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INTRODUCTION

The purpose of this report is to summarize the results of intensive archaeological investigations at the Wilgus site (7S-K-21), Sussex County, Delaware. The Wilgus site is listed on the National Register of Historic Places and was the topic of a preliminary excavation report by Richard E. Artusy (1978). This report will reanalyze the results of Artusy's preliminary excavations in conjunction with the analysis of the results of more intensive excavations carried out during the spring and summer of 1980 and 1981 by the University of Delaware Department of Anthropology and the Delaware Bureau of Archaeology and Historic Preservation. This additional research was undertaken when development plans were formulated by Gerald W. Wilgus, owner of the site. Artusy's original excavations and analysis had clearly documented the existence of buried, intact shell middens with extensive associated archaeological materials from the Early and Middle Woodland Periods and on the basis of these intact remains, the site was nominated to the National Register of Historic Places. When development plans threatened destruction of these middens a special program of intensive excavations was undertaken with the permission of Mr. Wilgus. In many ways, the project would not have been possible without Mr. Wilgus's support and understanding and we thank him for this help. We also thank Dan Griffith, Faye Stocum, and Alice Guerrant of the Bureau of Archaeology and Historic Preservation

for their help in coordinating the project and for participation in the fieldwork and analysis. We also thank members of the numerous University of Delaware archaeology classes who helped in the excavations and analysis of artifacts. Special thanks are also extended to members of the Archaeological Society of Delaware, Kent County Archaeological Society, and Society for Pennsylvania Archaeology (Schuylkill Valley Chapter No. 21) for their participation in the project.

ENVIRONMENTAL SETTING

The Wilgus site is located on Cedar Neck on the upper reaches of Beach Cove, an embayed tributary of the Indian River drainage system (Figure 1). Soils at the site are well-drained and are classified within the Klej loamy sand series (Ireland and Matthews 1974). Figure 2 shows a topographic map of the site which is presently on the top and slope of a small knoll less than 4 meters above sea level bordering a cordgrass marsh and poorly drained woodland.

The site's immediate environment has undergone pronounced changes during the past 2500 years of human habitation of the area. In order to investigate possible changes in topography at the site, a program of systematic augering with a 3-inch bucket auger was carried out in a north-south transect across the site. Figure 3 shows the sub-surface profile developed from the augering and composite site profiles. The anomaly in soil horizons encountered in Auger Hole 1 represents a buried ephemeral stream channel that once flowed into Beach Cove. Soils above the buried stream channel are not well-developed and probably less than 3000 years old. Therefore, it is likely that an ephemeral stream was present in this area during much of the prehistoric human occupation of the site.

Sea level rise has also altered the general environmental setting of the Wilgus site over the past 2500 years. Using the work of Kraft et al. (1976) it is possible to project sea level rise rates into the past and from their work it can be seen that around 1000 years ago Beach Cove would have been partially a freshwater stream. Almost certainly the water flowing in the now-buried stream channel noted above was fresh. Marsh grasses adapted to less saline settings would have been present adjacent to the site and the actual shore of the Indian River Bay would have been up to .5 km more distant than at present. In general, the environment would have contained more freshwater settings 1000 years ago than at present and would have presented a wider array of resources for human use. The listings of resources and the seasons of their availability provided by Thomas et al. (1975) can be used as an approximation of the resources available to the prehistoric inhabitants of the Wilgus site. The question of which resources were utilized will be considered in more detail in light of the ecofacts recovered from the midden deposits.

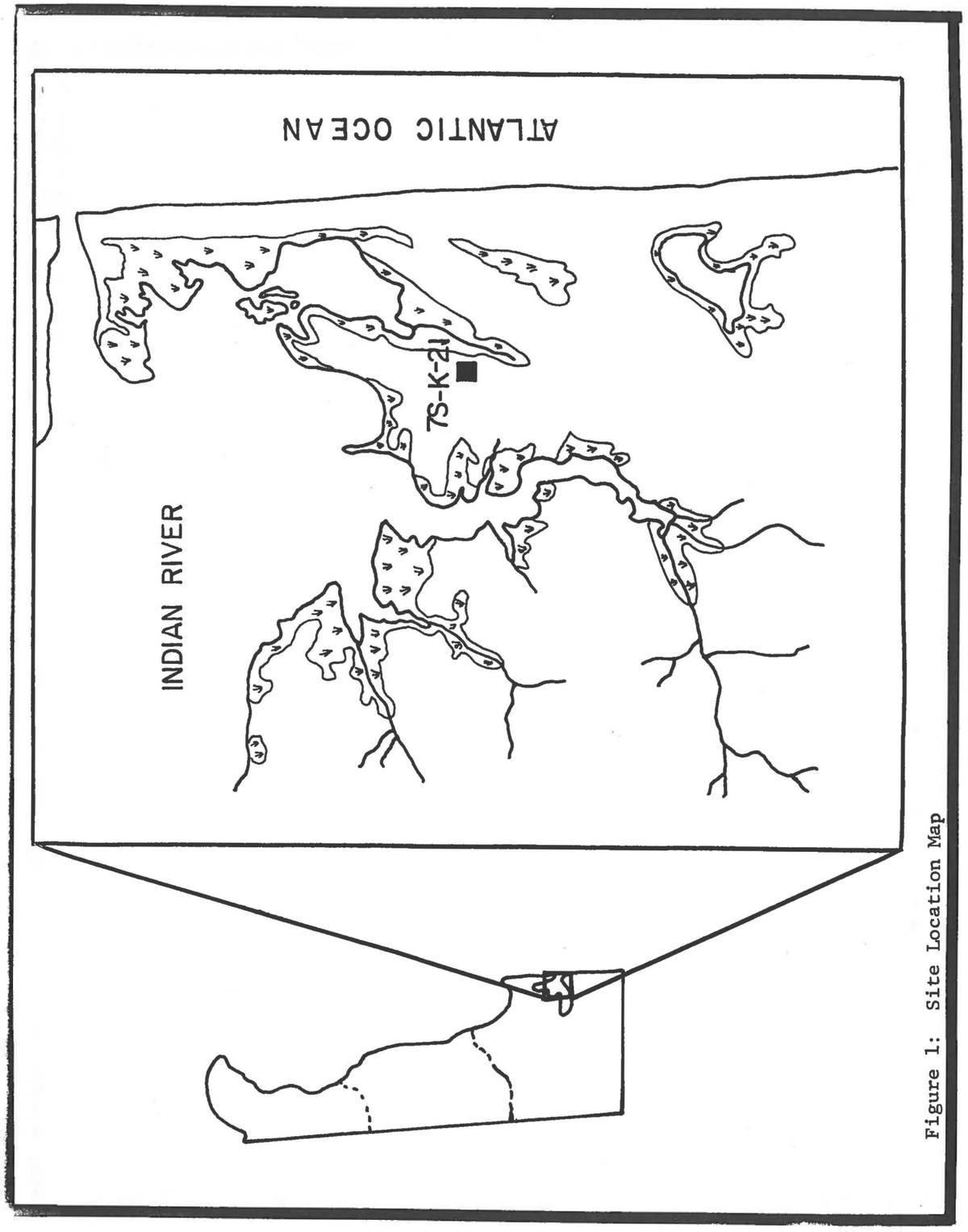


Figure 1: Site Location Map

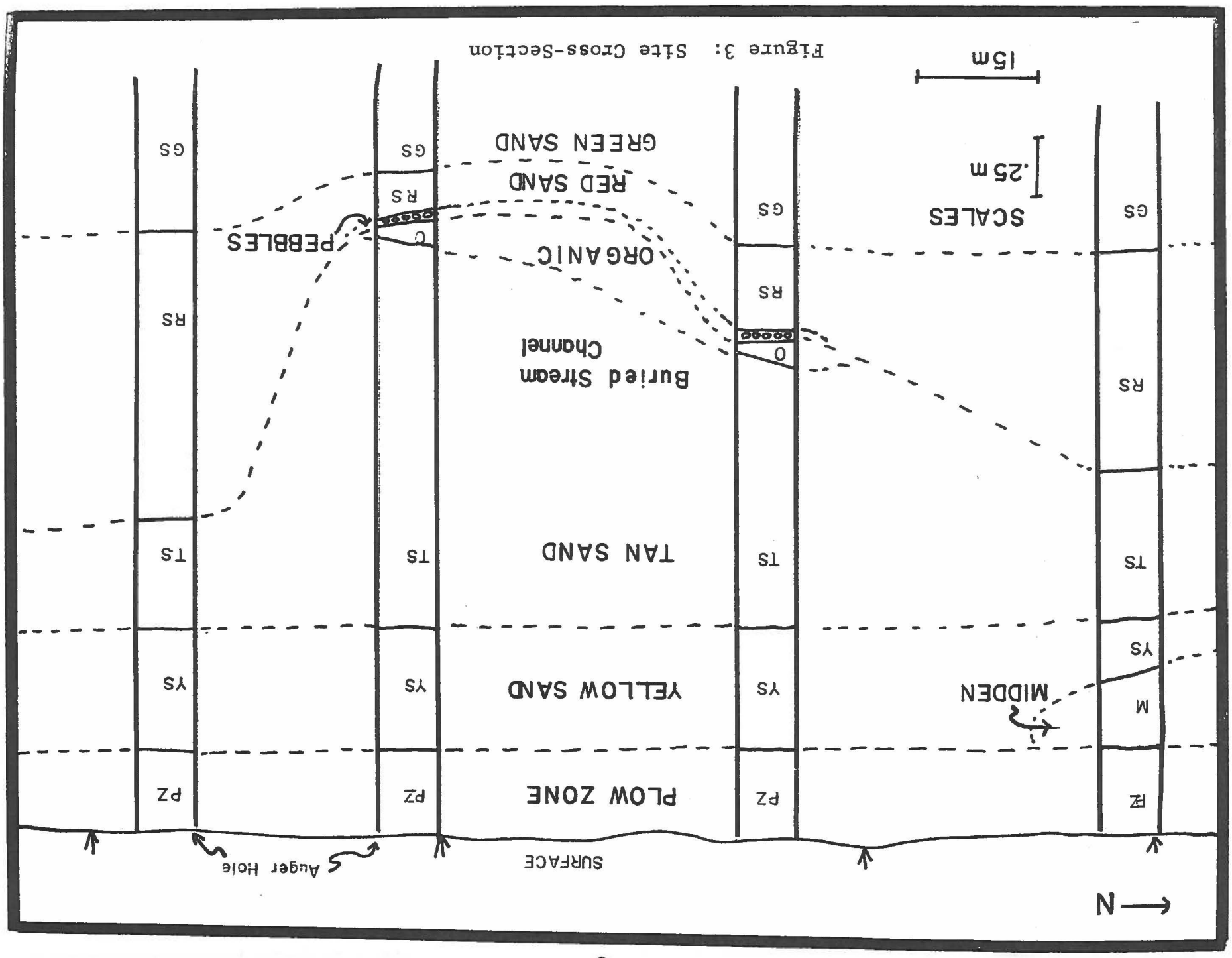


Figure 3: Site Cross-Section

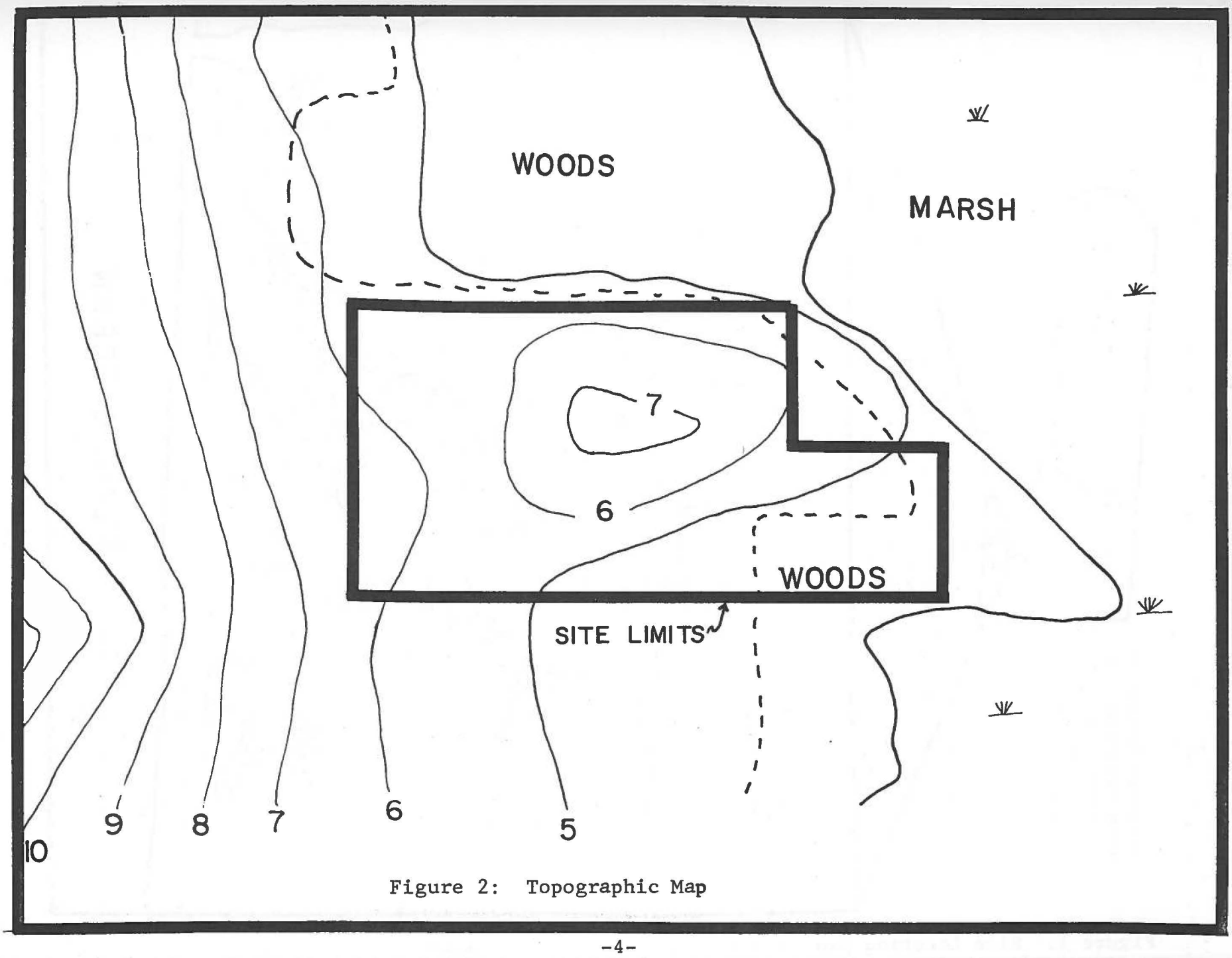


Figure 2: Topographic Map

Holocene climatic change in the Delaware area over the past 2500 years also would have altered the local environmental setting from its present configuration. A summary of the paleoenvironmental data has been presented by Custer (1983) and indicates that at the time of the initial prehistoric occupation of the Wilgus site, there would have been fairly warm and dry climatic conditions, much warmer and drier than at present. Grassland settings would have been more frequent in conjunction with open woodland settings. The basic forest composition of the ancient southern Delaware forests would not have varied too much from modern compositions; however, there are some indications that more hickory would have been present in the area around the Wilgus Site than is seen at present.

