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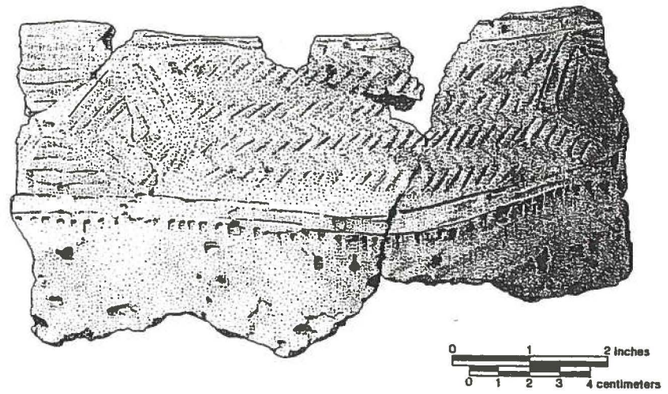

Preliminary Report on Archaeological Survey and Testing in the Atlantic Coast Zone of Delaware, 1987–1990

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Curation Note: The artifacts, excavation notes, and laboratory analysis notes are curated at the University of Delaware Center for Archaeological Research, Newark, Delaware. Site forms and location maps are curated at the Delaware Bureau of Archaeology and Historic Preservation, Dover, Delaware.

PRELIMINARY REPORT ON ARCHAEOLOGICAL SURVEY AND TESTING IN THE ATLANTIC COAST ZONE OF DELAWARE, 1987-1990

INTRODUCTION

The purpose of this report is to provide a preliminary description of the results of reconnaissance survey and intensive test excavations in the Atlantic Coast Zone of Delaware between 1987 and 1990 (Figure 1). The Atlantic Coast Zone was chosen as a focus for archaeological study by the Delaware Bureau of Archaeology and Historic Preservation and the University of Delaware Center For Archaeological Research because this area had been identified as an area with a high potential for containing significant archaeological sites (Custer 1986). This region was also identified as an area with a high level of subdivision development which destroys archaeological sites. Furthermore, a plan for managing prehistoric archaeological resources in the Atlantic Coast Zone itself (Custer 1987) identified specific localities within Delaware's Atlantic Coast Zone which should be the focus of both reconnaissance and intensive archaeological survey (Figure 2 - Cape Henlopen and Inland Bay/Mid-Drainage Management Units), and these areas were also given a high priority for survey in the guidelines for Historic Preservation Fund grant applications.

This report provides a summary of three field seasons of archaeological research in Delaware's Atlantic Coast Zone. During the winter of 1987 and 1988, reconnaissance survey was carried out in the inland bay/mid-drainage section of the Atlantic Coast Zone (Figure 2 - Areas IIa and IIb) and a detailed report was issued (Custer and Mellin 1989). During the summer of 1989, intensive excavations were undertaken at three sites identified in the earlier survey (Figure 2 - 7S-K-46, 7S-K-75, 7S-G-123) and a report issued (Custer and Mellin 1990). An additional reconnaissance survey was undertaken in the summer of 1990 in the Little Assawoman Bay area (Figure 2 - Area IIc) and a report completed (Custer and Mellin 1991). The preliminary results of all three projects are summarized here. The results of the reconnaissance surveys are presented first followed by the results of the intensive excavations. A brief description of the local environment and regional prehistory are also included before the discussion of the projects' results.

Environmental Setting

The Atlantic Coast area of Delaware area falls within the Low Coastal Plain Physiographic Zone which includes most of Kent and Sussex counties and is underlain by the sands of the Columbia Formation (Jordan 1964; Delaware Geological Survey 1976). These sands have been extensively reworked by various geological processes over the past millennia and the result is a very flat and relatively featureless landscape. Elevation differences range up to 10 meters (30 feet) and these small differences are

FIGURE 1

Study Area Location

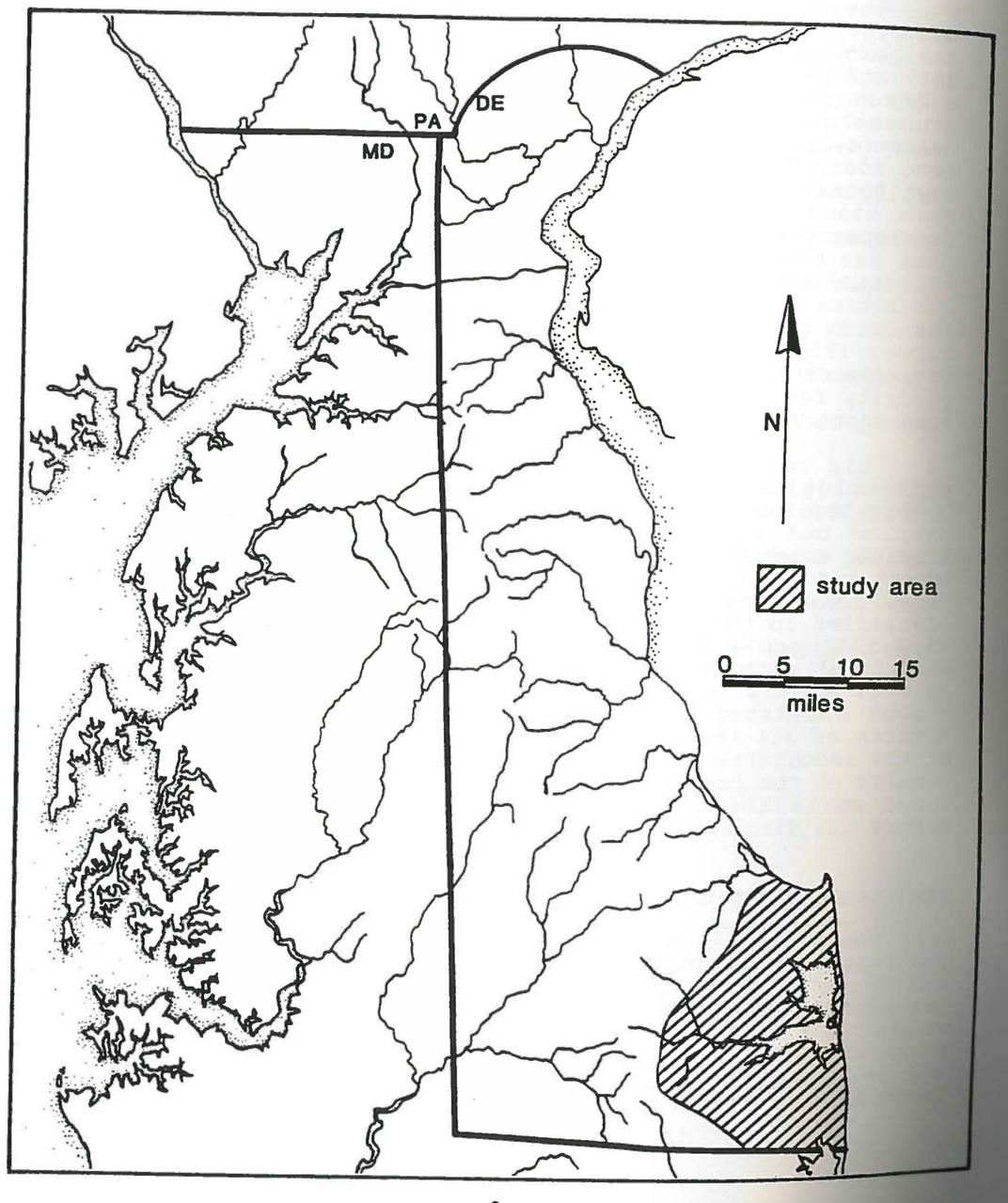
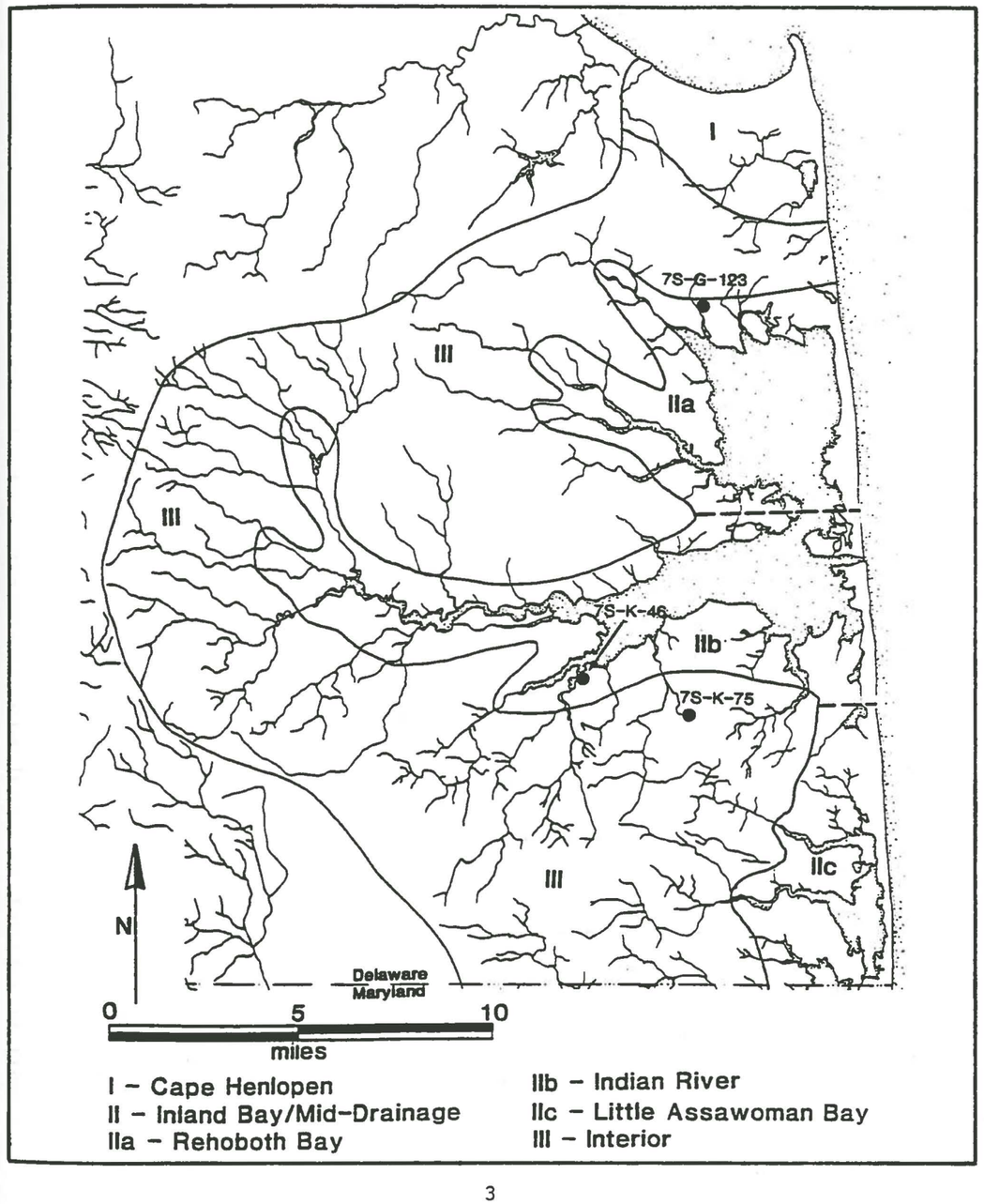


FIGURE 2

Atlantic Coast Management Units and Site Locations



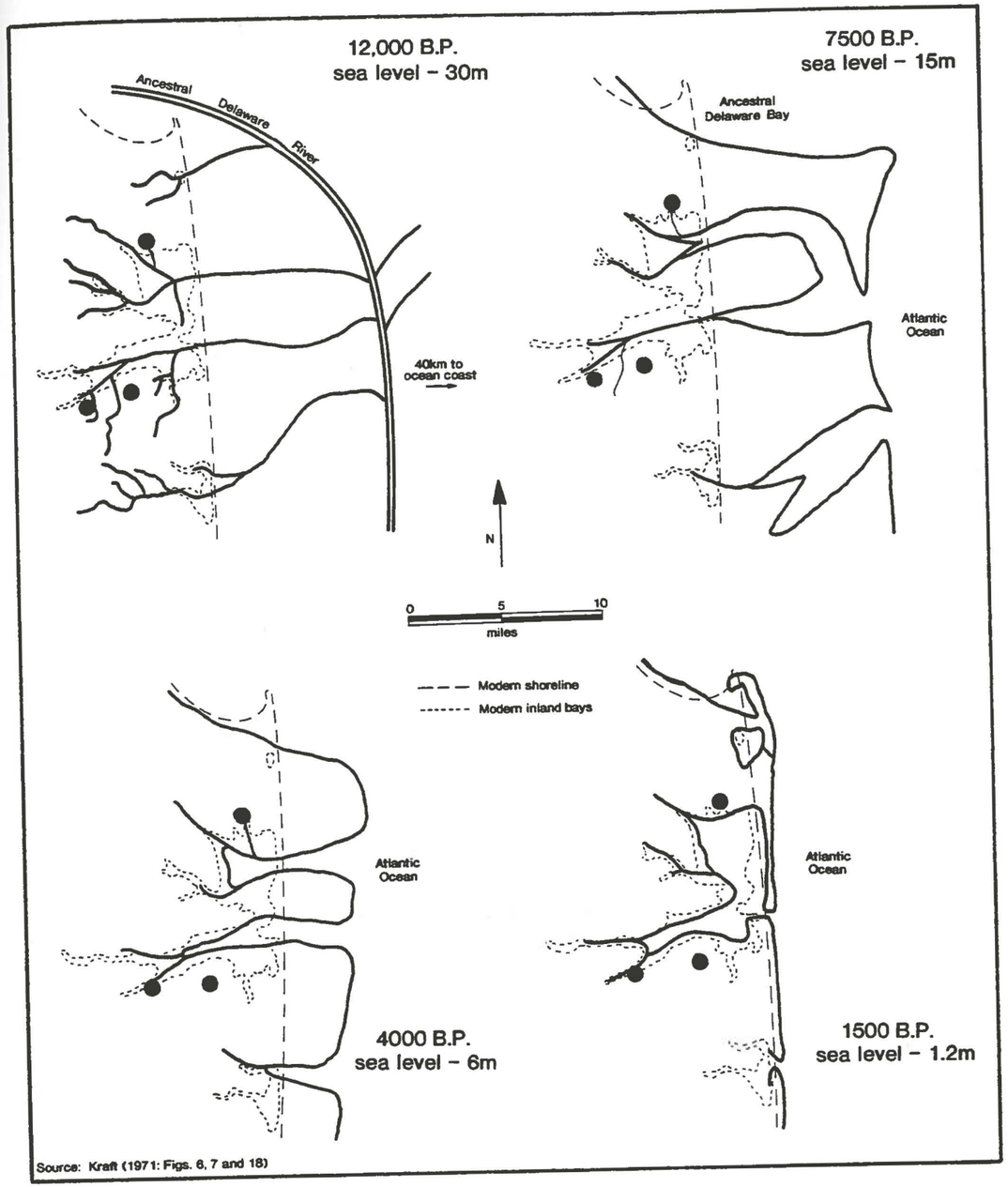
further moderated by gradually sloping land surfaces. Surface water settings have been severely affected by rising sea level. Most river systems, such as Indian River, are tidal and extensive salt marshes are found along their middle and lower reaches. These riverine systems combine a wide range of environments and represent especially attractive human habitation areas. Much of the area is poorly-drained; however, some well-drained areas are found on higher elevations and upper terraces of the major drainages.

The configuration of landforms and drainages within the Atlantic Coast region has changed dramatically over the past 15,000 years due to post-Pleistocene sea level rise. Belknap and Kraft (1977) have developed a sea level rise curve for the Delaware Bay and Atlantic Coast, and numerous other studies summarized by Custer (1987) provide reconstructions of past land forms in the region. Figure 3 shows these coastal reconstructions and the locations of the excavated sites described in this report. Twelve thousand to 15,000 years ago, sea level was 30m below its modern level and an expansive headland fronting the ancestral Delaware River extended up to 10km east of the modern shoreline under what is now the Atlantic Ocean. The Atlantic Ocean coast was more than 40km further to the east and there would have been no estuarine environments in the immediate study area. The areas around the modern inland bays would have been interior headlands associated with some poorly drained freshwater swamps. By 7,500 years ago, sea level was 18m below its modern levels and the Atlantic Coast was within 10km of its modern location. Some extensive estuarine bays would have been present in the coastal zone; however, they would have been located much further to the east than are the modern inland bays. Four thousand years ago, when sea level was 6m lower than its modern level, estuarine bays were located closer to their modern locations compared to earlier times, but the coastline and barrier island complexes were located 3-4km east of their modern locations. Fifteen hundred years ago when sea level was approximately 1m below its modern level, a reconstruction of the ancestral version of Cape Henlopen is possible and most of the inland bays were approximately in their modern locations.

Numerous sources of data indicate that there were marked climatic and environmental changes in Delaware's Atlantic Coastal Zone over the past 12,000 years. Detailed discussions have been presented elsewhere (Custer 1984:30-37, 44-48, 62-64, 89-93, 154) and only a summary will be presented here. Numerous sources of relevant paleoenvironmental data for Delaware's Atlantic Coastal zone including the Dill Farm Site (Custer and Griffith 1984), a series of cores from the Nanticoke drainage (Brush 1986), and a series of cores from the mouth of the Chesapeake Bay (Harrison et al. 1965) are available and Table 1 summarizes the changing environments through time and their distributions in the Atlantic Coastal Zone.

FIGURE 3

Shoreline Reconstructions and Site Locations



Source: Kraft (1971: Figs. 6, 7 and 18)

TABLE 1

SUMMARY OF ENVIRONMENTAL CHANGES

Episode	Interior Well-Drained	Poorly-drained	Major Drainages	Coastal Zone
Late Glacial (12,000 B.C.- 8,000 B.C.)	Boreal forest limited grass-lands	Bogs and swamps with deciduous gallery forest	Deciduous gallery forest with some grasslands in floodplains	Few estuarine settings, scrubby boreal woodlands low productivity
Pre-Boreal/ Boreal (8,000 B.C.- 6,500 B.C.)	Boreal forest	bogs and swamps with deciduous gallery forest	Deciduous gallery forest and boreal forest	Boreal forest, few estuarine settings, low productivity
Atlantic (6,500 B.C.- 3,000 B.C.)	Oak-Hemlock mesic deciduous forests	Extensive bogs and swamps with deciduous gallery forest	Mesic deciduous forests	Mesic deciduous forests, some estuarine settings, low productivity
Sub-Boreal (3,000 B.C.- 800 B.C.)	Oak-Hickory xeric forests and grasslands	Few bogs and swamps	Deciduous gallery forests with some fringing salt marshes, xeric forests and grass-lands in flood-plains	Extensive salt marshes with scrubby xeric vegetation and fringing xeric deciduous forests, high productivity
Sub-Atlantic - Recent (800 B.C. - Recent)	Oak - Pine - Hickory forest with mixed mesophytic communities	Bogs and swamps with deciduous gallery forests	Deciduous gallery forests (Oak - Chestnut) with extensive fringing salt marshes	Extensive salt marsh, Oak - Pine woodlands with some scrubby xeric vegetation high productivity

Prehistoric Background

This summary of the available local archaeological data is drawn from Custer (1984, 1986, 1989). The prehistoric archaeological record of the Atlantic Coastal Zone can be divided into four temporal study units, or periods: Paleo-Indian Period (ca. 12,000 B.C. - 6500 B.C.), the Archaic Period (6500 B.C. - 3000 B.C.), the Woodland I Period (3000 B.C. - A.D. 1000), and the Woodland II Period (A.D. 1000 - A.D. 1650). A fifth time period, the Contact Period, may also be considered and includes the time period from A.D. 1650 to A.D. 1750, the approximate date of the final Indian habitation of southern Delaware in anything resembling their pre-European Contact form. The archaeological data from each of these periods is described below.

Paleo-Indian Period (12,000 B.C. - 6500 B.C.). The Paleo-Indian Period encompasses the time period of the final disappearance of Pleistocene glacial conditions from Eastern North America and the establishment of more modern Holocene environments. The distinctive feature of the Paleo-Indian Period is an adaptation to the cold, and alternately wet and dry, conditions at the end of the Pleistocene and the beginning of the Holocene. This adaptation was primarily based on hunting and gathering, with hunting providing a large portion of the diet. A mosaic of deciduous, boreal, and grassland environments would have provided a large number of productive habitats for these game animals throughout southern Delaware, and watering areas would have been particularly good hunting settings.

Tool kits of the people who lived at this time are oriented toward the procurement and processing of hunted animal resources. A preference for high quality lithic materials has been noted in the stone tool kits and careful resharpening and maintenance of tools was common. A lifestyle of movement among the game-attractive environments has been hypothesized with the social organizations being based upon single and multiple family bands. Throughout the 5500 year time span of the period, the basic settlement structure remained relatively constant with some modifications being seen as Holocene environments appeared at the end of the Paleo-Indian Period.

Archaic Period (6500 B.C. - 3000 B.C.). The Archaic Period is characterized by a series of adaptations to the newly emerged full Holocene environments. These environments differed from earlier ones and were dominated by mesic forests of hemlock and oak. Rapid sea level rise is also associated with the beginning of the Holocene Period in the Atlantic Coastal zone, but most of the study area was still within an interior setting. Adaptations changed from the hunting focus of the Paleo-Indians to a more generalized foraging pattern in which plant food resources would have played a more important role.

Tool kits were more generalized than earlier Paleo-Indian tool kits and showed a wider array of plant processing tools such as grinding stones, mortars, and pestles. A mobile lifestyle was probably common with a wide range of resources and settings utilized on a seasonal basis. A shifting band-level organization which saw the seasonal waxing and waning of group size in relation to resource availability is evident.

Woodland I Period (3000 B.C. - A.D. 1000). The Woodland I Period can be correlated with a dramatic change in local climates and environments that seems to have been a part of events occurring throughout the Middle Atlantic region. A pronounced warm and dry period set in and lasted from ca. 3000 B.C. to 1000 B.C. Mesic hemlock-oak forests were replaced by xeric forests of oak and hickory, and grasslands again became common. Some interior streams dried up, but the overall effect of the environmental changes was an alteration of the environment, not a degradation. Continued sea level rise created extensive brackish water marshes which were especially high in productivity throughout much of the Atlantic Coast area (Figure 3). At this time, the Cape Henlopen area also became especially productive.

The major changes in environment and resource distributions caused a radical shift in adaptations for prehistoric groups. Important areas for settlements included the major river floodplains and estuarine areas. Many large base camps with fairly large numbers of people are evident in many parts of the Delmarva Peninsula. These sites supported many more people than previous base camp sites and may have been occupied on nearly a year-round basis. The overall tendency was toward a more sedentary lifestyle with increases in local population densities.

Woodland I tool kits show some minor variations as well as some major additions from previous Archaic tool kits. Plant processing tools became increasingly common as intensive harvesting of wild plant foods approached the efficiency of horticulture by the end of the Woodland I Period. Chipped stone tools changed little from the preceding Archaic Period; however, more broad-bladed knife-like processing tools became prevalent. Also, the presence of a number of non-local lithic raw materials indicates that trade and exchange systems with other groups were beginning to develop. The addition of stone, and then ceramic, containers is also seen. These items allowed more efficient cooking of certain types of food and may also have functioned as storage containers for surplus food resources.

Social organizations also seem to have undergone radical changes during this period. With the onset of relatively sedentary lifestyles and intensified food production, which might have produced occasional surpluses, incipient ranked societies began to develop. One indication of these early ranked societies is the presence of extensive trade and exchange networks.

Woodland II Period (A.D. 1000 - A.D. 1650). In many areas of the Middle Atlantic, the Woodland II Period is marked by the appearance of agricultural food production systems and large-scale village life. In southern Delaware, however, the change in lifeways is not as marked. There have been some finds of cultivated plants in the Atlantic Coast Zone (Custer 1984:165; Doms et al. 1986), but cultivated food remains are far less common than wild, gathered plant foods (Custer and Griffith 1986:44-49). In general, the Woodland II subsistence patterns in the Atlantic Coast Zone are similar to those of the Woodland I Period with the likely addition of minor amounts of cultivated plant food resources.

Changes in ceramic technologies and projectile point styles can be used to recognize archaeological sites from the Woodland II Period. Triangular projectile points appeared in stone tool kits immediately before the beginning of the Woodland II Period and by A.D. 1000, triangular projectile points are the only styles seen in prehistoric tool kits. Woodland II ceramics of the Atlantic Coast Zone are classified within the Townsend series and show certain technological similarities with the preceding Woodland I ceramics. However, the appearance of more complex decorations including incised lines and cord-wrapped stick impressions distinguish the Townsend ceramic styles.

Contact Period (A.D. 1650 - A.D. 1750). The Contact Period is an enigmatic portion of the archaeological record of southern Delaware which began with the arrival of the first substantial numbers of Europeans in Delaware. The time period is enigmatic because only one Native American archaeological site that clearly dates to this period has yet been discovered in Delaware (7NC-E-42 - Custer and Watson 1985). In southern Delaware, Contact occupations have been reported for the Townsend Site (Omwake and Stewart 1963); however, the associations of European and Native American artifacts are problematic (Custer 1984:177). Nevertheless, numerous Contact Period sites are evident in southeastern Pennsylvania and on the Maryland Eastern Shore (Davidson 1982; McNamara 1985; Davidson, Hughes, and McNamara 1985). It seems clear that the Native American groups of Delaware did not participate in much interaction with Europeans and were under the virtual domination of the Susquehannock Indians of southern Lancaster County, Pennsylvania, who lived during the same time period (Kent 1984). The Contact Period ended with the virtual extinction of Native American lifeways in the Middle Atlantic area except for a few remnant groups.

Atlantic Coast Reconnaissance Survey

A reconnaissance level survey of selected portions of the Inland Bay/Mid-Drainage portion of the Atlantic Coast Zone was carried out during the winter of 1987-1988. Areas were chosen for survey based on the presence of development projects which would impact potential likely locations for prehistoric sites

because the prime goal of the survey was to obtain archaeological information from sites which were likely to be destroyed in the immediate future. This method of selecting areas for survey does not necessarily yield unbiased samples of archaeological site locations, but it does focus limited resources on areas that are subject to the greatest threats of site destruction and provide maximum archaeological information for the time and energy invested. However, it is important to note that the site location data from this survey are biased and cannot be used to verify site location predictions or develop predictive models. The data can, nonetheless, be used to develop impressions of site location patterns for future research.

Field survey methods for the project included both surface collections and limited subsurface testing in the form of shovel test pits. Surface collection techniques were used in cultivated fields and along shorelines when ground visibility allowed. Shovel test pits were excavated in areas where ground surface visibility was poor; but, most of the survey focused on cultivated fields. Even in these cultivated fields, surface visibility was poor, however.

Figure 4 shows the location of the areas surveyed and the sites identified. Figure 5 shows the locations of previously known sites in the Atlantic Coast area and the locations of the new sites discovered in this survey. Appendix I lists the sites discovered in the survey along with information on their function and time period of occupation.

It is difficult to characterize the sites found in this survey because of the small number of artifacts found and the limited surface visibility at most of the sites. Therefore, it is hard to know if some of the sites identified in this survey yielded few artifacts because they were small sites with limited artifact assemblages or because they were sites where limited surface visibility precluded the collection of large artifact assemblages. Nonetheless, it can be stated that many of the sites found in the survey probably do represent procurement/processing sites.

