	175	54.9	38	100.0	5	100.0	43	100.0
Other	2	0.6						
White Ware								
Bowl								
Jar								
Other								
Red Ware								
Bowl	2	0.2						
Jar	6	1.0						
Other	158	43.2						
Brown Ware								
Bowl								
Jar								
Smudged Ware								
Jar	2	0.2						

Table A.1 Ceramic data summary, Windy Wheat Hamlet--Continued

Culture category: Tract / Ware / Type	Room 5 Floor N	Room 5 Floor %wt	Room 5 Roof fall N	Room 5 Roof fall %wt	Room 5 Total N	Room 5 Total %wt	Room 8 total N	Room 8 total %wt
Mesa Verde:								
Dolores Tract								
Gray Ware								
Chapin Gray	4	3.8			4	3.5		
Moccasin Gray								
Mancos Gray								
Dolores Brown								
Early Pueblo Gray	43	40.5	34	98.3	77	46.2	5	98.5
Late Pueblo Gray								
White Ware								
Chapin Black-on-white								
Piedra Black-on-white								
Painted White								
Polished White	1	0.2			1	0.2		
Smudged Ware								
Smudged								
San Juan Tract								
Gray Ware								
Chapin Gray	2	0.6			2	0.6		
Early Pueblo Gray								
White Ware								
Piedra Black-on-white								
Painted White								
Polished White	3	2.3			3	2.1		
Cahone Tract								
Gray Ware								
Chapin Gray								
Early Pueblo Gray	39	52.5			39	47.3		
White Ware								
Piedra Black-on-white								
Polished White								
Red Ware								
Early Pueblo Red								
Sandstone Tract								
Gray Ware								
Chapin Gray								
Moccasin Gray								
Early Pueblo Gray								
White Ware								
Painted White								
Polished White								
Red Ware								
Early Pueblo Red								
Blanding Tract								
Red Ware								
Abajo Red-on-orange								
Abajo Polychrome								
Bluff Black-on-red								
Dolores Red								
McPhee Black-on-red								
Early Pueblo Red			1	1.7	1	0.2	1	1.5
Slipped Red								
Cibola:								
Gray Ware								
Lino Gray								
Early Pueblo Gray								
Quartz Sand:								
Gray Ware								
Early Pueblo Gray								
White Ware								
Early Pueblo White								
Late Pueblo White								
Mogollon:								
Brown Ware								
Brown Smudge								
Indeterminate:								
Gray Ware								
Unclassifiable Gray								
Gray Body Sherds								
Total ceramics	92	100.0	35	100.0	127	100.0	6	100.0
Total wt (g)	1,774.4		195.8		1,970.2		59.2	
Vessel form:								
Gray Ware								
Bowl	2	0.6			2	0.6		
Jar	85	95.9	34	98.3	119	96.2	5	98.5
Other	1	0.9			1	0.8		
White Ware								
Bowl	4	2.5			4	2.3		
Jar								
Other								
Red Ware								
Bowl			1	1.7	1	0.2	1	1.5
Jar								
Other								
Brown Ware								
Bowl								
Jar								
Smudged Ware								
Jar								

Table A.1 Ceramic data summary, Windy Wheat Hamlet--Continued

Culture category: Tract / Ware / Type	Pitstructure 1							
	Floor		Roof fall		Noncultural fill		Total	
	N	%wt	N	%wt	N	%wt	N	%wt
Mesa Verde:								
Dolores Tract								
Gray Ware								
Chapin Gray	74	8.0	9	4.7	9	5.0	92	7.2
Moccasin Gray					1	0.5	1	0.1
Mancos Gray								
Dolores Brown								
Early Pueblo Gray	511	62.7	94	87.4	307	84.1	912	68.0
Late Pueblo Gray								
White Ware								
Chapin Black-on-white								
Piedra Black-on-white								
Painted White								
Polished White	44	10.1	7	3.6	7	1.7	58	8.1
Smudged Ware								
Smudged								
San Juan Tract								
Gray Ware								
Chapin Gray								
Early Pueblo Gray								
White Ware								
Piedra Black-on-white								
Painted White								
Polished White								
Cahone Tract								
Gray Ware								
Chapin Gray	7	0.7					7	0.5
Early Pueblo Gray	75	6.7	1	0.4	3	0.3	79	5.2
White Ware								
Piedra Black-on-white								
Polished White								
Red Ware								
Early Pueblo Red								
Sandstone Tract								
Gray Ware								
Chapin Gray								
Moccasin Gray								
Early Pueblo Gray			2	0.3	6	2.2	8	0.4
White Ware								
Painted White								
Polished White								
Red Ware								
Early Pueblo Red								
Blanding Tract								
Red Ware								
Abajo Red-on-orange	17	2.2					17	1.7
Abajo Polychrome	6	1.4					6	1.0
Bluff Black-on-red	115	7.8					115	5.9
Dolores Red								
McPhee Black-on-red								
Early Pueblo Red	7	0.6	6	3.1	32	6.1	45	1.8
Slipped Red			1	0.3			1	
Cibola:								
Gray Ware								
Lino Gray								
Early Pueblo Gray								
Quartz Sand:								
Gray Ware								
Early Pueblo Gray								
White Ware								
Early Pueblo White								
Late Pueblo White								
Mogollon:								
Brown Ware								
Brown Smudge								
Indeterminate:								
Gray Ware								
Unclassifiable Gray								
Gray Body Sherds								
Total ceramics	856	100.0	120	100.0	365	100.0	1,341	100.0
Total wt (g)	14,500.5		964.3		3,656.9		19,121.7	
Vessel form:								
Gray Ware								
Bowl	8	1.5	1	0.6			9	1.1
Jar	649	75.4	104	91.8	326	92.1	1,079	79.5
Other	10	1.1	1	0.5			11	0.8
White Ware								
Bowl			7	3.6	6	1.7	13	0.5
Jar	44	10.1			1	0.1	45	7.6
Other								
Red Ware								
Bowl	145	12.0	6	3.3	20	4.6	171	10.1
Jar					11	1.4	11	0.3
Other			1	0.2	1	0.1	2	
Brown Ware								
Bowl								
Jar								
Smudged Ware								
Jar								

Table A.1 Ceramic data summary, Windy Wheat Hamlet--Continued

Culture category: Tract / Ware / Type	Pitstructure 2: Floor prior to remodeling N	%wt	Floor after remodeling N	%wt	Roof fall N	%wt	Noncultural fill N	%wt
Mesa Verde:								
Dolores Tract								
Gray Ware								
Chapin Gray			4	8.7	14	9.2	10	3.2
Moccasin Gray					4	5.6	4	1.0
Mancos Gray								
Dolores Brown					1	0.3		
Early Pueblo Gray	37	83.4	98	73.1	147	77.5	326	82.7
Late Pueblo Gray								
White Ware								
Chapin Black-on-white					6	1.0		
Piedra Black-on-white							7	1.3
Painted White							1	0.1
Polished White			4	0.6	1	0.4	6	1.5
Smudged Ware								
Smudged								
San Juan Tract								
Gray Ware								
Chapin Gray								
Early Pueblo Gray								
White Ware								
Piedra Black-on-white								
Painted White								
Polished White			20	4.3			1	0.1
Cahone Tract								
Gray Ware								
Chapin Gray								
Early Pueblo Gray							3	0.5
White Ware								
Piedra Black-on-white								
Polished White								
Red Ware								
Early Pueblo Red								
Sandstone Tract								
Gray Ware								
Chapin Gray								
Moccasin Gray								
Early Pueblo Gray					2	0.3	6	2.3
White Ware								
Painted White								
Polished White							1	0.4
Red Ware								
Early Pueblo Red								
Blanding Tract								
Red Ware								
Abajo Red-on-orange							12	3.3
Abajo Polychrome								
Bluff Black-on-red	8	16.2	6	13.1	3	3.5		
Dolores Red								
McPhee Black-on-red								
Early Pueblo Red	3	0.4	2	0.2	9	2.3	15	2.5
Slipped Red								
Cibola:								
Gray Ware								
Lino Gray								
Early Pueblo Gray								
Quartz Sand:								
Gray Ware								
Early Pueblo Gray							4	0.9
White Ware								
Early Pueblo White								
Late Pueblo White								
Mogollon:								
Brown Ware								
Brown Smudge								
Indeterminate:								
Gray Ware								
Unclassifiable Gray								
Gray Body Sherds							2	0.2
Total ceramics	48	100.0	134	100.0	187	100.0	398	100.0
Total wt (g)	1,622.3		2,350.3		3,520.2		4,156.3	
Vessel form:								
Gray Ware								
Bowl			1	7.3	2	0.4	2	0.5
Jar	37	83.4	100	74.0	166	92.4	352	89.9
Other			1	0.6			1	0.5
White Ware								
Bowl			24	4.8	7	1.4	15	3.0
Jar							1	0.4
Other								
Red Ware								
Bowl	11	16.6	8	13.3	9	5.5	24	5.1
Jar					2	0.1	3	0.6
Other					1	0.2		
Brown Ware								
Bowl								
Jar								
Smudged Ware								
Jar								

Table A.1 Ceramic data summary, Windy Wheat Hamlet--Continued

Culture category: Tract / Ware / Type	Pitstructure 2 Total N	Pitstructure 2 Total %wt	Pitstructure 3 Floor N	Pitstructure 3 Floor %wt	Pitstructure 3 Noncultural fill N	Pitstructure 3 Noncultural fill %wt	Pitstructure 3 Total N	Pitstructure 3 Total %wt
Mesa Verde:								
Dolores Tract								
Gray Ware								
Chapin Gray	28	5.7	27	26.0	5	2.5	32	15.
Moccasin Gray	8	2.0						
Mancos Gray								
Dolores Brown	1	0.1						
Early Pueblo Gray	608	79.3	153	58.0	148	81.7	301	68.4
Late Pueblo Gray								
White Ware								
Chapin Black-on-white	6	0.3						
Piedra Black-on-white	7	0.5			4	1.1	4	0.9
Painted White	1	0.1	1	0.5			1	0.1
Polished White	11	0.8						
Smudged Ware								
Smudged								
San Juan Tract								
Gray Ware								
Chapin Gray								
Early Pueblo Gray								
White Ware								
Piedra Black-on-white								
Painted White								
Polished White	21	0.9						
Cahone Tract								
Gray Ware								
Chapin Gray								
Early Pueblo Gray	3	0.2	1	2.2	4	2.0	5	2.1
White Ware								
Piedra Black-on-white								
Polished White					1	0.4	1	0.2
Red Ware								
Early Pueblo Red								
Sandstone Tract								
Gray Ware								
Chapin Gray								
Moccasin Gray								
Early Pueblo Gray	8	0.9						
White Ware								
Painted White								
Polished White	1	0.1						
Red Ware								
Early Pueblo Red								
Blanding Tract								
Red Ware								
Abajo Red-on-orange	12	1.2			8	10.7	8	4.7
Abajo Polychrome								
Bluff Black-on-red	17	6.0	22	13.1	2	0.6	24	7.6
Dolores Red								
McPhee Black-on-red								
Early Pueblo Red	29	1.7	5	0.2	7	1.1	12	0.6
Slipped Red								
Cibola:								
Gray Ware								
Lino Gray								
Early Pueblo Gray								
Quartz Sand:								
Gray Ware								
Early Pueblo Gray	4	0.3						
White Ware								
Early Pueblo White								
Late Pueblo White								
Mogollon:								
Brown Ware								
Brown Smudge								
Indeterminate:								
Gray Ware								
Unclassifiable Gray								
Gray Body Sherds	2	0.1						
Total ceramics	767	100.0	209	100.0	179	100.0	388	100.0
Total wt (g)	11,649.1		3,040.8		2,401.9		5,442.7	
Vessel form:								
Gray Ware								
Bowl	5	1.7	1	0.3			1	0.2
Jar	655	86.5	179	85.7	155	81.7	334	83.9
Other	2	0.3	1	0.2	2	4.5	3	2.1
White Ware								
Bowl	46	2.5	1	0.5	4	1.1	5	0.7
Jar	1	0.1			1	0.4	1	0.2
Other								
Red Ware								
Bowl	52	8.5	27	13.3	15	12.0	42	12.8
Jar	5	0.3			2	0.3	2	0.1
Other	1	0.1						
Brown Ware								
Bowl								
Jar								
Smudged Ware								
Jar								

Table A.1 Ceramic data summary, Windy Wheat Hamlet--Continued

Culture category: Tract / Ware / Type	Possible ramada noncultural fill N	%wt	Other excavated units N	%wt	Site total N	%wt
Mesa Verde:						
Dolores Tract						
Gray Ware	2	11.4	132	7.2	514	7.9
Chapin Gray			10	0.1	34	0.4
Moccasin Gray			1		1	
Mancos Gray			1		2	
Dolores Brown	18	87.4	3,193	75.9	8,643	74.9
Early Pueblo Gray			1		1	
Late Pueblo Gray						
White Ware					7	0.1
Chapin Black-on-white			3	0.1	14	0.1
Piedra Black-on-white			4	0.2	15	0.1
Painted White			100	2.4	230	2.7
Polished White					2	
Smudged Ware						
Smudged						
San Juan Tract						
Gray Ware			4	0.2	6	0.1
Chapin Gray			58	1.3	60	0.4
Early Pueblo Gray						
White Ware			1		1	
Piedra Black-on-white			1		2	
Painted White			16	0.3	42	0.2
Polished White						
Cahone Tract						
Gray Ware			2	0.1	10	0.1
Chapin Gray			15	0.3	174	2.4
Early Pueblo Gray						
White Ware			2	0.1	2	
Piedra Black-on-white			3	0.1	10	
Polished White						
Red Ware			7	0.1	13	
Early Pueblo Red						
Sandstone Tract						
Gray Ware			2		2	
Chapin Gray					1	
Moccasin Gray			22	0.4	42	0.3
Early Pueblo Gray						
White Ware			1		1	
Painted White			1		3	
Polished White						
Red Ware			2		2	
Early Pueblo Red						
Blanding Tract						
Red Ware			56	2.4	292	3.8
Abajo Red-on-orange					6	0.2
Abajo Polychrome			31	2.7	194	3.2
Bluff Black-on-red			1		1	
Dolores Red			1		1	
McPhee Black-on-red	1	1.1	301	5.8	514	2.6
Early Pueblo Red			8	0.1	17	0.1
Slipped Red						
Cibola:						
Gray Ware			1		1	
Lino Gray					1	
Early Pueblo Gray						
Quartz Sand:						
Gray Ware			4		13	0.1
Early Pueblo Gray					1	
White Ware					1	
Early Pueblo White			1			
Late Pueblo White						
Mogollon:						
Brown Ware			1		2	
Brown Smudge						
Indeterminate:						
Gray Ware			3	0.1	4	
Unclassifiable Gray					2	
Gray Body Sherds						
Total ceramics	21	100.0	3,996	100.0	10,939	100.0
Total wt (g)	184.7		23,674.9		90,580.9	
Vessel form:						
Gray Ware			3	0.1	26	0.6
Bowl	20	98.9	3,440	84.9	9,507	85.5
Jar			12	0.7	33	0.7
Other						
White Ware			104	2.2	241	1.4
Bowl			28	1.0	86	1.9
Jar			1	0.1	2	
Other						
Red Ware	1	1.1	298	8.2	713	7.0
Bowl			78	1.5	134	0.7
Jar			31	1.4	193	2.3
Other						
Brown Ware			1		1	
Bowl					1	
Jar						
Smudged Ware					2	
Jar						

Table A.2 Flaked lithic tools, Windy Wheat Hamlet

	Modern ground surface			Room 1					
				Floor			Noncultural fill		
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Total tools:	642	100.0	63	3	100.0	166	2	100.0	860
Tool morpho-use									
Inapplicable	17	2.6	65						
Indeterminate	2	0.3	10						
Utilized flake	340	53.0	35	2	66.7	249			
Core	25	3.9	97				2	100.0	860
Used core, cobble tool	77	12.0	181						
Thick uniface	96	15.0	67						
Thin uniface	19	3.0	21						
Specialized form	23	3.6	30						
Thick biface	30	4.7	110						
Thin biface	6	0.9	32						
Projectile point	7	1.1	1	1	33.3	1			
Grain size									
Course									
Medium	4	0.6	118						
Fine	146	22.7	75	1	33.3	1			
Very fine	281	43.8	78	2	66.7	249			
Microscopic	208	32.4	34				2	100.0	860
Irregular	3	0.5	40						
Item condition									
Indeterminate	3	0.5	30						
Broken									
Indeterminate	18	2.8	39						
Distal present	6	0.9	5						
Proximal present	3	0.5	16						
Medial/lateral present	15	2.3	23						
Complete/nearly complete	597	93.0	66	3	100.0	166	2	100.0	860
Dorsal face evaluation									
Indeterminate	17	2.6	65						
Core	92	14.3	149				2	100.0	860
Unworked with cortex	282	43.9	53	2	66.7	249			
Unworked without cortex	198	30.8	25						
Edged with cortex	35	5.5	136						
Edged without cortex	10	1.6	101						
Primarily thinned	2	0.3	23	1	33.3	1			
Secondarily thinned	1	0.2	3						
Well-shaped	2	0.3	1						
Highly stylized	3	0.5	1						

Table A.2 Flaked lithic tools, Windy Wheat Hamlet--Continued

	Room 1			Room 2 total			Room 3		
	Total						Floor		
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Total tools:	5	100.0	444	5	100.0	33	9	100.0	243
Tool morpho-use									
Inapplicable									
Indeterminate									
Utilized flake	2	40.0	249	3	60.0	25	3	33.3	10
Core	2	40.0	860				2	22.2	422
Used core, cobble tool				1	20.0	90	1	11.1	1,285
Thick uniface									
Thin uniface									
Specialized form									
Thick biface							2	22.2	14
Thin biface									
Projectile point	1	20.0	1	1	20.0	1	1	11.1	2
Grain size									
Course									
Medium				1	20.0	59			
Fine	1	20.0	1	1	20.0	90			
Very fine	2	40.0	249	1	20.0	3	7	77.8	224
Microscopic	2	40.0	860	2	40.0	7	1	11.1	2
Irregular							1	11.1	620
Item condition									
Indeterminate									
Broken									
Indeterminate									
Distal present									
Proximal present									
Medial/lateral present									
Complete/nearly complete	5	100.0	444	5	100.0	33	9	100.0	243
Dorsal face evaluation									
Indeterminate									
Core	2	40.0	860	1	20.0	90	2	22.2	422
Unworked with cortex	2	40.0	249	1	20.0	59	1	11.1	19
Unworked without cortex				2	40.0	8	2	22.2	6
Edged with cortex							3	33.3	438
Edged without cortex									
Primarily thinned	1	20.0	1						
Secondarily thinned									
Well shaped				1	20.0	1	1	11.1	2
Highly stylized									

Table A.2 Flaked lithic tools, Windy Wheat Hamlet--Continued

	Room 3						Room 4 total		
	Roof fall			Total					
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Total tools:	4	100.0	26	13	100.0	176	1	100.0	5
Tool morpho-use									
Inapplicable									
Indeterminate									
Utilized flake	1	25.0	4	4	30.8	9			
Core				2	15.4	422			
Used core, cobble tool				1	7.7	1,285			
Thick uniface									
Thin uniface									
Specialized form									
Thick biface	1	25.0	80	3	23.1	36			
Thin biface	1	25.0	20	1	7.7	20			
Projectile point	1	25.0	1	2	15.4	2	1	100.0	5
Grain size									
Course									
Medium									
Fine							1	100.0	5
Very fine	2	50.0	50	9	69.2	185			
Microscopic	2	50.0	3	3	23.1	2			
Irregular				1	7.7	620			
Item condition									
Indeterminate									
Broken									
Indeterminate									
Distal present									
Proximal present									
Medial/lateral present									
Complete/nearly complete	4	100.0	26	13	100.0	176	1	100.0	5
Dorsal face evaluation									
Indeterminate									
Core				2	15.4	422			
Unworked with cortex				1	7.7	19			
Unworked without cortex	1	25.0	4	3	23.1	5			
Edged with cortex				3	23.1	438			
Edged without cortex	1	25.0	80	1	7.7	80			
Primarily thinned									
Secondarily thinned	1	25.0	20	1	7.7	20	1	100.0	5
Well-shaped	1	25.0	1	2	15.4	2			
Highly stylized									

Table A.2 Flaked lithic tools, Windy Wheat Hamlet--Continued

	Room 5 Total			Pitstructure 1					
				Floor			Roof fall		
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Total tools:	1	100.0	965	32	100.0	481	6	100.0	13
Tool morpho-use									
Inapplicable									
Indeterminate							1	16.7	3
Utilized flake				2	6.3	21	1	16.7	11
Core				6	18.8	542			
Used core, cobble tool				17	53.1	539			
Thick uniface	1	100.0	965	2	6.3	385	3	50.0	16
Thin uniface									
Specialized form				1	3.1	4			
Thick biface				3	9.4	719	1	16.7	14
Thin biface									
Projectile point				1	3.1	2			
Grain size									
Course									
Medium									
Fine				2	6.3	572	1	16.7	7
Very fine	1	100.0	965	22	68.8	594	2	33.3	21
Microscopic				8	25.0	145	3	50.0	9
Irregular									
Item condition									
Indeterminate									
Broken									
Indeterminate							2	33.3	5
Distal present									
Proximal present									
Medial/lateral present									
Complete/nearly complete	1	100.0	965	32	100.0	481	4	66.7	17
Dorsal face evaluation									
Indeterminate							1	16.7	7
Core				19	59.4	490			
Unworked with cortex				4	12.5	204	3	50.0	11
Unworked without cortex									
Edged with cortex	1	100.0	965	7	21.9	750	1	16.7	32
Edged without cortex				1	3.1	4			
Primarily thinned				1	3.1	2			
Secondarily thinned							1	16.7	3
Well-shaped									
Highly stylized									

Table A.2 Flaked lithic tools, Windy Wheat Hamlet--Continued

	Pitstructure 1						Pitstructure 2		
	Noncultural fill			Total			Floor		
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Total tools:	15	100.0	40	53	100.0	303	13	100.0	300
Tool morpho-use									
Inapplicable							1	7.7	477
Indeterminate				1	1.9	3			
Utilized flake	11	73.3	40	14	26.4	36			
Core	1	6.7	32	7	13.2	469	2	15.4	383
Used core, cobble tool	1	6.7	107	18	34.0	515	3	23.1	433
Thick uniface				5	9.4	163	3	23.1	95
Thin uniface							2	15.4	42
Specialized form	2	13.3	5	3	5.7	4			
Thick biface				4	7.5	543	1	7.7	991
Thin biface									
Projectile point				1	1.9	2	1	7.7	2
Grain size									
Course									
Medium									
Fine	4	26.7	58	7	13.2	197			
Very fine	6	40.0	48	30	56.6	447	5	38.5	553
Microscopic	5	33.3	15	16	30.2	79	8	61.5	142
Irregular									
Item condition									
Indeterminate									
Broken									
Indeterminate				2	3.8	5			
Distal present							1	7.7	14
Proximal present									
Medial/lateral present									
Complete/nearly complete	15	100.0	40	51	96.2	315	12	92.3	324
Dorsal face evaluation									
Indeterminate				1	1.9	7	1	7.7	477
Core	2	13.3	70	21	39.6	450	5	38.5	413
Unworked with cortex	9	60.0	42	16	30.2	77	3	23.1	54
Unworked without cortex	4	26.7	19	4	7.5	19	1	7.7	30
Edged with cortex				8	15.1	660	1	7.7	991
Edged without cortex				1	1.9	4	1	7.7	175
Primarily thinned				1	1.9	2			
Secondarily thinned				1	1.9	3	1	7.7	2
Well-shaped									
Highly stylized									

Table A.2 Flaked lithic tools, Windy Wheat Hamlet--Continued

	Pitstructure 2								
	Roof fall			Noncultural fill			Total		
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Total tools:	6	100.0	74	25	100.0	73	44	100.0	140
Tool morpho-use									
Inapplicable							1	2.3	477
Indeterminate									
Utilized flake	3	50.0	28	15	60.0	35	18	40.9	34
Core							2	4.5	383
Used core, cobble tool	1	16.7	274	4	16.0	181	8	18.2	287
Thick uniface	2	33.3	43				5	11.4	74
Thin uniface				1	4.0	61	3	6.8	48
Specialized form									
Thick biface				4	16.0	125	5	11.4	298
Thin biface									
Projectile point				1	4.0	1	2	4.5	2
Grain size									
Course									
Medium									
Fine				1	4.0	4	1	2.3	4
Very fine	6	100.0	74	21	84.0	85	32	72.7	156
Microscopic				3	12.0	7	11	25.0	105
Irregular									
Item condition									
Indeterminate									
Broken									
Indeterminate									
Distal present							1	2.3	14
Proximal present									
Medial/lateral present									
Complete/nearly complete	6	100.0	74	25	100.0	73	43	97.7	143
Dorsal face evaluation									
Indeterminate							1	2.3	477
Core	1	16.7	274	3	12.0	155	9	20.5	311
Unworked with cortex	2	33.3	16	12	48.0	55	17	38.6	51
Unworked without cortex	1	16.7	54	7	28.0	28	9	20.5	31
Edged with cortex				2	8.0	243	3	6.8	492
Edged without cortex	2	33.3	43				3	6.8	87
Primarily thinned									
Secondarily thinned							1	2.3	2
Well-shaped									
Highly stylized				1	4.0	1	1	2.3	1

Table A.2 Flaked lithic tools, Windy Wheat Hamlet--Continued

	Pitstructure 3								
	Floor			Noncultural fill			Total		
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Total tools:	40	100.0	204	17	100.0	63	57	100.0	162
Tool morpho-use									
Inapplicable									
Indeterminate									
Utilized flake	5	12.5	60	5	29.4	66	10	17.5	63
Core	21	52.5	239	1	5.9	26	22	38.6	230
Used core, cobble tool	8	20.0	337				8	14.0	337
Thick uniface	2	5.0	65	3	17.6	120	5	8.8	98
Thin uniface	2	5.0	2				2	3.5	2
Specialized form									
Thick biface									
Thin biface				3	17.6	116	3	5.3	116
Projectile point	2	5.0	3	5	29.4	1	7	12.3	1
Grain size									
Course				2	11.8	293	2	3.5	293
Medium	1	2.5	91				1	1.8	91
Fine	3	7.5	289	4	23.5	62	7	12.3	159
Very fine	23	57.5	223	6	35.3	34	29	50.9	184
Microscopic	12	30.0	138	4	23.5	1	16	28.1	104
Irregular	1	2.5	412	1	5.9	26	2	3.5	219
Item condition									
Indeterminate									
Broken									
Indeterminate									
Distal present									
Proximal present				1	5.9	5	1	1.8	5
Medial/lateral present									
Complete/nearly complete	40	100.0	204	16	94.1	67	56	98.2	165
Dorsal face evaluation									
Indeterminate									
Core	28	70.0	269	2	11.8	135	30	52.6	260
Unworked with cortex	3	7.5	115	5	29.4	152	8	14.0	138
Unworked without cortex	4	10.0	59	3	17.6	9	7	12.3	37
Edged with cortex	1	2.5	1	1	5.9	1	2	3.5	1
Edged without cortex	3	7.5	12	2	11.8	3	5	8.8	8
Primarily thinned				2	11.8	1	2	3.5	1
Secondarily thinned									
Well-shaped	1	2.5	4	2	11.8	1	3	5.3	2
Highly stylized									

Table A.2 Flaked lithic tools, Windy Wheat Hamlet--Continued

	Possible ramada noncultural fill ~~(total)~~			Other excavated units			Site total		
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Total tools:	1	100.0	46	429	100.0	46	1251	100.0	78
Tool morpho-use									
Inapplicable							18	1.4	88
Indeterminate				4	0.9	10	7	0.6	9
Utilized flake				202	47.1	21	593	47.4	31
Core	1	100.0	46	62	14.5	70	123	9.8	150
Used core, cobble tool				39	9.1	178	152	12.2	240
Thick uniface				42	9.8	34	154	12.3	69
Thin uniface				33	7.7	14	57	4.6	18
Specialized form				15	3.5	19	41	3.3	24
Thick biface				14	3.3	127	56	4.5	158
Thin biface				13	3.0	22	23	1.8	37
Projectile point				5	1.2	2	27	2.2	2
Grain size									
Course				1	0.2	42	3	0.2	209
Medium				2	0.5	57	8	0.6	92
Fine				17	4.0	70	181	14.5	81
Very fine				234	54.5	59	619	49.5	101
Microscopic	1	100.0	46	156	36.4	24	415	33.2	40
Irregular				19	4.4	41	25	2.0	78
Item condition									
Indeterminate				6	1.4	17	9	0.7	21
Broken									
Indeterminate				37	8.6	19	57	4.6	25
Distal present				8	1.9	7	15	1.2	7
Proximal present				24	5.6	14	28	2.2	14
Medial/lateral present				6	1.4	28	21	1.7	24
Complete/nearly complete	1	100.0	46	348	81.1	53	1,121	89.6	85
Dorsal face evaluation									
Indeterminate				1	0.2	10	20	1.6	80
Core	1	100.0	46	93	21.7	99	251	20.1	182
Unworked with cortex				95	22.1	58	422	33.7	58
Unworked without cortex				186	43.4	18	409	32.7	22
Edged with cortex				9	2.1	100	61	4.9	241
Edged without cortex				28	6.5	23	48	3.8	43
Primarily thinned				12	2.8	16	18	1.4	13
Secondarily thinned				1	0.2	3	6	0.5	6
Well shaped				2	0.5	2	10	0.8	2
Highly stylized				2	0.5	3	6	0.5	2

.able A.3 Flaked lithic debitage, Windy Wheat Hamlet

	Modern ground surface			Room 1									Room 3		
				Floor			Noncultural fill			Total			Floor		
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Flakes/flake frags:															
Grain size															
Medium	36	1.8	30	0	0	0	0	0	0	0	0	0	0	0	0
Fine	260	12.7	19	0	0	0	1	14.3	21	1	10.0	21	1	7.7	7
Very fine	1,104	53.8	16	2	66.7	4	2	28.6	6	4	40.0	5	3	23.1	4
Microscopic	651	31.7	11	1	33.3	7	4	57.2	24	5	50.0	21	9	69.2	3
Total flakes/ Flake frags	2,051	100.0	15	3	100.0	5	7	100.0	18	10	100.0	14	13	100.0	4
Items with cortex	821	40.0	...	0	0	...	0	0	...	0	0	...	5	38.5	...
Whole flakes	1,251	61.0	...	1	33.3	...	3	42.9	...	4	40.0	...	10	76.9	...
Nonlocal items	0	0	...	0	0	...	0	0	...	0	0	...	0	0	...
Angular debris	13	100.0	20	0	0	0	0	0	0	0	0	0	4	100.0	58

NOTE: ... - Information not available.
frags - Fragments.

Table A.3 Flaked lithic debitage, Windy Wheat Hamlet--Continued

	Room 3						Room 5								
	Roof fall			Total			Floor			Roof fall			Total		
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Flakes/flake frags:															
Grain size															
Medium	1	7.1	1	1	3.7	1	0	0	0	0	0	0	0	0	0
Fine	4	28.6	2	5	18.5	3	0	0	0	0	0	0	0	0	0
Very fine	7	50.0	4	10	37.0	4	5	83.3	9	1	100.0	26	6	85.7	12
Microscopic	2	14.3	9	11	40.7	4	1	16.7	3	0	0	0	1	14.3	3
Total flakes/ Flake frags	14	100.0	4	27	100.0	4	6	100.0	8	1	100.0	26	7	100.0	10
Items with cortex	3	21.4	...	8	29.6	...	4	66.7	...	1	100.0	...	5	71.4	...
Whole flakes	8	57.1	...	18	66.7	...	3	50.0	...	1	100.0	...	4	57.1	...
Nonlocal items	0	0	...	0	0	...	0	0	...	0	0	...	0	0	...
Angular debris	5	100.0	13	9	100.0	33	0	0	0	0	0	0	0	0	0

Table A.3 Flaked lithic debitage, Windy Wheat Hamlet--Continued

	Room 8			Pitstructure 1											
	Floor			Floor			Roof fall			Noncultural fill			Total		
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Flakes/flake frags:															
Grain size															
Medium	0	0	0	5	0.9	19	4	3.8	26	4	6.3	36	13	1.8	26
Fine	0	0	0	9	1.6	2	3	2.9	5	0	0	0	12	1.6	3
Very fine	3	100.0	7	346	61.0	6	70	66.7	6	34	53.1	12	450	61.1	6
Microscopic	0	0	0	207	36.5	7	28	26.7	6	26	40.6	8	261	35.5	7
Total flakes/ Flake frags	3	100.0	7	567	100.0	6	105	100.0	7	64	100.0	12	736	100.0	7
Items with cortex	1	33.3	...	32	5.6	...	24	22.9	...	15	23.4	...	71	9.6	...
Whole flakes	2	66.7	...	112	19.8	...	58	55.2	...	28	43.8	...	198	26.9	...
Nonlocal items	0	0	...	0	0	...	0	0	...	0	0	...	0	0	...
Angular debris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A.3 Flaked lithic debitage, Windy Wheat Hamlet--Continued

	Pitstructure 2														
	Floor prior to remodeling			Floor after remodeling			Roof fall			Noncultural fill			Total		
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Flakes/flake frags:															
Grain size															
Medium	0	0	0	7	2.0	37	1	3.7	23	5	4.8	34	13	1.9	35
Fine	5	2.6	11	10	2.8	5	0	0	0	1	1.0	11	16	2.4	7
Very fine	31	16.4	6	73	20.7	3	15	55.6	6	65	61.9	16	184	27.3	8
Microscopic	153	81.0	1	262	74.4	0	11	40.7	2	34	32.4	12	460	68.4	2
Total flakes/ Flake frags	189	100.0	2	352	100.0	2	27	100.0	5	105	100.0	15	673	100.0	4
Items with cortex	6	3.2	...	14	4.0	...	4	14.8	...	29	27.6	...	53	7.9	...
Whole flakes	45	23.8	...	30	8.5	...	10	37.0	...	46	43.8	...	131	19.5	...
Nonlocal items	0	0	...	0	0	...	0	0	...	0	0	...	0	0	...
Angular debris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A.3 Flaked lithic debitage, Windy Wheat Hamlet--Continued

	Pitstructure 3									Possible ramada noncultural fill ~~(total)~~			Other excavated units			Site total		
	Floor			Noncultural fill			Total											
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Flakes/flake frags:																		
Grain size																		
Medium	0	0	0	2	2.8	7	2	1.6	7	0	0	0	22	1.4	22	87	1.7	27
Fine	0	0	0	6	8.5	18	6	4.8	18	0	0	0	96	5.9	9	396	7.5	15
Very fine	21	38.2	4	17	23.9	21	38	30.2	11	1	50.0	18	958	58.9	9	2,758	52.4	11
Microscopic	34	61.8	4	46	64.8	4	80	63.5	4	1	50.0	13	551	33.9	6	2,021	38.4	7
Total flakes/ Flake frags	55	100.0	4	71	100.0	9	126	100.0	7	2	100.0	16	1,627	100.0	8	5,262	100.0	10
Items with cortex	11	20.0	...	21	29.6	...	32	25.4	...	1	50.0	...	369	22.7	...	1,361	25.9	...
Whole flakes	21	38.2	...	42	59.2	...	63	50.0	...	2	100.0	...	854	52.5	...	2,527	48.0	...
Nonlocal items	0	0	...	3	4.2	...	3	2.4	...	0	0	...	1	0.1	...	4	0.1	...
Angular debris	13	100.0	48	8	100.0	51	21	100.0	49	1	100.0	2	214	100.0	14	258	100.0	18

Table A.4 Nonflaked lithic tools, Windy Wheat Hamlet

	Modern ground surface			Room 1 total			Room 3 Floor		
	N	%wt	Mean wt(g)	N	%wt	Mean wt(g)	N	%wt	Mean wt(g)
Total tools:	126	100.0	362	2	100.0	1,662	6	100.0	1,772
Tool morpho-use									
Indeterminate	43	34.1	305						
Miscellaneous	29	23.0	334	1	50.0	2,075			
Hammerstone	22	17.5	318				2	33.3	845
Mano fragment	10	7.9	220				1	16.7	1,099
One-hand mano	5	4.0	538						
Two-hand mano	15	11.9	717	1	50.0	1,249	1	16.7	1,889
Metate fragment									
Trough metate							1	16.7	5,150
Hafted item	2	1.6	83				1	16.7	806
Ornament									
Blank type									
Rounded cobble	14	11.1	331				5	83.3	1,097
Flattened cobble	35	27.8	389						
Slab fragment									
Thick slab									
Thin slab							1	16.7	5,150
Very thin slab									
Completely modified item									
Data not available	77	61.1	355	2	100.0	1,662			
Item condition									
Indeterminate	2	1.6	133						
Broken									
Unidentifiable	12	9.5	214						
Identifiable	74	58.7	329				2	33.3	2,978
Complete/nearly complete	38	30.2	484	2	100.0	1,662	4	66.7	1,169
Production evaluation									
Indeterminate	26	20.6	238						
Natural (unmodified)	85	67.5	347	1	50.0	2,075	3	50.0	929
Minimally modified	9	7.1	680	1	50.0	1,249	1	16.7	806
Well-shaped	6	4.8	623				2	33.3	3,520
Stylized									

Table A.4 Nonflaked lithic tools, Windy Wheat Hamlet--Continued

	Room 3						Room 4 total		
	Roof fall			Total					
	N	%wt	Mean wt(g)	N	%wt	Mean wt(g)	N	%wt	Mean wt(g)
Total tools:	2	100.0	391	8	100.0	1,427	1	100.0	2,300
Tool morpho-use									
Indeterminate									
Miscellaneous							1	100.0	2,300
Hammerstone				2	25.0	845			
Mano fragment				1	12.5	1,099			
One-hand mano	1	50.0	780	1	12.5	780			
Two-hand mano				1	12.5	1,889			
Metate fragment									
Trough metate				1	12.5	5,150			
Hafted item				1	12.5	806			
Ornament	1	50.0	2	1	12.5	2			
Blank type									
Rounded cobble	1	50.0	780	6	75.0	1,044	1	100.0	2,300
Flattened cobble									
Slab fragment									
Thick slab									
Thin slab				1	12.5	5,150			
Very thin slab									
Completely modified item	1	50.0	2	1	12.5	2			
Data not available									
Item condition									
Indeterminate									
Broken									
Unidentifiable									
Identifiable	1	50.0	2	3	37.5	1,986	1	100.0	2,300
Complete/nearly complete	1	50.0	780	5	62.5	1,091			
Production evaluation									
Indeterminate									
Natural (unmodified)				3	37.5	929	1	100.0	2,300
Minimally modified	1	50.0	780	2	25.0	793			
Well-shaped				2	25.0	3,520			
Stylized	1	50.0	2	1	12.5	2			

Table A.4 Nonflaked lithic tools, Windy Wheat Hamlet--Continued

	Room 5			Pitstructure 1					
	Total			Floor			Roof fall		
	N	%wt	Mean wt(g)	N	%wt	Mean wt(g)	N	%wt	Mean wt(g)
Total tools:	6	100.0	1,520	27	100.0	4,254	10	100.0	3,229
Tool morpho-use									
Indeterminate				3	11.1	1,153	2	20.0	4,166
Miscellaneous	2	33.3	1,028	7	25.9	1,358	1	10.0	53
Hammerstone	1	16.7	2,200	5	18.5	715	2	20.0	42
Mano fragment	1	16.7	2,800	3	11.1	1,929	2	20.0	90
One-hand mano				1	3.7	800			
Two-hand mano				3	11.1	1,612			
Metate fragment				2	7.4	10,100			
Trough metate				3	11.1	22,233	1	10.0	21,300
Hafted item	2	33.3	1,033				2	20.0	1,173
Ornament									
Blank type									
Rounded cobble	4	66.7	1,621	3	11.1	2,360	2	20.0	67
Flattened cobble	1	16.7	1,405	3	11.1	1,585	1	10.0	100
Slab fragment				1	3.7	2,400			
Thick slab							1	10.0	21,300
Thin slab									
Very thin slab	1	16.7	1,235						
Completely modified item									
Data not available				20	74.1	5,031	5	50.0	2,165
Item condition									
Indeterminate									
Broken									
Unidentifiable				1	3.7	238	3	30.0	137
Identifiable				4	14.8	2,293	2	20.0	14,700
Complete/nearly complete	6	100.0	1,520	22	81.5	4,793	5	50.0	1,241
Production evaluation									
Indeterminate							2	20.0	156
Natural (unmodified)	1	16.7	2,200	17	63.0	2,212	5	50.0	1,667
Minimally modified	3	50.0	1,675	9	33.3	8,462	2	20.0	1,173
Well-shaped	2	33.3	948	1	3.7	1,094	1	10.0	21,300
Stylized									

Table A.4 Nonflaked lithic tools, Windy Wheat Hamlet--Continued

	Pitstructure 1						Pitstructure 2		
	Noncultural fill			Total			Floor		
	N	%wt	Mean wt(g)	N	%wt	Mean wt(g)	N	%wt	Mean wt(g)
Total tools:	16	100.0	1,021	53	100.0	3,085	39	100.0	4,762
Tool morpho-use									
Indeterminate	2	12.5	992	7	13.2	1,968	6	15.4	1,282
Miscellaneous	3	18.8	988	11	20.8	1,138	16	41.0	2,134
Hammerstone	5	31.3	1,075	12	22.6	753	5	12.8	283
Mano fragment				5	9.4	1,194	3	7.7	2,932
One-hand mano				1	1.9	800			
Two-hand mano	3	18.8	1,232	6	11.3	1,422	3	7.7	2,172
Metate fragment	2	12.5	1,001	4	7.5	5,551	2	5.1	7,955
Trough metate				4	7.5	22,000	3	7.7	36,763
Hafted item	1	6.3	314	3	5.7	886	1	2.6	951
Ornament									
Blank type									
Rounded cobble	2	12.5	207	7	13.2	1,089	5	12.8	2,567
Flattened cobble	1	6.3	2,550	5	9.4	1,481	8	20.5	2,274
Slab fragment				1	1.9	2,400			
Thick slab				1	1.9	21,300	1	2.6	13,150
Thin slab									
Very thin slab									
Completely modified item									
Data not available	13	81.3	1,029	39	73.6	3,199	25	64.1	5,661
Item condition									
Indeterminate									
Broken									
Unidentifiable	2	12.5	992	6	11.3	439			
Identifiable	4	25.0	804	10	18.9	4,178	5	12.8	3,570
Complete/nearly complete	10	62.5	1,114	37	69.8	3,218	34	87.2	4,937
Production evaluation									
Indeterminate	2	12.5	992	4	7.5	574	2	5.1	7,159
Natural (unmodified)	12	75.0	1,157	34	64.2	1,760	27	69.2	2,211
Minimally modified	2	12.5	234	13	24.5	6,075	8	20.5	6,401
Well-shaped				2	3.8	11,197	2	5.1	30,248
Stylized									

Table A.4 Nonflaked lithic tools, Windy Wheat Hamlet--Continued

	Pitstructure 2								
	Roof fall			Noncultural fill			Total		
	N	%wt	Mean wt(g)	N	%wt	Mean wt(g)	N	%wt	Mean wt(g)
Total tools:	5	100.0	529	11	100.0	4,174	55	100.0	4,259
Tool morpho-use									
Indeterminate	1	20.0	1,397	2	18.2	374	9	16.4	1,093
Miscellaneous	3	60.0	261	8	72.7	1,283	27	49.1	1,674
Hammerstone	1	20.0	467				6	10.9	314
Mano fragment							3	5.5	2,932
One-hand mano									
Two-hand mano							3	5.5	2,172
Metate fragment							2	3.6	7,955
Trough metate				1	9.1	34,900	4	7.3	36,298
Hafted item							1	1.8	951
Ornament									
Blank type									
Rounded cobble				3	27.3	3,110	8	14.5	2,771
Flattened cobble	2	40.0	206	3	27.3	148	13	23.6	1,465
Slab fragment									
Thick slab							1	1.8	13,150
Thin slab									
Very thin slab									
Completely modified item									
Data not available	3	60.0	745	5	45.5	7,227	33	60.0	5,452
Item condition									
Indeterminate									
Broken									
Unidentifiable				1	9.1	8,840	1	1.8	8,840
Identifiable	3	60.0	633	5	45.5	300	13	23.6	1,635
Complete/nearly complete	2	40.0	373	5	45.5	7,114	41	74.5	4,980
Production evaluation									
Indeterminate				1	9.1	8,840	3	5.5	7,719
Natural (unmodified)	4	80.0	569	8	72.7	4,556	39	70.9	2,524
Minimally modified	1	20.0	371	2	18.2	311	11	20.0	4,745
Well-shaped							2	3.6	30,248
Stylized									

Table A.4 Nonflaked lithic tools, Windy Wheat Hamlet--Continued

	Pitstructure 3								
	Floor			Noncultural fill			Total		
	N	%wt	Mean wt(g)	N	%wt	Mean wt(g)	N	%wt	Mean wt(g)
Total tools:	15	100.0	6,345	12	100.0	1,748	27	100.0	4,302
Tool morpho-use									
Indeterminate	2	13.3	7,600	1	8.3	602	3	11.1	5,267
Miscellaneous	4	26.7	3,310	4	33.3	1,619	8	29.6	2,464
Hammerstone	3	20.0	489	2	16.7	384	5	18.5	447
Mano fragment				1	8.3	1,310	1	3.7	1,310
One-hand mano	1	6.7	693	1	8.3	882	2	7.4	788
Two-hand mano	2	13.3	1,020	1	8.3	1,143	3	11.1	1,061
Metate fragment									
Trough metate	2	13.3	31,113				2	7.4	31,113
Hafted item	1	6.7	306				1	3.7	306
Ornament				2	16.7	4,901	2	7.4	4,901
Blank type									
Rounded cobble	4	26.7	917	6	50.0	700	10	37.0	787
Flattened cobble	6	40.0	3,816	3	25.0	876	9	33.3	2,836
Slab fragment									
Thick slab	2	13.3	23,216				2	7.4	23,216
Thin slab	2	13.3	10,400	2	16.7	7,075	4	14.8	8,738
Very thin slab	1	6.7	1,374				1	3.7	1,374
Completely modified item				1	8.3	2	1	3.7	2
Data not available									
Item condition									
Indeterminate									
Broken									
Unidentifiable									
Identifiable	3	20.0	7,197	3	25.0	3,837	6	22.2	5,517
Complete/nearly complete	12	80.0	6,132	9	75.0	1,052	21	77.8	3,955
Production evaluation									
Indeterminate									
Natural (unmodified)	8	53.3	3,066	5	41.7	765	13	48.1	2,181
Minimally modified	1	6.7	4,700	4	33.3	2,798	5	18.5	3,178
Well-shaped	6	40.0	10,991	2	16.7	2,982	8	29.6	8,989
Stylized				1	8.3	2	1	3.7	2

Table A.4 Nonflaked lithic tools, Windy Wheat Hamlet--Continued

	Possible ramada total			Other excavated units			Site total		
	N	%wt	Mean wt(g)	N	%wt	Mean wt(g)	N	%wt	Mean wt(g)
Total tools:	1	100.0	314	52	100.0	1,200	331	100.0	1,959
Tool morpho-use									
Indeterminate				6	11.5	439	68	20.5	811
Miscellaneous				14	26.9	2,342	93	28.1	1,358
Hammerstone				16	30.8	455	64	19.3	490
Mano fragment	1	100.0	314	2	3.8	219	24	7.3	955
One-hand mano				1	1.9	1,320	10	3.0	716
Two-hand mano				9	17.3	1,705	38	11.5	1,249
Metate fragment				1	1.9	150	7	2.1	5,466
Trough metate				1	1.9	487	12	3.6	25,088
Hafted item				2	3.8	976	12	3.6	742
Ornament							3	0.9	3,268
Blank type									
Rounded cobble				13	25.0	489	63	19.0	1,011
Flattened cobble	1	100.0	314	5	9.6	793	69	20.8	1,033
Slab fragment				1	1.9	487	2	0.6	1,444
Thick slab							4	1.2	20,220
Thin slab							5	1.5	8,020
Very thin slab				3	5.8	299	5	1.5	701
Completely modified item							2	0.6	2
Data not available				30	57.7	1,689	181	54.7	2,133
Item condition									
Indeterminate				1	1.9	275	3	0.9	180
Broken									
Unidentifiable				3	5.8	62	22	6.6	646
Identifiable	1	100.0	314	18	34.6	518	126	38.1	1,098
Complete/nearly complete				30	57.7	1,754	180	54.4	2,751
Production evaluation									
Indeterminate				5	9.6	353	38	11.5	879
Natural (unmodified)				33	63.5	702	210	63.4	1,184
Minimally modified				6	11.5	5,181	50	15.1	3,843
Well-shaped	1	100.0	314	8	15.4	798	31	9.4	5,618
Stylized							2	0.6	2

APPENDIX B

MAGNETOMETER SURVEY RESULTS FOR WINDY WHEAT HAMLET

by

Robert J. Huggins

Introduction

At Windy Wheat Hamlet, a magnetometer survey began on 17 April 1979, and when finished, covered a total of six blocks or 2400 m^2. The original grid, consisting of four blocks, covered most of the central area of a dense lithic and ceramic scatter that also contained burned adobe and some sandstone blocks. The scatter was contained within a recently cultivated field and no confusing effects were expected from the underlying bedrock. After data from the initial four blocks were collected and sent to NEBCAR (Nebraska Center for Archaeophysical Research) for preliminary analysis, it became evident that additional information would be useful. The field crew then added two blocks, one to the south of the southwest block and another to the east side of the northeast block. The final configuration is shown in figures B.1 and B.2. The magnetic field was measured on a grid of points at 1-m intervals, a standard used for most of the sites in the DAP study area.

Processing

After all six blocks of data were received by NEBCAR, the data were corrected for diurnal drift, the background levels on all blocks were adjusted to be equal, and the corrected values were entered into an IBM 360/370 in a suitable form for access by several graphic display routines. Some problems were noted in equalizing the background level of the blocks; this was attributed to instrument malfunction. The data were re-collected in block A (running 1N - 21N, 1E - 21E), and after the data were reprocessed it was felt that this problem had been eliminated.

Figure B.1 Variable density contour map of magnetic field, Windy Wheat Hamlet.

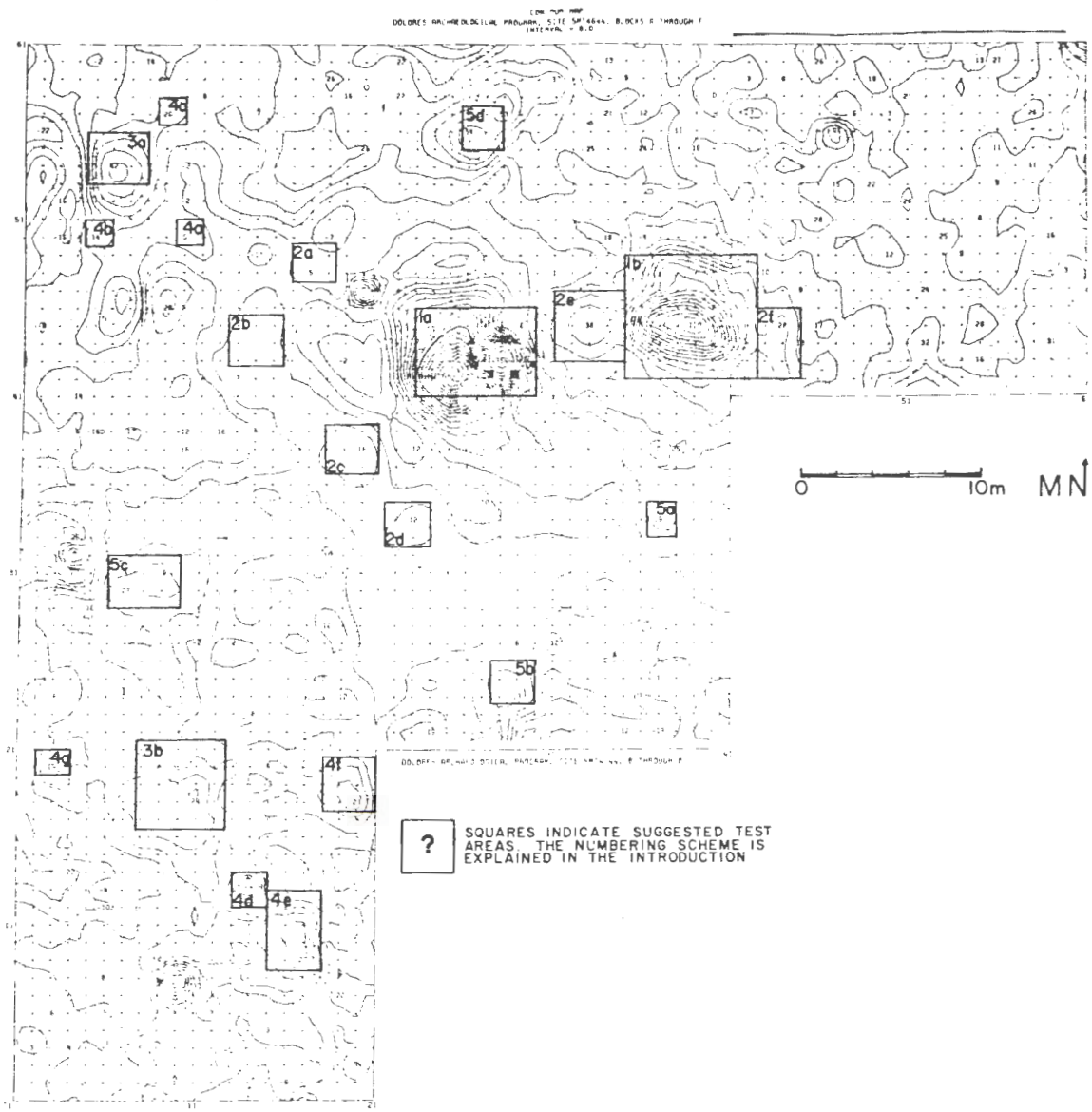


Figure B.2 Line contour map of magnetic field showing suggested test squares, Windy Wheat Hamlet.

Interpretation

Preliminary information on Windy Wheat Hamlet, consisting of a SYMAP and several suggested areas of excavation, was sent to the DAP for use during the summer of 1979. At that time the intital priority scheme was used and test squares were located on the more obvious anomalies. A more complete listing of anomalies based on the updated priority scheme (Huggins and Wemouth 1981) is presented in table B.1 with priorities and comments. The final numbering and location of test squares is shown in figure B.2.

Prior to excavation, the anomalies were interpreted in the following ways: anomaly 1a was believed to result from a rectangular pitstructure with some sort of antechamber attached to the south. The most intensely burned region appeared to be in the southern portion of the pitstructure. Due to the influence of metal on the surface, metric size approximations through the use of modeling were not possible. However, on the basis of similar anomalies it was estimated that the floor of the structure measured approximately 5 by 5 m.

Anomaly 1b was also believed to result from a pitstructure. Attempts to re-create the anomaly using geometric models suggested a complex susceptibility distribution. There was a strong east-west burned section on line 45N; a single maximum suggested a central hearth at the point 45.5N/39E. The model indicated a shallow rectangular floor at a depth of approximately 1 m. The floor dimensions were roughly 6 by 6 m. Evidence for a southward pointing antechamber was also present.

Anomalies 2a through 2d were believed to represent burned regions associated with the pitstructures. Anomaly 2e implied either an activity area or the presence of an associated structure to the west of anomaly 1b.