In sum, during the time of its prehistoric occupation, the Wilgus site was located in an area that contained a juxtaposition of freshwater and brackish water environmental settings with surrounding marshes of variable composition. More freshwater would have been available in the immediate site area than at present and a variety of scrubby woodland, open woodland, and grassland settings would have been present in the surrounding areas. Figure 4 shows a generalized environmental reconstruction of the area during Early Woodland times.

RESEARCH METHODS

Field Methods

The Wilgus site was investigated using a variety of excavation techniques all of which had to be adapted to the limitations of time and funds. Many times we were never sure if the present day's work at the site would be the last. Therefore, there was a tendency to make each series of excavations a distinct unit of research. Nevertheless, a controlled surface collection carried out by Artusy and analyzed before the 1980-1981 fieldwork provided a unifying theme. In general, we attempted to sample the various areas of differential artifact distributions apparent from the surface collection data. These artifacts and their effect on the sampling program are summarized in the description of the controlled surface collection. Also, subsurface proving with a soil auger was utilized to delineate possible buried midden areas.

After an area was selected for excavation, a series of 1m x 2m squares were laid out with the long axis of the unit perpendicular to the slope of the site (N-S in Figure 2). The plow zone within each unit was removed as a single level. In most cases undisturbed shell or black earth middens weregenerally less than 10 cm thick and wereremoved as a single cultural level. In some cases (Feature 2) a dark natural level of deposits less than 5 cm thick was present above the shell midden surface. In these cases the overlying horizon was excavated as a single level and the shell midden as a separate level. In almost all cases, artifacts seemed to be in situ

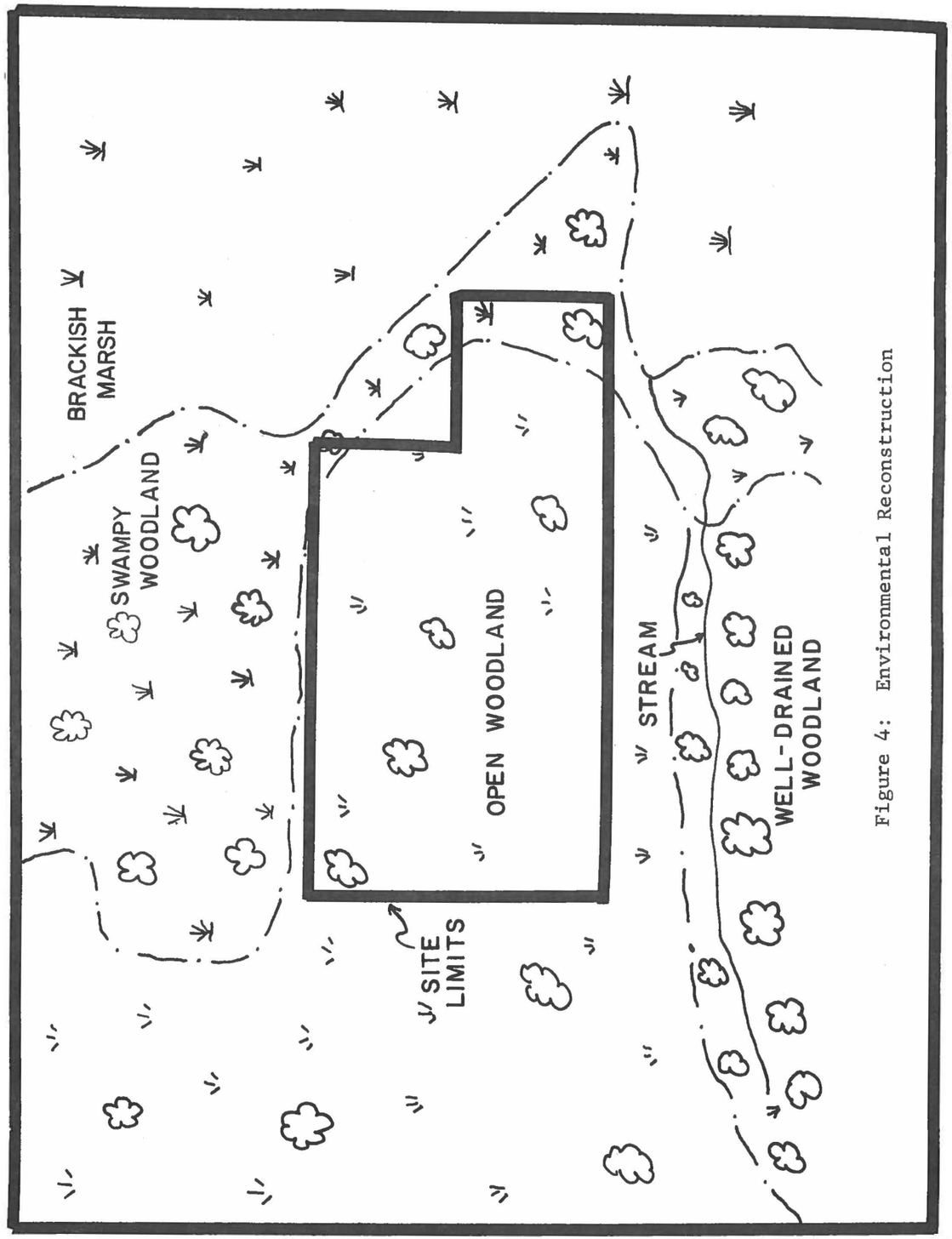


Figure 4: Environmental Reconstruction

with minimal disturbance; however, time constraints did not allow the use of exact provenience techniques to record artifact positions. Instead, each 1m x 2m square was broken into eight .5m x .5m blocks and each block was treated as a separate excavation unit. This technique allowed the rapid generation of distribution data on a finer level than overall 1m x 2m units.

All subsurface levels were screened through 1/4" mesh and in all cases counts were taken of shellfish hinges by species in accordance with methods proposed by Waselkov (1982). Standard flotation samples of blocks .5m x .5m x 10cm were taken and processed. A column soil sample was also taken from all discrete sets of excavation units that contained subsurface materials. Where available, radiocarbon samples were taken of both shell and charcoal. In Features 6 and 7 oyster shell hinges were retained for seasonality analysis.

In cases where discrete cultural features were observed that were smaller in size than excavation units (Feature 3) or that cross-cut only a few arbitrary excavation units (Feature 5), the feature itself was treated as the minimal excavation unit. Where internal stratigraphy was apparent (Feature 5), the internal strata were used as excavation levels. In these cases the flotation sample included all feature fill (Feature 3) or a section sample (1/4 of Feature 5).

Laboratory Analysis Methods

All artifacts recovered were washed and marked according to the accession system devised for the Island Field Museum. All lithic artifacts were catalogued by the following categories: flakes (debitage), flake tools, bifaces, and points. Lithic raw materials were noted along with the presence or absence of cortex in order to discern utilization of secondary cobble raw materials. Where specialized flake tool categories were evident they were noted. Low-power microscopic analysis of tool working edges was also carried out. Bifaces were categorized by reduction stage (Callahan 1979) and differences between discarded and rejected bifaces were noted (Custer 1982a). Ceramics were catalogued by the recognized cultural-temporal historical types described in the literature (Artusy 1976; Griffith 1982; Custer 1983).

All flotation samples were processed through a stationary flotation device and heavy and light fraction samples were collected. All samples were sorted by screens and artifacts and ecofacts recovered. Faunal samples were identified by Mary Stiner using a series of standard identification manuals. Seed samples were sorted and identified by Jay Custer using standard identification manuals (Martin and Barkley 1961; Montgomery 1977), and reference collections maintained at the North Museum, Franklin and Marshall College.

ANALYSIS OF CONTROLLED SURFACE COLLECTION

As part of the original research carried out at the Wilgus site by Artusy, a controlled surface collection using 10 meter blocks was carried out. The location of the surface collected area is noted in Figure 2. These data were reanalyzed as part of the more recent research using the SYMAP computer programs for the analysis of spatial data. Figure 5 shows the density of total artifacts across the site. The major concentration in the central part of the site consists mainly of lithic chipping debris and ceramics. Ceramics of various time periods including Coulbourn, Mockley, and Townsend (Woodland I - Woodland II) were found in the surface collections from this area. The concentration of artifacts at the western end of the site consisted primarily of fire-cracked rock.

Figure 6 shows the location of the various excavation areas in relation to the controlled surface collection area. Area 1, located on the western margin of the site was designed to test the area of fire-cracked rock concentration noted in the controlled surface collection. Few, if any artifacts were recovered in the plow zones and no buried features were encountered. Given the absence of artifacts other than fire-cracked rock, no interpretation of the area can be made. Area 2 was located adjacent to a concentration of Townsend ceramics noted in the controlled surface collection and was also close to test excavations by Artusy which located a disturbed Late Woodland pit feature (Artusy 1978:7). Excavations in this area uncovered another Late Woodland pit feature that was undisturbed (Feature 5). Area 3 was located within the general concentration area noted in the surface collection, but is not an area with an especially high concentration of artifacts in the controlled surface collection. This area was chosen for study in order to see if there were buried features in the sections of the site witn few, if any, artifacts in the controlled surface collection. Numerous artifacts dating from the Woodland I Period were recovered from the plow zone, but no buried, in situ deposits were discovered. Area 4 consisted of numerous excavation units that were located just downslope from the major concentration area shown from the controlled surface collection. These units were also excavated because they were in the general area of the site where Artusy's test excavations showed buried shell midden deposits (Artusy 1978:6). The present excavations also encountered buried, in situ, midden deposits. Area 5 was located west of Area 4 and was placed to see if additional buried shell midden deposits were present. No shell middens were encountered, but a buried black-earth midden was discovered.

An additional area of the site was studied and is located approximately 50 meters to the east of the controlled surface collection grid as noted in Figure 2. This area was originally part of the wooded area that rimmed the undeveloped site (Figure 2); however, as development of the proposed housing development progressed late in our program of research, the trees were removed