Procurement/processing sites represent locations that were inhabited for short periods of time and were used only for limited resource procurement and processing activities. Consequently, these sites did not produce many artifacts, including diagnostic artifacts which could be used to date the sites. Small procurement/processing sites were the most common site type identified in this survey probably because previous surveys in the Delaware Coastal Plain (Custer and Galasso 1983; Custer, Bachman, and Grettler 1986) have shown that these sites are ubiquitous throughout the Coastal Plain and this survey was one of the first to systematically record these sites in the Atlantic Coast Zone. It can be noted that the procurement sites identified in this survey are located in a variety of riverine and coastal environments with no real preference for any specific setting. This variety of locations indicates that procurement

FIGURE 4

Atlantic Coast Reconnaissance Survey Areas and New Sites

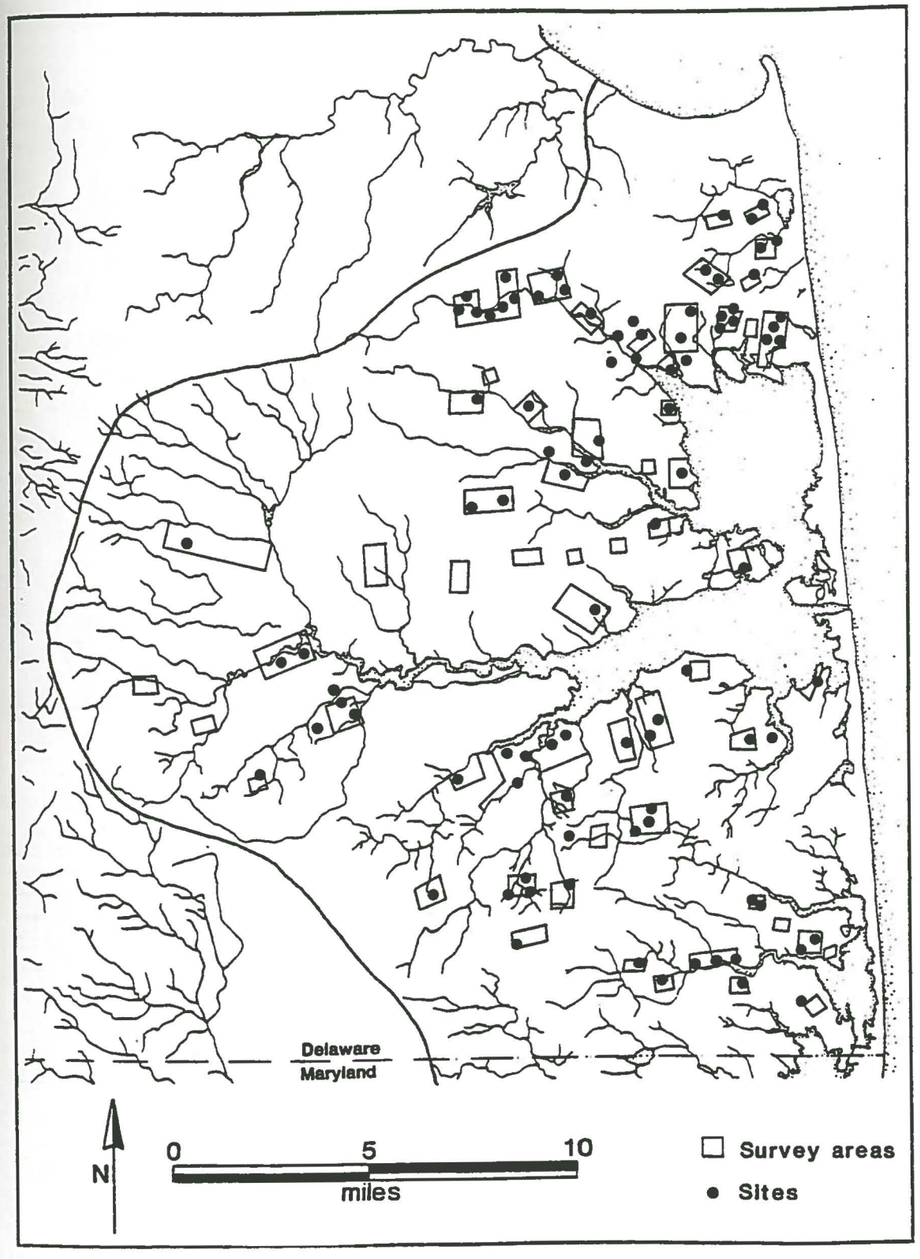
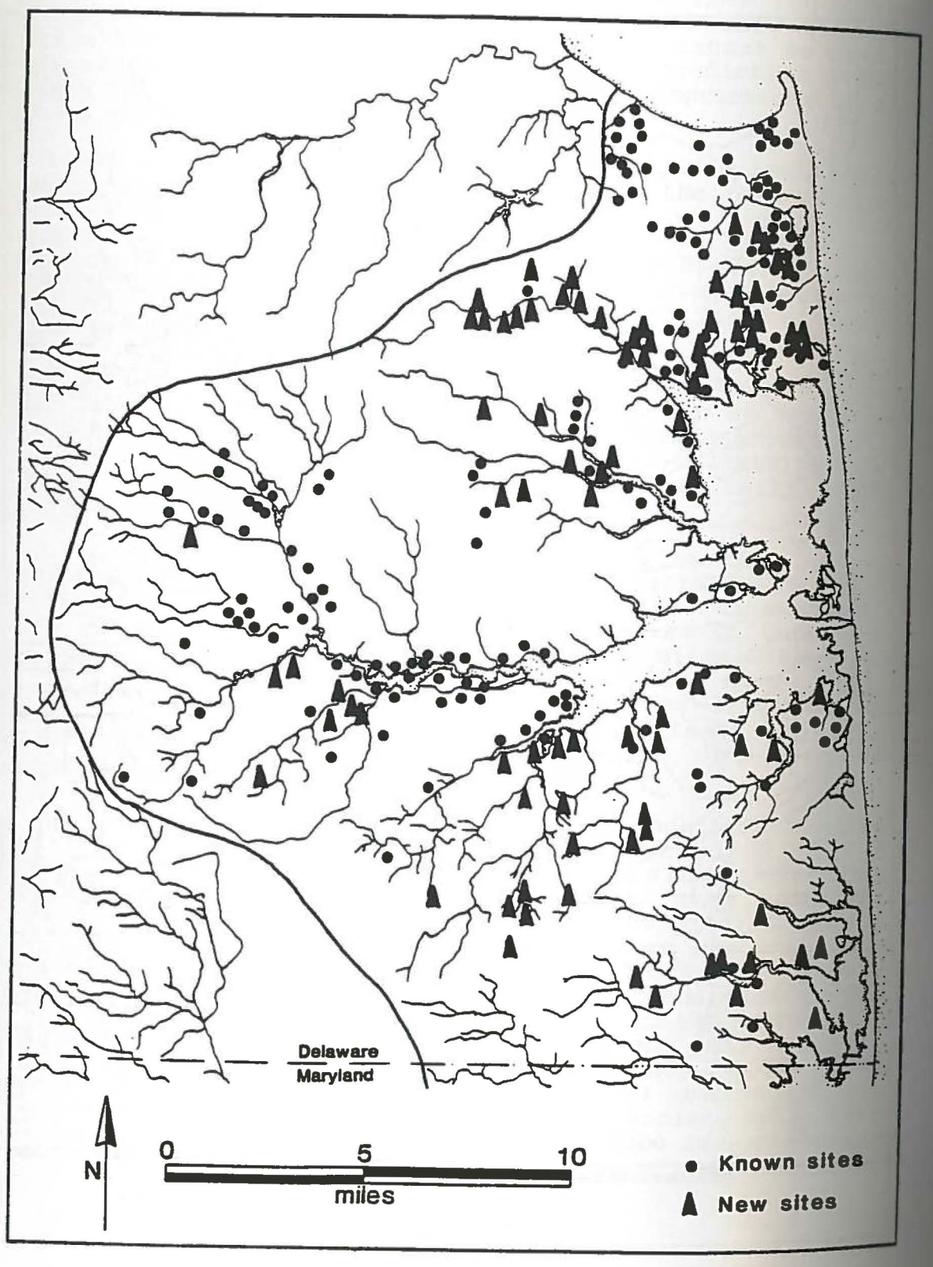


FIGURE 5

New Sites and Previously Known Sites–
Atlantic Coast Reconnaissance Survey



forays from base camps focused on all kinds of environments in interior, coastal, and riverine settings in the Atlantic Coast Zone of Delaware.

Although most of the sites discovered in this survey could not be assigned to a cultural time period or complex, a few large base camp sites which did produce diagnostic artifacts were found (Table 2, Figure 6). These sites are located in the vicinity of the confluence of Indian River, Vines Creek, and Pepper Creek and in the mid-drainage section of Love Creek. The sites show some signs of non-local lithic raw materials, such as steatite, rhyolite, and argillite, and are quite similar in terms of artifact assemblages and environmental setting to large base camps of the Barker's Landing Complex of central Delaware (Custer 1984). Their location is within the productive mid-drainage zone of the Indian River and Love Creek drainages and they may have been large base camps from which fairly substantial populations utilized the emerging coastal wetland environments of the Indian River drainage (Figure 7). Most of these sites date to the Woodland I Period and further research at these sites was recommended because they should provide important data on middle Holocene adaptations in southern Delaware.

Little Assawoman Bay Reconnaissance Survey

A reconnaissance level survey of selected portions of the Inland Bay/Mid-Drainage portion of Little Assawoman Bay was carried out during the summer of 1990. The sampling scheme and field methods used in this survey were the same as those used in the Atlantic Coast Reconnaissance Survey. Figure 8 shows the location of the areas surveyed and the 169 new sites identified. Figure 9 shows the locations of previously known sites in the Atlantic Coast area and the locations of the new sites discovered in this survey. Appendix II lists the sites discovered in the survey along with information on their function and time period of occupation.

A total of 169 new sites were identified and 158 of these were historic archaeological sites. Two sites had both historic and prehistoric components and nine had only prehistoric components. The historic sites all seemed to be ephemeral occupations characterized by very limited artifact assemblages scattered over very small areas. Although it is difficult to characterize these sites based on the limited artifact assemblages, it is possible that they represent rural agricultural tenant sites that were occupied for only very short periods of time. A similar rural tenancy, the Lewis-E site, was excavated during the data recovery studies of the Route 13 project and a large number of similar sites were noted by Wittkofski (1988) in a survey of the middle section of the Virginia Eastern Shore. Wittkofski discovered documentary evidence that clearly showed that these sites were agricultural tenancies, often occupied by blacks, that were periodically moved as patterns of field cultivation changed. The high density of

TABLE 2

ATLANTIC COAST SURVEY
BASE CAMP SITES AND DIAGNOSTIC ARTIFACTS

Site #	Quad	Time Period	Diagnostic Artifacts
7S-K-42	Frankford	WI	lots of argillite points and debitage, Wolfe Neck ceramics
7S-K-47	Frankford	WI	Wolfe Neck and Mockley ceramics
7S-D-52	Frankford	?	none
7S-G-102	Fairmont	?	miscellaneous points and ceramics
7S-G-104	Fairmont	?	none
7S-G-106	Fairmont	WI	stemmed points
7S-G-112	Fairmont	WI	Mockley ceramics
7S-G-114	Fairmont	?	none
7S-G-115	Fairmont	?	none
7S-J-35	Whaleysville	?	none
7S-G-124	Fairmont	WI, WII	Mockley and Townsend ceramics
7S-K-70	Selbyville	WII	triangular point; Townsend ceramics
7S-F-70	Harbeson	WI, WII	broadspears, stemmed points, triangles; Wolfe Neck, and Mockley ceramics
7S-K-75	Frankford	WI, WII	Fox Creek point; Wolfe Neck, Mockley, and Townsend ceramics

these sites in the Assawoman Bay region has not previously been encountered in Delaware. It may be that this kind of historic rural settlement pattern is a phenomenon of the southern Delmarva Peninsula and this is the first time that an intensive survey was undertaken far enough south to encounter this site distribution.

FIGURE 6

Base Camp Sites from Atlantic Coast Reconnaissance Survey

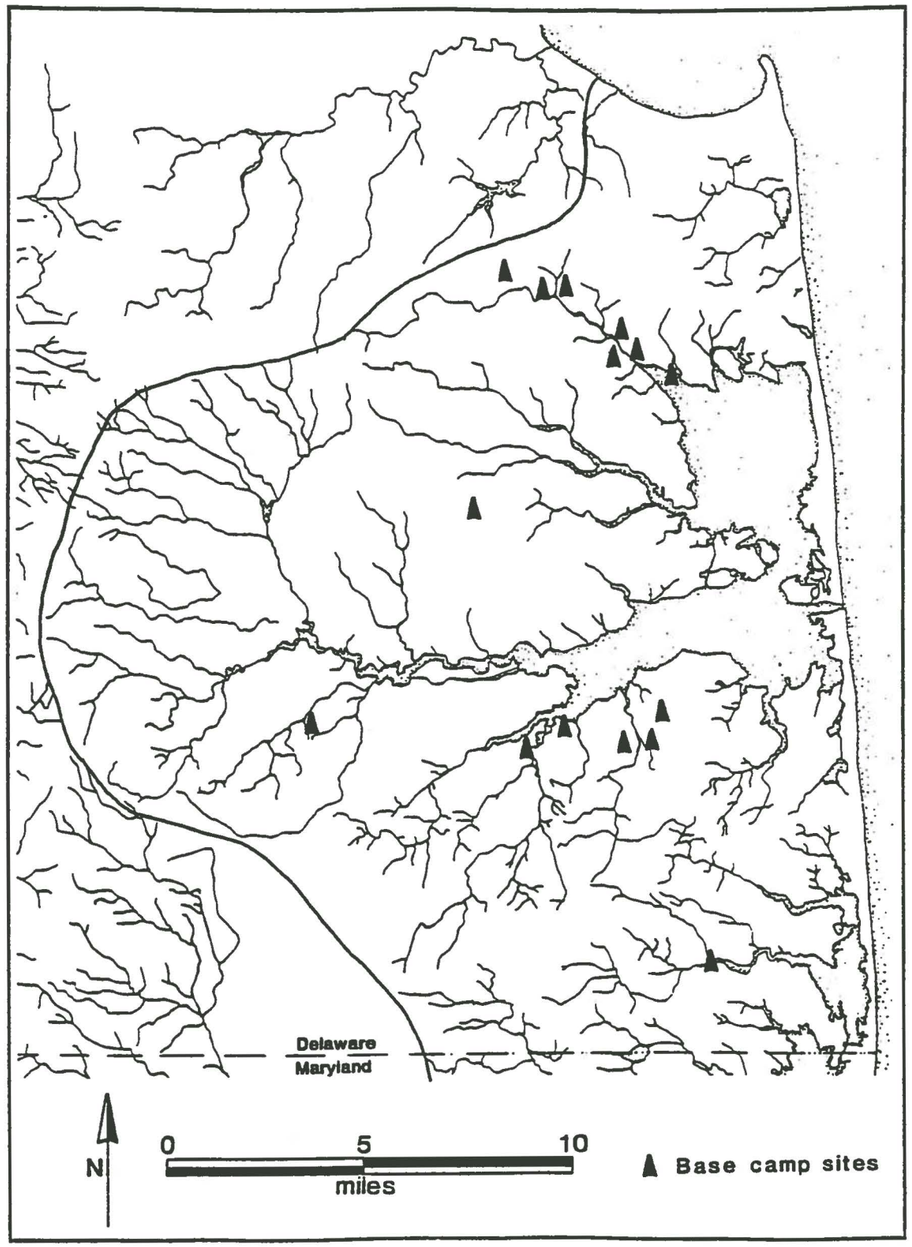


FIGURE 7

Mid-Drainage and Coastal Zone Settlement Patterns

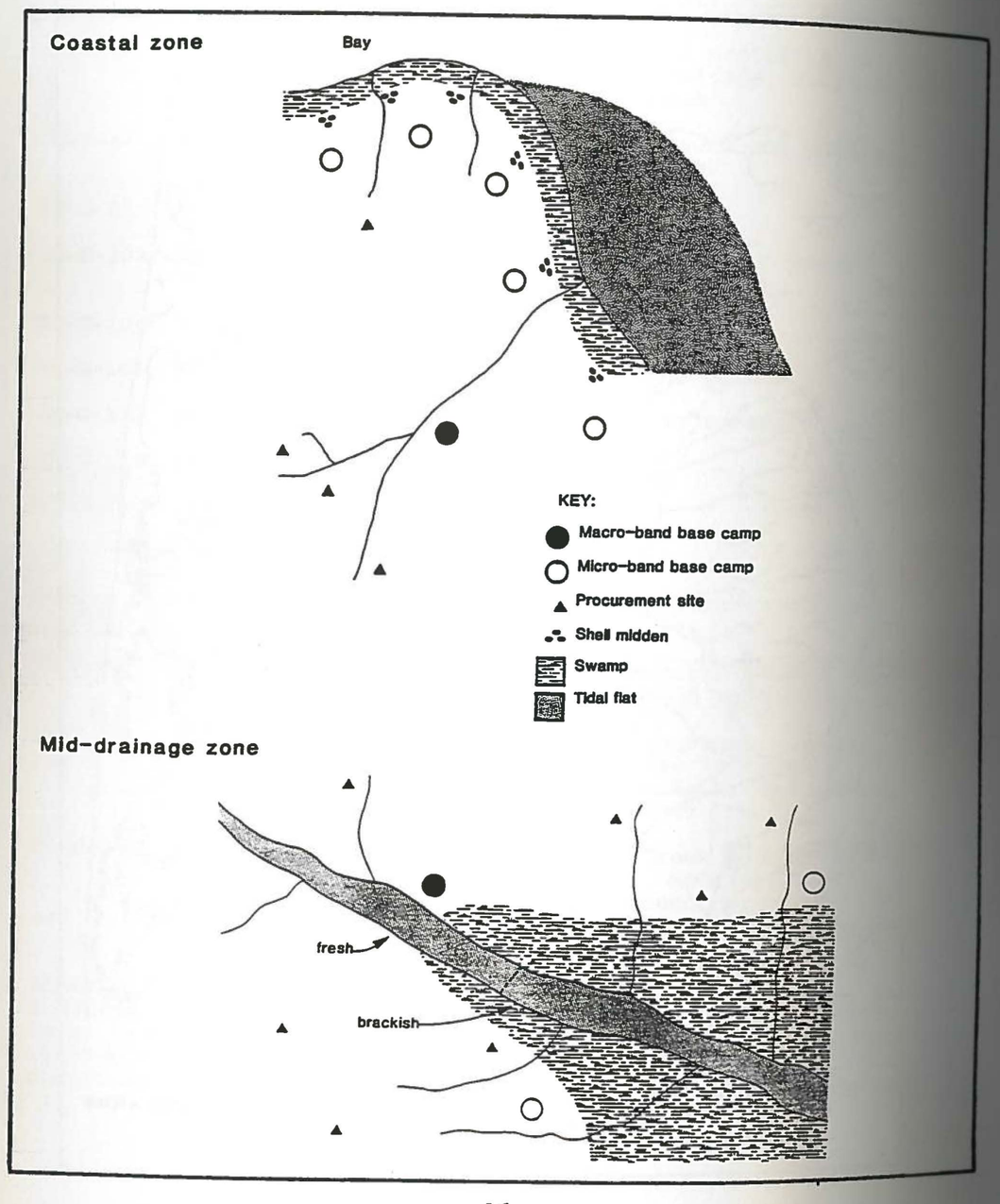


FIGURE 8

Survey Areas and New Sites– Little Assawoman Bay Survey

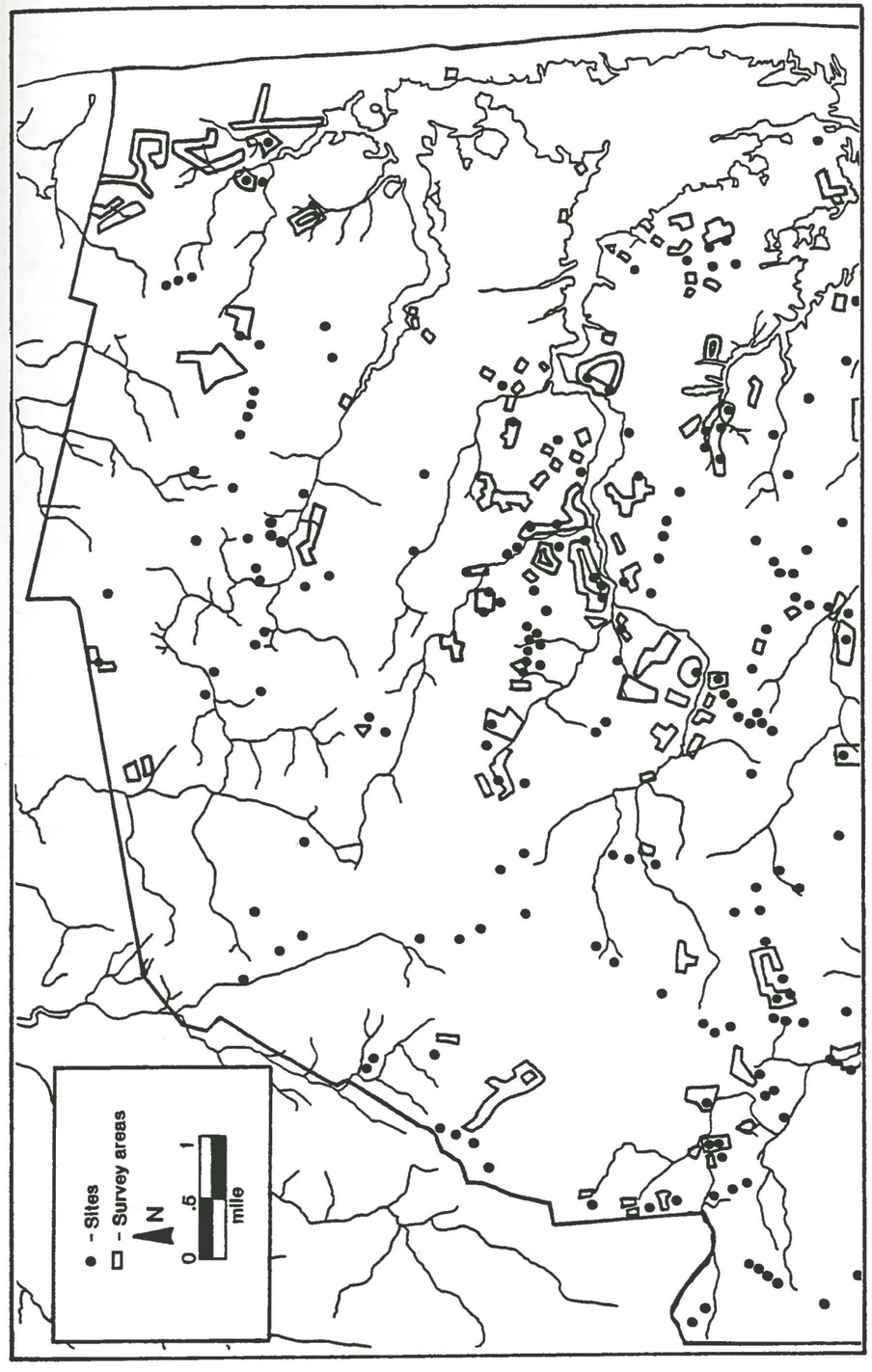
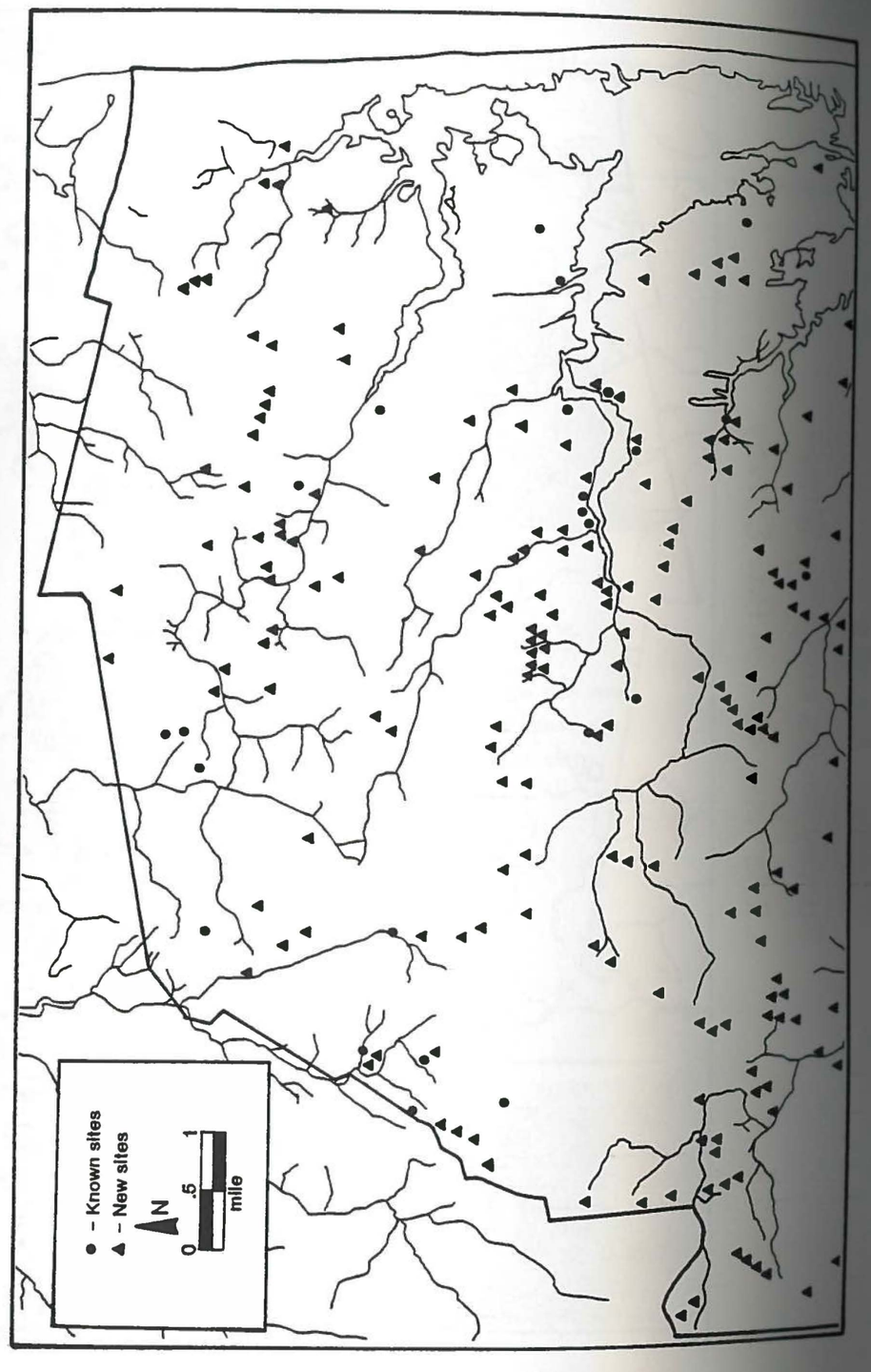


FIGURE 9

New Sites and Previously Known Sites–
Little Assawoman Bay Survey



Further reconnaissance survey could be undertaken to further document this settlement pattern and intensive survey could be undertaken at a sample of these sites to gather larger artifact assemblages and look for associated sub-surface features.

It is difficult to characterize the prehistoric sites found in this survey because of the small number of artifacts found and the limited surface visibility at most of the sites. Therefore, it is hard to know if some of the sites identified in this survey yielded few artifacts because they were small sites with limited artifact assemblages, or because they were sites where limited surface visibility precluded the collection of large artifact assemblages. Nonetheless, it can be stated that it is very likely that many of the sites found in the survey do represent procurement/processing sites, as was the case in the Atlantic Coast Survey.

The results of this survey can be compared to the results of the reconnaissance of nearby areas of the Atlantic Coast Zone which were described earlier. Without a doubt, a lower density of prehistoric sites was encountered in this survey compared to survey areas to the north and northwest on Indian River and Rehoboth Bay. Both large and small prehistoric sites occurred in significantly fewer numbers in the Assawoman area compared to the other areas.

There are several possible explanations for the smaller number of sites in the Assawoman survey area. First, it is possible that our survey methods failed to find the prehistoric sites that are present. However, this explanation is not considered to be likely because the survey methods used in this project were no different from methods used in our other projects which did not fail to find prehistoric sites. A second possible explanation is that because the Assawoman survey area is smaller than the other survey areas, there is a greater chance that modern development has destroyed sites in the Assawoman Bay area. Development in the Assawoman area is certainly intense on the west side of the barrier island and along the inland bays and these areas are high probability site locations. However, this factor does not seem sufficient by itself to account for the low prehistoric site densities.

The final explanation for the low prehistoric site densities may be the fact that prehistoric settlement was indeed less intensive in the Assawoman area compared to other areas of Delaware's Atlantic Coast Zone. The Assawoman Bay area does have fewer high order drainages than the Indian River/Rehoboth Bay region and the lower frequency of major waterways may explain the lower prehistoric site densities. Further survey will provide more insights on these site distribution patterns.

LINN WOODS SITE (7S-K-46) EXCAVATIONS

Site Setting

The Linn Woods Site is located on a series of broad sandy knolls on the south side of Vines Creek, a high order tributary of Indian River (Figure 2). At the time of the excavations, in the spring and summer of 1989, the site was wooded with large trees and limited amounts of secondary growth. The site area had been subdivided into house lots as part of the Linn Woods housing development, and some access roads have been cut through the site.

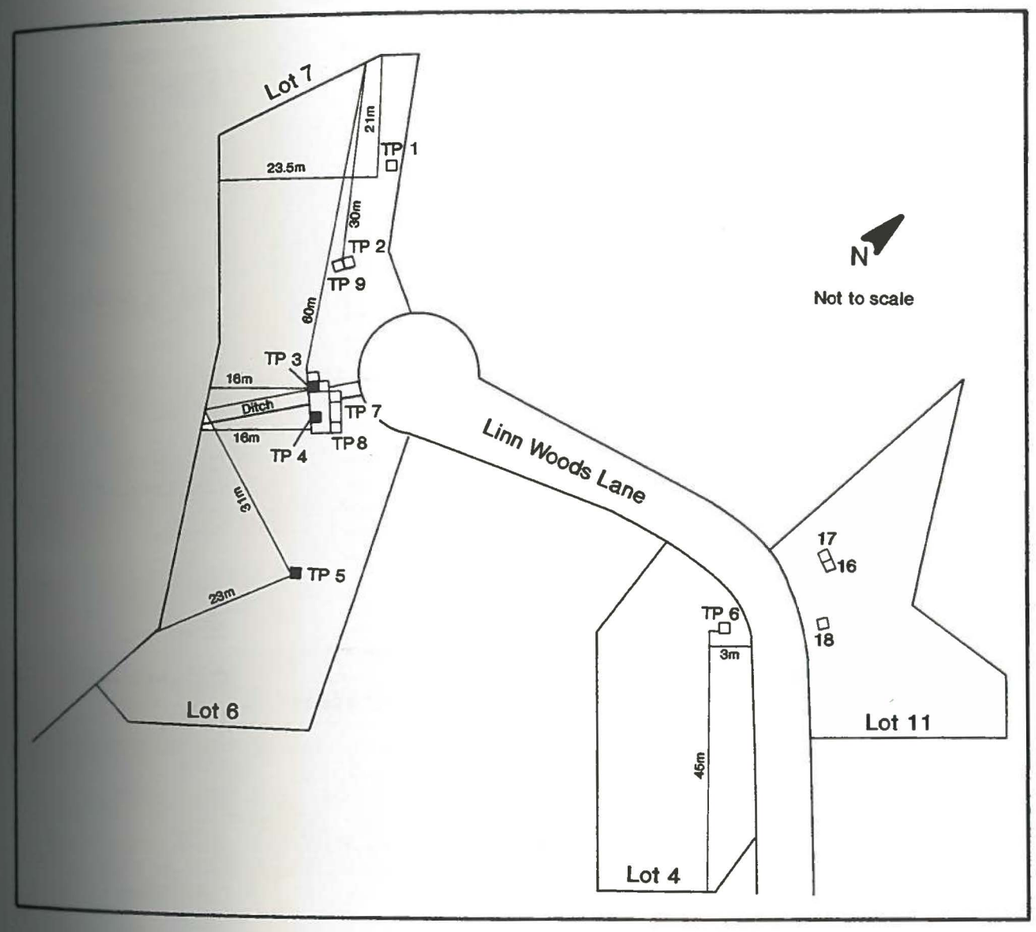
The knolls throughout the site area are composed of well-drained sandy soils and are currently bordered by a brackish water tidal marsh. Based on the coastal reconstructions shown in Figure 3, the site has been directly associated with tidal wetlands for only the past 1500 years (since AD 400). From 4000 BP to 1500 BP (2000 BC - AD 400), the site would have been located within 2 km of the brackish wetlands at the ecotone between freshwater and saltwater environments. During this time period, the site would have been an especially good habitation area for prehistoric hunters and gatherers because they would have been able to exploit resources found in both brackish and freshwater environments without having to travel very far. Prior to 4000 BP (2000 BC), the site would have been located adjacent to Vines Creek, near its confluence with Indian River within a gallery forest that was probably always dominated by deciduous trees regardless of the surrounding matrix of woodlands (Table 1).