Table B.1 Magnetic anomalies with possible archaeological affiliations, Windy Wheat Hamlet

Anomaly & priority*	Location of center†	Possible source	Statistics§	Comments
1a**	43N/25E	Likely rectangular and shallow pitstructure	A = 33 xA = 12 m	Confused because of metal interference
1b	45N/39E	Unevenly burned pitstructure	A = 25 xA = 19 m	Bottom slightly deeper than the pitstructure represented by anomaly 1a
2a	48N/17E	Possible hearth close to the surface	A = 1 xA = 0.5 m	
2b	44N/14E	Possible burned surface structure	A = 2 xA = 7 m monopole	
2c**	38N/19E	Possible surface structure	A = 3 xA = 2.5 monopole	More intensely burned than 2b
2d	34N/23E	Burned region, possible activity area	A = 2 xA = 4 monopole	
2e	45N/33E	Burned activity area	A = 8 xA = indistinct monopole	Some functional area related to pitstructure anomaly 1b

* Each anomaly is assigned a priority between 1 and 5, with 1 indicating the clearest and most identifiable anomalies (definite pitstructures or kivas) and 5 indicating the least identifiable anomalies (activity areas, middens, etc.). Anomalies with the same priority are distinguished by lowercase a, b, c, etc.

† See figure B.2.

§ A = magnitude (gamma/4 units); xA = area inside half-width contour (m^2); nm = not measurable.

** Additional description of this anomaly can be found in the text of this appendix.

Table B.1 Magnetic anomalies with possible archaeological affiliations, Windy Wheat Hamlet--Continued

Anomaly & priority*	Location of center†	Possible source	Statistics§	Comments
2f	44N/44E	Hearth	A = 2.5 xA = 3	Likely a small region of burning outside the pit-structure
3a	54N/6E	Intense burning might be caused by a hearth, pitstructure, or surface structure	A = 10 xA = 9	
3b	17N/10E	Surface structure	A = 5 xA = 9 monopole	Less likely because of diffuse nature
4a	50N/10E	Hearth	A = 1 xA = 0.5 monopole	Might be a hearth associated with anomaly 3a
4b	50N/5E	Hearth	A = 2 xA = 0.5 monopole	Might be a hearth associated with anomaly 3a
4c	57N/9E	Hearth	A = 2 xA = 1 monopole	Might be a hearth associated with anomaly 3a
4d	13N/14E	Hearth	A = 7 xA = 1 monopole	Might be a hearth associated with anomaly 3b

Table B.1 Magnetic anomalies with possible archaeological affiliations, Windy Wheat Hamlet--Continued

Anomaly & priority*	Location of center†	Possible source	Statistics§	Comments
4e	10N/17E	Burned region	A = 5 xA = 4 monopole	Might be a hearth associated with anomaly 3b
4f	18N/20E	Hearth or burned region	A = 3 xA = 2 monopole	Anomalies 4f and 4g indicate sources close to the surface
4g	20N/3E	Hearth	A = 4 xA = 1 monopole	Anomalies 4f and 4g indicate sources close to the surface
5a	34N/37E	Burned region	A = 3 xA = 2 monopole	Although this is a less likely choice, it should be considered because of its size and magnitude
5b	24N/29E	Activity area	A = 3 xA = 2 monopole	Although somewhat diffuse, this localized plateau is in an area of interest
5c	31N/8E	Activity area	A = 3 xA = 4 monopole	Although most likely a geologic feature this region warrants inspection
5d	56N/27E	Possible structure	A = 10 xA = 6 monopole	The area and magnitude suggest the anomaly is most likely caused by a geologic feature. Its proximity to anomalies 1a and 1b imply it might be a surface structure

Anomaly 3b had some characteristics that qualify it as a possible surface structure, but its size and irregularity account for its lower priority. Investigation was recommended.

Anomaly 5d was located north of the pitstructure anomalies and might represent a roomblock area. The large confusing contributions from what appear to be geologic sources lend to the assignment of its low priority. If the anomaly appears to be caused by a cultural feature, the anomaly to the west at the point 54N/17E should also be examined.

As all of the anomalies located on this site were contained within the bounds of the surveyed region, the survey of additional areas adjacent to the grid is not advised.

Summary

The magnetometer survey of Windy Wheat Hamlet resulted in the location of 20 areas of archaeological interest; anomalies 1a and 1b are obvious pitstructures, while anomalies 2a through 2e are most likely burned features associated with the pitstructures. Anomaly 3a, a localized monopole, is a good choice for a surface structure. Anomaly 3b, although a less likely choice for a surface structure, has a magnitude and shape that warrant investigation. Anomalies 4a through 4g were probably features associated with anomalies 3a and 3b. Anomalies 5a through 5c have archaeologically interesting signatures. Although anomaly 5d has an atypical signature for an archaeological feature, its proximity to the pitstructures suggests that it might be of interest.

APPENDIX C

THE POLLEN RECORD AT WINDY WHEAT HAMLET

by

Linda J. Scott

INTRODUCTION[1]

The pollen samples discussed in this appendix were collected during the 1979 field season of the DAP. The pitstructures under study are Pitstructures 1 and 2 from Windy Wheat Hamlet (Site 5MT4644), which were occupied during the Sagehen Phase (i.e., the Pueblo I period). Pitstructure 1 was chosen for intensive pollen and macrobotanical analysis (see appendix D) because the structure burned during occupation, and activity patterns, therefore, were not disturbed by the abandonment process.

Windy Wheat Hamlet is located in a cultivated field in north Sagehen Flats Locality. Stands of pinyon/juniper are also located on nearby knolls. Palynological studies at several sites in Sagehen Flats suggest that the local biotic community was a sagebrush shrubland during the prehistoric occupation.

During excavation of Pitstructure 1, upper control samples were collected from the roof fall stratum for each square meter of floor space. The floor itself was gridded into 1-m squares, which were then subdivided into quarters. The pollen samples were taken from within these $0.25m^2$ units as part of an intensive sampling design that was conceived by Dr. Robert Bye and William Litzinger of the University of Colorado. Bulk soil samples were collected in this same manner (appendix D). Thus, the pollen samples are complementary to the other sample types taken and all of these samples will eventually be interpreted as a unit. Integration of the pollen analysis and bulk soil analysis is expected to yield more

---

[1]Numerous people associated with the DAP aided in the completion of this project by supplying information concerning the pitstructures and by providing base maps from which to work. Thanks are also due to Vicki Dean, who assisted with the laboratory processing of these samples, and Hazel Nutter, who also assisted with the laboratory processing and typed the manuscript. Special thanks are due Douglas Scott, who provided comments on the manuscript.

conclusive interpretations concerning use areas and patterns within Pitstructure 1. The results and interpretations presented here should be considered to be preliminary.

Pitstructure 2 was not sampled as intensively as Pitstructure 1. Sample locations were selected based on the patterns of pollen distribution in Pitstructure 1. That is, the samples selected were those that were expected to provide the maximum information from a minimum number of pollen samples. Because both pitstructures had burned, pollen preservation was expected to be good in both.

METHODOLOGY

The pollen samples were taken in the field using sterilized equipment. When the samples were received in the laboratory, the pollen was extracted using heavy liquid flotation. This procedure involved the following steps:

1. Hydrochloric acid (10 percent) was added to approximately 50 ml of dry sediment; this mixture was stirred to dissolve any calcium carbonate. Concentrated hydrochloric acid was added and the mixture was stirred until there was no further reaction.
2. The material was screened through 150-micron mesh to remove the larger material. The samples were then centrifuged to concentrate the material for flotation.
3. Zinc bromide (density 2.0) was used to float all samples. The flotation process was executed three times, after which the supernatant containing the pollen and other organic material was saved, while the inorganic material was discarded.
4. To reduce the specific gravity, the supernatant was diluted with distilled water and hydrochloric acid. This solution was then centrifuged. Several times, the samples were washed with distilled water and were centrifuged. Finally, the supernatant was discarded.
5. Fifty percent hydrochloric acid was added to the samples to remove any silicates remaining after flotation.
6. The sediment remaining was treated with an acetolysis mixture for three minutes to remove cellulose.
7. All samples were washed thoroughly prior to making the microscope slides. The slides were made with glycerine jelly and stained with basic fuschin.

A light microscope was used to count the pollen at a magnification of 430x. Oil immersion at a magnification of 970x was employed occasionally to discern the features of certain pollen grains. Where possible, a total of 200 pollen grains was counted from each sample. Where this was not possible, a minimum of 70 pollen grains constituted a sample that would be accepted as sufficient for inclusion in the pollen study.

INTENSIVE ANALYSIS OF POLLEN SAMPLES FROM THE FLOOR OF PITSTRUCTURE 1

Introduction

Ninety pollen samples from the floor of Pitstructure 1 and two from the vent have been analyzed. In figure C.1, the shaded grid squares are those from which samples with sufficient pollen counts were collected. Pollen counts for each sample are provided in table C.1.

Features and the main artifact concentrations are shown in figure C.2. Along the west wall, there is a large concentration of ceramic fragments and evidence of several reconstructible vessels. Within the lithic concentration in the northwest corner of the pitstructure, only two pollen samples contain sufficient pollen. At the edge of this lithic area is a warming pit (or possible pot rest). Another warming pit (or pot rest) is located in the northeast quadrant of the pitstructure. There was no evidence of burned soil or ash in connection with the two warming pits (or pot rests), so there is some speculation as to the exact purpose of these two features. A small concentration of ceramic fragments is found near the warming pit (or pot rest) in the northeast corner of the pitstructure. Four postholes are located east of the hearth; these postholes are arranged in a square. Two small concentrations of ceramic fragments are also found east of the hearth. An unburned pit (sand repository) is located north of the hearth. The area behind the east wingwall contains some matting and groundstone. A small lithic concentration is found in the southeast corner behind the wingwall. One metate associated with the floor occurs south of the west wingwall.

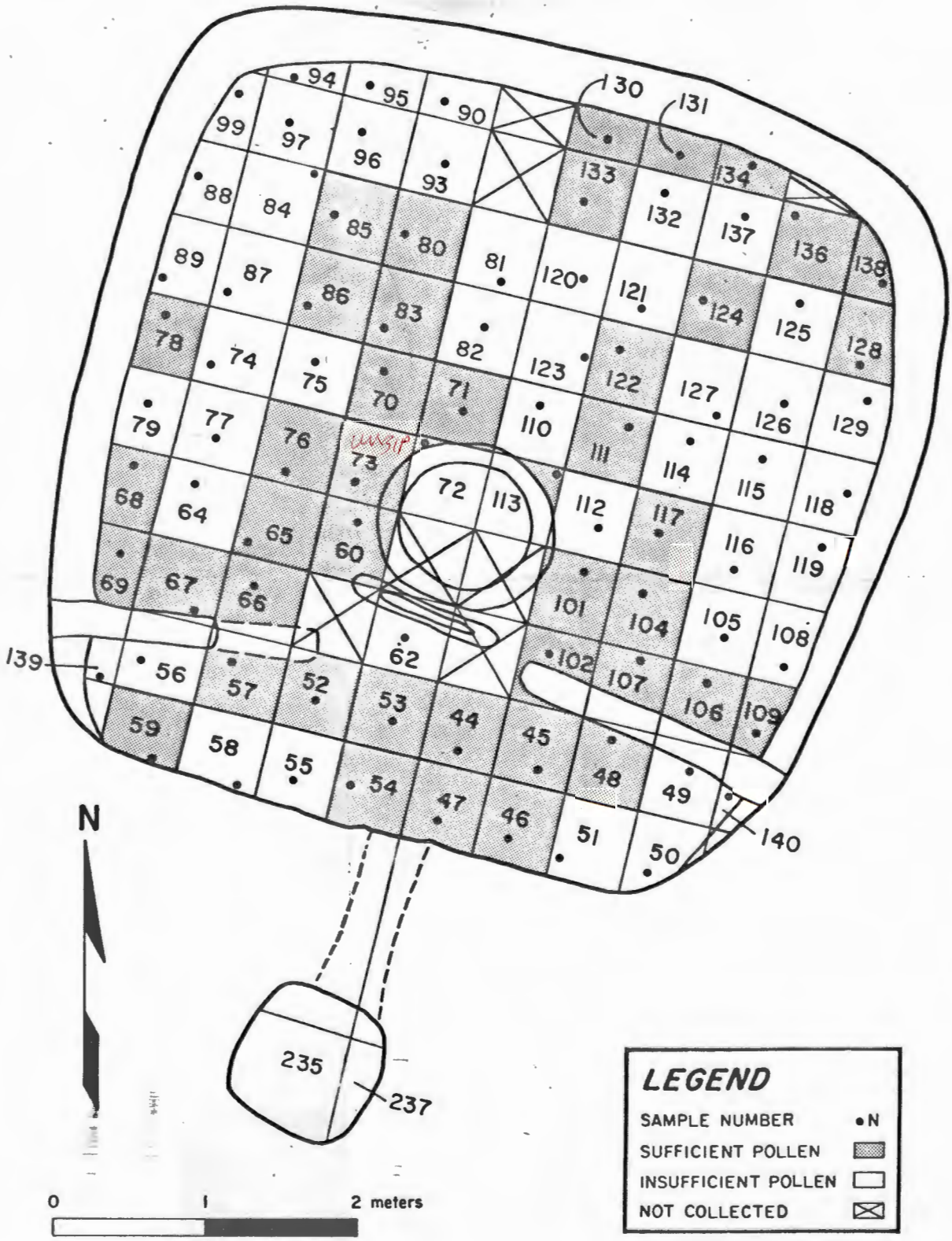


Figure C.1 Base map of Pitstructure 1 floor showing the locations of pollen samples that contained sufficient pollen for analysis.

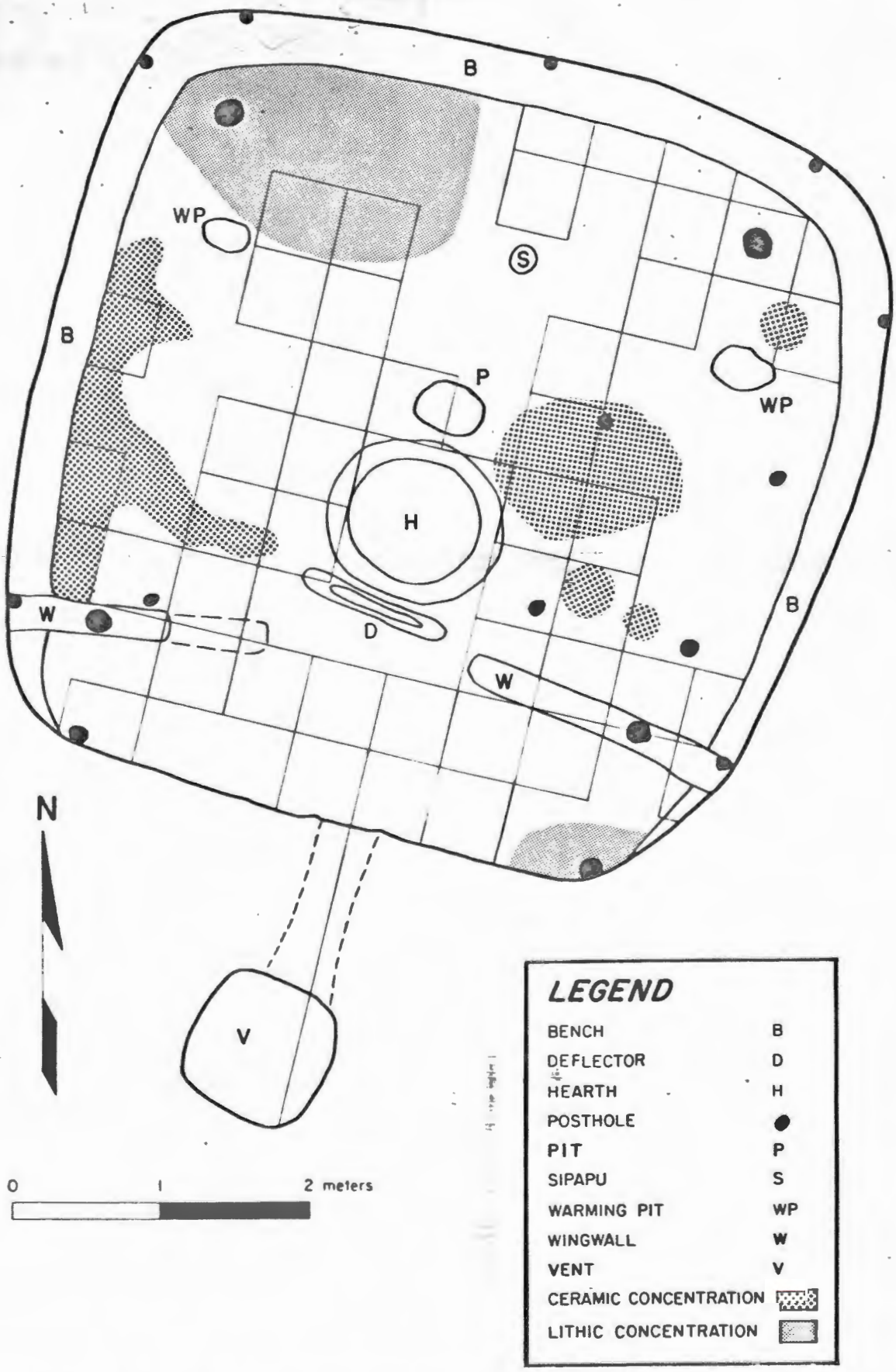


Figure C.2 Plan map of Pitstructure 1 showing major cultural features and artifact clusters.

Table C.1 Results of analysis of pollen samples from Windy Wheat Hamlet

The distribution of each of the economic pollen types noted in the pitstructure has been plotted in relation to the grid system to show the pattern of occurrence and frequency. At times, pollen types are noted as present in a square even though the sample count is not large enough to calculate the percent. It should be noted that the arboreal pollen frequencies vary very little within this pitstructure and are considered to be background or ambient pollen. Some of the pollen types that have been plotted on the pitstructure floor can probably be attributed to background or ambient pollen as well. However, many of the pollen types represented in the pitstructure come from zoophilous (animal-pollinated) rather than anemophilous (wind-pollinated) plants. Because pollen from zoophilous plants is rare even in a natural setting, its occurrence in a cultural setting suggests that they have been culturally introduced. Many of these plants have been documented in the ethnographic literature as having been economically important.

Large portions of the Pitstructure 1 floor do not contain sufficient pollen for analysis (fig. C.1). Specifically, the lithic area in the northwest corner of the pitstructure is almost completely devoid of pollen, as is a large area along the east wall. A portion of the area north of the hearth also contains very little pollen. The southeast and southwest corners behind the wingwalls contain relatively little pollen. In the southeast corner, this paucity of pollen corresponds with a lithic concentration.

Two samples from the floor of the vent shaft were analyzed as control samples. These two samples were expected to contain ambient pollen deposited by the air flowing through the ventilator system and into the pitstructure. Both samples on the ventilator shaft floor contain virtually no pollen.

Results of Pollen Analysis

The *Zea* pollen within the pitstructure occurs in a rather scattered pattern (fig. C.3), but there is a concentration of *Zea* pollen behind the wingwalls, along the east wingwall, and northwest of the hearth. *Zea* pollen occurs regularly in association with both of the warming pits (or pot rests) in the north half of the pitstructure, and also around the hearth, particularly around the north portion of the hearth and near the pit feature (sand repository). The single empty square north of the hearth does not contain sufficient pollen for a complete pollen count and contains little economic pollen of any type. There is also a concentration of *Zea* pollen in the area behind the wingwalls; this area may have been used as a processing or storage area. The *Zea* pollen behind the wingwalls occurs toward the center of this area, and not in direct association with the lithic concentration directly behind the east wingwall. However, *Zea* pollen is noted in the corner behind the west wingwall in the general vicinity of a metate associated with the floor. Concentrations of *Zea* in the main chamber along the east wingwall indicate that this area was probably also used for the preparation of maize. The *Zea* pollen observed to the west of the hearth is not located directly next to the hearth, but occurs 0.5 m to the west. A relatively large amount of *Zea* pollen is also present in the corner north of the west wingwall. The pollen may be associated with some of the ceramic fragments noted along the west wall, or may represent the preparation or storage of corn in this area.

In ethnobotanical literature, *Zea* is described as a staple and versatile food for the modern Pueblo Indians (Robbins et al. 1916; Stevenson 1915; Whiting 1939). *Zea* pollen is frequently noted in Anasazi sites, as are macroremains of maize, including kernels and cobs. The ubiquity with

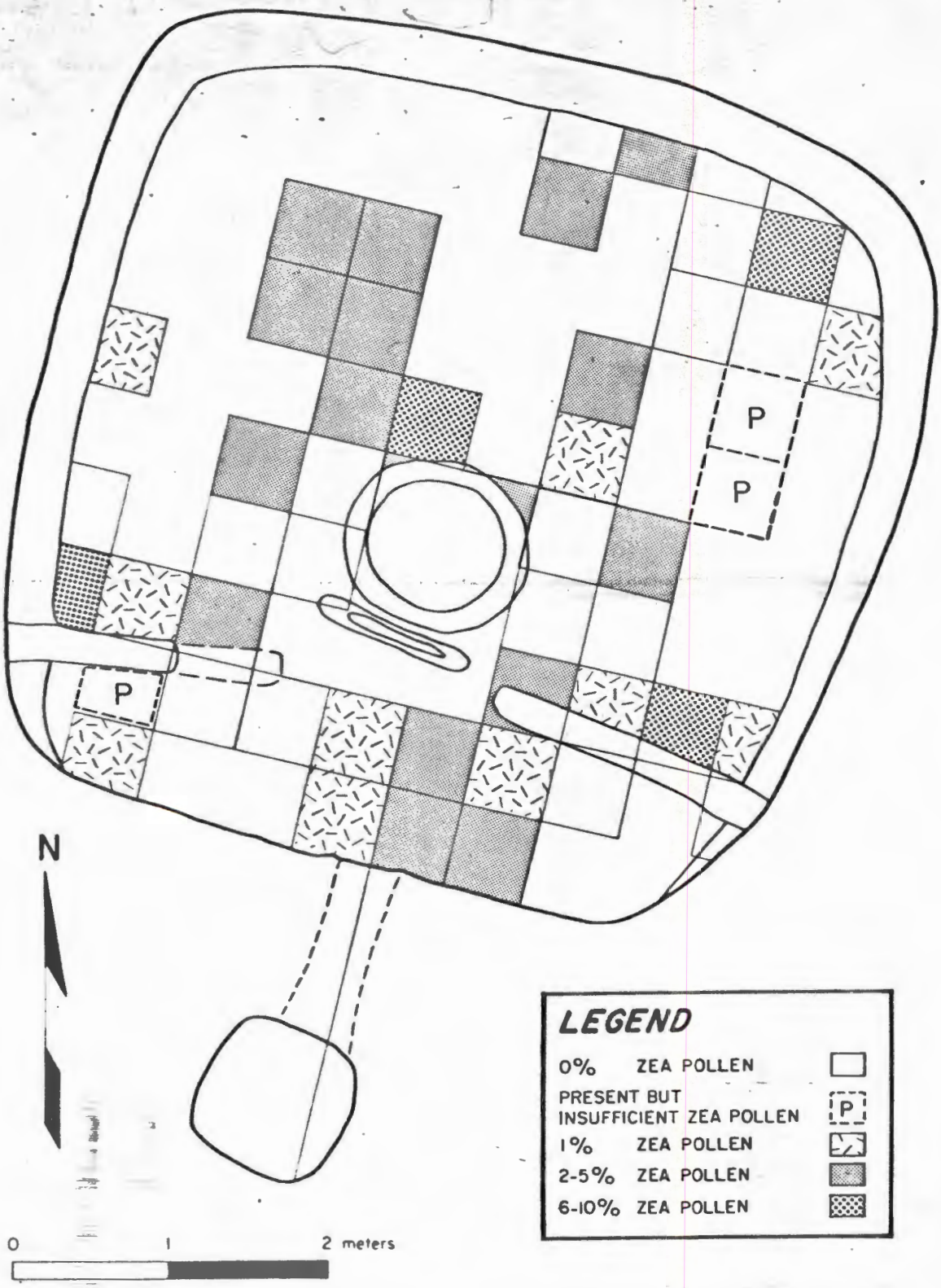


Figure C.3 Distribution of *Zea mays* pollen on the floor of Pitstructure 1.

which Zea pollen occurs in this pitstructure indicates that this cultigen was undoubtedly an important food resource at this site.

Cucurbita or squash pollen is noted in only a few locations in the pitstructure (fig. C.4). The Cucurbita pollen occurs near the pit (sand repository) north of the hearth, north of the west wingwall, and east of the hearth in the vicinity of a small ceramic concentration. Superimposing the occurrences of squash and maize in the pitstructure results in the direct association of both maize and squash near the pit (sand repository) north of the hearth and north of the west wingwall. Although both squash and maize occur east of the hearth, they are not observed in the same 0.25 m^2 grid unit.

Cucurbita pollen is not readily transported because the pollen grain is large and because Cucurbita is insect pollinated. Even small quantities of Cucurbita pollen are, therefore, sufficient to indicate the cultivation and use of squash. Cucurbita flowers and fruit are eaten by the modern Pueblo Indians (Stevenson 1915). Gourds were used as ladles and dippers and for ceremonial rattles and a variety of other purposes (Robbins et al. 1916). The seeds of the squash were parched and eaten (Whiting 1939).

Cleome pollen occurs over a large part of Pitstructure 1 (fig. C.5), but most of the occurrences of Cleome pollen appear to be grouped in the south half of the pitstructure. The largest frequencies of Cleome pollen occur behind the wingwalls, with two instances of over 10 percent Cleome pollen. In addition, moderately large amounts of Cleome pollen are present in the main chamber near the east wingwall and east of the hearth. Smaller quantities of Cleome pollen occur north and west of the hearth. A large quantity of Cleome pollen occurs in the main chamber in the southwest corner near the west wingwall. A high frequency of Zea

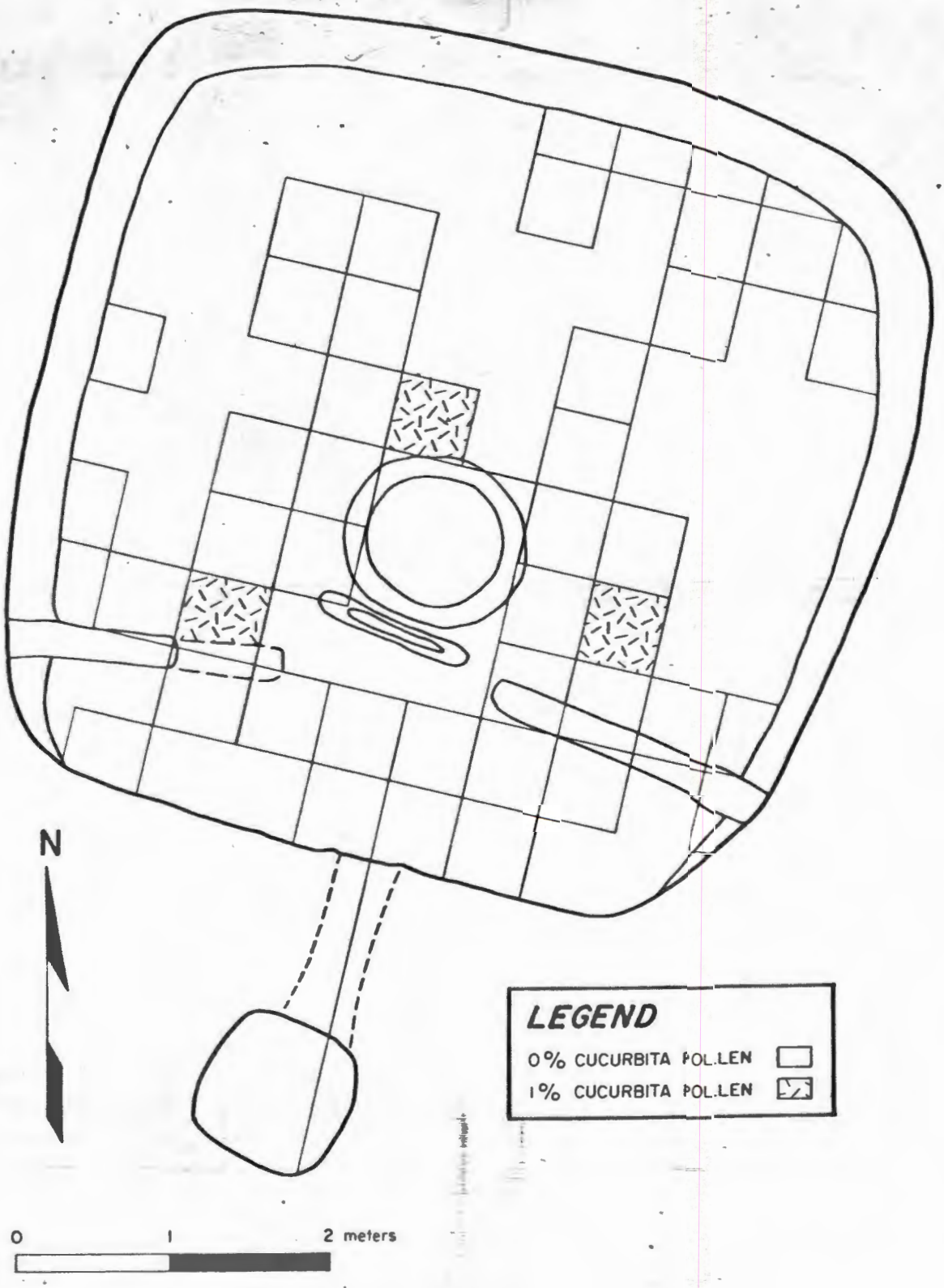


Figure C.4 Distribution of Cucurbita pollen on the floor of Pitstructure 1.

Sample 140 zipped wrong

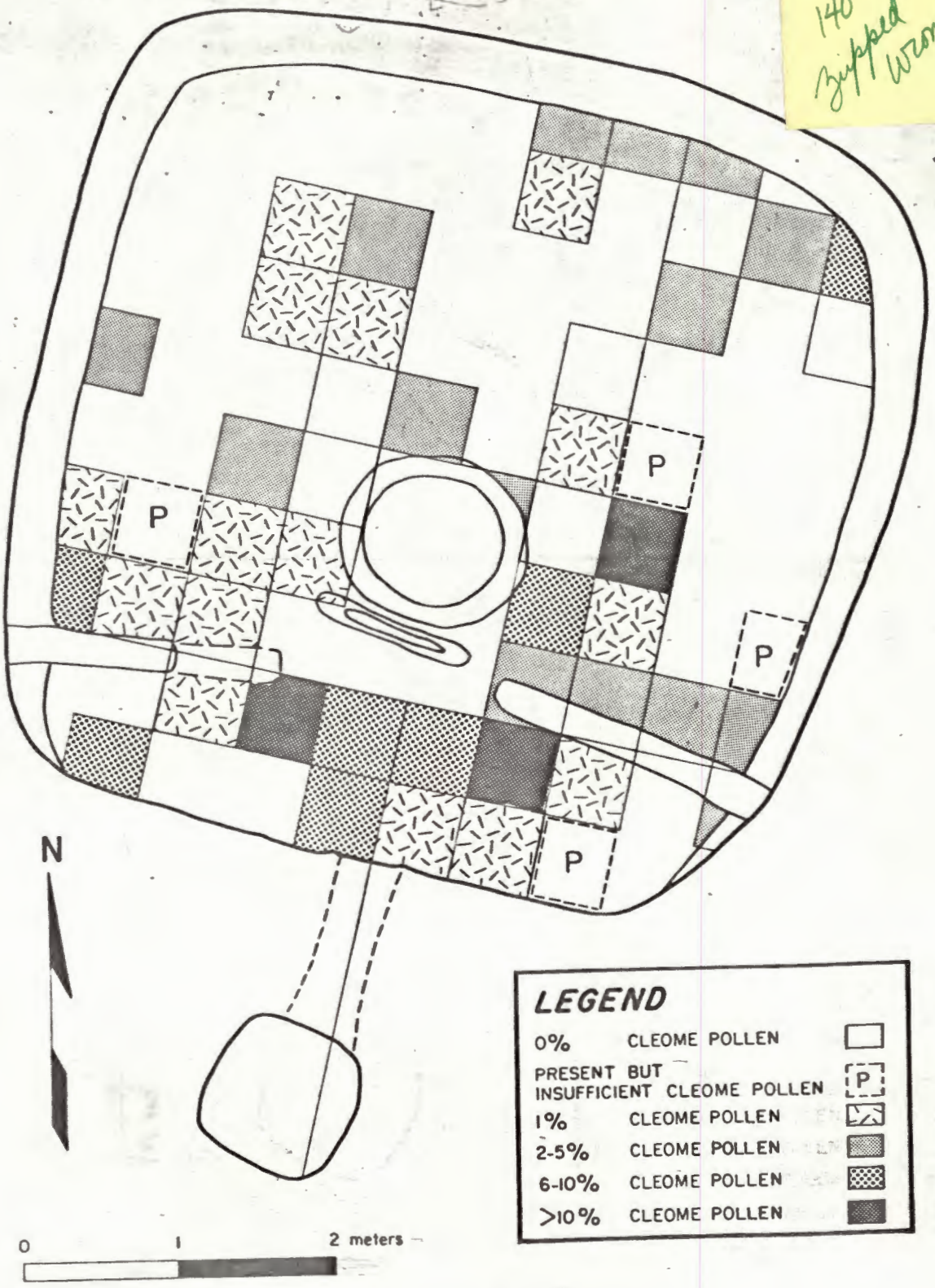


Figure C.5 Distribution of Cleome pollen on the floor of Pitstructure 1.

pollen is also present in this area. There seems to be some correlation between the occurrence of Cleome pollen and the presence of ceramic fragments along the west wall. Cleome pollen also occurs near the warming pit (or pot rest) at the edge of the lithic area in the northwest corner, but not in direct association with the warming pit (or pot rest) in the northeast portion of the pitstructure. Cleome pollen is also present along most of the north wall from the center of the pitstructure to the eastern edge.

Cleome is also an important plant to the modern Pueblo Indians. Although it is not cultivated, its growth is frequently encouraged (Whiting 1939). At Hano it is named with the three chief cultivated plants--maize, pumpkin, and cotton (Robbins et al. 1916). Cleome was used as a food (boiled as greens) and as a pottery paint (Robbins et al. 1916; Whiting 1939). Cleome also appears to have been an important element of the Anasazi diet. Coprolite studies have indicated that it was ingested (Martin and Sharrock 1964; Scott 1979a). A study of vessels from a Pueblo II site at Mesa Verde also yielded evidence of a large quantity of Cleome pollen in the residue adhering to the bottom of a bowl (Scott 1979b). The occasional large frequencies of Cleome pollen in this pitstructure, as well as the ubiquitous nature of the distribution of small quantities of Cleome pollen, are indicative of the importance of this plant to the inhabitants of Pitstructure 1.

Portulaca constitutes 2 percent of the pollen in one 0.25 m^2 grid unit behind the wingwalls (fig. C.6). It also occurs in association with the hearth and with the pit (or sand repository) north of the hearth. Portulaca pollen is also present near the warming pit (or pot rest) in the northeast portion of the pitstructure. The Portulaca pollen associated

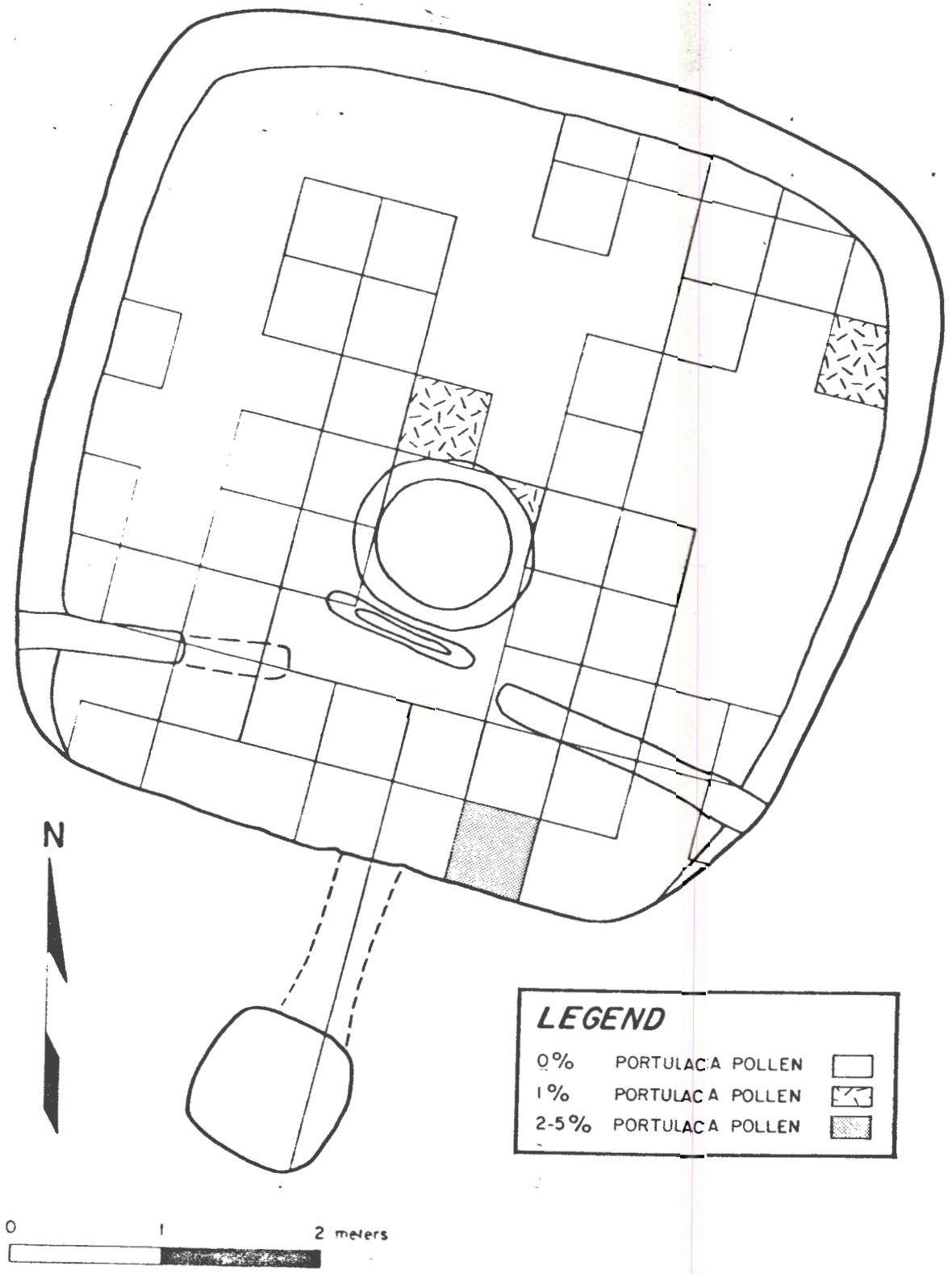


Figure C.6 Distribution of Portulaca pollen on the floor of Pitstructure 1.

with the hearth and one of the warming pits (or pot rests) may indicate that Portulaca was indeed cooked within this pitstructure. Portulaca pollen behind the wingwalls may be indicative of either the preparation or storage of Portulaca in this area.

Portulaca was eaten cooked in gravy (Whiting 1939), or boiled (Robbins et al. 1916). Portulaca pollen occurs rarely in the pollen record at prehistoric sites, probably because the leaves are tender and edible before the plant reaches the flowering stage. The small quantities of Portulaca pollen found in this pitstructure are therefore deemed adequate evidence for utilization of this genus.

Typha (cattail) pollen occurs behind the wingwalls and near the east wingwall (fig. C.7). Near the warming pit (or pot rest) in the northeast portion of the pitstructure it is present in a slightly larger quantity.

Whiting (1939) notes that Hopi children chew the mature cattail heads and also the stems, and that Typha was important ceremonially. Typha pollen is only rarely encountered in Anasazi sites, and does not appear to have contributed, on a large scale, to the diet or activities of the inhabitants of Pitstructure 1.

Opuntia pollen occurs in its largest frequency in a 0.25 m^2 grid unit behind the wingwalls near the back wall (fig. C.8), and also near the Portulaca pollen. Opuntia also occurs next to the Allium near the east wingwall, along the northeast edge of the hearth, north of the hearth near the pit (or sand repository), west of the hearth, along the north wall, and near the warming pit (or pot rest) in the northeast section of the pitstructure. The association of Opuntia pollen with the hearth and one warming pit (or pot rest) may be related to cooking activities. Other areas containing Opuntia pollen, such as the areas near the east wingwall

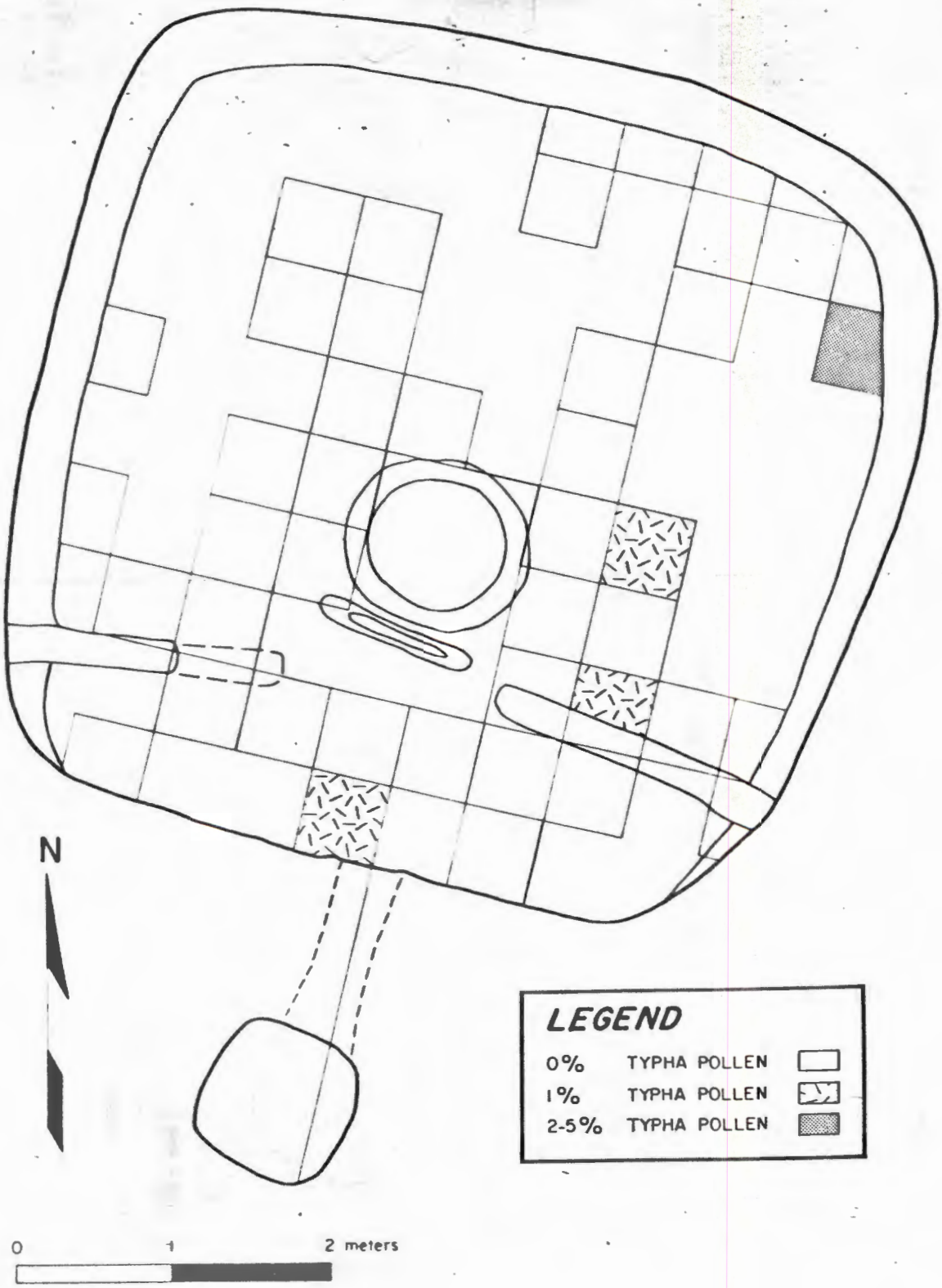


Figure C.7 Distribution of Typha pollen on the floor of Pitstructure 1.

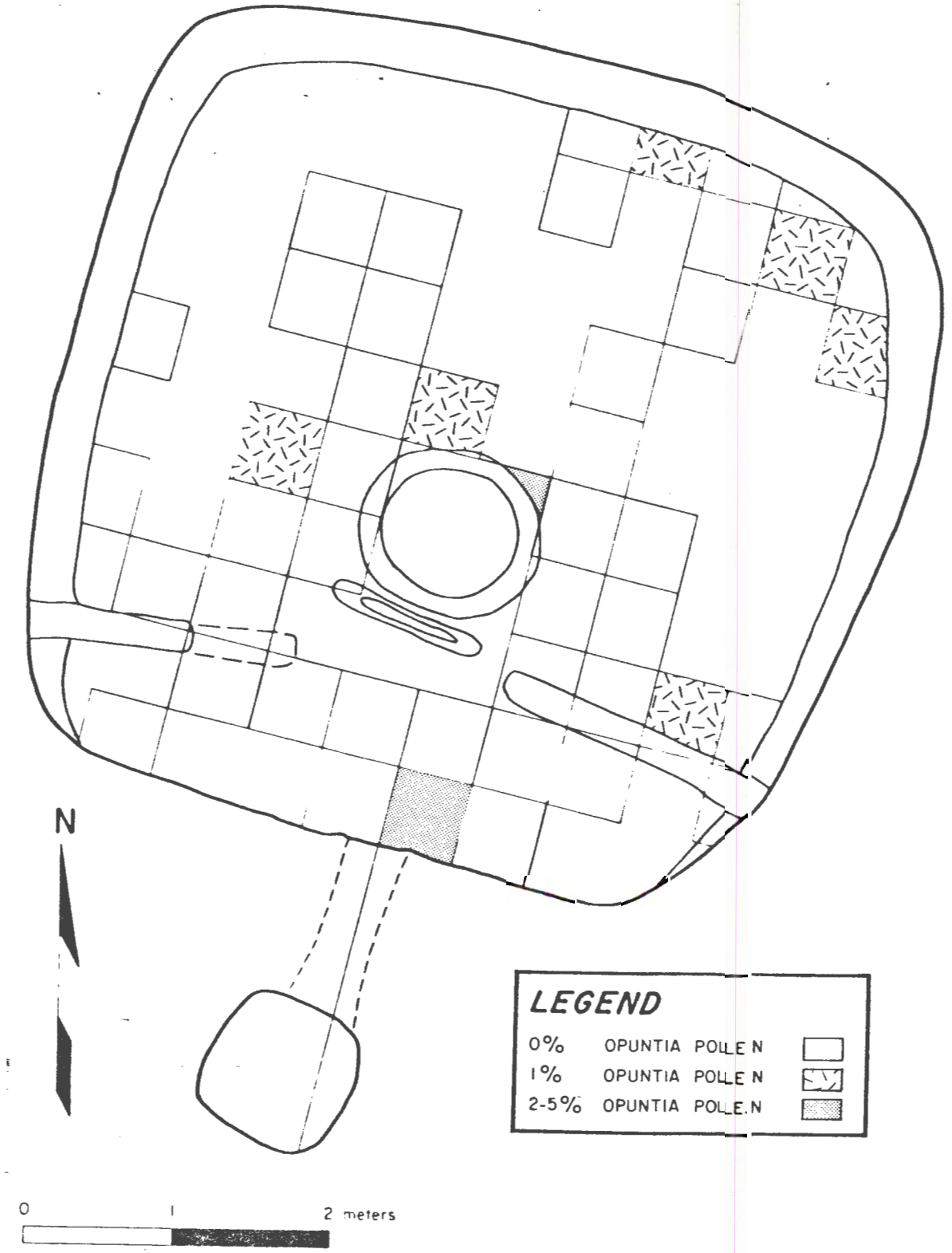


Figure C.8 Distribution of Opuntia pollen on the floor of Pitstructure 1.

and behind the wingwalls, may be related to the preparation or storage of Opuntia.

Opuntia was eaten by the historic Pueblo Indians (Robbins et al. 1916; Stevenson 1915; Whiting 1939). Although the fruit is mentioned most often, it appears that the joints were also eaten. The fruit was also dried and ground into flour (Stevenson 1915).

Allium pollen occurs as 23 percent of the pollen in the sample taken in the corner north of the east wingwall (fig. C.9). There is a feature (Feature 8) on the bench above this sample, and it is probable that the Allium pollen noted in this sample is associated with the storage of wild onions in this corner or in the feature. Whiting (1939) notes that small wild onions were commonly used for flavoring before the introduction of the cultivated onion.

Sphaeralcea occurs in a 0.25 m^2 grid unit behind the wingwall, at the northeast edge of the hearth, and against the north wall of the pitstructure (fig. C.10). Sphaeralcea appears to have been used primarily as a medicine (Robbins et al. 1916; Whiting 1939) and as a ceremonial plant (Stevenson 1915). Although this pollen type exhibits no definite distribution pattern in Pitstructure 1, the presence of this pollen within the pitstructure may be associated with the use of Sphaeralcea for either medicinal or ceremonial purposes.

The identification of Nicotiana pollen in this pitstructure was made under oil immersion. Due to the poor preservation of some of the pollen grains, the Nicotiana pollen has only been tentatively classified as Nicotiana attenuata, which is a native tobacco that grows in the study area today.

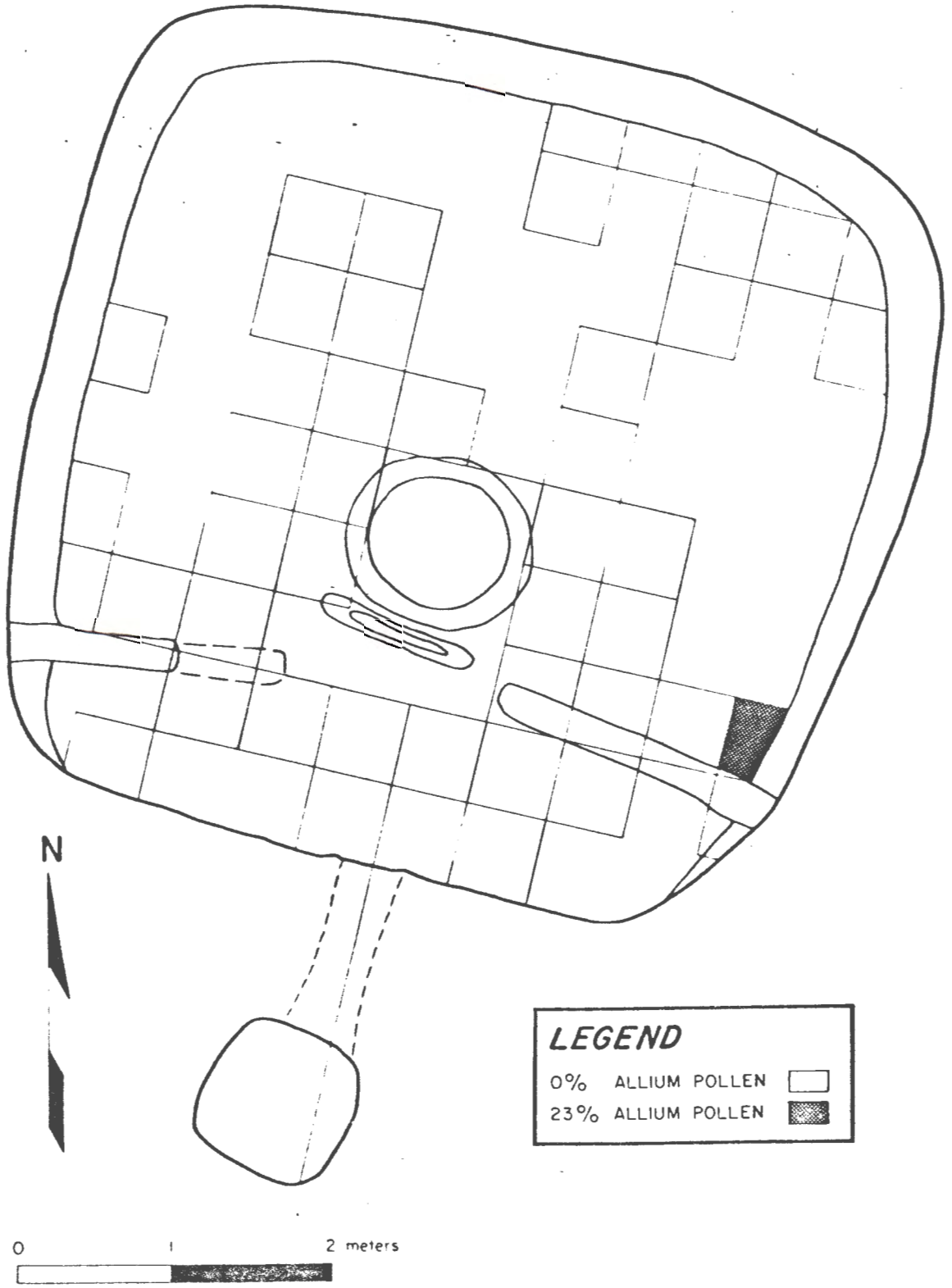


Figure C.9 Distribution of Allium pollen on the floor of Pitstructure 1.

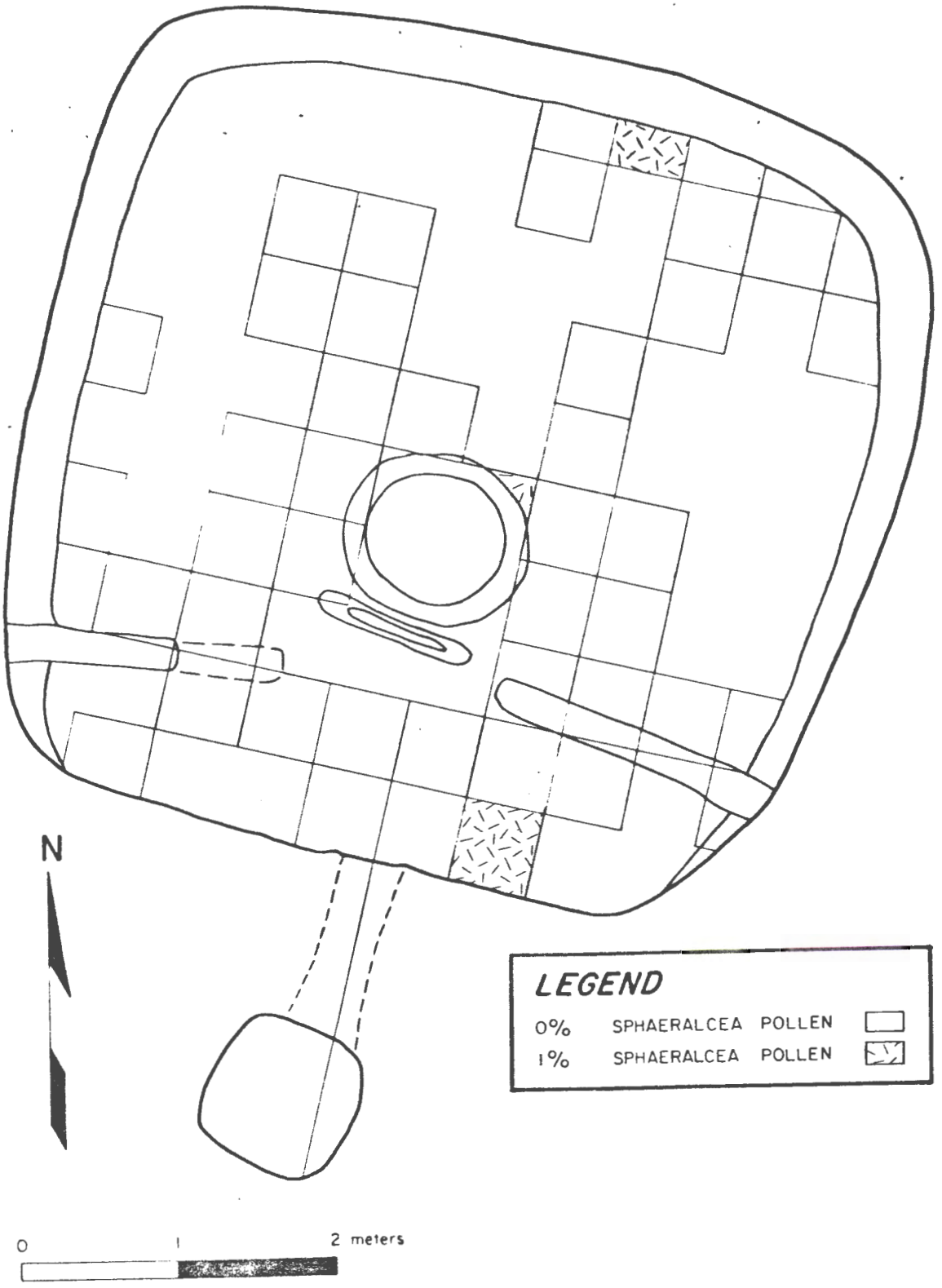


Figure C.10 Distribution of Sphaeralcea pollen on the floor of Pitstructure 1.