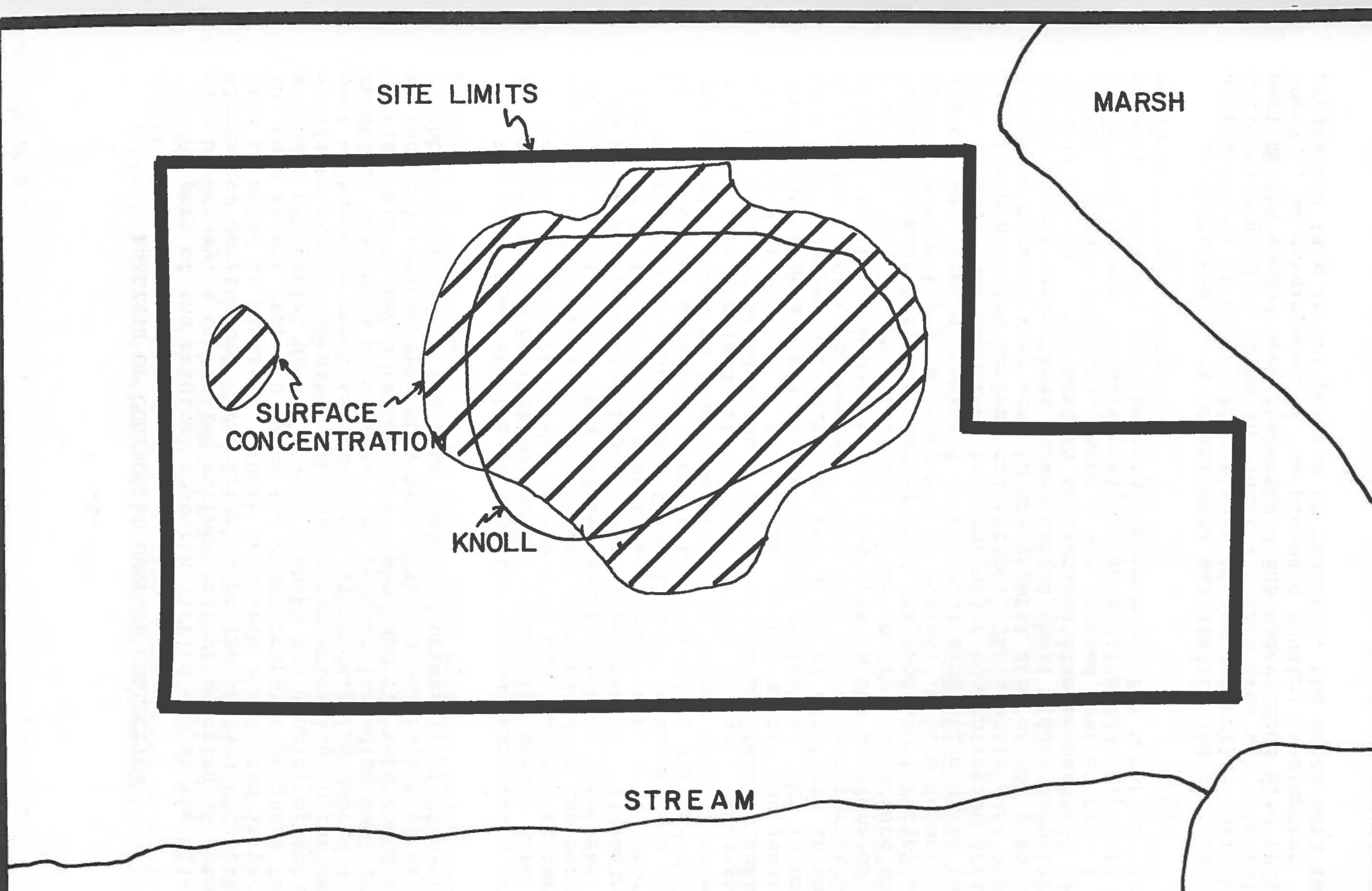


Figure 5: Controlled Surface Collection

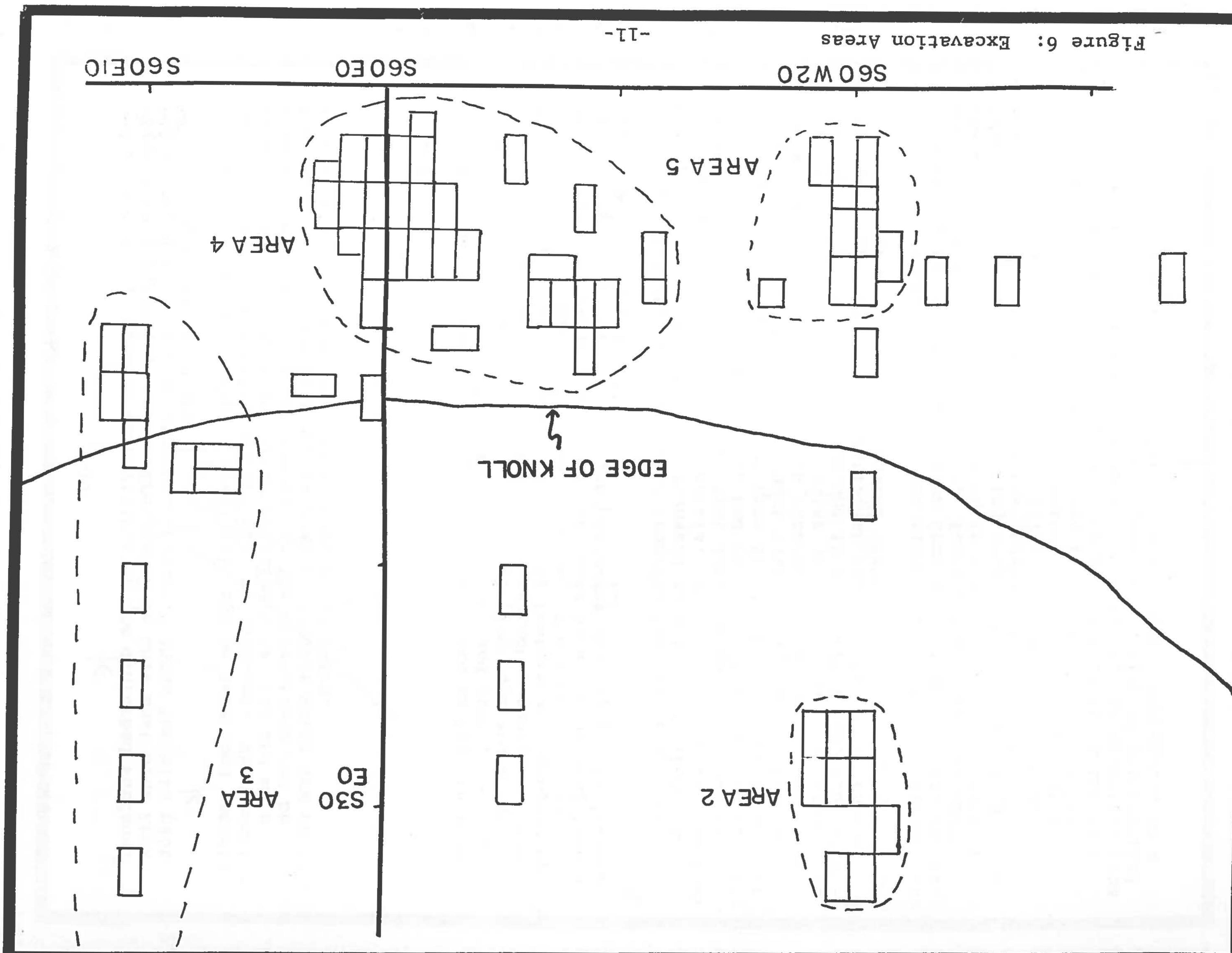


Figure 6: Excavation Areas

and more cultural remains were visible on the disturbed surface. Several test excavation units were opened in this East Site Area and a buried shell midden exposed. Figure 7 shows the site plot of this additional site area.

Each of these excavation areas will now be described individually and then their relationships will be assessed. The descriptions of the excavation summarize detailed site data and more complete information on the results of the excavations can be found in the site analysis and excavation records which are on file at the Island Field Museum, South Bowers, Delaware.

EXCAVATION DESCRIPTIONS

Area 2

Area 2 contained a large pit feature, noted as Feature 5 in the excavation records, and the surface plot and profile of the feature are shown in Figure 8. After the plow zone above the feature was removed, the feature was excavated by quadrats. The quadrats comprising the south half of the feature were removed by natural levels to expose a clear profile. The remaining half of the feature was excavated by smaller, more detailed natural levels exposed in the profile wall. The northwest quarter of the feature was saved for flotation.

Few artifacts were recovered from the feature fill. One hundred and six body sherds of Townsend ceramics were recovered along with 98 pieces of lithic debris. The majority (more than 90%) of these artifacts were in the first level beneath the plow zone. Approximately half of the flakes had cortex on them and the majority were cherts and jaspers derived from local cobbles. One triangular projectile point base and one chert flake tool with a retouched lateral edge were the only tools recovered from the feature. The Townsend ceramics and the triangular projectile point indicate that the feature belongs to the Woodland II time period (ca. A.D. 1000 - 1600) and represents an occupation of the site by populations of the Slaughter Creek Complex (Custer 1983).

Although this feature was not rich in artifacts, it did provide abundant floral and faunal remains from each of the natural stratigraphic levels shown in Figure 8. Table 1 summarizes the charred plant and animal remains recovered from each level. The distribution of the different plant species shows some changes through the natural levels. Using data on the seasonal availability of the plant foods compiled by Moeller (1975), the season of deposition of the varied levels can be determined. In general, all of the charred plant food remains deposited in Feature 5 are available during late summer and early fall, usually not later in the year than November. Seasonal information is difficult to ascertain from the faunal remains except to note that the portion of white-tailed deer skull with attached antler in Level 2 would correspond to a

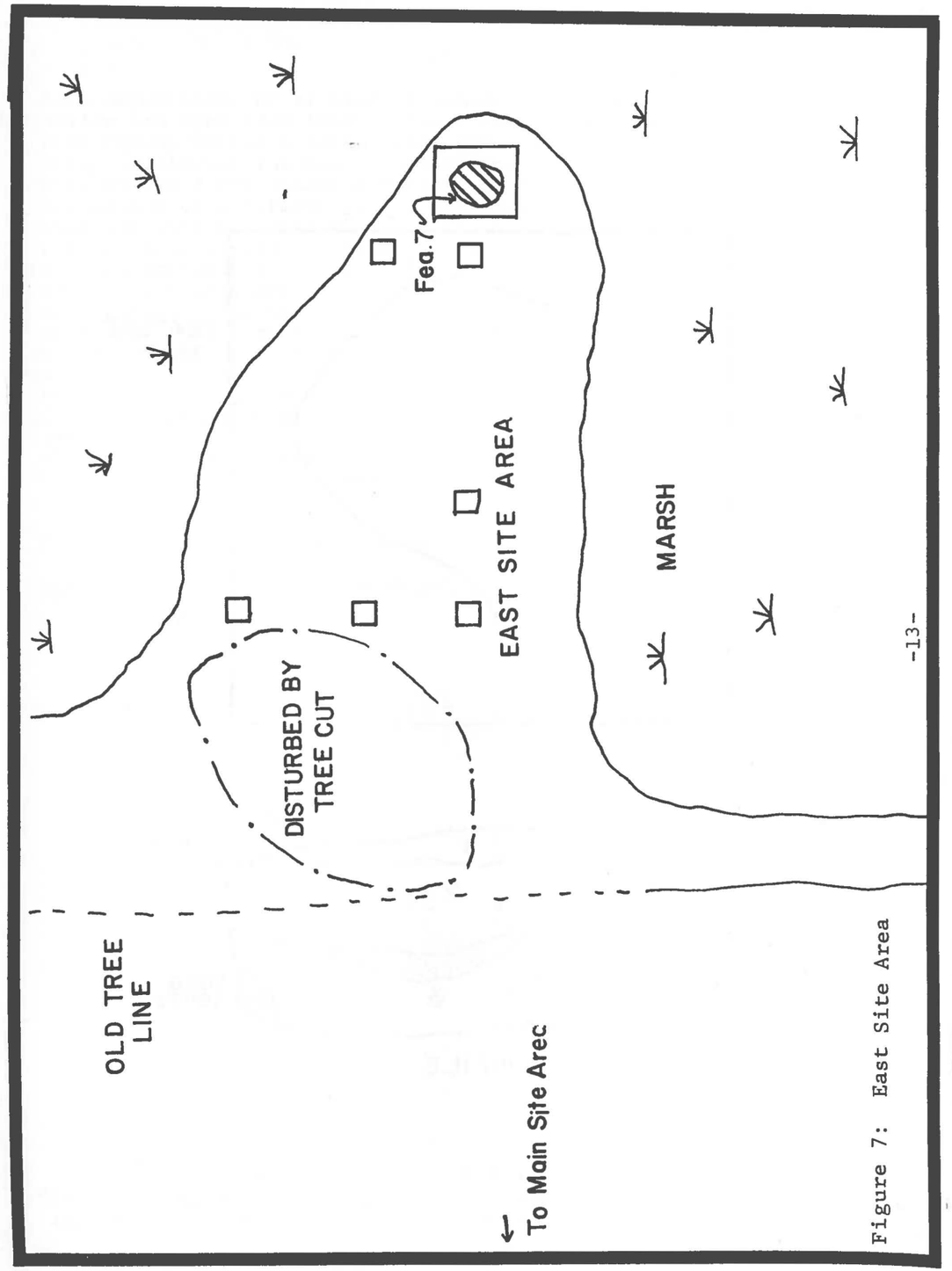


Figure 7: East Site Area

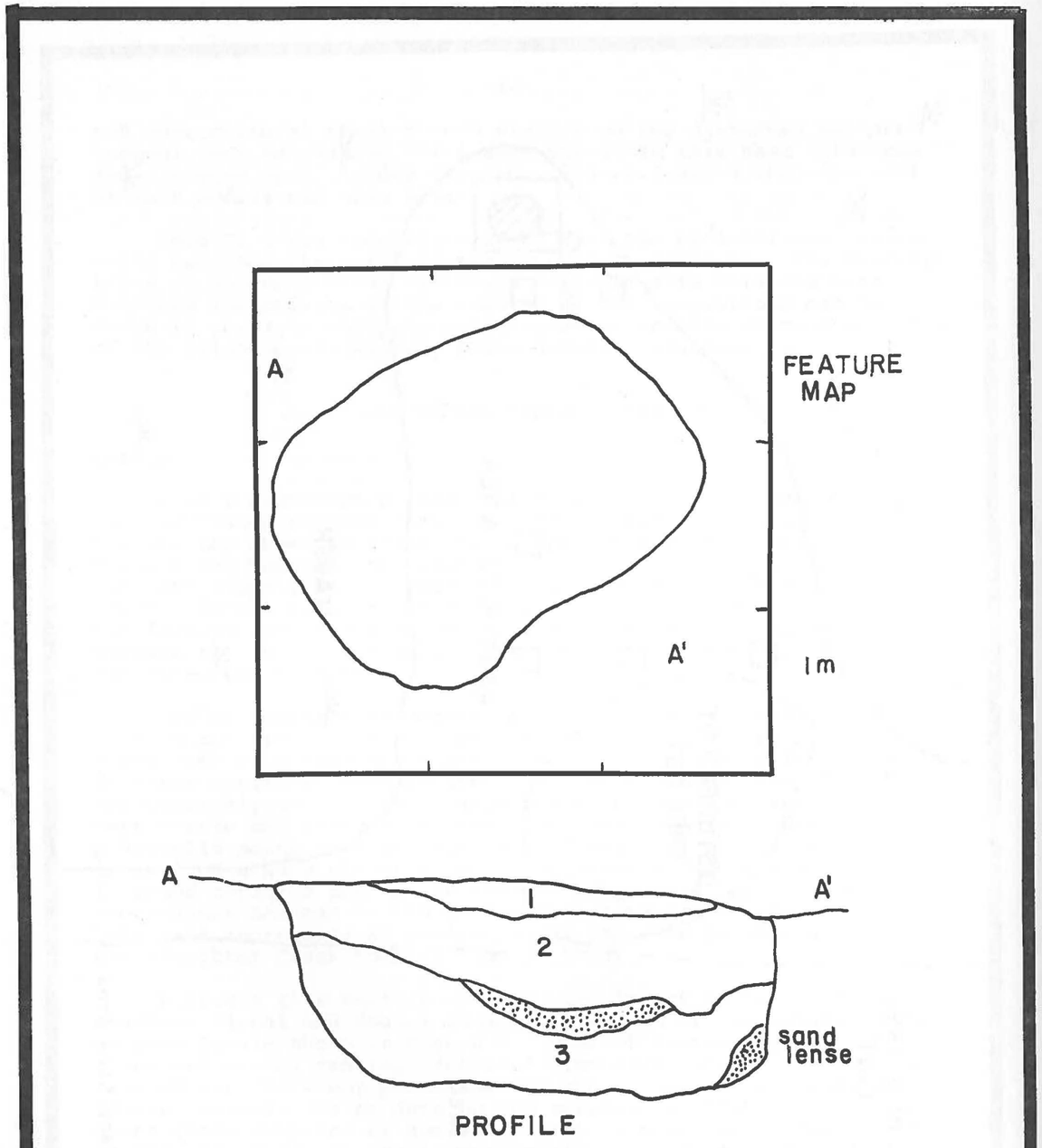


Figure 8: Feature 5

fall deposition, or at least a season prior to mid-winter when antler are shed (Rue 1962). Thus, the feature was probably filled with refuse during a late summer through fall occupation of the site. Following the suggestion of Moeller (1975) for similar pit data in the Upper Delaware Valley, it is possible that the preponderance of artifacts in the uppermost levels of the pit indicates that the site was abandoned at this time. Although the varied natural soil horizons evident in the feature profile represent several episodes of filling of the pit feature with refuse, the seasonality data are insufficiently detailed to discriminate seasonal differences among the filling episodes. It should also be noted that some shellfish remains were present in the feature consisting mainly of oyster with some welk. No shells were retained for analysis of season of death; however, the consistency of the seasonality from the other ecofacts would suggest that these shellfish were gathered and consumed during the same seasons of the year. Finally, it should be noted that in spite of a concerted effort to identify the remains of cultigens during the field excavations and the flotation analysis, none were recovered.

Table 1: Ecofacts from Feature 5

Level	Section	Floral Remains[a]	Faunal Remains
1	S 1/2	--	turtle, catfish, muskrat, snake
	NE 1/4	--	turtle, fish, snake
	NW 1/4	amarantn (310)[b] hackberry (1)	white-tailed deer, turtle, fish
2	S 1/2	--	turtle, white-tailed deer, fish, raccoon, snake
	NE 1/4	--	muskrat, catfish, white-tailed deer, turtle
	NW 1/4	amaranth (172) hackberry (1) chenopodium (27)	white-tailed deer (skull fragments with antler)
3	S 1/2	--	turtle, catfish
	NE 1/4	--	snake, turtle, fish, muskrat
	NW 1/4	hackberry (74) chenopodium (56) eelgrass (94) smartweed (57) blackhaw (10)	turtle

[a]Flotation analysis to recover floral remains was undertaken only in the northwest quarter of the feature.

[b]Counts represent the number of charred seeds per 10 liter flotation sample.