Research Design and Excavation Methods

Because the site area is scheduled for development in the immediate future, a major research goal of the excavations was to salvage as many artifacts and as much archaeological data as possible. Preliminary test excavations at the site showed that artifacts from almost all of the varied time periods of Delaware's prehistoric archaeological record were present, buried at depths of up to 70 cm across an area of approximately 10,000 square meters. Figure 10 shows the locations of the initial test pits and Table 3 summarizes the artifacts found in these units. Site boundaries were determined by the extent of disturbance from the initial phases of house lot development. Intensive testing focused on the most productive test squares (Figure 11). Larger block excavations were opened in these areas to search for and recover archaeological materials from activity areas in order to understand the duration and intensity of the prehistoric settlement at the site. Furthermore, it was hoped that block excavations would allow a better determination of site stratigraphy and identify the presence of features. Test units also contained preserved floral remains from buried, *in situ* contexts and it was hoped that intensive excavations would be

FIGURE 10

Test Excavation Units 7S-K-46



able to recover additional ecofacts which would allow studies of prehistoric diets and paleoenvironments. The descriptions of the results of the excavations will be organized by the excavation blocks noted in Figure 11.

Excavation methods used at the site followed the standard excavation procedures used by the University of Delaware Center for Archaeological Research. The basic horizontal provenience unit was a 1-meter square and all soils excavated from these units were screened through 1/4" mesh. The basic vertical

TABLE 3

7S-K-46, SUMMARY CATALOGUE OF PRELIMINARY TEST UNITS

Test Unit	Level	Debitage	Points	Ceramics
1	1	12	--	Townsend
	2	19	--	Townsend
				Mockley
	3	18	--	--
	4	7	--	--
2	1	--	--	--
	2	1	--	--
	3	2	--	--
	4	1	--	Wolfe Neck
	5	8	--	--
	6	--	--	--
3	1	--	--	--
	2	4	--	--
	3	10	--	Townsend
	4	18	--	Coulbourn
	5	14	--	--
	6	1	--	--
	7	--	--	--
4	1	1	--	Townsend
	2	6	--	--
	3	4	--	Coulbourn
	4	4	Broadspear	--
	5	2	--	--
	6	4	--	--
	7	3	--	--
5	1	--	--	--
	2	--	--	--
	3	4	--	Coulbourn
	4	1	--	--
	5	--	--	--
	6	1	--	--
6	1	--	--	--
	2	1	--	--
	3	7	--	--
	4	--	--	--
	5	2	--	--

TABLE 3 (cont.)

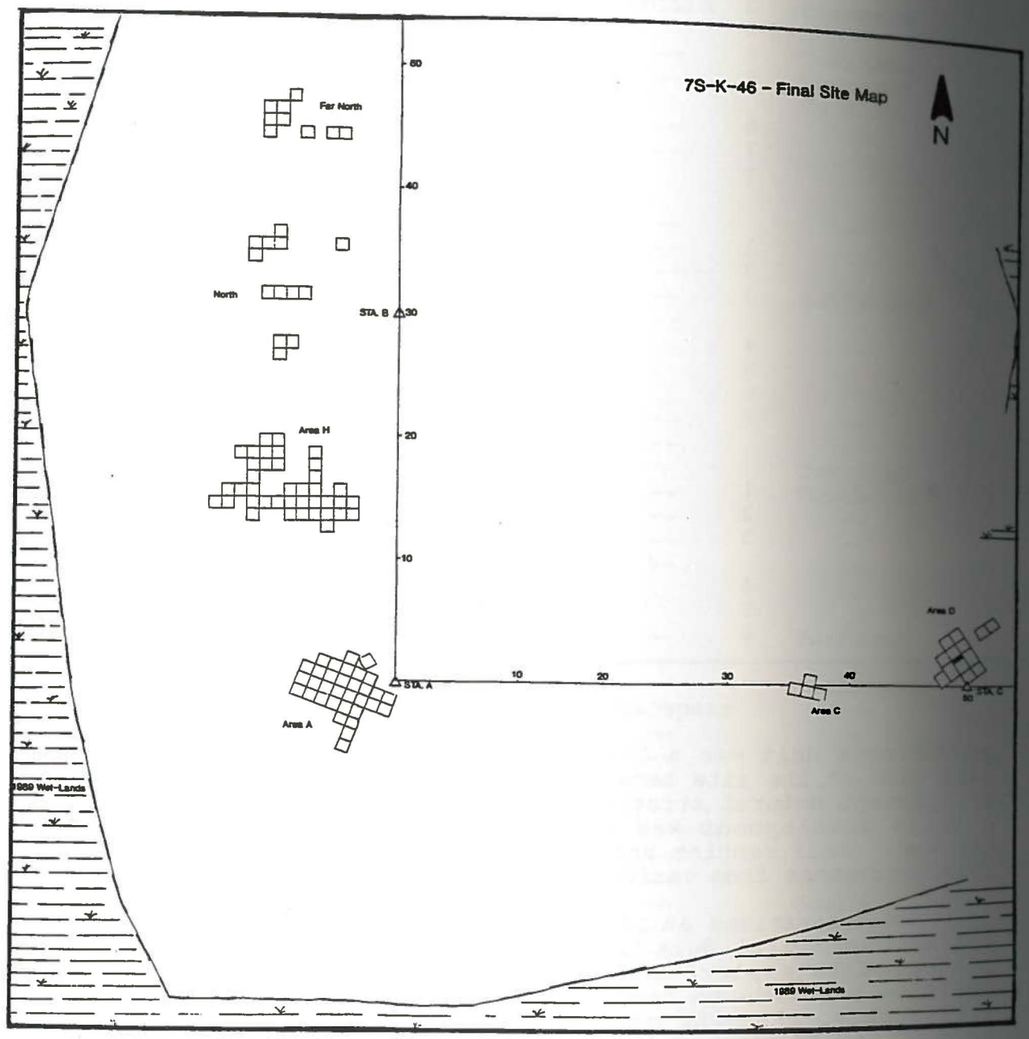
Test Unit	Level	Debitage	Points	Ceramics
7	1	--	--	--
	2	3	--	--
	3	12	--	Dames Quarter
	4	11	--	Dames Quarter
	5	21	--	Dames Quarter
				Coulbourn
	6	7	--	--
	7	9	--	--
	8	1	--	--
8	1	--	--	Townsend
	2	2	--	Hell Island
	3	4	--	Townsend
				Wolfe Neck
	4	8	--	Dames Quarter
	5	4	--	--
	6	--	--	--
	7	2	--	--
9	1	--	--	--
	2	--	--	Townsend
	3	2	--	Townsend
				Mockley
	4	2	--	Mockley
	5	3	--	Mockley
	6	1	--	--

provenience unit was a 10cm arbitrary level. Arbitrary levels were used at the site because the sandy soils of the site showed no apparent natural stratigraphy during excavation although some profile development was apparent after longer profiles were exposed. Soil samples and flotation samples were also taken in 10cm increments from various areas of the site.

The excavations at Linn Woods recovered even more artifacts and archaeological data than was hoped for and created a wealth of topics to explore and analyze. During the excavations a decision was made to concentrate the available funding on the fieldwork so that the maximum data could be salvaged. By the time of the writing of the initial report (June 1990), the site has been partly destroyed and we feel justified in our decision. However, because of limited funds, this report can only begin to describe the data from the site. Consequently, the data descriptions noted below stress the analysis of the cultural and natural stratigraphy of the site. A sample of four of the

FIGURE 11

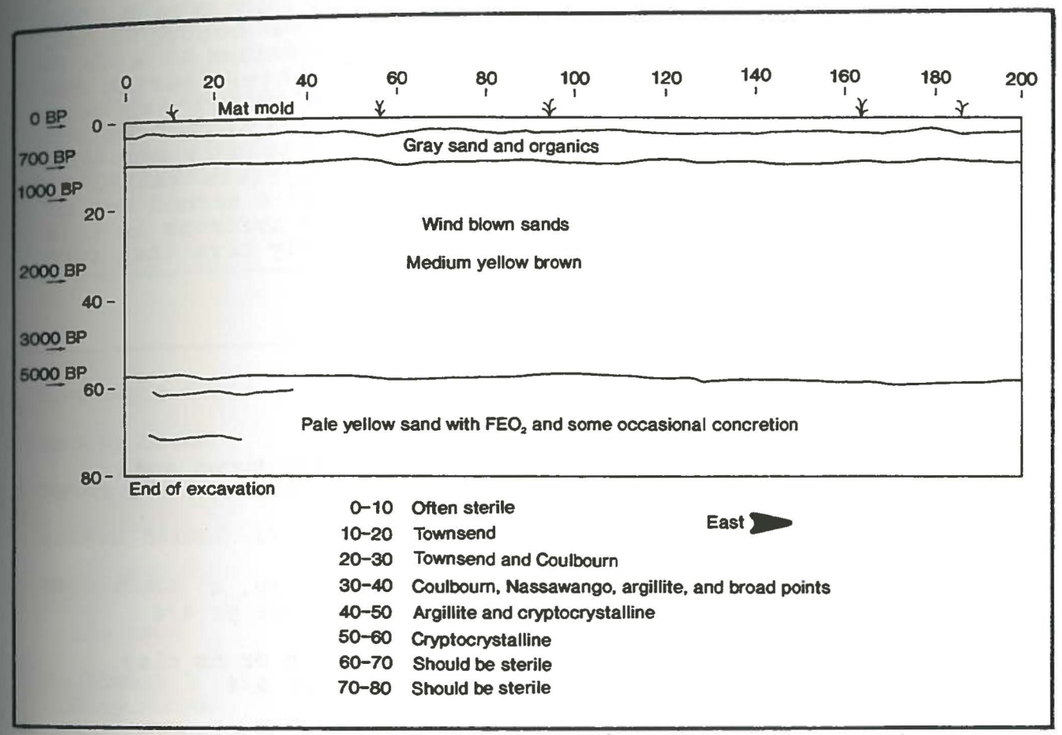
7S-K-46 Block Excavation Areas



thirteen individual components present at the site are described in more detail. Descriptions of the remaining components, and additional research topics such as flotation analysis, ceramic technologies, and blood residue analyses will be covered in future reports.

FIGURE 12

7S-K-46 Area D Profile



Natural and Cultural Stratigraphy

Little or no natural stratigraphy was apparent during the excavations at the Linn Woods Site. Most of the soils are well drained sands that show few signs of pedogenic development and there are no well defined depositional horizons. Nonetheless, in two areas of the site (Areas D and H) there were some signs of pedogenic development that tell something about the stability of landscapes at the site. Figure 12 shows the north wall profile of test units 7 and 8. The top 10cm of the profile consist of organic-rich surface sediments that have accrued during recent times. Below the surface soils, extending to a depth of 60cm, are a series of yellow-brown sands with no signs of pedogenic development. From a depth of 60cm to 80cm, the bottom of the excavations, there are a series of yellow-tan sands with some lamellae and other signs of pedogenic development, including increased clay content. The degree of pedogenic development and the presence of lamellae in the lowest horizon of the profile

indicate that the bottom of the profile has been intact for at least the last 5000 years. The absence of signs of profile development in the top 60cm of the indicate an age of less than 3000 years.

Table 4 shows the profile of the south wall of Test Unit 64 in Area H. In contrast to the profile seen in Area D, the profile from Area H shows some signs of a depositional discontinuity. The top 4 horizons (Ao,E,B,C) extend to a depth of 50cm and represent a single depositional unit. During the time that these soils were being deposited, there was some stability of the local landscapes because an incipient B horizon (B) did develop. However, because this B horizon is not well developed, the age of these soils is probably less than 3000 years. From a depth of 50cm to 190cm there is a second set of soil horizons (IIB1, IIB2, IIC1, IIC2). The B horizons in this depositional unit are well developed and probably more than 5000 years old.

TABLE 4

7S-K-46 - AREA H PROFILE

0-7cm	A_o	A_o - Organic-rich modern humus and root mat (sandy texture)
7-12-17cm	E	E - Medium sand 10 yr 4/4
17-35cm	B	B - Silty sand, some clay, a little structure, 7.5 yr 4/6
35-50cm	C	C - Silty sand - little or no clay, no structure, 10 yr 5/6
50-81cm	IIB_1	IIB_1 - Fine sandy loam, some clay, a little structure, 10 yr 6/4
81-120cm	IIB_2	IIB_2 - Fine sand, some clay more than IIB_1, 10 yr 7/4
120-150cm	IIC_1	IIC_1 - Fine, medium/fine sand, little or no clay (10 yr 8/3), some very thin and discontinuous lamellae (5 yr 5/8)
150-190cm	IIC_2	IIC_2 - Silty sand (10 yr 8/2), more lamellae than IIC_1, (5 yr 5/8)

note - Between IIC_1 and IIC_2 there is a large thick (22 cm) narrow (20cm) lamellae-like feature. - Definitely pedogenic

The cultural stratigraphy at the site can be correlated with the natural stratigraphy in order to provide further clarification of the ages of the varied soil horizons and arbitrary levels. Diagnostic artifacts, particularly ceramics, are the only chronological controls available from the site because no radiocarbon dates are available. Table 5 shows the dates of the diagnostic ceramics from southern Delaware used in this study. A few diagnostic projectile points were also found at the site and where these can be used as chronological controls they are noted. Also, the distribution of argillite and rhyolite through the arbitrary levels was plotted as a chronological control because these distinctive non-local materials, especially argillite, were used primarily during initial Woodland I times in southern Delaware (Custer 1989:235-247).

TABLE 5

DIAGNOSTIC CERAMIC DATES

Soapstone Bowls	1700 BC - 1200 BC		
Marcey Creek	1200 BC - 900 BC		
Dames Quarter	1000 BC - 700 BC		
Selden Island	1000 BC - 700 BC		
Ware Plain	1000 BC - 700 BC		
Wolfe Neck	700 BC - 400 BC	Nassawango	800 BC - 400 BC
Coulbourn & Clay Wares	800 BC - 200 AD	Coulbourn	400 BC - 100 BC
		Wilgus	300 BC - 200 AD
Mockley	100 AD - 500 AD		
Hell Island	600 AD - 1000 AD		
Townsend	1000 AD - 1600 AD		

The method used to analyze the cultural stratigraphy was to first plot the distribution of total artifacts, diagnostic artifacts, and argillite and rhyolite in each excavation level of each area. Secondly, the absolute frequency and proportions of total artifacts, diagnostic artifacts, and argillite and rhyolite were summarized in tables and graphically. Finally, the distribution data noted above were combined and synthesized in order to assign date ranges to the varied levels in each area. The cultural stratigraphy of each area of the site (Figure 11) is described below.

TABLE 6

7S-K-46, AREA A - SUMMARY OF VERTICAL DISTRIBUTION OF ARTIFACTS

	Total Artifacts		Argillite and Rhyolite		
1	145	7	1	5	2
2	490	25	2	42	17
3	651	34	3	93	37
4	356	18	4	75	30
5	184	9	5	33	13
6	82	4	6	3	1
7	29	1	7	1	<1
	1937			252	

Level %

	T/Ming	HI	M	C	WN	Exp	Soap
1	7	0	0	0	0	0	1
2	15	5	6	9	6	1	1
3	0	1	2	8	22	8	3
4	0	0	0	3	1	4	2
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	1

Assemblage %

	T/Ming	HI	M	C	WN	Exp	Soap
1	32	0	0	0	0	0	12
2	68	83	75	45	21	8	12
3	0	17	25	40	76	62	38
4	0	0	0	15	3	31	25
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	12

Key:
T= Townsend
Ming= Minguannan
HI= Hell Island
M= Mockley
C= Coulbourn
WN= Wolfe Neck
Exp= Experimental Wares
Soap= Soapstone

Table 6 shows a summary of the artifact distributions shown for Area A and Figure 13 shows the same summary data in graphic form. The assemblage percentages noted show the distributions of each diagnostic ceramic type through the varied levels. The level percentages show the proportions of four diagnostic ceramic types found in each level as would be done in a standard seriation chart. The majority of the artifacts from this area are found in Levels 2 and 3 and the majority of the argillite and rhyolite artifacts are found in Levels 3 and 4.

The assemblages from Levels 1 and 2 contain mainly Townsend and Minguannan ceramics and date to the Woodland II period (AD 900 - 1600). A variety of earlier Woodland I ceramics (Coulbourn, Wolfe Neck, and experimental wares) dominate the assemblages in Levels 3 and 4 and five broadspears (four Lehigh/Koens-Crispin and one Susquehanna broadspear) were also found in these levels (Figure 14A-E). The broadspears date to ca. 2500 - 1000 BC within the earlier portion of the Woodland I period (Custer 1989:151-157). Based on the presence of these diagnostics, Levels 3 and 4 date to ca. 1000 - 500 BC. Levels 5 - 7 contain no ceramics, very little argillite and rhyolite, and pre-date the Woodland I period. An Amos serrated projectile point (Figure 14F) was recovered from Level 5 and this point type dates to ca. 10,000 years ago (8000 BC). Therefore, Levels 5 - 7 most likely date to that same general time interval which falls at the end of the Paleo-Indian Period.

Table 7 shows a summary of the artifact distributions for Area C and Figure 15 shows the same summary data in graphic form. No diagnostic projectile points were recovered from this area of the site. Figure 15 shows that the bulk of the artifacts from Area C were found in Levels 3 - 5. Unfortunately, the diagnostic ceramics are mixed through a number of levels and the age of the individual levels cannot be specified.

Table 8 shows a summary of the artifact distributions for Area D and Figure 16 shows the same summary data in graphic form. The majority of the artifacts were found in Levels 2 - 5 and the majority of the argillite and rhyolite artifacts were found in Levels 3 and 4. Levels 1 and 2 contain mainly Woodland II Townsend ceramics and date to ca. AD 1000 - 1600. Levels 3 - 5 contain Coulbourn, Wolfe Neck, and experimental ceramics. Also, a Lehigh/Koens-Crispin broadspear (Figure 17) was found in Level 4. Based on the presence of these diagnostic artifacts, Levels 3 - 5 probably date to ca. 1000 - 500 BC.

Table 9 shows a summary of the artifact distributions for Area H and Figure 18 shows the same summary data in graphic form. Figure 19 shows the projectile points found in Area H.

The majority of the artifacts in Area H were found in Level 3 and the majority of argillite and rhyolite artifacts were found in Levels 3 and 4. Levels 1 and 2 are dominated by Townsend ceramics with small amounts of Mockley and Hell island ceramics

FIGURE 13

7S-K-46 - Area A - Summary of Vertical Distribution of Artifacts

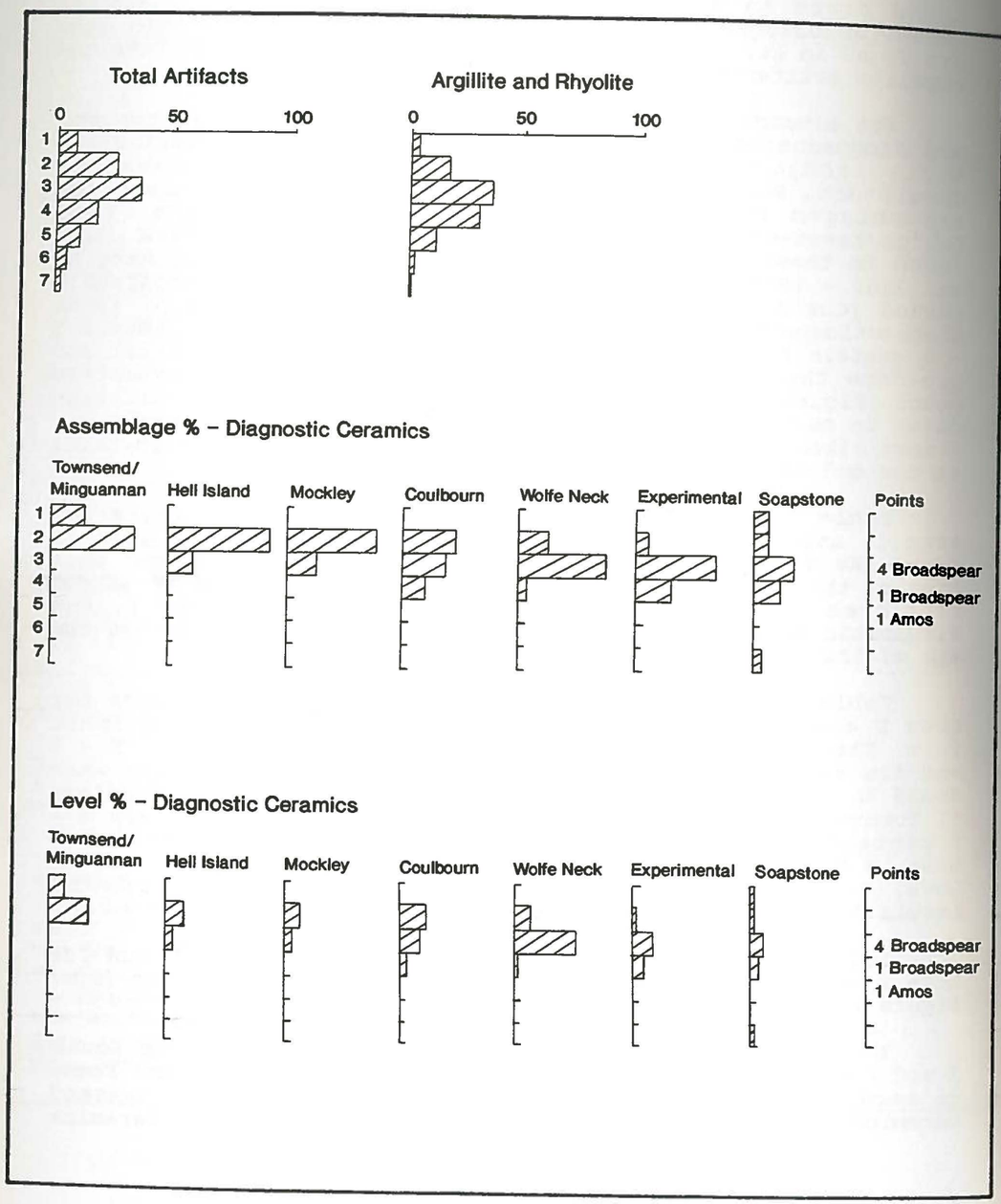


FIGURE 14

7S-K-46 - Area A - Diagnostic Projectile Points

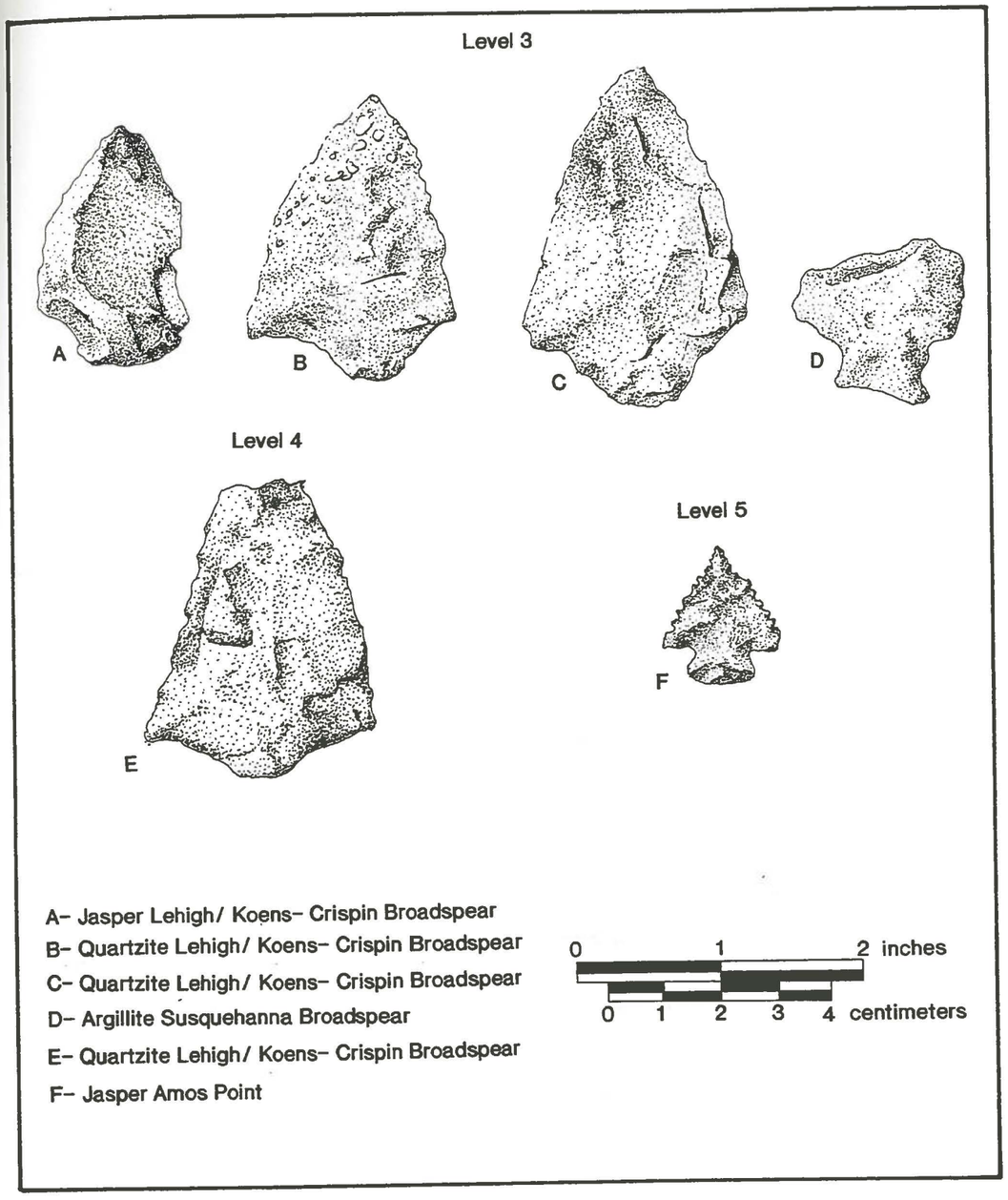


TABLE 7

7S-K-46, AREA C - SUMMARY OF VERTICAL DISTRIBUTION OF ARTIFACTS

	Total Artifacts		Argillite and Rhyolite	
1	0	0	0	0
2	32	12	1	2
3	90	35	7	11
4	80	31	26	42
5	39	15	21	34
6	13	5	6	10
7	2	1	1	2
	256		62	

Level %

	T/Ming	HI	M	C	WN	Exp	Soap
1	0	0	0	0	0	0	0
2	0	0	100	0	0	0	0
3	10	50	0	40	0	0	0
4	0	0	28	43	14	14	0
5	0	0	0	0	0	0	0
6	0	0	0	100	0	0	0
7	0	0	0	0	0	0	0

Assemblage %

	T/Ming	HI	M	C	WN	Exp	Soap
1	0	0	0	0	0	0	0
2	0	0	92	0	0	0	0
3	100	100	0	40	0	0	0
4	0	0	8	30	100	100	0
5	0	0	0	0	0	0	0
6	0	0	0	30	0	0	0
7	0	0	0	0	0	0	0

Key:
T= Townsend
Ming= Minguannan
HI= Hell Island
M= Mockley
C= Coulbourn
WN= Wolfe Neck
Exp= Experimental Wares
Soap= Soapstone