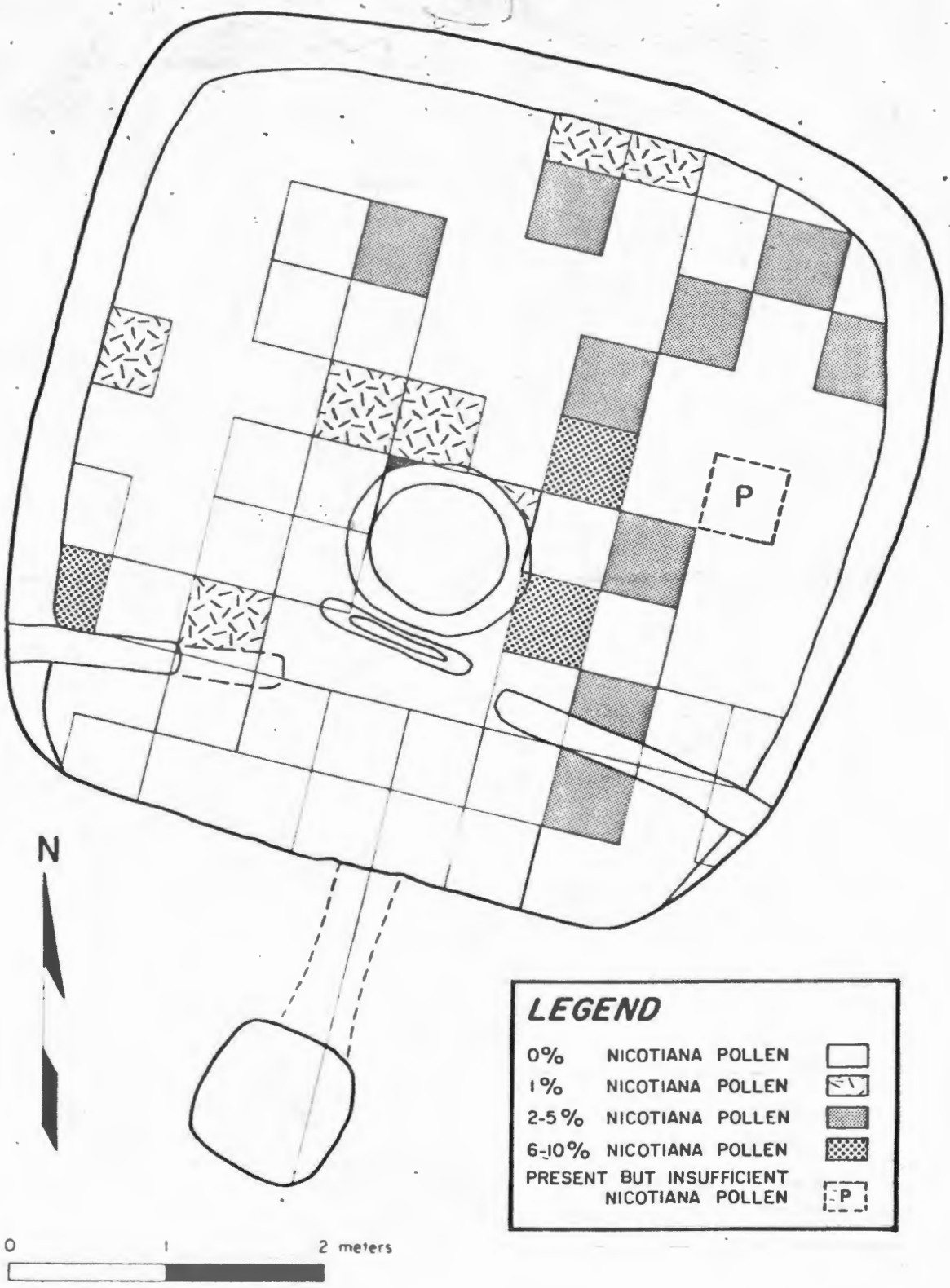


Figure C.11 Distribution of Nicotiana pollen on the floor of Pitstructure 1.

Nicotiana pollen occurs primarily in association with the hearth and the warming pit (or pot rest) in the northeast portion of the pitstructure (fig. C.11). The largest frequency of Nicotiana pollen was observed in association with the northwest edge of the hearth. The area in the southwest corner of the main chamber near the west wingwall contains a relatively large amount of Nicotiana pollen. This area contains a large variety of economic pollen types and may have been used either as a storage location or in the processing of plant materials.

It should be mentioned at this point that Nicotiana pollen may have been introduced into the site, since at least one member of the archaeological crew smoked and used snuff while at the site. Samples of a fresh cigarette, cigarette ash, and snuff were processed in the laboratory to observe the pollen types present and to determine whether these items had contaminated the samples from the pitstructure. The cigarette sample contains some Nicotiana pollen and abundant quantities of Compositae pollen, primarily short-spine composites. The snuff sample is quite similar, although the frequencies of the various pollen types observed vary somewhat from those of the cigarette. This was thought to reflect the area in which the tobacco was grown, and probably varies between brands of cigarettes and snuff. The ash sample, however, does not contain any pollen. Although it is reassuring to know that the pollen is destroyed when the cigarette is smoked, there is always the possibility of contamination before the cigarette is lit and when the cigarette butt is discarded. Snuff poses more of a problem, as would chewing tobacco, as the pollen present in these forms of tobacco is never burned, but is mixed with saliva, which may then contaminate the site if one spits (or even spills the tobacco). Several pollen types that are exotic to the South-

west were noted in the cigarette and snuff samples. Fortunately, none of these pollen types were observed in the samples from this pitstructure. It seems probable, therefore, that the Nicotiana pollen observed in the floor samples is aboriginal, particularly in light of the presence of Nicotiana seeds in some of the bulk soil samples.

Nicotiana or tobacco was used for both ceremonial and medicinal purposes by the historic Pueblo Indians (Robbins et al. 1916; Whiting 1939). Robbins et al. (1916) provide an excellent description of the method of rolling and smoking native tobacco cigarettes. Corn husks were used as the "paper" and small amounts of tobacco were rolled in the husks. The smoker crushed the tobacco leaves in his hand before making the cigarette. The smoker also coughed and spit freely while smoking the native tobacco. These activities would tend to deposit tobacco pollen on the floor of the pitstructure. Nicotiana leaves are sticky and glandular and, therefore, usually collect and hold pollen that falls on them. The use of tobacco may, therefore, also be responsible for the presence of pollen types other than Nicotiana in the pitstructure.

Umbelliferae pollen occurs throughout most of the pitstructure (fig. C.12). There is a concentration of Umbelliferae pollen behind the wingwalls, with one of the highest frequencies of Umbelliferae pollen occurring toward the center of this area. Moderately high frequencies of Umbelliferae pollen are also present in the main chamber of the pitstructure near the east wingwall. Umbelliferae pollen is observed in higher frequencies to the east of the hearth than it is in other areas near the hearth, as is Cleome. There is, however, an isolated high frequency of Umbelliferae pollen west of the hearth. Umbelliferae pollen also occurs with regularity near the west wingwall and appears to be

fig 12

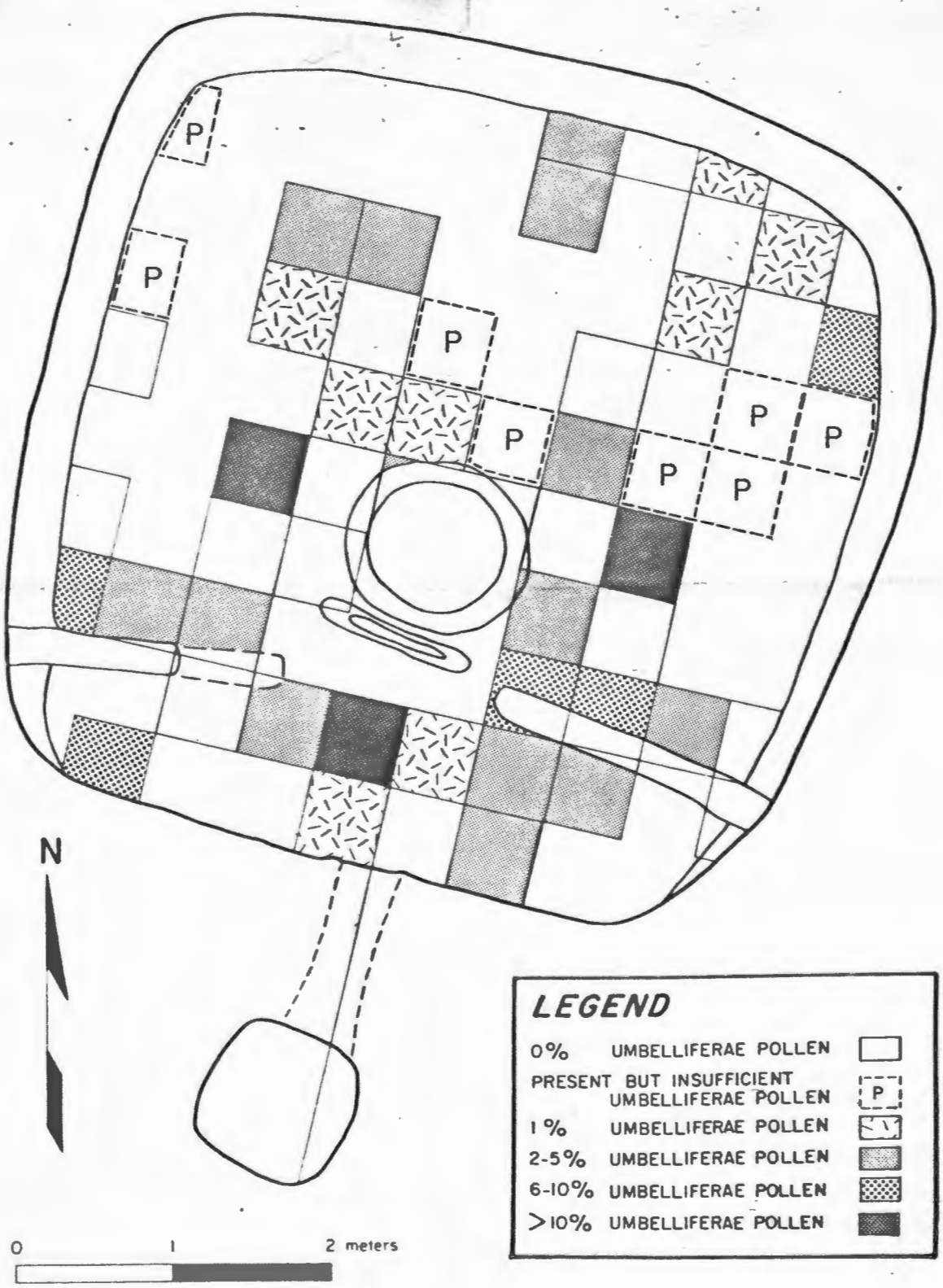


Figure C.12 Distribution of Umelliferae pollen on the floor of Pitstructure 1.

associated with the wingwall rather than with the concentration of ceramics nearby. The highest frequency along the west wingwall occurs in the southwest corner of the main chamber. This particular area appears to contain a relatively high frequency of several economic pollen types; the area may have been intensively used in the processing or storage of plants. Again, there is an indication of the association of Umbelliferae pollen with the warming pit (or pot rest) near the edge of the lithic area.

Umbelliferae pollen is present against the north wall of the pitstructure and is also associated with the warming pit (or pot rest) in the eastern portion of the pitstructure. The concentrations of Umbelliferae pollen near the hearth and both warming pits (or pot rests) are difficult to interpret due to the widespread occurrence of Umbelliferae pollen in this pitstructure.

Members of the Umbelliferae family do not appear to have been widely used by the historic Pueblo Indians. A limited number of plants from this family were used by the Hopi. Several have been introduced and cultivated in modern Hopi gardens. The roots of Cymopterus (a native plant) are edible. The presence of relatively large quantities of Umbelliferae pollen within Pitstructure 1 appears to be indicative of the use of members of this family. However, the widespread occurrence of Umbelliferae pollen in this pitstructure precludes definitive interpretations.

Ephedra pollen (fig. C.13) is included in this discussion of economic pollen types primarily because it constitutes 34 percent of the pollen in one of the samples west of the hearth. Normally, most of the Ephedra pollen would be considered to be ambient because it is so readily wind

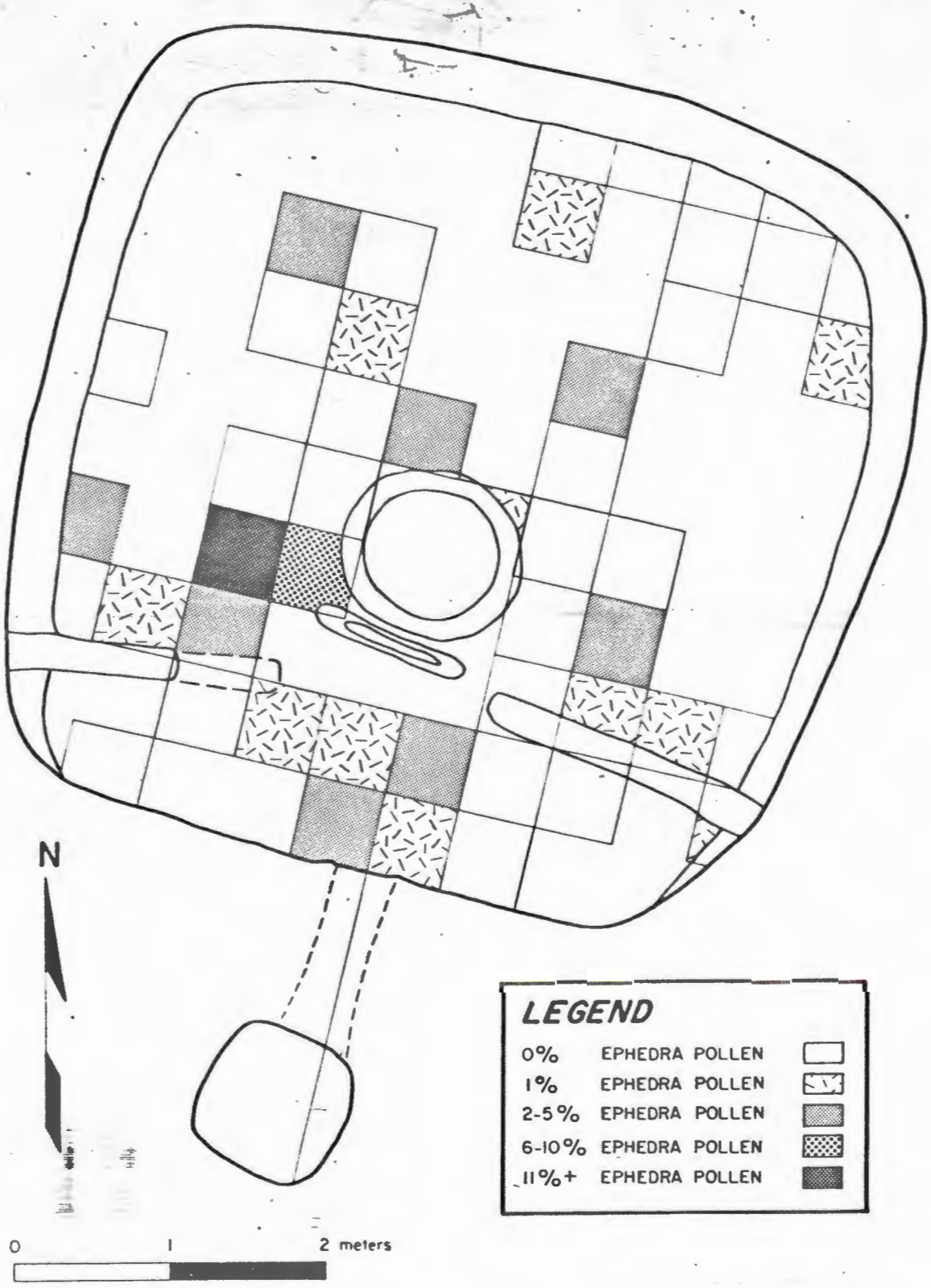


Figure C.13 Distribution of Ephedra pollen on the floor of Pitstructure 1.

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
16		
	"CHENO-AMS"	2
	PINUS	1
	TOTAL	3
17		
	SARCOBATUS	1
	"CHENO-AMS"	1
	TOTAL	2
18		
	CLEOME	11
	INDETERMINATE	21
	ARTEMISIA	38
	GRAMINEAE	2
	EPHEDRA NEVADENSIS-TYPE	3
	"CHENO-AMS"	10
	COMPOSITAE-LOW SPINE	24
	POLYGONUM SAWATCHENSE-TYPE	1
	JUNIPERUS	4
	TOTAL	114
19		
	CLEOME	1
	ARTEMISIA	8
	INDETERMINATE	10
	COMPOSITAE-LOW SPINE	1
	ERIOGONUM	1
	TOTAL	21
20		
	ZEA	4
	GRAMINEAE	1

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	JUNIPERUS	6
	COMPOSITAE-LOW SPINE	27
	PINUS	12
	INDETERMINATE	34
	SARCOBATUS	1
	COMPOSITAE-HIGH SPINE	10
	ERIOGONUM	2
	SPHAERALCEA	1
	CLEOME	5
	ARTEMISIA	80
	"CHENO-AMS"	17
	TOTAL	200
21		
	QUERCUS	2
	ERIOGONUM	2
	ZEA	7
	PINUS	8
	ARTEMISIA	84
	EPHEDRA NEVADENSIS-TYPE	1
	SARCOBATUS	1
	CELTIS	1
	COMPOSITAE-LOW SPINE	21
	UMBELLIFERAE	7
	JUNIPERUS	3
	GRAMINEAE	4
	OPUNTIA	1
	POLYGONUM SAWATCHENSE-TYPE	2
	"CHENO-AMS"	14
	ROSACEAE	5
	CUCURBITA	1
	INDETERMINATE	14
	CLEOME	7
	TOTAL	185
22		
	INDETERMINATE	3
	COMPOSITAE-LOW SPINE	4
	TOTAL	7

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
23		
	INDETERMINATE	4
	JUNIPERUS	4
	COMPOSITAE-HIGH SPINE	1
	CLEOME	1
	COMPOSITAE-LOW SPINE	3
	ARTEMISIA	3
	TOTAL	16
24		
	JUNIPERUS	1
	"CHENO-AMS"	1
	COMPOSITAE-HIGH SPINE	1
	COMPOSITAE-LOW SPINE	1
	ARTEMISIA	1
	INDETERMINATE	2
	GRAMINEAE	1
	TOTAL	8
25		
	COMPOSITAE-LOW SPINE	16
	COMPOSITAE-HIGH SPINE	3
	JUNIPERUS	1
	"CHENO-AMS"	12
	SHEPHERDIA	1
	PINUS	3
	ZEA	3
	CLEOME	8
	INDETERMINATE	28
	EPHEDRA NEVADENSIS-TYPE	1
	ARTEMISIA	26
	TOTAL	102
26		
	"CHENO-AMS"	1
	GRAMINEAE	1

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	CAMPANULA	1
	CLEOME	1
	ARTEMISIA	4
	JUNIPERUS	1
	INDETERMINATE	5
	TOTAL	14
27		
	EPHEDRA NEVADENSIS-TYPE	1
	INDETERMINATE	46
	EPHEDRA TORREYANA-TYPE	1
	PINUS	5
	COMPOSITAE-HIGH SPINE	6
	ZEA	13
	SARCOBATUS	1
	CLEOME	11
	"CHENO-AMS"	14
	ERIOGONUM	3
	GRAMINEAE	5
	COMPOSITAE-LOW SPINE	29
	POLYGONUM SAWATCHENSE-TYPE	1
	JUNIPERUS	2
	QUERCUS	1
	ARTEMISIA	61
	TOTAL	200
28		
	POLYGONUM SAWATCHENSE-TYPE	1
	UMBELLIFERAE	2
	CLEOME	13
	COMPOSITAE-LIGULIFLORAE	1
	POLYGONUM	1
	PINUS	1
	ARTEMISIA	31
	"CHENO-AMS"	15
	JUNIPERUS	1
	INDETERMINATE	17
	COMPOSITAE-LOW SPINE	8
	COMPOSITAE-HIGH SPINE	9
	SARCOBATUS	1
	TOTAL	101

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
29		
	SARCOBATUS	1
	PINUS	16
	COMPOSITAE-HIGH SPINE	8
	COMPOSITAE-LOW SPINE	15
	ZEA	9
	"CHENO-AMS"	18
	EPHEDRA NEVADENSIS-TYPE	1
	POLYGONUM SAWATCHENSE-TYPE	1
	ARTEMISIA	85
	INDETERMINATE	28
	ALNUS	1
	CLEOME	13
	ERIOGONUM	4
	TOTAL	200
30		
	"CHENO-AMS"	7
	CUCURBITA	1
	EPHEDRA NEVADENSIS-TYPE	4
	COMPOSITAE-HIGH SPINE	5
	CLEOME	5
	COMPOSITAE-LOW SPINE	17
	ZEA	10
	INDETERMINATE	36
	PINUS	18
	JUNIPERUS	3
	ERIOGONUM	1
	SPHAERALCEA	2
	ARTEMISIA	92
	GRAMINEAE	1
	TOTAL	202
31		
	COMPOSITAE-LOW SPINE	19
	ARTEMISIA	22
	CLEOME	2
	PINUS	1
	"CHENO-AMS"	4
	COMPOSITAE-HIGH SPINE	5

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	JUNIPERUS	2
	INDETERMINATE	41
	ZEA	2
	GRAMINEAE	2
	TOTAL	100
32		
	ERIOGONUM	2
	AMELANCHIER	1
	"CHENO-AMS"	13
	ARTEMISIA	79
	EPHEDRA NEVADENSIS-TYPE	1
	COMPOSITAE-LOW SPINE	14
	ZEA	15
	POLYGONUM SAWATCHENSE-TYPE	1
	PINUS	11
	COMPOSITAE-HIGH SPINE	4
	INDETERMINATE	50
	CLEOME	4
	GRAMINEAE	1
	OPUNTIA	1
	JUNIPERUS	2
	SARCOBATUS	1
	TOTAL	200
33		
	CLEOME	11
	PINUS	2
	"CHENO-AMS"	13
	JUNIPERUS	4
	EPHEDRA NEVADENSIS-TYPE	1
	ARTEMISIA	35
	COMPOSITAE-HIGH SPINE	12
	INDETERMINATE	7
	COMPOSITAE-LOW SPINE	28
	GRAMINEAE	1
	TOTAL	114

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
34		
	COMPOSITAE-LIGULIFLORAE	1
	COMPOSITAE-HIGH SPINE	5
	INDETERMINATE	18
	ARTEMISIA	46
	GRAMINEAE	3
	"CHENO-AMS"	7
	PINUS	2
	JUNIPERUS	1
	COMPOSITAE-LOW SPINE	13
	CLEOME	2
	TOTAL	98
35		
	ZEA	8
	UMBELLIFERAE	2
	SHEPHERDIA	1
	"CHENO-AMS"	41
	POLYGONUM	1
	COMPOSITAE-LOW SPINE	7
	CUCURBITA	1
	INDETERMINATE	16
	PINUS	1
	COMPOSITAE-HIGH SPINE	21
	ERIOGONUM	3
	CLEOME	7
	ARTEMISIA	57
	JUNIPERUS	8
	POLYGONUM SAWATCHENSE-TYPE	3
	QUERCUS	2
	GRAMINEAE	2
	TOTAL	181
36		
	JUNIPERUS	2
	"CHENO-AMS"	8
	GRAMINEAE	3
	CLEOME	12
	EPHEDRA NEVADENSIS-TYPE	1

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	JUNIPERUS	2
	INDETERMINATE	26
	ZEA	5
	COMPOSITAE-HIGH SPINE	3
	"CHENO-AMS"	10
	EPHEDRA NEVADENSIS-TYPE	1
	GRAMINEAE	2
	ARTEMISIA	22
	COMPOSITAE-LOW SPINE	12
	PINUS	14
	TOTAL	100
41		
	ARTEMISIA	5
	PINUS	1
	"CHENO-AMS"	1
	COMPOSITAE-LOW SPINE	2
	INDETERMINATE	4
	TOTAL	13
42		
	PINUS	4
	INDETERMINATE	20
	COMPOSITAE-HIGH SPINE	6
	COMPOSITAE-LOW SPINE	15
	"CHENO-AMS"	16
	GRAMINEAE	3
	ERIOGONUM	1
	ARTEMISIA	41
	CLEOME	92
	JUNIPERUS	2
	TOTAL	200
43		
	INDETERMINATE	23
	PINUS	6
	COMPOSITAE-LOW SPINE	10
	"CHENO-AMS"	7
	COMPOSITAE-HIGH SPINE	6

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	COMPOSITAE-LOW SPINE	14
	INDETERMINATE	20
	ARTEMISIA	35
	COMPOSITAE-HIGH SPINE	5
	TOTAL	100
37		
	CLEOME	4
	ARTEMISIA	26
	JUNIPERUS	2
	ROSACEAE	2
	INDETERMINATE	23
	"CHENO-AMS"	15
	COMPOSITAE-LOW SPINE	11
	COMPOSITAE-HIGH SPINE	8
	PINUS	7
	GRAMINEAE	2
	TOTAL	100
38		
	"CHENO-AMS"	2
	ARTEMISIA	1
	INDETERMINATE	10
	COMPOSITAE-LOW SPINE	3
	TOTAL	16
39		
	COMPOSITAE-HIGH SPINE	1
	COMPOSITAE-LOW SPINE	1
	TOTAL	2
40		
	POLYGONUM SAWATCHENSE-TYPE	1
	UMBELLIFERAE	1
	QUERCUS	1

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	ZEA	3
	CLEOME	2
	UMBELLIFERAE	1
	JUNIPERUS	1
	ERIOGONUM	1
	ARTEMISIA	40
	TOTAL	100
44		
	COMPOSITAE-HIGH SPINE	5
	COMPOSITAE-LIGULIFLORAE	1
	QUERCUS	1
	"CHENO-AMS"	9
	UMBELLIFERAE	1
	ARTEMISIA	46
	ZEA	3
	ERIOGONUM	5
	COMPOSITAE-LOW SPINE	4
	JUNIPERUS	1
	CRUCIFERAE	1
	CLEOME	6
	EPHEDRA NEVADENSIS-TYPE	2
	PINUS	8
	ONAGRACEAE	1
	TOTAL	94
45		
	"CHENO-AMS"	8
	ZEA	1
	UMBELLIFERAE	3
	COMPOSITAE-HIGH SPINE	9
	PINUS	6
	ERIOGONUM	2
	QUERCUS	2
	JUNIPERUS	1
	CLEOME	39
	COMPOSITAE-LOW SPINE	5
	ARTEMISIA	21
	TOTAL	97
46		
	SPHAERALCEA	1
	JUNIPERUS	3

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	ZEA	2
	QUERCUS	1
	UMBELLIFERAE	3
	COMPOSITAE-HIGH SPINE	4
	COMPOSITAE-LOW SPINE	6
	"CHENO-AMS"	7
	PORTULACA	2
	ARTEMISIA	45
	GRAMINEAE	1
	INDETERMINATE	16
	CLEOME	1
	PINUS	7
	TOTAL	99
47		
	CLEOME	1
	GRAMINEAE	1
	OPUNTIA	2
	"CHENO-AMS"	23
	COMPOSITAE-LOW SPINE	13
	COMPOSITAE-HIGH SPINE	11
	ZEA	3
	JUNIPERUS	4
	EPHEDRA	1
	ARTEMISIA	25
	PINUS	4
	TOTAL	88
48		
	PINUS	4
	UMBELLIFERAE	3
	NICOTIANA	2
	GRAMINEAE	1
	CLEOME	1
	INDETERMINATE	8
	"CHENO-AMS"	5
	COMPOSITAE-HIGH SPINE	1
	ALNUS	1
	ERIOGONUM	2
	ARTEMISIA	64
	QUERCUS	1
	COMPOSITAE-LOW SPINE	7
	TOTAL	100

POLLEN ANALYSIS SITE 5MT4044

SAMPLE NUMBER	TAXON	COUNT
49		
	ARTEMISIA	1
	ALNUS	1
	COMPOSITAE-HIGH SPINE	1
	"CHENO-AMS"	1
	TOTAL	4
50		
	"CHENO-AMS"	1
	INDETERMINATE	2
	ARTEMISIA	3
	JUNIPERUS	2
	TOTAL	8
51		
	CLEOME	1
	TOTAL	1
52		
	INDETERMINATE	6
	JUNIPERUS	1
	QUERCUS	4
	ARTEMISIA	27
	"CHENO-AMS"	9
	PINUS	5
	GRAMINEAE	3
	COMPOSITAE-LOW SPINE	16
	ERIOGONUM	1
	COMPOSITAE-HIGH SPINE	8
	UMBELLIFERAE	5
	EPHEDRA NEVADENSIS-TYPE	1
	ROSACEAE	1
	ONAGRACEAE	1
	CLEOME	12
	TOTAL	100

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
53		
	EPHEDRA NEVADENSIS-TYPE	1
	ERIOGONUM	1
	CLEOME	10
	QUERCUS	1
	ROSACEAE	1
	"CHENO-AMS"	10
	UMBELLIFERAE	13
	GRAMINEAE	7
	COMPOSITAE-LOW SPINE	4
	PINUS	3
	COMPOSITAE-HIGH SPINE	12
	INDETERMINATE	11
	ARTEMISIA	24
	ZEA	1
	TOTAL	99
54		
	UMBELLIFERAE	1
	COMPOSITAE-LOW SPINE	3
	PINUS	12
	GRAMINEAE	4
	POLYGONUM SAWATCHENSE-TYPE	1
	SARCOBATUS	1
	JUNIPERUS	17
	"CHENO-AMS"	33
	ZEA	2
	ARTEMISIA	49
	POLYGONUM	1
	EPHEDRA	3
	ROSACEAE	2
	CLEOME	14
	ERIOGONUM	1
	QUERCUS	2
	COMPOSITAE-HIGH SPINE	8
	INDETERMINATE	26
	TYPHA	1
	TOTAL	181

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
55		
	ARTEMISIA	3
	GRAMINEAE	1
	COMPOSITAE-HIGH SPINE	1
	TOTAL	5
56		
	COMPOSITAE-HIGH SPINE	1
	COMPOSITAE-LOW SPINE	6
	ZEA	1
	ARTEMISIA	2
	INDETERMINATE	1
	TOTAL	11
57		
	CLEOME	1
	ARTEMISIA	44
	COMPOSITAE-HIGH SPINE	9
	GRAMINEAE	3
	"CHENO-AMS"	6
	QUERCUS	1
	COMPOSITAE-LOW SPINE	13
	JUNIPERUS	3
	INDETERMINATE	17
	PINUS	3
	TOTAL	100
58		
	ARTEMISIA	1
	COMPOSITAE-HIGH SPINE	1
	TOTAL	2

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
59		
	PINUS	3
	UMBELLIFERAE	9
	COMPOSITAE-LOW SPINE	7
	COMPOSITAE-HIGH SPINE	10
	GRAMINEAE	7
	"CHENO-AMS"	6
	JUNIPERUS	3
	ZEA	1
	INDETERMINATE	13
	CLEOME	6
	ARTEMISIA	29
	QUERCUS	2
	ROSACEAE	3
	SARCOBATUS	1
	TOTAL	100
60		
	INDETERMINATE	12
	ERIOGONUM	1
	EPHEDRA NEVADENSIS-TYPE	5
	COMPOSITAE-LIGULIFLORAE	1
	COMPOSITAE-LOW SPINE	17
	CLEOME	1
	ARTEMISIA	7
	COMPOSITAE-HIGH SPINE	38
	TOTAL	82
62		
	INDETERMINATE	2
	TOTAL	2
64		
	COMPOSITAE-LOW SPINE	1
	ARTEMISIA	1
	"CHENO-AMS"	1

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	COMPOSITAE-HIGH SPINE	1
	GRAMINEAE	1
	QUERCUS	1
	CLEOME	1
	INDETERMINATE	1
	TOTAL	8
65		
	ARTEMISIA	5
	INDETERMINATE	14
	ERIOGONUM	2
	"CHENO-AMS"	34
	CLEOME	2
	GRAMINEAE	1
	COMPOSITAE-LOW SPINE	37
	EPHEDRA NEVADENSIS-TYPE	67
	JUNIPERUS	1
	COMPOSITAE-HIGH SPINE	36
	TOTAL	199
66		
	EPHEDRA NEVADENSIS-TYPE	2
	GRAMINEAE	1
	UMBELLIFERAE	5
	JUNIPERUS	6
	COMPOSITAE-HIGH SPINE	4
	ZEA	2
	CUCURBITA	1
	ROSACEAE	2
	NICOTIANA	1
	"CHENO-AMS"	16
	CLEOME	1
	INDETERMINATE	17
	PINUS	10
	ARTEMISIA	26
	POLYGONUM	1
	COMPOSITAE-LOW SPINE	5
	TOTAL	100

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
67		
	PINUS	16
	EPHEDRA TORREYANA-TYPE	1
	COMPOSITAE-HIGH SPINE	9
	UMBELLIFERAE	3
	ZEA	1
	CLEOME	1
	JUNIPERUS	2
	COMPOSITAE-LOW SPINE	6
	QUERCUS	1
	ROSACEAE	2
	"CHENO-AMS"	3
	ERIOGONUM	2
	PICEA	1
	ARTEMISIA	24
	GRAMINEAE	2
	TOTAL	74
68		
	ARTEMISIA	58
	PINUS	1
	INDETERMINATE	9
	GRAMINEAE	1
	CLEOME	1
	QUERCUS	1
	EPHEDRA NEVADENSIS-TYPE	5
	ERIOGONUM	3
	"CHENO-AMS"	73
	COMPOSITAE-LOW SPINE	39
	TOTAL	191
69		
	COMPOSITAE-LOW SPINE	2
	UMBELLIFERAE	5
	NICOTIANA	5
	COMPOSITAE-HIGH SPINE	5
	ZEA	3
	ARTEMISIA	12
	PINUS	4
	POLYGONUM SAWATCHENSE-TYPE	1

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	CLEOME	3
	"CHENO-AMS"	4
	INDETERMINATE	5
	ERIOGONUM	1
	TOTAL	50
70		
	COMPOSITAE-HIGH SPINE	6
	ZEA	3
	NICOTIANA	1
	COMPOSITAE-LOW SPINE	10
	ARTEMISIA	56
	INDETERMINATE	6
	UMBELLIFERAE	1
	ROSACEAE	3
	PINUS	6
	"CHENO-AMS"	6
	JUNIPERUS	1
	GRAMINEAE	1
	TOTAL	100
71		
	CLEOME	3
	INDETERMINATE	15
	PORTULACA	2
	PINUS	18
	QUERCUS	14
	EPHEDRA NEVADENSIS-TYPE	5
	SARCOBATUS	2
	"CHENO-AMS"	21
	UMBELLIFERAE	2
	GRAMINEAE	6
	JUNIPERUS	14
	CUCURBITA	1
	CRUCIFERAE	2
	NICOTIANA	2
	COMPOSITAE-HIGH SPINE	20
	COMPOSITAE-LOW SPINE	4
	ROSACEAE	2
	ZEA	11
	ARTEMISIA	51
	SALIX	1

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	OPUNTIA	1
	TOTAL	197
72		
	"CHENO-AMS"	7
	PINUS	3
	NICOTIANA	11
	COMPOSITAE-HIGH SPINE	4
	ERIOGONUM	3
	CRUCIFERAE	1
	ARTEMISIA	44
	ZEA	3
	JUNIPERUS	4
	COMPOSITAE-LOW SPINE	1
	GRAMINEAE	1
	UMBELLIFERAE	4
	TOTAL	86
74		
	"CHENO-AMS"	3
	COMPOSITAE-HIGH SPINE	1
	INDETERMINATE	2
	TOTAL	6
75		
	ARTEMISIA	4
	TOTAL	4
76		
	ROSACEAE	2
	COMPOSITAE-HIGH SPINE	9
	QUERCUS	2
	ZEA	4
	ARTEMISIA	19

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	UMBELLIFERAE	15
	GRAMINEAE	4
	"CHENO-AMS"	4
	COMPOSITAE-LOW SPINE	7
	INDETERMINATE	14
	JUNIPERUS	6
	CLEOME	2
	PINUS	11
	OPUNTIA	1
	TOTAL	100
77		
	INDETERMINATE	1
	ARTEMISIA	2
	PINUS	1
	TOTAL	4
78		
	PINUS	9
	NICOTIANA	1
	COMPOSITAE-LOW SPINE	5
	COMPOSITAE-HIGH SPINE	9
	GRAMINEAE	3
	JUNIPERUS	9
	ZEA	1
	CLEOME	3
	INDETERMINATE	17
	ARTEMISIA	33
	"CHENO-AMS"	10
	TOTAL	100
79		
	COMPOSITAE-HIGH SPINE	1
	TOTAL	1

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
80		
	NICOTIANA	2
	"CHENO-AMS"	7
	ZEA	2
	COMPOSITAE-HIGH SPINE	6
	CLEOME	3
	COMPOSITAE-LOW SPINE	6
	ROSACEAE	1
	PINUS	6
	ARTEMISIA	52
	ERIOGONUM	1
	INDETERMINATE	8
	UMBELLIFERAE	3
	GRAMINEAE	3
	TOTAL	100
81		
	INDETERMINATE	2
	COMPOSITAE-HIGH SPINE	1
	ARTEMISIA	1
	"CHENO-AMS"	1
	TOTAL	5
82		
	INDETERMINATE	2
	"CHENO-AMS"	1
	ROSACEAE	1
	ARTEMISIA	3
	UMBELLIFERAE	1
	TOTAL	8
83		
	POLYGONUM SAWATCHENSE-TYPE	1
	COMPOSITAE-HIGH SPINE	15
	ROSACEAE	1
	QUERCUS	2

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	CLEOME	1
	"CHENO-AMS"	5
	ERIOGONUM	2
	INDETERMINATE	9
	COMPOSITAE-LOW SPINE	9
	EPHEDRA NEVADENSIS-TYPE	2
	ARTEMISIA	124
	PINUS	17
	ZEA	6
	JUNIPERUS	1
	GRAMINEAE	2
	CRUCIFERAE	2
	TOTAL	199
84		
	ARTEMISIA	1
	TOTAL	1
85		
	PICEA	2
	COMPOSITAE-LOW SPINE	7
	EPHEDRA TORREYANA-TYPE	1
	INDETERMINATE	16
	ZEA	3
	"CHENO-AMS"	9
	PINUS	11
	ARTEMISIA	31
	ROSACEAE	1
	COMPOSITAE-HIGH SPINE	16
	GRAMINEAE	2
	EPHEDRA NEVADENSIS-TYPE	1
	CLEOME	1
	JUNIPERUS	2
	UMBELLIFERAE	3
	TOTAL	106

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
86		
	ALNUS	1
	COMPOSITAE-HIGH SPINE	15
	POLYGONUM SAWATCHENSE-TYPE	1
	QUERCUS	1
	JUNIPERUS	6
	ARTEMISIA	133
	UMBELLIFERAE	1
	INDETERMINATE	8
	CLEOME	2
	ZEA	2
	ERIOGONUM	1
	"CHENO-AMS"	5
	PICEA	1
	COMPOSITAE-LOW SPINE	7
	PINUS	4
	TOTAL	188
87		
	COMPOSITAE-LOW SPINE	1
	INDETERMINATE	4
	"CHENO-AMS"	1
	TOTAL	6
88		
	COMPOSITAE-LOW SPINE	1
	TOTAL	1
89		
	COMPOSITAE-HIGH SPINE	1
	PINUS	1
	UMBELLIFERAE	1
	ARTEMISIA	4
	TOTAL	7

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
90		
	INDETERMINATE	2
	TOTAL	2
93		
	"CHENO-AMS"	1
	INDETERMINATE	1
	JUNIPERUS	1
	TOTAL	3
94		
	INDETERMINATE	1
	TOTAL	1
95		
	ARTEMISIA	1
	ERIOGONUM	1
	COMPOSITAE-HIGH SPINE	1
	TOTAL	3
96		
	INDETERMINATE	2
	PINUS	1
	TOTAL	3
97		
	COMPOSITAE-HIGH SPINE	1
	INDETERMINATE	1

POLLEN ANALYSIS SITE 5MI4644

SAMPLE NUMBER	TAXON	COUNT
104		
	EPHEDRA NEVADENSIS-TYPE	2
	"CHENO-AMS"	77
	CLEOME	1
	SARCOBATUS	1
	ARTEMISIA	11
	CUCURBITA	1
	PINUS	2
	ERIOGONUM	1
	EPHEDRA TORREYANA-TYPE	1
	INDETERMINATE	10
	COMPOSITAE-LOW SPINE	31
	COMPOSITAE-HIGH SPINE	62
	TOTAL	200
105		
	INDETERMINATE	1
	TOTAL	1
106		
	QUERCUS	1
	PICEA	1
	UMBELLIFERAE	2
	OPUNTIA	1
	"CHENO-AMS"	10
	COMPOSITAE-LOW SPINE	6
	PINUS	18
	CLEOME	2
	ZEA	7
	ARTEMISIA	30
	COMPOSITAE-HIGH SPINE	9
	JUNIPERUS	4
	INDETERMINATE	11
	GRAMINEAE	1
	EPHEDRA TORREYANA-TYPE	1
	TOTAL	104

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	PINUS	1
	TOTAL	3
99		
	INDETERMINATE	1
	COMPOSITAE-HIGH SPINE	1
	UMBELLIFERAE	1
	ARTEMISIA	1
	TOTAL	4
101		
	ARTEMISIA	39
	COMPOSITAE-LOW SPINE	14
	PINUS	3
	UMBELLIFERAE	2
	INDETERMINATE	10
	COMPOSITAE-HIGH SPINE	14
	"CHENO-AMS"	9
	JUNIPERUS	1
	NICOTIANA	7
	CLEOME	7
	QUERCUS	1
	TOTAL	107
102		
	PINUS	5
	JUNIPERUS	1
	"CHENO-AMS"	6
	UMBELLIFERAE	8
	GRAMINEAE	1
	ARTEMISIA	45
	COMPOSITAE-HIGH SPINE	3
	COMPOSITAE-LOW SPINE	7
	CLEOME	4
	INDETERMINATE	16
	ZEA	2
	ROSACEAE	2
	TOTAL	100

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
107		
	ARTEMISIA	67
	COMPOSITAE-HIGH SPINE	13
	ERIOGONUM	1
	NICOTIANA	11
	JUNIPERUS	2
	SALIX	1
	CLEOME	10
	"CHENO-AMS"	17
	PINUS	17
	UMBELLIFERAE	15
	ZEA	1
	INDETERMINATE	17
	TYPHA	2
	ROSACEAE	3
	QUERCUS	4
	EPHEDRA NEVADENSIS-TYPE	1
	GRAMINEAE	11
	COMPOSITAE-LOW SPINE	9
	TOTAL	202
108		
	CLEOME	1
	ARTEMISIA	1
	"CHENO-AMS"	1
	TOTAL	3
109		
	JUNIPERUS	2
	ZEA	1
	PICEA	1
	ALLIUM	23
	ARTEMISIA	39
	CLEOME	5
	COMPOSITAE-HIGH SPINE	4
	COMPOSITAE-LOW SPINE	1
	PINUS	6
	GRAMINEAE	1
	INDETERMINATE	12
	"CHENO-AMS"	5
	TOTAL	100

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
110		
	PINUS	1
	INDETERMINATE	4
	"CHENO-AMS"	2
	UMBELLIFERAE	2
	ARTEMISIA	11
	TOTAL	20
111		
	ZEA	1
	ERIOGONUM	1
	ARTEMISIA	38
	NICOTIANA	9
	CLEOME	1
	INDETERMINATE	17
	ROSACEAE	1
	COMPOSITAE-HIGH SPINE	7
	GRAMINEAE	2
	PINUS	3
	"CHENO-AMS"	9
	JUNIPERUS	5
	UMBELLIFERAE	4
	COMPOSITAE-LOW SPINE	1
	TOTAL	99
112		
	INDETERMINATE	4
	ARTEMISIA	1
	TOTAL	5

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
113		
	POLYGONUM SAWATCHENSE-TYPE	1
	SPHAERALCEA	2
	PINUS	12
	CLEOME	9
	OPUNTIA	3
	COMPOSITAE-HIGH SPINE	21
	ZEA	11
	PORTULACA	1
	EPHEDRA NEVADENSIS-TYPE	2
	ARTEMISIA	72
	JUNIPERUS	2
	COMPOSITAE-LOW SPINE	7
	NICOTIANA	2
	INDETERMINATE	16
	ERIOGONUM	2
	PICEA	1
	"CHENO-AMS"	36
	GRAMINEAE	2
	TOTAL	202
114		
	CLEOME	1
	COMPOSITAE-LOW SPINE	1
	UMBELLIFERAE	1
	ARTEMISIA	1
	"CHENO-AMS"	2
	QUERCUS	1
	INDETERMINATE	3
	COMPOSITAE-HIGH SPINE	2
	PINUS	2
	TOTAL	14
115		
	ARTEMISIA	3
	UMBELLIFERAE	1
	INDETERMINATE	1
	COMPOSITAE-HIGH SPINE	1
	ZEA	1
	NICOTIANA	1
	"CHENO-AMS"	1
	TOTAL	9

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
116		
	INDETERMINATE	1
	TOTAL	1
117		
	CLEOME	21
	QUERCUS	1
	ROSACEAE	8
	PINUS	8
	INDETERMINATE	14
	NICOTIANA	9
	ALNUS	1
	UMBELLIFERAE	27
	ZEA	4
	ARTEMISIA	72
	POLYGONUM	1
	GRAMINEAE	6
	TYPHA	1
	CRUCIFERAE	2
	COMPOSITAE-LOW SPINE	1
	"CHENO-AMS"	10
	COMPOSITAE-HIGH SPINE	10
	ERIOGONUM	2
	TOTAL	198
118		
	ARTEMISIA	1
	INDETERMINATE	1
	TOTAL	2
119		
	POLYGONUM	1
	TOTAL	1

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
120		
	ARTEMISIA	1
	TOTAL	1
121		
	INDETERMINATE	0
	TOTAL	0
122		
	QUERCUS	3
	PINUS	10
	COMPOSITAE-LIGULIFLORAE	1
	EPHEDRA NEVADENSIS-TYPE	3
	NICOTIANA	3
	COMPOSITAE-HIGH SPINE	8
	ONAGRACEAE	1
	COMPOSITAE-LOW SPINE	2
	INDETERMINATE	8
	ZEA	2
	POLYGONUM SAWATCHENSE-TYPE	1
	JUNIPERUS	4
	"CHENO-AMS"	6
	ARTEMISIA	43
	GRAMINEAE	5
	TOTAL	100
123		
	ARTEMISIA	2
	INDETERMINATE	1
	TOTAL	3

POLLEN ANALYSIS SITE 5MI4644

SAMPLE NUMBER	TAXON	COUNT
124		
	QUERCUS	1
	UMBELLIFERAE	1
	PINUS	5
	ROSACEAE	6
	JUNIPERUS	1
	CLEOME	3
	ARTEMISIA	59
	INDETERMINATE	12
	NICOTIANA	3
	COMPOSITAE-LOW SPINE	5
	"CHENO-AMS"	2
	COMPOSITAE-HIGH SPINE	3
	TOTAL	101
125		
	ARTEMISIA	1
	COMPOSITAE-LOW SPINE	2
	TOTAL	3
126		
	UMBELLIFERAE	1
	COMPOSITAE-HIGH SPINE	4
	COMPOSITAE-LOW SPINE	1
	ARTEMISIA	2
	ZEA	2
	INDETERMINATE	1
	TOTAL	11
127		
	INDETERMINATE	2
	COMPOSITAE-LOW SPINE	2
	ARTEMISIA	8
	TOTAL	12

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
128		
	PINUS	7
	GRAMINEAE	1
	ZEA	1
	COMPOSITAE-HIGH SPINE	3
	ERIOGONUM	1
	ARTEMISIA	33
	QUERCUS	2
	COMPOSITAE-LOW SPINE	1
	PORTULACA	1
	LYCIUM	1
	UMBELLIFERAE	6
	EPHEDRA TORREYANA-TYPE	1
	OPUNTIA	1
	TYPHA	2
	ROSACEAE	1
	JUNIPERUS	5
	NICOTIANA	2
	INDETERMINATE	23
	"CHENO-AMS"	6
	SARCOBATUS	1
	TOTAL	99
129		
	PINUS	1
	UMBELLIFERAE	1
	TOTAL	2
130		
	NICOTIANA	1
	"CHENO-AMS"	10
	POLYGONUM	1
	GRAMINEAE	1
	CLEOME	2
	UMBELLIFERAE	2
	COMPOSITAE-LOW SPINE	6
	INDETERMINATE	20
	PINUS	1
	COMPOSITAE-HIGH SPINE	16
	ARTEMISIA	35

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	POLYGONUM SAWATCHENSE-TYPE	1
	JUNIPERUS	3
	TOTAL	99
131		
	PINUS	6
	CLEOME	3
	"CHENO-AMS"	29
	NICOTIANA	2
	INDETERMINATE	26
	ZEA	3
	ARTEMISIA	60
	GRAMINEAE	6
	COMPOSITAE-LOW SPINE	20
	SPHAERALCEA	1
	SARCOBATUS	2
	JUNIPERUS	11
	OPUNTIA	1
	ERIOGONUM	1
	COMPOSITAE-HIGH SPINE	29
	TOTAL	200
132		
	ARTEMISIA	1
	COMPOSITAE-HIGH SPINE	1
	COMPOSITAE-LOW SPINE	1
	TOTAL	3
133		
	EPHEDRA NEVADENSIS-TYPE	1
	JUNIPERUS	2
	NICOTIANA	3
	UMBELLIFERAE	4
	"CHENO-AMS"	4
	CLEOME	1
	PINUS	10
	ROSACEAE	1
	INDETERMINATE	11

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	ZEA	3
	COMPOSITAE-HIGH SPINE	6
	COMPOSITAE-LOW SPINE	4
	ARTEMISIA	50
	QUERCUS	1
	TOTAL	101
134		
	PINUS	4
	JUNIPERUS	3
	COMPOSITAE-HIGH SPINE	16
	CLEOME	2
	COMPOSITAE-LOW SPINE	8
	ARTEMISIA	42
	QUERCUS	2
	INDETERMINATE	11
	UMBELLIFERAE	1
	"CHENO-AMS"	11
	TOTAL	100
136		
	CLEOME	3
	COMPOSITAE-LOW SPINE	5
	GRAMINEAE	4
	ZEA	10
	UMBELLIFERAE	1
	INDETERMINATE	14
	"CHENO-AMS"	11
	ARTEMISIA	28
	COMPOSITAE-HIGH SPINE	12
	ROSACEAE	1
	JUNIPERUS	2
	NICOTIANA	3
	OPUNTIA	1
	PINUS	5
	TOTAL	100

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
137		
	COMPOSITAE-HIGH SPINE	1
	TOTAL	1
138		
	ARTEMISIA	31
	COMPOSITAE-LOW SPINE	8
	INDETERMINATE	11
	ERIOGONUM	2
	GRAMINEAE	4
	POLYGONUM SAWATCHENSE-TYPE	1
	PINUS	2
	COMPOSITAE-HIGH SPINE	20
	CLEOME	8
	"CHENO-AMS"	13
	TOTAL	100
139		
	ERIOGONUM	1
	INDETERMINATE	5
	"CHENO-AMS"	3
	ARTEMISIA	2
	COMPOSITAE-HIGH SPINE	1
	COMPOSITAE-LOW SPINE	3
	TOTAL	15
140		
	JUNIPERUS	9
	INDETERMINATE	18
	GRAMINEAE	4
	"CHENO-AMS"	7
	ARTEMISIA	36
	ROSACEAE	2
	COMPOSITAE-HIGH SPINE	16
	EPHEDRA NEVADENSIS-TYPE	1
	QUERCUS	1

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	COMPOSITAE-LOW SPINE	3
	CLEOME	3
	TOTAL	100
181		
	COMPOSITAE-LOW SPINE	10
	INDETERMINATE	30
	CLEOME	1
	PINUS	2
	COMPOSITAE-HIGH SPINE	7
	JUNIPERUS	2
	"CHENO-AMS"	9
	ALNUS	1
	ARTEMISIA	38
	TOTAL	100
183		
	INDETERMINATE	37
	CLEOME	3
	COMPOSITAE-HIGH SPINE	4
	SARCOBATUS	1
	UMBELLIFERAE	2
	COMPOSITAE-LOW SPINE	12
	ARTEMISIA	109
	QUERCUS	11
	ZEA	2
	GRAMINEAE	1
	JUNIPERUS	1
	"CHENO-AMS"	9
	PINUS	7
	TOTAL	199

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
186		
	COMPOSITAE-LOW SPINE	35
	ARTEMISIA	71
	JUNIPERUS	1
	GRAMINEAE	1
	PINUS	3
	COMPOSITAE-HIGH SPINE	9
	POLYGONUM SAWATCHENSE-TYPE	1
	EPHEDRA NEVADENSIS-TYPE	1
	INDETERMINATE	50
	"CHENO-AMS"	11
	ERIOGONUM	1
	CLEOME	5
	TOTAL	189
187		
	SARCOBATUS	1
	UMBELLIFERAE	1
	GRAMINEAE	4
	JUNIPERUS	1
	COMPOSITAE-LOW SPINE	16
	EPHEDRA NEVADENSIS-TYPE	1
	COMPOSITAE-HIGH SPINE	9
	COLLOMIA	9
	INDETERMINATE	42
	ARTEMISIA	88
	POLYGONUM SAWATCHENSE-TYPE	1
	"CHENO-AMS"	23
	PINUS	4
	TOTAL	200
191		
	ONAGRACEAE	1
	GRAMINEAE	4
	JUNIPERUS	6
	ERIOGONUM	2
	COMPOSITAE-HIGH SPINE	7
	COMPOSITAE-LOW SPINE	6
	PINUS	5
	UMBELLIFERAE	1

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	ROSACEAE	1
	POLYGONUM SAWATCHENSE-TYPE	2
	CLEOME	3
	INDETERMINATE	9
	"CHENO-AMS"	10
	ARTEMISIA	43
	TOTAL	100
193		
	COMPOSITAE-HIGH SPINE	10
	JUNIPERUS	2
	"CHENO-AMS"	31
	CLEOME	40
	PINUS	6
	POLYGONUM SAWATCHENSE-TYPE	1
	QUERCUS	1
	ARTEMISIA	70
	OPUNTIA	2
	GRAMINEAE	7
	UMBELLIFERAE	4
	CACTACEAE	2
	INDETERMINATE	13
	COMPOSITAE-LOW SPINE	10
	ZEA	1
	TOTAL	200
194		
	PINUS	7
	CLEOME	1
	COMPOSITAE-HIGH SPINE	4
	JUNIPERUS	3
	ZEA	3
	SARCOBATUS	1
	INDETERMINATE	11
	GRAMINEAE	3
	"CHENO-AMS"	10
	COMPOSITAE-LOW SPINE	5
	UMBELLIFERAE	10
	ARTEMISIA	42
	TOTAL	100

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
195		
	UMBELLIFERAE	2
	INDETERMINATE	21
	SARCOBATUS	1
	ARTEMISIA	78
	ERIOGONUM	3
	GRAMINEAE	4
	JUNIPERUS	4
	PINUS	8
	"CHENO-AMS"	17
	COMPOSITAE-LOW SPINE	19
	CLEOME	20
	COMPOSITAE-HIGH SPINE	23
	TOTAL	200
196		
	INDETERMINATE	45
	ARTEMISIA	79
	JUNIPERUS	2
	EPHEDRA NEVADENSIS-TYPE	1
	"CHENO-AMS"	14
	ERIOGONUM	1
	COMPOSITAE-HIGH SPINE	18
	PINUS	3
	COMPOSITAE-LOW SPINE	24
	CLEOME	12
	UMBELLIFERAE	1
	TOTAL	200
198		
	UMBELLIFERAE	3
	GRAMINEAE	11
	ERIOGONUM	1
	LINUM	1
	JUNIPERUS	7
	COMPOSITAE-LOW SPINE	21
	COMPOSITAE-LIGULIFLORAE	1
	"CHENO-AMS"	11
	QUERCUS	1
	ARTEMISIA	82

POLLEN ANALYSIS SITE 5MT4644

SAMPLE NUMBER	TAXON	COUNT
	CELTIS	1
	COMPOSITAE-HIGH SPINE	14
	INDETERMINATE	28
	PINUS	3
	TOTAL	185
201		
	CLEOME	3
	UMBELLIFERAE	3
	PINUS	7
	GRAMINEAE	2
	ERIOGONUM	1
	JUNIPERUS	4
	"CHENO-AMS"	26
	ARTEMISIA	38
	COMPOSITAE-HIGH SPINE	5
	POLYGONUM	1
	INDETERMINATE	10
	TOTAL	100
202		
	INDETERMINATE	15
	ZEA	1
	PINUS	5
	COMPOSITAE-LIGULIFLORAE	1
	ERIOGONUM	3
	OPUNTIA	1
	"CHENO-AMS"	18
	ARTEMISIA	87
	POLYGONUM SAWATCHENSE-TYPE	2
	SPHAERALCEA	1
	COMPOSITAE-HIGH SPINE	5
	JUNIPERUS	6
	COMPOSITAE-LOW SPINE	29
	TOTAL	174
203		
	GRAMINEAE	2

transported. However, the occurrence of such a large frequency of Ephedra pollen in a single locality within the pitstructure suggests the probability that Ephedra was utilized here. Ephedra pollen also occurs near the central portion of the area behind the wingwalls (a high density area for economic pollen), as well as north of the east wingwall. Small frequencies are also present near the west wingwall, in the ceramic area along the west wall, in the area north of the hearth near the pit (or sand repository), near both warming pits (or pot rests), and scattered in the northern section of the pitstructure.