Area 3

Five excavation units were tested in Area 3. These units were arranged in a north - south transect of the eastern edge of the surface concentration of ceramics and flakes. The two southernmost excavation units did not contain any artifacts. The three northernmost squares produced less than a dozen flakes each from the plow zones and no subsurface features were discovered. One large rhyolite Fox Creek biface (Figure 9a) was found in unit S32E10 and Townsend ceramics and mixed clay/shell-tempered ceramics were found in units S24E10 and S32E10. The rhyolite biface has a medial transverse fracture across its medial section. This kind of breakage is indicative of tool use as a knife (Ahler 1971) and the tool shows very little edge retouch. Based on these data it is suggested that the biface was a cutting tool that broke early in its use life and discarded without resharpening. It should also be noted that the shape of the biface and its blade is similar to Fox Creek projectile points that date to the later portions of the Woodland I Period in Delaware (Carey and Late Carey Complexes - ca. 0 A.D. - 800 A.D. - Custer 1983). The raw material is not local to the area and the finished tool was probably traded into the Delmarva area.

The Townsend ceramics are indicative of a Late Woodland Slaughter Creek occupation of the site and are similar to those found in Feature 5. The shell/clay-tempered ceramics represent a variety of ceramics different from any described in the standard ceramic typologies for the area (Artusy 1976; Griffith 1982). This new variety is termed Wilgus Ware and a technical description is provided in the Appendix to this report. Based on its stratigraphic context in Area 4 and 5, this ceramic type dates to the middle portions of the Woodland I Period (late Delmarva Adena and early Carey Complexes - ca. 300 B.C. - A.D. 500 - Custer 1983). In sum, the lithic artifacts and the ceramics indicate that Woodland I and Woodland II components are mixed in the plow zone in Area 3 and refuse and/or storage features are absent in this section of the site.

Area 4

Area 4 represents the most extensive area of excavations and the most complex archaeological remains. Including Artusy's original excavation, three distinct shell midden deposits are present in this area of the site. The original description of two of the middens excavated by Artusy (1978:7-8) is sufficiently detailed so that no further discussion is necessary; however, it should be noted that Midden I noted by Artusy (see Figure 6 for location in relation to the present excavations) produced a shell radiocarbon date of 2240 B.P. ± 60 (U.Ga. 1763) associated with Wolfe Neck and Coulbourn ceramics (Artusy 1978:7). Midden II, located slightly to the east of Midden I (see Figure 6), also produced a shell radiocarbon date of 1710 B.P. ± 70 (U.Ga. 1762) associated with Coulbourn and Mockley ceramics (Artusy 1978:8). The significance of these dates will be

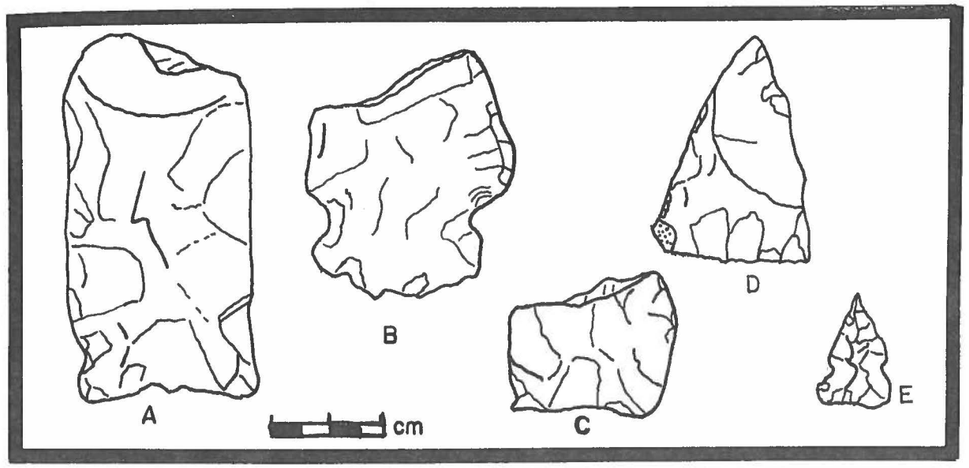
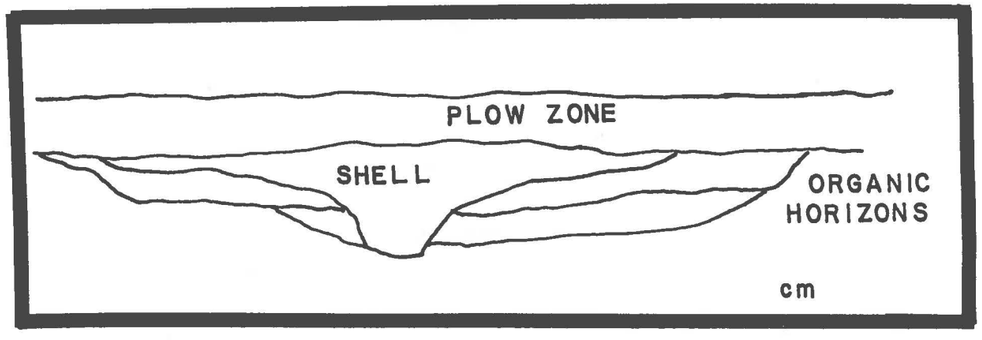


Figure 9: Projectile Points

A - Fox Creek point of rhyolite (Area 3)
B - Adena point (Area 4)
C - Fox Creek-like base (Area 4)
D - Triangular point (Area 4)
E - Side-notched point (Area 4)

Figure 10: Profile of Artusy Midden



discussed in association with the analysis of the other more recently-excavated shell midden.

Recent excavations in Area 4 consisted of two sets of block excavations. The first set of excavations to be discussed were located adjacent to Artusy's excavations of Midden I and were designed to procure additional artifacts and ecofacts that could be associated with the radiocarbon date noted above. The 1981 excavations located Artusy's original units and verified the presence of a thin shell lense beneath the plow zone (see Figure 10 for profile). The extent of these excavations was insufficient to generate distributional data; however, some important artifacts and ecofacts were recovered. Coulbourn rim and body sherds and jasper and chert flakes were found within the undisturbed shell midden and approximately half of the flakes had cortex present. A Flint Ridge chalcedony Delmarva Adena projectile point (Figure 9b) was also recovered from these test units along with a fragment of an unfinished, partially-drilled slate gorget. The projectile point has no evidence of edge wear or resharpening and is similar to notched biface forms found in cremation burial contexts at the Frederica and St. Jones Delmarva Adena sites located to the north in Kent County, Delaware (Thomas 1970, 1976). The association of the Delmarva Adena projectile point, the radiocarbon date of 290 B.C., and the Coulbourn ceramics is consistent with associations seen elsewhere in Delaware (Delaware Division of Historical and Cultural Affairs 1978; Custer 1983) and represent a clear indication of a Delmarva Adena Complex occupation of the site.

Six well-preserved oyster shell hinges were also recovered from these excavations. Using methods developed by Kent (1982), these hinges were analyzed for season of death. All six shells showed the beginning of columnar crystal growth on the terminal edge of the hinge following the granular growth patterns indicative of winter growth. Therefore, the shells were collected sometime in the very early spring. The association of these shells and the Delmarva Adena artifacts indicates that the Delmarva Adena Complex occupation of the site occurred during the late winter and early spring.

The largest block of excavation units opened in this area of the site was located approximately 4 meters east of the midden area noted above and included Features 1 - 4 (Figure 11). Feature 1 consisted of a small shallow feature filled with dark organic soil and clam shells. No artifacts were recovered from this feature and flotation analysis showed no burned plant remains of any kind. The shells from the feature were relatively unweathered and based on this combination of evidence, the feature is interpreted as a modern intrusion into the prehistoric midden.

Feature 3 comprised the largest midden in this area of the site and was defined on the basis of a very dark organic soil that contained substantial shell remains. Most of the shell was very fragmentary and was highly weathered. Figure 12 shows the north -

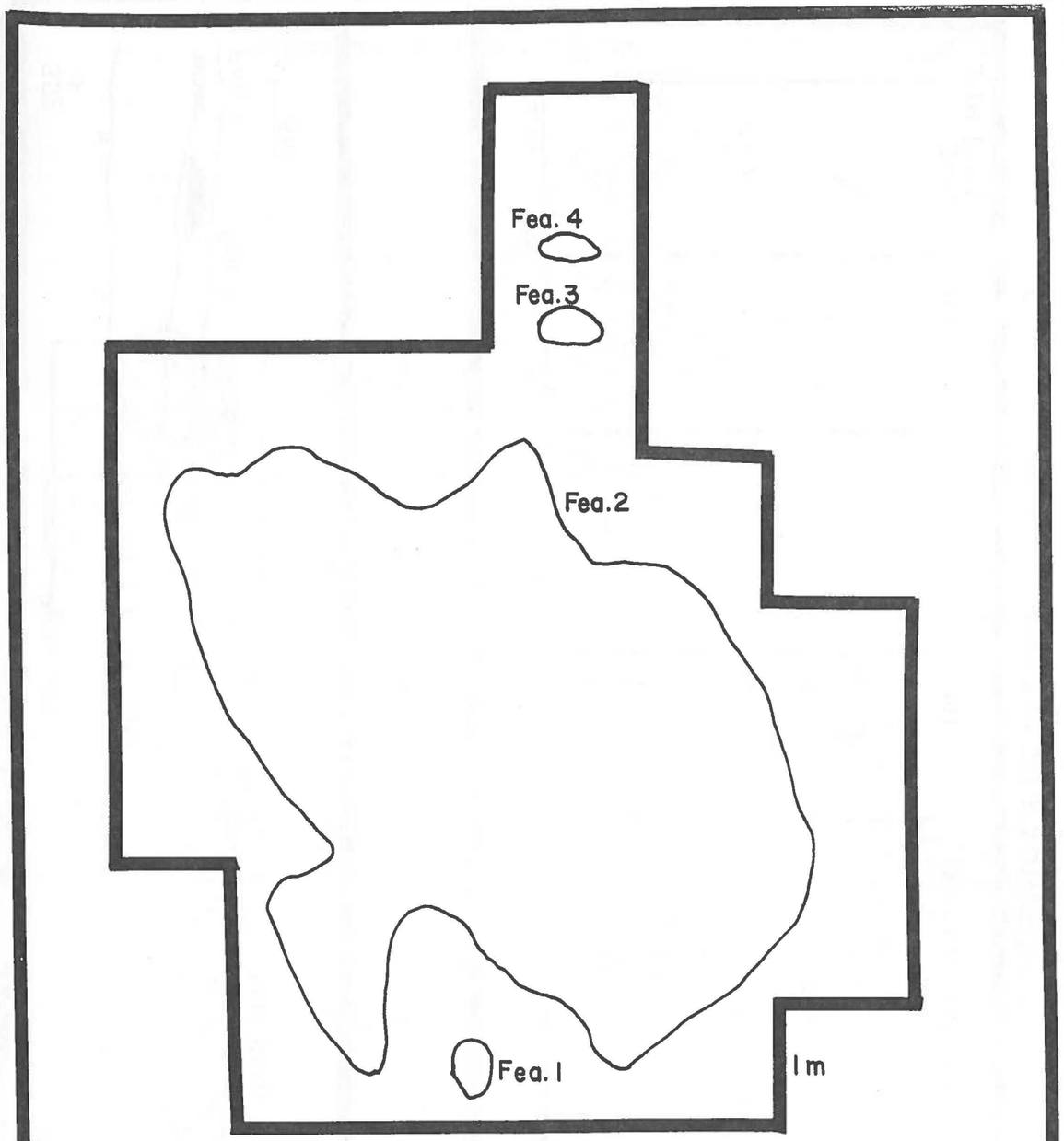


Figure 11: Features 1 - 4 (Area 4)