FIGURE 15

7S-K-46 - Area C - Summary of Vertical Distribution of Artifacts

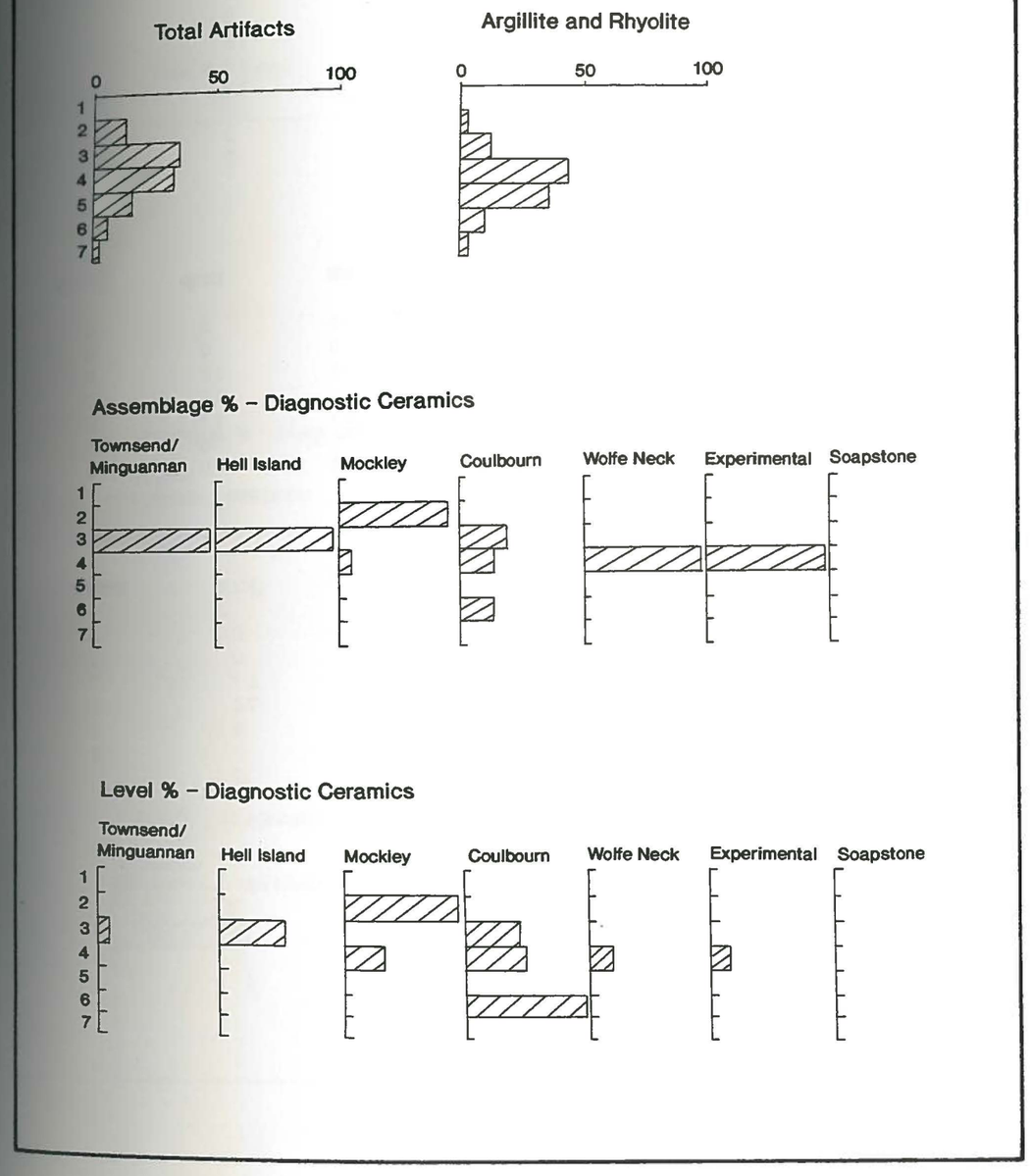


TABLE 8

7S-K-46, AREA D - SUMMARY OF VERTICAL DISTRIBUTION OF ARTIFACTS

	Total Artifacts		Argillite and Rhyolite	
1	36	6	0	0
2	156	24	10	16
3	188	29	24	39
4	138	21	18	29
5	66	10	7	11
6	31	5	2	3
7	33	5	1	2
	650		62	

Level %

	T/Ming	HI	M	C	WN	Exp	Soap
1	100	0	0	0	0	0	0
2	89	7	2	2	0	0	0
3	5	2	2	57	24	10	0
4	0	8	0	17	4	71	0
5	0	0	0	50	17	33	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0

Assemblage %

	T/Ming	HI	M	C	WN	Exp	Soap
1	21	0	0	0	0	0	0
2	75	50	50	3	0	0	0
3	4	17	50	75	83	17	0
4	0	33	0	12	8	74	0
5	0	0	0	9	8	9	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0

Key:
T= Townsend
Ming= Minguannan
HI= Hell Island
M= Mockley
C= Coulbourn
WN= Wolfe Neck
Exp= Experimental Wares
Soap= Soapstone

FIGURE 16

7S-K-46 - Area D - Summary of Vertical Distribution of Artifacts

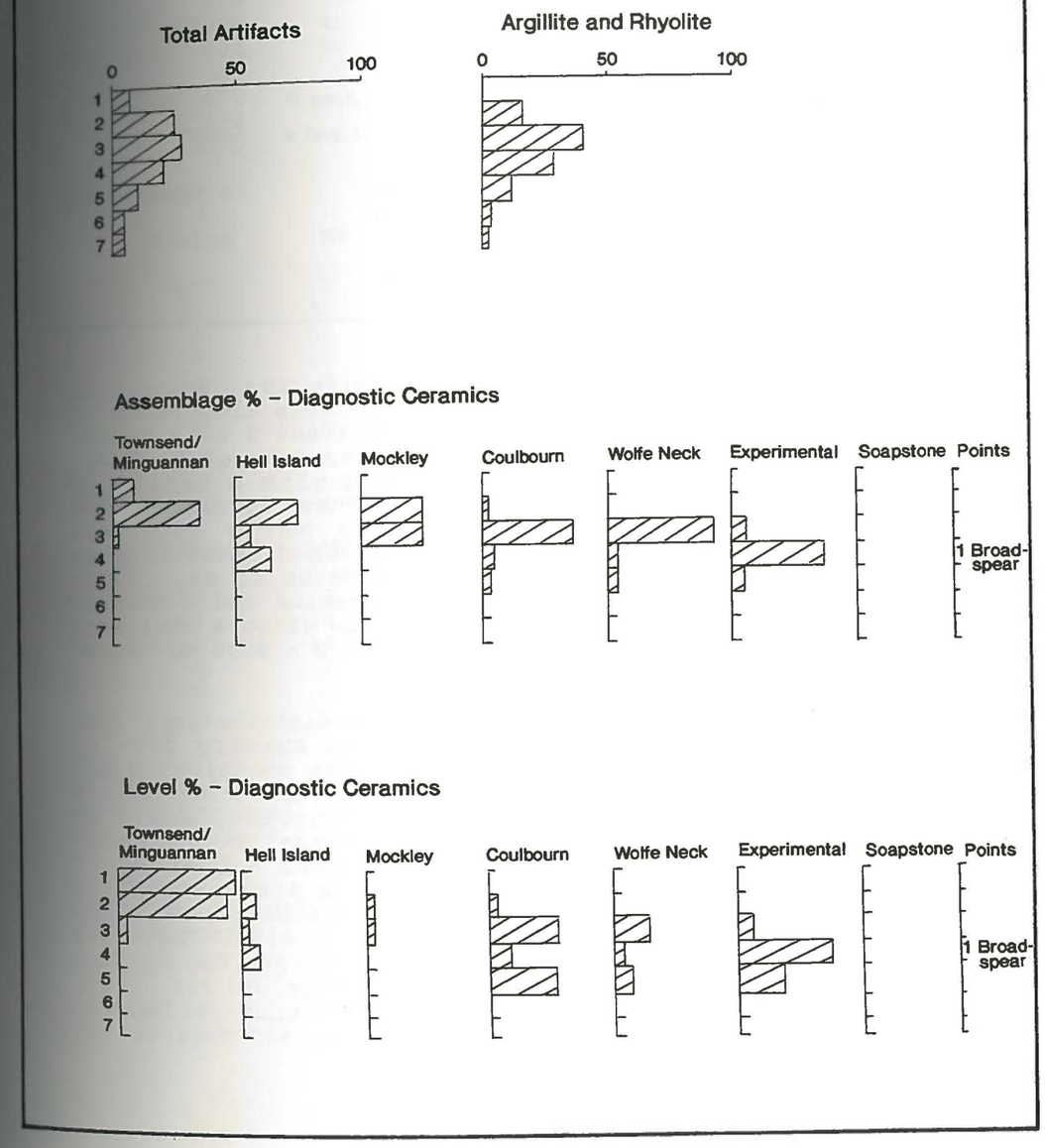
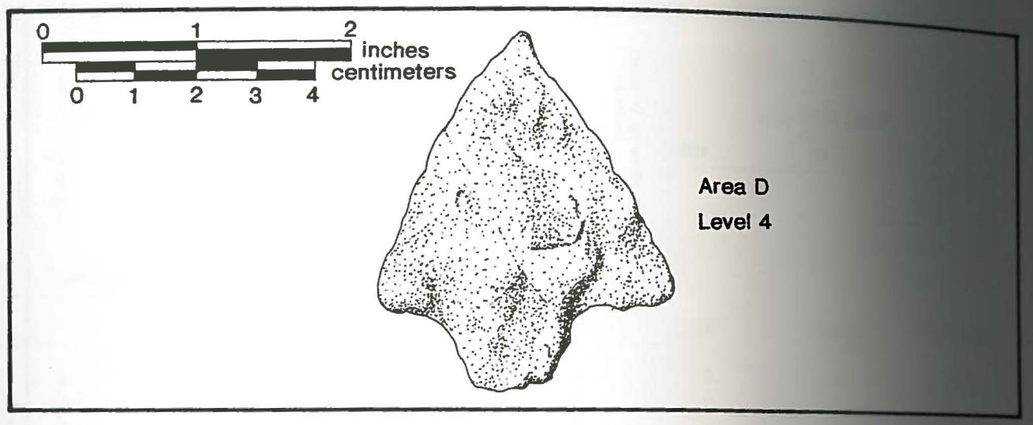


FIGURE 17

7S-K-46 - Area D - Diagnostic Projectile Points



also present. Two triangular points (Figure 19A, B) and an undiagnostic side-notched point (Figure 19C) were also found in Level 2. Based on these diagnostics, Levels 1 and 2 date to ca. AD 500 and 1600. Levels 3 and 4 contain a variety of Mockley, Coulbourn, and Wolfe Neck ceramics along with a series of notched and stemmed points (Figure 19D-J). These levels date to ca. 700 BC - AD 200. Level 5 contains Wolfe Neck and experimental ceramics along with a single stemmed point (Figure 19K). Based on these diagnostics, Level 5 dates to ca. 1000 - 500 BC. Levels 6 and 7 contain almost no ceramics and a Dalton-Hardaway point (Figure 19L) and an ovate biface (Figure 19M) were recovered from these levels. An age of ca. 9000 - 8500 BC can be assigned to these levels.

Table 10 shows a summary of the artifact distributions from the North Area and Figure 20 shows the same summary data in graphic form. Levels 1 and 2 of the North Area contained a mix of Townsend, Hell island, and Mockley ceramics and these levels date to ca. AD 600 - 1600. Levels 3 - 7 contained a mix of Coulbourn, Wolfe Neck, and experimental ceramics and these levels date to ca. 1000 - 500 BC. Table 11 shows a summary of the artifact distributions from the Far North Area, Figure 21 shows the same summary data in graphic form, and Figure 22 shows diagnostic projectile points from the Far North Area. Levels 1 and 2 contained Townsend ceramics and date to ca. AD 1000 - 1600. Level 3 contained Mockley ceramics and dates to ca. AD 100 - 500. Levels 4 and 5 contained Coulbourn, Wolfe Neck, experimental ceramics, a Susquehanna broadspear (Figure 22A), and date to ca.

TABLE 9

7S-K-46, AREA H - SUMMARY OF VERTICAL DISTRIBUTION OF ARTIFACTS

	Total Artifacts		Argillite and Rhyolite		
1	92	3	0	0	
2	528	17	17	11	
3	1399	46	60	38	
4	604	20	48	30	
5	249	8	17	11	
6	162	5	13	8	
7	36	1	4	3	
	3070		159		

Assemblage %

	T/Ming	HI	M	C	WN	Exp	Soap
1	46	2	4	0	1	0	0
2	50	32	38	9	5	4	0
3	4	50	55	89	46	18	25
4	0	16	3	5	42	54	50
5	0	0	0	0	3	25	25
6	0	0	0	0	3	0	0
7	0	0	0	0	1	0	0

Level %

	T/Ming	HI	M	C	WN	Exp	Soap
1	68	5	21	0	5	0	0
2	16	19	47	8	8	1	0
3	0	11	25	30	31	2	0
4	0	8	3	4	67	16	2
5	0	0	0	0	38	54	8

Key:
T= Townsend
Ming= Minguannan
HI= Hell Island
C= Coulbourn
WN= Wolfe Neck
Exp= Experimental Wares
Soap= Soapstone

FIGURE 18

7S-K-46 - Area H - Summary of Vertical Distribution of Artifacts

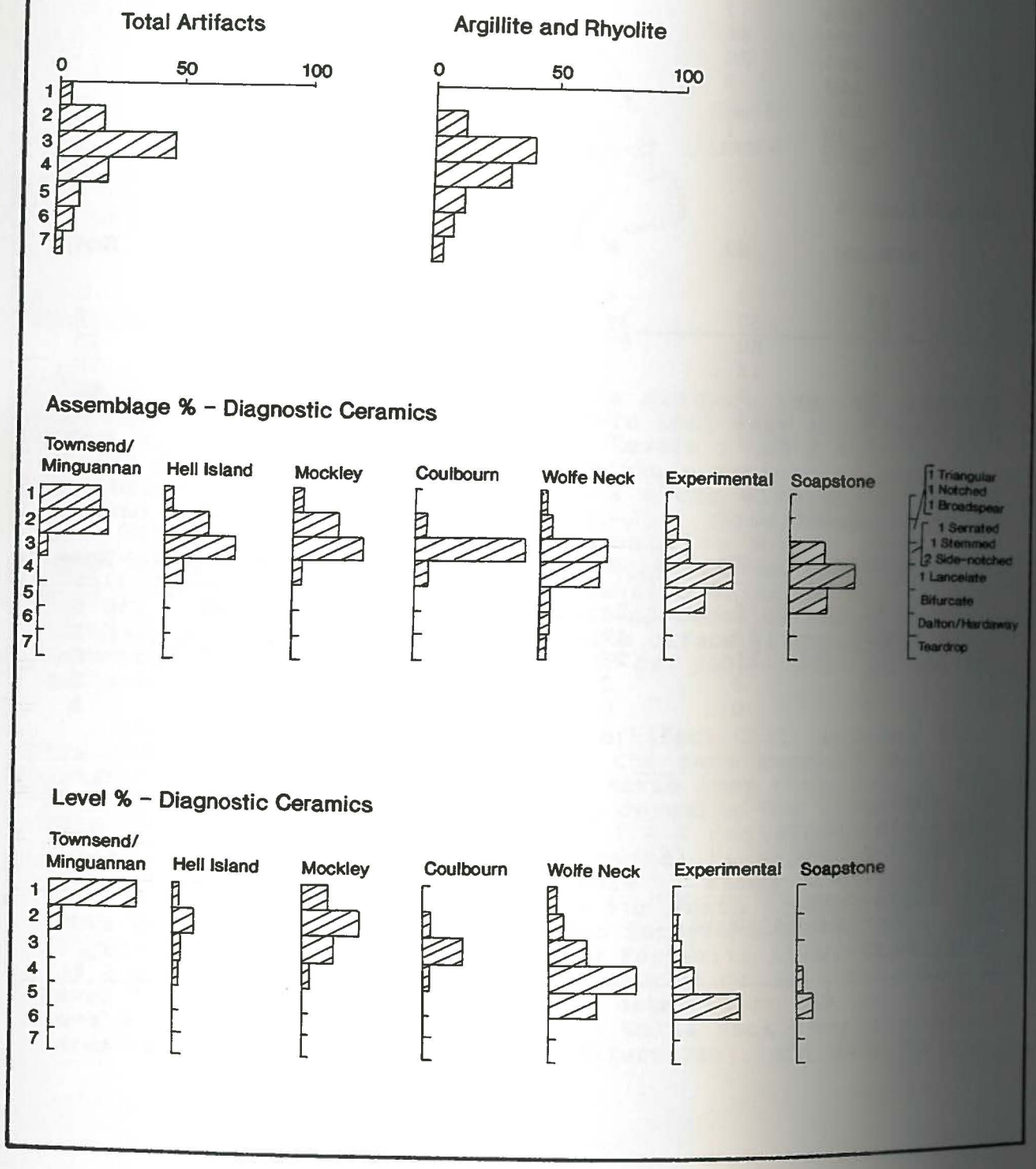
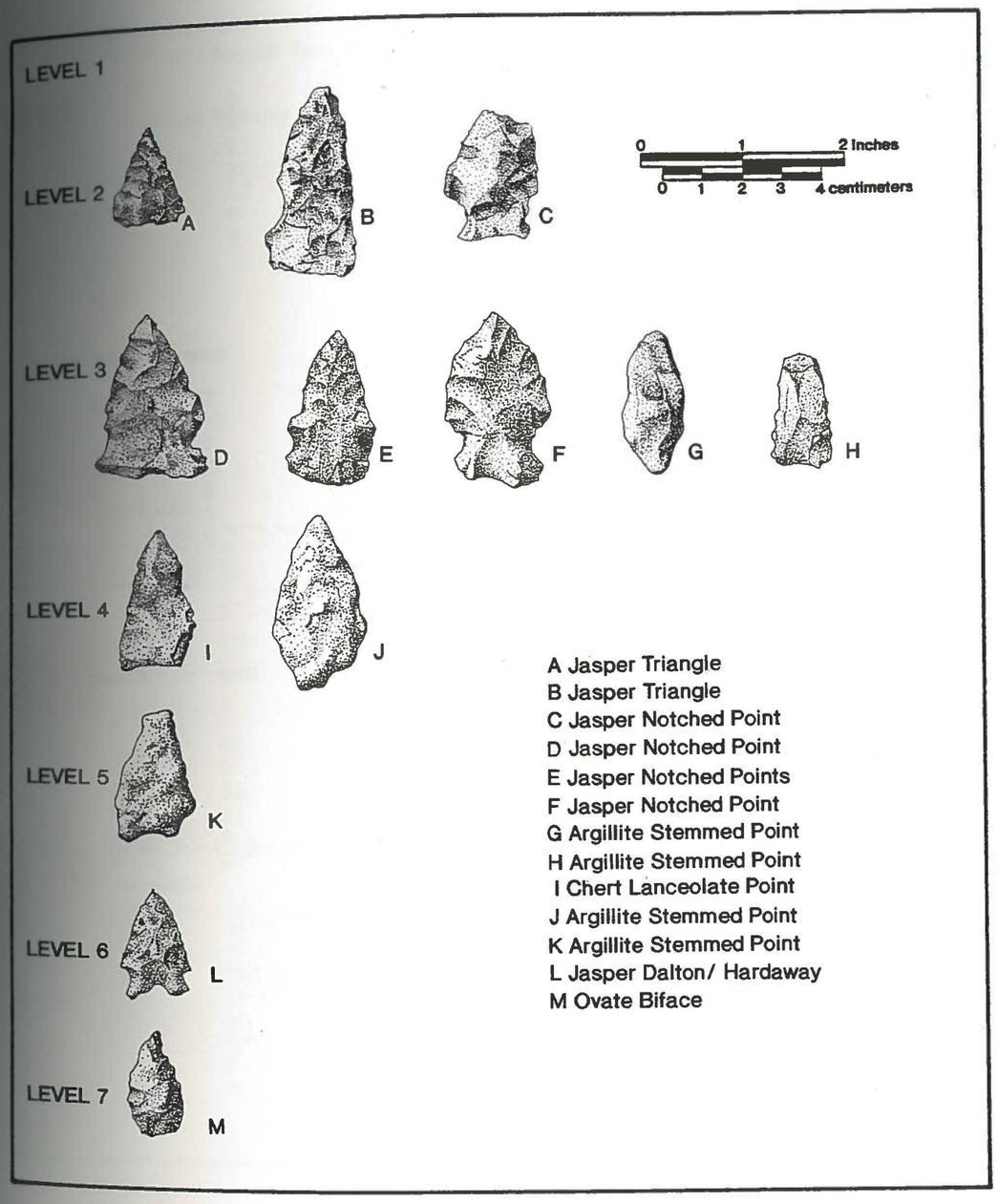


FIGURE 19

7S-K-46 - Area H - Diagnostic Projectile Points



A Jasper Triangle
B Jasper Triangle
C Jasper Notched Point
D Jasper Notched Point
E Jasper Notched Points
F Jasper Notched Point
G Argillite Stemmed Point
H Argillite Stemmed Point
I Chert Lanceolate Point
J Argillite Stemmed Point
K Argillite Stemmed Point
L Jasper Dalton/ Hardaway
M Ovate Biface

TABLE 10

7S-K-46, NORTH AREA
SUMMARY OF VERTICAL DISTRIBUTION OF ARTIFACTS

	Total Artifacts		Argillite and Rhyolite	
1	11	2	2	2
2	74	12	1	1
3	186	30	13	15
4	192	31	29	34
5	98	16	28	33
6	46	7	8	9
7	22	3	4	5
	629		85	

Level %

	T/Ming	HI	M	C	WN	Exp	Soap
1	50	50	0	0	0	0	0
2	23	23	15	8	8	23	0
3	2	47	18	2	33	0	2
4	0	0	2	7	82	9	0
5	0	15	0	0	75	5	5
6	0	0	0	0	100	0	0
7	0	0	0	0	100	0	0

Assemblage %

	T/Ming	HI	M	C	WN	Exp	Soap
1	20	3	0	0	0	0	0
2	60	10	17	20	1	38	0
3	20	77	75	20	21	0	50
4	0	0	8	40	49	50	0
5	0	10	0	0	20	12	50
6	0	0	0	0	7	0	0
7	0	0	0	0	1	0	0

Key:
T= Townsend
Ming= Minguannan
HI= Hell Island
M= Mockley
C= Coulbourn
WN= Wolfe Neck
Exp= Experimental Wares
Soap= Soapstone

FIGURE 20

7S-K-46 - North Area - Summary of Vertical Distribution of Artifacts

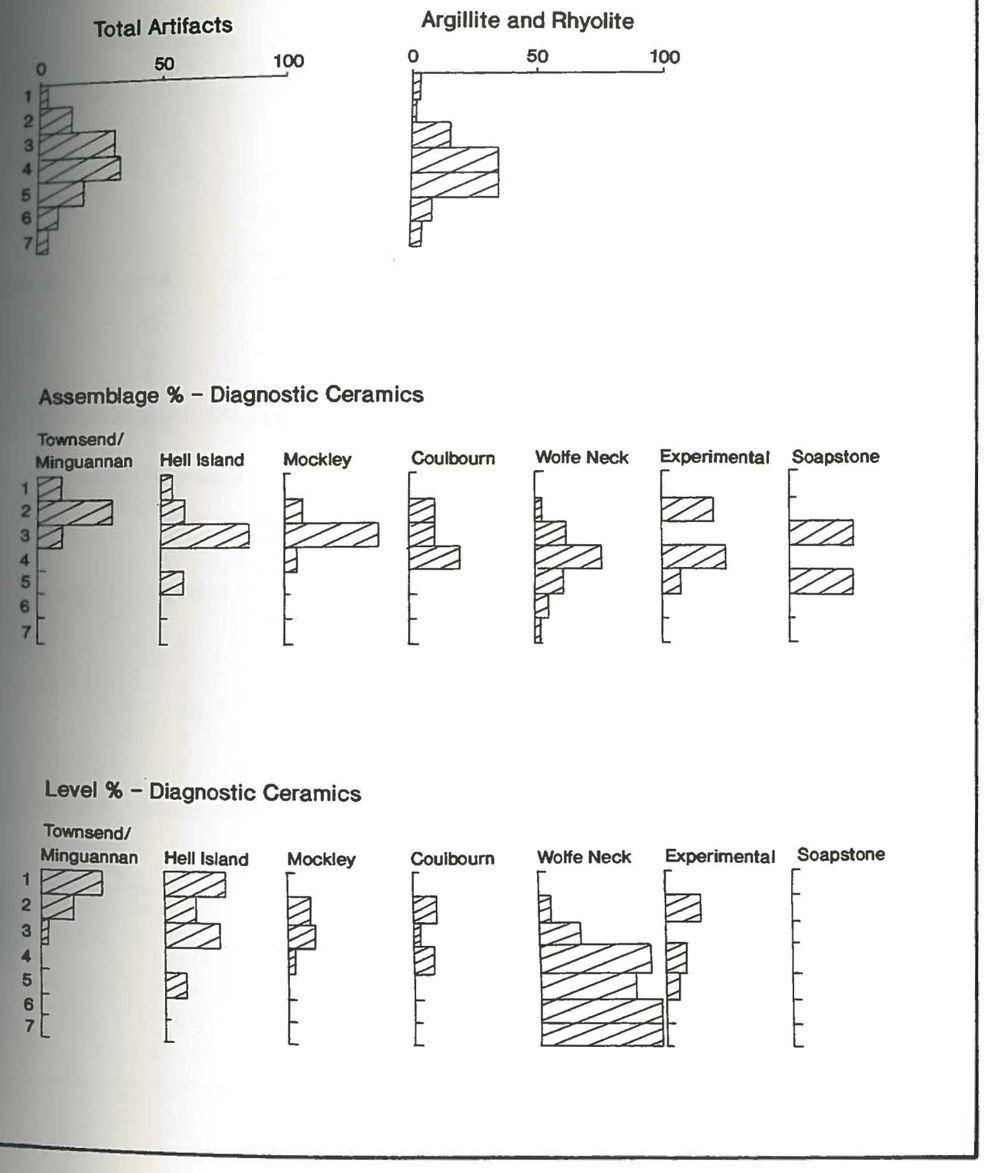


TABLE 11

7S-K-46, FAR NORTH AREA
SUMMARY OF VERTICAL DISTRIBUTION OF ARTIFACTS

	Total Artifacts		Argillite and Rhyolite		
1	4	1	1	0	0
2	21	6	2	0	0
3	149	41	3	15	31
4	114	31	4	15	31
5	39	11	5	13	27
6	28	8	6	4	8
7	7	2	7	2	4
	362			49	

Level %

	T/Ming	HI	M	C	WN	Exp	Soap
1	100	0	0	0	0	0	0
2	60	20	0	0	20	0	0
3	0	0	80	12	5	3	0
4	0	0	17	10	5	69	0
5	0	0	20	40	0	40	0
6	0	0	50	50	0	0	0
7	0	0	0	0	100	0	0

Assemblage %

	T/Ming	HI	M	C	WN	Exp	Soap
1	40	0	0	0	0	0	0
2	60	100	0	0	12	0	0
3	0	0	87	56	50	6	0
4	0	0	10	25	25	88	0
5	0	0	1	12	0	6	0
6	0	0	1	6	0	0	0
7	0	0	0	0	12	0	0

Key :
T= Townsend
Ming= Minguannan
HI= Hell Island
M= Mockley
C= Coulbourn
WN= Wolfe Neck
Exp= Experimental Wares
Soap= Soapstone

FIGURE 21

7S-K-46 - Far North Area - Summary of Vertical Distribution of Artifacts

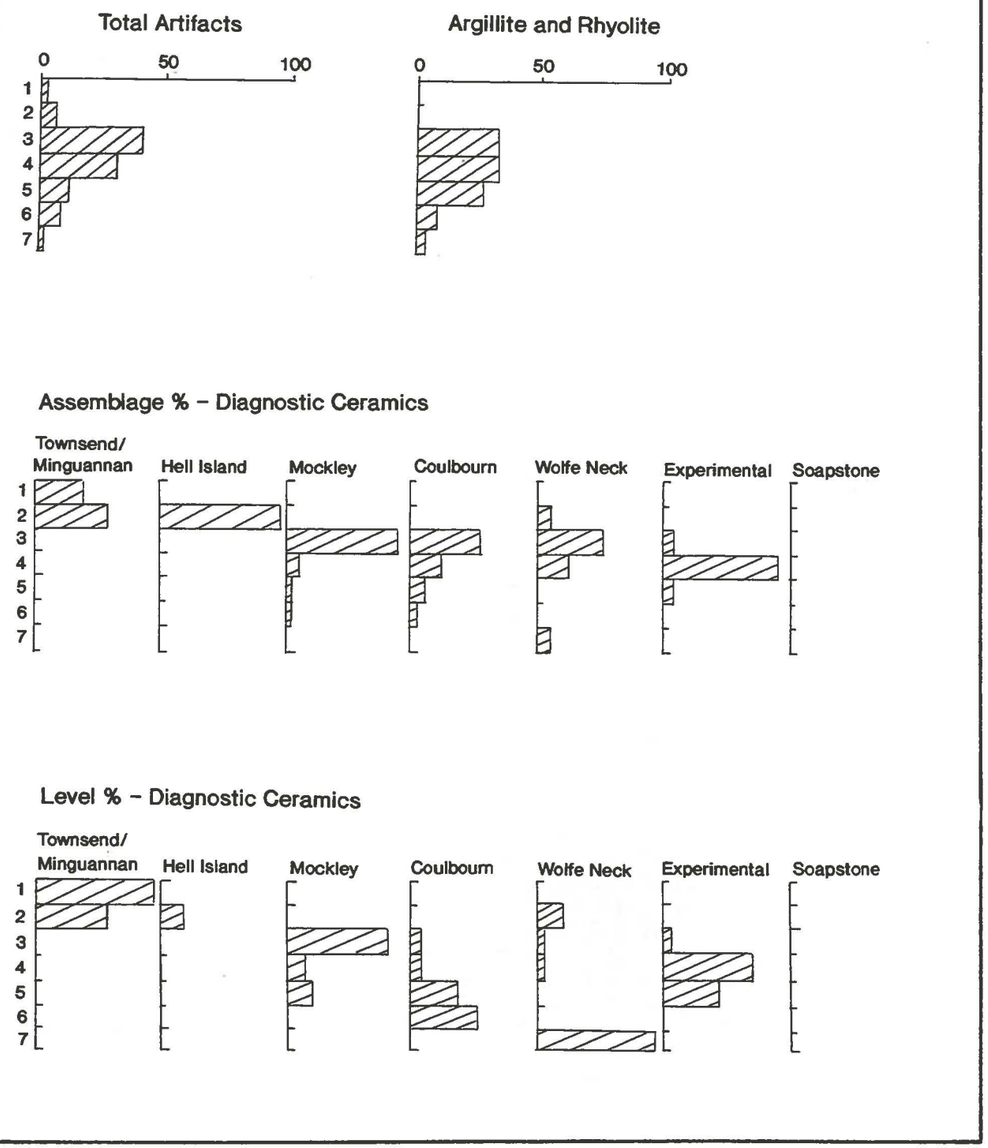
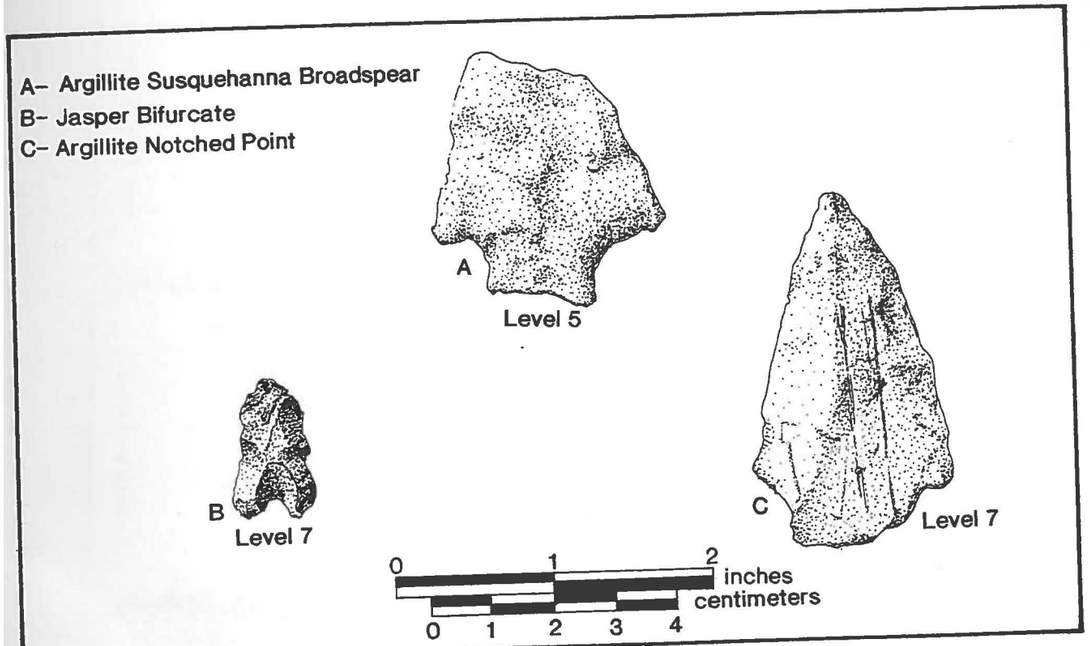


FIGURE 22

7S-K-46 - Far North Area - Diagnostic Projectile Points



1000 - 500 BC. Levels 6 and 7 contain almost no ceramics and a bifurcate projectile point (Figure 22B) and a large notched point (Figure 22A). These levels date to ca. 6500 BC.