In the ethnobotanical literature, Ephedra is documented as having been used as a medicine (Robbins et al. 1916; Whiting 1939). Stevenson (1915) also states that Ephedra was occasionally steeped in hot water and drunk as a beverage. It is possible that the large quantity of Ephedra pollen west of the hearth is indicative of the utilization of Ephedra for either medicinal purposes or as a beverage. The distribution of small quantities of Ephedra throughout the pitstructure may relate either to the utilization of Ephedra within the pitstructure, or to the distribution of this pollen type by the wind.

Both high-spine Compositae (excluding Artemisia) and Cheno-am pollen were considered to be primarily ambient or background pollen types in this pitstructure. They occur with regularity throughout the pitstructure and are fairly consistent in their frequencies. In a few instances, however, large quantities of high-spine Compositae and Cheno-am pollen occur in Pitstructure 1 (figs. C.14 and C.15). Compositae pollen occurs in high frequencies east of the hearth (31 percent) and in samples west of the hearth (46 percent). Cheno-am pollen occurs in high frequencies east of the hearth (39 percent) and near the west wall (38 percent). High-spine

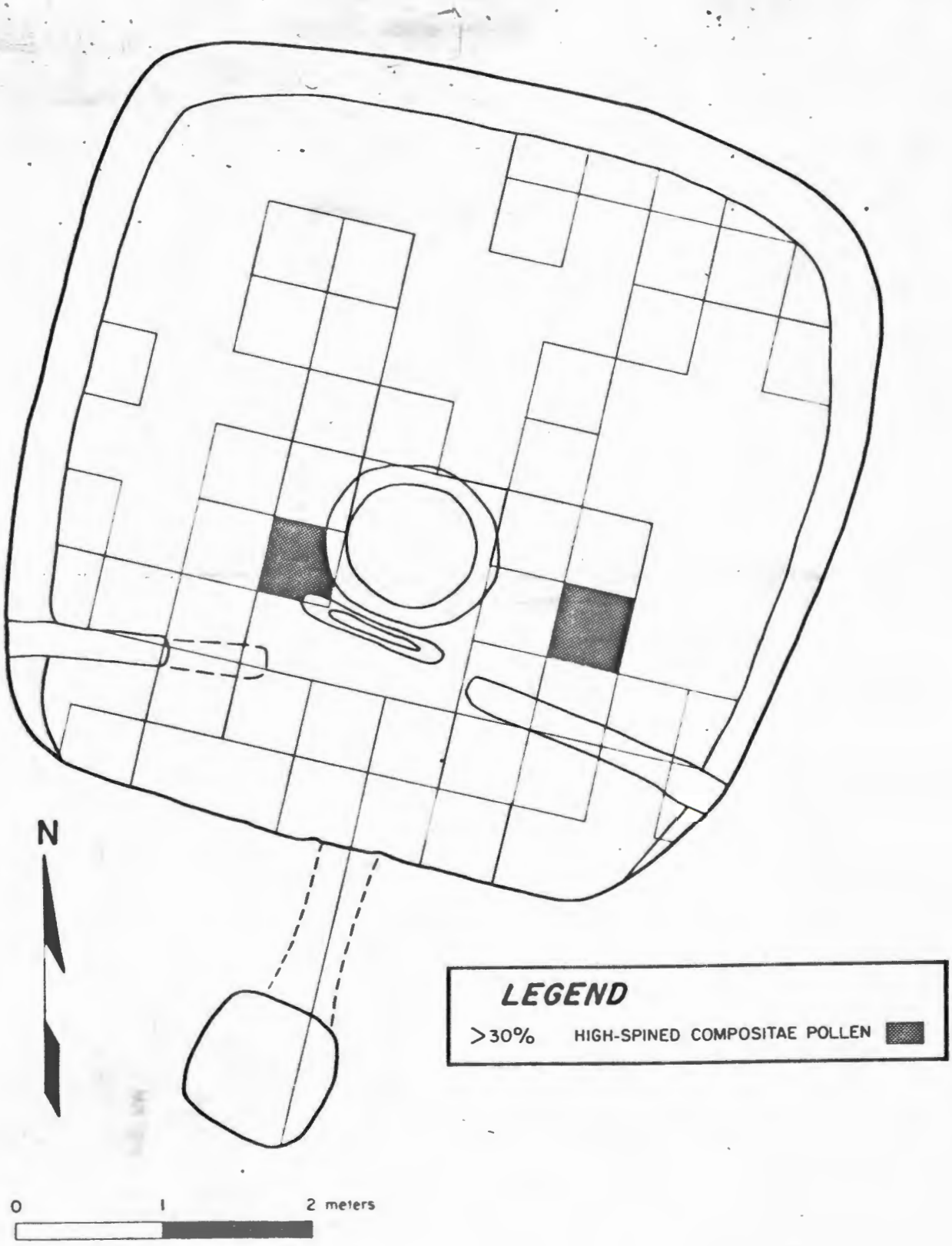


Figure C.14 Occurrence of high-spined Compositae pollen in high frequencies (over 30 percent) on the floor of Pitstructure 1.

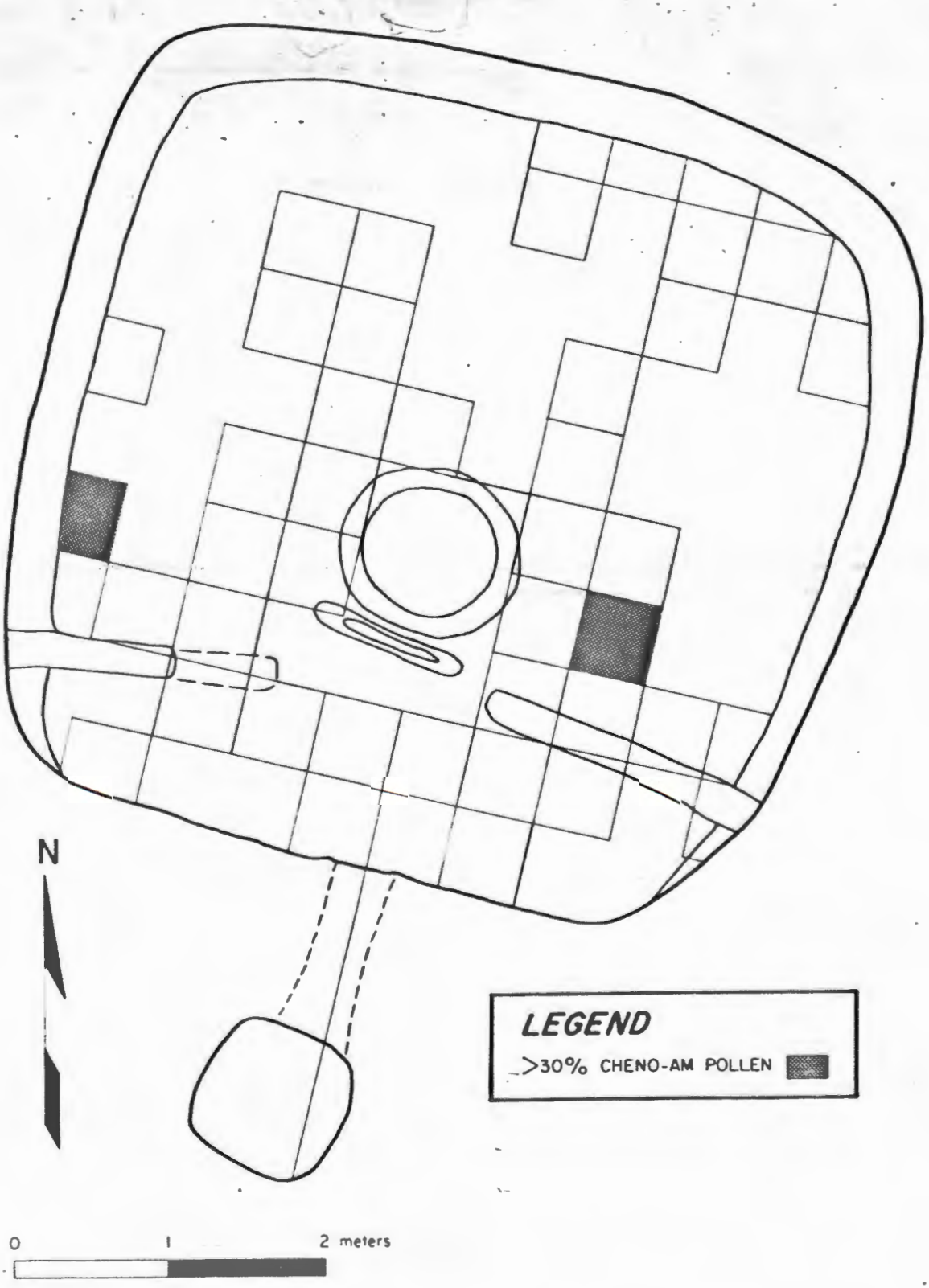


Figure C.15 Occurrence of Cheno-am pollen in high frequencies (over 30 percent) on the floor of Pitstructure 1.

Compositae and Cheno-am pollen both occur in large frequencies in the same 0.25 m^2 grid unit east of the hearth. This particular location contains neither large quantities of other economic pollen types nor a large variety of economic pollen types. A small concentration of ceramics is noted in this area, however. The Cheno-am pollen concentration near the west wall of the pitstructure occurs in association with the ceramic fragments in that area, while the high frequency of high-spine Compositae pollen occurs closer to the hearth. It seems quite probable that Cheno-am and Compositae were used in at least some areas of the pitstructure, and/or were stored in ceramic vessels.

Atriplex and Amaranthus (both Cheno-ams) have been used by the Hopi (Whiting 1939). Atriplex was burned and the ashes used as alkali in making blue corn meal. Amaranthus greens were cooked while Amaranthus seeds were eaten. The large quantities of Cheno-am pollen observed east of the hearth and near the west wall may be an indication of the use of one or both of these plants.

High-spine Compositae pollen encompasses many genera, several of which have been cited in the ethnobotanical literature as having been utilized. As an example, the Hopi use Chrysothamnus (rabbitbrush) for various purposes including use of the yellow flowers as a dye (Whiting 1939). Helianthus flowers are ceremonially ground by the Zuni (Stevenson 1915), while the seeds are eaten by the Hopi (Whiting 1939). Although it is not possible to identify the Compositae genus used in this pitstructure, the large quantities of high-spine Compositae pollen to the east and west of the hearth point to the use of one or more plants within the Compositae family.

Although low-spine Compositae pollen was present in samples from the floor of Pitstructure 1, this pollen is wind-pollinated and is therefore deemed to be ambient or background pollen.

Conclusions

Within Pitstructure 1, the areas that contain the largest variety of economic pollen and also the largest frequencies of the individual economic pollen types--behind the wingwalls, in front of both wingwalls, around the hearth, and in the vicinity of warming pits (or pot rests)--are logical areas for the preparation, cooking, or storage of plants.

Pollen from food-related plants (*Zea*, *Cucurbita*, *Cleome*, *Typha*, *Portulaca*, *Opuntia*, and *Allium*) occur with regularity and in larger frequencies around the hearth, along the north side of the east wingwall, in the central portion of the area behind the wingwalls, and in the corner where the west wingwall joins the wall of the main chamber. The grid units on the north side of the hearth contain more pollen from this group than do the units on either the east or the west sides of the hearth. Although the frequencies are lower, these pollen types also occur along the north wall and in the northeast corner of the pitstructure and near the warming pit (or pot rest~~s~~) in the northeast quadrant. *Zea* pollen is also observed in a diagonal line between the hearth and the warming pit (or pot rest) in the northwest quadrant of the pitstructure. The concentrations of pollen from plants that are known food items occur around the hearth, near the east wingwall, behind the wingwalls, and in the corner near the west wingwall. These concentrations appear to be indicative of the intense utilization (preparation, storage, or cooking) of these foods within these areas. Similar pollen concentrations occur

near the warming pit (or pot rest) in the northeast quadrant. More diversity in pollen types is noted in the northeast quadrant of the pitstructure than in the northwest quadrant. Allium is the exception among the food-related pollen types. It is noted only in the corner where the east wingwall joins the wall of the main chamber. This larger quantity of Allium pollen in this single location appears to be indicative of the storage of wild onions.

Umbelliferae pollen has not been included in the discussion of food items since the presence of large quantities of Umbelliferae pollen cannot be explained through analogy with either the ethnobotanical literature or other archaeological pollen studies. The pattern of distribution of Umbelliferae pollen within the pitstructure, however, is similar to that of other food-related pollen types. The larger frequencies of Umbelliferae pollen occur to the east and west of the hearth, in the corner north of the west wingwall, along the east wingwall, behind the wingwalls, and near the warming pit (or pot rest) in the northeast quadrant of the pitstructure. This distribution of the pollen suggests the utilization of Umbelliferae as a food item.

The concentration of Ephedra pollen west of the hearth implies that Ephedra may have been utilized, possibly either as a medicine or as a beverage.

The concentration of Cheno-am pollen in association with ceramic concentrations east of the hearth and near the west wall could imply a connection either with the ceramics, or with both the hearth and the ceramics. In either case, it is apparent that at least one member of this group of plants was used in the pitstructure.

The concentrations of Compositae pollen to the east and west of the hearth are also associated with ceramic concentrations. Ethnographic inferences suggest that the flowers or seeds of a member of the Compositae family may have been stored in vessels in the pitstructure, or the seeds may have been parched in the hearth.

Sphaeralcea pollen occurs in association with the hearth and the area behind the wingwalls. Sphaeralcea pollen also occurs against the north wall of the pitstructure. The distribution of Sphaeralcea pollen within the pitstructure is roughly similar to that of Opuntia pollen, with the exception that Sphaeralcea pollen does not occur near the northeast warming pit (or pot rest). In the ethnobotanical literature, Sphaeralcea is generally considered to be a medicinal plant.

Nicotiana pollen was found primarily in the eastern portion of the pitstructure north of the wingwall. This distribution is unlike any other pollen type in the pitstructure. Nicotiana pollen was associated with the north and east sides of the hearth, as well as with the corner where the west wingwall and west wall of the main chamber join. The presence of Nicotiana pollen probably represents the smoking of native tobacco within the pitstructure.

Some areas of the pitstructure--such as most of the northwest corner, (which contained lithic debris) and a large area along the east wall--did not contain sufficient pollen to allow a full pollen count. These locations are as important in defining the limits of activity areas as are the locations containing large amounts of pollen.

Several of the economic pollen types including Zea, Cleome, and Umbelliferae were present in almost every countable sample from the pitstructure. It is possible that activities within the pitstructure may

have redistributed a portion of the pollen present, thus complicating the definition of precise activity areas.

In addition to determining use and activity patterns within the pitstructure, it was hoped that this study would help to guide future sampling strategies in the DAP study area. Based on the data generated by the comprehensive study of this pitstructure floor, a suite of samples that are representative of the primary areas that yield evidence of "economic" pollen has been selected (fig. C.16). This suite of samples is recommended as a base from which to work--not as an exclusive list of pollen samples to be taken. The purpose of recommending a minimum suite of samples as base samples is to maximize the amount of information that can be gained through the analysis of a minimum number of samples. This approach is an attempt to work within the economic constraints placed on most archaeological projects. This sampling strategy has been developed for use in Anasazi pitstructures. This design could easily be modified to meet the requirements of other culture areas. A second purpose of the development of this sampling strategy is to facilitate comparative studies by encouraging consistency in the sampling of pitstructures.

The area behind the wingwalls should be divided into three sections, with one sample taken toward the corners behind each wingwall (samples 1 and 3, fig. C.16) and the other sample taken in the central area (sample 2). These samples should be taken from a relatively large floor area as they are meant to represent large activity areas.

In the main chamber of the pitstructure, the two wingwalls should be divided into two units each, with two samples (samples 4 and 2) taken in the corners where the wingwalls join the walls of the main chamber (about 0.5 m by 0.5 m) and the other two (samples 5 and 6) taken along the wing-

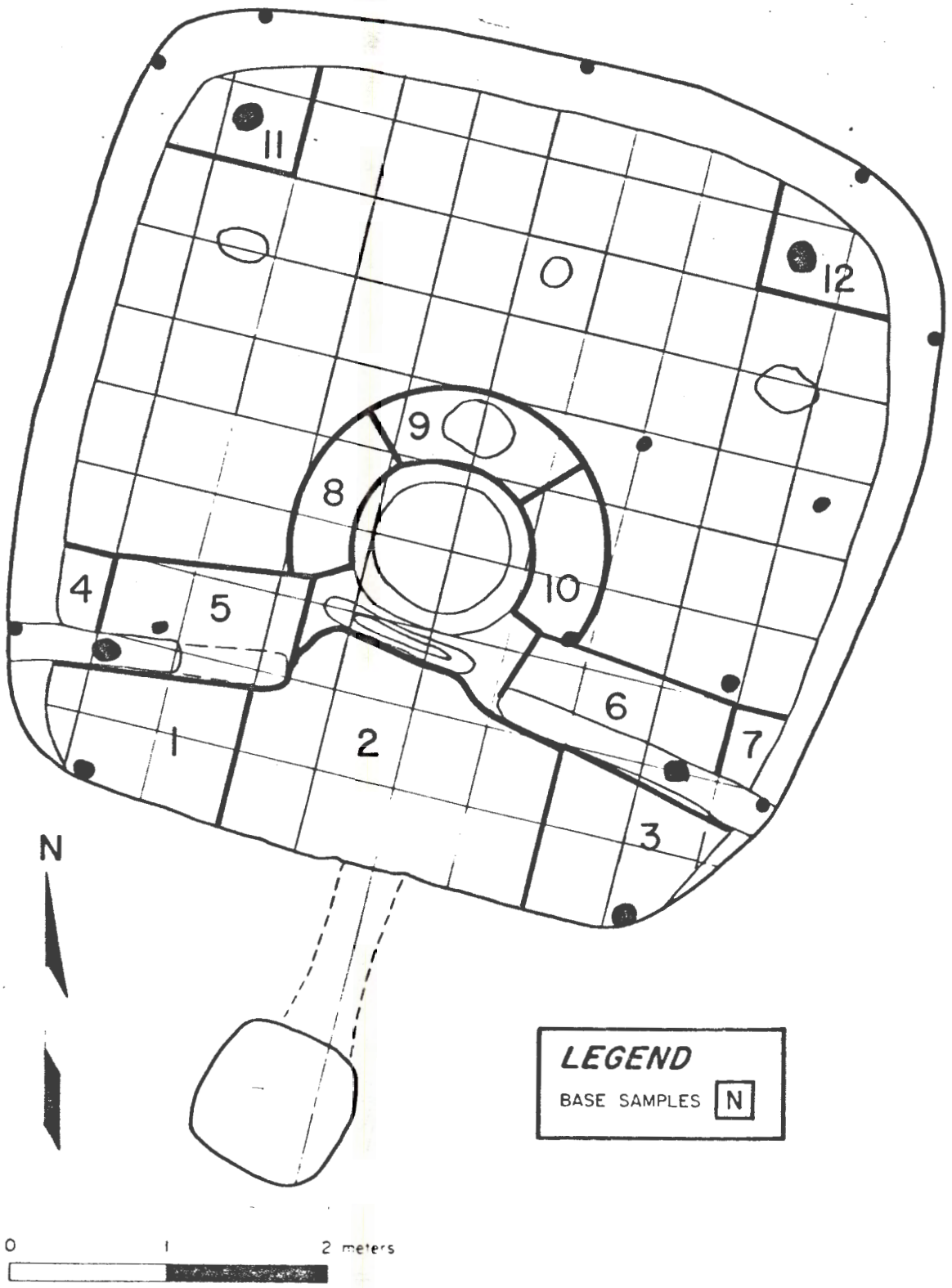


Figure C.16 Location of suggested "base" samples for minimum pollen sampling of an Anasazi pitstructure.

walls. The samples along the wingwalls in general should encompass a relatively large area but should extend no more than 0.5 m away from the wingwall in an effort to reflect the activities along the wingwalls. The area around the hearth should be divided into three areas if a deflector is present, and four if no deflector is present. Separate samples should be taken along the east, north, west (samples 8, 9, and 10, respectively), and south sides of the hearth, with the south side omitted if it contains a deflector. Two control samples should be taken from the remaining two corners of the pitstructure (samples 11 and 12) to establish ambient pollen frequencies. This represents a suite of 12 pollen samples as a sampling base. All of the samples recommended thus far are associated with architectural details of the pitstructure.

Samples associated with features within the pitstructure must necessarily vary from one structure to another. Features should be sampled if they relate to the cooking, preparation, or storage of vegetal materials. Examples of such features include the following: warming pits, pot rests, in situ metates, manos or concentrations of manos, ceramic concentrations (or areas containing reconstructible vessels), whole vessels, and cists. Samples should be taken around such features as warming pits, pot rests, in front of in situ metates, under such features as manos and ceramics, and on the interior of cists.

It should be reiterated that the interpretations of the pollen data are preliminary at this point. The final interpretation of the activity areas within this pitstructure will await the integration of the pollen and macrobotanical studies. It is only then that we will begin to understand the patterning of activities that took place within this pitstructure.

INTENSIVE ANALYSIS OF POLLEN SAMPLES FROM THE ROOF FALL STRATUM IN PITSTRUCTURE 1

Introduction

In addition to the samples from the floor of Pitstructure 1, samples from the roof fall of Pitstructure 1 were analyzed for their pollen content.

The roof fall (Stratum 7) from Pitstructure 1 was sampled for pollen by collecting one sample from each 1 m^2 of area. Twenty-eight pollen samples were collected and analyzed. In figure C.17, shaded grid squares represent samples with sufficient pollen counts for calculating percentages. Individual sample pollen counts are given in table C.1. The samples from the roof fall serve two purposes in the pollen analysis of material from Pitstructure 1. First, they serve as upper controls for the floor of the pitstructure. That is, roof fall pollen distributions and quantities can be compared to those of the floor in an effort to identify natural versus cultural pollen distributions on the floor. Second, these samples represent a discrete living surface--that of the roof of this pitstructure. It is therefore possible to compare the pattern of distribution of pollen from economically important plants on the roof and with these on the floor. Evidence of pollen from economically important plants was found in the samples from the roof fall, and these pollen types frequently exhibited different patterns of distribution than those observed in the samples taken from the floor the pitstructure.

Results of Pollen Analysis

Zea pollen occurs in high frequencies near the center of the pitstructure (i.e., near the roof entry), as well as in the northwest

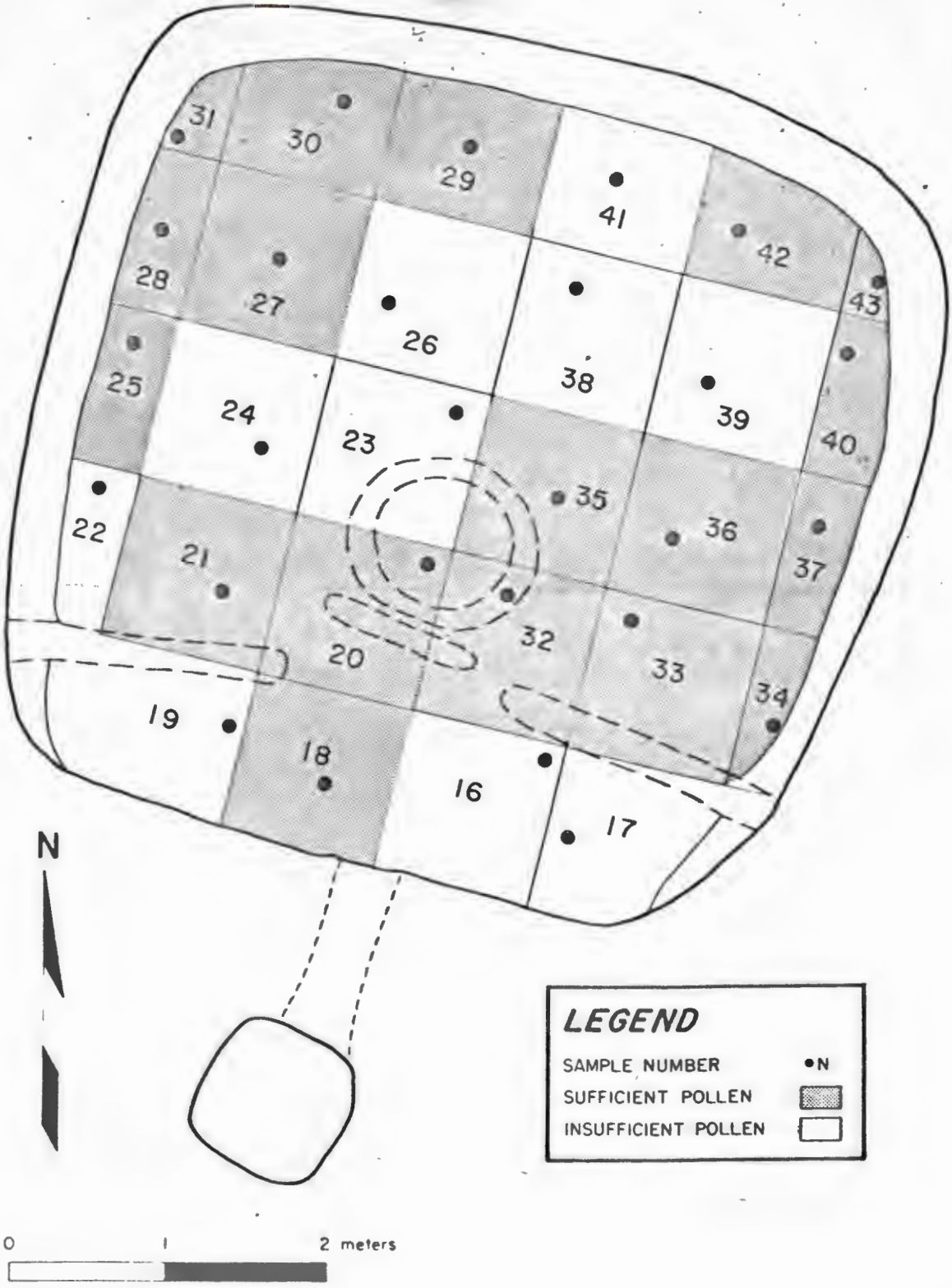


Figure C.17 Base map of Pitstructure 1 roof fall stratum showing the locations of pollen samples that contained sufficient pollen for analysis.

quarter of the roof (fig. C.18). A much smaller concentration was also observed in the northeast corner of the roof fall. This contrasts with the pattern of distribution of Zea pollen on the floor, where high frequencies of Zea pollen occur in areas that are devoid of Zea pollen in the roof fall.

Cucurbita pollen occurs in association with Zea pollen in three of the 1-m^2 grid units sampled (fig. C.19). The Cucurbita pollen in the roof fall is noted in association with the entry, to the southwest of the entry, and in the northwest corner of the roof. It is possible that the Cucurbita pollen observed on the floor of this pitstructure represents pollen that entered the pitstructure through the entryway and was subsequently dispersed.

Opuntia pollen occurs in only two locations in the roof fall: near the south side of the entry and southwest of the entry (fig. C.20). These locations do not correspond with the pattern of distribution of Opuntia on the floor of the pitstructure.

Cleome pollen is observed in most of the samples from the roof fall (fig. C.21). This is also the case for the floor samples from this pitstructure. The pattern of concentration, however, is slightly different for the floor and the roof fall samples. By far the largest concentration of Cleome pollen in the roof fall occurs in the northeast corner of the roof. A pollen frequency of 46 percent is noted in that area. Other large concentrations of Cleome are scattered throughout the roof area, with clusterings occurring toward the east side of the roof, south of the entry, and in the northwest corner of the roof.

Sphaeralcea pollen is present in two locations in the roof fall: southwest of the entry, and in the northwest corner of the roof

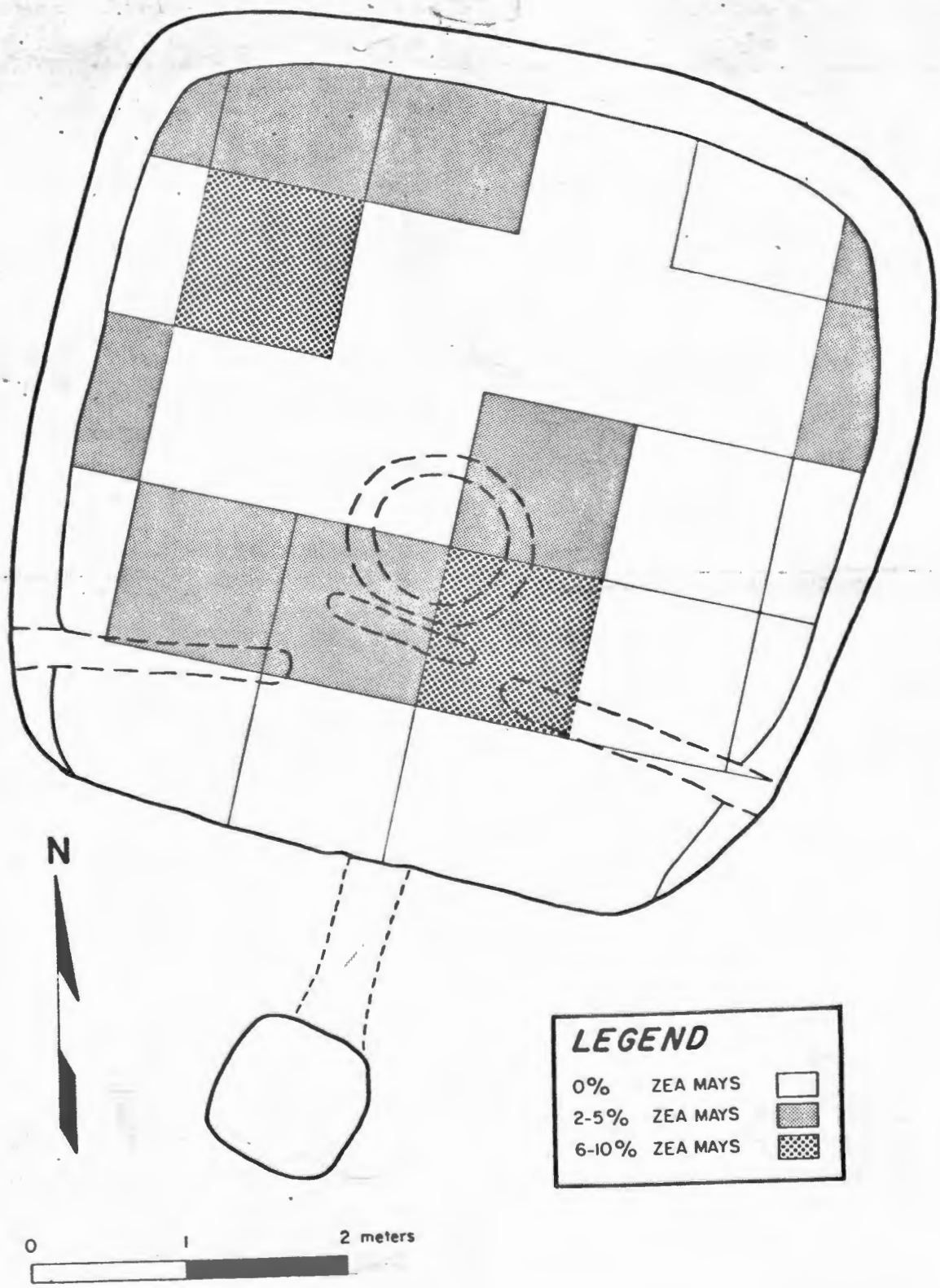


Figure C.18 Horizontal distribution of Zea pollen in the Pitstructure 1 roof fall stratum.

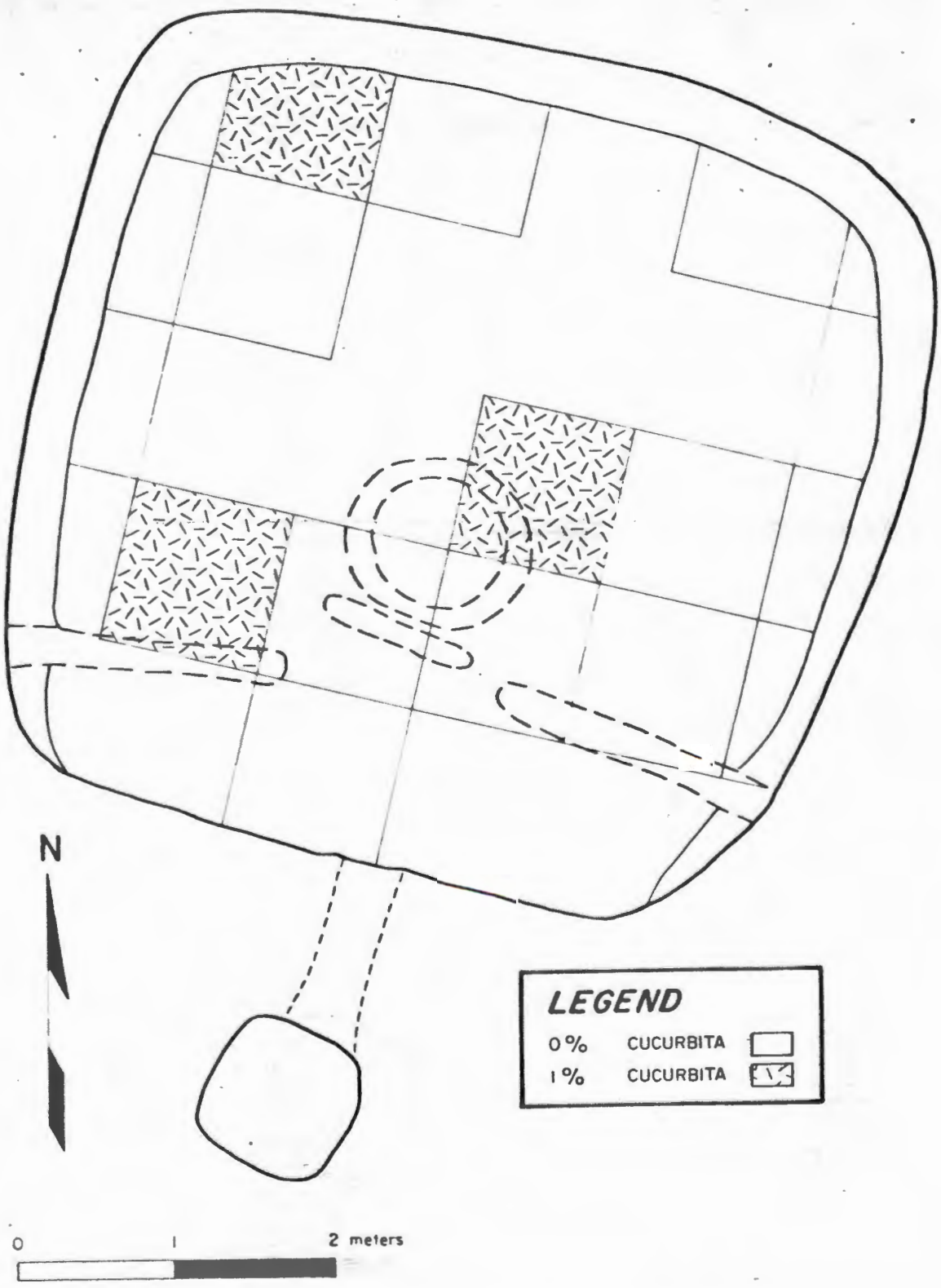


Figure C.19 Horizontal distribution of Cucurbita pollen in the Pitstructure 1 roof fall stratum.

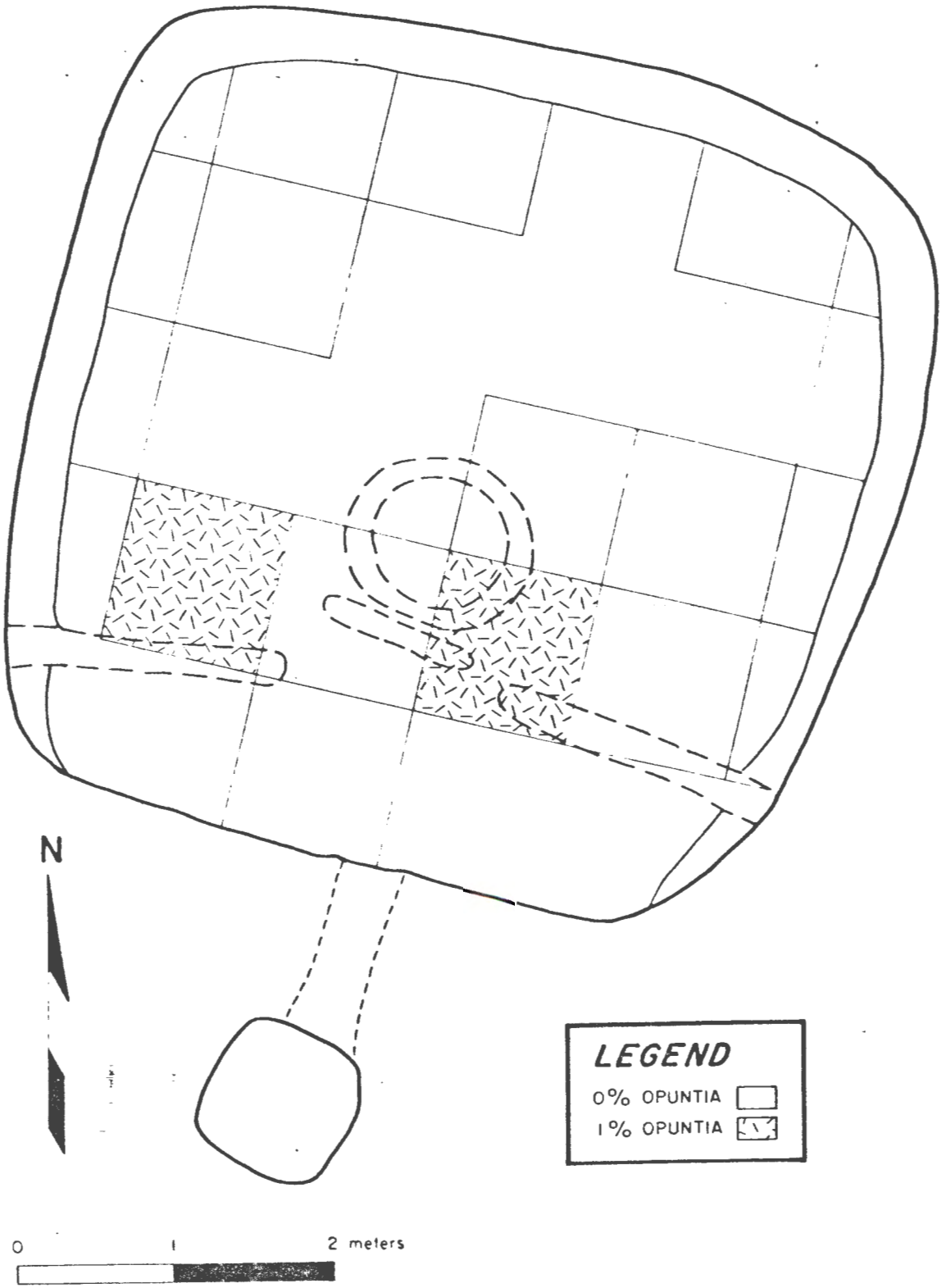


Figure C.20 Horizontal distribution of Opuntia pollen in the Pitstructure 1 roof fall stratum.

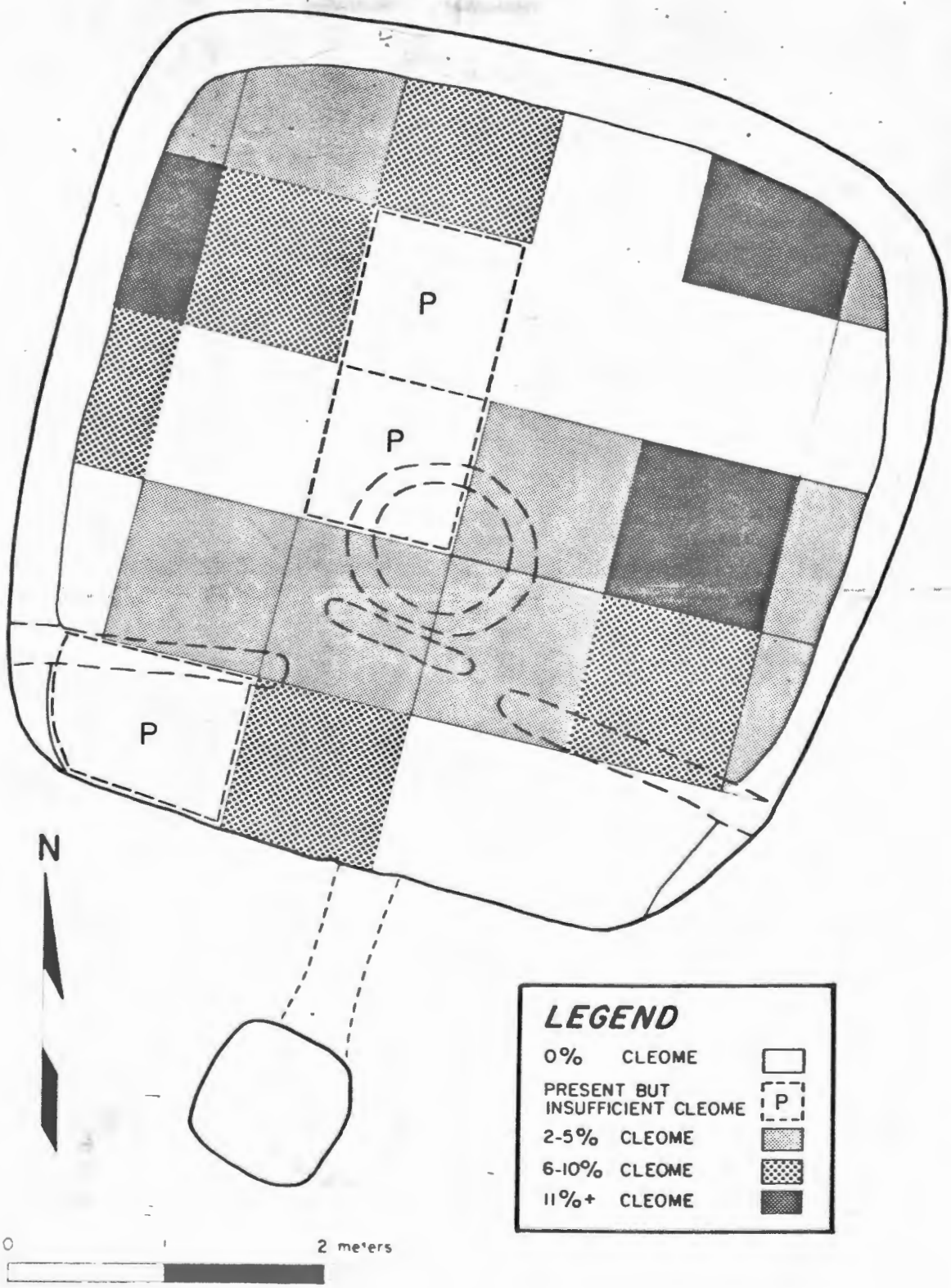


Figure C.21 Horizontal distribution of Cleome pollen in the Pitstructure 1 roof fall stratum.

(fig. C.22). Sphaeralcea pollen occurs as only 1 percent or less of the pollen in each of the two locations in the roof fall, and similar frequencies are present in the floor samples. It does not appear that there is a causal relationship between the location of Sphaeralcea pollen in the roof fall samples and in the floor samples.

Ephedra pollen is quite readily wind dispersed and is expected to be a common element in the pollen record in southwest Colorado. Since it occurs in a rather large frequency west of the hearth in the floor samples (fig. C.13), the frequencies of Ephedra pollen in the roof fall samples are of particular interest. It was found that the area of the roof fall above the Ephedra concentration on the floor contains 1 percent or less Ephedra pollen (fig. C.23), compared with 34 percent in the floor sample. Thus, the comparison between the roof fall and floor samples indicates that Ephedra was probably being used or prepared west of the hearth on the floor of Pitstructure 1.

High-spine Compositae pollen ranges from 0 to 12 percent in the samples taken from the roof fall (fig. C.24) and appears to represent ambient pollen rain. None of these frequencies, however, approach the concentrations of high-spine Compositae pollen noted in the floor samples to the east and west of the hearth of this pitstructure. While the pollen samples from the roof fall do not indicate a pattern of utilization for Compositae on the roof of this structure, they do help to substantiate the probability that the large quantities of Compositae pollen noted in the floor samples are due to cultural activity.

Umbelliferae pollen is present in relatively small frequencies in samples from the roof fall (fig. C.25). This differs from the pattern of Umbelliferae pollen on the floor, where Umbelliferae pollen frequently

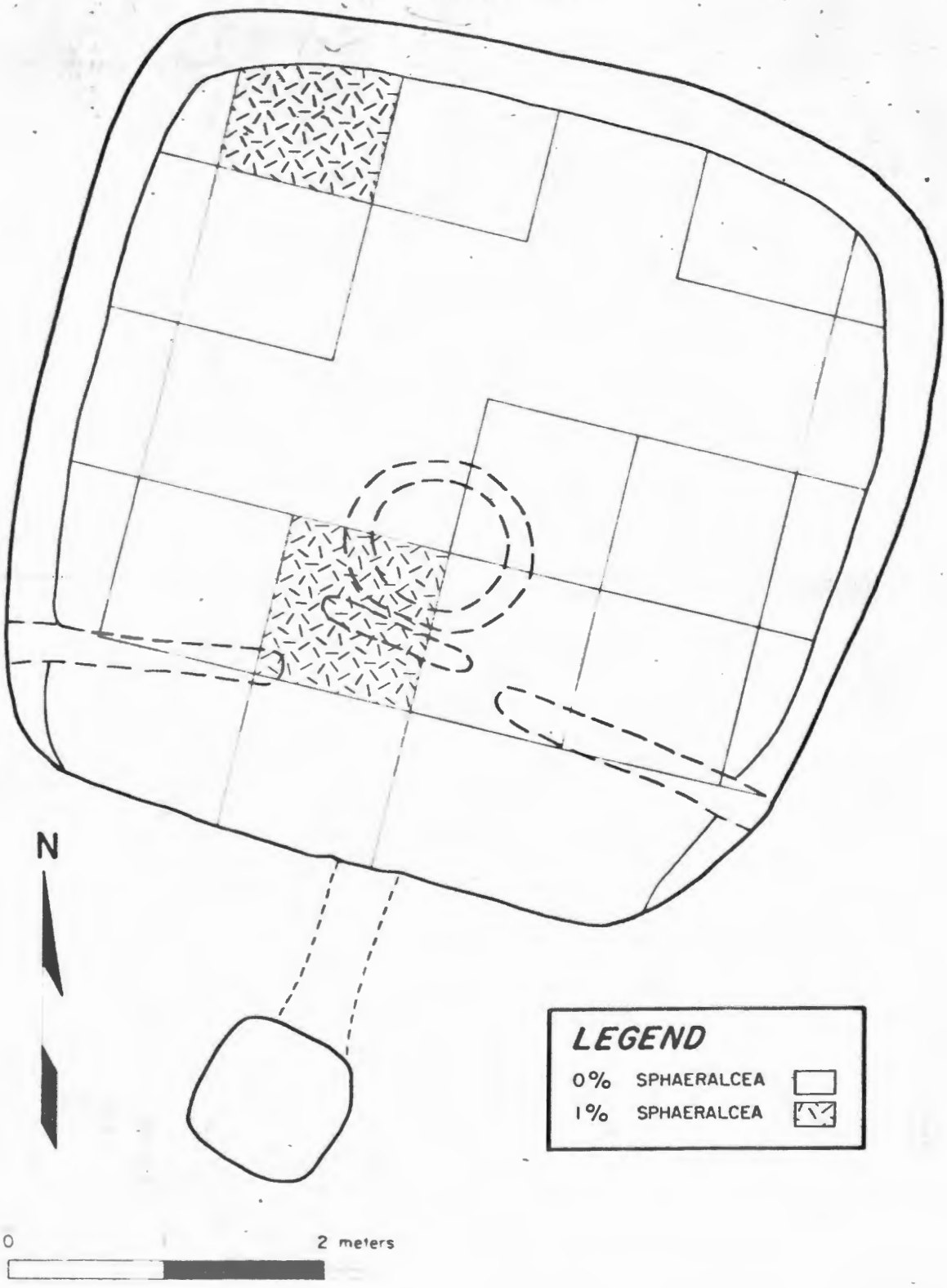


Figure C.22 Horizontal distribution of Sphaeralcea pollen in the Pitstructure 1 roof fall stratum.

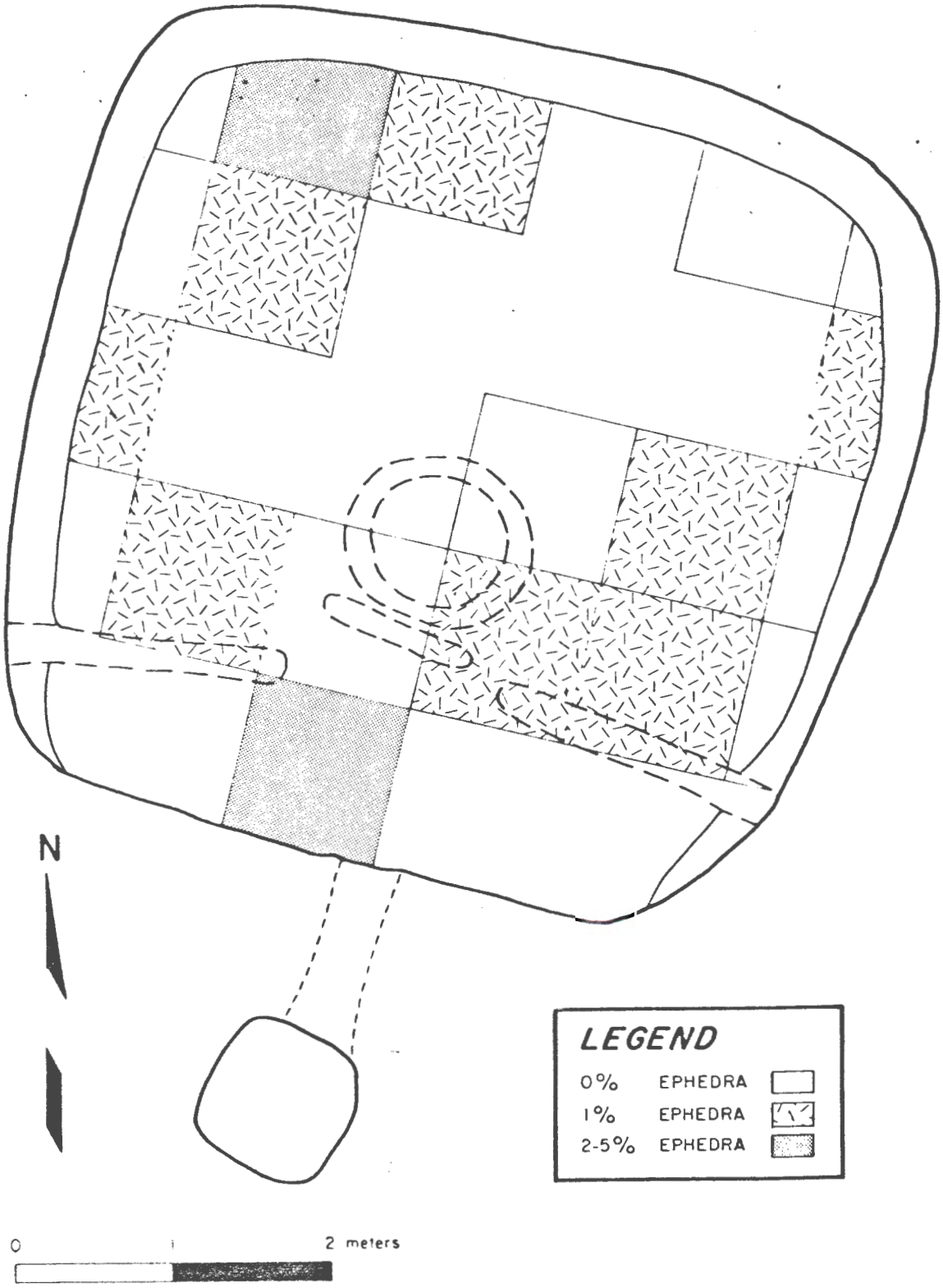


Figure C.23 Horizontal distribution of Ephedra pollen in the Pitstructure 1 roof fall stratum.

exceeds 5 percent of the pollen in a given sample, and is widely distributed throughout the pitstructure. The low frequencies and limited distribution of Umbelliferae pollen in the roof fall samples suggests that this pollen accumulated as part of the ambient pollen rain on the roof. The low frequencies in the roof fall also suggest that the high frequencies of Umbelliferae on the floor are indicative of use or processing of members of this family of plants on the floor of this pitstructure.