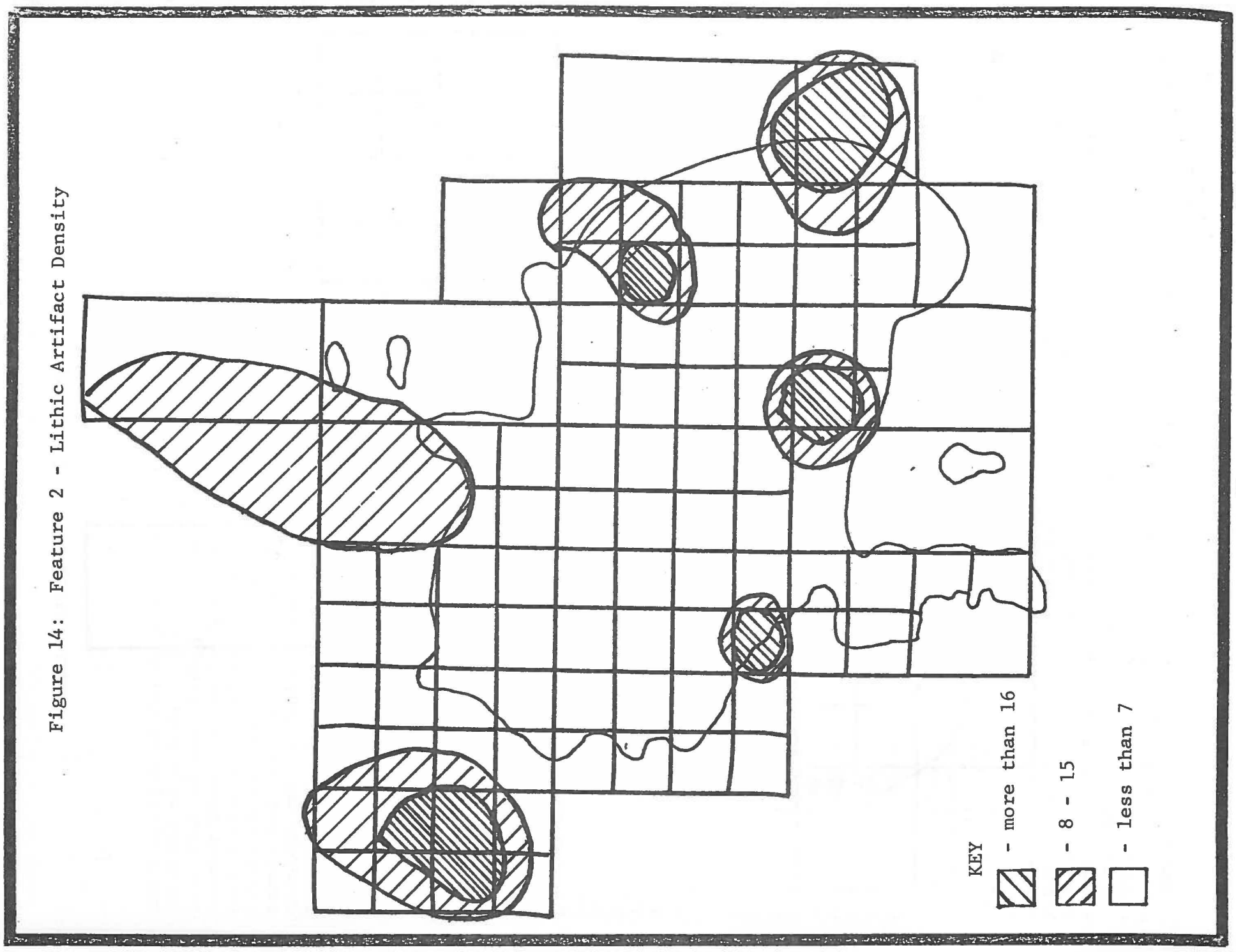


Figure 14: Feature 2 - Lithic Artifact Density

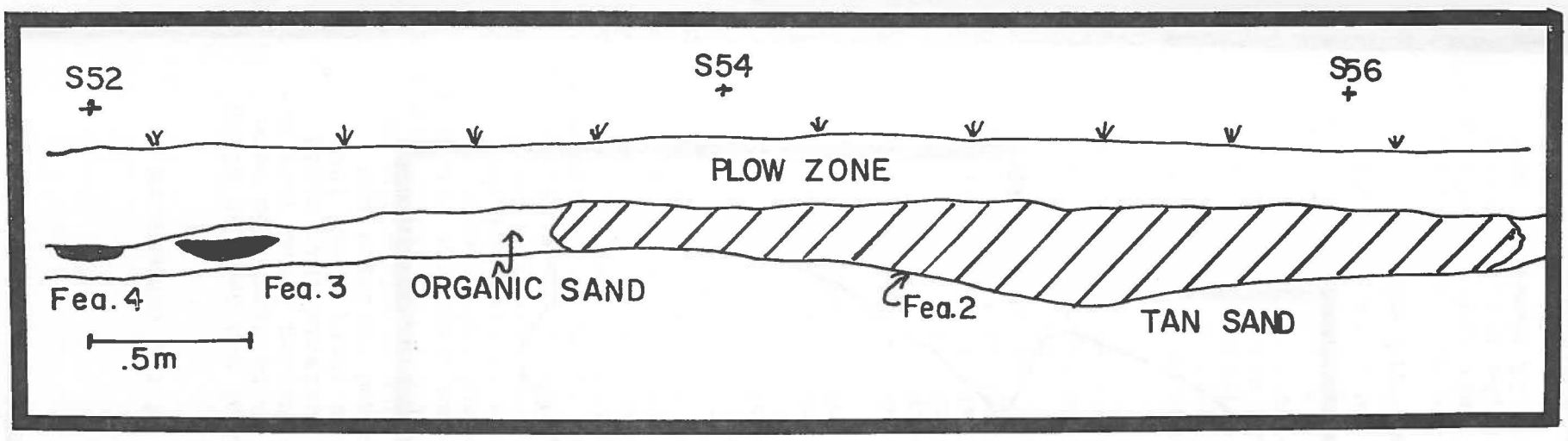


Figure 12: Feature 2 Profile

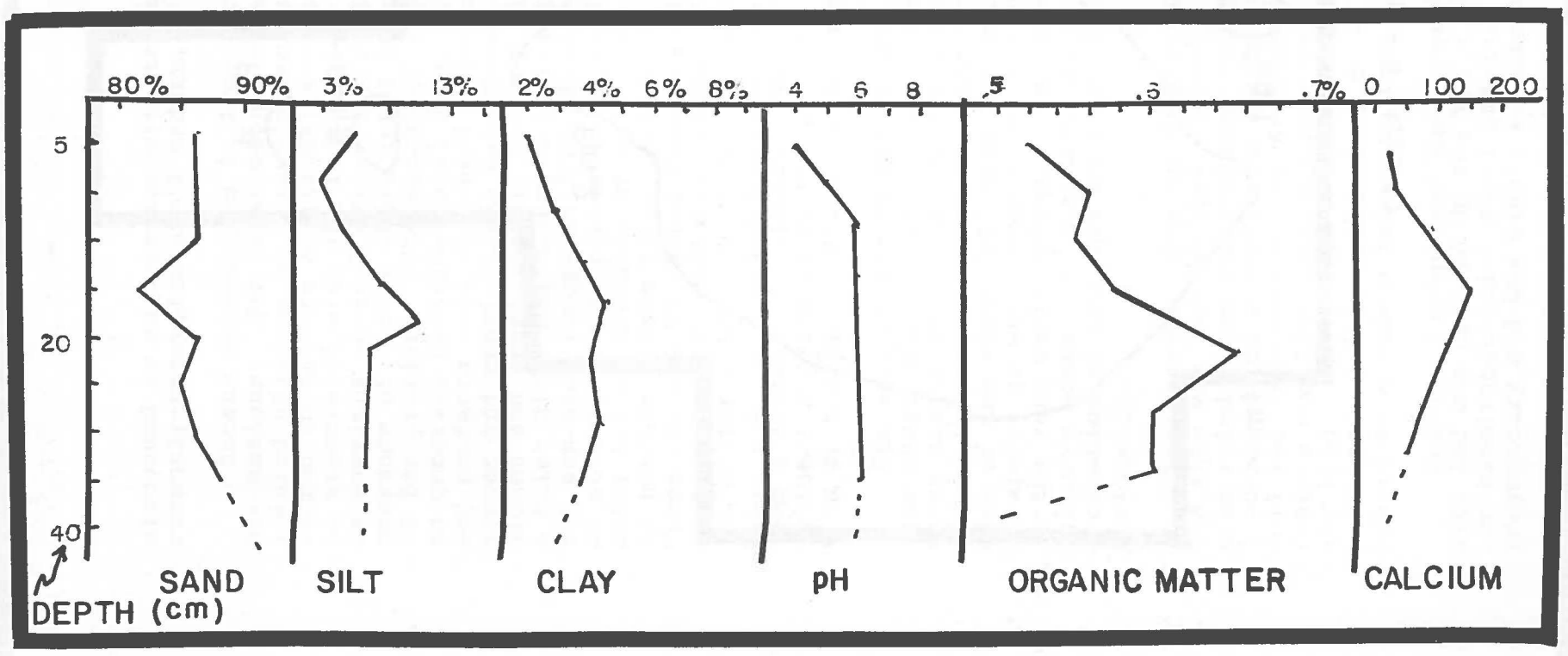
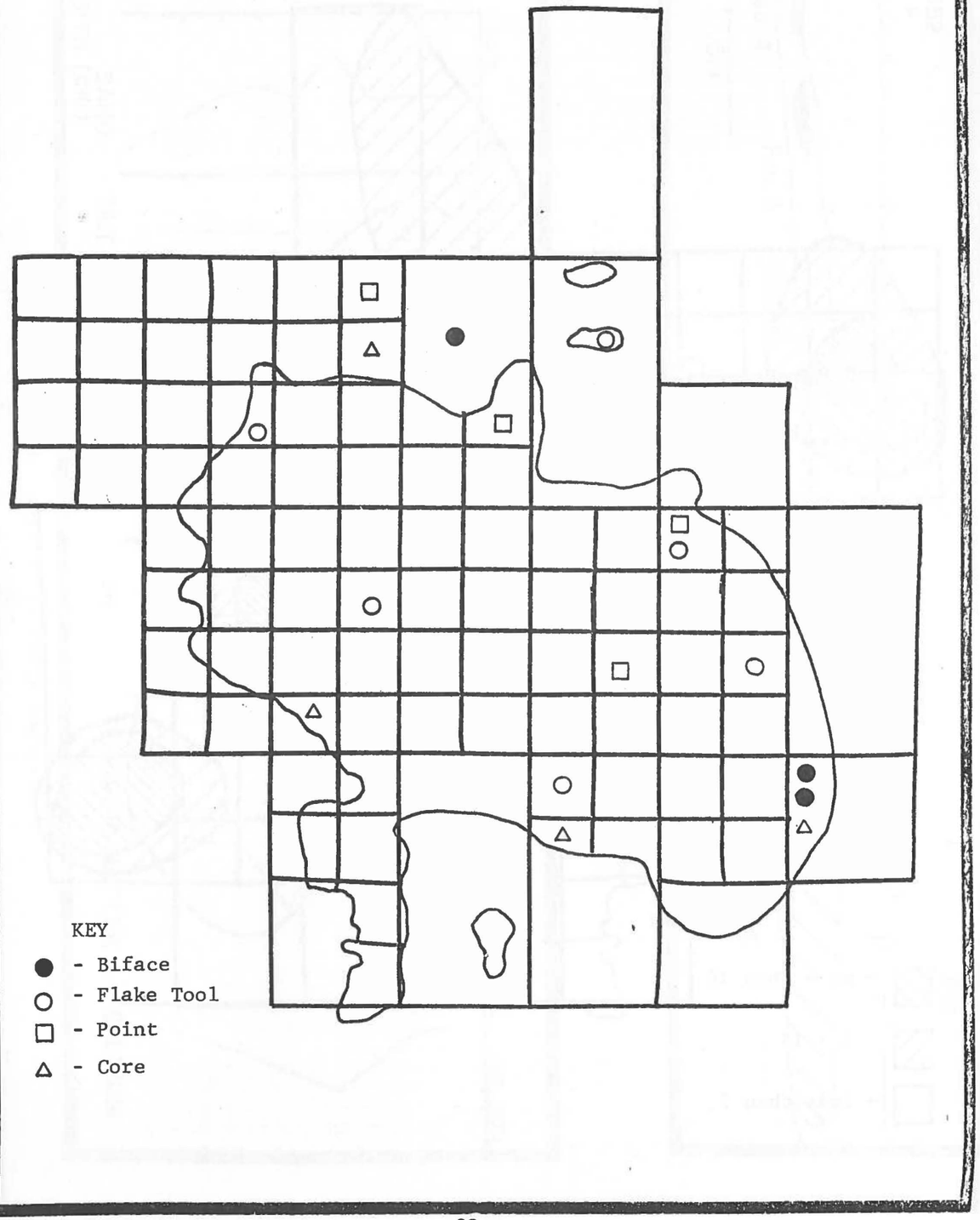


Figure 13: Results of Soils Analysis

Figure 15: Feature 2 - Tool Distribution



south profile of the midden and shows that the midden itself generally consists of a 5 cm - 10 cm thick layer of shell and organic-rich soil that is undisturbed by plowing. Most likely, the midden was thicker when originally deposited and the uppermost portions have been disturbed by plowing. In order to better understand the depositional processes that buried the midden, a column soil sample was taken and analyzed for particle size distribution and chemical constituents by the Soils Laboratory, College of Agricultural Sciences, University of Delaware. Figure 13 shows the results of the soils analysis and plots changing particle size distribution, pH, percentage organic matter, and calcium carbonate indices with depth. The increases in calcium carbonate indices, percent organic matter, and pH below 15 cm in depth indicates the presence of the shell midden itself. These trends occur just below the plow zoneand show that at least a portion of the midden has not been disturbed by the plowing. The decrease in percentages of sand-sized particles and the increase in silt and clay-sized particles below 20 cm shows the presence of translocated fine-sized particles that indicate developing pedogenesis. The process of pedogenesis indicates that the profile has been stable for up to 3000 years (Bilzi and Ciolkosz 1977) and that the midden has not been disturbed by natural factors such as erosion or redeposition. It should be noted that in other sites located in the Middle Atlantic Coastal Plain where aeolian erosion has been shown to be a factor in disturbing the contexts of artifacts, this degree of profile development is not noted (McNamara 1982a). Therefore, the soils data from Feature 2 underscore the fact that the midden and its archaeological deposits are not disturbed and have good context.

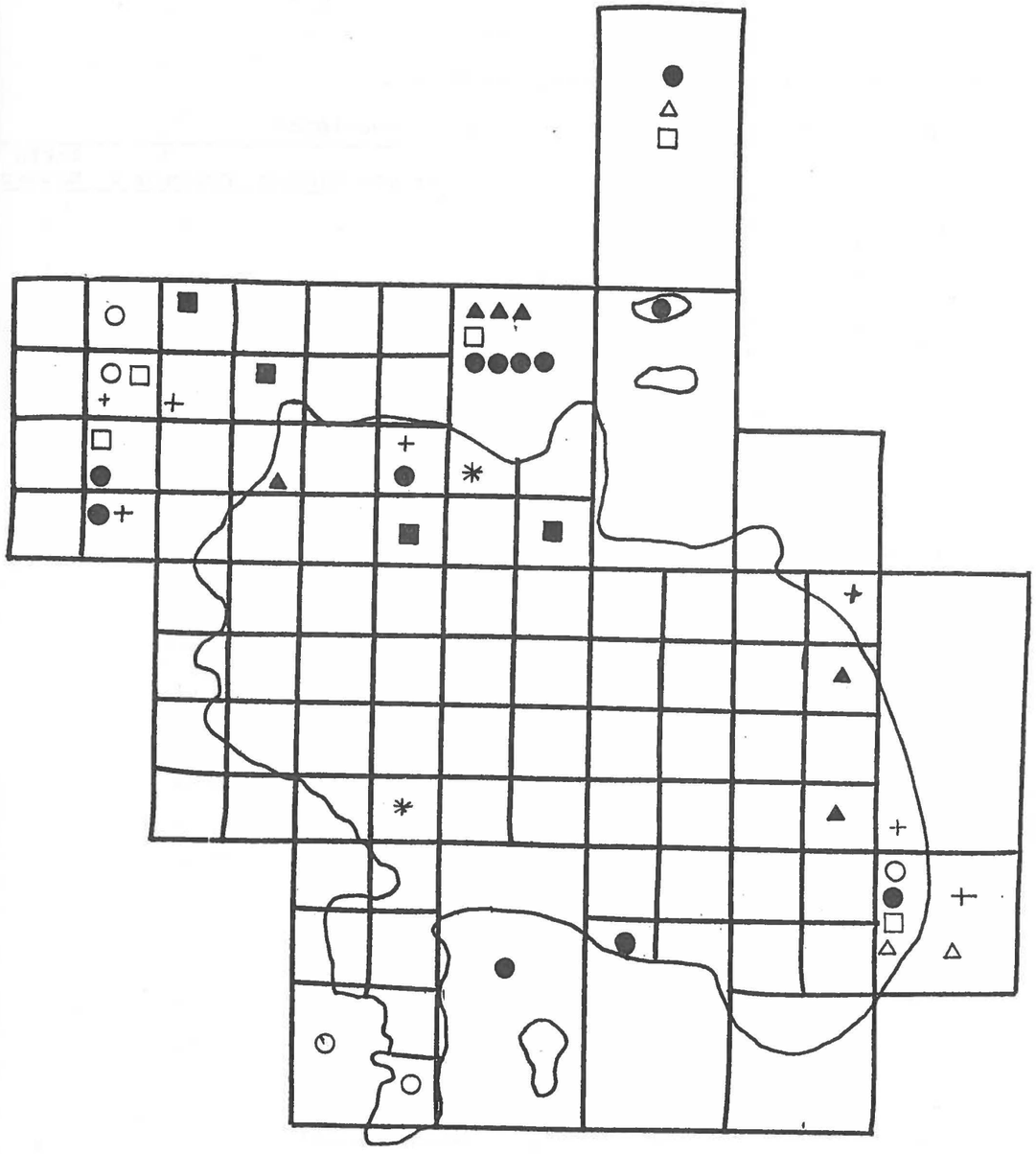
The good context of the major midden comprising Feature 2 presented an important chance to obtain distributional information on artifacts and ecofacts. Consequently, the entire midden was excavated by .5 m blocks and all artifacts were catalogued by these minimum provenience units (Figure 11). Figure 14 shows the distribution of lithic artifacts across the midden and is based on the density of artifacts per .5 m block. These artifacts are 95% debitage with only a few retouched tools noted. The distribution of tools is noted in Figure 15 and included are cores, bifaces, projectile points, and flake tools. Projectile points are depicted in Figure 9c-e and include the basal fragment of a jasper parallel-sided point that is probably a late Woodland I Fox Creek or Jacks Reef variety (Figure 9c), a triangular jasper point (Figure 9d), and a tiny (less than 3 cm long) sidenotched point (Figure 9e). A non-diagnostic point tip was also found. All bifaces are early-stage rejects with extensive cortex present and are between 10 cm and 15 cm in length. Most likely, they were discarded in the process of manufacturing, due to small size, excessive internal fractures and manufacturing errors that produced extensive step fractures. Cores from the midden area are exhausted and represent discarded materials. There is no evidence of retouching or battering that would indicate that the cores themselves were used as tools. Flake tools from the midden are lightly retouched along their lateral edges and 4 of 6 have cortex present

on them. As wide as they are long, these tools seem to have been manufactured from cores, lightly retouched to increase their edge angles, utilized, and then discarded. Low-power examination of edges shows little edge rounding and little flake scar edge polishing suggesting that these tools did not have a long use life and were continually replenished with new flakes from other cores. The debitage from the midden is difficult to characterize as tool production debris, or unmodified tools. Pebble cherts and jaspers comprise 90% of the debitage with the remainder included quartz, quartzite, and rhyolite. None of the debitage is burned and approximately 10% have cortex present. Some of the unmodified flakes may have been tools as well as waste material from biface production.