Table 12 summarizes the chronological data on the different levels within each of the site areas and lists the basic components found at the site. Because the excavation block areas are separated from one another spatially, each of the components defined in Table 12 can be viewed as a separate artifact assemblage for the purposes of further analysis.

The cultural stratigraphic data from Area H can be combined with the data on natural stratigraphy (see Table 4) and Figure 23 shows the correlation of the two sources of stratigraphic data. The initial age estimates for the natural soil horizons are confirmed by the cultural stratigraphy. Of special interest is the discontinuity which can be seen at a depth of 50cm in both the natural and cultural stratigraphies. By combining the cultural and natural stratigraphies and noting the presence of the major depositional discontinuity it is possible to reconstruct the depositional history of the site (Figure 24). Prior to 11,000 years ago, aeolian soils accrued at the site and

TABLE 12

7S-K-46, SUMMARY OF DATED LEVELS BY AREA

Area	Levels	Dates	Complex
A	1-2	900 AD - 1600 AD	Slaughter Creek
	3-4	1000 BC - 500 BC	Barker's Landing/ Wolfe Neck/ Delmarva Adena
	5-7	ca. 8000 BC	
D	1-2	1000 AD - 1600 AD	Slaughter Creek
	3-5	1000 BC - 500 BC	Barker's Landing/ Wolfe Neck/ Delmarva Adena
H	1-2	500 AD - 1600 AD	Slaughter Creek/ Late Carey
	3-4	700 BC - 200 AD	Carey/ Wolfe Neck/ Delmarva Adena
	5	1000 BC - 500 BC	Barker's Landing/ Wolfe Neck/ Delmarva Adena
	6-7	9000 BC	
North	1-2	600 AD - 1600 AD	Slaughter Creek/ Late Carey
	3-7	1000 BC - 500 BC	Barker's Landing/ Wolfe Neck/ Delmarva Adena
Far North	1-2	1000 AD - 1600 AD	Slaughter Creek
	3	100 AD - 500 AD	Carey
	4-5	1000 BC - 500 BC	Barker's Landing/ Wolfe Neck/ Delmarva Adena
	6-7	6500 BC	

artifacts from Paleo-Indian occupation surfaces were buried. From 10,000 to 3,500 years ago, it is possible that additional soils and artifacts were deposited at the site; however, the absence of a paleosol and artifacts dating to that time period indicate that erosion took place. This erosion removed an unknown amount of soils, but by 3500 years ago, soils again began to accrue at the site, landscapes stabilized, and these processes continued into historic times. The best preserved depositional context at the site seems to date to this later period of soil deposition.

FIGURE 23

7S-K-46 - Area H - Correlation of Natural and Cultural Stratigraphy

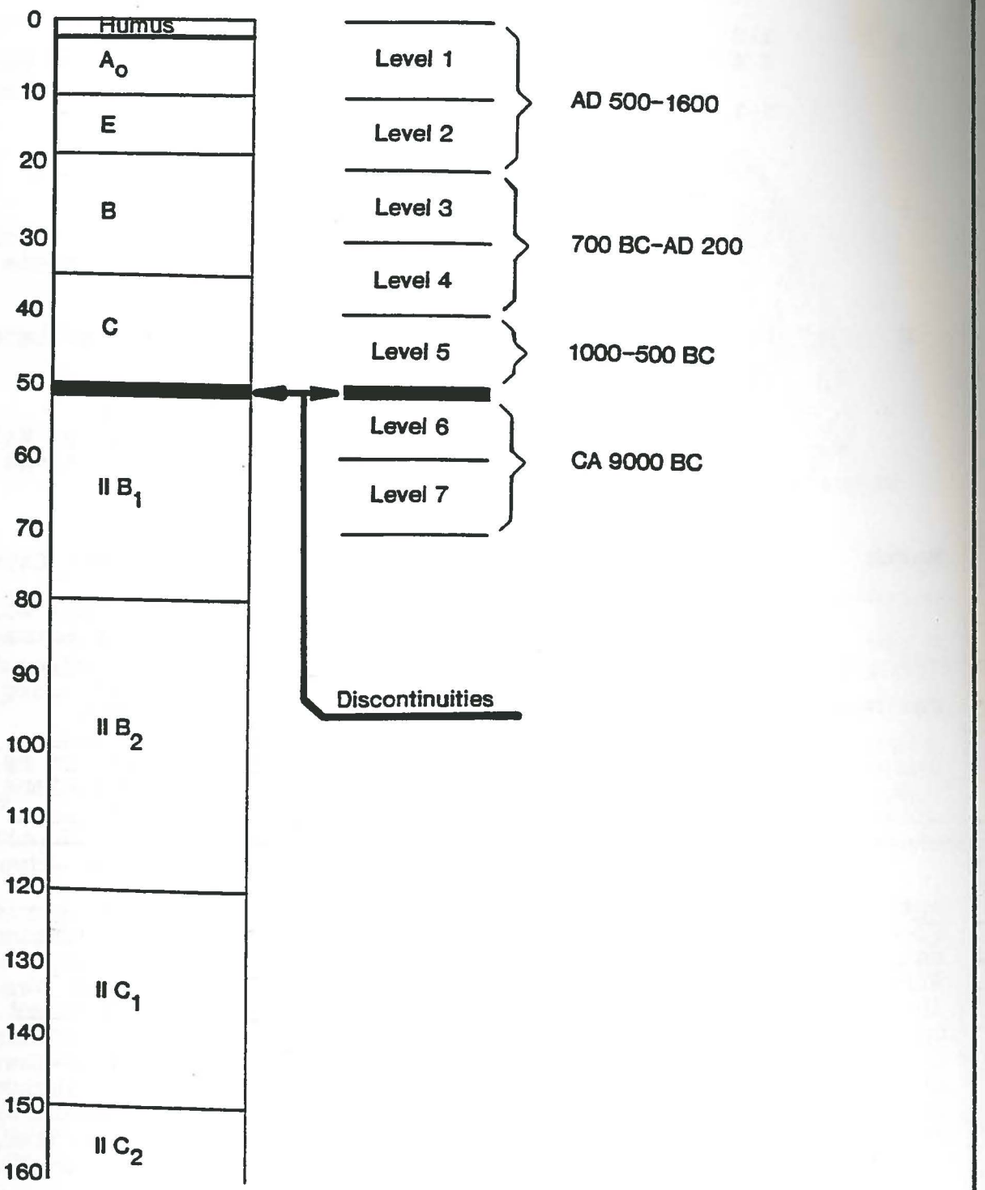
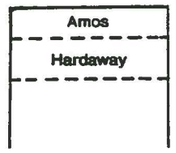


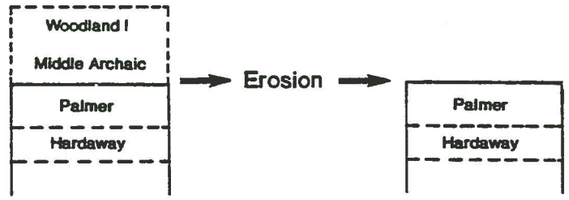
FIGURE 24

7S-K-46 - Depositional History

I 10,500 and older- Aeolian sands accrued and Hardaway and Amos points and debitage deposited

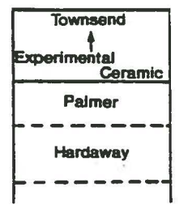


II Perhaps latter Middle Archaic and initial Woodland I materials deposited and then eroded away. (10,500–3,500 BP)



During this time the II B Horizons had a chance to develop.

III (3500 BP–300 BP). Soils again acrue. Woodland I and II groups live here and deposit artifacts. Deposition occurred and new B Horizon developed. Deposition is primarily Aeolian.



[Note minor cultural discontinuity]

IV (300 BP– present). Yet more Aeolian and humus input to complete profile.

Component Descriptions

A sample of the components noted in Table 12 are described in detail below. The components described include the Paleo-Indian components of Areas H and A, the Archaic component of the Far North Area, and the Woodland I component of Area A. The descriptions include preliminary analyses of lithic and ceramic technologies, lithic resource utilization patterns, and activity areas.

Paleo-Indian Component - Area H. Figure 25 shows the distribution of the artifacts from the Paleo-Indian component of Area H. Although artifacts from this component are found throughout Area H, the largest concentration is seen in the northwest section of the excavation block. The concentration of artifacts is primarily composed of debitage and may represent a tool production, or lithic workshop, area.

The only tools in the assemblage are a jasper flake tool (Figure 26A), a chert core, a jasper Dalton-Hardaway point (Figure 19L), and an ovate biface (Figure 19M). Both the flake tool and the core show signs of cortex and were manufactured from secondary cobble sources. The cobble core has several facets where flakes have been removed and there are few, if any additional platforms from which flakes could be detached. Therefore, this tool was probably discarded because its tool manufacturing potential had been exhausted. The flake tool (Figure 26A) is wider than it is long (following the traditional convention where flake length is defined as the distance between the platform and the opposite, distal, end) and has been retouched along both the platform and the distal edges. The retouch on the proximal end of this flake is bifacial and that along its distal end is unifacial. Because unifacial and bifacial retouch are usually related to different tool functions, it is likely that this flake tool was used for more than one function. One of the lateral edges of the tool has been reshaped to a blunted tip which seems to have been used for some kind of chiselling purpose similar to those inferred for "slug-shaped" unifaces, or "limaces" (Grimes and Grimes 1985). The opposite lateral edge of the tool has been resharpened into a thin graving tip. Thus, this one flake tool served at least 4 functions including bifacial cutting edge, unifacial cutting/scraping edge, graver, and chiselling. Such multi-function tools have been observed in other Paleo-Indian tool assemblages from southern Delaware and elsewhere in the southern Delmarva Peninsula (Custer 1989:105-106; Lowery and Custer 1990; Lowery 1989) and indicate that the Paleo-Indian inhabitants of Area H of this site were carefully husbanding their lithic resources.

The point and the biface from this assemblage are small, less than 25mm in length. The biface (Figure 19M) shows signs of a remnant platform with cortex on its proximal end and was manufactured from a secondary cobble source. There is heavy

FIGURE 25

7S-K-46 - Paleo-Indian Component - Area H Distribution Map

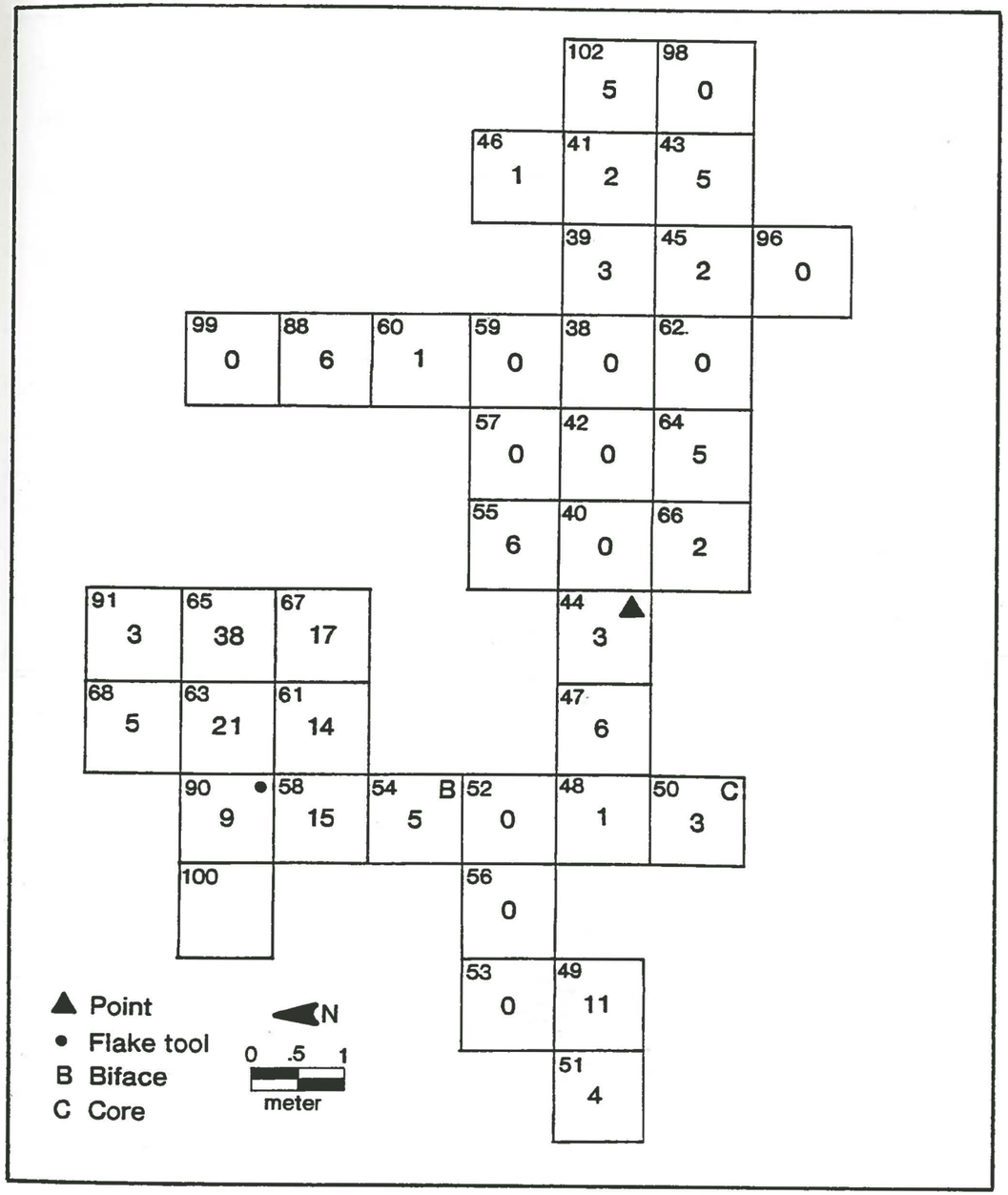
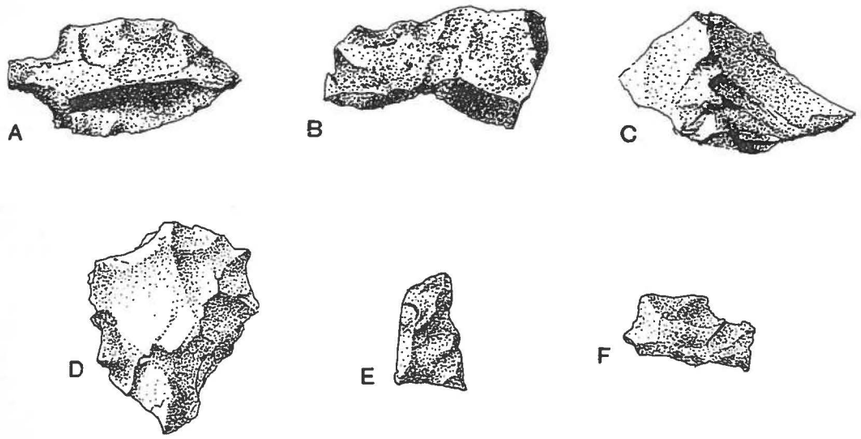
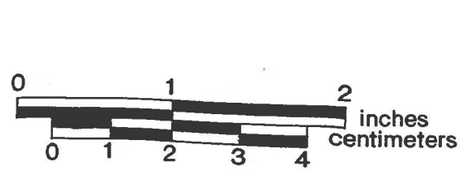


FIGURE 26

7S-K-46 - Paleo-Indian and Archaic Lithic Tools



A Jasper flake tool- Area H
B Jasper flake tool- Area A
C Chert biface fragment- Area A
D Jasper flake tool- Far north area
E Chert flake tool- Far north area
F Chert biface fragment- Far north area



resharpening along both lateral edges of the distal end of this biface and a portion of a remnant impact fracture is visible on one face of the biface's distal end. These kinds of use wear are typical of projectile points and this artifact is probably the heavily resharpened remnant of a lanceolate projectile point. The projectile point (Figure 19L) does not show any signs of remnant cortex; however, there is a small grey discoloration on one face of the point. Similar grey discolorations are seen within cobble jaspers and there is a good chance that the Dalton-Hardaway point was manufactured from a secondary cobble source. The asymmetrical shape of the point's blade section indicates some resharpening; however, the retouch along the lateral edges of the point do not show especially intensive resharpening. There is some polish of flake scar ridges on the distal end of the point from its use as a penetrating tip of a projectile.

Table 13 shows a summary catalogue of the debitage from this component. As is typical of Paleo-Indian lithic resource utilization patterns from other sites on the Delmarva Peninsula

TABLE 13

7S-K-46, DEBITAGE SUMMARY - PALEO-INDIAN AND ARCHAIC COMPONENTS

Area H - Paleo-Indian (Dalton-Hardaway)

	Qtze	Qrtz	Chrt	Jas	Arg	Rhy	Total
Total Debitage	2	14	45	116	11	10	198
Debitage w/ Cortex	2	8	15	57	--	--	82
Cortex Percentages	100	57	33	49	--	--	41
Raw Material %	1	7	23	58	6	5	

Area A - Paleo-Indian (Amos)

	Qtze	Qrtz	Chrt	Jas	Arg	Rhy	Total
Total Debitage	4	28	63	114	36	8	283
Debitage w/ Cortex	1	14	48	94	--	--	157
Cortex Percentages	25	50	76	82	--	--	55
Raw Material %	1	10	22	51	13	3	

Far North Area - Archaic (Bifurcate)

	Qtze	Qrtz	Chrt	Jas	Arg	Rhy	Total
Total Debitage	1	3	15	20	12	2	53
Debitage w/ Cortex	1	2	9	13	--	--	24
Cortex Percentages	100	67	60	65	--	--	45
Raw Material %	2	6	28	38	23	4	

Key:
Qtze= Quartzite
Qrtz= Quartz
Chrt= Chert
Jas= Jasper
Arg= Argillite
Rhy= Rhyolite

(Custer 1989:114-117), cryptocrystalline materials, such as jasper and chert, account for 81% of the debitage assemblage. Small amounts of other raw materials, including non-local rhyolite and argillite are also present. Cortex is present on most of the debitage and indicates extensive use of secondary cobble resources. No flakes with remnant biface edges were observed in the assemblage and it is likely that the debitage was produced through the reduction of locally procured cobble cores rather than the resharpening of curated bifaces which had been brought to the site as part of the inhabitant's transported tool kits. Many of these flakes probably represent small flake tools used for cutting activities without retouching of the flake edges prior to their use as tools. The remainder of the flakes are waste flakes from the process of producing these expedient flake tools.

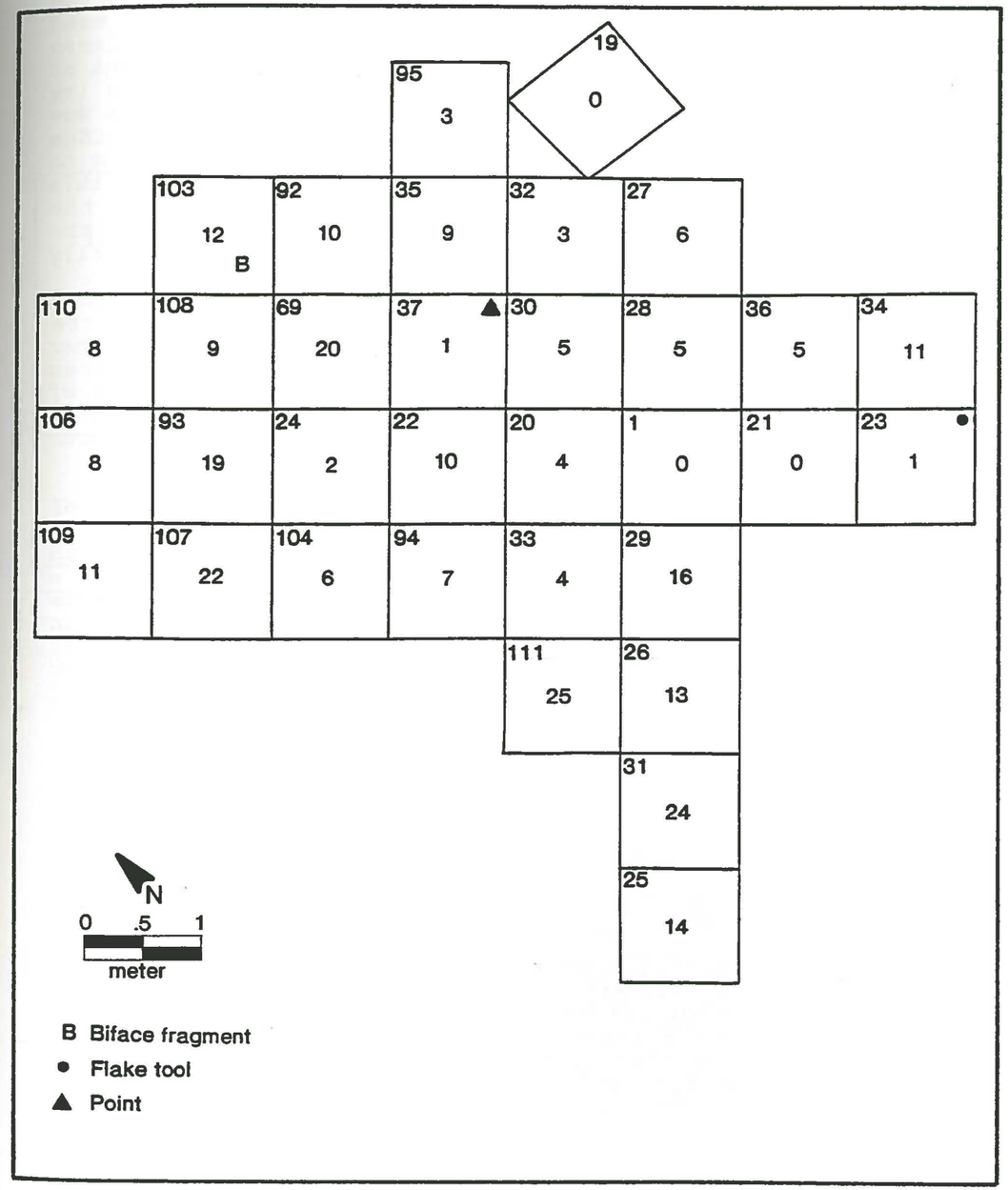
In sum, the Paleo-Indian component of Area H represents a small, short-term occupation. The range of activities represented is small. The absence of biface reduction activities suggests that some expedient flake tools were produced at the site from locally procured cobbles and that some heavily used projectile points, flake tools, and cores were discarded at the site. The expedient tools were probably used for processing activities at the site. Based on the lithic tool assemblage the Paleo-Indian occupation of Area H probably represents a transient camp or procurement/processing site.

Paleo-Indian Component - Area A. The distribution of artifacts from this early occupation of Area A is shown in Figure 27. The artifacts from this component are scattered throughout the excavation block with one concentration in its western end and another in its southern end. A biface and projectile point are associated with the western concentration, but no tools were found in the southern area of the block. Because of the low number of tools in these concentrations, these two activity areas probably represent small tool production and lithic reduction areas.

Three tools are associated with the component: a jasper Amos projectile point (Figure 14F), a fragment of a chert biface (Figure 26C), and a jasper scraper (Figure 26B). The jasper Amos point does not show any signs of cortex on its surface and was probably manufactured from primary lithic materials; however, it is possible that the point was made from secondary cobble material and all of the signs of cortex were removed during the reduction sequence. The point has a slight curvature to it when viewed along its medial cross-section indicating that it was probably manufactured from a flake. There are no apparent signs of edge wear or damage anywhere on the point, except for the fact that the one tang of the point near the corner notch has been broken off. The point may have been discarded because of this break, or perhaps it was just lost.

FIGURE 27

7S-K-46 - Paleo-Indian Component - Area A Distribution Map



The jasper scraper (Figure 26B) from the site is completely covered by cortex on its dorsal surface. The tool was manufactured from a distal flake fragment and has been retouched by removing flakes from its dorsal surface toward its ventral surface so that the flat cortex surface is part of its working edge. The resulting working edge has a very steep edge angle and is somewhat blunt. This kind of edge is typical of tools used for woodworking or scraping the fat and flesh from hides (Wilmsen 1970). The biface fragment (Figure 26C) consists of a segment of the edge with a large prepared platform located midway along its edge. The edge fragment probably broke off from the biface due to a mis-directed thinning blow. There is a pronounced ridge perpendicular to the biface edge emanating from the platform on the dorsal surface that is surrounded by step fractures and this ridge and the step fractures probably contributed to the unsuccessful attempt to remove the thinning flake from the biface. This biface also has remnant cortex and was initially manufactured from a secondary cobble source.

Table 13 shows a summary catalogue of the debitage from the Paleo-Indian component of Area A. As was the case with the other Paleo-Indian component, jasper and chert are the main raw materials utilized and account for 73% of the debitage. 55% of the total debitage assemblage and 82% of the jasper debitage show signs of cortex and secondary cobble resources were a major focus of these groups' lithic technologies.

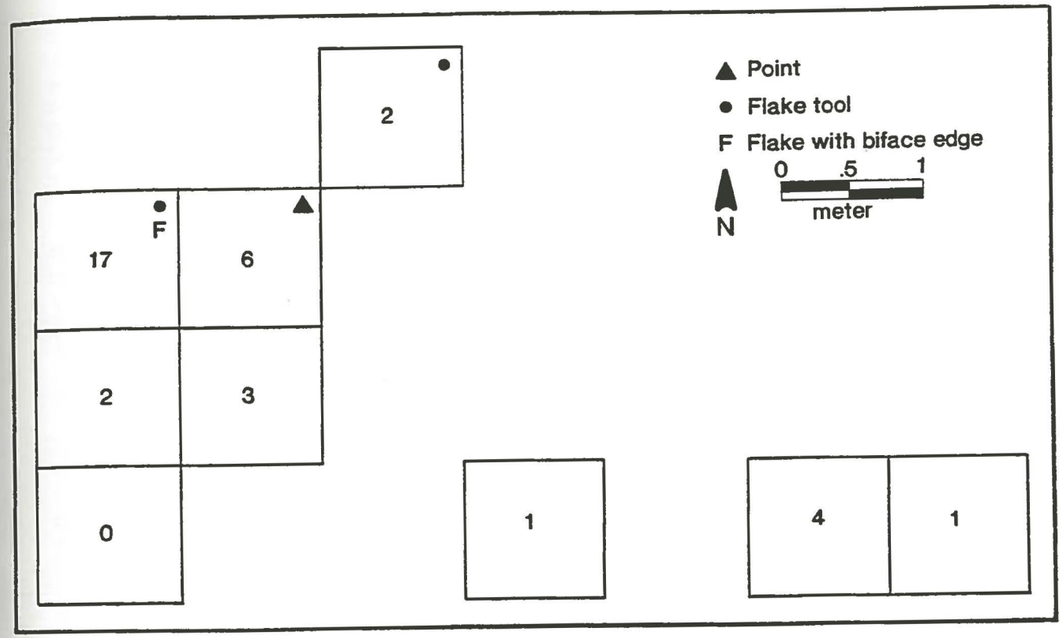
The Paleo-Indian component of Area A is similar to that of Area H in terms of tool variety and lithic resource utilization patterns. The tool classes are limited and the occupation probably represents a resource procurement/processing site or a small transient camp. The presence of a biface fragment suggests that some biface reduction or resharpening, as well as reduction of cobble cores, also took place at the site. It is not clear whether the biface found was manufactured at the site, or whether it was part of a transported tool kit.

Archaic Component - Far North Area. The Archaic component of the Far North Area is smaller than the Paleo-Indian components described above; however, it is of special significance because it is one of the only examples of an **in situ** Archaic period occupation on the Delmarva Peninsula. Figure 28 shows the distribution map of this component. For the most part, the component is focused on a 2m square area in the northwest section of the Far North Area.