A single grain of Shepherdia pollen occurs in the roof fall against the west wall of the pitstructure (fig. C.26) and a single grain was found northwest of the hearth. No pollen of this genus occurs in any of the floor samples. It is unlikely that the use of Shepherdia berries would introduce pollen into the site. Therefore, the presence of Shepherdia pollen is probably due to accidental introduction of the pollen grain.

The Cheno-am frequencies are also rather variable (4 percent to 23 percent) among the roof fall samples and appear to represent ambient or background pollen deposition (fig. C.27). Large quantities of Cheno-am pollen occur in floor samples east of the hearth (39 percent) and against the west wall (38 percent). These pollen frequencies are considerably larger than those noted in any of the pollen samples from the roof fall, and appear to be associated with human activities.

Conclusions

In Pitstructure 1, the areas of the roof fall containing the largest variety of pollen taxa, as well as the largest frequency of pollen from economically important plants, include the area around the entry into the pitstructure, the northwest corner of the roof, and to a lesser extent, the northeast corner of the roof. The south edge of the roof contains by

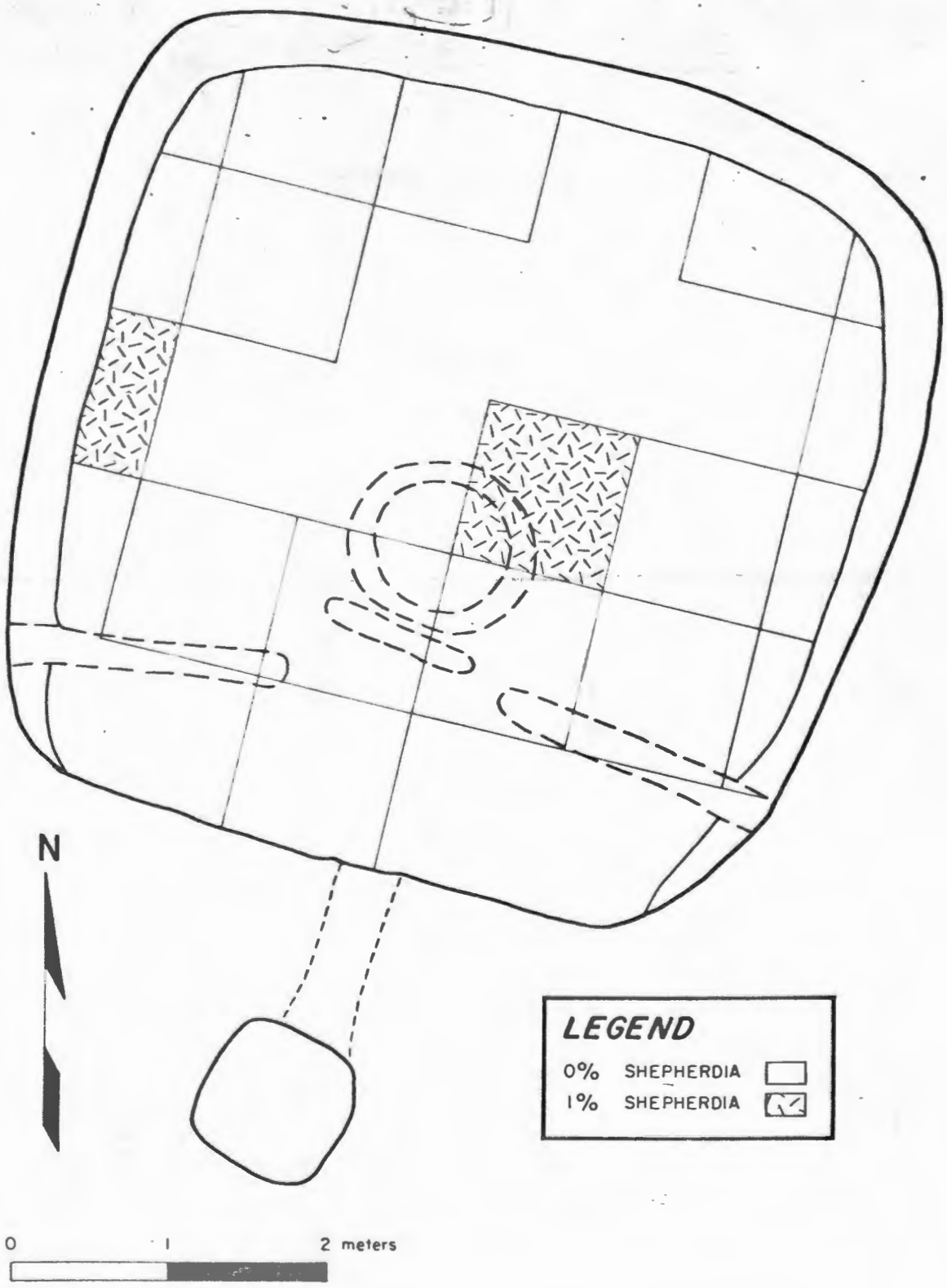


Figure C.26 Horizontal distribution of Sheperdia pollen in the Pitstructure 1 roof fall stratum.

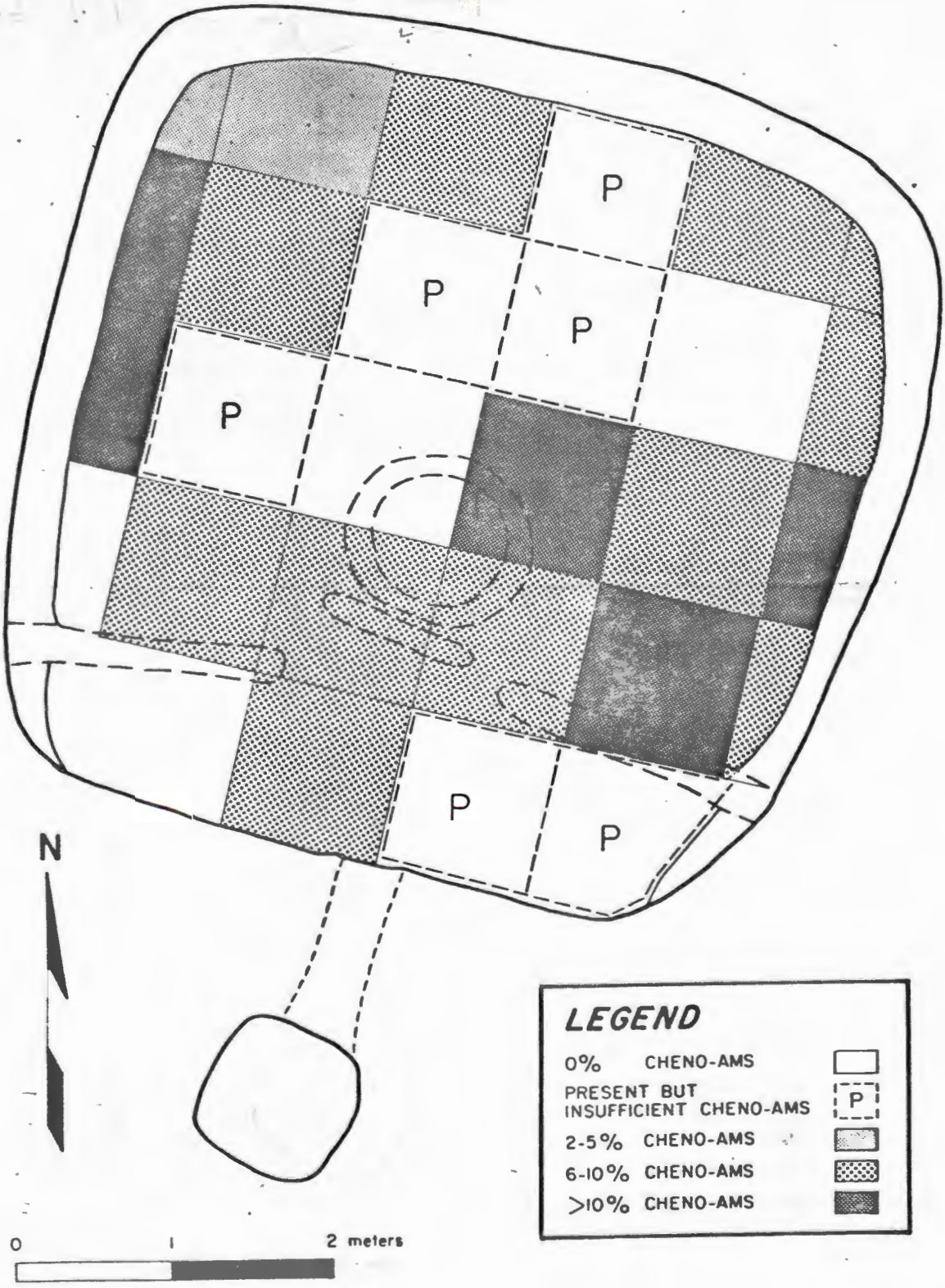


Figure C.27 Horizontal distribution of Cheno-am pollen in the Pitstructure 1 roof fall stratum, ~~Windy Wheat~~ Hamlet.

far the least amount of pollen from economically important plants, but several of these samples do not contain sufficient pollen for analysis.

Zea, Cucurbita, and Cleome are the major pollen taxa indicating use of the roof of this pitstructure as a living surface. Zea and Cucurbita pollen are relatively heavy and not easily wind transported. Their presence in the pollen assemblage of the roof fall is probably indicative of cultural activity on the roof. Cleome occurs as 46 percent of the pollen in the northeast corner of the roof, indicating that cultural activity on the roof may have been responsible for the occurrence of some of these pollen types in the roof fall stratum.

That pollen from economic plants occurs in large quantities in the vicinity of the entry into the pitstructure may indicate the transport of these plants from the fields or storage areas into the pitstructure. The plants also may have been temporarily laid near the entry to facilitate their transport into the pitstructure. Either of these factors could have acted to increase the quantity of economic pollen deposited in this location.

The larger quantities of economic plant pollen in the northeast and particularly the northwest corners of the roof may indicate preferred areas for short-term storage or drying of plants on the rooftop. It is also possible that these concentrations of pollen from economic plants occur as a result of inconsistent sampling of the roof fall stratum. All samples were taken at a relatively consistent depth below the present ground surface (because they were designed as upper control samples), rather than being taken consistently on the top of the roof fall or at a certain depth within the roof fall. This has evidently resulted in the analysis of samples from varying contexts within or near the roof fall

proper. This may have had a marked effect on the quantity of not only the pollen types associated with economic plants within the samples, but also on the overall quantity of pollen within the sample.

Nevertheless, the distribution of several pollen types from plants with known economic importance throughout these roof fall samples illustrates the importance of observing material from the upper living surface (i.e., the roof area) of pitstructures in addition to the more traditional examination of material from the floor. Examination of roof fall from other pitstructures will be necessary to confirm whether the distribution of the pollen from economic plants is structure specific or has continuity throughout a geographical area or has continuity through time.

ANALYSIS OF POLLEN FROM PITSTRUCTURE 2

Introduction

The sixteen pollen samples analyzed from Pitstructure 2 were collected from the floor, a pit (or sand repository) north of the hearth, and the bench (fig. C.28). The samples selected for analysis were chosen on the basis of information from pollen samples analyzed from Pitstructure 1. The floor proveniences examined within Pitstructure 2 were primarily associated with the wingwalls and hearth, areas that had contained large quantities of economic pollen in Pitstructure 1. The pollen data for each sample are presented in table C.1. The only sample that did not contain sufficient pollen for analysis was sample 204 (from the pit [or sand repository]).

Results of Pollen Analysis

The distribution of *Pinus* pollen is mapped on the floor (fig. C.29) because the largest frequencies (18 and 19 percent) of this pollen type were noted near the hearth, indicating possible stacking of *Pinus* wood and use of this wood as fuel. The frequencies of *Pinus* pollen in the rest of the pitstructure are relatively similar to one another and never exceed 7 percent.

Zea pollen is noted in several areas of the pitstructure, but always in relatively low frequencies (fig. C.30). The largest quantities of *Zea* pollen occur west and southwest of the hearth and along the back wall of the pitstructure behind the west wingwall. *Zea* pollen also occurs in front of the west wingwall, in the corner in front of the east wingwall, and near a metate at the back wall of the pitstructure. The pattern of

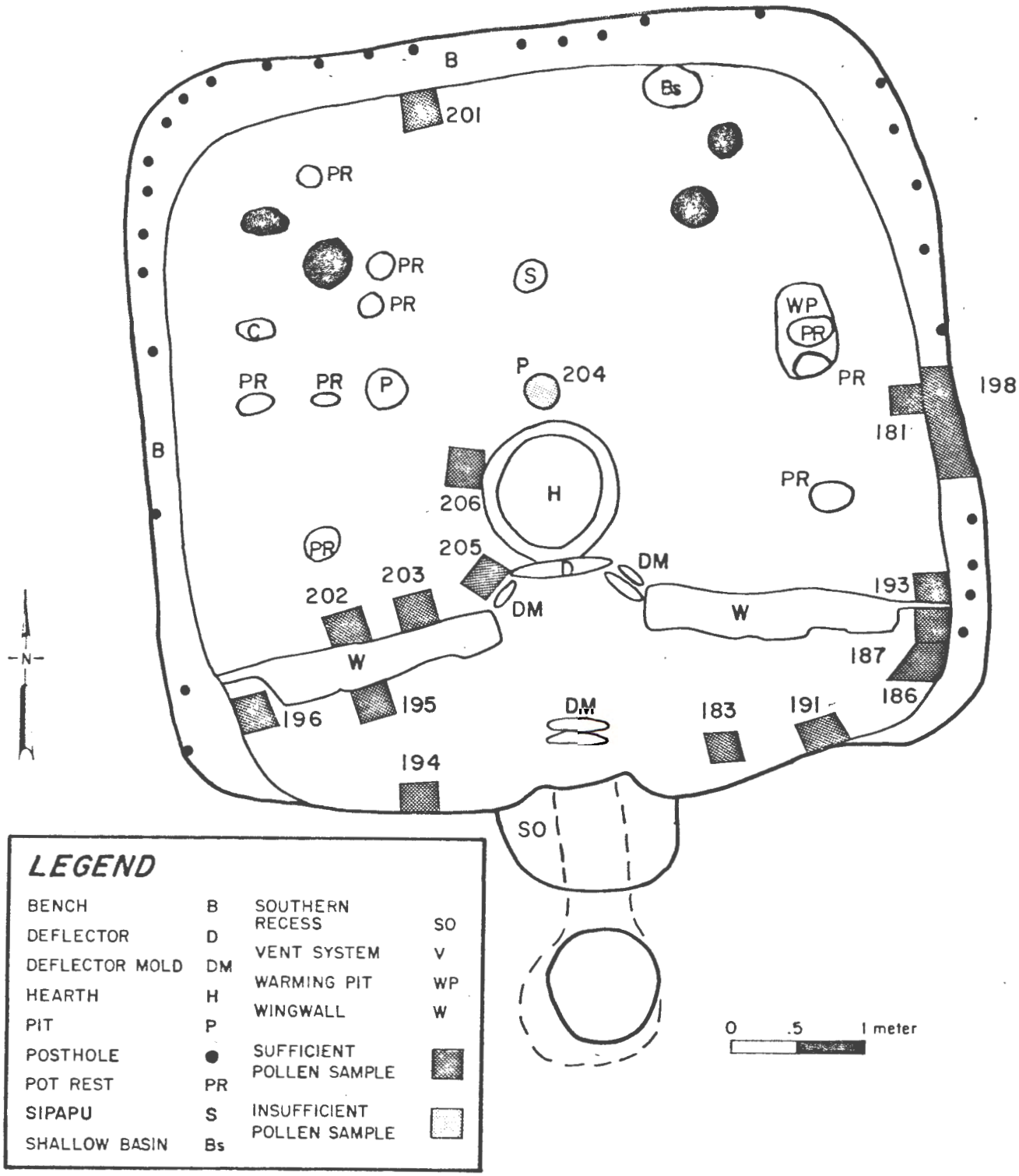


Figure C.28 Plan map of Pitstructure 2 showing features, major artifact clusters, and locations of pollen samples. ~~Windy Wheat Hamlet~~

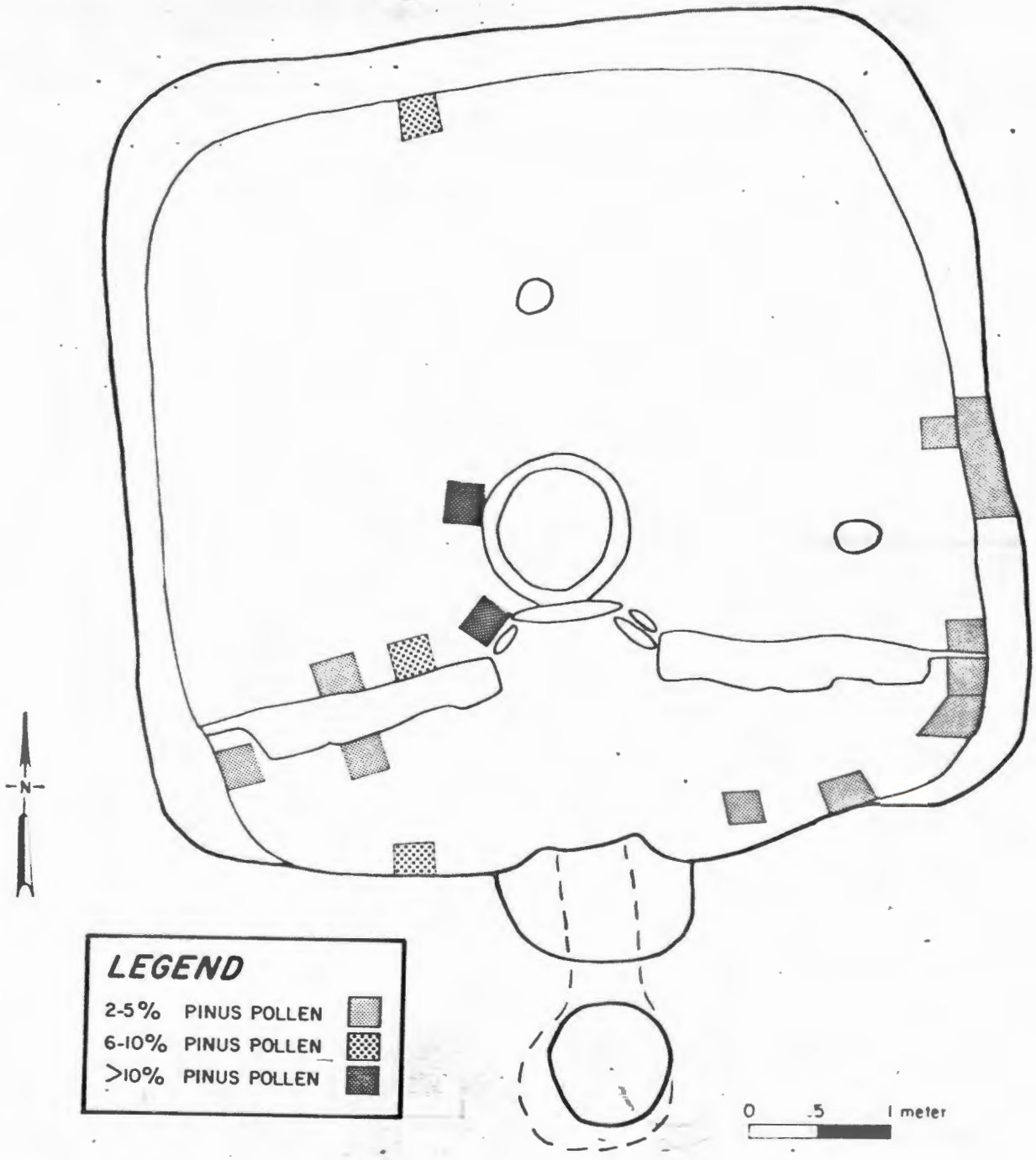


Figure C.29 Occurrence of Pinus pollen in pollen samples from Pitstructure 2, Windy Wheat Hamlet.

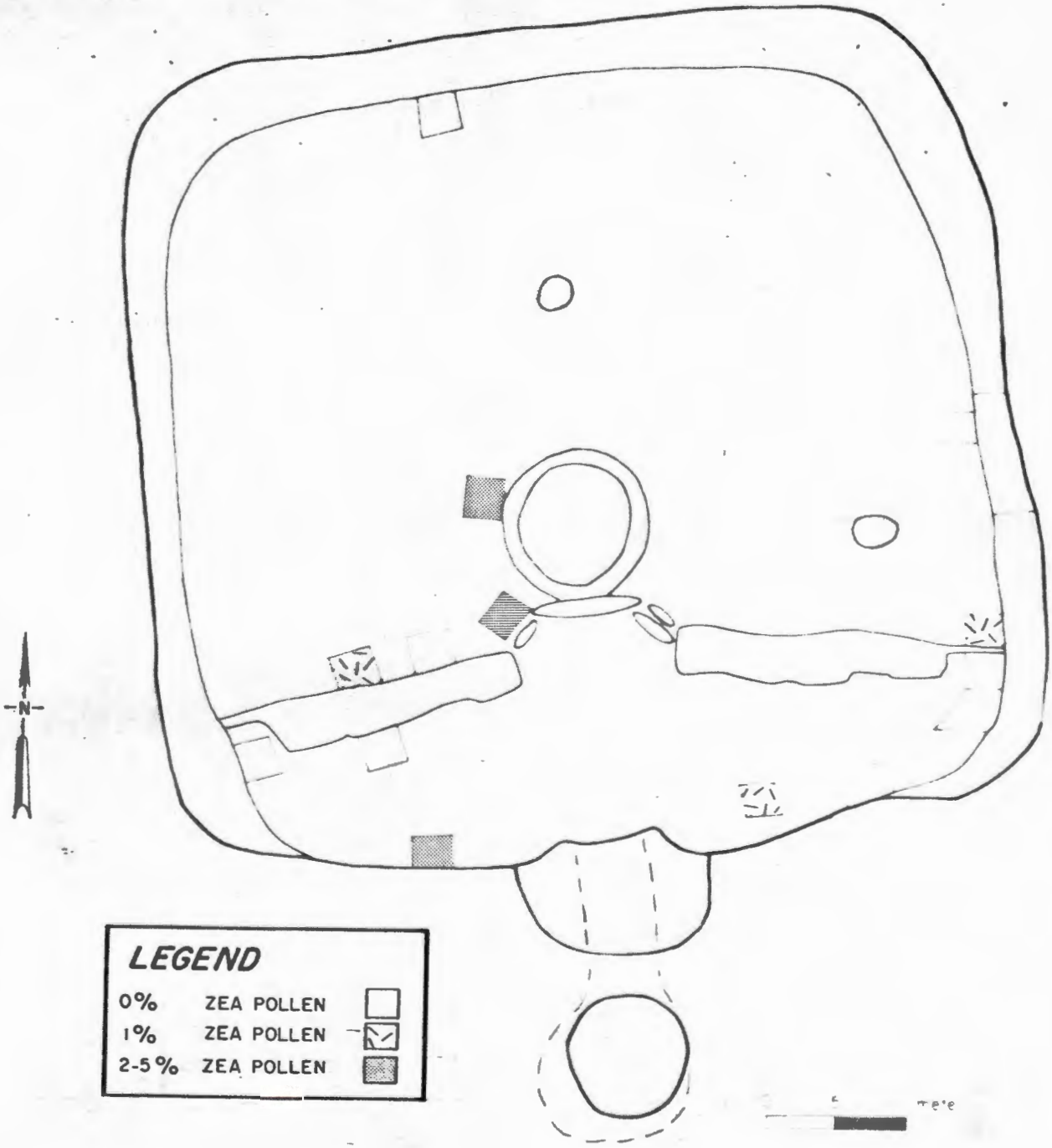


Figure C.30 Occurrence of Zea pollen in pollen samples from Pitstructure 2, ~~Windy Wheat Hamlet.~~

Zea pollen distribution in the pitstructure suggests that activities involving Zea were carried on near the hearth and both in front of and behind the wingwalls.

Cleome pollen is widely distributed throughout the pitstructure, with the larger quantities (10 and 20 percent) occurring behind the west wingwall and in the corner in front of the east wingwall (fig. C.31). Other areas with moderately high Cleome frequencies are located in front of and behind the west wingwall and on the bench along the east wall. The floor below the bench contains much less Cleome pollen than does the bench. The entire area behind the east wingwall contains slightly less Cleome pollen than the area behind the west wingwall. This distribution pattern suggests that the most intense utilization of Cleome occurred near the wingwalls, although Cleome is also present throughout the pitstructure.

Linum pollen is present only in the bench sample along the east wall (fig. C.32). While this indicates the presence of Linum in the pitstructure, there is little evidence to suggest a pattern of its distribution. The only other evidence of Linum pollen from the DAP study area comes from a bench sample at Site 5MT2193.

Evidence of single grains of Onagraceae (fig. C.33) and Sphaeralcea (fig. C.34) pollen is also present in this pitstructure. The Onagraceae pollen occurs near the back wall and the Sphaeralcea pollen occurs north of the west wingwall.

Opuntia pollen is found in three samples from Pitstructure 2, including one west of the hearth, one in front of the west wingwall, and one in the corner in front of the east wingwall (fig. C.35). These areas also contain evidence of other plants of documented economic importance.

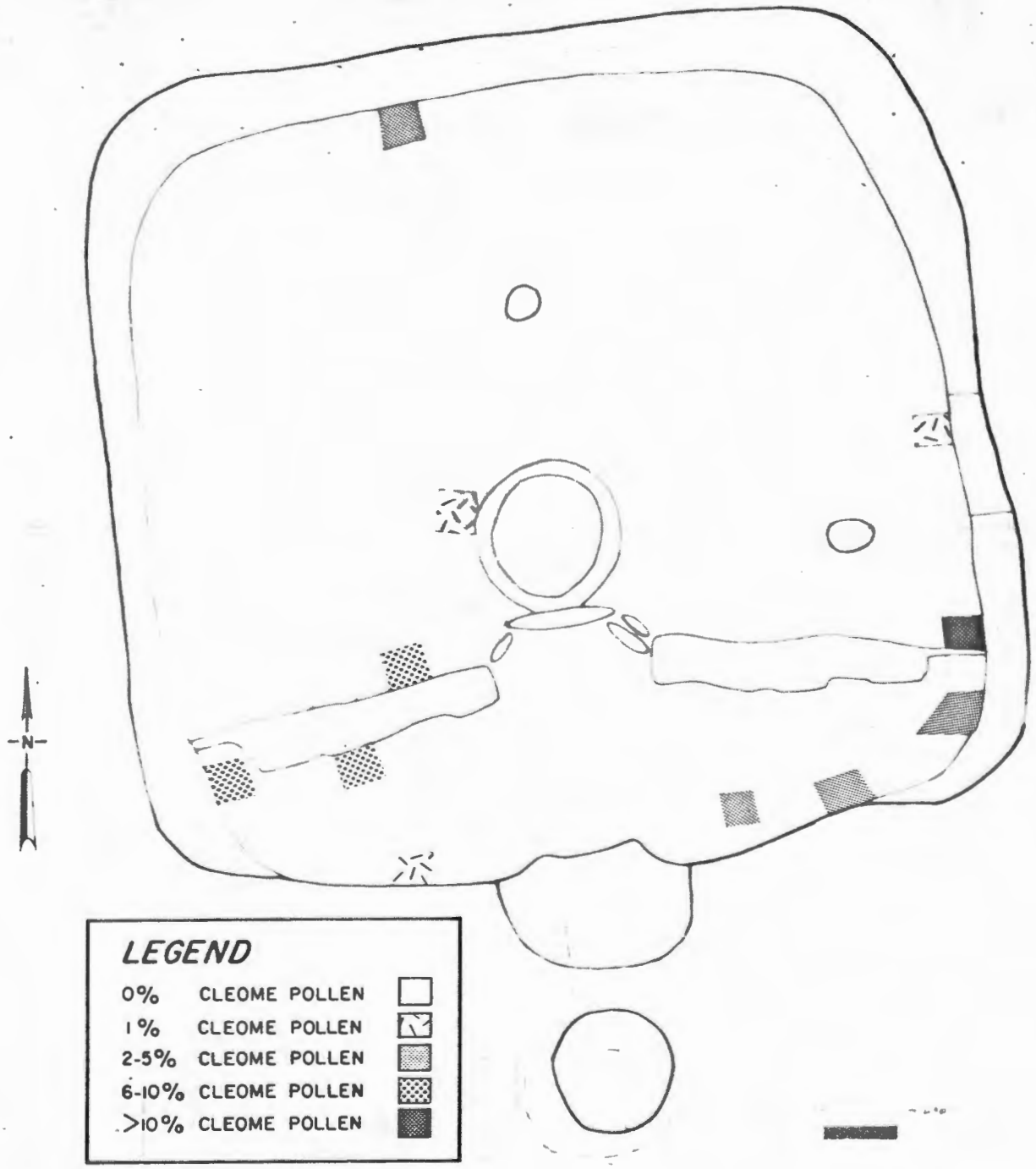


Figure C.31 Occurrence of Cleome pollen in pollen samples from Pitstructure 2, ~~Windy Wheat Hamlet.~~

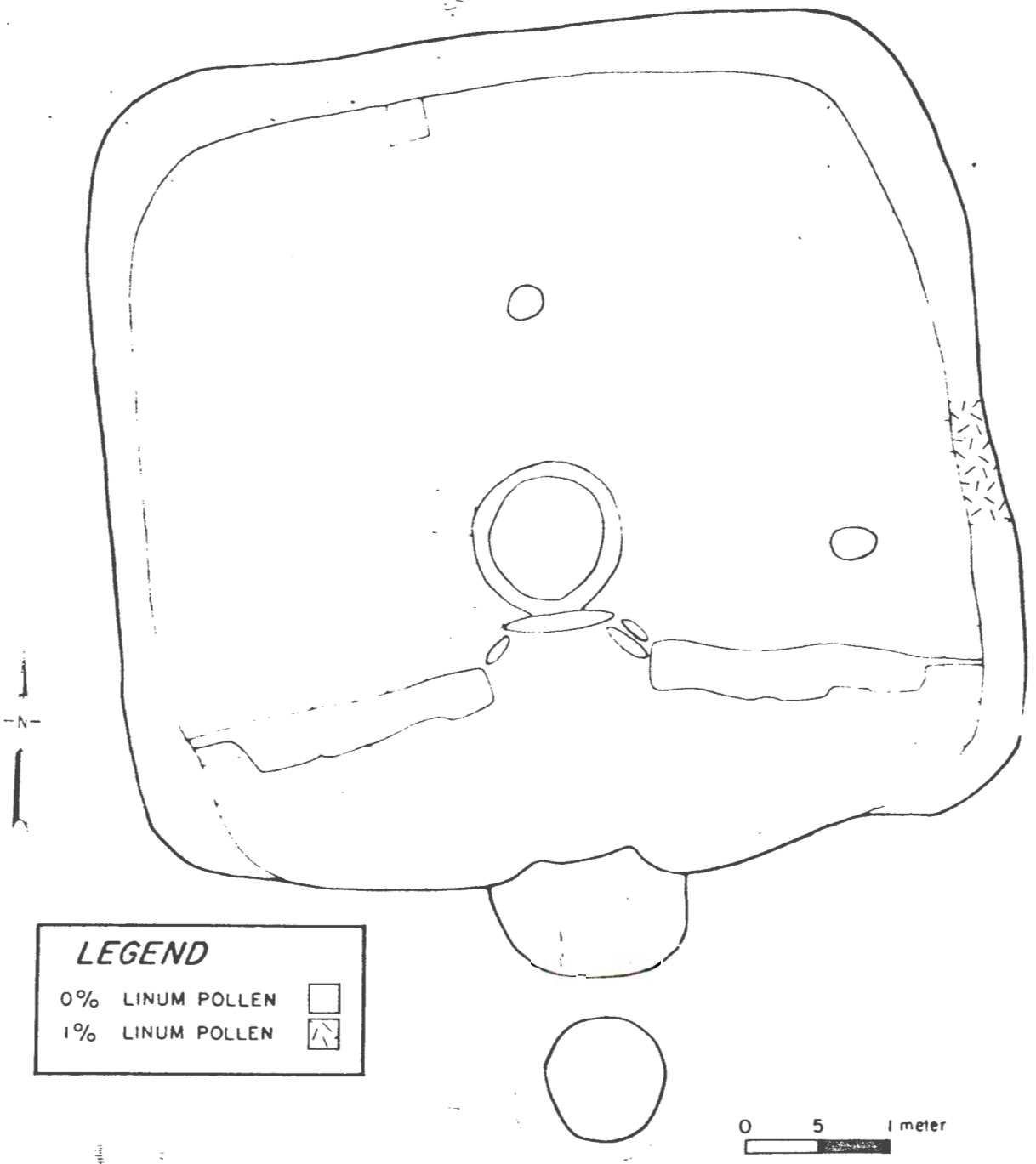


Figure C.32 Occurrence of Linum pollen in pollen samples from Pitstructure 2, ~~Windy Wheat Hamlet.~~

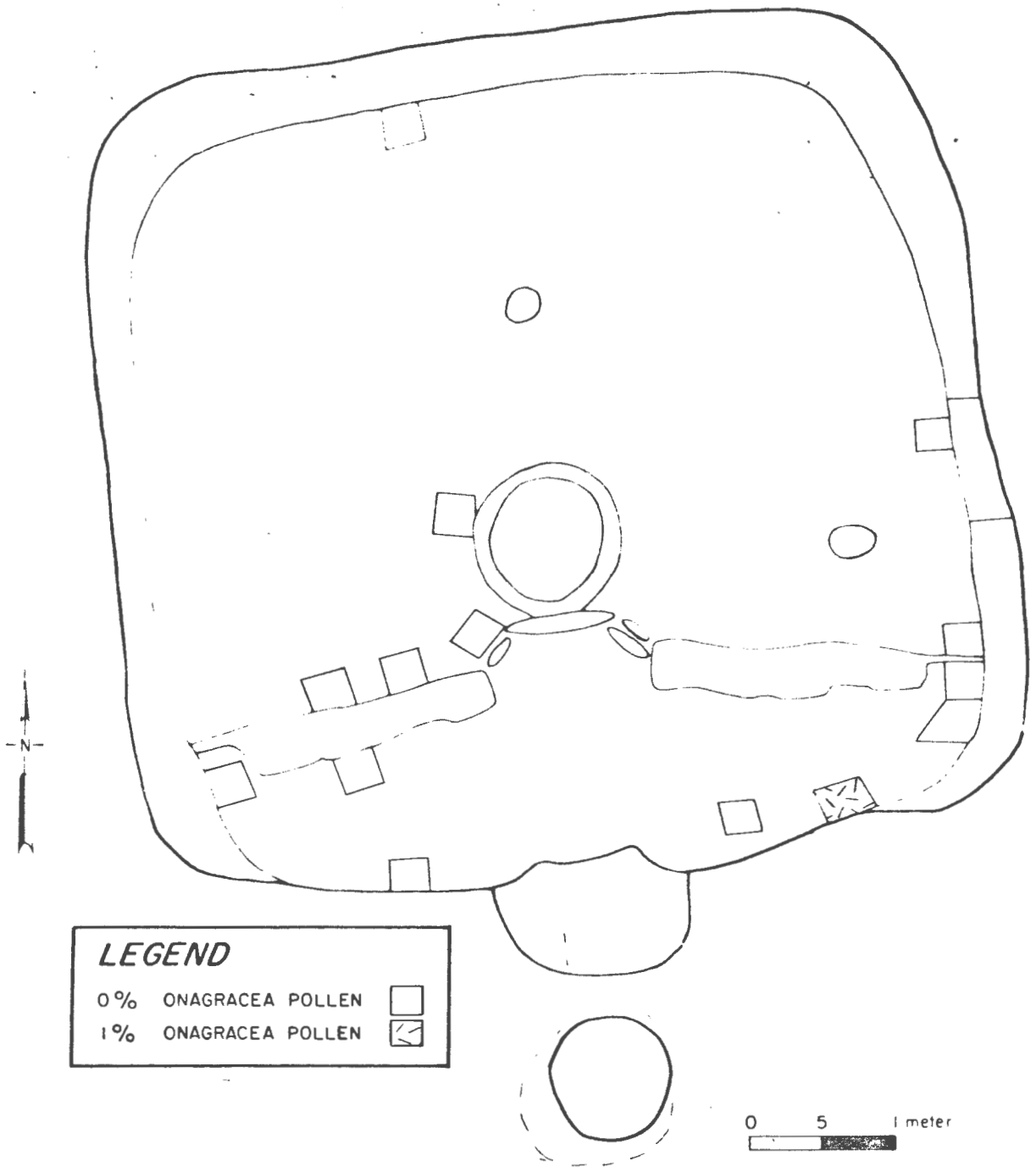


Figure C.33 Occurrence of Onagraceae pollen in pollen samples from Pitstructure 20 ~~Windy Wheat Hamlet.~~

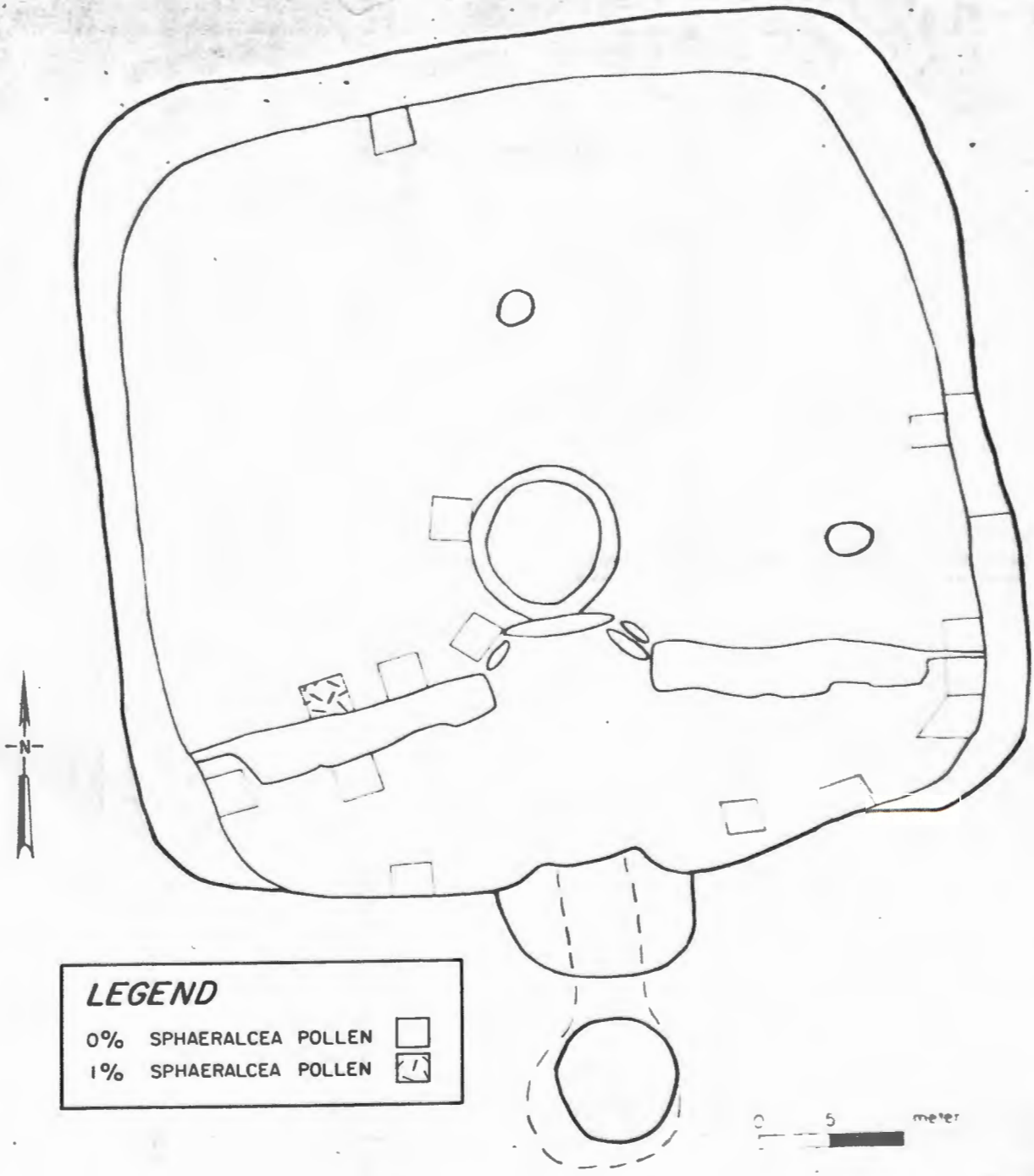


Figure C.34 Occurrence of Sphaeralcea pollen in pollen samples from Pitstructure 2, ~~Windy Wheat Hamlet~~.

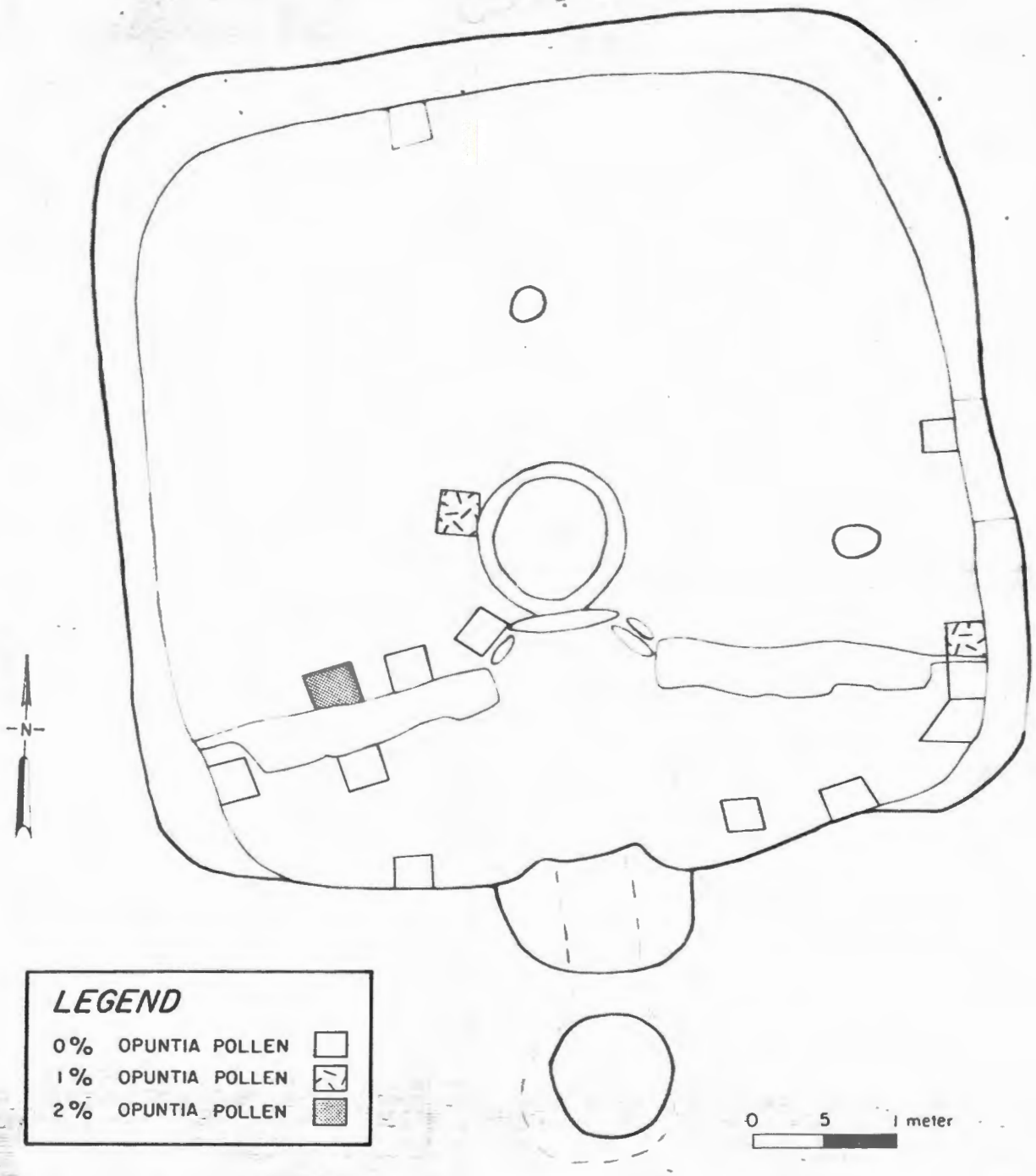


Figure C.35 Occurrence of Opuntia pollen in pollen samples from Pitstructure 2, ~~Windy Wheat Hamlet.~~

In Pitstructure 2, as in Pitstructure 1, Umbelliferae pollen is widespread, albeit in smaller quantities (fig. C.36). The largest frequency of Umbelliferae pollen occurs near the back wall behind the west wingwall. Slightly smaller quantities of Umbelliferae pollen were observed west of the hearth, along the north wall, on the bench along the east wall, and in the corner in front of the east wingwall. Although this pollen is diffused throughout most of the pitstructure, it is present in areas that contain higher frequencies of economic pollen types.

The largest quantities of pollen from economically important plants are concentrated in three locations in Pitstructure 2: near the hearth, in front of the west wingwall, and in the corner in front of the east wingwall. The sample from the bench along the east wall and the three samples from the back wall of the pitstructure also contain a variety of probable economic pollen types. Most of the other samples from Pitstructure 2 contain primarily Cleome and Umbelliferae pollen, which appear to be rather ubiquitous in their distribution. The larger quantities of these two pollen taxa can probably be used to determine possible use areas.

Conclusions

The pollen samples from Pitstructure 2 were selected on the basis of the pollen distributions in Pitstructure 1. This sample was effective in providing a maximum amount of information from a minimum number of samples. All but one of the samples contained sufficient pollen for analysis. Further, the samples analyzed provided enough information to suggest distributions for the pitstructure floor as a whole. This minimum

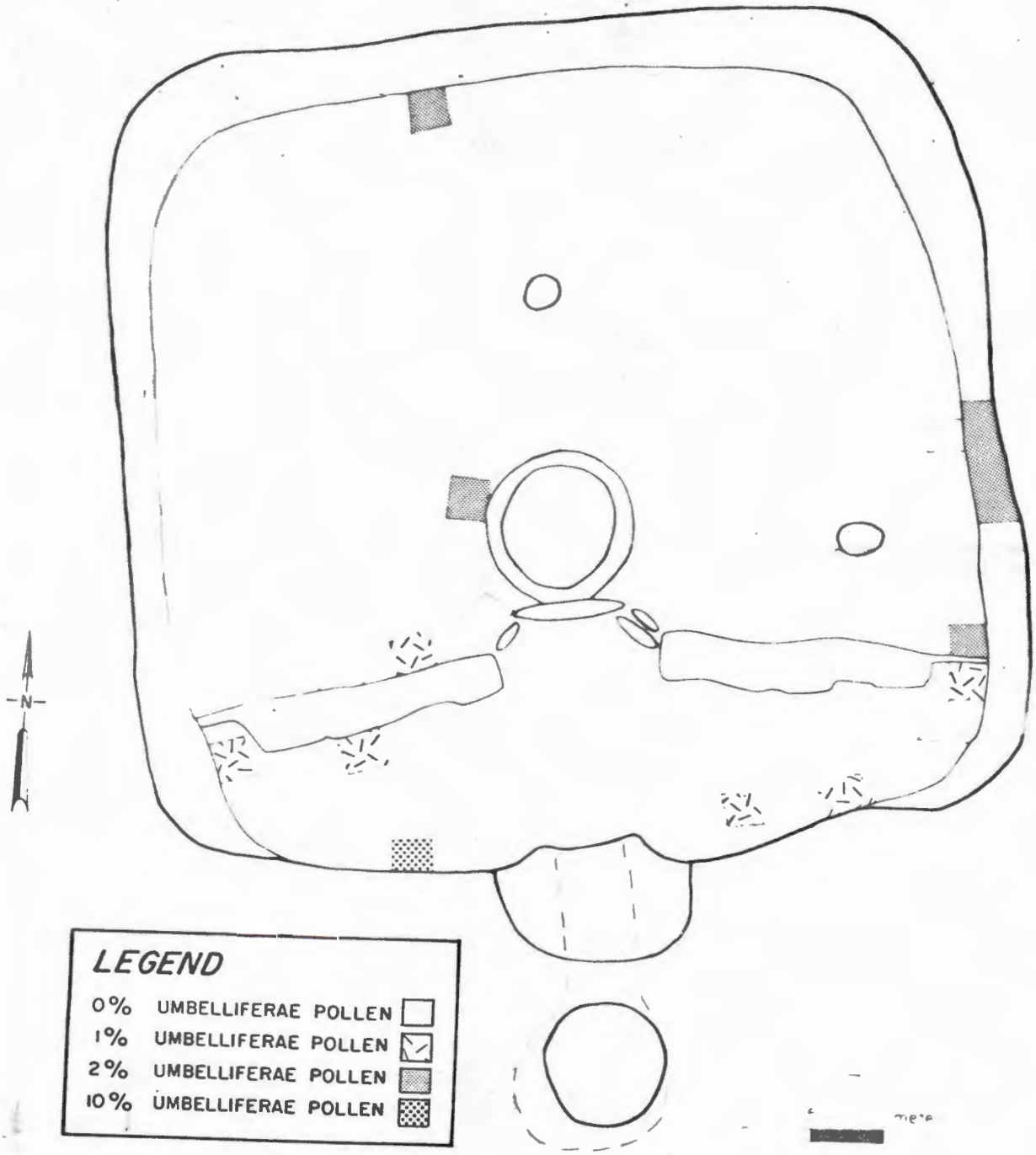


Figure C.36 Occurrence of Umbelliferae pollen in pollen samples from Pitstructure 2, ~~Winny Wheit Hamlet.~~

sample constitutes an adequate sample for a pitstructure floor and provides significantly more information than would one or two samples, the number traditionally analyzed from a pitstructure.

APPENDIX D

MACROBOTANICAL REMAINS FROM WINDY WHEAT HAMLET

by

Meredith H. Matthews

INTRODUCTION

The major purpose for the collection and analysis of macrobotanical remains from Windy Wheat Hamlet was to identify the potential botanical resources that were gathered or cultivated by the prehistoric occupants. In turn, the data generated from analysis has direct implications for interpreting the prehistoric subsistence economy. The macrobotanical assemblage from the site is comprised of two categories of botanical remains which are differentiated by size and mode of collection. Small-scale macrobotanical remains (e.g., seeds and fruits) were recovered from bulk soil flotation samples. Macrobotanical remains that were readily visible during excavation (e.g., corn cobs, beans, and wood fragments) were collected like any other artifact and are referred to as vegetal remains. These two categories of macrobotanical remains usually represent different classes of resource products. The small-scale remains from soil samples are predominately ruderal genera, most of which are ethnographically documented as economic plants often used for food. The vegetal remains are usually remnants of construction material, fuel resources, or cultivated plants.

Macrobotanical remains at Windy Wheat Hamlet were recovered from structure fills, floors, and features, as well as within nonstructural units. Genera within 24 families were identified. Taxa recovered represent a range of cultigens, ruderal plants, weeds, wild native plants, and woody plants.

Collection of soil samples at Windy Wheat Hamlet followed the standardized sampling procedures of the DAP (Litzinger 1979) except in the cases of Pitstructures 1 and 2. Pitstructure 1 was intensively sampled as

part of a specialized study design. Pitstructure 2 was used in a special cruciform transect sampling project designed to track the density and distribution of macrobotanical remains around hearths and in situ metates. Details concerning this latter study have been reported elsewhere (Matthews 1981). All macrobotanical remains were processed and analyzed according to the standard procedures of the Botanical Studies Section of the DAP (Matthews and Benz 1981).

Results of analysis are presented in numerous tables throughout this appendix, which is separated into two sections. The nature of the research focus and the number of samples analyzed from the special study conducted in Pitstructure 1 required the study to be discussed in one section. The other section of the report describes the remainder of the macrobotanical assemblage. Prior to presenting the results of analysis, several factors affecting analysis, data presentation, and interpretation of macrobotanical remains need to be addressed.

Association and Contamination

Difficulty in interpreting the association between macrobotanical remains and a prehistoric occupation is often determined by the type of plant material recovered. Barring large-scale disturbance, the remains of cultigens from a site are unequivocally associated with prehistoric subsistence activities because cultigens are dependent upon human manipulation for propagation. It is fairly accurate to state that remains of cultigens primarily represent food resources, although once the food value (edible portion) has been extracted the remaining parts of domesticates can serve secondary functions, such as corn cobs used as fuel. Making a

direct association between the remains of wood and some wild plants, e.g., Phragmites, and the prehistoric occupation is also reasonable because of the limitations that the reproductive and dispersal mechanisims of such plants impose upon the chance of accidental inclusion in a cultural context. Although remains of such plants may not be recovered in use association, which precludes a functional interpretation, their presence in a site is probably a direct by-product of prehistoric exploitation.

It is interpreting the significance of ruderal plant remains and their association with the prehistoric occupation that is often problematic. Ruderal plants are characteristically prodiguous seed producers, thriving in anthropogenic communities and dependent upon humans for dispersal and perpetuation. The dispersal and reproductive mechanisms of this class of plants and their affinity for disturbed habitats increases the potential for their unintentional inclusion in cultural contexts.

The literature (c.f. Gasser 1982; Keepax 1977; Lopinot and Brussell 1982; Minnis 1981) reflects the tendency of some archeobotanists to consider only the charred remains of ruderal plants recovered from open-air sites to be associated with the prehistoric occupation. Noncharred remains are assumed to be modern contaminants and are disregarded. This criterion is believed to be overly simplistic and often inadequate because of insufficient research conducted on the longevity of seed preservation in the soil bank (Harper 1977; Kivilaan and Bandurski 1981; Lerman and Cigliano 1971). Unless noncharred disseminules can be positively identified as undeniably modern or from an introduced taxon, it is believed that a more appropriate criterion to use is the vertical and horizontal distribution of such remains, regardless of their condition. Factors such as the biological attributes of a particular taxon, its economic value or

nonvalue, and the cultural perception of it as a tolerated, encouraged, or cultivated plant would affect its distribution in a site (Matthews and Benz 1983). Consequently, both charred and noncharred remains are included in this report.