The distinctive colors of the chert and jasper flakes and their cortex allowed the sorting of some of the flakes by their core source. In several cases, actual refitting of flakes was accomplished. Approximately 15% of the debitage could be sorted into core sources with supporting refitted pieces. Table 2 summarizes descriptions of these sets of artifacts. The analysis of the distribution of these materials can be used to define areas of single-component occupation (see Villas 1982; Gross 1974; McNamara 1982) and Figure 16 shows the distribution of the groups, or cores, noted in Table 2. It can be seen that refitted pieces from the same core are found in both ends of the midden and that this distribution matches that of the overall lithic artifact distribution (Figure 14). Thus, it can be stated that the midden represents a single occupation, or component, and that artifacts located within the undisturbed midden were deposited relatively contemporaneously.

Figure 17 shows the distribution of various ceramic wares through the midden in Feature 2. The three ceramic types found in the midden are Coulbourn Ware, a crushed-pottery-tempered ware associated with the Woodland I Delmarva Adena Complex; Mockley Ware, a shell-tempered ware associated with the Woodland I Carey Complex; and Wilgus Ware, a newly-named Woodland I ware described in the Appendix (Griffith 1982; Artusy 1976; Custer 1983). The three varieties are mixed within single provenience units as well as being spread throughout the undisturbed midden area. Based on the analysis of the core data for the lithic artifacts, and the soils data which show that the midden is undisturbed, these three varied ceramic types all must have been utilized contemporaneously by the people who deposited the Wilgus midden. Similarly, the varied projectile points were also most likely utilized contemporaneously. The implications of these interpretations are noted in the final section of this report.

Figure 16: Distribution of Refitted Cores



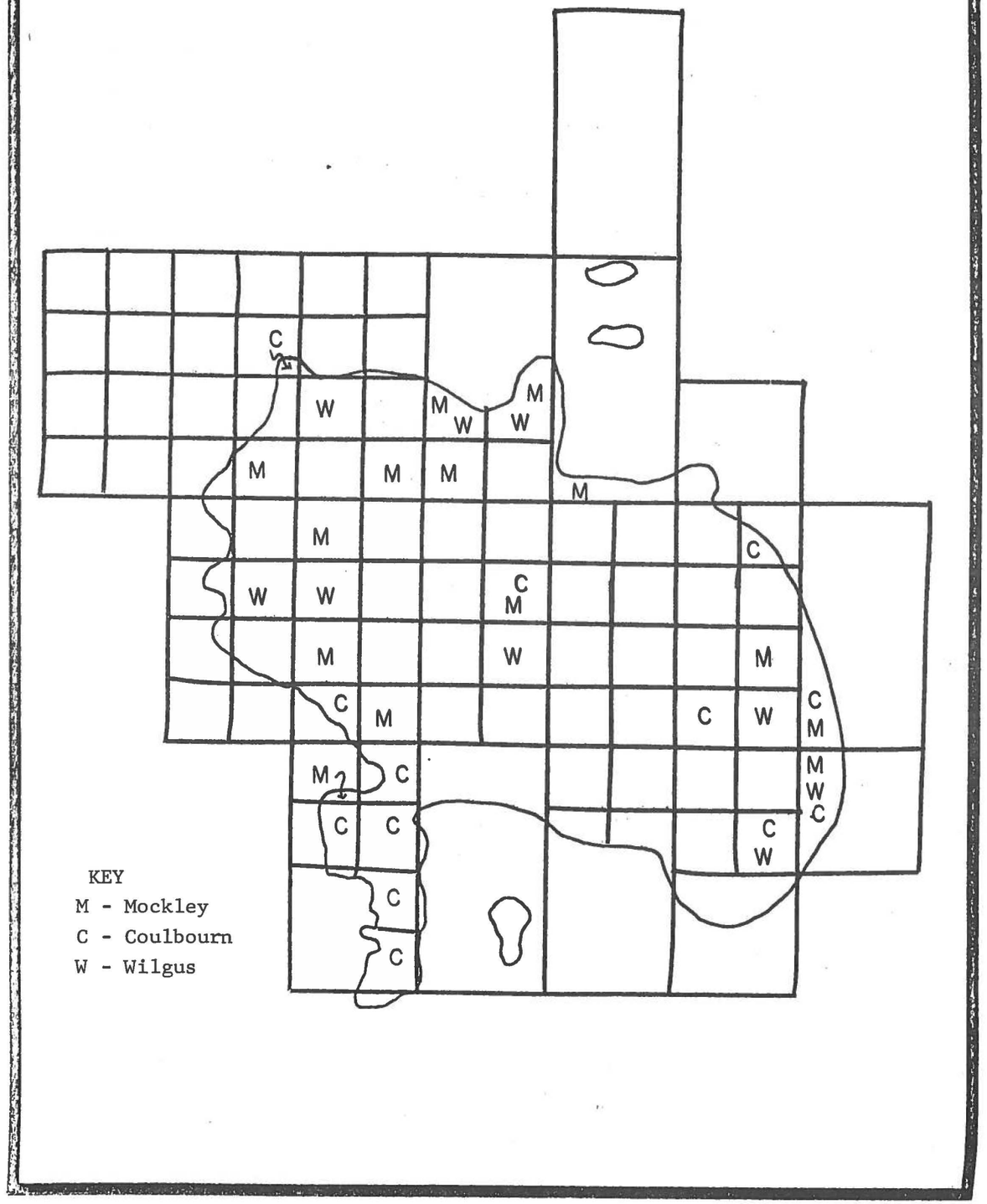
Each distinctive symbol represents a separate refitted core

Table 2: Descriptions of Identified Cores

Core #	Color Range[a]	# of flakes	Provenience		
			Artusy Midden	Feature 2	Earth Midden
83	5Y5/1;2.5Y5/4	17		X	X
7	5YR7/1	3			X
31	2.5YR3/2	7			X
103	2.5Y5/6	3		X	
97	7.5YR7/2	30		X	
179	2.5Y7/0	6		X	
23	10R4/4	7		X	
14	10YR7/3	3		X	
149	7.5YR7/0	13		X	
47	2.5Y7/0-8/0	11	X	X	
140	10R6/1	7	X	X	
137	10YR5/1	12	X	X	
101	2.5Y5/6-4/6	24	X	X	
26	10R2.5/2	8	X	X	
90	10YR6/4	11	X	X	
92	2.5Y5/6;2.5Y6/0	16	X	X	
108	5Y6/2	14	X	X	
84	10YR5/6	22	X	X	
41	10YR6/1	8	X	X	
48	10YR8/1	46	X	X	X
75	10YR5/6;10YR3/3	6	X	X	X
182	2.5YR2.5/0	32	X	X	X
18	10R3/4	28	X	X	X

[a]Munsell color description.

Figure 17: Distribution of Ceramic Types



Feature 2 contained abundant ecofacts for analysis, the most abundant of which was shell. Ninety five percent of the total shell remains were clam shells (Mercenaria mercenaria) which were very badly eroded. The remainder of the shells were oysters (Crassostrea virginica) which were also too badly eroded for seasonality analysis. Figure 18 shows the distribution of oyster shells within the midden and a clustering in the southeastern corner can be seen. The shift in species composition across the midden may indicate slightly varied food choices during the midden's deposition that may be related to seasonal availability. However, the shell data by itself is insufficient to answer this question.

Faunal remains from Feature 2 included primarily deer and turtle remains with some small mammals represented including raccoon and muskrat. Some fish bones identifiable as catfish and unidentified fish bones were also present. Figure 19 shows the distribution of various species in the midden and the deer/turtle association is found throughout the midden. The turtle remains include several species (box, snapping, and painted) and the large number of remains indicates the high probability of many individuals being present. It is suggested here that these finds of multiple individuals of several species may indicate a winter gathering of hibernating individuals. These animals would be buried in the mud of the shallow water marshes, the same locations where the shellfish would be gathered, and probably could be easily located by probing in the soft muds with a stick. Their sluggish nature due to hibernating would make them rather easy prey.

Analysis of flotation samples from the Feature 2 midden revealed abundant charred plant remains. Table 3 lists all materials recovered from two of the samples. The presence of small retouch flakes shows the preparation and maintenance of tool edges and the presence of rhyolite flakes shows that artifacts made from this non-local raw material were used and maintained for technomic functions. The seeds in the flotation noted in Table 3 were all charred and considering the size of the flotated sample, they are fairly abundant. Chenopodium and amaranth are both food sources that would have been available for collecting in late summer (Moeller 1975). This seasonality indicator provides a contradiction to the hypothesized winter period of midden deposition for Feature 2. However, the season of seed availability may not be the season of their consumption and disposal.