The tools from this component include a jasper bifurcate point (Figure 22B), an argillite notched point (Figure 22C), a jasper scraping tool (Figure 26D), a chert flake tool (Figure 26E), and a chert biface edge fragment (Figure 26F). The bifurcate point is 25cm long and is very highly resharpened. There are impact fractures on both faces of its distal end indicating that it had been used as a projectile point. Given

FIGURE 28

7S-K-46 - Archaic Component Far North Area



the tip damage and extensive resharpening, the point was probably discarded because it could no longer be used. No cortex is present on the point and it was probably manufactured from primary materials. The argillite notched point is 60cm long and very heavily eroded. The basal end appears to have been damaged and it is difficult to tell much more about the point given its extreme weathering.

The jasper scraping tool (Figure 26D) is retouched across its distal end and along both lateral edges. There are several concavities along the resharpened distal edge and the protuberances between the concavities seem to have been used as graving or incising tools. The original flake from which the tool was manufactured was quite thick and the tool could be classified as a carinated, or keeled, scraper. Because of the thickness of the original flake, the edge angles of some of the scraping edges are quite steep and were probably used for wood working and/or hide scraping. Therefore, this single flake tool combines multiple uses on its various edges. Some remnant areas of cortex are visible on the dorsal surface of the tool and it was manufactured from a secondary cobble. The chert flake tool from this component (Figure 26E) is an elongated distal flake

fragment that has light resharpening along its distal end. The resharpening seems to be associated with some kind of light cutting or scraping and the tool was discarded before any modification of its lateral edge took place. There are no signs of cortex anywhere on its surface and the flake blank was probably derived from a core of primary raw material. The biface edge fragment from this component (Figure 26F) has cortex on it indicating that the original biface had been manufactured from secondary cobble material. This edge fragment has an extensively prepared platform on one of its ends and it looks as if the flake broke in half longitudinally when struck. At the same time the flake also broke off the biface with a feathered edge just beyond the bulb of percussion. These breakages most likely resulted from a misplaced thinning blow which struck the biface at too steep of an angle.

Table 13 shows the summary catalogue of the debitage from this Archaic assemblage. As was the case with the Paleo-Indian debitage assemblages, chert and jasper account for the majority of the assemblage (64%); however, argillite accounts for 23% of the Archaic assemblage and this proportion is almost twice as much as the proportion present in the Paleo-Indian assemblages. A large proportion of the Archaic debitage shows signs of cortex indicating that cobble use was common.

The Archaic component of the Far North Area is similar to the Paleo-Indian components in that it shows a limited number and range of tools that are probably associated with resource procurement and processing during a transient occupation of the site. Archaic groups reduced cobble cores, primary cores, and bifaces manufactured from cobbles at the site with an emphasis on the use of secondary materials. Nonetheless, there was a significant increase in the use of argillite by Archaic groups compared to earlier time periods with both points and flakes present in the assemblage. Analysis of Archaic Period projectile points (Custer 1989:115-119, 139) shows similar shifts in lithic resource use that are associated with changing adaptations during this period.

Woodland I Component - Area A. The Woodland I component of Area A includes a variety of artifact classes, including debitage and lithic tools, ceramics, and fire-cracked rocks, whose individual distributions (Figures 29-31) are of interest for defining activity areas. Figure 32 summarizes these distributions and their spatial correlations. Two concentrations of fire-cracked rocks are present in the northeast and southwest corners of the area and these areas probably represent hearths. Ceramic concentrations are associated with both hearths as are a variety of chipped stone tools including projectile points, bifaces, and flake tools. A concentration of debitage is associated with the hearth area in the southwest corner of the site, but there is no similar association with the northeastern hearth. A large debitage concentration is present in the southern area of the site separate from the hearths and another debitage concentration

FIGURE 29

7S-K-46 - Woodland I Component Area A - Debitage and Tool Map

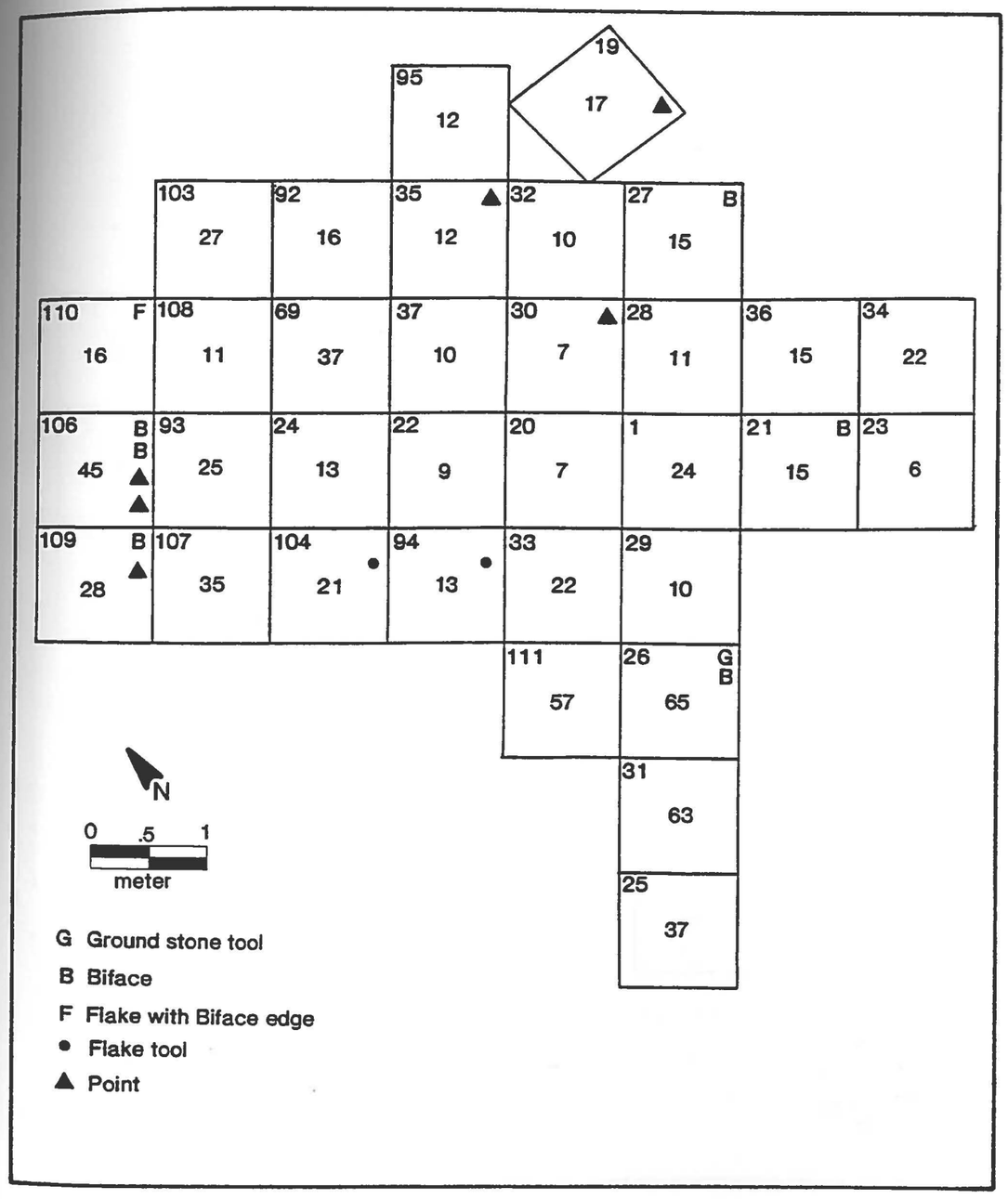


FIGURE 30

7S-K-46 - Woodland I Component Area A - Ceramic Map

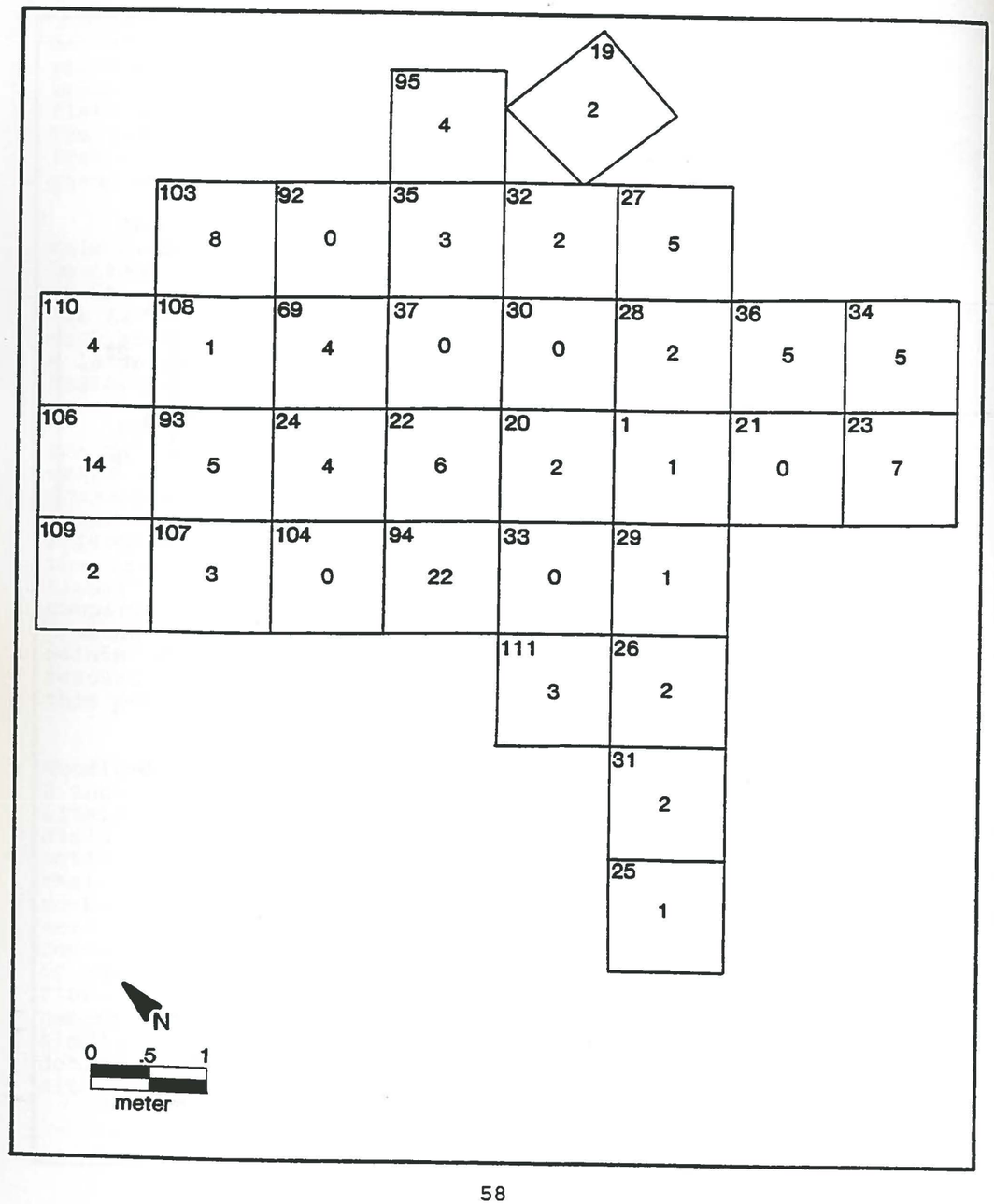


FIGURE 31

7S-K-46 - Woodland I Component Area A - Fire-cracked Rock Map

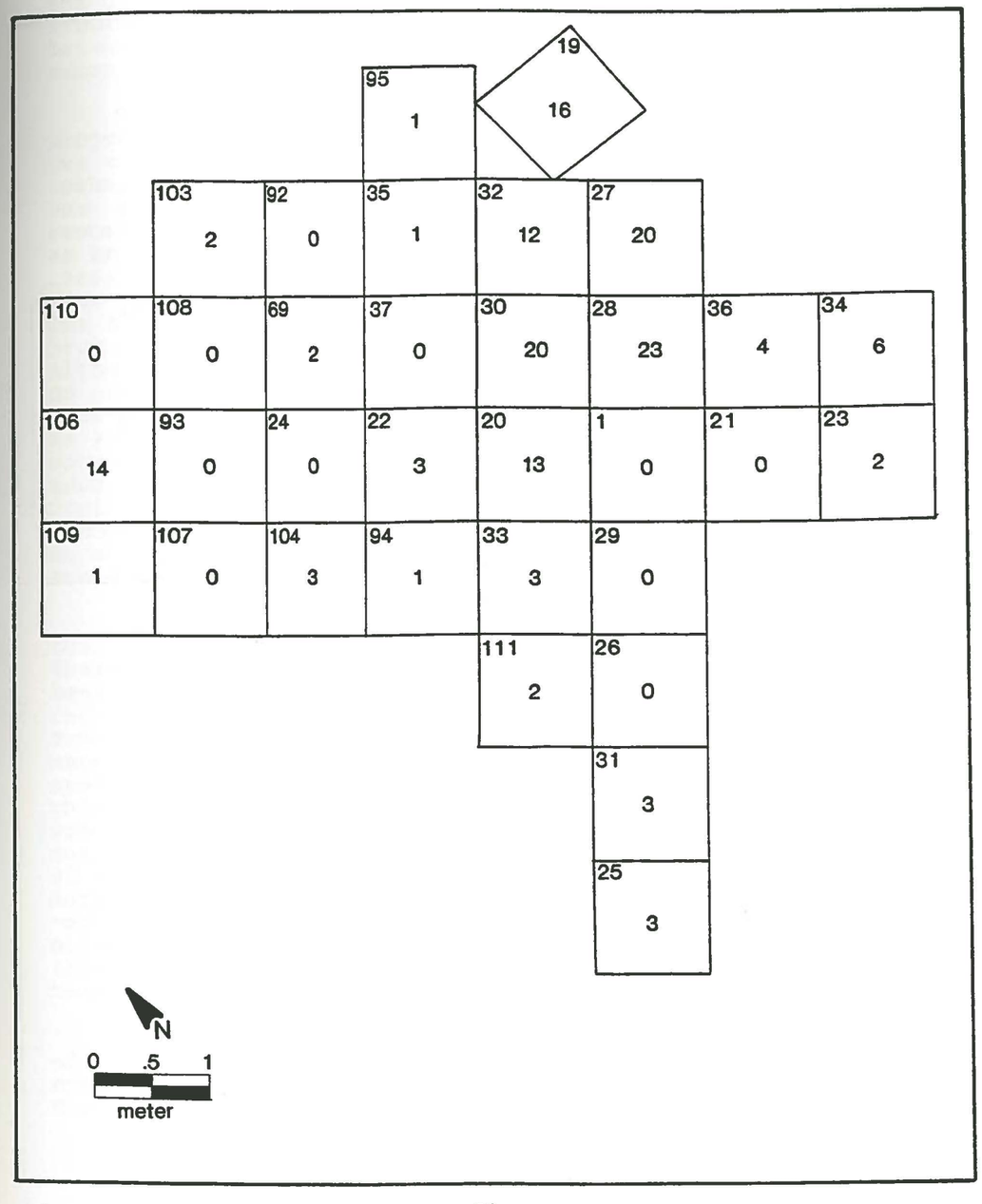
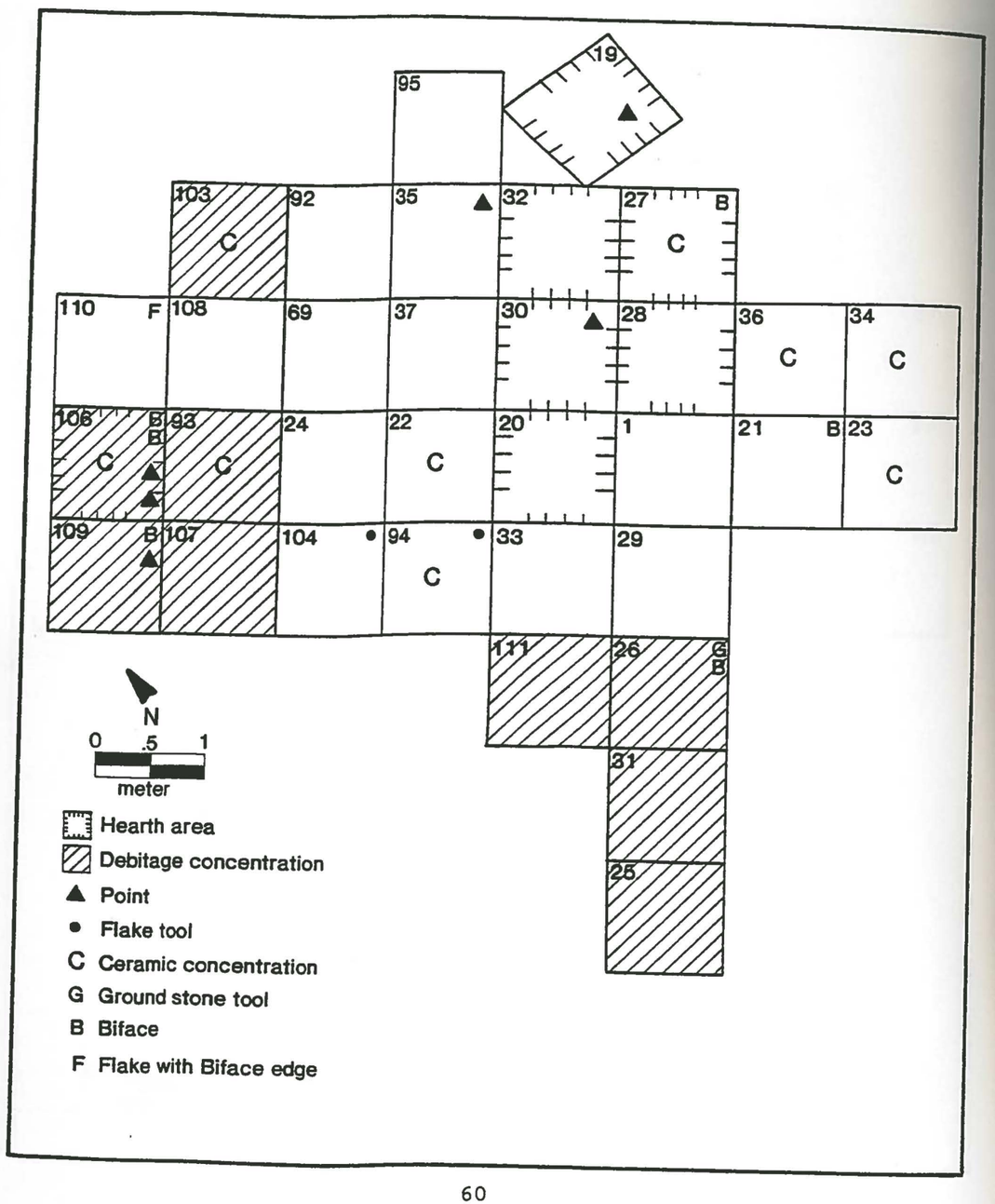


FIGURE 32

7S-K-46 - Woodland I Component Area A - Activity Area Map



and an associated ceramic concentration are present in the northwestern corner of the site. The ceramic concentrations associated with each of the hearths and the northwestern ceramic concentration all include Wolfe Neck and experimental ceramics and there is no way to determine the contemporaneity or relative age of the occupations. Nevertheless, the potential activities associated with the varied artifact concentrations can be determined through a closer examination of the artifact associations and the tools found in each artifact concentration.

The northwestern hearth area is associated with three projectile points all of which are broadspears (Figure 14B-D). Two of these broadspears (Figures 14B and C) show extensive resharpening along their lateral edges and the other (Figure 14D) has a transverse medial fracture. These breakage and resharpening patterns are typical of utilization of these bifaces as knives and generalized processing tools (Custer and Mellin 1986). Two scrapers were also found in this area of the site and were probably used for the processing of game animal resources. The bifaces associated with this hearth area seem to have been broken while being used, rather than while being reduced. Although debitage is present around this hearth area, there are no pronounced concentrations as are present in other areas of the site. The presence of bifaces and broadspears with signs of use as knives and the presence of generalized processing tools suggests that this hearth area is an area of resource processing, such as late stage butchering and food preparation, rather than a tool reduction area. The association of ceramic concentrations around the hearth area also suggests resource processing, especially cooking. Thus, the northeastern section of the site seems to have been used for cooking and resource processing.

The second hearth area located in the southwestern corner of the site differs from the northeastern activity area in that there is a debitage concentration associated with the second hearth. Three bifaces which appear to have been broken during reduction are also present in this area along with two broadspears (Figure 14A and E) and a point tip. Both broadspears appear to have been broken and discarded during reduction. One specimen (Figure 14A) has been badly damaged by a reduction blow which removed almost all of one face of the point. The other specimen (Figure 14E) has a snapped tip and a large protuberance surrounded by hinge fractures on one face. Based on the presence of a debitage concentration and bifacially flaked tools broken during reduction, this hearth seems to have an associated lithic reduction activity area, which was focused on reduction of bifaces. The presence of a ceramic concentration also indicates that food processing and cooking probably also took place at this hearth activity area.

The final activity area noted for the Woodland I component of Area A is a debitage concentration located in the southern area of the site. An edge ground cobble flake, which could have functioned as an abrader, and a biface broken during reduction

were also found in this area and underscore the functional evaluation of this section of the area as a lithic reduction activity area.

Debitage from the three activity areas noted above were compared to see if there were any differences in lithic resource utilization activities among the three areas. Table 14 shows the debitage catalogues from each activity area and cortex proportions are noted along with proportions of each lithic raw material for each activity area's assemblage. Table 15 shows a systematic comparison of the raw material proportions among the three areas. A difference-of-proportion test (Parsons 1974) was applied to determine if any of the proportions were significantly different. When the two hearth areas are compared there are no significant differences among the raw materials proportions. When the northeast hearth is compared to the southern chipping area, there is significantly more jasper in the chipping feature and significantly more argillite than rhyolite in the northeast hearth area. Comparing the southwest hearth area and the chipping area, there is significantly more chert and jasper in the chipping area and significantly more quartzite, quartz, argillite, and rhyolite in the southwest hearth area. The chipping area clearly seems to be an area where focused reduction of cryptocrystalline materials took place; whereas, more reduction of argillite and rhyolite, and to a lesser degree quartz and quartzite, took place around the hearths.

Proportions of cortex within each raw material type were compared among the three activity areas and the results are noted in Table 15. There are no significant differences between the hearth areas. However, when the northeast hearth area is compared to the chipping area, it can be seen that there is significantly more cortex for quartz, chert, and jasper in the northeast hearth area. Similarly, there is significantly more cortex for quartz and jasper in the southwest hearth area when it is compared to the chipping area.

When the varied attributes of the activity areas and the lithic utilization patterns are considered, a number of observations about activities at the Area A Woodland I component can be noted. The northeast hearth area seems to be a resource processing and cooking activity area and had no real concentration of debitage. The debitage that is present is primarily jasper and chert that was derived from cobble cores. This hearth area also has significantly more argillite and rhyolite than the chipping area. The broadspears and bifaces from this hearth area are also manufactured from quartzite and argillite and the debitage could be derived from their resharpening and limited reduction. Because argillite, rhyolite, and large pieces of quartzite are not locally available, these tools and the debitage from these materials are probably derived from tool kits that Woodland I groups transported to the site. At the same time, they were also reducing locally available jasper and chert cobbles for expedient tools used in resource processing.

TABLE 14

7S-K-46, AREA A, WOODLAND I COMPONENT DEBITAGE COMPARISON

NE Hearth

	Qtze	Qrtz	Chrt	Jas	Arg	Rhy	Total
Total Debitage	7	21	98	125	85	15	351
Debitage w/ Cortex	3	15	80	86	--	--	184
Cortex Percentages	43	71	82	69	--	--	52
Raw Material %	2	6	28	36	24	4	

SW Hearth

	Qtze	Qrtz	Chrt	Jas	Arg	Rhy	Total
Total Debitage	5	14	39	49	53	13	173
Debitage w/ Cortex	2	10	31	35	--	--	78
Cortex Percentages	40	71	79	71	--	--	45
Raw Material %	3	8	22	28	31	7	

Chipping

	Qtze	Qrtz	Chrt	Jas	Arg	Rhy	Total
Total Debitage	3	13	124	221	36	4	401
Debitage w/ Cortex	1	4	79	107	--	--	191
Cortex Percentages	33	31	64	48	--	--	48
Raw Material %	1	3	31	55	9	1	

Key:
Qtze= Quartzite
Qrtz= Quartz
Chrt= Chert
Jas= Jasper
Arg= Argillite
Rhy= Rhyolite

TABLE 15

7S-K-46, AREA A, WOODLAND I COMPONENT DEBITAGE COMPARISON

NE Hearth versus SW Hearth

Qz	Q	CH	J	A	R
--	--	--	--	--	--

NE Hearth versus Chip

Qz	Q	CH	J	A	R
--	--	--	CH*	NE*	NE*

SW Hearth versus Chip

Qz	Q	CH	J	A	R
SW*	SW*	CH*	CH*	SW*	SW*

NE Hearth versus SW Hearth

Qz	Q	CH	J	Total
--	--	--	--	---

NE Hearth versus Chip

Qz	Q	CH	J	Total
--	NE*	NE*	NE*	---

SW Hearth versus Chip

Qz	Q	CH	J	Total
--	SW*	--	SW*	---

Key :
Qz= Quartzite
Q= Quartz
CH= Chert
J= Jasper
A= Argillite
R= Rhyolite
*= Cortex %

The second hearth area is similar to the first in terms of activities, except for the fact that more tool reduction took place at the southwestern hearth as evidenced by the debitage concentration associated with it. The bifaces present at the southwestern hearth were broken in manufacture and were made from secondary cryptocrystalline materials indicating that Woodland I groups at the site were manufacturing bifaces from locally available cobbles to replace the bifacial tools that had been transported to the site, broken in use, and then discarded. Compared to the chipping area, there is still a focus on non-cryptocrystalline non-local materials in the southwestern hearth area indicating that curated tools were also being reduced and resharpened in this area. And, the high percentage of cortex present on jasper in this area indicates that local secondary cobble cores were also being reduced here. In general, the southwestern hearth area seems to show a wider range of lithic reduction activities than does the northeastern hearth area.

The chipping area has a limited range of activities and the highest proportion of cryptocrystalline materials. Biface reduction seems to have been an important activity; however, the cortex proportions from this area are lower than those seen in the hearth areas. Because cryptocrystalline materials are not locally available, except in cobble form, it is unlikely that the low cortex percentages in this area of the site are due to a focus on primary cryptocrystalline materials. Rather, it is likely that there is less lithic material with cortex in this area because later stages of reduction, when cortex material had already been removed from cores and bifaces, took place here. Thus, this area can be characterized as a secondary reduction area focused on cryptocrystalline materials for the manufacture, and late stage reduction of cores and bifaces.

An important feature of all of the tool kits observed in the Woodland I component of Area A is the fact that no cores were found. The other tools found in all of the activity areas seem to represent either discarded exhausted tools or manufacturing rejects. Cores manufactured from both primary and secondary materials were probably present at the site in order to produce the wide range of debitage; however, their absence in the archaeological assemblage would indicate that the cores were not completely reduced to the point at which they would have been discarded and were an important component of transported and curated tool kits.

The analysis of the samples of the components at 7S-K-21 shows that there are a variety of archaeological data preserved in good stratigraphic context at the site and that these data can be used to address numerous research questions concerning lithic technology, lithic resource utilization, settlement patterns, and adaptations. Additionally, questions concerning prehistoric subsistence patterns can be addressed using the preserved floral remains which were present at the site, but not analyzed in this report.

7S-K-75 EXCAVATIONS

Site Setting

Site 7S-K-75 is located on a series of broad sandy knolls on the east side of Clarksville Branch, a lower order tributary of Blackwater Creek and Indian River, near its confluence with another small unnamed creek (Figure 2). At the time of the excavations, in the fall and winter of 1989, the site was wooded with limited amounts of secondary growth. The site area has been subdivided into house lots and some preliminary clearing of the site had taken place.

The knolls throughout the site area are composed of well-drained sandy soils and are currently bordered by a poorly drained woodlands which grade into freshwater, and then brackish water, marshes moving downstream on Clarksville Branch and Blackwater Creek. Based on the coastal reconstructions shown in Figure 3, the site has never really been directly associated with tidal wetlands. Since 4000 BP (AD 900), the site would have been located within 4 km of the brackish wetlands near the ecotone between freshwater and saltwater environments. During this time period, the site would have been an especially good habitation area for prehistoric hunters and gatherers because they would have been able to exploit resources found in both brackish and freshwater environments without having to travel very far. Prior to 4000 BP (2000 BC), the site would have been located in an upland interior setting within a gallery forest that was probably always dominated by deciduous trees regardless of the surrounding matrix of woodlands (Table 1).

Research Design and Excavation Methods

Because the site area is scheduled for development in the immediate future, a major research goal of the excavations was to salvage as many artifacts and archaeological data as possible. Initial test excavations at the site showed that artifacts were present in some abundance and subsequent excavations focused on this area (Figure 33). A single large excavation block was opened in order to search for and recover archaeological materials from varied activity areas so that the duration and intensity of the prehistoric settlement at the site could be determined. Unfortunately, on-going development at the site makes it impossible to estimate original site boundaries or area and there is no way to tell what portion of the site we excavated. As was the case at 7S-K-46, excavation methods used at the site followed the standard excavation procedures used by the University of Delaware Center for Archaeological Research.