The integrity of charred ruderal disseminules has to be evaluated as well because a charred condition does not necessarily imply intentional exploitation of the plant. There are multiple pathways by which this type of disseminule can be introduced into a cultural context (Adams 1980:255). Some of these pathways include transport on clothing or skins of game, unintentional inclusion with harvested resources, transport by rodents or ants, deposition by wind and water activity, or purposely brought in. Once incorporated into a cultural context, ruderal plant parts can accidently be charred during processing activities, or inadvertently charred because of their location within the site.

Therefore, deciding whether the charred disseminules of ruderal plants implies direct utilization or accidental inclusion is difficult. Various lines of evidence have to be evaluated such as provenience of recovery, the fill type, preservation potential of the situation, the associated remains, and the possible economic status of the taxon represented. These same factors also have to be considered when evaluating noncharred remains that are not from an introduced taxon or are obviously modern. The sampling strategy used at Windy Wheat Hamlet established a vertical control system (Litzinger 1979) to test the integrity of macrobotanical remains from cultural contexts. Depending upon relative proportions, similarity in remains from control samples and other types of samples can decrease the cultural association and interpretive value of the small-scale remains from the cultural contexts.

Representativeness

There are several biases inherent in a macrobotanical assemblage that have to be contended with when making interpretations. The composition of the assemblage has to be considered as only a partial record of the total botanical resources exploited. Factors such as processing technique, longevity of occupation, sampling strategy, and preservation have a direct effect upon assemblage composition. Not only is it a partial record of exploited resources, but it is biased towards durable plant parts (Munson et al. 1971) so there is the probability of overrepresentation of plants with the sturdiest parts. To further complicate interpretations, the part preserved is not necessarily the part for which the plant was selected and might only be representative of the taxon (Dennel 1976). While the ethnobotanical literature (c.f. Elmore 1944; Robbins et al. 1916; Stevenson 1915; Whiting 1939) suggests that most of the genera identified from Windy Wheat Hamlet are economic plants, determining plant part use is difficult because many plants have multiple edible or economic parts; e.g., *Amaranthus* seeds and greens. To avoid overextending the interpretive parameters of the macrobotanical assemblage, or abusing the use of ethnographic analogy (Ascher 1961; Binford 1968) the representativeness of the assemblage has to be critically evaluated.

Measuring Relative Importance

Two different measures of the relative importance of a plant type have been used in this report. The primary measurement used is an abundance measure (e.g., actual counts or weights) for the different classes of material. This measure is used because of the often small return of botanical material, relative to the number of samples analyzed, that can be compared from different proveniences within a site. This type of

measure seems to also be the most representative for vegetal remains which are randomly collected within a site by a variety of collection modes. Nevertheless, abundance measures are prone to skewedness for the same reasons that taxon representativeness is biased. For abundance measures to be significant, they have to be viewed relative to the part being reported, the provenience of recovery, and the quantity of associated remains. Abundance measures are given in the tables in this appendix, except in the case of the upper control and floor samples from Pitstructure 1.

It was decided a more appropriate measure to use for Pitstructure 1 was presence values (Gasser 1982; Hubbard 1980) because one purpose of the specialized study design used in the structure was to track the distribution of macorbotanical remains across the floor and there was a large sample size generated from the study (353 samples). A presence value represents the percentage of samples in which a particular taxon occurs within the total number of samples analyzed. The higher the presence value, the greater the relative importance of the plant. The presence values have been calculated for each taxon as well as for plant parts within each taxon. Abundance measures are also given, separated for charred and noncharred conditions and whether a part was quantified by count or weight. As with abundance measures, the comparative use of presence values should be maintained with similar categories of plant parts because of the different value each plant would have had in the subsistence economy.

SPECIALIZED SAMPLING DESIGN FOR PITSTRUCTURE 1

During the 1979 excavations at Windy Wheat Hamlet, Pitstructure 1 was discovered to have been abruptly abandoned due to fire. It was assumed that the catastrophic abandonment of this pitstructure would provide a case where debris from ongoing activities would have been left in situ and preservation of macrobotanical remains would be optimal. It was believed that this situation would provide information concerning subsistence resources, season of occupation, and possibly an idea of the general ecology of the site during occupation. It was also believed that intensive bulk soil sampling could be a means for determining the density, distribution, and range of macrobotanical remains associated with activity areas, which would provide a finer resolution of information for interpretative purposes. Finally, the results of intensive sampling would help to modify the project botanical sampling design which was instituted during the 1979 field season.

To test the range of information retrieval from a catastrophically abandoned structure, an intensive sampling program was initiated in Pitstructure 1, under the direction of Dr. Robert Bye and William Litzinger, for the recovery of bulk soil and pollen samples. The results of the pollen analysis are presented in appendix C. The roof fall stratum overlying the floor was divided into 1-m^2 units, with 1-L upper control samples collected from each square. A total of 28 samples were collected. The standard sampling format usually employed for floors (Litzinger 1979) was not used. Instead, the floor was divided in 25 cm^2 sampling units (fig. D.1), with 1-L samples collected from each unit when possible. This intensive sampling project resulted in collection of 353

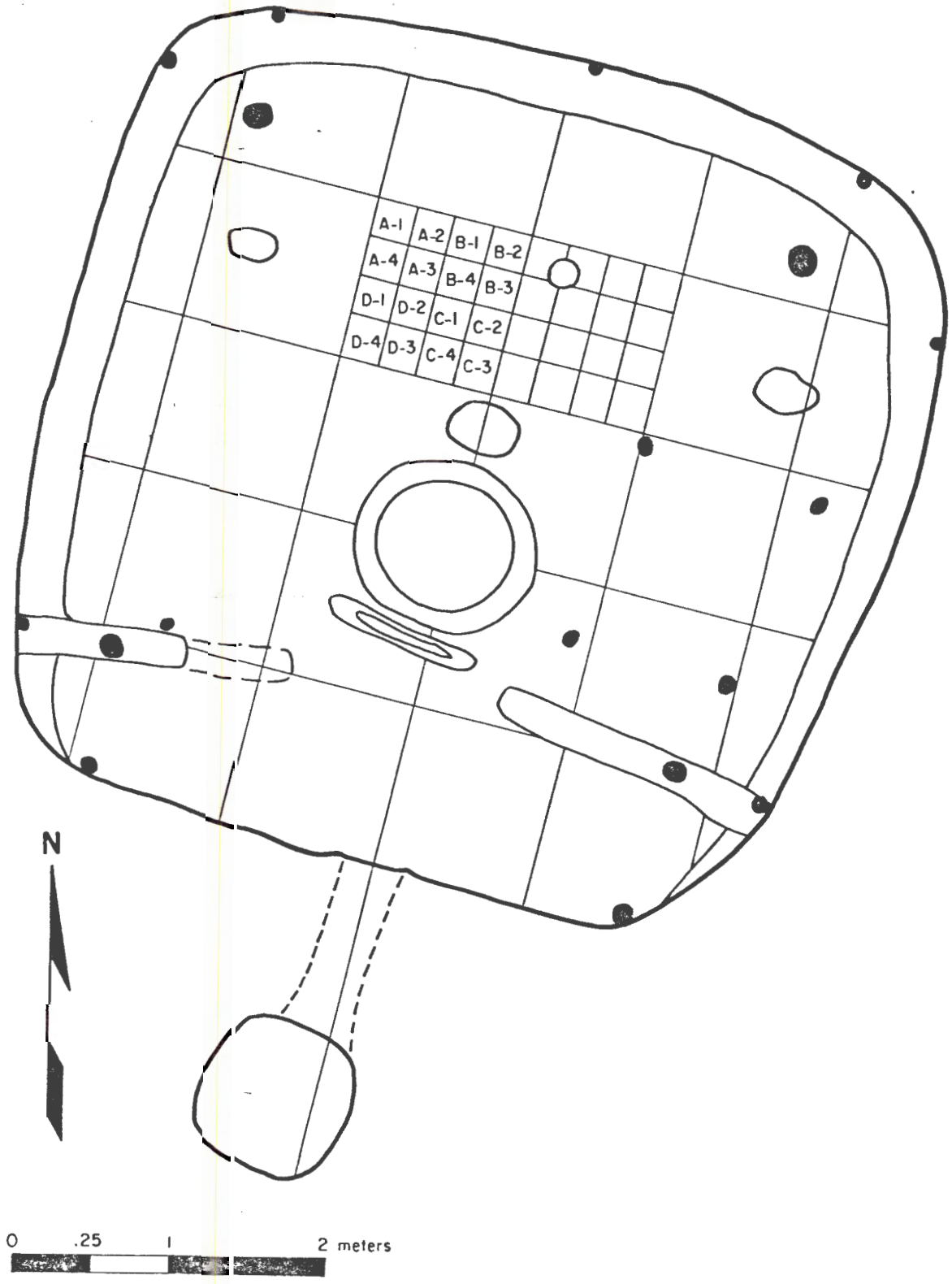


Figure D.1 Example of sampling grid units, Pitstructure 1, Windy Wheat Hamlet.

soil samples from the floor, with essentially the whole floor being collected. Feature fills were sampled according to the standard procedure of 1-L sample per feature or stratum in a feature. All samples were processed and analyzed according to the standard procedures of the DAP Botanical Studies Section (Matthews and Benz 1981). In addition to the small-scale remains, e.g., seeds and fruits, retrieved through bulk soil sampling, vegetal remains were also collected from Pitstructure 1. Genera within 21 families and 3 classes were identified from the pitstructure. The focus of the study design was on information retrieval from the flotation samples. Therefore, the discussion of Pitstructure 1 macrobotanical remains will be primarily concerned with the distribution of small-scale remains in the structure. This report will be primarily concerned with the distribution of the small-scale remains in Pitstructure 1.

Results

The results of the analysis of Pitstructure 1 macrobotanical remains are presented in tables D.1 through D.5.[1] The macrobotanical remains from the floor samples can be broadly classified into two plant-part categories: reproductive parts, e.g., seeds and fruits; and structural parts, e.g., wood and leaves. This latter category of remains is believed to be part of the overlying roof fall stratum, fragments of which were inadvertently collected with the floor samples. Therefore, the distribution of these remains is not considered to reflect activity patterns within Pitstructure 1 and will be disregarded in the following discussion. For the most part, only the occurrence and distribution of reproductive parts on the floor will be discussed.

---

[1]Tables D.4 through D.10 were compiled by Lora Van Renselaar, Botanical Studies Group, DAP.

Table D.1. Presence values for taxa recovered from floor samples in Pitstructure 1, Windy Wheat Hamlet

Taxon Family Genus species Plant part	Abundance Counted C	P	Non	Weighed C	Non	Number of samples	Percent of total samples N = 353
Amaranthaceae							
Amaranthus sp.							
seed	31		34			58	16
"Cheno-am"							
fruit	22		5			23	7
Chenopodiaceae							
fruit	2					1	<1
Chenopodium sp.							
fruit	39		4			36	10
Compositae							
fruit	5		3			7	2
Artemisia sp.							
leaf	14X		2X			37	10
wood				75g		148	42
fruit	196					49	14
wood							
Lactuca serriola							
fruit			21			18	5
Cruciferae							
seed	6		1			6	2
Descurainia sp.							
seed	2					1	<1
Cupressaceae							
Juniperus sp.							
scale	106	2	4			41	12
wood				9g	1g	4	1
seed	1					1	<1
Juniperus osteosperma							
scale	47		11			8	2
Cornaceae							
Cornus sp.							
wood				0.5g		1	<1
Cyperaceae							
fruit	5					5	1
Fagaceae							
Quercus gambelii							
wood				6.0g		11	3
Gramineae							
fruit	32		1			21	6
Poa sp.							
fruit	1					1	<1
Zea mays							
kernel				9.7g		24	7
cob	X					2	<1
cupule	34X					37	10
Labiatae							
Moldavica sp.							
seed			1			1	<1

NOTE: "Cheno-am" - *Chenopodium-amaranthus*, indistinguishable.
C - Charred.
P - Partially charred.
Non - Noncharred.
X - Fragments with no actual representation assessable.
g - Grams.
n.a. - Not applicable.

Table D.1. Presence values for taxa recovered from floor samples in Pitstructure 1, Windy Wheat Hamlet--Continued

Taxon Family Genus species Plant part	Abundance Counted C	P	Non	Weighed C	Non	Number of samples	Percent of total samples N = 353
Leguminosae							
seed	3					2	<1
Phaseolus sp.							
cotyledon	1					1	<1
Liliaceae							
Yucca sp.							
fiber	n.a.			n.a.		3	<1
Loasaceae							
Mentzelia sp.							
seed	2					2	<1
Malvaceae							
seed	2					2	<1
Sphaeralcea sp.							
seed			1			1	<1
Polygonaceae							
fruit	1					1	<1
Polygonum							
fruit	1					1	<1
Pinaceae							
Pinus sp.							
bark				2.5g		5	1
wood				98.5g		192	54
Pinus edulis							
seed			1			1	<1
needle	1					1	<1
wood				6.7g		12	3
Pinus ponderosa							
bark				0.5g		1	<1
wood				9.4g		17	5
Portulacaceae							
Portulaca sp.							
seed	152	1	22			98	28
Rosaceae							
wood				4.5g		9	3.1
Prunus sp.							
wood				1.0g		2	<1
Salicaceae							
Populus sp.							
wood				87.5g		165	47
Solanaceae							
Nicotiana attenuata							
seed	62	34				49	14
Dicotyledoneae							
seed	8		2			9	3
wood				30.5g		52	15
leaf	5X		4X			14	4
Gymnospermae							
wood				45.5g,0.5g		94	27
Monocotyledoneae							
leaf	4					3	<1
culm				1.0g		2	<1

Table D.2. Presence values for taxa recovered from upper control samples in Pitstructure 1, Windy Wheat Hamlet

Taxon Family Genus species Plant part	Abundance				Number of samples	Percent of total samples
	Counted		Weighed			
	C	Non	C	Non		N = 28
Amaranthaceae *Amaranthus* sp. seed					1	4
Cactaceae spine	2				1	4
"Cheno-am" fruit	13	4			8	29
Chenopodiaceae *Chenopodium* sp. fruit	7	7			7	25
Compositae *Artemisia* sp. leaf wood fruit	 3 20 20		 13.8g		 3 24 4	 11 86 14
Cruciferae *Descurainia* sp. seed	51				1	4
Cupressaceae *Juniperus* sp. scale	3				1	4
Fagaceae *Quercus gambelii* wood			2.0g		5	18
Gramineae Indeterminate fruit *Zea mays* kernel cob cupule	 2 X 18X		 8.0g		 2 2 1 15	 7 7 4 54

NOTE: "Cheno-am" - *Chenopodium-Amaranthus* indistinguishable.
C - Charred.
Non - Noncharred.
X - Fragments with no actual representation assessable.
g - Grams.

Table D.2. Presence values for taxa recovered from upper control sample in Pitstructure 1, Windy Wheat Hamlet--Continued

Taxon Family Genus species Plant part	Abundance: Counted C	Abundance: Counted P	Abundance: Counted Non	Abundance: Weighed C	Abundance: Weighed Non	Number of samples	Percent of total samples N = ~~353~~ 28
Liliaceae							
Yucca sp.							
leaf	1					1	4
Malvaceae							
Sphaeralcea sp.							
seed	1					1	4
Pinaceae							
Pinus sp.							
bark				0.6g		3	11
wood				13.2g		13	46
Pinus edulis							
needle	2					2	7
wood				1.5g		1	4
Pinus ponderosa							
needle	2X					2	7
wood				38.0g		16	57
Portulacaceae							
Portulaca sp.							
seed	36					13	46
Rosaceae							
wood				6.7g		5	18
Salicaceae							
wood				1.3g		1	4
Populus sp.							
wood				24.0g		18	64
Solanaceae							
Nicotiana attenuata							
seed	11	24				13	46
Physalis sp.							
seed	5					1	4
Solanum sp.							
seed		1				1	4
Dicotyledoneae							
seed	2	24				13	46
fruit	1					1	4
wood				3.5g	0.5g	7	25
Gymnospermae							
wood				1.0g		3	11
Monocotyledoneae							
fruit	1					1	4

Tables D.3 Clusters of presence values of taxa on the floor of Pitstructure 1, Windy Wheat Hamlet

<1%	>1%, ≤5%	>5%, ≤10%	>10%, ≤20%	>20%
Chenopodiaceae	Compositae	"Cheno-am"	*Amaranthus*	*Portulaca*
Descurania	*Lactuca serriola*	*Chenopodium*	*Artemisia*	
Juniperus	Cruciferae	Graminae	*Zea mays*	
Poa	Cyperaceae		*Nicotiana attenuata*	
Leguminosae				
Phaseolus				
Malvaceae				
Sphaeralcea				
Polygonaceae				
Polygonum				
Pinus edulis				
Moldavica				
Mentzelia				

NOTE: "Cheno-am" - *Chenopodium-amaranthus*, indistinguishable.

Table D.4. Bulk soil sample results from features, Pitstructure 1, Windy Wheat Hamlet

Taxon	Provenience								
	F8 (cist)	F16 (hearth)			F17 (warming pit)		F31 sipapu	F72 (pit)	F74 (warming pit)
Family Genus species Plant part	BS22	Strat 2 BS759	Strat 3 BS760	Strat 4 BS761	BS762	BS763	BS770	BS769	BS777
Amaranthaceae *Amaranthus* sp. seed	3/C	1/N							1/N
"Cheno-am" fruit	1/C								
Chenopodiaceae *Chenopodium* sp. fruit	3/C	1/C	1/C	1/C					
Compositae fruit					1/N				
Artemisia sp. leaf wood		<1g/C	1g/C	<1g/C			<1g/C		
Cupressaceae *Juniperus* sp. scale		18/C, 2/N	2/C						
Fagaceae *Quercus gambelii* wood		2.2g/C	<1g/C			<1g/C		<1g/C	0.1g/C
Gramineae fruit			2/C						
Zea mays kernel			<1g/C						
glume		X/C	X/C						
cupule		X/C	X/C						
Loasaceae *Mentzelia* sp. seed		4/C							
Malvaceae fruit	1/C								
Pinaceae *Pinus* sp. wood	1g/C							<1g/C	
Pinus ponderosa wood	1g/C								
Portulacaceae *Portulaca* sp. seed	1/C	4/C,6/P	30/C	9/C					2/C, 2/N
Rosaceae wood								<1g/C	
Salicaceae *Populus* sp. wood	<1g/C		1g/C						
Solanaceae *Nicotiana attenuata* seed		7/C,25X/N	5/C,8/N		1/N	1/N		8/N	2/C,41/N
Dicotyledoneae wood	<1g/C	1g/C, 1g/C, 1g/C	<1g/C	<1g/C				<1g/C	
Gymnospermae wood		1g/C	<1g/C		<1g/C	<1g/C	<1g/C	<1g/C	

NOTES: In the body of the table, numerals to the left of the bar indicate the number of items present, except in those cases where the items have been reported as a weight. In this later case, the numeral is followed by the abbreviation "g" indicating the number of grams of material present.

BS - Bulk soil.
F - Feature.
Strat - Stratum.
C - Charred.
P - Partially charred.
N - Noncharred.
X - Fragments present; no count possible.
"Cheno-am" - *Chenopodium-amaranthus*; indistinguishable.

Table D.5. Vegetal remains from Pitstructure 1, Windy Wheat Hamlet

Taxon	Provenience								
	Fill				Surface 1				
Family Genus species Plant part	General	Level 1	Level 2	Level 3	PL112	PL120	PL150	PL197	PL229
Compositae									
Artemisia sp.									
leaf			13/C						
wood	189.6g/C	31.9g/C	59.2g/C	93.3g/C					
Cucurbitaceae									
Cucurbita sp.									
seed			2X/C						
Fagaceae									
Quercus gambelii									
fruit									
cupule									
wood		8.7g/C		0.5g/C					
Gramineae									
Zea mays									
ear						1fg/C			
fruit		2.5g/C	32.8g/C	47.7g/C	0.6g/C	1.5g/C	0.5g/C		9.8g/C
cob		31fg/C		13fg/C			4fg/C		
cupule		36/C				X/C			
Leguminosae									
Phaseolus sp.									
cotyledon	3X/C			230X/C	249X/C		4X/C		
seed	1/C			138/C	114/C		1/C		
Pinaceae									
Pinus sp.									
wood	12.4g/C	1.8g/C	0.5g/C	45.4g/C		0.5g/C			
Pinus edulis									
seed									
wood			13.9g/C						
Pinus ponderosa									
bark	9.8g/P		210g/P						
wood	1386.3g/C	1768.8g/C	1587.9g/C	4779.9g/C					
Pseudotsuga menziesii									
needle									
wood									
Rosaceae									
wood									
Salicaceae									
wood									
Populus sp.									
wood	363.3g/C		638.6g/C	469.2g/C					
Salix sp.									
wood									
Gymnospermae									
wood									
Monocotyledoneae									
leaf				1/P					
culm									

NOTES: In the body of the table, numerals to the left of the bar indicate the number of items present, except in those cases where the items have been reported as a weight. In this later case, the numeral is followed by the abbreviation "g" indicating the number of grams of material present.

PL - Point Location. F - Feature. X - Fragments present, no count of fragments possible.
PH - Posthole. WW - Wingwall.
fg - Fragment. C - Charred.
P - Partially charred. N - Noncharred.

Table D.5. Vegetal remains from Pitstructure 1, Windy Wheat Hamlet--Continued

Taxon Family Genus species Plant part	Provenience							
	Surface 1							F73
	PL 344	PL 345	PL 361	PL 362	PL 389	PL 390	General surface	(PH)
Compositae								
Artemisia sp.								
leaf							0.5g/C	
wood								
Cucurbitaceae								
Cucurbita sp.								
seed								
Fagaceae								
Quercus gambelii								
fruit								
cupule								
wood								
Gramineae								
Zea mays								
ear								
fruit								
cob								
cupule								
Leguminosae								
Phaseolus sp.								
cotyledon								
seed								
Pinaceae								
Pinus sp.								
wood								
Pinus edulis								
seed	1/N							
wood								
Pinus ponderosa								
bark								
wood							462.4g/C	
Pseudotsuga menziesii								
needle								
wood								
Rosaceae								
wood						0.5g/C		
Salicaceae								
wood		14.7g/C						
Populus sp.								
wood					0.5g/C		92g/C	
Salix sp.								
wood				1g/C				
Gymnospermae								
wood								2.4g/N
Monocotyledoneae								
leaf								
culm								

Table D.5 Vegetal remains from Pitstructure 1, Windy Wheat Hamlet--Continued

Taxon	Provenience										
	F80	F10	F2 (Bench)								
Family Genus species				F6	F12	F117	F118	F120	Surface 1		
Plant part	(PH)	(WW)	Level 1	(PH)	(PH)	(PH)	(PH)	(PH)	PL6	PL10	PL13
Compositae Artemisia sp. leaf wood											
Cucurbitaceae Cucurbita sp. seed											
Fagaceae Quercus gambelii fruit cupule wood											
Gramineae Zea mays ear fruit cob cupule	3.5g/C 4fg/C X/C								2g/C		2fg/C 2g/C 26fg/C
Leguminosae Phaseolus sp. cotyledon seed											
Pinaceae Pinus sp. wood Pinus edulis seed wood Pinus ponderosa bark wood Pseudotsuga menziesii needle wood	62.8g/C		131g/C	1.6g/C 1.5g/C	7g/C	7.4g/C	40g/P	6.7g/C		14.8g/C	
Rosaceae wood											
Salicaceae wood Populus sp. wood Salix sp. wood											
Gymnospermae wood											
Monocotyledoneae leaf culm											

Table D.5. Vegetal remains from Pitstructure 1, Windy Wheat Hamlet--Continued

Taxon	Provenience						
	F2 (bench)						
	Surface 1						
Family Genus species Plant part	PL35	PL78	PL87	PL88	PL94	PL95	General bench surface
Compositae *Artemisia* sp. leaf wood							
Cucurbitaceae *Cucurbita* sp. seed							
Fagaceae *Quercus gambelii* fruit cupule wood							
Gramineae *Zea mays* ear fruit cob cupule		4.5g/C 13fg/C					0.5g/C
Leguminosae *Phaseolus* sp. cotyledon seed							
Pinaceae *Pinus* sp. wood *Pinus edulis* seed wood *Pinus ponderosa* bark wood *Pseudotsuga menziesii* needle wood			2.9g/C	9.7g/C	124g/C	9.7g/C	22.1g/C
Rosaceae wood							
Salicaceae wood *Populus* sp. wood *Salix* sp. wood	16.6g/C		2.9g/C				0.9g/C
Gymnospermae wood			0.5g/C				
Monocotyledoneae leaf culm							1g/C

The presence values in table D.1 appear to group into five clusters (table D.3). These clusters are based on patterns the author thought were evident within the data, not on any statistical manipulation. As tables D.1 and D.2 illustrate, there is not a ubiquitous occurrence of any one taxon or several taxa. For that matter, given the abandonment mode, there were fewer small-scale macrobotanical remains than expected. Nevertheless, the fact that the presence values cluster in the manner they do might be indicative of patterning of remains in particular loci on the floor.

Distributions of macrobotanical remains across the floor of Pit-structure 1 are essentially meaningless by themselves. They become more meaningful when viewed in conjunction with features and activity areas. Figure D.2 is a plan map of the major features and activity areas defined in the structure. Activity areas were designated by the crew chief based on features, the types of artifacts, and their density and/or distribution. A plan map of the floor artifacts can be found in the main text of this report (figs. 18 and 19). In this study, the activity areas of interest are Activity Areas 17, 18, 19, 21, and 22. Activity Areas 18, 21, and 22 have been designated food storage and/or processing areas. Activity Area 17 has been described as a storage area that contained numerous lithic tools and one vessel. Activity Area 19 is interpreted as a nonspecific economic area, possibly used for basketry manufacture.

Focusing on the six taxa that had the highest presence values, ($\geq$ 10 percent; table D.3) individual contour maps (SYMAP's [Dougenik and Sheehan 1975]) were generated using the frequency and distribution of the disseminules of *Amaranthus*, *Artemisia*, *Chenopodium*, *Nicotiana attenuata*, *Portulaca*, and *Zea mays* (figs. D.3 through D.8). A 50-cm mapping interval

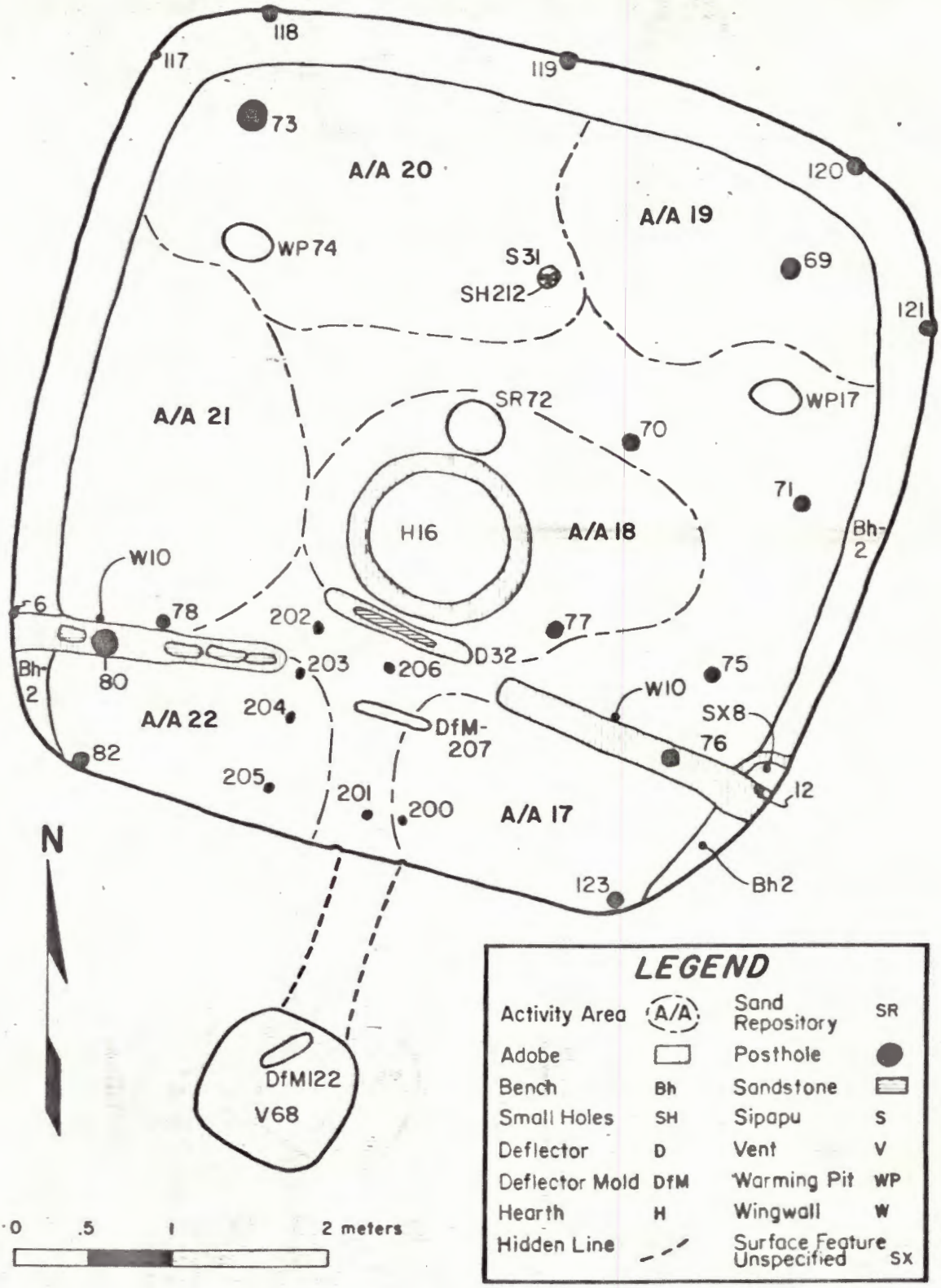


Figure D.2 Features and activity areas, Surface 1, Pitstructure 1, Windy Wheat Hamlet.

Figure D.3 Distribution of *Amaranthus* on the floor of Pitstructure 1, Windy Wheat Hamlet.

05MT4644

PITSTRUCTURE 1

SURFACE 1

DISTRIBUTION OF

BULK SOILS

(AMARANTHUS)

0 25 50

SCALE IN CM

Figure D.4 Distribution of *Artemisia* on the floor of Pitstructure 1, Windy Wheat Hamlet.

05MT4644

PITSTRUCTURE 1

SURFACE 1

DISTRIBUTION OF

BULK SOILS

(CHENOPODIUM)

0 25 50

SCALE IN CM

Figure D.5 Distribution of Chenopodium on the floor of Pitstructure 1, Windy Wheat Hamlet.

05MT4644

PITSTRUCTURE 1

SURFACE 1

DISTRIBUTION OF

BULK SOILS

(ARTEMISIA)

0 25 50

SCALE IN CM

Figure D.6 Distribution of *Nicotiana attenuata* on the floor of Pitstructure 1, Windy Wheat Hamlet.

05MT4644

PITSTRUCTURE 1

SURFACE 1

DISTRIBUTION OF

BULK SOILS

(NICOTIANA)

0 25 50

SCALE IN CM

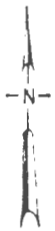


Figure D.7 Distribution of *Portulaca* on the floor of Pitstructure 1, Winey Wheat Hamlet.

05MT4644

PITSTRUCTURE 1

SURFACE 1

DISTRIBUTION OF

BULK SOILS

(PORTULACA)

0 25 50

SCALE IN CM

Figure D.8 Distribution of *Zea mays* on the floor of Pitstructure 1, Windy Wheat Hamlet.

05MT4644

PITSTRUCTURE 1

SURFACE 1

DISTRIBUTION OF

BULK SOILS

(ZEA MAYS)

0 25 50

SCALE IN CM

was used to construct the SYMAP's. This is a larger interval than that used for the actual sampling, but it is adequate. Areas of the SYMAP's that are the darkest indicate areas of the heaviest concentration of a taxon. The SYMAP of Zea mays (fig. D.8) shows only the distribution of countable parts such as cobs and cupules. Corn kernels are weighed items and the two quantification systems cannot be combined for SYMAP.

Interpretation of Distribution Mapping

Using the SYMAP of Zea mays as an example (fig. D.8), the patterning of remains relative to the activity areas of interest is fairly evident. The heaviest concentration of corn occurs behind the west wing wall in Activity Area 22, a mealing area that contained numerous ground stone tools including manos and metates.

The distribution of Amaranthus and Portulaca (figs. D.3 and D.7) appear to strongly coincide with Activity Areas 18 and 21, food preparation and storage areas. Nicotiana and Chenopodium occur in several of the activity areas, but to a lesser degree than the three former genera. The distribution of Artemisia fruits is predominately in the southern third of Pitstructure 1 and mostly concentrated outside of the defined activity areas.

The SYMAP of Zea mays illustrates that the distribution of botanical remains is affected by the patterning of cultural activity. The occurrence of Z. mays in Pitstructure 1 is unquestionably a by-product of human activity, although the SYMAP distribution might not be an exact replica of the pattern of activity. Remains of Z. mays were also recovered from upper control samples (table D.2), which were collected 10-20 cm above the floor, and there is the possibility of some contamination from the roof fall stratum.

As explained previously, interpreting the occurrence of ruderal genera is not always easy because of the numerous possibilities for unintentional introduction. The distribution of the five ruderal genera across the floor is believed to have been predominately affected by three factors: (1) the cultural perception of the genera as encouraged or tolerated "weeds"; (2) the economic utilization of the plant (part specific); and (3) possible preparation technique. The cultural perception of a ruderal plant will affect the vertical and horizontal distribution of its remains within a site. Encouraged economic species will be found more frequently in association with living surfaces than tolerated, albeit economic, species. However, there usually will not be a complete separation of the two within a site, given the characteristics of ruderal plants previously discussed.

The presence values and patterning of Amaranthus and Portulaca imply a greater association with cultural activity than Chenopodium, Nicotiana, or Artemisia. Also, the occurrence of Amaranthus is negligible in the overlying stratum (table D.2), with only one seed recovered in the 28 samples analyzed. This negative evidence substantiates the idea that Amaranthus was an encouraged ruderal plant that was culturally recognized and harvested as part of the subsistence regime.

The presence values for the remaining four ruderals from the upper control samples are relatively high within their class type, which implies that these four taxa were present in the ambient environment. However, the floor distribution of at least Portulaca, suggests that it was also an encouraged ruderal resource. Since the vertical and horizontal distribution of these remains is not clear enough to distinguish between encouraged and tolerated ruderals, the potential use of these taxa has to be reviewed.

Portulaca is most commonly cited for its use as a green, although the seeds are also edible. The greens are extremely nutritious and are palatable throughout its maturation period, even after the seeds are mature. Chenopodium is also most frequently referred to as a source of edible greens. However, the leafy material becomes unpalatable as the edible fruits mature. Nicotiana attenuata is referred to as a nonedible plant; the leaves are harvested for smoking material. The seeds of tobacco reach maturity somewhat prior to the full maturation of the leaves, and often will be dispersed prior to harvesting although many can stick to the plant because of a resinous substance that coats the leaves.

The ethnographic literature indicates that greens are eaten raw, boiled, combined with other foods as they cook, or are dried for storage. Seeds and fruits are usually parched, most often ground into a flour that is used for a variety of gruel, cake, and bread dishes. Nicotiana leaves are harvested and dried inside or out of structures, although the whole plant is sometimes pulled up by its roots and hung to dry. The leaves are either rolled into cigarettes or used in pipes.

Based on the vertical and horizontal distribution of Amaranthus, Chenopodium, Nicotiana, and Portulaca, and the possible value of each taxa, one possible explanation of their distribution is as follows. As already mentioned, Amaranthus is considered to have been an encouraged ruderal, probably harvested for the seeds since the greens are bitter as the plant matures. Portulaca, a prolific ground creeper with a predilection for gardens, is viewed as an encouraged ruderal harvested for its greens and/or seeds. Chenopodium, on the other hand, is not as well represented and may have been either an encouraged ruderal that was preferred for its greens and not as intensely gathered during its fruiting

period, or a tolerated weed whose occurrence is incidental. Nicotiana attenuata might have been either encouraged or tolerated. If it was gathered for its leaves, then seed dispersal in Pitstructure 1 would have been partially dependent upon where the plants were dried and stored. Occurrence of Portulaca, Chenopodium, and N. attenuata in the upper control samples implies growth of these taxa in the area surrounding the site. Therefore, some dispersal of the disseminules on the floor could be from the roof fall stratum, due to natural causes or tracked in by the prehistoric occupants.

The distribution of Artemisia fruits is believed to be an example of the situation where one plant part represents the use of a different part of the taxon. In this case, the fruits were probably not the economically important part; the wood was. Artemisia wood is commonly recovered from the roof fall of structures in the project area and appears to have been important as closing material for roofs. It was recovered in the roof fall stratum of Pitstructure 1. Since the distribution of Artemisia fruits is attributed to roofing material, it may also be tentatively suggested that Pitstructure 1 was constructed in late summer to early fall, since Artemisia does not fruit until this time (Deitschman 1974:235), and the fruits are easily dispersed by natural forces. Therefore, if Artemisia wood with the fruits still attached was used in the roof construction, the wood had to have been processed prior to full maturation of the fruits.

Other Remains on the Floor

With the exception of Phaseolus and Lactuca serriola, it is difficult to say whether the remainder of taxa in table D.3 represent resources or intrusive material that was inadvertently charred when the structure

burned. Phaseolus as a cultigen is obviously a resource and, as table D.5 shows, was recovered in quantity from the floor. Lactuca serriola is a contaminant. This species is an introduced taxon and all 21 achenes are definitely modern. Recovery of this species points to contamination of the samples either during excavation or flotation procedures, although the former is considered more likely. The occurrence of this contaminant also indicates that other noncharred material might be intrusive. However, Sphaeralcea is the only other taxon recovered soley in a noncharred condition and none of the other noncharred disseminules were obviously modern. The majority of taxa listed in table D.3 does not appear in table D.2, which might indicate purposeful introduction into the structure, although their minimal representation does not indicate their economic position as one of importance.

Remains From Features

Macrobotanical remains from the six features sampled in Pitstructure 1 are presented in table D.4. The wood charcoal recovered from Features 16, 17, and 74 probably represents fuel relating to the heating/warming function of the features. Charcoal from the other features could be part of roof fall material or could be generalized debris that was incorporated into these features prior to abaondonment.

The small-scale remains reflect some of the same taxa recovered from the floor samples, with Amaranthus, Chenopodium, Portulaca, and Nicotiana attenuata each represented in more than one of the features. The cooccurrence of these taxa from floor samples and feature samples is shown if the SYMAP's and figure D.2 are compared. Areas of high density often correspond to the approximate locations of the features from which the

different taxa were recovered. This correspondence may be used to strengthen an argument that all four taxa were encouraged or at least tolerated economic ruderal resources. It is noteworthy that Artemisia fruits were not recovered from any of the features. The surficial distribution substantiates the interpretation that the fruits were not being exploited but were representative of Artemisia wood.

Vegetal Remains From Pitstructure 1

Since vegetal remains are visible during excavation, this class of remains usually consists of cultigens and wood. Table D.5 presents the vegetal remains from the structure. The presence of wood from the general fill, Levels 1 through 3, and on the floor indicates that Artemisia, Pinus edulis, P. ponderosa, Populus, Salix, and Quercus gambelii were all used in roof construction. Wood from main support postholes (Features 73 and 80) and auxiliary postholes on the bench (Features 6, 12, 117, 118, and 120) indicate a preference for Pinus wood, probably P. ponderosa, as the major material for supporting the superstructure of the pitstructure. This preference for P. ponderosa indicates that a fair amount of energy had to be expended for the construction of Pitstructure 1, unless the occupants of Pitstructure 1 robbed previously occupied structures for materials. It is believed (Petersen 1983) that P. ponderosa did not occur in the immediate vicinity of Windy Wheat Hamlet and the occupants would have had to go elsewhere in the canyon for aquisition of the wood.

Zea mays, Phaseolus, and Cucurbita were recovered as vegetal remains. Large quantities of corn and beans and some squash were retrieved from Levels 1 through 3. Occurrence of these remains in these levels, which are part of the roof, is probably due to the use of the

ceiling area for storage and the use of the roof itself as a processing area (refer to appendix C). Additional analysis of the squash and beans has identified the squash as C. pepo and the beans as P. vulgaris.

Summary

The macrobotanical assemblage from Pitstructure 1 represents a range of cultivated, encouraged, and natural resources that would have involved the utilization of and impact upon a variety of vegetation zones in the project area. Evidence for the use of (and by extension, cultivation of) Zea mays, Phaseolus vulgaris, and Cucurbita pepo was found. Also, intensive sampling of Pitstructure 1 provided evidence of the encouragement of Amaranthus and Portulaca, and possibly Nicotiana attenuata and Chenopodium. Other ruderal taxa were also recovered but their minimal representation precludes statements concerning their status in the prehistoric subsistence regime. Based on the recovery and distribution of Artemisia fruits, it has been suggested that Pitstructure 1 was built in the late summer to early fall. Also, the apparent preference for Pinus ponderosa wood for construction purposes has implications for resource cost estimates, as this resouce probably was not available in the immediate site area.

The intensive sampling project across the floor of Pitstructure 1 did prove that cultural activity will produce a definable patterning of macrobotanical remains. Through the comparison of SYMAP's, activity area designations, and feature locations, the relationship of Zea mays, Amaranthus, Portulaca, Chenopodium, and Nicotiana attenuata distributions, relative to areas of cultural activity, became evident. The distribution of these remains was used to substantiate ideas concerning the

distribution of encouraged versus tolerated ruderals in archeological deposits. The patterning of remains showed areas of potentially high yield for botanical information, similar to the areas defined by Scott's pollen analysis (appendix C). Furthermore, this study has indicated the value and level of information retrieval from bulk soil sampling in areas that are well preserved and have been designated as food processing/ storage activity areas.

Macorotanical Remains From Pitstructures 2 and 3

Pitstructure 2

Pitstructure 2 is believed to have burned soon after it was abandoned, a situation that lends itself to moderate preservation and contamination of botanical remains. The macrobotanical remains identified from Pitstructure 2 are presented in tables D.6 and D.7. As these tables indicate, a mixture of deciduous and coniferous woods were recovered from the structure. Fragments of wood from the upper control samples, structure fill, bench, and floor are probably roofing material and illustrate the use of *Artemisia*, *Juniperus*, *Quercus gambelii*, *Pinus edulis*, *P. ponderosa*, *Populus*, *Amelanchier*, and indeterminte rosaceous wood in the construction of Pitstructure 2. More specificially, wood identified as *Juniperus* and *Pinus* spp. was recovered from leaner postholes in the bench. Some of the wood from the bench and floor may also be general debris that was spread around the structure prior to it burning. Charcoal from the hearth, Feature 21, was identified as *Artemisia*, *Quercus gambelii*, *Pinus edulis*, *P. ponderosa*, *Juniperus*, *Cercocarpus*, and indeterminate Rosaceae; genera assumed to have been used as fuel. Charred wood fragments recovered from a sand-filled pit (Feature 51) and the

Table D.6:

NOTES: In the body of the table, numerals to the left of the bar indicate the number of items present, except in those cases where the items have been reported as a weight. In this later case, the numeral is followed by the abbreviation "g" indicating the number of grams of material present.

BS	- Bulk soil.
F	- Feature.
Strat	- Stratum.
B, C, D	- Special transect sample numbers.
C	- Charred.
N	- Noncharred.
"Cheno-am"	- Chenopodium-amaranthus; indistinguishable.
X	- Fragments present; no count of fragments possible.
fg	- Fragment.

Table D.6 Bulk soil sample results, Pitstructures 2 and 3, Windy Wheat Hamlet

Taxon	Provenience									
	Pitstructure 2									
	Upper control	Upper control	Upper control	Lower control Level 1	Floor					F 19 (bench) Upper control Level 1
Family Genus species Plant part	BS563	BS633	BS703	BS750	BS623	BS624	BS634	BS635	BS651	BS567
Amaranthaceae										
Amaranthus sp.										
seed	2/C			1/C						
Anacardiaceae										
Rhus aromatica										
twig		W/C								
"Cheno-am"										
fruit			1/C							
Chenopodiaceae										
Chenopodium sp.										
fruit										
Compositae										
fruit		1/N								
Artemisia sp.										
leaf								1/C		
fruit							1/C			
wood		1.0g/C		<1g/C	<1g/C	<1g/C	<1g/C	<1g/C	<1g/C	<1g/C
Helianthus sp.										
fruit										
Cruciferae										
seed										
Descurainia sp.										
seed			1/N							
Cupressaceae										
Juniperus sp.										
scale	1/C				5/C					
wood										
Cyperaceae										
fruit										
Scirpus sp.										
fruit										
Fagaceae										
Quercus gambelii										
fruit										
cupule										
wood							<1g/C	<1g/C	<1g/C	<1g/C
Gramineae										
stem				<1g/C						<1g/C
fruit										
inflorescence										
leaf										
Phragmites sp.										
culm										
Zea mays										
ear										
fruit										1/N
glume										
cob										
cupule	1/C					1/C				1/C
Hydrangaceae										
Fendlera sp.										
wood										

Table D.6 Bulk soil sample results, Pitstructures 2 and 3, Windy Wheat Hamlet--Continued

Taxon	Provenience									
	Pitstructure 2									
	Upper control	Upper control	Upper control	Lower control Level 1	Floor					F19 (bench) Upper control Level 1
Family Genus species Plant part	BS563	BS633	BS703	BS750	BS623	BS624	BS634	BS635	BS651	BS567
Leguminosae cotyledon										
Malvaceae seed Sphaeralcea sp. seed Mentzelia sp. seed										
Polygonaceae Polygonum fruit										
Pinaceae Pinus sp. needle wood Pinus edulis needle wood Pinus ponderosa needle wood Pseudotsuga menziesii needle	<1g/C X/C X/C	<1g/C 1.8g/C <1g/C	<1g/C <1g/C		<1g/C		<1g/C	<1g/C	<1g/C	<1g/C
Portulacaceae Portulaca sp. seed	1/C									1/C
Rosaceae wood Amelanchier sp. wood Cercocarpus sp. wood									<1g/C	<1g/C
Salicaceae wood Populus sp. wood		<1g/C				<1g/C		<1g/C	<1g/C <1g/C	
Solanaceae Nicotiana attenuata seed Physalis sp. seed				4/N	3/N					
Dicotyledoneae seed leaf wood			1/C	1/N <1g/C			<1g/C		<1g/C	
Gymnospermae wood		<1g/C	<1g/C		<1g/C		<1g/C	<1g/C	<1g/C	
Monocotyledoneae culm					<1g/C					

Table D.6 Bulk soil sample results, Pitstructures 2 and 3, Windy Wheat Hamlet--Continued

Taxon	Provenience								
	Pitstructure 2								
	F19 (bench)		F48 (sipapu)		F51 (pit)	F21 (hearth)			
Family Genus species Plant part	BS564	BS568	Strat 2 BS743	Strat 3 BS744	full cut BS741	Strat 1 BS731	Strat 3 BS732	Strat 4 BS733	Strat 9 BS734
Amaranthaceae *Amaranthus* sp. seed								1/C	1/C
Anacardiaceae *Rhus aromatica* twig									
"Cheno-am" fruit						1/C	1/C		
Chenopodiaceae *Chenopodium* sp. fruit	1/N						1/C		1/C
Compositae fruit *Artemisia* sp. leaf fruit wood *Helianthus* sp. fruit		1/C			<1g/C	<1g/C	1/C	<1g/C	<1g/C 2/C
Cruciferae seed *Descurainia* sp. seed							1/C		
Cupressaceae *Juniperus* sp. scale wood	<1g/C, <1g/N	7/C <1g/C				2/C	9/C		5/C 1g/C
Cyperaceae fruit *Scirpus* sp. fruit							1/C 1/C		
Fagaceae *Quercus cambelli* fruit cupule wood				<1g/C	<1g/C		<1g/C	<1g/C	
Gramineae stem fruit inflorescence leaf *Phragmites* sp. culm *Zea mays* ear fruit glume cob cupule	7/C	3fg/C 5/C			2/C	2/C <1g/C	<1g/C 1/C <1g/C X/C	1/C X/C	1/C <1g/C X/C
Hydrangaceae *Fendlera* sp. wood									

Table D.6 Bulk soil sample results, Pitstructures 2 and 3, Windy Wheat Hamlet--Continued

Taxon	Provenience								
	Pitstructure 2								
	F19 (bench)		F48 (sipapu)		F51 (pit)	F21 (hearth)			
Family Genus species Plant part	BS564	BS568	Strat 2 BS743	Strat 3 BS744	full cut BS741	Strat 1 BS731	Strat 3 BS732	Strat 4 BS733	Strat 9 BS734
Leguminosae cotyledon									
Malvaceae seed Sphaeralcea sp. seed									
Loasaceae Mentzelia sp. seed						2/C		11/C	1/C
Polygonaceae Polygonum sp. fruit									
Pinaceae Pinus sp. needle wood	<1g/C, <1g/N	<1g/C	<1g/C		<1g/C	<1g/C	<1g/C		
Pinus edulis needle wood	<1g/C								
Pinus ponderosa needle wood	1.2g/C	<1g/C							
Pseudotsuga menziesii needle									
Portulacaceae Portulaca sp. seed						1/C		4/C	1/C
Rosaceae wood Amelanchier sp. wood					<1g/C				
Cercocarpus sp. wood									
Salicaceae wood Populus sp. wood					<1g/C	<1g/C	<1g/C	<1g/C	<1g/C
Solanaceae Nicotiana attenuata seed			6/N	3/N	2/N	2/N	2/C,3/N		
Physalis sp. seed		1/C							
Dicotyledoneae seed						1/C			
leaf wood									<1g/C, <1g/C
Gymnospermae wood	<1g/C	<1g/C, <1g/N			<1g/C				
Monocotyledoneae culm									

Table D.6 Bulk soil sample results, Pitstructures 2 and 3, Windy Wheat Hamlet--Continued

Taxon	Provenience												
	Pitstructure 2												
	Floor samples associated with F21 (hearth)												
Family Genus species Plant part	B-1 BS710	B-2 BS711	B-3 BS667	B-4 BS666	B-5 BS665	C-2 BS683	C-3 BS684	C-4 BS609	C-5 BS610	D-0 BS590	D-3 BS591	D-4 BS592	D-5 BS593
Amaranthaceae													
Amaranthus sp.													
seed							1/N						
Anacardiaceae													
Rhus aromatica													
twig													
"Cheno-am"													
fruit													
Chenopodiaceae													
Chenopodium sp.													
fruit		7/C	1/C										
Compositae													
fruit				2/N					1/C			1/N	
Artemisia sp.													
leaf													
fruit													
wood			<1g/C		<1g/C	<1g/C			<1g/C				
Helianthus sp.													
fruit													
Cruciferae													
seed													
Descurainia sp.													
seed													
Cupressaceae													
Juniperus sp.													
scale		1/C											
wood													
Cyperaceae													
fruit													
Scirpus sp.													
fruit													
Fagaceae													
Quercus gambelii													
fruit													
cupule													
wood													
Gramineae													
stem													
fruit													
inflorescence						1/C							
leaf													
Phragmites sp.													
culm													
Zea mays													
ear													
fruit	<1g/C												
glume													
cob													
cupule													
Hydrangaceae													
Fendlera sp.													
wood													

Table D.6 Bulk soil sample results, Pitstructures 2 and 3, Windy Wheat Hamlet--Continued

Taxon	Provenience												
	Pitstructure 2												
	Floor samples associated with F21 (hearth)												
Family Genus species Plant part	B-1 BS710	B-2 BS711	B-3 BS667	B-4 BS666	B-5 BS665	C-2 BS683	C-3 BS684	C-4 BS609	C-5 BS610	D-0 BS590	D-3 BS591	D-4 BS592	D-5 BS593
Leguminosae cotyledon		1/C											
Malvaceae seed Sphaeralcea sp. seed Mentzelia sp. seed		1/C					1/N						
Polygonaceae Polygonum sp. fruit	1/C												
Pinaceae Pinus sp. needle wood Pinus edulis needle wood Pinus ponderosa needle wood Pseudotsuga menziesii needle	<1g/C	<1g/C						<1g/C	1/C <1g/C	<1g/C 1/C	1/C	<1g/C X/C	X/C 1/C
Portulacaceae Portulaca sp. seed	1/N	2X/C				2/C				2/C			
Rosaceae wood Amelanchier sp. wood Cercocarpus sp. wood													
Salicaceae wood Populus sp. wood							<1g/C						
Solanaceae Nicotiana attenuata seed Physalis sp. seed	5/C, 32X/N	13/C, 16X/N	15/N	6/N		2/C	4/C						
Dicotyledoneae seed leaf wood		1/C		<1g/C									
Gymnospermae wood			<1g/C			<1g/C			<1g/C				<1g/C
Monocotyledoneae culm													

Table D.6 Bulk soil sample results, Pitstructures 2 and 3, Windy Wheat Hamlet--Continued

Taxon	Provenience							
	Pitstructure 3							
	Floor				F165 (hearth)		F163 (ashpit)	F175 (ashpit)
Family Genus species Plant part	BS861	BS863	BS868	BS882	Full cut BS890	Full cut BS891	full cut BS886	full cut BS894
Amaranthaceae *Amaranthus* sp. seed								
Anacardiaceae *Rhus aromatica* twig								
"Cheno-am" fruit								
Chenopodiaceae *Chenopodium* sp. fruit								
Compositae fruit *Artemisia* sp. leaf fruit wood *Helianthus* sp. fruit		<1g/C	<1g/C	<1g/C	1/C <1g/C	<1g/C	<1g/C 1/N	<1g/C
Cruciferae seed *Descurainia* sp. seed								
Cupressaceae *Juniperus* sp. scale wood			2/C		16/C, 2/N <1g/C	<1g/C		
Cyperaceae fruit *Scirpus* sp. fruit								
Fagaceae *Quercus gambelii* fruit cupule wood	<1g/C	<1g/C		<1g/C	<1g/C	<1g/C	<1g/C	<1g/C
Gramineae stem fruit inflorescence leaf *Phragmites* sp. culm *Zea mays* ear fruit glume cob cupule		X/C		5/C	<1g/C 1X/C	<1g/C 2/C	X/N 1/C 1/C	<1g/C 5/C
Hydrangaceae *Fendlera* sp. wood					<1g/C	<1g/C		

Table D.6 Bulk soil sample results, Pitstructures 2 and 3, Windy Wheat Hamlet--Continued

Taxon	Provenience							
	Pitstructure 3							
	Floor				F165 (hearth)		F163 (ashpit) full cut BS886	F175 (ashpit) full cut BS894
Family Genus species Plant part	BS861	BS863	BS868	BS882	Full cut BS890	Full cut BS891		
Leguminosae cotyledon								
Malvaceae seed Sphaeralcea sp. seed Mentzelia sp. seed								
Polygonaceae Polygonum sp. fruit								
Pinaceae Pinus sp. needle wood Pinus edulis needle wood Pinus ponderosa needle wood Pseudotsuga menziesii needle	X/C		X/C		1/C		<1g/C	<1g/C <1g/C
Portulacaceae Portulaca sp. seed		1/C						
Rosaceae wood Amelanchier sp. wood Cercocarpus sp. wood	<1g/C	<1g/C <1g/C		<1g/C <1g/C <1g/C	1.3g/C	<1g/C	<1g/C	<1g/C
Salicaceae wood Populus sp. wood			<1g/C	<1g/C	<1g/C			<1g/C
Solanaceae Nicotiana attenuata seed Physalis sp. seed	4/N	3X/N	49X/N		1/N		1/N	
Dicotyledoneae seed leaf wood			<1g/C		<1g/C	<1g/C		<1g/C
Gymnospermae wood			<1g/C	<1g/C			<1g/C	<1g/C
Monocotyledoneae culm							<1g/C	

Table D.7 Vegetal remains, Pitstructures 2 and 3, Windy Wheat Hamlet

Taxon	Provenience											
	Pitstructure 2											
			Feature 19 (bench)						F35	F36	F20	Surf 1
Family Genus species Plant part	Level 2	Level 3	Surf 1 PL33	F84 (PH)	F89 (PH)	F96 (PH)	F102 (PH)	F106 (PH)	(entry) Surf 1	(entry) Surf 1	(vent) Level 3	General surf
Amaranthaceae *Amaranthus* sp. seed												
Compositae *Artemisia* sp. wood		149.4g/C									49.3g/C	
Cupressaceae *Juniperus* sp. wood				78.7g/N								
Fagaceae *Quercus gambelii* wood												
Gramineae *Phragmites* sp. culm *Zea mays* ear fruit cob cupule			3fg/C 4g/C						<1g/C 1fg/C	1fg/C		<1g/C 71fg/C 26/C
Leguminosae *Phaseolus* sp. cotyledon seed		1/C										
Pinaceae *Pinus* sp. wood *Pinus edulis* wood *Pinus ponderosa* bark wood	47g/C	82.8g/C			14.5g/N	10.4g/P		9.5g/N			11.7g/C	68.5g/C
Rosaceae wood *Cercocarpus* sp. wood												
Salicaceae *Populus* sp. wood											13.8g/C	
Gymnospermae wood		–					53.9/N					

NOTES: In the body of the table, numerals to the left of the bar indicate the number of items present, except in those cases where the items have been reported as a weight. In this later case, the numeral is followed by the abbreviation "g" indicating the number of grams of material present.