Figure 18: Distribution of Oyster Shell

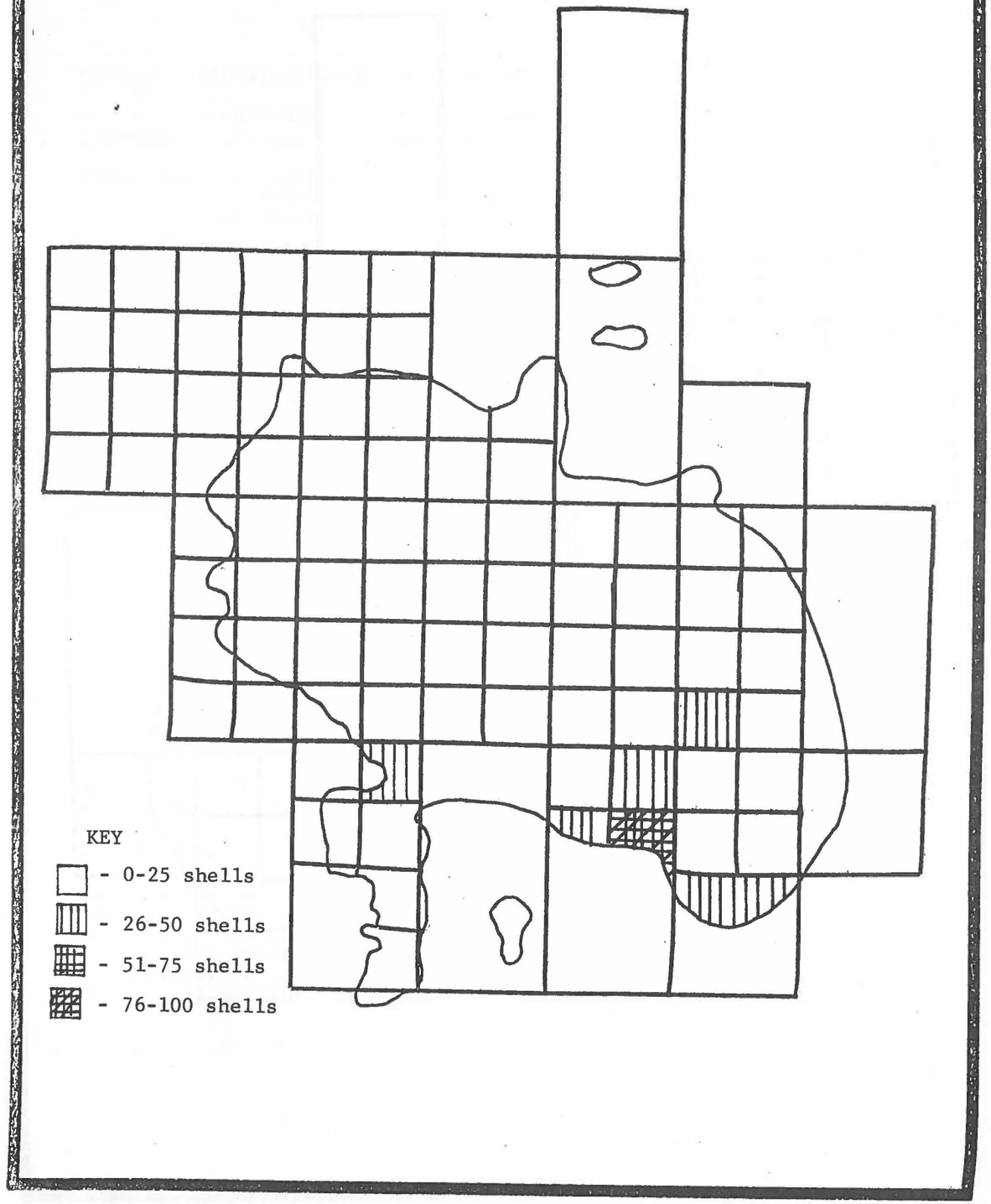


Figure 19: Distribution of Faunal Remains

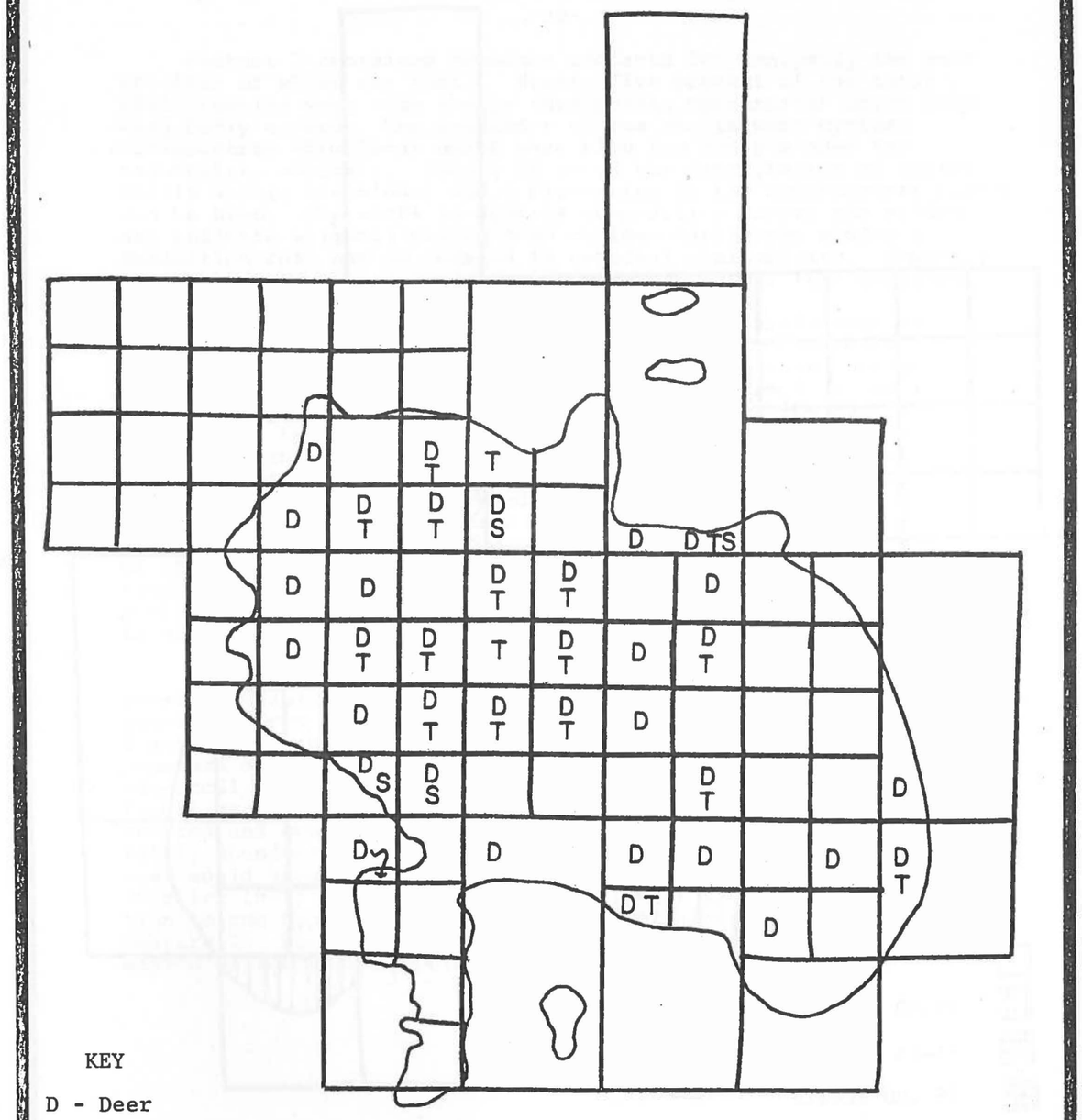


Table 3: Flotation Analysis - Feature 2

Sample	Retouch Flakes	Charcoal	Bone Fragments	Charred Seeds	Volume
S56E0, SSW	2 rhyolite 1 jasper 12 chert	.6g	10.15g	25 chenopodium 6 scutelaria 450 amaranth	8 l.
S54W3, SNE	--	.05g	--	1300 amaranth 120 chenopodium 5 scutelaria	5 l.

Some clarification can be obtained by considering the relationship between this midden and the midden excavated by Artusy. As noted previously, analysis of the oyster shells comprising the Artusy midden showed that this midden was deposited very late in the winter or early in the spring. If this midden, with its secure seasonal identification, could be shown to be contempotaneous with the Feature 2 midden, then the presence of seeds available during late summer in a midden deposited in winter and early spring may be explained by storage of seed plant foods for later consumption. The identification of core sources and refitted flakes provides this information. Table 2 shows that 14 separate cores are shared between the two middens. Given the previously noted short tool life, high rate of core consumption, and the use of conjoined pieces and identified flakes from a single core to isolate single components, the contemporaneity of the two middens can be inferred with reasonable assurance. Therefore, it is likely that the seeds in Feature 2 were gathered in late summer, processed, stored for later use, and then consumed with the waste deposited in Feature 2 during late winter/early spring.

Two additional small shell features were found in Area 4 during the 1980 excavations and are noted as Features 3 and 4 in Figure 11. Figure 20 shows the profile of Feature 3 and both features seem to be small, single episodes of trash dumping. Less than ten ceramic and lithic artifacts were found from both features; however, in Feature 3, two of these artifacts are of interest. Figure 20 shows the exact provenience locations of the artifacts within this small feature. Of the three ceramic sherds, two are Mockley and one is Coulbourn. The association of these two ceramic wares in undisturbed single-event context underscores the associations noted for Feature 2. A flotation sample from Feature 3 was also processed, analyzed, and seen to contain some pressure flakes, amaranth, and chenopodium.

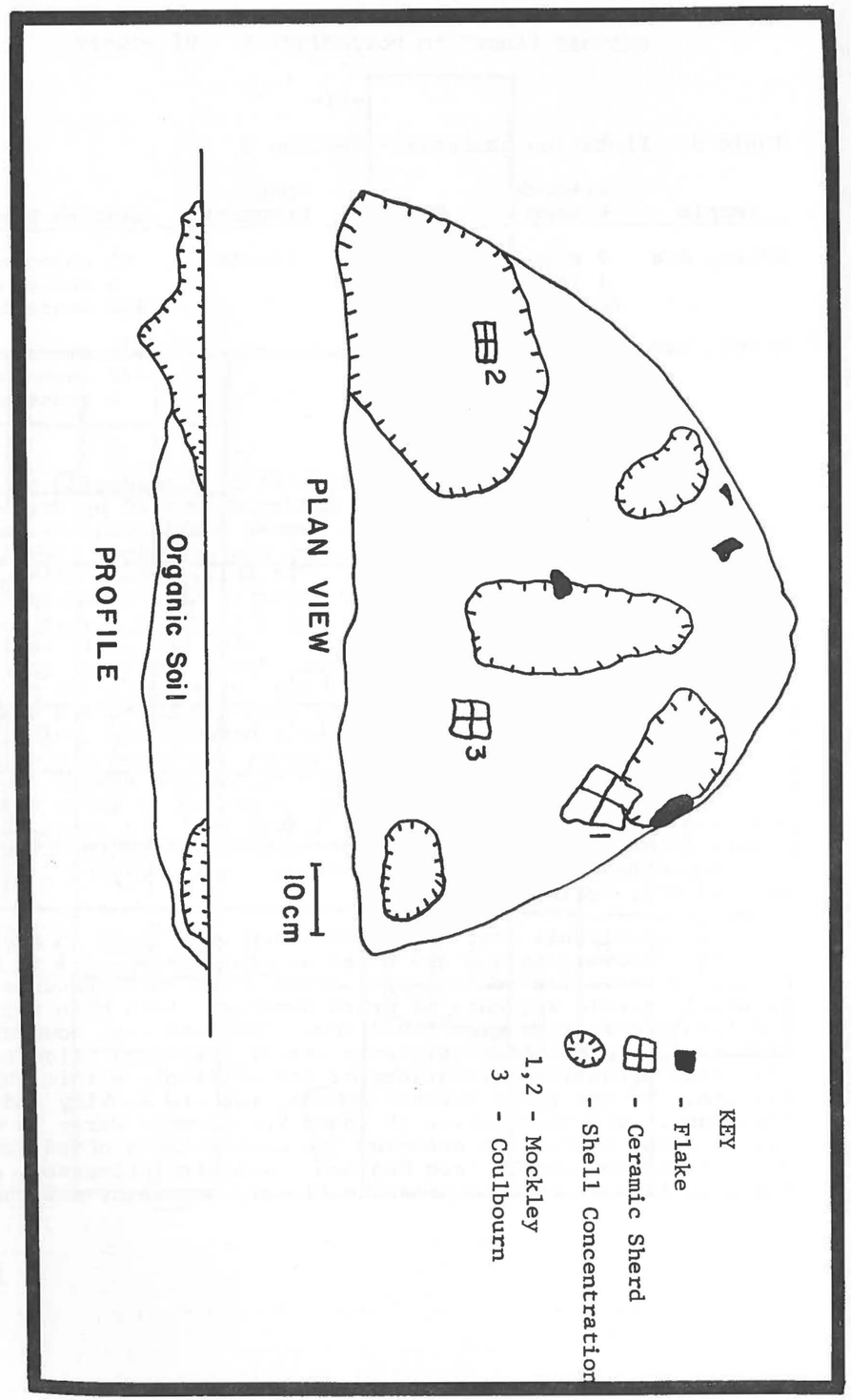


Figure 20: Feature 3

Area 5

A series of contiguous units were excavated in Area 5 to investigate a very dark organic soil deposit that was observed in soil augerings. No shell midden deposits were present; however, abundant artifacts and ecofacts were recovered from the dark earth midden deposit. Figure 21 shows the midden profile. The only lithic artifacts recovered were 72 flakes, and 3 exhausted cores. Jaspers and cherts comprised 80% of the lithic artifacts and the remainder were quartzite, argillite, and rhyolite. Approximately half of the lithic artifacts have cortex present. Four tools were recovered and three are generalized retouched flakes with morphology and use-wear patterns similar to those seen on flakes from Feature 2. The other tool is a burin with all the diagnostic attributes noted by Semenov (1964:94-100) indicating bone or antler processing at the site. Flakes from this area were also matched to cores and analyzed for conjoinable pieces. Table 2 shows that the flakes from this earth midden can be matched to core identifications from both the midden excavated by Artusy and Feature 2. Therefore, the earth midden was deposited by the same occupation that deposited the shell midden.

The excavations in Area 5 recovered the largest concentration of ceramics from the site. Coulbourn, Wilgus, and Mockley ceramics were present and their distribution through the excavation units is noted in Figure 22. The association of these varied types of ceramics is similar to the pattern seen in Feature 2. The abundance of the ceramics and large size of some of the sherds allowed the mending of many pieces and Figure 23 shows the distribution of mended sherds. These provenience units cross-cut the area where the three ceramics co-occurred and further reinforce the validity of the hypothesis of their contemporaneity.

No faunal remains were found in the earth midden, probably because there was no shell to lower the soil acidity to a point where bone could be preserved. A 3 liter flotation sample was analyzed and contained both artifacts and ecofacts. Eleven small pressure flakes were recovered; nine of jasper and one each of Flint Ridge chalcedony and rhyolite. The Flint Ridge chalcedony pressure flake is interesting because it suggests that artifacts made from this rather rare raw material, which is usually used to manufacture specialized grave goods, were being used and maintained as tools, at least to a limited extent, at the Wilgus site. In addition to the artifacts, 76 charred chenopodium seeds and 950 amaranth seeds were recovered. Because there was no clearly defined shell midden with which to associate the seed remains, a control sample from outside any midden areas (Square S54W13, Level 2) was also subjected to flotation analysis. The control sample contained no charred seeds, although one chert pressure flake and a few small unidentified bone fragments were present. Therefore, the charred seeds in the dark earth midden, and the other middens as well, were most likely deposited by human activity and are not simple natural seed "fallout" from surrounding burned areas. The