FIGURE 33
7S-K-75 – Final Site Map

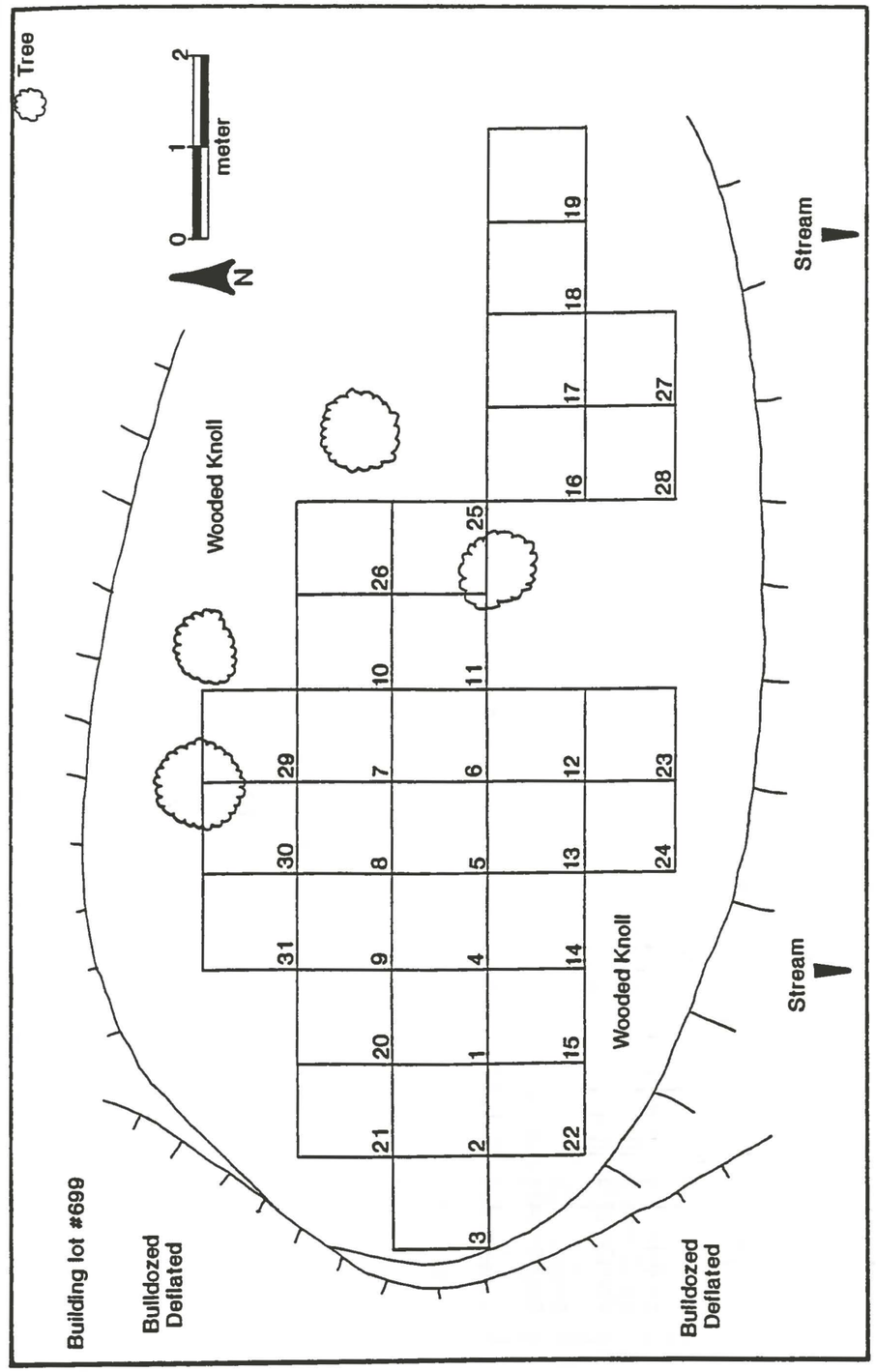


TABLE 16

7S-K-75 SUMMARY CATALOGUE

	Qzte	Qtz	Chert	Jas	Rhy	Arg	Chal	Other
flakes (cortex)	7(4)	2	43(20)	65(21)	606	3	159(4)	2
utilized flakes (cortex)	0	0	0	0	6	0	0	0
Woodland I points	0	0	0	0	0	2	0	0
Total	7(4)	2	43(20)	65(21)	612	5	159(4)	2
Sum Total: 895(49)								

fire-cracked rock (count and weight): 7 at 238 grams

prehistoric ceramics:
1 Coulbourn
9 Wolfe Neck
43 Townsend
3 Unidentified

miscellaneous:
9 burnt bone
2 pieces hematite
3 broken schist/hornblend cobble
12 pieces shell
1 piece nutshell
89 packets of charcoal

Key:
Qzte = Quartzite
Qtz = Quartz
Jas = Jasper
Rhy = Rhyolite
Arg = Argillite
Chal = Chalcedony
( ) = Cortex

Results of Excavations

Table 16 shows the summary catalogue for 7S-K-75. Figure 34 shows the total artifact distribution across the site and Figure 35 shows the distribution of ceramics and projectile points. Table 17 shows the vertical distribution of ceramics and Figure 36 shows the diagnostic projectile points and ceramics.

Examination of Table 16 shows that rhyolite debitage accounts for 64% of the artifact assemblage and Figure 34 shows that there is a pronounced concentration of this rhyolite debitage in Test Unit 8 in the north central section of the site. Moving away from Test Unit 8 in all directions, the artifact counts decrease dramatically and the distributional data suggest that most of the excavated area is a dispersed rhyolite chipping feature. Figure 35 shows that most of the ceramics from the site are located in the eastern set of test units and the eastern end of the site probably represents a separate and distinct activity area. Because the main artifacts from the eastern end of the site are ceramics with few lithic artifacts and no tools it is difficult to characterize the activities that took place in this area.

Two projectile point fragments are present in the chipping feature and these are small basal ends of argillite Fox Creek points (Figure 36). The breakage pattern just above the hafting element is characteristic of processing use as knives. The presence of the Fox Creek points would indicate a Carey/Late Carey Complex (ca. AD 500 - AD 1000) date for the rhyolite chipping feature. This date is consistent with other data from other sites which indicate that there was heavy utilization of rhyolite during Carey Complex times (Custer 1989:282-286). The presence of a few Townsend sherds in the chipping feature area are probably related to a later Woodland II Period Slaughter Creek Complex occupation of the site because Table 17 shows that most of the Townsend ceramics are located in Levels 1 and 2 and the bulk of the rhyolite debitage is located in Levels 3 and 4. Furthermore, the majority of the Townsend pottery is not associated with the chipping feature activity area (Figures 34 and 35).

It is interesting to note that all of the Townsend rim sherds found at the site are plain forms with no decoration. The absence of decorated rim varieties could suggest that the Woodland II Slaughter Creek Complex occupation of the site post-dates AD 1300 and is therefore quite distantly removed in time from the Carey Complex occupation.

FIGURE 34

7S-K-75 - Total Artifact Distribution Map

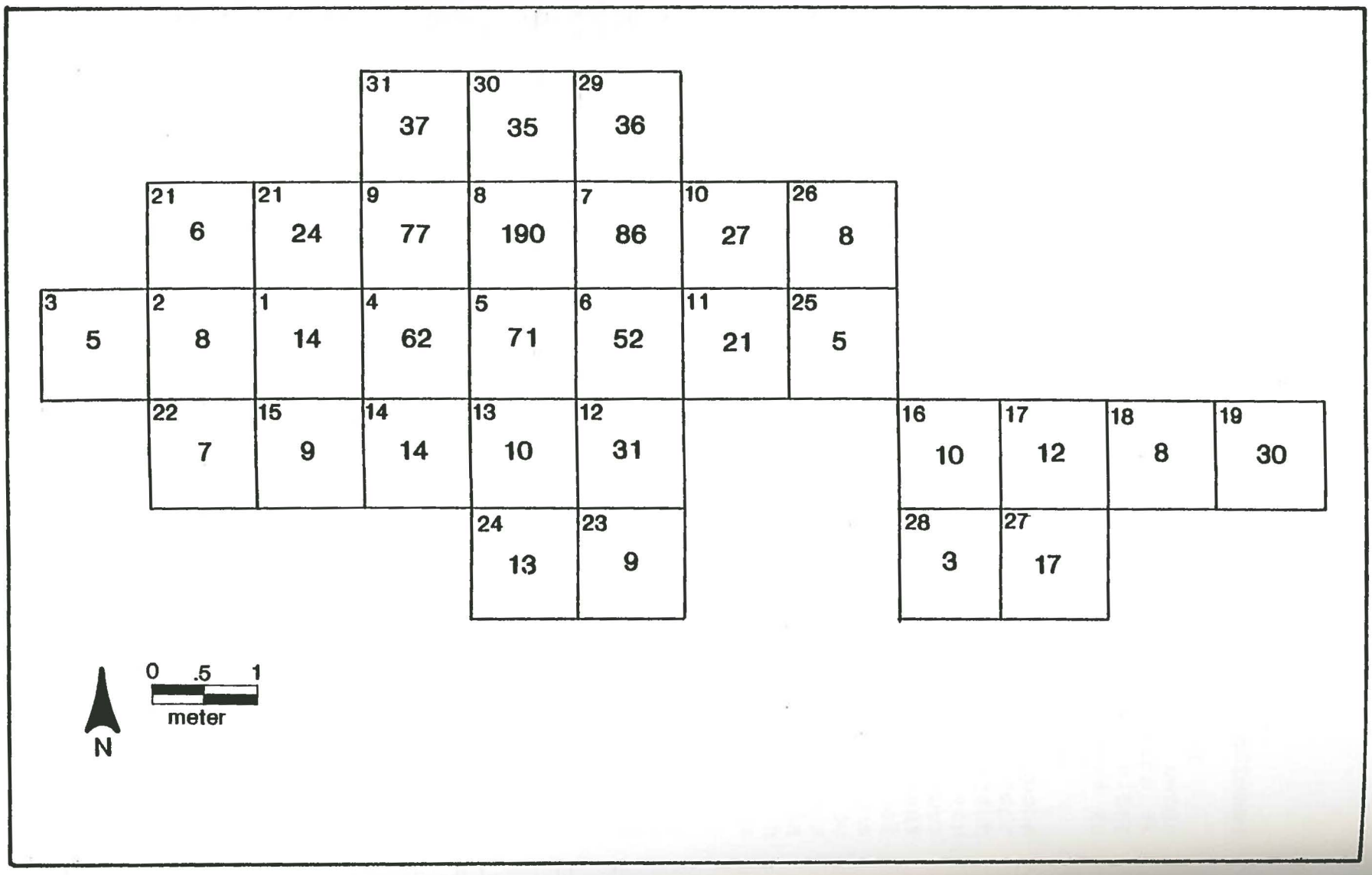


FIGURE 35

7S-K-75 - Ceramics and Points Distribution Map

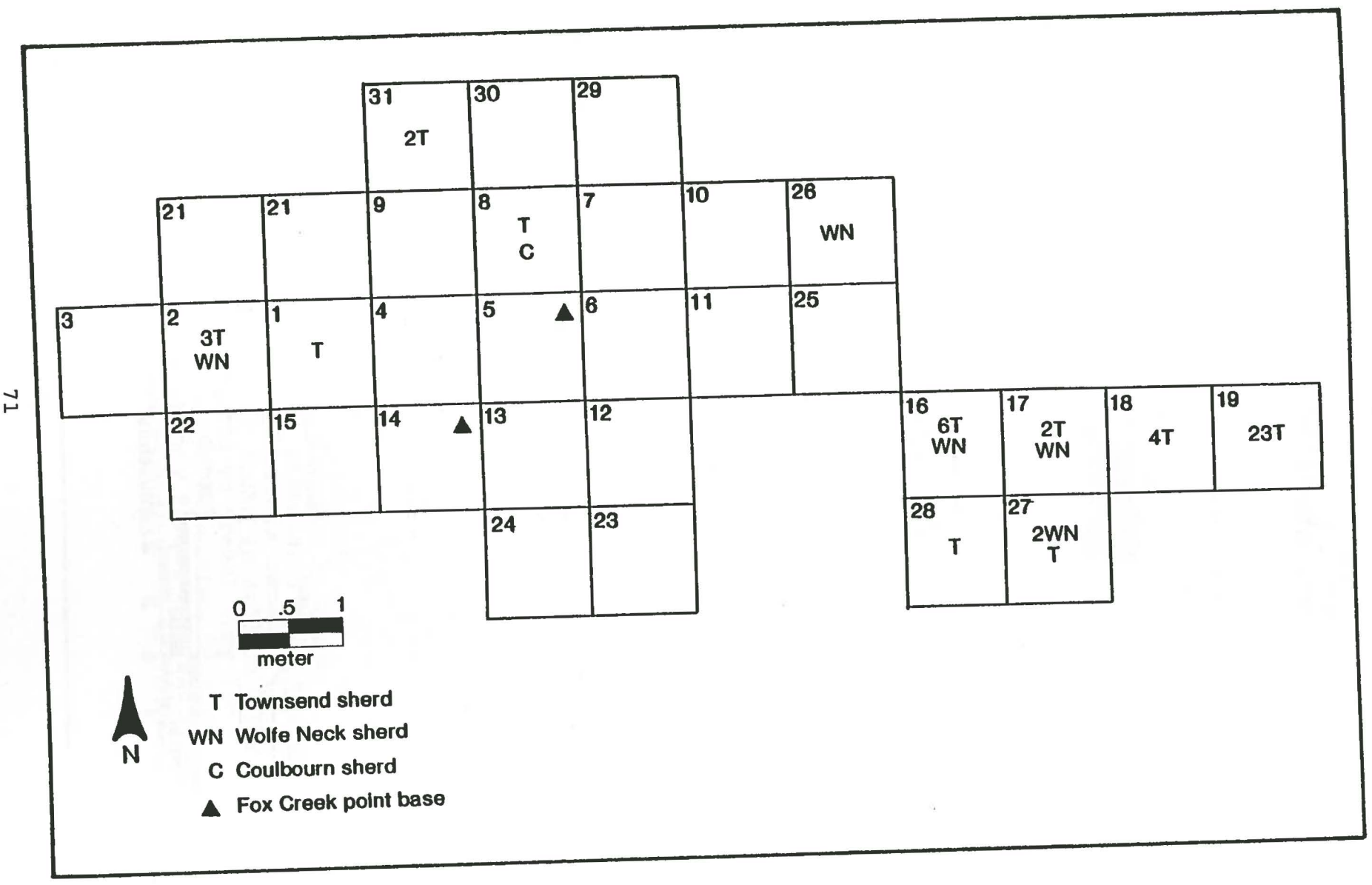


FIGURE 36

7S-K-75 - Diagnostic Points and Ceramics

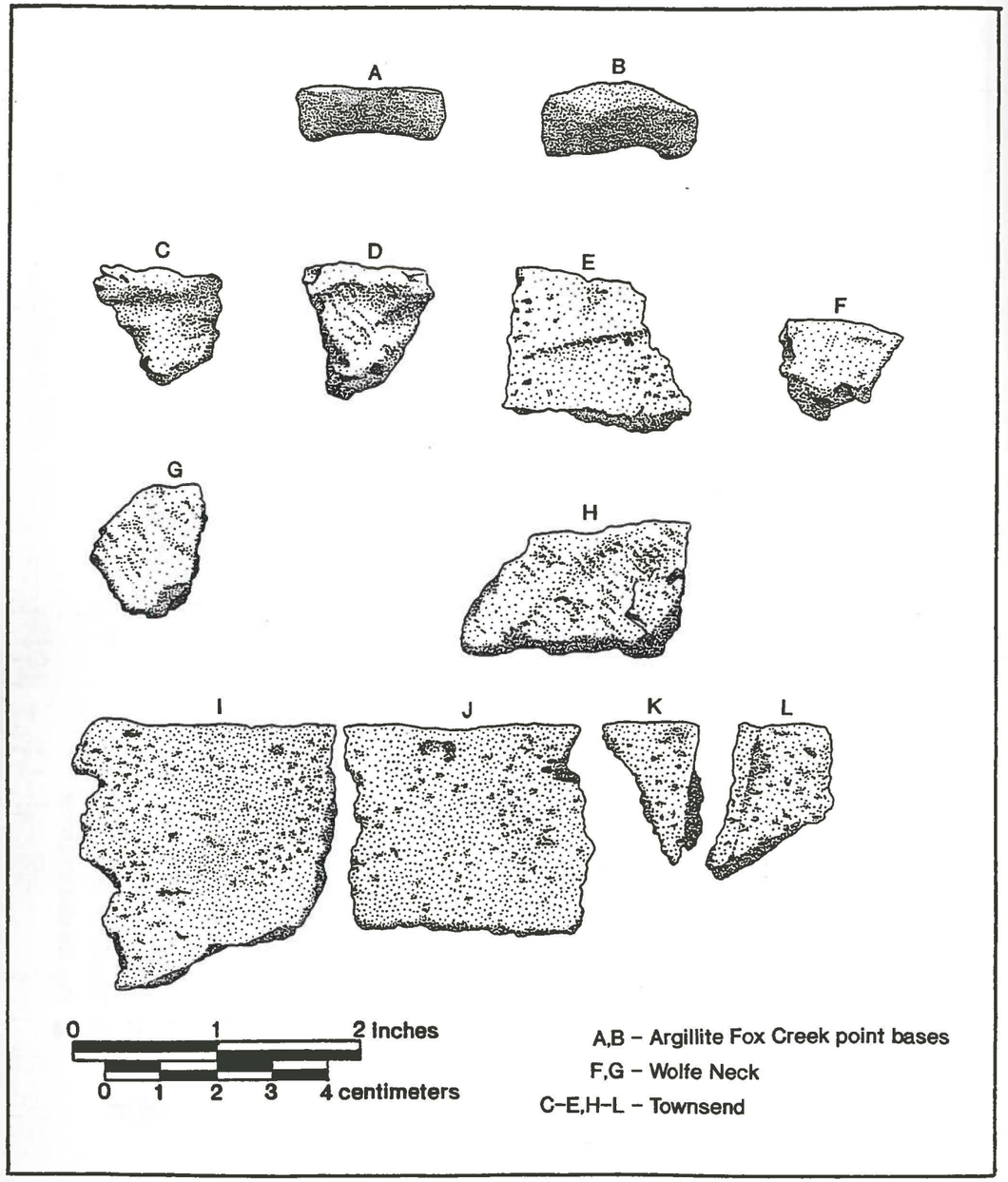


TABLE 17

7S-K-46, VERTICAL CERAMIC DISTRIBUTION

	Ceramic Types		
	Townsend/ Minguannan	Claggett/ Mockley	Wolfe Neck/ Coulbourn
Levels			
1	15	0	0
2	11	6	3
3	7	0	2
4	1	0	0
5	1	0	0

Site Setting

Site 7S-G-123 is located on the east bank of Arnell Creek, a lower order tributary of Rehoboth Bay, opposite the confluence of the creek and an unnamed tributary (Figures 2). At the time of the excavations, in the fall and winter of 1989, the site area had been graded for construction of houses.

The creek bank in the vicinity of the site area consists of well-drained sandy soils and are currently bordered by a poorly drained woodlands which grade into freshwater, and then brackish water, marshes moving downstream on Arnell Creek toward Rehoboth Bay. Based on the coastal reconstructions shown in Figure 3, the site has never really been directly associated with tidal wetlands. Since 4000 BP (AD 900), the site would have been located within 4 km of the brackish wetlands near the ecotone between freshwater and saltwater environments. During this time period, the site would have been an especially good habitation area for prehistoric hunters and gatherers because they would have been able to exploit resources found in both brackish and freshwater environments without having to travel very far. Prior to 4000 BP (2000 BC), the site would have been located in an upland interior setting within a gallery forest that was probably always dominated by deciduous trees regardless of the surrounding matrix of woodlands (Table 1).

Research Design and Excavation Methods

Because the site area was being destroyed by development at the time of excavation, the major research goal of the excavations was to salvage as many artifacts and archaeological data as possible. Initial surface collections of graded areas of the site showed that artifacts were present in some abundance in two areas on a slight knoll and subsequent excavations focused on these areas (Figure 37). By the time our excavations were complete, the site was completely destroyed. As was the case with the other two sites, excavation methods used at the site followed the standard excavation procedures used by the University of Delaware Center for Archaeological Research.

Results of Excavations

Northern Block. Two features were encountered in the northern excavation block of 7S-G-123 and their locations are noted in Figure 38. Figure 39 shows a cross section of Feature 1 which is a shallow basin shaped pit that was defined by abundant charcoal and organic-rich fill. Some hard clam (**Mercenaria mercenaria**) were also present in the fill along with burned nut shells and some charred seeds. There is no apparent stratification within the feature and its infilling seems to have been a single short-term depositional event. Approximately 50 sherds of Townsend ceramics were present in the feature and a cursory analysis of the sherds reveals that a least 3 vessels were present in the feature. Figure 40 shows sherds from the three vessels. One vessel (Figure 40 - Vessel A) has a wiped-over corded body treatment and relatively simple incised design motifs (RI3A variety of Rappahannock Incised - Custer 1989:303). Vessel B (Figure 40) has a smoothed body treatment and rather complex incised designs on the rim (combination of RI4a and RI5a varieties of Rappahannock Incised - Custer 1989:303). Vessel C has a corded body treatment and no incised designs at all. The co-occurrence of vessels with complex incised designs and vessels with no designs has been seen at other sites and indicates that this feature probably dates to the early part of the Slaughter Creek Complex (ca. AD 900 - 1300). Also included in Feature 1 were a bipitted hammerstone and the broken bit of an axe or celt. Only 4 pieces of cryptocrystalline debitage were present in the feature. Most likely, the feature was a small roasting pit for plant food processing.

Feature 2 is a large concentration of fire-cracked rock and a plan view of the feature is shown in Figure 41. The fire-cracked rock was abundant across an area of approximately 4 square meters, but was not a densely packed continuous mass. It is possible that the feature's present form represents a large platform hearth which had been disturbed through time; or, it may be a series of small hearths that were all mixed together. Figure 42 shows the distribution of lithic artifacts in this excavation block and Figure 43 shows the distributions of