Surf - Surface.
F - Feature.
PH - Posthole.
fg - Fragments.
Strat - Stratum.
Vent - Ventilator.
P - Partially charred.
C - Charred.
N - Noncharred.
PL - Point location.

Table D.7 Vegetal remains, Pitstructures 2 and 3, Windy Wheat Hamlet--Continued

Taxon	Provenience										
	Pitstructure 2						Pitstructure 3				
	Surf 1						Level 1	Surf 1			
Family Genus species Plant part	F21 (hearth) Strat 9	F21 Full cut	F27 (PH)	F42 (PH)	F57 (PH)	F22 (wing-wall surf)		PL2	PL15	F165 (hearth)	F169 (PH)
Amaranthaceae *Amaranthus* sp. seed		1/N V									
Compositae *Artemisia* sp. wood		6.1g/C				1.0g/C				3.0g/C	
Cupressaceae *Juniperus* sp. wood		1.0g/C				<1g/C					
Fagaceae *Quercus gambelii* wood		1.0g/C								1.0g/C	
Gramineae *Phragmites* sp. culm *Zea mays* ear fruit cob cupule		1.0g/C 4fg/C 6/C				16.5g/C				1fg/C	[illegible]g/C
Leguminosae *Phaseolus* sp. cotyledon seed		3/C									
Pinaceae *Pinus* sp. wood *Pinus edulis* wood *Pinus ponderosa* bark wood	<1g/C	3.2g/C 5.5g/C 1.7g/C	119.9g/N	161.1g/N 1.5g/C	37.7g/N		18.7g/N	19.2g/N	14.7g/N	1.8g/C	
Rosaceae wood *Cercocarpus* sp. wood		<1g/C, 1.9g/C 3.2g/C					4.6g/C				
Salicaceae *Populus* sp. wood							4.1g/C			4.0g/C	
Gymnospermae wood						4.5g/P					

sand-filled sipapu (Feature 45) may not be related to the features but are fragments of debris incorporated into the fill of the features.

The genera represented by small-scale remains are similar to those recovered from Pitstructure 1; although there are some differences in representation. The frequently occurring, nondomesticated genera identified from the bulk soil samples were Nicotiana attenuata (41 percent), Portulaca (28 percent), Amaranthus (16 percent) and Chenopodium (16 percent). All other genera of plants represented by reproductive parts occurred in less than 1 percent of the bulk soil samples. Parts of the four previously mentioned ruderal genera were retrieved from floor and hearth samples. Contrary to the pattern seen in Pitstructure 1, charred and noncharred Nicotiana seeds were recovered most frequently. These seeds were most commonly found in the floor samples while the other taxa were more dispersed in their occurrence. There is a noticeable absence of Artemisia fruits from this structure, which could mean that the Artemisia wood used for fuel and construction was collected prior to or after fruiting.

It is difficult to state whether any of the four taxa were encouraged plant resources. Although there is a high frequency of Nicotiana in Pitstructure 2, the abandonment mode for the structure and the large percentage of noncharred seeds might indicate postabandonment contamination. Since the internal structure of the noncharred Nicotiana seeds was gone, it is assumed that these seeds are not modern. Also, there has been a pattern noticed in the DAP macrobotanical assemblage of the cooccurrence of Nicotiana seeds and sand-covered floors or sand-filled features. There is a chance that the Nicotiana seeds are inadvertently being bought into the structure with the sand, since Nicotiana grows naturally in sandy

areas. It is apparent that the four ruderal genera were available to the occupants of Pitstructure 2, and possibly were growing in the habitation area. All four genera are considered to be potential economic resources, although their status within the subsistence regime cannot be estimated. Based on frequency of occurrence, the other ruderal plants would not appear to have been very important as gathered resources. However, there are several factors like differential preservation, preparation techniques, and season of abandonment that could adversely affect their representation.

In addition to these weedy types of economic plants, remains of Zea mays and Phaseolus were also recovered. The distribution of Zea mays on the floor of the structure may be generalized debris dispersed after abandonment or the remains may be de facto refuse from processing activities.

As mentioned earlier in this appendix, Pitstructure 2 was used in a cruciform transect sampling project that involved 12 other pitstructures in the project area. Materials from the bulk soil samples from Pitstructure 2 used in this study are shown in table D.6, under "Floor samples associated with Feature 21." The main purpose of the project was to address the feasibility of using macrobotanical remains in discerning spatial patterning of food processing activity areas. A secondary purpose of the project was to evaluate the effect of different abandonment modes on the interpretability of these remains. Refer to Matthews (1981) for the results of this study.

Pitstructure 3

Pitstructure 3 was not buried, implying minimal preservation potential, and consequently very little macrobotanical material was

recovered. Also, since Pitstructure 3 is believed to have been used as a trash dump during construction of Pitstructure 2, material collected from Pitstructure 3 may not necessarily be associated with the use of this structure. As tables D.6 and D.7 show, wood charcoal was the most frequently retrieved material. Wood fragments were collected from the structure fill, floor, hearth, and ash pits. Taxa identified include Artemisia, Juniperus, Quercus gambelii, Fendlera, Pinus spp., Amelanchier, Cercocarpus, Populus, Rosaceae, and Salicaceae. As with the other two pitstructures discussed, the remains of wood are believed to represent fuel and construction resources.

A few fragments of Zea mays were recovered from the floor, hearth, and ash pits in Pitstructure 3. It is impossible to say whether the corn found on the floor is de facto refuse from food processing activities or extraneous debris. The unburned nature of the structure and the charred condition of the corn would imply that the remains are trash.

In addition to wood and corn, one Portulaca and numerous Nicotiana attenuata seeds were retrieved from flotation samples. The Nicotiana seeds were not obviously modern although they were all noncharred and all but two seeds were recovered from floor samples. In light of the preservation potential of Pitstructure 3, these noncharred seeds might be postabandonment inclusions.

Macrobotanical Remains From Rooms, Nonstructures, and Grid Units

Excavated areas other than the pitstructures were fairly shallow and disturbed by repeated plowing during recent years. Disturbance from plowing probably increased the level of contamination and decreased the level of preservation. Since the preservation potential for these areas

was considered minimal, very few bulk soil samples were considered worth analyzing.

Rooms

Results of analysis for rooms are presented in tables D.8 and D.9. The majority of vegetal material from the rooms is wood charcoal and cultigens. Wood from postholes in Rooms 1 and 6 was identified as Pinus spp. and Juniperus, respectively. Other taxa identified include Artemisia, Quercus gambelii, Amelanchier, Prunus, Populus, and indeterminate Rosaceae. Most of the wood was recovered from the floors of the rooms or in the fill just above the floor and is believed to be construction or fuel materials. Most of the rooms contained remains of Zea mays and/or Phaeolus. Because of these remains, several of the rooms have been designated as specific food-processing activity areas.

The small-scale remains from the bulk soil samples from Room 3 (table D.8) contain an array of genera and plant parts similar to those found in the pitstructures. It is believed that the charred material is either associated with the occupation of the structure or was at least incorporated into the structure prior to it burning. However, the integrity of the noncharred material is dubious and this material may be postabandonment inclusions.

Occupation Area and Grid Units

Wood charcoal collected in the occupation area and various grid units (table D.10) was identified as Artemisia, Acer, Quercus gambelii, Juniperus, Pinus spp., Cercocarpus, Populus, and an indeterminate Rosaceae. Remains of Zea mays, Phaseolus, and Cucurbita were also recovered from these proveniences. Features 18, 131, and 143 in the occupation area were abandoned prior to the abandonment of the site and

Table D.8 Bulk soil sample results, Room 3, and the occupation area, Windy Wheat Hamlet

Taxon	Provenience										
	Room 3			Occupation Area							
	Floor		F139 (ashpit)	F15 (cist)			F33 (FP) Strat 1	F132 (pit)			
				Full cut	Full cut	Full cut		East half		West half	
Family Genus species Plant part	BS906	BS907	BS917	BS429	BS430	BS431	BS533	BS921	BS925	BS930	BS932
Amaranthaceae *Amaranthus* sp. seed	1/N			1/N	1/N			4X/N	6X/N		1X/N
Anacardiaceae *Rhus aromatica* twig			W/C								
"Cheno-am" fruit			1/C								
Chenopodiaceae *Chenopodium* sp. fruit		1/C		15X/N	7X/N	16X/N	4/N	1/C		2/C	1/C
Compositae *Artemisia* sp. wood	<1g/C	<1g/C		<1g/C	<1g/C	<1g/C	<1g/C	<1g/C	1.0/C	<1g/C	<1g/C
Helianthus sp. fruit				1/C							
Cupressaceae *Juniperus* sp. scale			1/C								
wood									<1g/C	<1g/C	
Cyperaceae fruit	1/C		1/C								
Fagaceae *Quercus gambelii* wood			<1g/C							<1g/C	
Gramineae culm				<1g/C	<1g/C, <1g/N	<1g/C		<1g/C			<1g/C
Phragmites sp. culm									<1g/C		
Zea mays kernal	<1g/C	<1g/C	<1g/C	12.6g/C	13.9g/C	11.3g/C	<1g/C	1.1g/C	1.6g/C	1.7g/C	<1g/C
cob				10fg/C	20fg/C	6fg/C					
cupule	1/C	1/C	4/C	48/C	72X/C	76/C		1X/C	4X/C	1X/C	4/C
Hydrangaceae *Fendlera* sp. wood						<1g/C					

NOTES: In the body of the table, numerals to the left of the bar indicate the number of items present, except in those cases where the items have been reported as a weight. In this later case, the numeral is followed by the abbreviation "g" indicating the number of grams of material present.

BS - Bulk soil.
F - Feature.
N - Noncharred.
C - Charred.
X - Fragments present, no count of fragments possible.

fg - Fragment.
W - Worked.
FP - Fireplace.
"Cheno-am" - Chenopodium-Amaranthus? Indistinguishable.

Table D.8 Bulk soil sample results, Room 3, and the occupation area, Windy Wheat Hamlet--Continued

Taxon	Provenience										
	Room 3			Occupation Area							
	Floor		F139 (ashpit)	F15 (cist)			F33 (FP) Strat 1	F132 (pit)			
				Full cut	Full cut	Full cut		East half		West half	
Family Genus species Plant part	BS906	BS907	BS917	BS429	BS430	BS431	BS533	BS921	BS925	BS930	BS932
Leguminosae *Phaseolus* sp. cotyledon		X/C						5/C		X/C	
Liliaceae *Yucca* sp. fiber					W/C						
Loasaceae *Mentzelia* sp. seed						1/C			1/C		
Malvaceae seed				3/N			2/N				1/C
Pinaceae *Pinus* sp. wood	<1g/C						<1g/C	<1g/C	1.0g/C		<1g/C
Pinus edulis needle		1/C									
wood											<1g/C
Pinus ponderosa wood		<1g/C									
Portulacaceae *Portulaca* sp. seed	2/C	103X/C, 3/N	1/C	2/C, 2/N	1/C	9/C, 2/N		1/C	4/C	2/C	2/C
Rosaceae seed			1/C								
Amelanchier sp. wood	<1g/C		<1g/C								
Cercocarpus sp. wood								<1g/C			<1g/C
Salicaceae wood							<1g/C		<1g/C		<1g/C
Populus sp. wood	<1g/C	<1g/C		<1g/C	<1g/C	<1g/C	<1g/C	<1g/C		<1g/C	
Solanaceae *Nicotiana attenuata* seed		7X/N	1/C, 2/N								
Dicotyledoneae seed	1/C	6/C	1/C	1/C		1/N		3/C	1/C	3/C, 1/C	5/C
wood	<1g/C		<1g/C	<1g/C		<1g/C	<1g/C	<1g/C			
Gymnospermae wood	<1g/C				<1g/C		<1g/C	<1g/C		<1g/C	<1g/C

Table D.9 Vegetal remains from rooms, Windy Wheat Hamlet

Taxon	Provenience										
	Room 1							Room 2			
	Strat 1	Surface 1				Surface 2		Surface 1			
Family Genus species Plant part		General surface	PL23	F114 (indt)	F115 (PH)	General surface	PL20	General surface	PL6	PL10	PL13
Compositae *Artemisia* sp. wood	3.4g/C					1.5g/C					
Cupressaceae *Juniperus* sp. wood	1.7g/C										
Fagaceae *Quercus gambelii* wood											
Gramineae *Zea mays* ear fruit cob cupule	2g/C					2.6g/C			5fg/C 5g/C 6fg/C	2g/C 11fg/C 10/C	3g/C 7/C
Leguminosae *Phaseolus* sp. cotyledon seed	108X/C 10/C	9X/C 1/C	50X/C 11/C		3	26X/C 84/C					
Liliaceae *Yucca* sp. leaf											1/C
Pinaceae *Pinus* sp. wood *Pinus ponderosa* wood	4.9g/C	<1g/C		9.5g/C	42.6g/N			27.7g/C		<1g/C	
Rosaceae wood *Prunus* sp. wood		5.5g/C								<1g/C	
Salicaceae *Populus* sp. wood		7.3g/C				11.1g/C					
Gymnospermae wood	<1/C	4.3/N					4.0/N				

NOTES: In the body of the table, numerals to the left of the bar indicate the number of items present, except in those cases where the items have been reported as a weight. In this later case, the numeral is followed by the abbreviation "g" indicating the number of grams of material present.

Indt - Indeterminate.
PH - Posthole.
PL - Point location.
Strat - Stratum.
X - Fragments present; no count of fragments possible.

F - Feature.
N - Noncharred.
C - Charred.
P - Partially charred.
fg - Fragment.

Table D.9 Vegetal remains from rooms, Windy Wheat Hamlet--Continued

Taxon	Provenience											
	Room 3											
	Strat 1	Surface 1										
Family Genus species Plant part		PL1	PL3	PL9	PL11	PL30	PL31	PL36	PL60	PL61	PL75	F133 (hearth)
Compositae *Artemisia* sp. wood												
Cupressaceae *Juniperus* sp. wood												
Fagaceae *Quercus gambelii* wood												2.7g/C
Gramineae *Zea mays* ear fruit cob cupule	<1g/C	<1g/C		<1g/C		<1g/C		1g/C 1fg/C	5g/C 15fg/C 10/C		4g/C 1fg/C	
Leguminosae *Phaseolus* sp. cotyledon seed	49X/C 2/C		2/C		6X/C	2X/C						
Liliaceae *Yucca* sp. leaf												
Pinaceae *Pinus* sp. wood *Pinus ponderosa* wood	26.4g/P									3.7g/C		
Rosaceae wood *Prunus* sp. wood											<1g/C	
Salicaceae *Populus* sp. wood	2.1g/C						1g/C					
Gymnospermae wood												

Table D.9 Vegetal remains from rooms, Windy Wheat Hamlet--Continued

Taxon	Provenience								
	Room 4			Room 5			Room 6		Room 8
	Strat 1	Surface 1		Surface 1			Surface 1		
Family Genus species Plant part		General surface	F128 PL1	PL21	PL22	PL23	F180 PH	F181 PH	F13 Pit
Compositae									
Artemisia sp.									
wood									
Cupressaceae									
Juniperus sp.									
wood							45.3g/N	1.7g/N	
Fagaceae									
Quercus gambelii									
wood									
Gramineae									
Zea mays									
ear									
fruit			36g/C	<1g/C					<1g/C
cob			3fg/C						
cupule			1/C						
Leguminosae									
Phaseolus sp.									
cotyledon			65X/C	1X/C					1X/C
seed			1/C						
Liliaceae									
Yucca sp.									
leaf									
Pinaceae									
Pinus sp.									
wood		8.4g/C			<1g/C	3.5g/C			10g/P
Pinus ponderosa									
wood									
Rosaceae									
wood									
Prunus sp.									
wood									
Salicaceae									
Populus sp.									
wood						2.7g/C			
Gymnospermae									
wood									

Table D.10 Vegetal remains from other excavation units, Windy Wheat Hamlet

Taxon	Provenience											
	Occupation area											
	1- by 1-m grid units											
	112/138 Strat 1	112/141 Strat 1	112/146 Level 1	113/146					114/141			114/142
				Strat 1	Level 1	Surf 1			F33 (FP)			Strat 1
Family Genus species Plant part						General surf	PL21	F15 (cist)	Strat 1	Strat 1	Full cut	
Aceraceae *Acer* sp. wood		<1g/C										
Compositae *Artemisia* sp. wood					<1g/C				<1g/C	<1g/C	<1g/C	
Cucurbitaceae *Cucurbita* sp. seed												
Cupressaceae *Juniperus* sp. wood												
Fagaceae *Quercus garbelii* wood												
Gramineae *Phragmites* sp. culm *Zea mays* glume culm ear fruit cob cupule	<1g/C	<1g/C	19.6g/C 9fg/C 2/C	16.4g/C 28fg/C X/C	23.6g/C 15fg/C X/C	<1g 3/C 51.4g/C 25fg/C 7/C	5/C 24.7g/C 35fg/C 8/C	26fg/C 209.5g/C 211fg/C 97/C	<1g/C	<1g/C	<1g/C	
Leguminosae *Phaseolus* sp. cotyledon seed	1/C		2/C 1/C			3/C		3/C		1/C	X/C	3X/C 1/C
Pinaceae *Pinus* sp. wood *Pinus ponderosa* wood	1.4g/C		12.7g/C						<1g/C	<1g/C	<1g/C	
Rosaceae wood *Cercocarpus* sp. wood												
Salicaceae *Populus* sp. wood		<1g/C							<1g/C		<1g/C	
Dicotyledoneae fruit bark wood							<1g/C					
Gymnospermae bark wood												

NOTES: In the body of the table, numerals to the left of the bar indicate the number of items present, except in those cases where the items have been reported as a weight. In this latter case, the numeral is followed by the abbreviation "g" indicating the number of grams of material present.

F - Feature.
FP - Fireplace.
W - Worked.
C - Charred.

Table D.10 Vegetal remains from other excavation units, Windy Wheat Hamlet--Continued

Taxon	Provenience											
	Occupation area											
	1- by 1-m grid units		2- by 2-m grid units									
	114/142		110/130		110/137	110/144	112/134	112/146				114/140
								F18 (cist)				
Family Genus species Plant part	F66 (FP)	F113 (PH)	Strat 1	F143 (pit)	F132 (indt)	Level 1	F131 (cist) Level 1	Strat 2	Strat 3	Strat 4	Full cut	Level 1
Aceraceae Acer sp. wood												
Compositae Artemisia sp. wood	<1g/C									<1g/C		
Cucurbitaceae Cucurbita sp. seed								g <1g/C				
Cupressaceae Juniperus sp. wood	<1g/C	<1g/C					16.3g/C				1.6g/C	
Fagaceae Quercus gambelii wood										<1g/C		
Gramineae Phragmites sp. culm Zea mays glume culm ear fruit cob cupule	<1g/C		<1g/C	2.2g/C 7fg/C	0.5g/C	2.5g/C			1fg/C	<1g/C 12fg/C 45g/C 14fg/C	5.8g/C	<1g/C
Leguminosae Phaseolus sp. cotyledon seed			12X/C	2/C						2/C 1/C	3/C	
Pinaceae Pinus sp. wood Pinus ponderosa wood	3.0g/C				<1g/C	125.5g/C			<1g/C	<1g/C		
Rosaceae wood Cercocarpus sp. wood										<1g/C <1g/C		
Salicaceae Populus sp. wood	2.3g/C	<1g/C			<1g/C		12.7g/C	<1g/C		<1g/C	<1g/C	
Dicotyledoneae fruit bark wood												
Gymnospermae bark wood												

Table D.10 Vegetal remains from other excavation units, Windy Wheat Hamlet--Continued

Taxon	Provenience											
	2- by 2-m grid unit 124/128 Level 1	Misc 1- by 1-m grid unit 113/138 Strat 1	Misc 2- by 2-m grid units									
			112/136		112/142 Level 1	112/144 Level 1	114/142 Level 1	114/144 Level 1	114/146 Level 1	122/144 Level 2	124/148 Level 1	124/166 Level 1
			Strat 1	Level 3								
Family Genus species Plant part												
Aceraceae *Acer* sp. wood												
Compositae *Artemisia* sp. wood								<1g/C	<1g/C		1.0g/N	
Cucurbitaceae *Cucurbita* sp. seed												
Cupressaceae *Juniperus* sp. wood			2.5g/C	2.5g/P								
Fagaceae *Quercus gambelii* wood												
Gramineae *Phragmites* sp. culm *Zea mays* glume culm ear fruit cob cupule		<1g/C	<1g/C		<1g/C	8.0g/C 19/C	3.0g/C	3.0g/C 1fg/C	1/C 20g/C 4fg/C 8/C			
Leguminosae *Phaseolus* sp. cotyledon seed		1/C			1/C	2X/C	9X/C 1/C	5X/C	1X/C			*6/N
Pinaceae *Pinus* sp. wood *Pinus ponderosa* wood	W/P					<1g/C		<1g/C 3.6g/C			16.0g/P	
Rosaceae wood *Cercocarpus* sp. wood												
Salicaceae *Populus* sp. wood								1.5g/C				
Dicotyledoneae fruit bark wood												
Gymnospermae bark wood										4.5g/N		

* Modern contaminant.

element is variable. The remaining taxa identified occur more sporadically throughout the occupation of Windy Wheat Hamlet. Subjectively speaking, there is no major difference in the genera of macrobotanical remains identified from each element of occupation. The minor differences in either occurrence of genera, representativeness, or quantity of remains is believed to reflect sampling bias and preservation, not actual differences in the sbusistence economy of each occupation.

In the discussion of Pitstructure 1, evidence was presented to support the idea that Amaranthus and Portulaca were encouraged ruderal resources, while Chenopodium and Nicotiana attenuata might have been tolerated economic weeds. However, the occurrences of these genera in other structures may be considered somewhat contradictory to the pattern seen in Pitstructure 1. Portulaca and Nicotiana occur more frequently than Amaranthus or Chenopodium and in greater quantities. It is feasible that individual reproductive strategies and other factors affecting representation could be responsible for this variability. Nonetheless, there is the possibility that these remains reflect cultural preference for particular genera, as there is a steady occurrence of Portulaca and an increased occurrence of Amaranthus. Results of analysis make it apparent that Amaranthus, Chenopodium, Nicotiana attenuata, and Portulaca were available during all three occupations of the site. Their occurrence in features and from occupation surfaces indicates that all of these genera were exploited. However, the question of their encouraged versus tolerated status remains unanswered. More studies from other sites with similar temporal sequences are needed to test patterning of these genera and their status in the subsistence economy.

The frequently occurring genera of woody plants indicates the

the vegetal remains recovered from these features is considered to be trash. The temporal assignment of Features 33, 66, 133, and 137 is indeterminate although the material from these features is undoubtedly related in some way to the occupation of the site. The vegetal remains from the grid-squares are considered to be broadcasted trash.

Small-scale remains were extracted from the fills of Features 15 and 132 (table D.8), located in the occupation area. These two features are believed to have been open or in use during the final occupation of the site. Due to their proximity to modern ground surface and the disturbance from plowing, the noncharred material is probably intrusive. The genera of the charred small-scale remains (e.g., disseminules of Chenopodium, Portulaca, Mentzelia) are consistent with remains found within structures. This charred material is not believed to be directly associated with the use of the features because neither is burned and the remains are probably trash that was not removed to the midden prior to abandonment of the site.

Summary

In attempting to reconstruct the prehistoric subsistence economy, patterns in the occurrence of subsistence items need to be assessed.

In reviewing the result of macrobotanical analysis of material from the various study units, there are some patterns or consistencies in the assemblages from the different elements. There is a ubiguitous occurrence of ruderal genera (Amaranthus, Chenopodium, Nicotiana attenuata, and Portulaca), of various wood-bearing genera (Artemisia, Juniperus, Quercus gambelii, Pinus spp., Populus, and Rosaceae) and of two domesticates (Zea mays and Phaseolus). The percentage occurrence of any of these genera per

prehistoric cultural preference for certain fuel and construction materials. Petersen's (1983) reconstruction of the project vegetation (prior to major historic disturbance) places Windy Wheat Hamlet in a sagebrush shrubland zone, surrounded by a pinyon-juniper woodland zone. Populus, Pinus ponderosa, and maybe the Rosaceous woods would have required more energy to harvest than the genera that occur in sagebrush and pinyon-juniper zones. There is a definite preference for P. ponderosa as the major construction material in Pitstructures 1 and 2. The preservation of wood from Pitstructure 3 and the rooms was too poor to give any clear indication of preferential wood resources.

The macrobotanical assemblage from Windy Wheat Hamlet is a diverse collection of domesticated, ruderal, weedy, and wild resources. The ubiquitous occurrence of domestic and nondomestic plants indicates a horticultural subsistence strategy, and possibly reflects a polycropping system of the domestic and ruderal plants. Remains of some plants are believed to be directly related to cultural preference, while the remains of other plants cannot be as easily interpreted.

APPENDIX E

WORKED VEGETAL MATERIAL FROM WINDY WHEAT HAMLET

by

Linda P. Hart

Worked vegetal material was recovered from the bench and the floor surface of Pitstructure 1, from the floor surface of Pitstructure 2, and from an ash pit in Room 3. Two extramural excavation units also yielded worked vegetal items. An inventory of these materials is presented in table E.1.

A number of worked vegetal items were preserved when Pitstructure 1 burned. Items from the bench include four fragments of twining (RV's 4, 5, 6, and 7[1]), one piece of cordage (RV 3), and a mass of processed, unused basketry or cordage construction material (RV 2). The twined items may be the remains of matting and are very similar in manufacturing technique; two of the four could have been part of the same item. The warps and wefts in RV's 6 and 7 are two-ply, yucca-fiber[2] cordage, and exhibit z-spin and s-twist. The mean cordage diameter of the two pieces differs by 0.75 mm (1.00 mm to 1.75 mm), but variation within a single piece is large; this difference could therefore be viewed as insignificant. The twining is done at an s-slant in both specimens. Technologically, RV 5 is indentical to RV's 6 and 7, but the appearance is different; the twining is so regular that the stitches are alined in columns. Like RV's 5, 6, and 7, RV 4 has two-ply, z-spin, and s-twist cordage wefts at an s-slant; however, the warps are single ply with an s-spin, and the finished product is much thicker. A portion of continuous selvage is present. The yucca-fiber cordage (RV 3) recovered from the bench could be a warp element from RV 5, 6, or 7. It exhibits the same two-ply, z-spin, s-twist construction

---

[1]RV numbers are assigned to worked vegetal materials on a site-wide basis.

[2]The material from Windy Wheat Hamlet was analyzed at a time when no comparative collection was available. When an item is described as being made from yucca fiber, it should be noted that this identification was made on the basis of resemblance to material later positively identified as *Yucca* sp.

Table E.1 Worked vegetal material, Windy Wheat Hamlet

Provenience	RV	Comments
Pitstructure 1 bench (Feature 2)	2	Fragment of two-ply cordage; possibly part of RV 5, 6, or 7; Yucca sp.; PL 242
	3	Mass of unused basketry construction material; Yucca sp.; PL 246
	4	Fragment of a twined item of indeterminate form, probably a mat; continuous selvage; Yucca sp.
	5	Fragment of a twined item of indeterminate form, probably a mat; Yucca sp.
	6	Fragment of a twined item of indeterminate form, probably a mat; very similar to RV 7; Yucca sp.
	7	Fragment of a twined item of indeterminate form, probably a mat; very similar to RV 6; Yucca sp.; PL 51
Pitstructure 1 floor surface	8	Fragments of a twined item of indeterminate form, probably a mat; Yucca sp.; PL's 361 and 362
	9	Fragments of a twined item of indeterminate form, probably a mat; Yucca sp.; PL's 389 and 390
	10	Mass of disarticulated basketry construction material; Yucca sp.; BS 77
	11	Mass of disarticulated basketry construction material; Yucca sp.; BS 80
	12	Mass of disarticulated basketry construction material; Yucca sp.; BS 105
	13	Mass of unused basketry construction material; Yucca sp.
	14	Mass of disarticulated basketry construction material; Yucca sp.; BS 135
Pitstructure 1 floor surface	16	Disarticulated fragments of a coiled item of indeterminate form; Rhus aromatica; BS 633

NOTES: RV numbers are assigned to worked vegetal materials on a site-wide basis.

BS - Bulk soil sample.

Table E.1 Worked vegetal material, Windy Wheat Hamlet--Continued

Provenience	RV	Comments
Room 3 ash pit (Feature 139)	17	Disarticulated fragment of a coiled item of indeterminate form; *Rhus aromatica*; BS 917
2- by 2-m grid unit 113S/146E storage pit (Feature 15)	15	Fragment of single-ply cordage; *Yucca* sp.; BS 430
2- by 2-m grid unit 124S/128E	1	Wood chip; *Pinus ponderosa*

and has a cord diameter of 1.75 mm. It was classified as cordate, however, because the small sample collected showed no signs of twining. RV 2 is a mass of basketry construction material. It is composed of retted yucca fibers. Little can be said of this material other than that it may have been intended for use in the manufacture of basketry items.

The remaining seven items recovered from Pitstructure 1 came from the floor surface. Two specimen types were present: twined items of indeterminate form (RV's 8 and 9) and basketry construction materials (RV's 10 through 14). The fragments of possible matting in RV 8 are from two point-located artifacts (PL's 361 and 362). They were combined under one RV number due to their similar technological attributes and close proximity south of the east wing wall. The twined fragments in RV 8 exhibit what is probably an s-slant (the surface is highly deteriorated). The fragments have s-spun wefts (1.25 mm) and warps of two-ply yucca-fiber cordage (1.83 mm) with z-spin and s-twist. The fragments in RV 9 exhibit the same technological attributes, although the warps and wefts are a little larger in diameter (warps 2.08 mm, wefts 1.46 mm). Like RV 8, the fragments in RV 9 came from two point-located artifacts (PL's 389 and 390) south of the east wingwall. The fragments assigned to RV's 8 and 9 could be from the same items as RV's 4 and 5, respectively, but they were recovered from areas a considerable distance apart (RV's 8 and 9 behind the east wingwall, and RV's 4 and 5 on the the middle of the western bench). RV's 10, 11, 12, and 14 are disarticulated yucca-fiber basketry materials recovered from bulk soil samples. One of these samples of basketry material (RV 13) does not appear to have ever been used; the fibers are long and straight, not crimped or twisted.

Coiled basketry was found only in Pitstructure 2 (RV 16) and Room 3 (RV 17). Sewing elements of longitudinally split squawbush (Rhus aromatica) twigs were recovered from the floor of Pitstructure 2 (5 pieces; mean width 1.3 mm) and from an ash pit in Room 3 (1 piece; width 2.0 mm). No foundation elements were recovered and the basketry forms cannot be determined.

Excavations in extramural areas yielded additional worked vegetal materials. RV 15 is a piece of cordage that was recovered in a bulk soil sample from a corn-filled pit located east of Rooms 1 and 7. It is single ply and s-spun; its diameter is 0.75 mm. RV 1, a small (2.0 cm by 3.6 cm by 0.7 cm) piece of ponderosa pine (Pinus ponderosa), was recovered from surficial deposits west of Pitstructure 2. It is a wood chip that appears to have been split along the grain.

APPENDIX F

LITHIC ARTIFACTS FROM WINDY WHEAT HAMLET

by

Thomas H. Hruby

Windy Wheat Hamlet (Site 5MT4644) is a small hamlet located in the north Sagehen Flats Locality of the DAP research area. Three distinctive occupations, termed elements, were recognized during the excavations at Windy Wheat Hamlet. Element 1 at Windy Wheat Hamlet is represented by Pitstructure 3. Element 2 is represented by the initial use of Pitstructure 2 and Rooms 1, 6, and 7, plus the use of a borrow pit, an unidentified use area, and several outside hearths. The third element is represented by Pitstructures 1 and 2, eight surface rooms, and a few other identifiable use areas. Within DAP temporal systematics, the occupation designated Element 1 occurred during the Sagehill Subphase, while Elements 2 and 3 occurred during the *Dos Casas Subphase*.

The DAP Reductive Technologies Group is responsible for the analysis and interpretation of flaked lithic tools and debitage, nonflaked lithic tools, and worked bone. The reductive technology preliminary analysis systems are primarily attribute-oriented analyses that focus on the types and amounts of technological input invested in the manufacture of the various tool types. The *flaked lithic* tool morpho-use typology is primarily a technological classification. A separate analysis is being conducted to establish the function of these tools; unfortunately, the results of this analysis are not available at this time. The nonflaked lithic morpho-use typology is more functional in orientation, as the functions of these tool classes are more easily established. Refer to Phagan (1982) for a discussion of the various DAP reductive technology analysis systems.

The Kolmogorov-Smirnov two-sample test (Siegel 1956:127-136), a nonparametric statistical test, was used to determine whether the distributions of morpho-use types in selected DAP assemblages are statistically

similar to each other. The Kolmogorov-Smirnov test requires an ordinal ranking of the data. To meet this requirement, flaked lithic and non-flaked lithic morpho-use classifications were ranked by the amount of technological input believed to have been invested in the manufacture of the various tool forms. The flaked lithic tool morpho-use classification is an adequate ordinal ranking, but the nonflaked lithic tool morpho-use classification reflects a weak ordinal ranking. Although statistical tests of significance are appropriate for measuring some differences between assemblages, a qualitative assessment of assemblage characteristics is also used. These statistical and qualitative assessments allow comparisons among the lithic tool assemblages from the three elements at Windy Wheat Hamlet as well as comparisons between this site and temporally similar hamlets in the project area. Unfortunately, when this appendix was written, only two sites had comparable data sets with adequate sample sizes. Element 2 at Site 5MT4671 has been assigned to the late Dos Casas Subphase. Element 2 at Site 5MT2161 has been assigned to the Dos Casas Subphase as well. Although these elements might not be contemporaneous with Windy Wheat Hamlet (both occupations end later), they were the best available when this appendix was written.

Flaked Lithics

The flaked lithic tool totals for the three elements at Windy Wheat Hamlet are presented in table F.1. A cursory examination of the profiles from Windy Wheat Hamlet suggests that there are a number of technological differences between the assemblages. Some of these differences can be accounted for by the variability in sample size. The flaked lithic tool assemblage from Element 1 is very small for comparative purposes. This small sample can be accounted for by the leisurely abandonment of Pit-

Table F.1 Flaked lithic tool assemblages from Windy Wheat Hamlet and selected DAP sites

	5MT4644 Element 1		5MT4644 Element 2		5MT4644 Element 3		5MT4671 Element 2		5MT2161 Element 2	
	N	%	N	%	N	%	N	%	N	%
Total tools:	18	100.0	41	100.0	971	100.0	117	100.0	465	100.0
Tool morpho-use										
Indeterminate					17	1.8	2	1.7	5	1.1
Utilized flake	4	22.2	6	14.6	485	49.9	37	31.6	170	36.6
Core	5	27.8	17	41.5	91	9.4	14	12.0	31	6.7
Used core, cobble tool	3	16.7	5	12.2	121	12.5	22	18.8	60	12.9
Thick uniface	1	5.6	4	9.8	113	11.6	12	10.3	81	17.4
Thin uniface	2	11.1			41	4.2	4	3.4	35	7.5
Specialized form			1	2.4	29	3.0	1	0.9	13	2.8
Thick biface					42	4.3	11	9.4	37	8.0
Thin biface			3	7.3	16	1.6	8	6.8	10	2.2
Projectile point	3	16.7	5	12.2	16	1.6	6	5.1	23	4.9
Grain size										
Coarse			2	4.9	1	0.1				
Medium			1	2.4	6	0.6	1	0.9	3	0.6
Fine	3	16.7	4	9.8	127	13.1	8	6.8	140	30.1
Very fine	5	27.8	25	61.0	493	50.8	64	54.7	240	51.6
Microscopic	10	56.6	9	22.0	344	35.5	44	37.6	82	17.6
Item condition										
Indeterminate					7	0.7			2	0.4
Broken										
Unidentifiable					50	5.1	10	8.5	13	2.8
Distal present					10	1.0	1	0.9	4	0.9
Proximal present			1	2.4	26	2.7	3	2.6	7	1.5
Medial/lateral present					15	1.5	1	0.9	11	2.4
Complete/nearly complete	18	100.0	40	97.6	863	88.9	102	87.2	428	92.0
Dorsal face evaluation										
Indeterminate					14	1.4	1	0.9	2	0.4
Core	8	44.4	22	53.7	193	19.9	30	25.6	77	16.6
Unworked with cortex	2	11.1	7	17.1	315	32.4	31	26.5	205	44.1
Unworked without cortex	2	11.1	5	12.2	334	34.4	25	21.4	103	22.2
Thinned with cortex	2	11.1			48	4.9	12	10.3	37	8.0
Thinned without cortex	3	16.7	2	4.9	39	4.0	7	6.0	13	2.8
Primarily thinned			2	4.9	14	1.4	5	4.3	5	1.1
Secondarily thinned					5	0.5	2	1.7	6	1.3
Well-shaped	1	5.6	3	7.3	5	0.5	2	1.7	15	3.2
Highly stylized					4	0.4	2	1.7	2	0.4

structure 3 and the lack of a separate midden deposit for this element. Only items found on the floor of the unburned pitstructure could be confidently assigned to the first element.

Elements 2 and 3 have adequate samples for comparison even though the counts are substantially different. Both elements are represented by burned pitstructures and a number of surface rooms, but the nature of the sample associated with each element is different. Because Pitstructure 2 and the rooms associated with it continued to be occupied during Element 3, the artifacts on the floors of these structures were assigned to Element 3, not to Element 2. Artifacts associated with Element 2 come from cultural fills located in various units across the site. Pitstructure 1 (assigned to Element 3) burned while it was occupied and, therefore, a large number of items associated with floors could be confidently assigned to Element 3.

The Element 2 and 3 flaked lithic tool assemblages differ most strikingly in the percentages of utilized flakes and unused cores. The Element 2 assemblage has a relatively low percentage of utilized flakes and has a very large percentage of unused cores. Projectile points are also well represented in the assemblage. The assemblage from Element 2 can be interpreted to be a very specialized lithic assemblage representing a more limited set of activities than is generally associated with Anasazi habitations. The assemblage from Element 2 at Windy Wheat Hamlet is unique with respect to assemblages from similar hamlets in the DAP study area. However, since the Element 2 assemblage consists of materials from cultural fills and not from cultural surfaces, perhaps the assemblage is unique simply because it represents only a limited set of activities associated with the element.

Compared to Element 2, Element 3 at Windy Wheat Hamlet is more typical of Anasazi assemblages during the Pueblo I period in the DAP study area. These assemblages are dominated by utilized flakes, with used cores/cobble tools and thick unifaces also well represented. Technologically, these assemblages are characterized by low-input values for the dorsal face, suggesting a very expedient technology in terms of the energy invested in tool production. The assemblage from Element 3 fits the above characterization well. The only discrepancies are that the Element 3 assemblage has a relatively high percentage of utilized flakes and low percentages of bifaces and projectile points. The small number of bifaces and projectile points might indicate a deemphasis on activities generally associated with these tools.

The statistical results of several flaked lithic tool morpho-use profile comparisons are presented in table F.2. The Kolmogorov-Smirnov statistic indicates that, for the most part, Windy Wheat Hamlet is technologically different from other hamlets in the DAP area. Surprisingly, Element 2 at Windy Wheat Hamlet is statistically similar to Element 2 at 5MT4671 (assigned to the late Dos Casas Subphase). However, a review of the two morpho-use profiles indicates that substantial differences may actually exist between the two profiles in the utilized flake and used core categories. Archaeologically, this difference is technologically significant, but the profile differences are not statistically significant. The other statistical comparison for Element 2 is with the second element at 5MT2161. Here the profile is both quantitatively and qualitatively different.

Element 3 at Windy Wheat Hamlet is statistically different from Element 2 at Site 5MT4671 and Element 2 at Site 5MT2161. A review of the

profiles indicates that the differences may be accounted for by the high proportion of low-input tools and the relatively low percentage of bifaces and projectile points at Windy Wheat Hamlet. The dorsal face evaluations indicate only minor differences in technological input among the three elements. Although the assemblages are technologically similar, the morpho-use differences suggest that a different range of activities may be represented by the tool assemblage from Element 3 at Windy Wheat Hamlet.

Table F.2 Statistical intersite comparisons of flaked lithic tool morpho-use forms for Windy Wheat Hamlet and selected DAP sites

Site (element)	P*	Comments
5MT4644(2) vs 5MT4671(2)	.239	Similar
5MT4644(2) vs 5MT2161(2)	.037	Good evidence for differences
5MT4644(3) vs 5MT4671(2)	.002	Good evidence for differences
5MT4644(3) vs 5MT2161(2)	.000	Good evidence for differences

* P - The probability that the two samples were drawn from the same population, based on the Kolmogorov-Smirnov two-sample test.

A summary of the flaked lithic debitage data from Windy Wheat Hamlet is presented in table F.3. A comparison of the debitage from the three elements indicates a number of raw material differences. The debitage assemblages from Elements 1 and 2 at Windy Wheat Hamlet are dominated by microscopic-grained debitage. This contrasts with the Element 3 debitage, which is predominately made of very fine-grained material. To a certain extent this raw material difference can be accounted for by the small sample sizes from Elements 1 and 2. The comparison of debitage raw material categories with the flaked lithic tool raw material categories (table F.1) indicates a good agreement in the raw material proportions except for the Element 2 assemblage.

Table F.3 Flaked lithic debitage confidently assigned to each element, Windy Wheat Hamlet

	Element 1			Element 2			Element 3		
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Flakes/flake frags:									
Grain size									
Medium	0	0	0	2	2.5	7.0	71	1.6	28.0
Fine	1	1.7	14.0	5	6.2	18.2	284	6.4	13.7
Very fine	22	17.3	1.9	23	28.4	17.4	2,379	53.2	11.0
Microscopic	36	61.0	3.5	51	63.0	4.2	1,734	~~100.0~~ 38.8	9.7
Total flakes/ flake frags	59	100.0	3.1	81	100.0	8.9	4,468	100.0	9.7
Items with cortex	11	18.6	...	18	22.2	...	1,033	23.1	...
Whole flakes	21	35.6	...	43	53.1	...	2,066	46.2	...
Angular debris	13	100.0	48.4	7	100.0	64.0	223	100.0	14.4

NOTE: frags - Fragments.
... - Information not available.

The Element 1 debitage assemblage at Windy Wheat Hamlet is dominated by microscopic-grained raw materials that are mostly derived from the Burro Canyon Formation. The grain size categories for Element 2 vary substantially between the debitage and the tools. The debitage is dominated by microscopic-grained raw materials, while the tools are mostly very fine-grained orthoquartzites. Cherts are poorly represented in the tools from Element 2. The differences in raw material frequencies can probably be explained by the very small size of the debitage assemblage from Element 2.

The raw materials used during the Element 3 occupation are predominately very fine-grained orthoquartzites from both the Burro Canyon and Morrison Formations. The apparent shift at Windy Wheat Hamlet from microscopic-grained cherts to very fine-grained orthoquartzites is difficult to

evaluate because of the low sample sizes from Elements 1 and 2. Although the most likely explanation is small sample sizes, it is also possible that access to microscopic-grained materials became more difficult or costly through time. Another possibility is that the raw material preference changed.

Nonflaked Lithic Tools

The nonflaked lithic tool data for Windy Wheat Hamlet is presented in table F.4. Profiles for two sites dating to slightly later time periods than Windy Wheat Hamlet are included in the table for comparative purposes. A review of table F.4 indicates that the assemblages from Elements 1 and 2 at Windy Wheat Hamlet have very low sample sizes. The only assemblage from Windy Wheat Hamlet that is large enough for quantitative assessment is that from Element 3. Though sample sizes vary substantially between the elements, all three assemblages appear to be remarkably similar. The only exception is the lack of hammerstones in the Element 1 assemblage; this is most likely a result of the small sample size.

Most Pueblo I nonflaked lithic tool assemblages in the Dolores area are dominated by miscellaneous tools and hammerstones. Miscellaneous tools are for the most part minimally used abrading/grinding stones, although polishing stones, anvils, and lapstones are also included in this category. The Element 3 nonflaked lithic tool assemblage from Windy Wheat Hamlet fits this pattern very well. One interesting aspect of this assemblage is the small proportion of manos and metates (food processing tools). The reason for this is not clear, especially in Element 3 where a large sample size is present. Another interesting aspect of the Element 3 assemblage is the apparent decrease in well-shaped items as indicated by the production evaluation. The apparent shift from relatively high

Table F.4 Nonflaked lithic tool assemblages from Windy Wheat Hamlet and selected DAP sites

	5MT4644 Element 1		5MT4644 Element 2		5MT4644 Element 3		5MT4671 Element 2		5MT2161 Element 2	
	N	%	N	%	N	%	N	%	N	%
Total tools:	11	100.0	17	100.0	249	100.0	79	100.0	152	100.0
Tool morpho-use										
Indeterminate	2	18.2	1	5.9	48	19.3	9	11.4	10	6.6
Miscellaneous	4	36.4	4	23.5	74	29.7	28	35.4	34	22.4
Hammerstone			5	29.4	45	18.1	14	17.7	22	14.5
Mano fragment			1	5.9	22	8.8	6	7.6	1	0.7
One-hand mano	1	9.1	1	5.9	5	2.0			2	1.3
Two-hand mano	1	9.1	3	17.6	28	11.2	11	13.9	33	21.7
Metate fragment					8	3.2	3	3.8	1	0.7
Trough metate	1	9.1	1	5.9	8	3.2	2	2.5	36	23.7
Slab and basin metate							1	1.3	1	0.7
Hafted item	1	9.1			10	4.0	5	6.3	8	5.3
Ornaments	1	9.1	1	5.9	1	0.4			4	2.6
Item condition										
Indeterminate					3	1.2	1	1.3		
Broken										
Unidentifiable					19	7.6	3	3.8	5	3.3
Identifiable	3	27.3	3	17.6	96	38.6	12	15.2	68	44.7
Complete/nearly complete	8	72.7	14	82.4	131	52.6	63	79.7	79	52.0
Production evaluation										
Indeterminate					25	10.0	3	3.8	8	5.3
natural (unmodified)	6	54.5	7	41.2	162	65.1	41	51.9	68	44.7
Minimally modified	2	18.2	3	17.6	44	17.7	17	21.5	44	28.9
Well-shaped	3	27.3	6	35.3	17	6.8	18	22.8	30	19.7
Stylized			1	5.9	1	0.4			2	1.3

percentages of well-shaped items in Elements 1 and 2 to very low percentages in Element 3 is probably due to the small samples in the first two elements, but it is also possible that the inhabitants of the Element 3 households expended considerably less energy in the production of nonflaked lithic tools. The relatively low ranking of production input is undoubtedly related to the very low occurrence of food processing tools in the Element 3 assemblage.

The nonflaked lithic tool morpho-use profile comparisons are presented in table F.5. The Kolmogorov-Smirnov statistic indicates that Element 3 at Windy Wheat Hamlet is similar to Element 2 at 5MT4671 and is significantly different from Element 2 at 5MT2161. The profiles for Element 3 at Windy Wheat Hamlet and Element 2 at 5MT4671 are very similar in that both profiles are poorly represented in manos and metates, while less specialized tools such as hammerstones and miscellaneous nonflaked lithic tools predominate. On the other hand, Element 2 at 5MT2161 is dissimilar to Element 3 at Windy Wheat Hamlet. The large percentage of food processing tools, especially trough metates, from Element 2 at 5MT2161 accounts for most of this difference. Perhaps the differences in nonflaked lithic tool assemblages can be accounted for by the curation of food processing tools at the abandonment of Sites 5MT4644 and 5MT4671. It is also possible that a different set of activities is represented by the different assemblages.

Table F.5 Statistical intersite comparisons of nonflaked lithic tool morpho-use forms for Windy Wheat Hamlet and selected DAP sites

Site (element)	P*	Comments
5MT4644(3) vs 5MT4671(2)	.869	Similar
5MT4644(3) vs 5MT2161(2)	.000	Good evidence for differences

* P - The probability that the two samples were drawn from the same population, based on the Kolmogrov-Smirnov two-sample test.

Comparisons of the lithic tool assemblages from the different elements of occupation at Windy Wheat Hamlet indicate a number of apparent differences that are attributable to variation in sample size. Although the sample sizes for the lithic assemblages from Element 2 were adequate for statistical purposes, the archaeological context of the assemblages is poor. Thus, materials from this element probably should not be used in

household or other synthetic studies. Comparisons of lithic assemblages from Windy Wheat Hamlet and from two temporally later but otherwise similar hamlets find a number of morpho-use and technological differences. These differences are difficult to evaluate but a combination of and differences in activities at the sites may explain most of the variability.

APPENDIX G

FAUNAL REMAINS FROM WINDY WHEAT HAMLET

by

Sarah W. Neusius

Introduction

The faunal assemblage from Windy Wheat Hamlet provides evidence for Dolores Anasazi faunal exploitation strategies during the late Sagehill and the early Dos Casas Subphases (A.D. 740-825). Since the subsistence implications of the faunal remains are not discussed in the main body of the site report, a brief discussion has been undertaken in this appendix. This discussion has three parts: a brief presentation of the recovery and analytic procedures, a brief description of the taxonomic composition of the assemblage, and a preliminary comparison with other DAP faunal assemblages. This appendix provides information on the faunal assemblage as well as a preliminary indication of its significance within the DAP faunal data base.

Recovery and Analytic Procedures

Most of the NHB (nonhuman bone) described in this appendix was recovered during the course of normal excavation. Sixteen fragments of bone from bulk soil samples have been identified and included here. These bones do not represent any additional taxa. A systematic examination of the small nonhuman bone from bulk soil samples has not yet been undertaken. All sixteen fragments of NHB recovered by bulk soil sampling have therefore been treated as part of the macro-assemblage. Their inclusion does not negate the fact that there is a potential bias against the smallest faunal remains in this assemblage.

Over three-quarters (79.1 percent) of the NHB from Windy Wheat Hamlet was recovered by assemblage mode collection techniques (table G.1). Assemblage mode collection techniques are those likely to provide representative samples of the faunal remains in a particular provenience unit.

Screening and troweling are considered to be assemblage mode collection techniques (Kane and Robinson 1982:74-75). Because this proportion is so high, it can be assumed that this faunal assemblage is adequately representative (except with respect to the smallest faunal remains).

The identification of most of the NHB from Windy Wheat Hamlet was completed under the direction of Steven D. Emslie. NHB recovered in the field was washed or dry-brushed and cataloged. A preliminary sort was made, and these results were provided to the excavation crew chief. Final identifications were then made using comparative skeletons belonging to either the Anasazi Heritage Center or the Center for Western Studies. In some instances, other collections were consulted as well.

Table G.1 Nonhuman bone collection modes, Windy Wheat Hamlet

Collection mode	N	%
Inapplicable and general site	78	6.0
Nonintensive and intensive surface	7	0.5
Heavy equipment	5	0.4
Shovel and trowel	180	13.9
Trowel	953	73.8
Dry screen 1/4 in	13	1.0
Dry screen 1/8 in	20	1.6
Dry or wet screen 1/16 in	19	1.5
Bulk soil	16	1.2
Total	1,291	100.0

Minor modifications and additions to the faunal file for Windy Wheat Hamlet have been made since the establishment of the current Faunal Studies Section under the direction of S. Neusius. The procedures now employed by the Faunal Studies Section are outlined by Petersen et al. (1982:31-35). Any discrepancies between the NHB data in the main body of the site report and the data presented in this appendix are attributable to changes resulting either from the final identification or from the minor modifications and additions.

To date, analysis of the Windy Wheat Hamlet faunal assemblage has focused on taxonomic composition. Even this has been examined in only the simplest fashion. Relative abundance has been assessed in terms of NISP (Number of Individual Specimens [Payne 1975]). Critiques of this measure of abundance have pointed out that the minimum number of individuals (MNI [White 1953]) may be preferable. Furthermore, NISP need have no relationship to the caloric or nutrient yield of the animals (cf., Daly 1969; Grayson 1979; White 1953; Wing and Brown 1979). Nevertheless, NISP does provide a simple means of assessing proportions. More sophisticated analyses of the Windy Wheat Hamlet faunal assemblage will be incorporated in synthetic studies of DAP fauna.

Taxonomic Composition of the Faunal Assemblage

Although three elements of occupation are recognized at Windy Wheat Hamlet, at the time of this writing it was not possible to subdivide the faunal assemblage according to these elements. Therefore, the data are described according to the structure or context with which they are associated. The use of these divisions may suggest differences in the uses of pitstructures, surface rooms, and nonstructural areas at the site. The data presented here should be regarded as generally indicative of faunal exploitation strategies at Windy Wheat Hamlet rather than as indicative of specific activities during any one part of the site's occupation.

All 1291 fragments of nonhuman bone recovered from Windy Wheat Hamlet are listed in table G.2 regardless of the degree to which each is diagnostic. Identifiable fragments are those diagnostic to order, family, genus, or species. All other fragments are considered indeterminate.