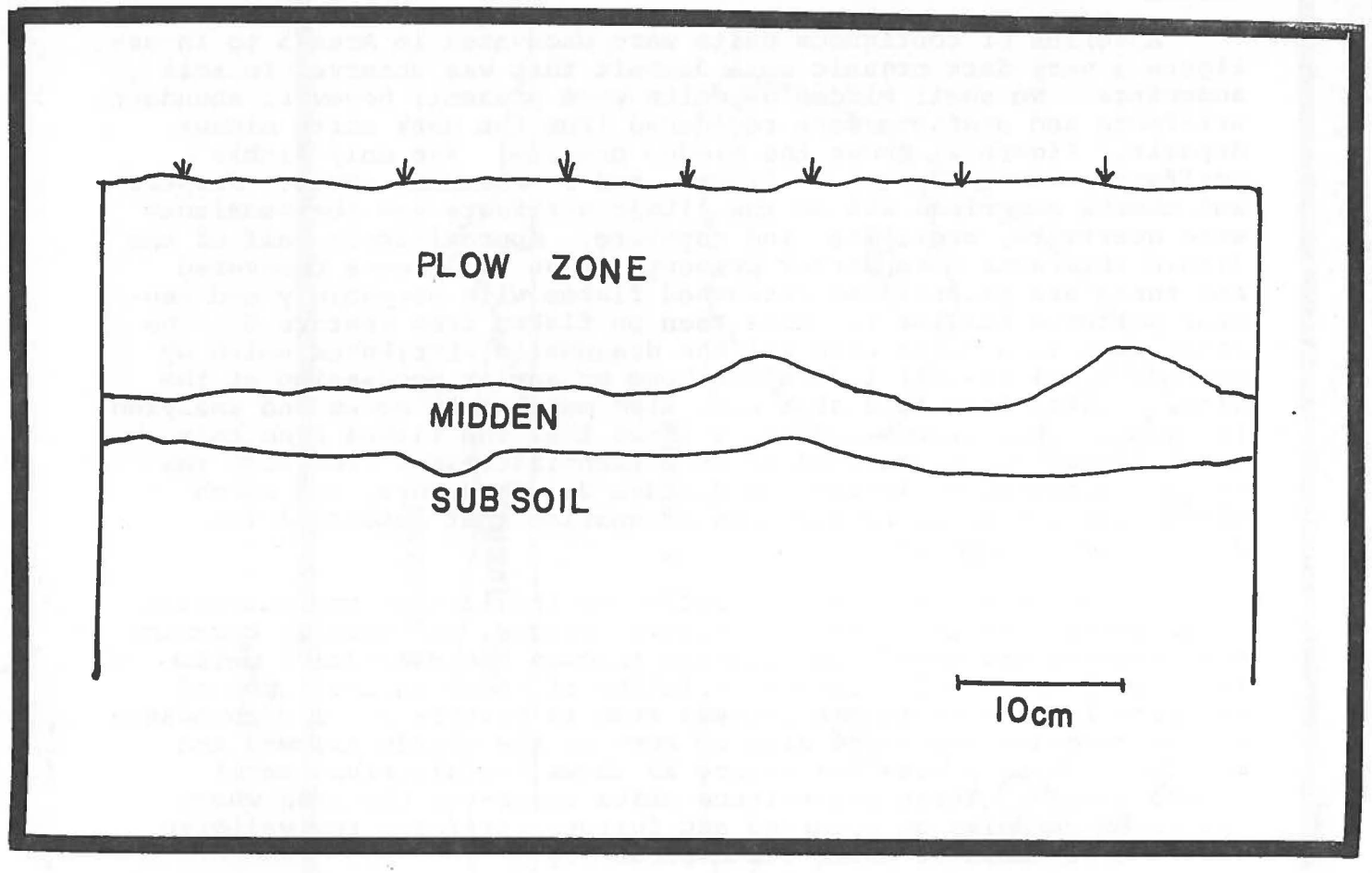


Figure 21: Earth Midden Profile

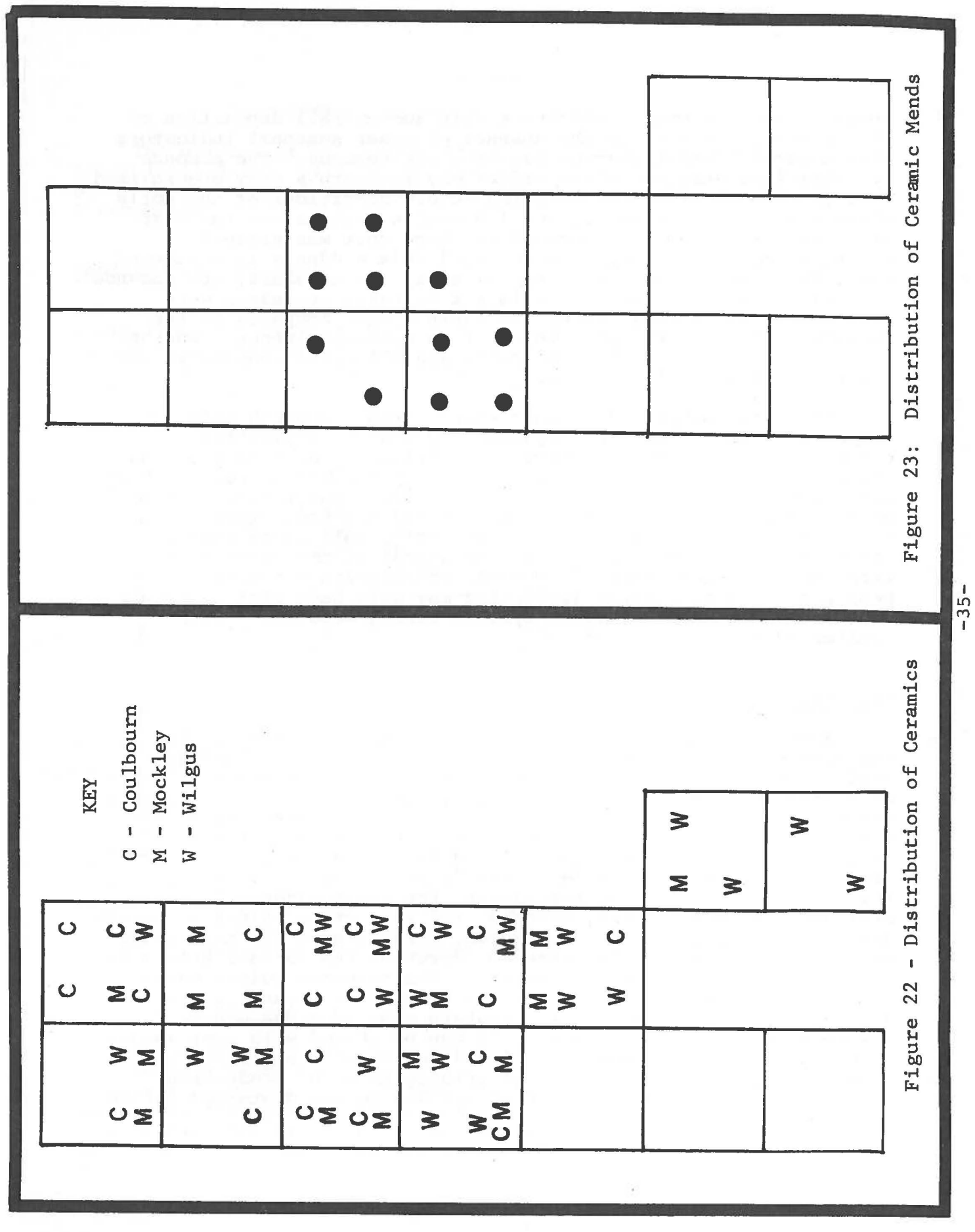


Figure 22 - Distribution of Ceramics

Figure 23: Distribution of Ceramic Mends

seeds themselves would indicate a late summer/fall deposition of this midden; however, in the absence of other seasonal indicators this seasonal identification may be a bit tenuous. The absence of other food remains in the midden may indicate a very specialized food processing area; however, the acidic conditions of the soils which were not mitigated by shell deposits such as was the case with Feature 2, may have decayed any bone that was present. Consequently, it is premature to label this midden a late summer/ early fall seed-processing/disposal area. Nonetheless, the absence of shell does indicate that different cultural processes were involved in the deposition of the earth midden compared to the Feature 2 shell midden with which it is contemporaneous. Whether or not these processes took place during different seasons is not clear from the available data.

The large number of ceramic sherds from the earth midden compared to the other shell middens may also be indicative of other activities. Mended sherds were primarily derived from one large Wilgus vessel that had a reconstructed rim diameter of 40 cm and a vessel height of at least 30 cm. There was little charring of the vessel walls indicating that it had not been exposed to fires for cooking (Hally 1983). Possibly, this large vessel and the other vessels represented by the sherds in the earth midden were used for seed storage. The use of ceramics for storage has been suggested by Gardner (1975) and may have been part of significant changes in subsistence systems during Woodland I times (Custer 1983).

East Site Area

A was noted earlier, excavations in this separate section of the site were undertaken when cutting of trees and preliminary grading associated with the housing development construction exposed a shell midden and associated artifacts (Figure 7). The midden was rather heavily disturbed by construction and the context of the artifacts is not as good as in the other areas of the site. Ceramics found in the midden included Coulbourn, Wilgus, and Mockley wares. Disturbance of these materials precludes any discussion of their associations or contemporaneity for these middens. Lithic artifacts included flakes, bifaces, and projectile points of cherts and jaspers. Adjacent to the midden, nine bifaces and triangular points were found and they seem to represent the various stages in the production of triangular points. The rejected points match the manufacturing sequence described by Rule and Evans (1981) and although the disturbance of the feature precludes the exact determination of activity areas, it can be stated with some assurance that the midden deposit included the rejects and discards from a fairly discrete episode of triangular point production. Flotation analysis was not carried out due to the disturbed nature of the deposits.

INTERPRETATIONS AND THEIR IMPLICATIONS

The discussion of interpretations of the site excavations and their implications will be divided into two parts, those dealing with the Woodland II component and those dealing with the Woodland I component.

Woodland II Component

The Woodland II component of the Wilgus site consists of a scattering of Slaughter Creek Complex artifacts on the surface and in the plow zone across the knoll and slope toward the buried stream channel, and at least two relatively large storage/refuse pit features. The presence of storage/refuse pits indicates something more than an ephemeral occupation and the ecofacts from Feature 5 suggest a late summer through fall occupation of the site with a possible abandonment of the site by winter. The varied tool forms, in addition to the features, suggest that during Woodland II times, the Wilgus site was a semi-permanent base camp or hamlet. However, it is much smaller than some other Slaughter Creek Complex base camp sites of the Delaware Atlantic Coast, such as the Townsend site (Omwake and Stewart 1963), and the Wilgus site would most likely fall within the micro-band base camp category (Custer 1983). It may even represent a single family occupation. Thus, the site is comparable to the Indian Landing site (Thomas et al. 1975), the Warrington site (Marine et al. 1964), the Poplar Thicket site (Griffith n.d.) and the Bay Vista site (Custer 1983), all within the Indian River/Rehoboth Bay area. The Wilgus site would be part of a larger settlement system that would consist of longer-term, semi-sedentary occupations at large sites such as the Townsend site in the coastal zone and mid-drainage areas with seasonal dispersal to smaller seasonally re-occupied micro-band base camps further inland up the drainages, such as the Wilgus site (Thomas et al. 1975).

It is interesting to note that the detailed analysis of the plant remains from Feature 5 revealed no cultigens, such as maize or squash. Only wild plant foods such as amaranth, chenopodium, and hackberry were present. Some corn is found at the larger macro-band base camps, but never in large quantities (Custer 1983). The findings from the Wilgus site suggest that agricultural food sources played only a minor role, if any role at all, in the subsistence systems of Slaughter Creek Complex groups at micro-band base camps.

Woodland I Component

The Woodland I component at the Wilgus site probably also represents a micro-band base camp. A scattering of ceramics and lithics across the knoll surface and in the plow zone probably represents living area debris and the buried shell and non-shell middens down the slope toward the buried stream channel are secondary refuse deposits. Refitted flakes and identified core sources show

that the initial midden excavated by Artusy (1978), Features 2 - 4, and the earth midden were deposited during the same occupation of the site sometime between 300 B.C. and A.D. 500 based on radiocarbon dates. These dates would place the occupation within late Delmarva Adena Complex and early Carey Complex times (Custer 1983). The presence of artifacts such as a gorget fragment, a Flint Ridge Chalcedony projectile point, and Coulbourn ceramics underscores the presence of a Delmarva Adena Complex occupation.

The subsistence data from the Woodland I middens is of special interest. The appearance of wild seed food remains from plants available in late summer in a late winter/early spring midden indicates that storage of seed plant foods was a component of Delmarva Adena - Carey Complex subsistence strategies. Apparently, a combination of deer and turtle, shellfish, and stored seed plant foods carried Delmarva Adena - Carey Complex groups through the late winter and early spring months, a time of relative resource scarcity for temperate lattitude hunters and gatherers (Jochim 1976). The use of shellfish to augment late winter/early spring diets corresponds to findings from other parts of the Middle Atlantic (McNamara 1982b; Waselkov 1982; Potter 1982; Brennan 1977) and confirms the predictions of Thomas et al. (1975). However, these findings contradict the predicted season of shellfish utilization generated from the application of optimum foraging theory (Cameron 1976; Gilsen 1980). The utilization of stored plant foods, documented at the Wilgus site, corresponds to models of intensification of subsistence practices during the Woodland I Period and the utilization of storage strategies is an important part of some models of increasing social complexity for the Delmarva Adena Complex (Custer 1982b; 1983). This kind of intensified plant food utilization may indeed be unique to Delmarva Adena Complex societies, but the comparative data base is small. Nonetheless, it can be noted that floral remains from the comparably dated Delaware Park site in northern Delaware (Crabtree and Langendorfer 1981) show a wider range of species stored and utilized, indicating a less specialized adaptation among non-Delmarva Adena societies. Even though there are some differences in floral utilization strategies indicated by the Wilgus data, the basic faunal utilization patterns are very similar to those seen at other sites of comparable age in the Middle Atlantic (Waselkov 1982; Potter 1982; Barber 1982; Griffith and Artusy 1977). These subsistence data indicate that the incipient ranked societies of the Delmarva Adena Complex who produced lavish cremation burials and engaged in long distance trade and exchange (Thomas 1970) were supported by a simple hunting and gathering base with some intensification apparent in plant food utilization. This intensification, coupled with shellfish utilization in coastal areas, allowed a degree of sedentism that in turn both allowed for, and required, a concomittant increase in social organization complexity.

The associations of projectile points and ceramics in the Woodland I middens have important implications for regional culture historical reconstructions. The detailed soil analysis, which shows that the middens are not disturbed below the plow zone, and the

refitted flakes and identified cores indicate that the middens were deposited by a single occupation and that the artifacts within them were used and deposited contemporaneously. The varied projectile points in this assemblage include Fox Creek lanceolate, Jacks Reef pentagonal, generalized side-notched, and triangles. This association calls into question the "one-point, one culture" assumption used by many archaeologists working in the Middle Atlantic. A similar phenomenon is seen for ceramics with Coulbourn, Wilgus, and Mockley ceramics utilized contemporaneously. In reality, these findings are not that extraordinary because the co-occurrence of several stylistic variants at a single point in time, or at least a limited range of time, is a basic pattern recognized and utilized in the development of seriation methods (Petrie 1899).

The identification of Wilgus Ware also has implications for local culture history. Prior to its identification, there was a gap in the southern Delaware ceramic sequence between 200 B.C., the suggested end date for Coulbourn ceramics, and A.D. 200, the suggested beginning date for Mockley ceramic utilization (Artusy 1976:11, Figure 2). In his original discussion of the Wilgus site, Artusy (1978:9-10, Figure 3) notes this gap and suggests that there was a pocket of Coulbourn ceramics in central and southern Delaware that is also coterminus with the distribution of Delmarva Adena artifacts in Delaware (Delaware Division of Historical and Cultural Affairs 1978; Custer 1983; Gardner 1982). Artusy (1978:9, Figure 3) then notes that it is not clear how Coulbourn ceramics were replaced by Mockley ceramics. The overlapping of Coulbourn and Mockley ceramics at the Wilgus site and the identification of Wilgus Ware, with its mix of crushed clay and shell temper, fills this gap and shows that the change in tempering materials was a gradual replacement of crushed clay with shell. This gradual replacement is of some interest because recently some authors (Luckenbach, Clark, and Levy 1982) have tried to document ceramic stylistic discontinuities during the middle portions of the Woodland I Period and link these discontinuities to population movements and migrations. In some cases these migrations are seen as related to the development of Delmarva Adena societies. The continuity demonstrated by the Wilgus data shows that ceramic discontinuities are not present, at least in the southern Delaware heartland of the Delmarva Adena distribution, and the search for the roots of Delmarva Adena societies and their social complexity need look no further afield than the seed plants and shellfish of the Delmarva Peninsula.

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Appendix - Wilgus Ware Type Description

This appendix describes a new ceramic variety identified during the analysis of artifacts from the Wilgus site (7S-K-21). The format of the description follows the conventions developed by Griffith (1982).

TECHNICAL DESCRIPTION

Name of Ceramic: WILGUS WARE

Defining Criteria: Temper - mix of crushed clay and shell in varying proportions.

Exterior Surface Treatment - cord-marked and net impressed.

General Description:

Rim/Lip: Rims are direct; lips are both rounded and flattened and are mostly smoothed.

Exterior: Cord-marking and net impressions occur in a combination of orientations with reference to the rim.

Interior: Four classes of interior treatment occur; scraped-over cord or net impressions, totally scraped, smoothed-over scraped, and totally smoothed.

The second method listed is the dominant treatment in the Wilgus site collection.

Vessel Wall Thickness: The maximum thickness is 13 mm and the minimum thickness is 7 mm.

Distribution: Wilgus Ware is assumed to be coterminus with Coulbourn ceramics and is found primarily in southern Kent County and Sussex County, Delaware. However, with further research it may extend further north and into the Eastern Shore area of Maryland.

Radiocarbon Dates: 1710 B.P. $\pm$ 70 (UGa 1762 - Wilgus site)

2240 B.P. $\pm$ 60 (UGa 1763 - Wilgus site)

GENERAL DISCUSSION

Wilgus ceramics look like a blend of Mockley and Coulbourn ceramics. The mix of crushed clay and shell temper ranges from almost entirely clay to almost entirely shell. Its co-occurrence with Mockley and Coulbourn wares at the Wilgus site suggests that it represents a stylistic change from crushed clay to shell tempering and that it is technologically transitional between these two wares. Its chronological position would be within the time gap between the time ranges for Coulbourn and Mockley ceramics noted by Artusy (1976) and would span the time period between 300 B.C. - A.D. 500. Given its role as a transitional ware, the time range of its manufacture may be even shorter. Further comments on the implications of the identification of this ceramic type and its dates are provided in the body of this report within the discussion of the interpretations of the Woodland I component.

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