Table G.2 Composition of the total faunal assemblage, Windy Wheat Hamlet

	Pitstructures																	
	Fills									Floors								
	Indeterminate			Identifiable			Total			Indeterminate			Identifiable			Total		
	N	% class	% total	N	% class	% total	N	% class	% total	N	% class	% total	N	% class	% total	N	% class	% total
Indeterminate vertebrate										1	100.0	0.4				1	100.0	0.2
Fish										1	100.0	0.4				1	100.0	0.2
Bird	1	100.0	0.4	8	100.0	4.3	9	100.0	1.9	1	100.0	0.4	7	100.0	4.4	8	100.0	1.8
Bird/mammal										2	100.0	0.7				2	100.0	0.5
Indeterminate mammal				5	2.8	2.7	5	1.1	1.1				18	11.8	11.3	18	4.2	4.1
Small mammal	164	57.3	57.1	*120	67.4	64.5	284	61.2	60.0	170	61.8	60.7	114	75.0	71.7	284	66.5	64.7
Medium mammal	13	4.6	4.5	4	2.3	2.2	17	3.7	3.6	33	12.0	11.8	6	4.0	3.8	39	9.1	8.9
Large mammal	109	38.1	38.0	49	27.1	26.0	158	34.1	33.4	72	26.2	25.7	14	9.2	8.8	86	20.1	19.6
Total	287		100.0	186		100.0	473		100.0	280		100.0	159		100.0	439		100.0

* Includes a partial skeleton of a rodent.

Table G.2 Composition of the total faunal assemblage, Windy Wheat Hamlet--Continued

	Miscellaneous nonstructural units									Surface rooms								
										Fills								
	Indeterminate			Identifiable			Total			Indeterminate			Identifiable			Total		
	N	% class	% total	N	% class	% total	N	% class	% total	N	% class	% total	N	% class	% total	N	% class	% total
Indeterminate vertebrate																		
Fish																		
Bird	5	100.0	2.4	3	100.0	4.5	8	100.0	2.9									
Bird/mammal	3	100.0	1.4				3	100.0	1.1									
Indeterminate mammal																		
Small mammal	113	55.7	53.6	57	89.1	85.1	170	63.7	61.2	2	22.2	22.2	2	100.0	100.0	4	36.4	36.4
Medium mammal	15	7.4	7.1				15	5.6	5.4	7	77.8	77.8				7	63.6	63.6
Large mammal	75	37.0	35.6	7	10.9	10.5	82	30.7	29.5									
Total	211		100.0	67		100.0	278		100.0	9		100.0	2		100.0	11		100.0

Table G.2 Composition of the total faunal assemblage, Windy Wheat Hamlet--Continued

	Surface rooms									Total								
	Floors																	
	Indeterminate			Identifiable			Total			Indeterminate			Identifiable			Total		
	N	% class	% total	N	% class	% total	N	% class	% total	N	% class	% total	N	% class	% total	N	% class	% total
Indeterminate vertebrate										1	100.0	0.1				1	100.0	0.1
Fish										1	100.0	0.1				1	100.0	0.1
Bird				12	100.0	34.3	12	100.0	13.3	7	100.0	0.8	30	100.0	6.7	37	100.0	2.9
Bird/mammal										5	100.0	0.6				5	100.0	0.4
Indeterminate mammal													23	5.5	5.1	23	1.9	1.8
Small mammal	50	90.9	90.5	11	47.8	31.4	61	78.2	67.8	499	60.3	59.3	304	72.6	67.7	803	64.4	62.2
Medium mammal	3	5.5	5.5				3	3.9	3.3	71	8.6	8.4	10	2.4	2.2	81	6.5	6.3
Large mammal	2	3.6	3.6	12	52.2	34.3	14	18.0	15.6	258	31.2	30.6	82	19.6	18.3	340	27.3	26.4
Total	55		100.0	35		100.0	90		100.0	842		100.0	449		100.0	1291		100.0

Identifiable NHB represents 34.8 percent of the total assemblage. Although this precentage may seem small, it is not unusual for archaeological faunal assemblages to have even lower proportions of identifiable bone. In fact, the proportion is relatively high and is consistent with that for most other DAP faunal assemblages (Neusius 1983a, 1983b, 1983c, 1983d, 1983e, 1983f, and 1983g). These relatively high values for percent identifiable have been tentatively attributed to the large percentage of highly diagnostic small mammals (such as lagomorphs) in DAP faunal assemblages (Neusius 1983e).

Almost all of this faunal assemblage is mammal bone (96.7 percent), although indeterminate vertebrate, fish, and bird remains were recorded as well. The proportion of bird remains (13.3 percent) in the assemblage from surface room floors is disproportionately high. However, this may be attributable to the small number of total remains recovered from these contexts.

Over 60 percent (62.3 percent) of the Windy Wheat Hamlet faunal assemblage is small mammal. About one-quarter is large mammal. These proportions are fairly consistent regardless of context type except with respect to the materials from surface room fills and floors. Because relatively little material was collected from these contexts, this is not considered indicative of significant intra-assemblage variability.

A breakdown of the identifiable assemblage by taxon is given in table G.3. Thirty fragments of identifiable bird bone were recovered. Passeriformes, including the green-tailed towhee (*Pipilo chlorura*), account for 12 of these. Galliformes are the next most common bird type, with grouse (Tetraonidae) being more common than turkey (*Meleagris gallopavo*). The turkey fragments could represent either wild or domestic

Table G.3 Taxonomic composition of the identifiable faunal assemblage from Windy Wheat Hamlet

Taxon	Pitstructures						Miscellaneous nonstructural units		
	Fills			Floors					
	N	% class	% total	N	% class	% total	N	% class	% total
Mammals:									
Sylvilagus spp. cottontail	45	25.3	24.2	31	20.4	19.5	31	48.4	46.3
Lepus californicus black-tailed jackrabbit	30	16.9	16.1	64	42.1	40.3	11	17.2	16.4
Rodentia rodents	* 4	2.3	2.2	18	11.8	11.3	1	1.6	1.5
Sciuridae squirrels	4	2.3	2.2	2	1.3	1.3			
Marmota flaviventris yellow bellied marmot	2	1.1	1.1	4	2.6	2.5	3	4.7	4.5
Spermophilus variegatus rock squirrel									
Cynomys gunnisoni Gunnison's prairie dog	17	9.6	9.1	11	7.2	6.9	3	4.7	4.5
Thomomys spp. pocket gopher	14	7.9	7.5				2	3.1	3.0
Thomomys bottae valley pocket gopher							3	4.7	4.5
Cricetidae New World rats and mice	3	1.7	1.6				2	3.1	3.0
Peromyscus spp. white-footed mice	4	2.3	2.2						
Peromyscus boylii or *truei* brush or pinyon mouse									
Neotoma spp. wood rats				1	0.7	0.6	1	1.6	1.5
Microtus spp. voles	1	0.6	0.5	1	0.7	0.6			
Erethizon dorsatum porcupine	4	2.3	2.2	5	3.3	3.2			
Canidae canids	1	0.6	0.5						
Canis familiaris domestic dog				1	0.7	0.6			
Artiodactyla Artiodactyls	13	7.3	7.0	6	4.0	3.8	4	6.3	6.0
Cervidae deer	19	10.6	10.2	4	2.6	2.5			
c.f. Cervidae	1	0.6	0.5						
Odocoileus hemionus mule deer	15	8.4	8.1	3	2.0	1.9	1	1.6	1.5
Antilocapra americana pronghorn	1	0.6	0.5	1	0.7	0.6	1	1.6	1.5
Ovis canadensis bighorn							1	1.6	1.5
Total Mammals	178	100.0	95.8	152	100.0	95.6	64	100.0	95.7
Birds:									
Falco sparverius American kestrel	5	62.5	2.7						
Tetraonidae grouse, ptarmigan	1	12.5	0.5	5	71.4	3.2	1	33.3	1.5
Meleagris gallopavo turkey							2	66.7	3.0
Grus canadensis sandhill crane	1	12.5	0.5	2	28.6	1.3			
Passeriformes perching birds	1	12.5	0.5						
Pipilo chlorura green-tailed towhee									
Total Birds	8	100.0	4.2	7	100.0	4.5	3	100.0	4.5
Total assemblage	186		100.0	159		100.0	67		100.0

* One partial skeleton included.

NOTE: c.f. - Compares favorably.

turkey. There are some reports of domestic turkeys for the Basketmaker III and Pueblo I periods (Schorger 1966:20-21), but these remain inconclusive and there is no archaeological evidence for turkey keeping (e.g., pens, guano deposits, etc.) from DAP sites. An intensive analysis of DAP Galliformes (underway at the time of this writing) suggests that this issue will be difficult to resolve.

A variety of mammalian taxa are represented. However, nearly half of the assemblage consists of lagomorphs. Black-tailed jackrabbit (Lepus californicus) and cottontail (Sylvilagus spp.) are equally well represented. Two species of cottontail (desert cottontail [S. audobonii] and Nuttall's cottontail [S. nuttallii]) could be represented. Both species are present in the area today (Bissell 1978) and preliminary measurements of mandibular characteristics (Findley et al. 1975:84-86) suggest that both species are included in DAP faunal assemblages. Except for these mandibular characteristics, the bones of these species cannot be reliably separated.

Rodents are of secondary importance (25.5 percent). Members of the squirrel family (Sciuridae, Marmota flaviventris, Spermophilus variegatus and Cynomys gunnisoni) occur most frequently. However, pocket gophers (Thomomys spp., Thomomys bottae), cricetids (Cricetidae, Peromyscus spp., Peromyscus boylei or truei, Neotoma spp. and Microtus spp.), and porcupine (Erethizon dorsatum) are also included among the rodents.

Some of the rodent remains in this assemblage may have been naturally deposited. Archaeological sites are attractive to many species. During occupation and after abandonment, living and storage areas at archaeological sites may attract many small animals; the soft, organic deposits may attract burrowing species, while the disturbed vegetation may be a

Table 5.3 Taxonomic composition of the identifiable faunal assemblage from Windy Wheat Hamlet--Continued

Taxon	Surface rooms						Total		
	Fills			Floors					
	N	% class	% total	N	% class	% total	N	% class	% total
Mammals:									
Sylvilagus spp.									
cottontail	1	50.0	50.0	2	8.7	5.7	110	26.3	24.5
Lepus californicus									
black-tailed jackrabbit				6	26.1	17.1	111	26.5	24.7
Rodentia									
rodent							23	5.5	5.1
Sciuridae									
squirrel							6	1.4	1.3
Marmota flaviventris									
yellow bellied marmot							9	2.1	2.0
Spermophilus variegatus									
rock squirrel	1	50.0	50.0				1	0.2	0.2
Cynomys gunnisoni									
Gunnison's prairie dog							31	7.4	6.9
Thomomys spp.									
pocket gopher							16	3.8	3.6
Thomomys bottae									
valley pocket gopher							3	0.7	0.7
Cricetidae									
New World rats and mice							5	1.2	1.1
Peromyscus spp.									
white-footed mice							4	1.0	0.9
Peromyscus boylei or *truei*									
brush or pinyon mouse				2	8.7	5.7	2	0.5	0.5
Neotoma spp.									
wood rat							2	0.5	0.5
Microtus spp.									
vole				1	4.4	2.9	3	0.7	0.7
Erethizon dorsatum									
porcupine							9	2.1	2.0
Canidae									
canid							1	0.2	0.2
Canis familiaris									
domestic dog							1	0.2	0.2
Artiodactyla									
Artiodactyls				1	4.4	2.9	24	5.7	5.4
Cervidae									
deer							23	5.5	5.1
c.f. Cervidae							1	0.2	0.2
Odocoileus hemionus									
mule deer				11	47.8	31.4	30	7.2	6.7
Antilocapra americana									
pronghorn							3	0.7	0.7
Ovis canadensis									
bighorn							1	0.2	0.2
Total Mammals	2	100.0	100.0	23	100.0	65.7	419	100.0	93.5
Birds:									
Falco sparverius									
American kestrel							5	16.7	1.1
Tetraonidae									
grouse, ptarmigan				1	8.3	2.9	8	26.7	1.8
Meleagris gallopavo									
turkey							2	6.7	0.5
Grus canadensis									
sandhill crane							3	10.0	0.7
Passeriformes									
perching birds				3	25.0	8.6	4	13.3	0.9
Pipilo chlorura									
green-tailed towhee				8	66.7	22.9	8	26.7	1.8
Total Birds				12	100.0	34.4	30	100.0	6.8
Total assemblage	2		100.0	35		100.0	449		100.0

suitable habitat for other species. Thomas (1971) has suggested that skeletal completeness is an indicator of intrusion. One partially complete skeleton of an indeterminate rodent was recovered from pitstructure fill. This individual probably should not be considered associated with the subsistence activities of the inhabitants of Windy Wheat Hamlet. On the other hand, it would be unwise to regard all rodent remains as insignificant in terms of subsistence reconstructions. Many rodents, particularly the large species, were occasionally procured by historic Pueblo Indian groups (Gnabasik 1981).

Artiodactyls represent most of the rest of the assemblage (18.1 percent). Deer (Cervidae, Odocoileus hemionus) remains are most common, but indeterminate artiodactyls, pronghorn (Antilocapra americana), and bighorn (Ovis canadensis) also occur. Only a few carnivore (Canis familiaris, Canidae) bones were recovered.

In summary, the taxonomic composition of the faunal assemblage from Windy Wheat Hamlet indicates that mammals were the most commonly exploited class of animals. The mammalian assemblage consists of a variety of taxa and is therefore high in richness. However, the high frequencies of lagomorphs indicate that exploitation was not as diverse as it first appears. The slightly higher proportions of rodents compared to artiodactyls are consistent with other evidence that small mammals played a major role in subsistence.

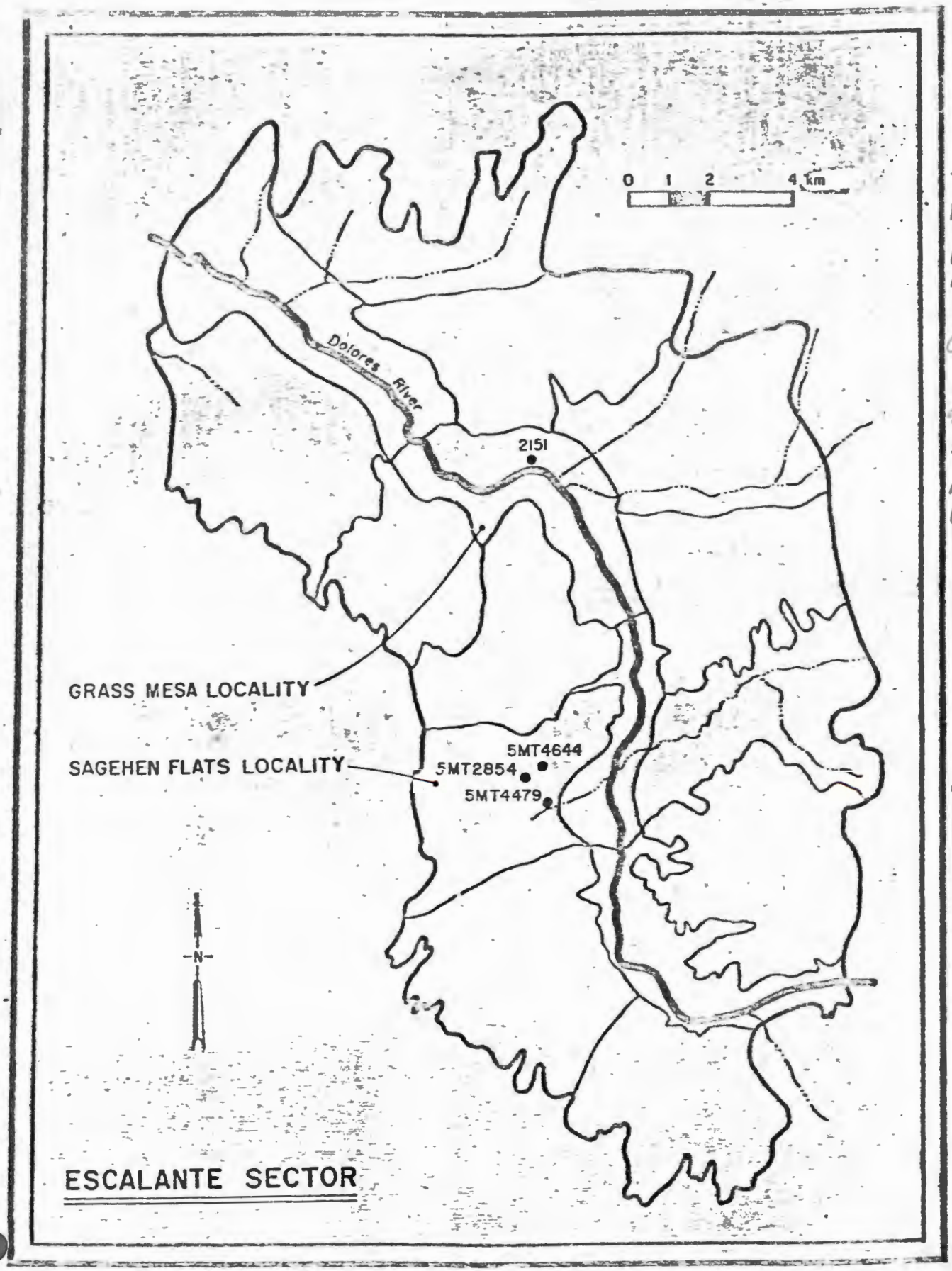
Discussion

Windy Wheat Hamlet is one of a number of DAP habitation sites that seem to have high proportions of small mammal bones in their faunal assemblages. Neusius and Phagan (1983) predicted that very high proportions of

small mammals should be found in sites occupied during the summer because small mammal procurement is likely to have been associated with other summer season activities such as horticulture (cf., Linares 1976). Although the proportion of small mammals in the Windy Wheat Hamlet faunal assemblage is only slightly higher than that found in Neusius and Phagan's (1983:table 1) sample of habitation sites, it is much higher than in the assemblages from some other DAP habitation sites (cf., Neusius 1983a, 1983b, 1983c, and 1983d). This raises the questions of how and why these relative proportions vary.

The preparation of a series of site report faunal appendixes (Neusius 1983a, 1983b, 1983c, 1983d, 1983e, 1983f, 1983g) has provided an opportunity to approach these questions. Two types of variability have been proposed (Neusius 1983g:36-37). First, assemblages seem to vary based on site location; DAP faunal assemblages from sites located in the Grass Mesa Locality (fig. G.1) at the northern end of the study area have higher proportions of large mammals than do those from sites located elsewhere in the study area. And second, an increase in the proportion of large mammals such as artiodactyls has been noted through time (Neusius 1983b and 1983g). This has been noted within the Grass Mesa Locality as well as elsewhere, although the data for the latter part of the Dolores Anasazi sequence are still sketchy.

Figures G.2 and G.3 represent an effort to see whether the faunal assemblage from Windy Wheat Hamlet is consistent with the proposed patterns. The Windy Wheat assemblage is compared with the assemblages from Element 2 at Site 5MT2854 (Aldea Sierritas, a Sagehill Subphase habitation located near Windy Wheat Hamlet in the Sagehen Flats Locality), from Element 1 at Site 5MT2151 (LeMoc Shelter, a late Sagehill Subphase

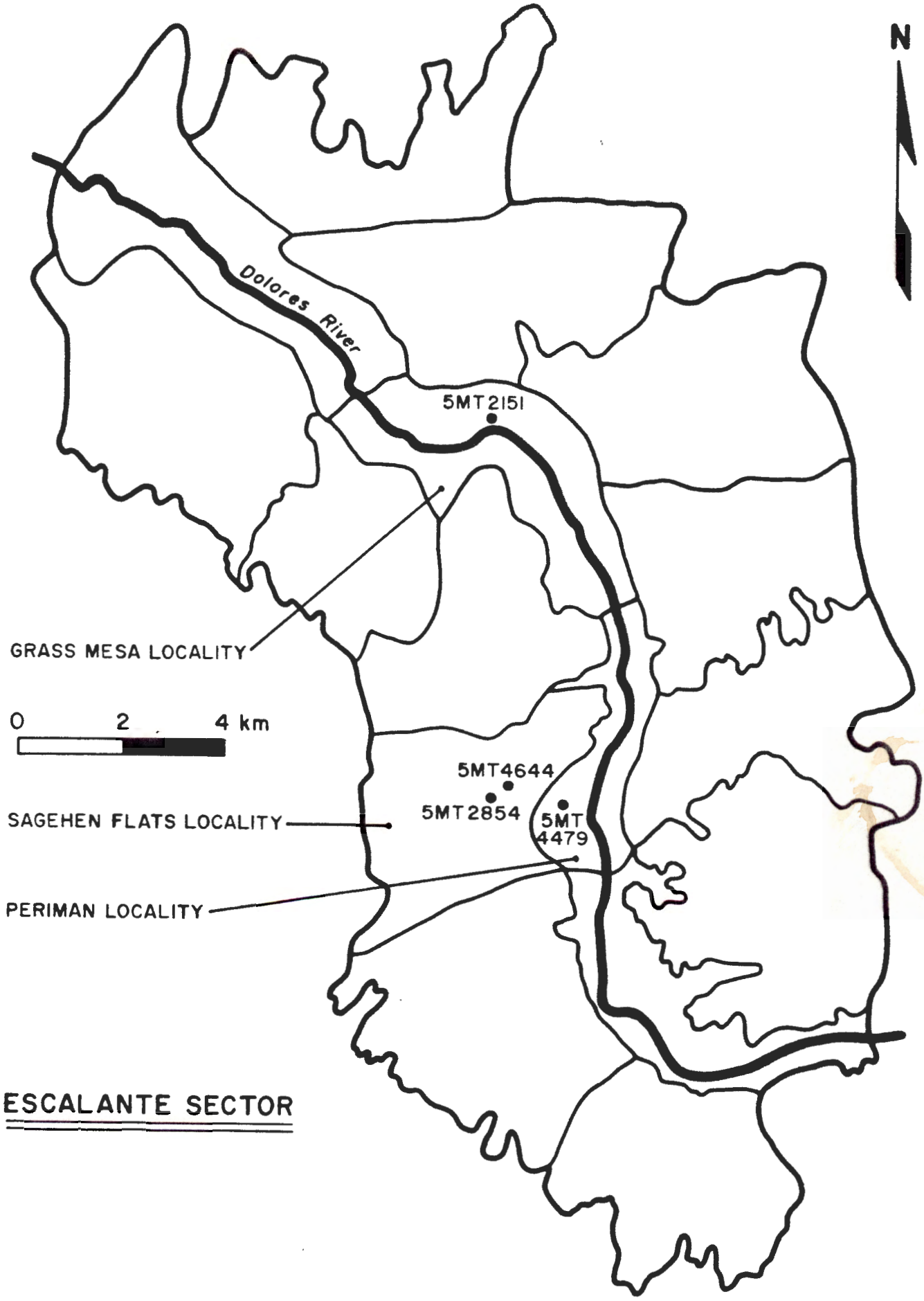


Label: perimon Locality.

Check location of 4479. s/b in in perimon Locality

Need "5MT" in point of 2151

Figure G.1 Map of the Escalante Sector showing localities and Sites 5MT4644, 5MT2854, 5MT2151, and 5MT4479.



ESCALANTE SECTOR

habitation located in the Grass Mesa Locality), and from Site 5MT4479 (Aldea Alfareros, a Periman Subphase habitation site in the Periman Locality). The faunal assemblage from Aldea Alfareros is the only faunal assemblage available from a habitation site occupied later than A.D. 850 and located outside of the Grass Mesa Locality. Thus, it has been chosen for comparative purposes even though it is located in a slightly different area than Windy Wheat Hamlet.

In figure G.2, the overall proportion of small mammals in the faunal assemblage from Windy Wheat Hamlet falls between the proportions in the faunal assemblages from Element 2 at Site 5MT2854 and Element 1 at Site 5MT2151. Moreover, the proportion of large mammals is the same at Windy Wheat Hamlet as at Site 5MT2151, while the proportion of medium mammals is the same as at Site 5MT2854. Perhaps the Site 5MT2854 assemblage is a poor model for assemblages from sites located outside of Grass Mesa Locality and occupied during the earlier part of the Dolores Anasazi sequence. Nevertheless, the Windy Wheat Hamlet faunal assemblage does seem more like the assemblage from Site 5MT2854 (outside the Grass Mesa Locality) than like the assemblage from Site 5MT2151 (in the Grass Mesa Locality).

When compared with the assemblage from Site 5MT4479 (a later site), the Windy Wheat Hamlet faunal assemblage indicates less use of both medium and large mammals. If Element 2 at Site 5MT2854 is indeed slightly earlier than the occupation of Windy Wheat Hamlet, then the increase in medium and large mammal use through time is further substantiated.

Unfortunately, these relationships are not as evident in figure G.3. In fact, the identifiable assemblage from Windy Wheat Hamlet resembles the assemblages from Element 1 at Site 5MT2151 and from Site 5MT4479 more than

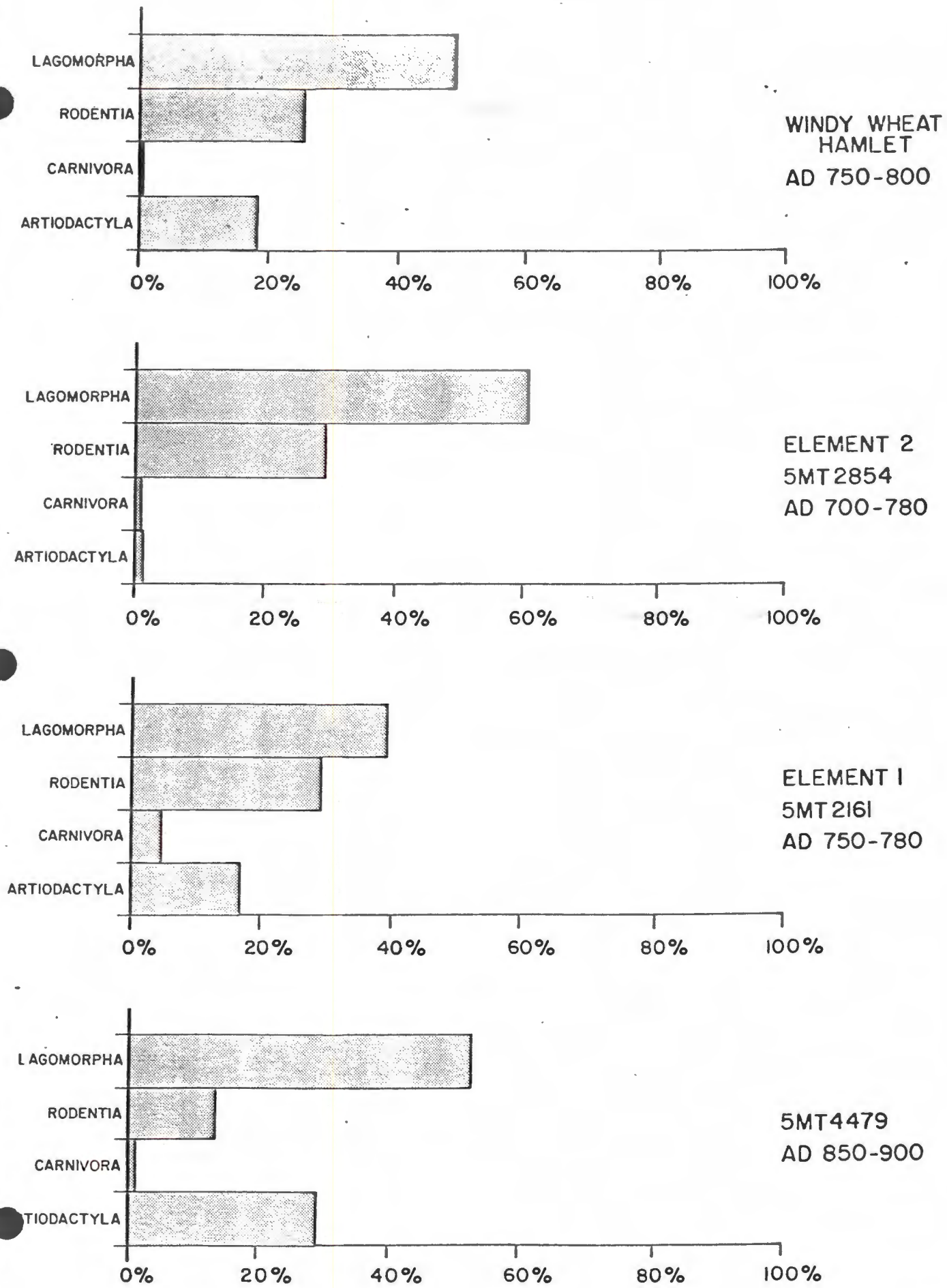


Figure G.2 Proportions of mammals in the total faunal assemblages from Windy Wheat Hamlet and selected DAP sites.

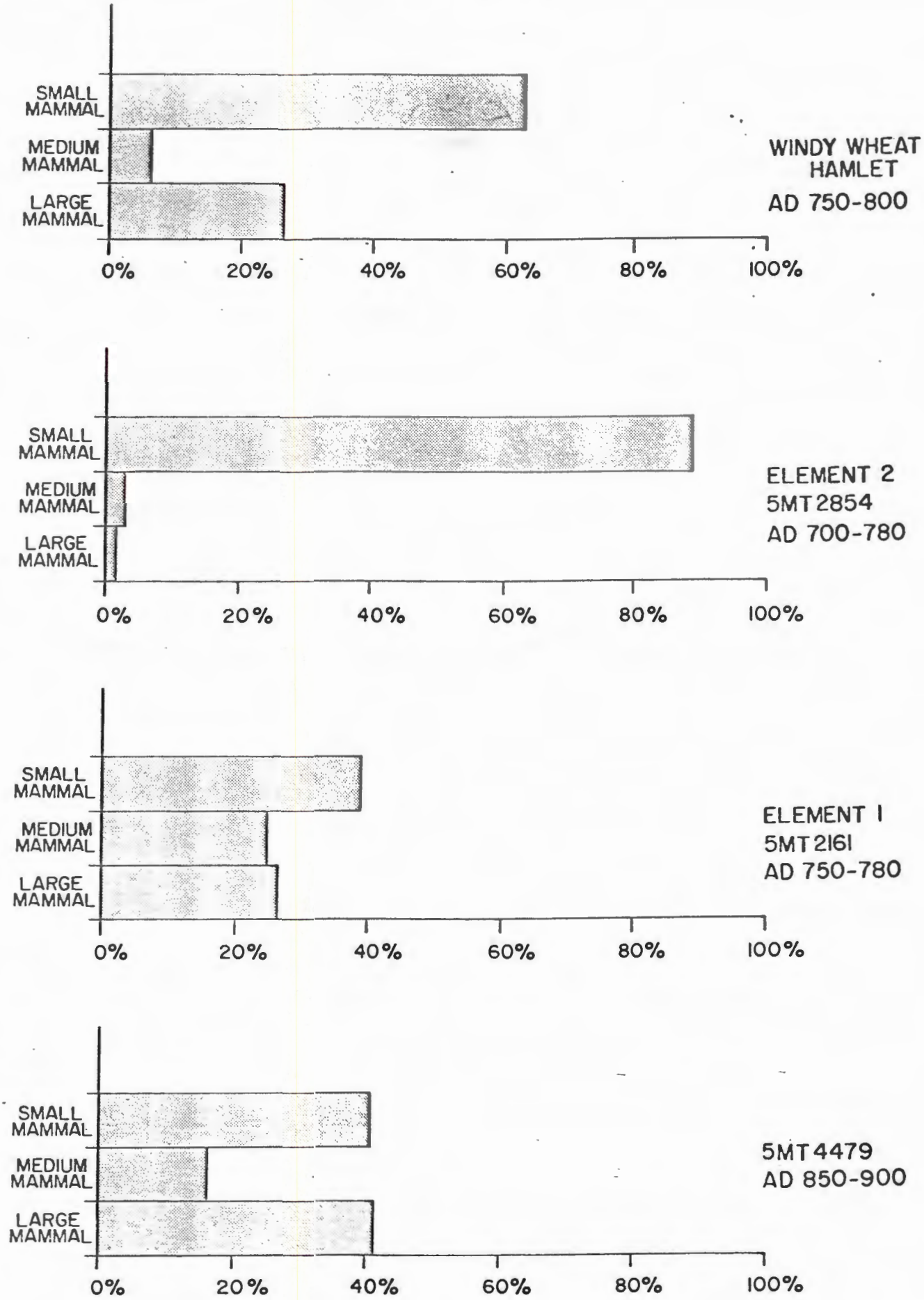


Figure 6.3 Proportions of mammals in the identifiable faunal assemblages from Windy Wheat Hamlet and selected DAP sites.

it resembles that from Site 5MT2854. In short, figure G.3 provides little support for either of the suggested patterns.

These comparisons establish the complex nature of interassemblage variability among DAP assemblages. Perhaps factors in addition to space and time need to be considered. One such factor might be the types of contexts excavated at each site. At Aldea Alfareros, assemblage composition seemed to differ between interhousehold and shared contexts. Perhaps other ways of assessing variability among DAP faunal assemblages will provide new insights. For example, assessment of diversity and richness may prove useful. Only future synthetic studies can hope to answer the questions raised here. Nevertheless, this preliminary discussion should help guide these studies particularly with respect to the incorporation of the Windy Wheat Hamlet faunal data.

Summary

Although the faunal assemblage from Windy Wheat Hamlet cannot be divided into meaningful temporal and spatial subunits at this time, it is clear that mammals were the focus of faunal exploitation throughout the site's occupation. Small mammals were more heavily utilized than either large or medium mammals. However, this focus on small mammals was not as extreme as at Site 5MT2854, another early Anasazi habitation site located in the Sagehen Flats Locality. A comparison of the Windy Wheat faunal assemblage with assemblages from other DAP habitation sites confirms the complexities of variability in the faunal exploitation strategies of the Anasazi in the DAP study area.

Brisbin, Joel M., Alice M. Emerson, and Sarah H. Schlanger
1981 Excavations at Dos Casas Hamlet (Site 5MT2193), a Basketmaker III/Pueblo I habitation site. Dolores Archaeological Program Technical Reports DAP-028. 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.

Bye, Robert A. Jr.
1981 Botanical studies-1979. Dolores Archaeological Program Technical Reports DAP-047. 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.

Cook, Sherburne F.
1972 Prehistoric demography. An Addison-Wesley Module in Anthropology 16. Reading.

Cordell, Linda
1975 Predicting site abandonment at Wetherill Mesa. The Kiva 40:189-202.

Daly, Patricia
1969 Approaches to faunal analysis in archaeology. American Antiquity 34:146-153.

Deitschman, Glenn H.
1974 Artemisia L sagebrush. In Seeds of Woody Plants in the United States, Agricultural Handbook 450:235-237. Forest Service, U.S. Department of Agriculture, Washington, D.C.

Dennel, R. W.
1976 The economic importance of plant resources represented on archaeological sites. Journal of Archaeological Science 3:229-247.

Dougenik, James A., and David E. Sheehan
1975 SYMAP user's reference manual (fifth ed.). Graduate School of Design, Harvard University. Cambridge.

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. Fisher, M. Fuller, V. A. Schmidt, and P. J. Wasilewski, pp. 133-144. Goddard Space Fight Center, Greenbelt, Maryland.

Elmore, Francis H.
1944 Ethnobotany of the Navajo. University of New Mexico, Monograph Series 1 Bulletin 392.

Findley, James A., Arthur H. Harris, Don E. Wilson, and Clyde Jones
1975 Mammals of New Mexico. University of New Mexico Press, Albuquerque.

REFERENCES CITED

Adams, Karen R.
1980 Relative numbers of native microfossils in strata of poor preservation, with emphasis flotation. In Salmon Ruin ethnobotanical report, by Vorsila L. Bohrer, Part 7. In Investigations at the Salmon site: the structure of Chacoan Society in the northern Southwest III, edited by Cynthia Irwin-Williams and Phillip H. Shelley, pp. 251-301. Eastern New Mexico University, Portales.

Ascher, Robert
1961 Analogy in archeological interpretation. Southwest Journal of Anthropology 17:317-325.

Beaglehole, Ernest
1937 Notes on Hopi economic life. Yale University Publications in Anthropology 15.

Benz, Bruce F.
1981 Present-day faunal investigations. In Environmental studies report, compiled by Bruce F. Benz and Vickie Clay, pp. 97-104. Dolores Archaeological Program Technical Reports DAP-061. 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.

Binford, Lewis R.
1968 Methodological consideration of the archaeological use of ethnographic data. In Man the hunter, edited by Richard B. Lee and Iven DeVore, pp. 268-273. Aldine, Chicago.

Blinman, Eric
1981 Dating with neckbands: calibration of temporal variation in Moccasin Gray and Mancos Gray ceramic types. In Dolores Archaeological Program synthetic report,1978-1981 DAP-055, pp. 346-374. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

1982 Ceramic dating of survey collections. Ms. on file, Dolores Archaeological Program, Dolores, Colorado.

Brew, John Otis
1946 Archaeology of Alkali Ridge, southeastern Utah, with a review of the prehistory of the Mesa Verde Division of the San Juan and some observations on archaeological systematics. Papers of the Peabody Museum of American Archaeology and Ethnology 21.

Brisbin, Joel
1983 Excavations at McPhee Pueblo (Site 5MT4475). In preparation for the Dolores Archaeological Program, Dolores, Colorado.

Gasser, Robert E.
1982 Anasazi diet. In the specialists' volume: biocultural analyses. Compiled by Robert E. Gasser, pp. 8-95. Museum of Northern Arizona Research Paper 23.

Gnabasik, Virginia R.
1981 Faunal utilization by the Pueblo Indians. Unpublished M.A. Thesis, Department of Anthropology, Eastern New Mexico University, Portales.

Grayson, Donald K.
1979 On the quantification of vertebrate archaeofaunas. In Advances in archaeological method and theory 2, edited by Michael B. Schiffer, pp. 199-237. Academic Press, New York.

Harper, J. L.
1977 Population Biology of Plants. Academic Press, New York.

Hathaway, J. Holly, Jeffrey L. Eighmy, and Allen E. Kane
1983 Preliminary modification of the Southwest virtual geomagnetic pole path AD 700 to AD 900: Dolores Archaeological Program results. Journal of Archaeological Science 10:51-59.

Hayes, Alden C., and James A. Lancaster
1975 Badger House Community, Mesa Verde National Park, Colorado. National Park Service Publications in Archeology 7E.

Hewitt, Nancy J., Allen E. Kane, Arthur Rohr, and Dorin Steele
1981 Temporal implications of architectural characteristics of Anasazi pitstructures, southwestern Colorado. Paper presented at the 46th Annual Meeting of the Society for American Archaeology, San Diego.

Hill, James N.
1970 Broken K Pueblo: prehistoric social organization in the American Southwest. Anthropological Papers of the University of Arizona 18.

Hubbard, R. N. L. B.
1980 Development of agriculture in Europe and the near East: evidence from quantitative studies. Economic Botany 34:51-67.

Huggins, Robert J., and John Weymouth
1981 Magnetometer results. Dolores Archaeological Program Technical Reports DAP-020. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Kane, Allen E.
1980 DAP temporal and spatial systematics. Ms. on file, Dolores Archaeological Program, Dolores, Colorado.

1981a The Sagehen Flats Archaeological Locality. Dolores Archaeological Program Technical Reports DAP-003. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Kane, Allen E.
1981b Introduction to field investigations and analysis. Dolores Archaeological Program Technical Reports DAP-001. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

1983 Fieldwork and systematics. Dolores Archaeological Program Technical Reports DAP-058. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Kane, Allen E., and Christine K. Robinson
1980 Pollen and bulk soil sampling strategies, Dolores Archaeological Program, southwestern Colorado. Paper presented at the 53rd Annual Pecos Conference, Mesa Verde National Park, Colorado.

Kane, Allen E., and Christine K. Robinson (compilers)
1982 Dolores Archaeological Program excavation manual. Ms. on file, Dolores Archaeological Program, Dolores, Colorado.

Kane, Allen E., William D. Lipe, Ruthann Knudson, Timothy A. Kohler, Steven E. James, Patrick Hogan, and Lynne Sebastian
1981 The Dolores Archaeological Program research design. Dolores Archaeological Program Technical Reports DAP-002. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

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.

Kivilaan, A., and Robert S. Bandurski
1981 The one hundred year period for Dr. Beal's seed viability experiment. American Journal of Botany 68:1290-1292.

Kleidon, James H.
1983 Excavations at Aldea Alfareros (Site 5MT4479), a Pueblo I habitation site. Dolores Archaeological Program Technical Reports DAP-100. 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.

Knudson, Ruthann, Steven E. James, Allen E. Kane, William D. Lipe, and Timothy A. Kohler
1981 The Dolores Project cultural resources mitigation design. Dolores Archaeological Program Technical Reports DAP-057. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Kuckelman, Kristin
1983 Excavations at Aldea Sierritas (Site 5MT2854), a Basketmaker III/ Pueblo I habitation site. Dolores Archaeological Program Technical Reports DAP-107. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Lambert, Marjorie F., and J. Richard Ambler
1961 A survey and excavation of caves in Hidalgo County, New Mexico. School of American Research Monograph 25.

Lancaster, James A., and Don W. Watson
1943 Excavation of Mesa Verde pithouses. American Antiquity 9:190-198.

Leonhardy, Frank C., and Vickie L. Clay
1982 Geology of the Dolores Project area. Dolores Archaeological Program Technical Reports DAP-050. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Lerman, J. C., and E. M. Cigliano
1971 New carbon-14 evidence for six hundred years old Canna compacta seed. Nature 232:568:569.

Linares, Olga F.
1976 Garden hunting in the American tropics. Human Ecology 4:331-349.

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

Lopinot, Neal H., and David Eric Brussell
1982 Assessing uncarbonized seeds from open-air sites in mesic environments: an example from southern Illinois. Journal of Archaeological Science 9:95-108.

Martin, Paul S., and F. W. Sharrock
1964 Pollen analysis of prehistoric human feces: a new approach to ethnobotany. American Antiquity 30:168-180.

Matthews, Meredith H.
1981 Information retreived on a microlevel of inquiry: bulk soil analysis of food processing activity areas in two habitation units. In Dolores Archaeological Program Synthetic Report, 1978-1981 DAP-055, pp. 459-493. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Matthews, Meredith H., and Bruce F. Benz
1981 Dolores Archaeological Program Environmental Archaeology Group. Bulk soils and vegetal material type: procedural guidelines. Ms. on file, Dolores Archaeological Program, Dolores, Colorado.

Matthews, Meredith H., and Bruce F. Benz
1983 Developing an ecological-behavioral model for the interpretation of pioneer plant remains in archaeological deposits. Paper presented at the 48th Annual Meeting for the Society for American Archaeology, Pittsburgh, Pennsylvania.

Minnis, Paul E.
1981 Seeds in archaeological sites: sources and some interpretive problems. American Antiquity 46:143-152.

Morris, Earl H.
1939 Archaeological studies in the La Plata District, southwestern Colorado and northwestern New Mexico. Carnegie Institution of Washington 519:1-298.

Munson, Patrick G., Paul W. Parmalee, and Richard A. Yarnell
1971 Subsistence ecology of Scovill, a terminal Middle Woodland village. American Antiquity 36:410-431.

Narroll, Raoul
1962 Floor area and settlement population. American Antiquity 27:587-589.

Neusius, Sarah W.
1983a Faunal remains from LeMoc Shelter. In Excavations at LeMoc Shelter (Site 5MT2151), a multiple-occupation Anasazi site, by Patrick Hogan, pp. 276-308. Dolores Archaeological Program Technical Reports DAP-083. 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.

1983b Faunal remains from Prince Hamlet. In Excavations at Prince Hamlet (Site 5MT2161), a Pueblo I habitation site, by Lynne Sebastian, pp. 305-334. Dolores Archaeological Program Technical Reports DAP-082. 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.

1983c Faunal remains from Area 3 at Grass Mesa Village. Ms. on file, Dolores Archaeological Program, Dolores, Colorado.

1983d Faunal remains from Area 4 at Grass Mesa Village. Ms. on file, Dolores Archaeological Program, Dolores, Colorado.

1983e Faunal remains from Periman Hamlet, Area 1. In Excavations at Periman Hamlet (Site 5MT4671) Area 1, a Pueblo I habitation, by Richard Wilshusen, pp. 315-341. Dolores Archaeological Program Technical Reports DAP-090. 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.

Neusius, Sarah W.
1983f Faunal remains from Aldea Sierritas. In Excavations at Aldea Sierritas (Site 5MT2854), a Basketmaker III-Pueblo I habitation site, by Kristin A. Kuckelman, pp. 197-232. Dolores Archaeological Program Technical Reports DAP-107. 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.

1983g Faunal remains from Aldea Alfareros. Ms. on file, Dolores Archaeological Program, Dolores, Colorado.

Neusius, Sarah W., and Carl J. Phagan
1983 Patterns of large and small game procurement among the Dolores Anasazi A.D. 600-950. Paper presented at the 1983 Anasazi Symposium, Farmington, New Mexico.

Osborne Carolyn M.
1965 The preparation of yucca fiber: an experimental study. Memoirs of the Society for American Archaeology 19:45-50.

Parsons, Elsie (Clews)
1974 Pueblo Indian religion (2 vols.). Reprinted Midway Reprints. Originally published 1939, University of Chicago Press.

Payne, Sebastian
1975 Partial recovery and sample bias. In Archaeozoological studies, edited by A. T. Clasen, pp. 7-17. American Elsevier, New York.

Petersen, Kenneth L.
1983 Vegetation classification for the Dolores Archaeological Program area and southwest Colorado and adjaent Utah. Ms. on file, Dolores Archaeological Program, Dolores, Colorado.

Petersen, Kenneth L., Vickie L. Clay, Meredith H. Matthews, and Sarah W. Neusius
1982 Environmental Archaeology Group midlevel research design. Ms. on file, Dolores Archaeological Program, Dolores, Colorado.

Phagan, Carl J.
1982 Reductive technologies. Dolores Archaeological Program Technical Reports DAP-042. Final report submitted to the U.S. Bureau of Reclamation, Upper Colo. Region, Salt Lake City, in compliance with Contract No. 8-07-40-S0562.

Robbins, Wilfred W., John P. Harrington, and Barbara Freire-Marreco
1916 Ethnobotany of the Tewa Indians. Bureau of American Ethnology Bulletin 55.

Rohn, Arthur H.
1971 Mug House, Mesa Verde National Park, Colorado. National Park Service Publications in Archeology 7D.

Schorger, A. W.
1966 The wild turkey: its history and domestication. University of Oklahoma Press, Norman.

Scott, Linda J.
1979a Dietary inferences from Hoy House coprolites: a palynological interpretation. The Kiva 44(2-3):257-281.

1979b Palynological investigations of fifteen vessels from MV820, Mesa Verde National Park. Ms. on file, Midwest Archaeological Center, National Park Service, Lincoln.

Siegel, Sidney
1956 Nonparametric statistics for the behavioral sciences. McGraw-Hill, New York.

Smith, Watson
1952 Kiva mural decorations at Awatovi and Kawaika-a with a survey of other wall paintings in the Pueblo Southwest. Papers of the Peabody Museum of American Archaeology and Ethnology 37.

Stevenson, Matilda C.
1915 Ethnobotany of the Zuni Indians. In Bureau of American Ethnology Annual Report 30:31-102.

Thomas, David H.
1971 On distinguishing natural from cultural bone in archaeological sites. American Antiquity 36:366-371.

White, Theodore E.
1953 A method of calculating the dietary percentage of various food animals utilized by aboriginal peoples. American Antiquity 18:396-398.

Whiting, Alfred E.
1939 Ethnobotany of the Hopi. Museum of Northern Arizona Bulletin 15.

Wilshusen, Richard
1983 Excavations at Periman Hamlet (Site 5MT4671) Area 1, a Pueblo I habitation. Dolores Archaeological Program Technical Reports DAP-091. 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.

Wing, Elizabeth S., and Antionette B. Brown
1979 Paleonutrition: method and theory in prehistoric foodways. Academic Press, New York.

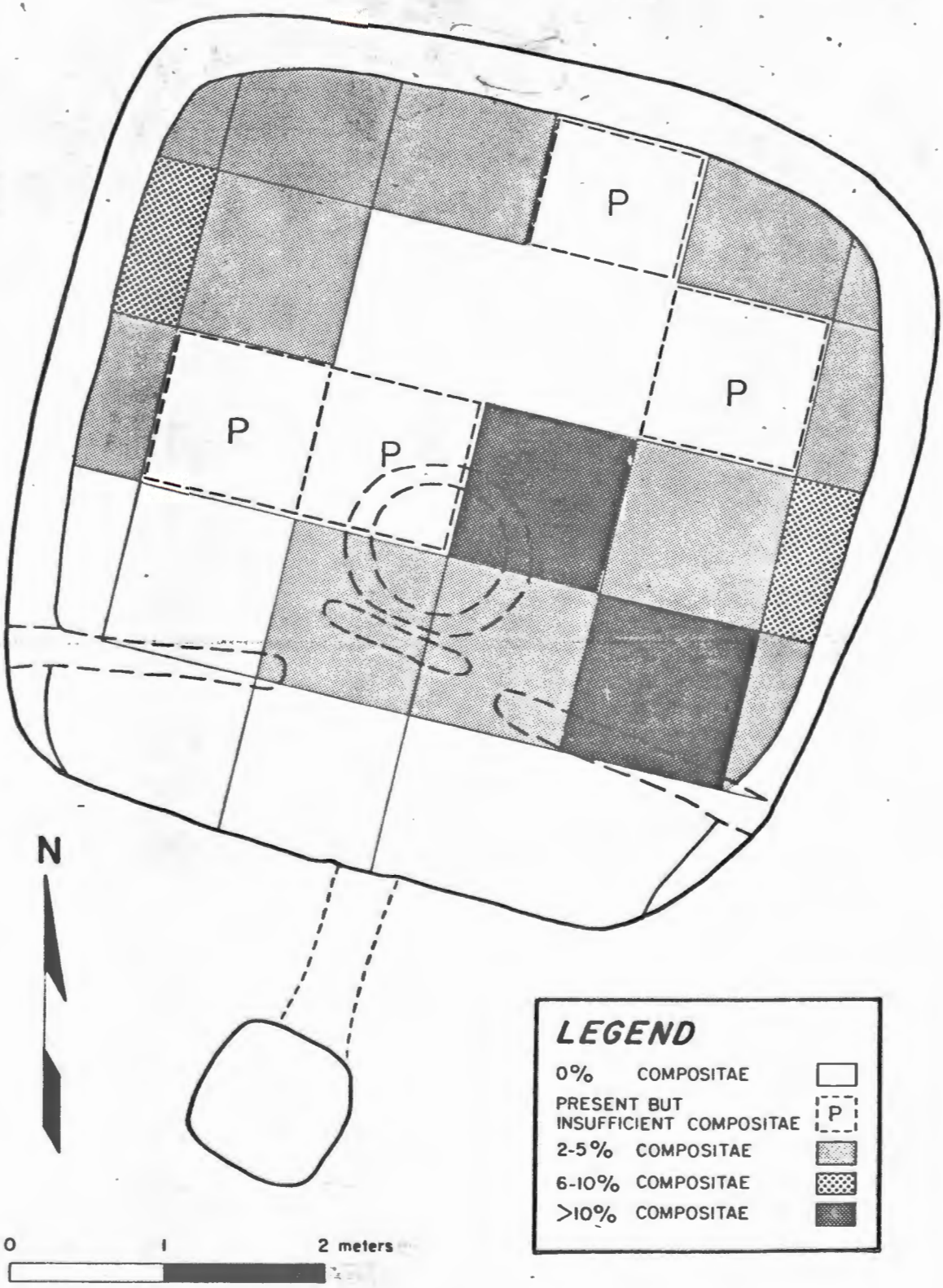


Figure C.24 Horizontal distribution of Compositae pollen in the Pitstructure 1 roof fall stratum.

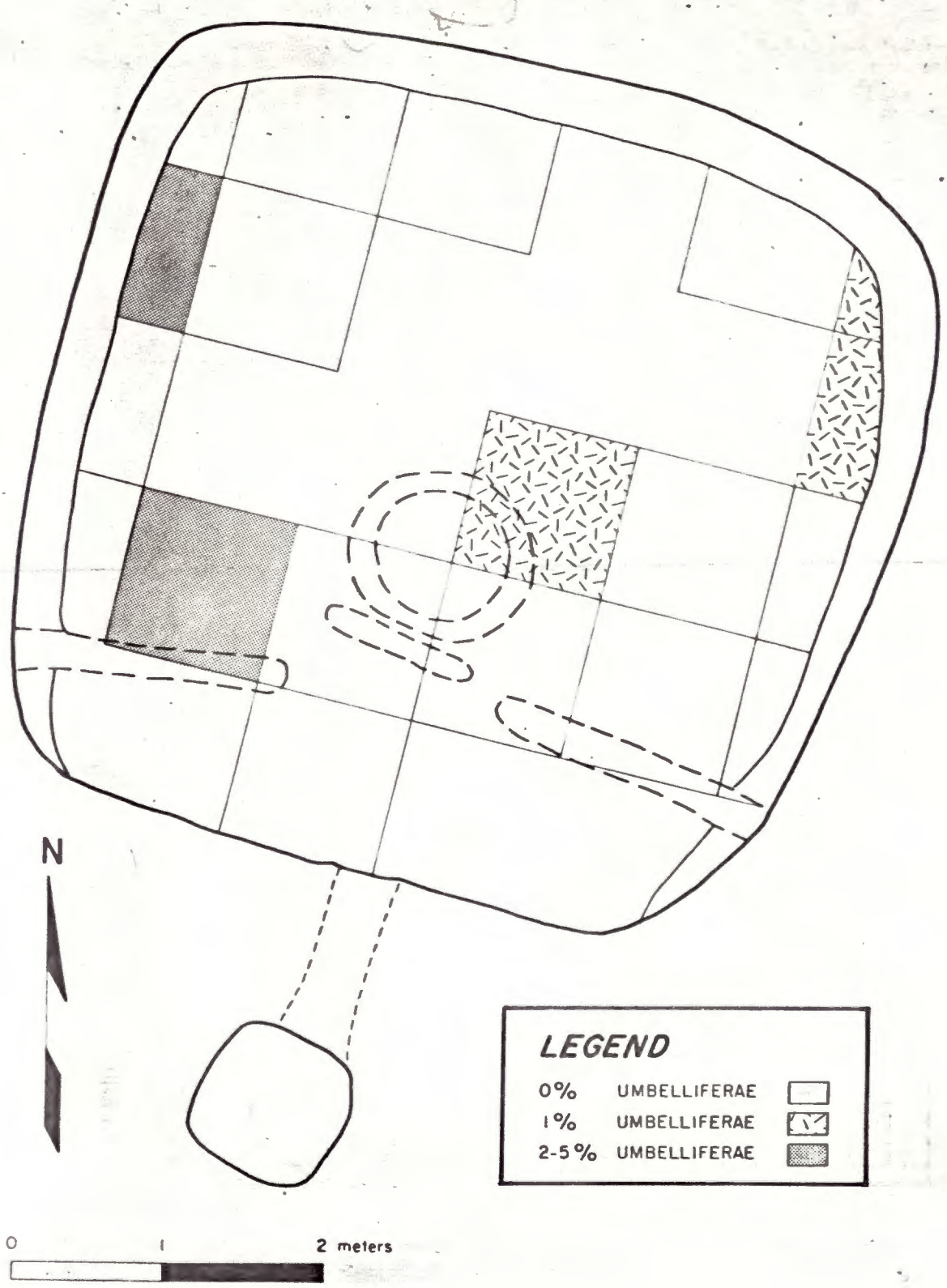


Figure C.25 Horizontal distribution of Umbelliferae pollen in the Pitstructure 1 roof fall stratum.