FIGURE 37 – Final Site Map

7S-G-123

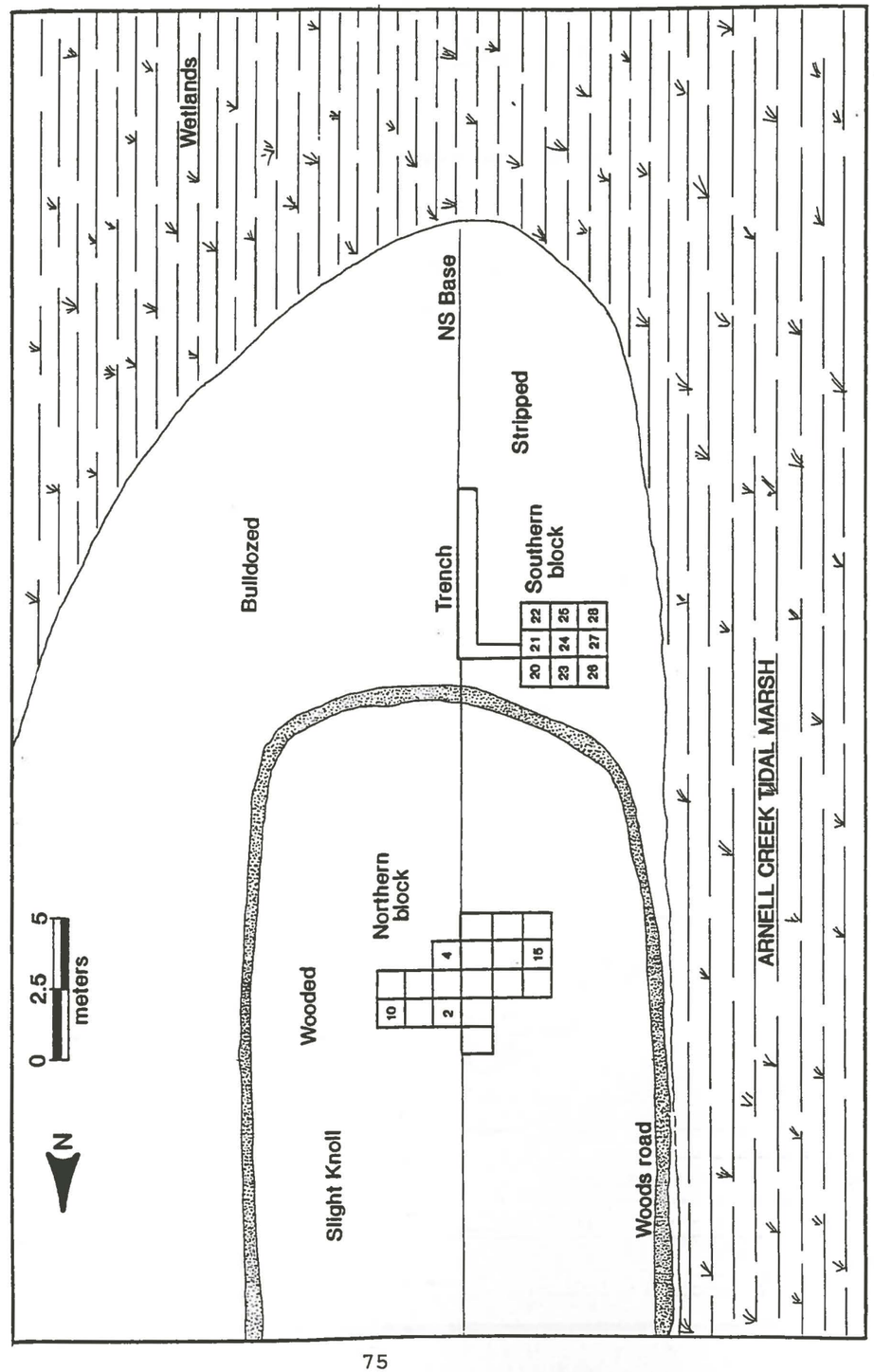


FIGURE 38

7S-G-123 - Feature Locations

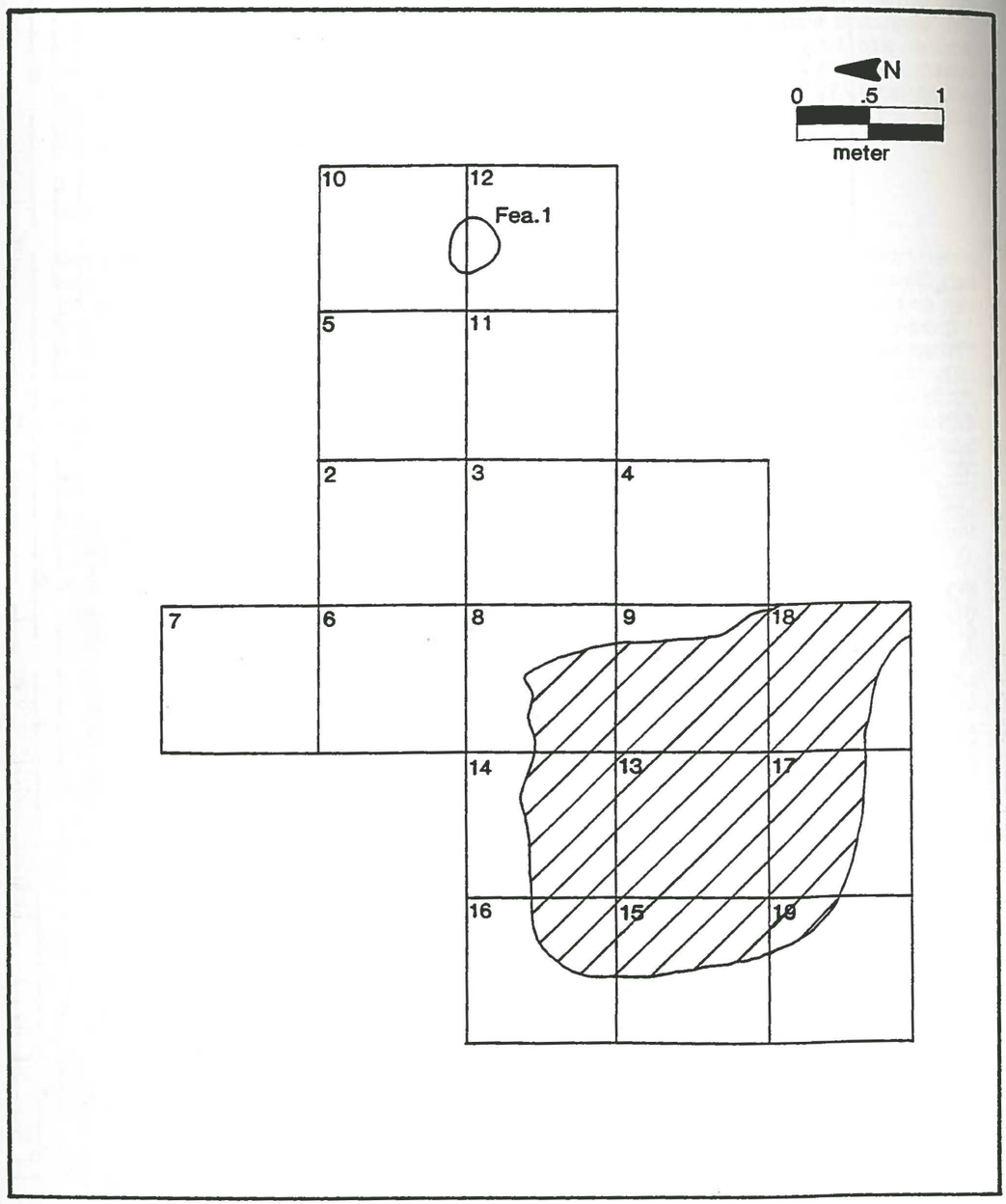


FIGURE 39

7S-G-123 - Feature I Cross Section

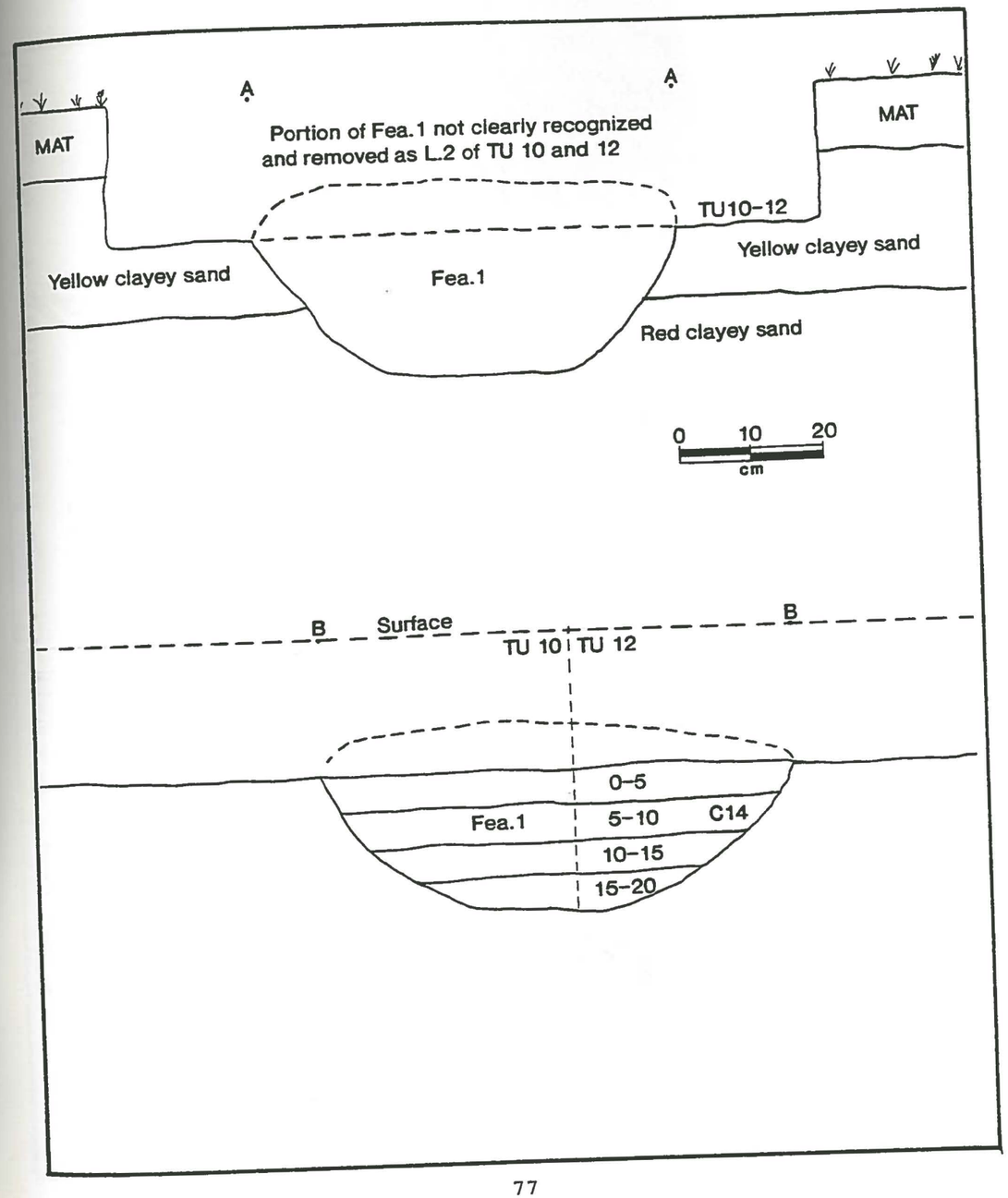


FIGURE 40A

7S-G-123 - Ceramic Sherds from Feature 1 - Vessel A

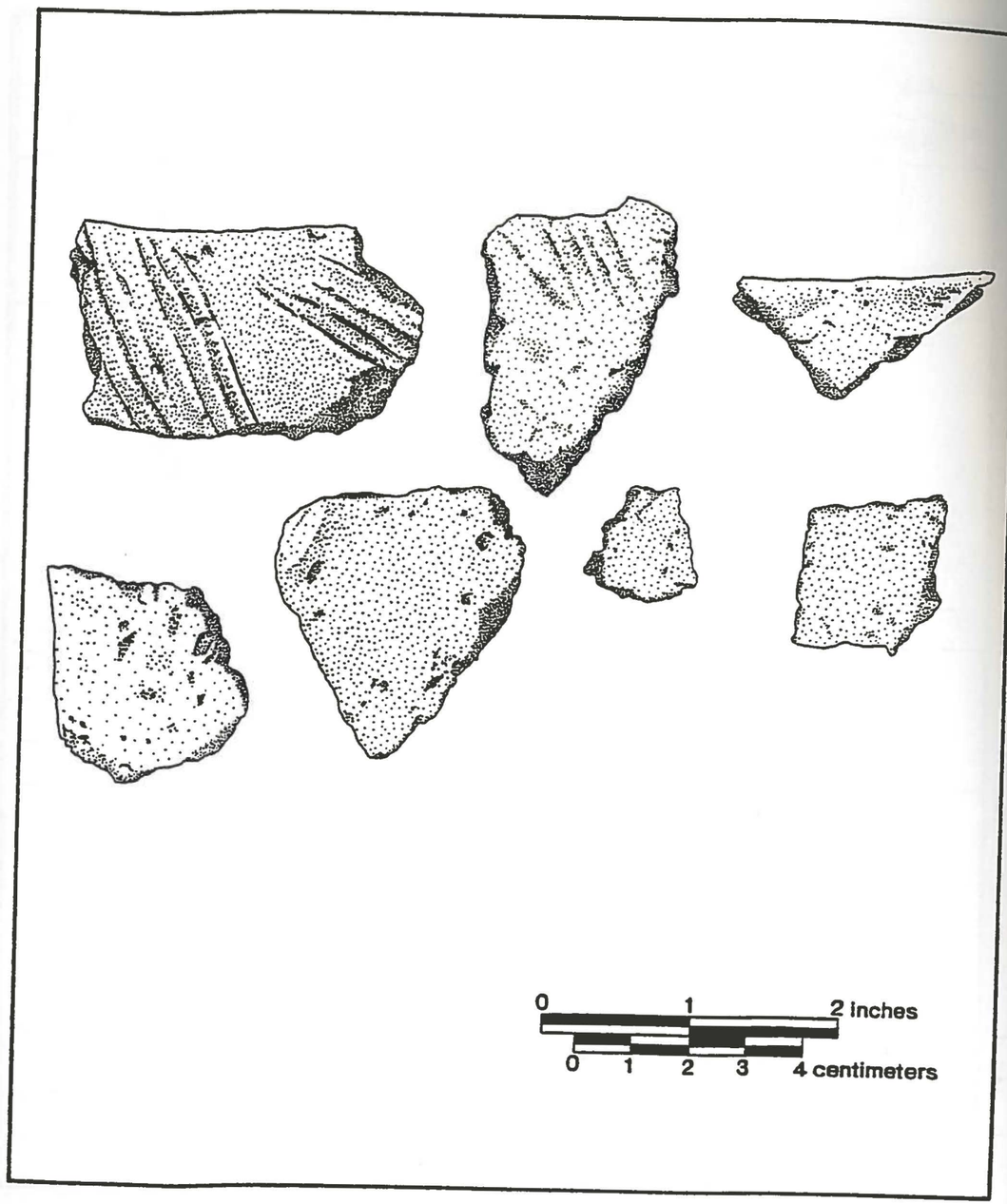


FIGURE 40 B

7S-G-123 – Ceramic Sherds from Feature 1 – Vessel B

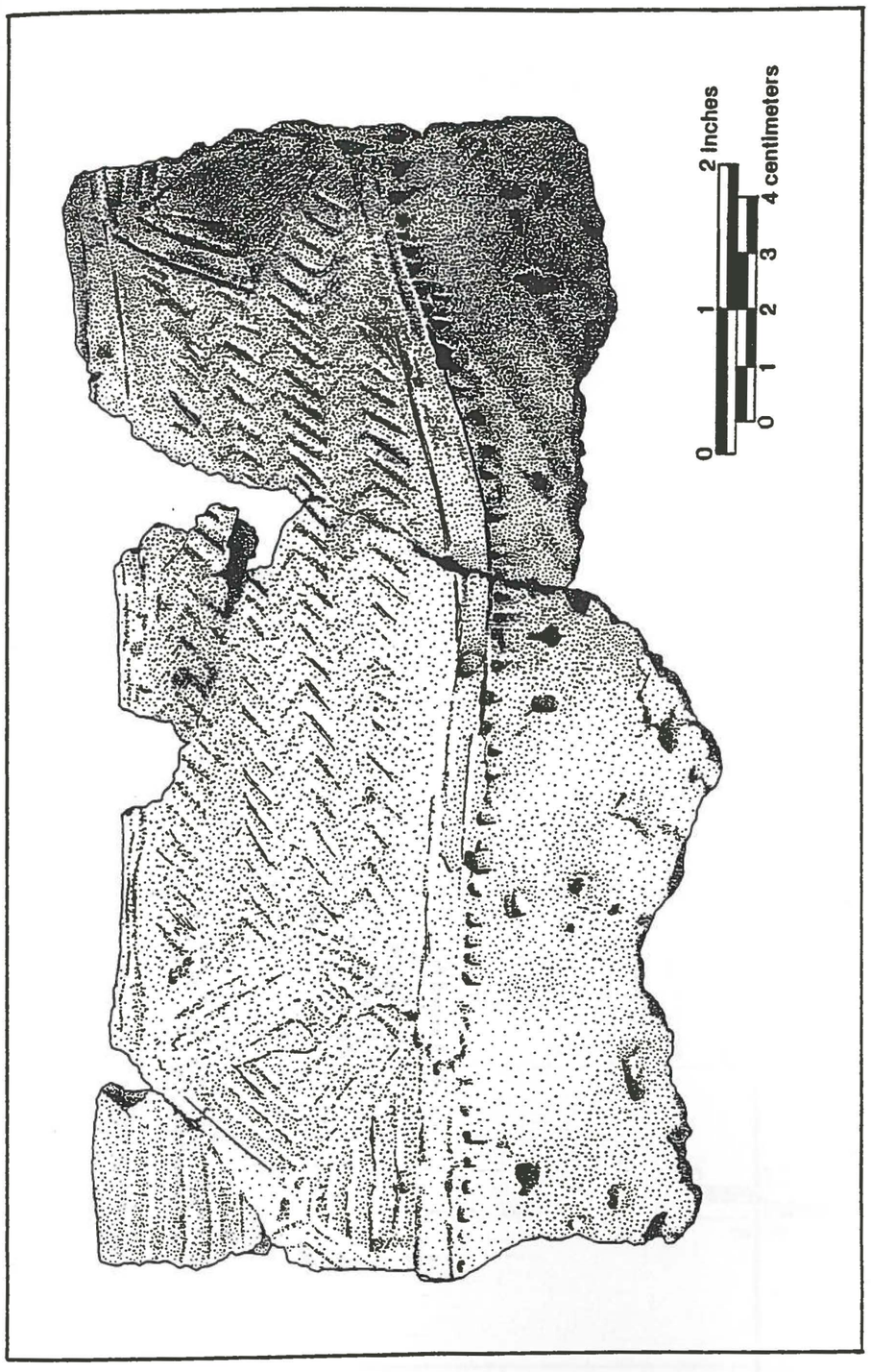


FIGURE 40C

7S-G-123 - Ceramic Sherds from Feature 1 - Vessel C

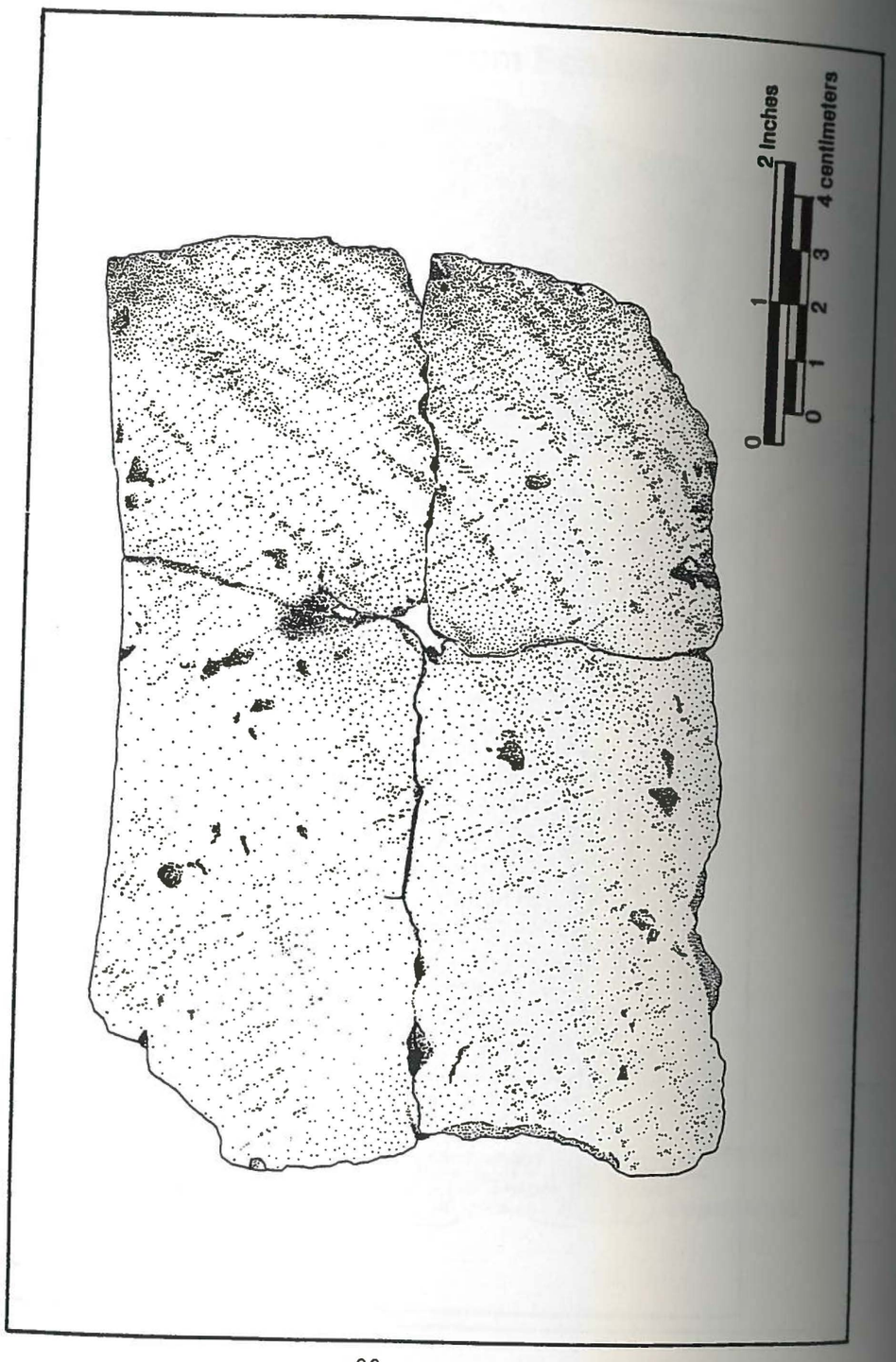


FIGURE 41

7S-G-123 - Plan View of Feature 2

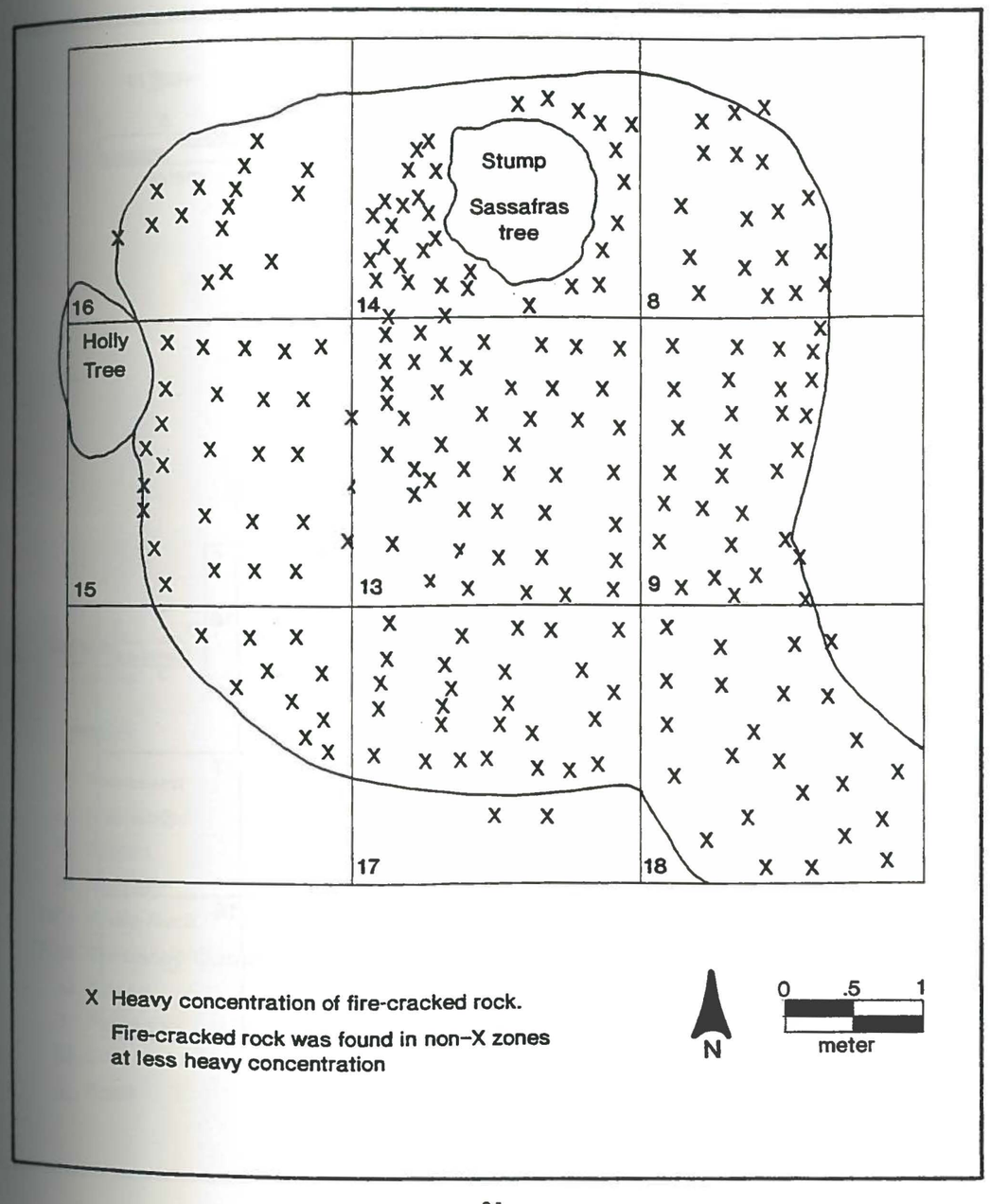


FIGURE 42

7S-G-123 - Lithic Artifact Distribution Map

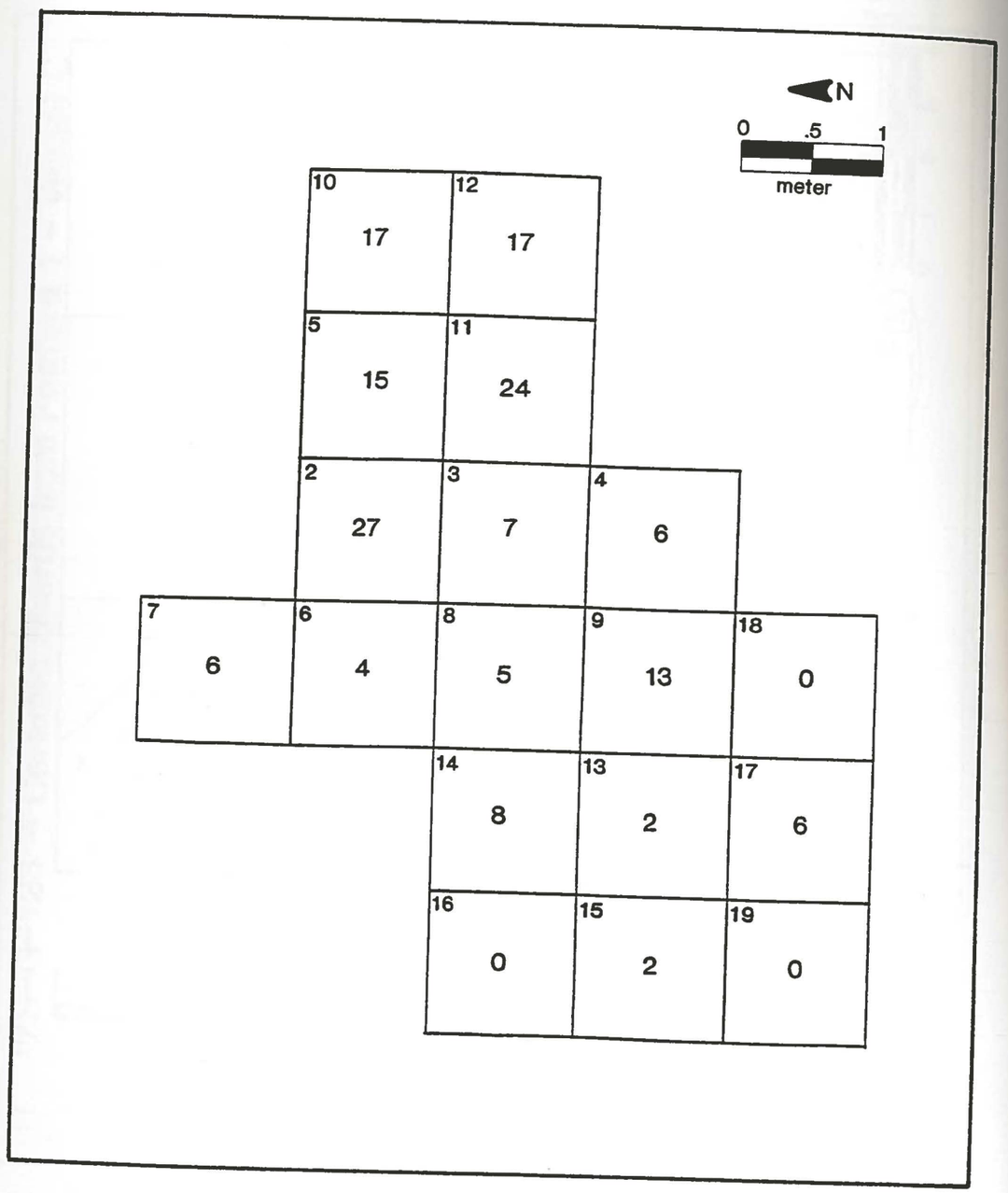


FIGURE 43

7S-G-123 - Ceramic and Tool Distribution Map

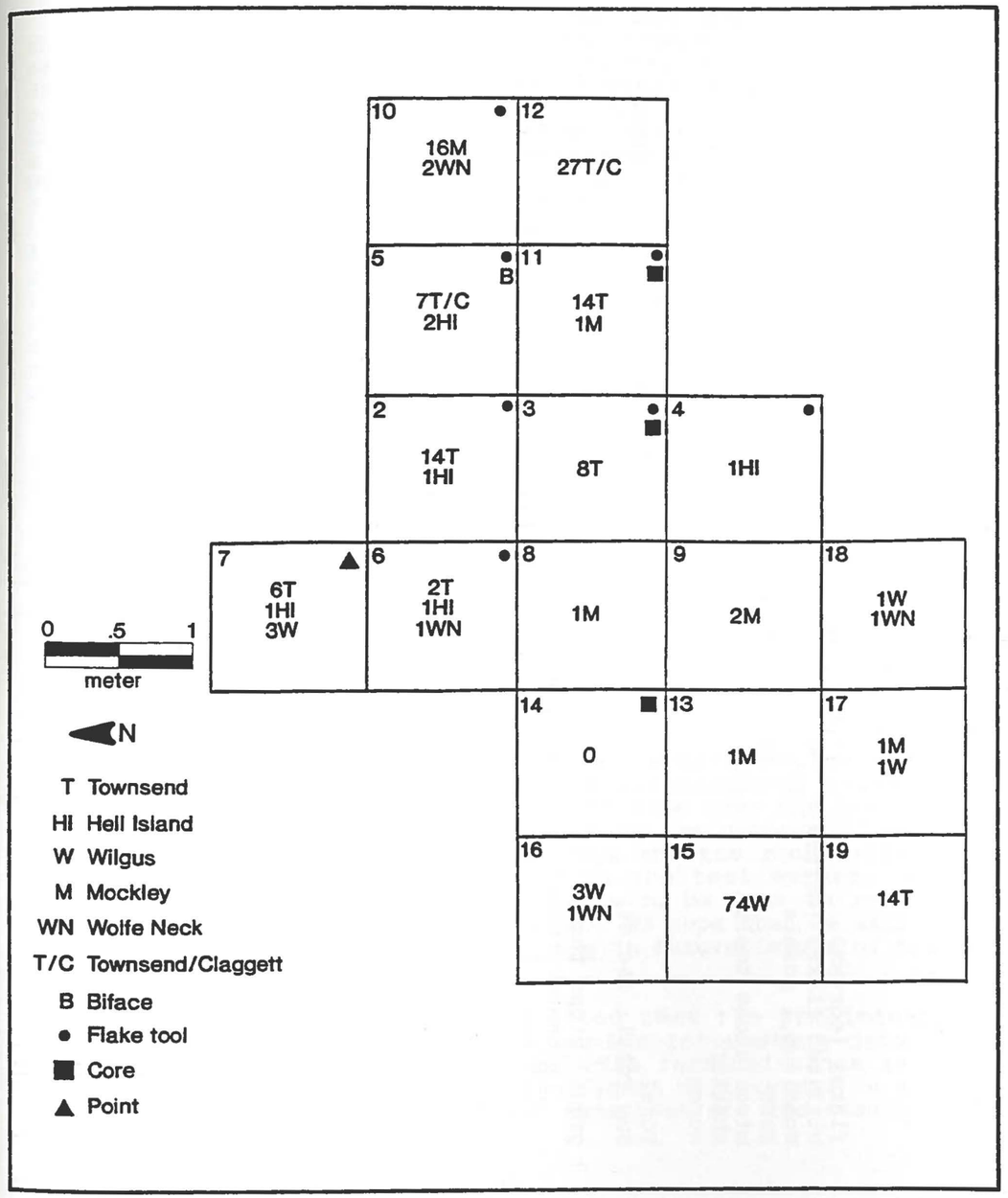


TABLE 18

7S-G-123 SUMMARY CATALOGUE

	Qzte	Qtz	Chert	Jas	Arg	Chal	Other
flakes (cortex)	27(18)	6(4)	55(29)	41(23)	5	13(5)	0
utilized flakes (cortex)	0	0	3(3)	3(2)	0	0	0
Woodland I points	1	0	0	0	0	0	0
ESBR	0	0	0	0	0	0	1(1)
misc. stone tools	0	0	1(1)	1(1)	0	0	0
shatter	1	2(1)	0	0	0	1	0
cores	0	0	0	3(1)	0	0	0
Total	29(18)	8(5)	59(33)	48(27)	5	14(5)	1(1)
Sum Total: 164(84)							

ground stone tools:
- 2 hammer stones (1 with charcoal staining)
- 1 axe bit fragment with charcoal staining)

fire-cracked rock (count and weight): 1101 at 30,575 grams

prehistoric ceramics:
- 6 Hell Island
- 84 Mockley
- 96 Townsend
- 65 Wilgus
- 1 possible Wilgus body
- 5 Wolfe Neck
- 27 Unidentified

Miscellaneous:
- 21 packets charcoal
- 2 large packets charcoal
- 2 packets charcoal and charred nuthulls
- 1 snail shell
- 1 packet bone fragments
- 11 hard shell clam fragments
- 1 bone fragment
- 1 bag of wet soil

Key:

Qzte = Quartzite
Qtz = Quartz
Jas = Jasper
( ) = Cortex
Arg = Argillite
Chal = Chalcedony

ceramics and lithic tools. It can be seen that few artifacts are found in the vicinity of Feature 2 except for a large concentration of Wilgus ceramic sherds found on the southern end of the excavation block. These sherds seem to be derived from a single vessel and would indicate that Feature 2 may date to the time period of the Delmarva Adena Complex (ca. 500 BC - 0 AD).

Based on the artifact associations, the two features from this excavation block represent different occupations of the site separated in time by more than 4 centuries. The southern area dates to ca. 500 BC - AD 0 (Delmarva Adena Complex) and the northern area dates to ca. AD 900 - 1300 (Slaughter Creek Complex). The southern area of the block, including Feature 2, is a hearth area with few associated artifacts except for a single Wilgus vessel. The northern area includes a plant processing feature and an associated artifact scatter of ceramics and flake tools that indicate that processing of other resources and some limited tool production may also have taken place in this area of the site. Table 18 shows a summary catalogue of the artifacts from this excavation block and it can be seen that debitage from cryptocrystalline cobbles comprise most of the lithic artifact assemblage. Probably the most common lithic reduction activity at the site was the reduction of cores derived from secondary cobbles.

Southern Block. This area of the site was extensively disturbed by grading and was flat-shovelled to see if any features were present. None were identified and no artifacts from **in situ** contexts were encountered.

The excavations at 7S-G-123 show that the site has at least two components spanning the later portion of the Woodland I Period and the early portion of the Woodland II Period. Unfortunately, the site has been nearly entirely destroyed by ongoing construction.

CONCLUSIONS

This report was intended only as a **very** preliminary description of the results of the archaeological research accomplished in Delaware's Atlantic Coast Zone over the last few years. In many ways we were overwhelmed by the numbers of sites identified in the reconnaissance surveys and the rich artifact and ecofact assemblages encountered in the test excavations. Clearly, there is much artifact analysis to be done to realize the full potential of these collections. We hope that we will be able to provide more results of analyses in future issues of this bulletin.

For the mean time, it can be noted that the preliminary levels of analysis described here provide interesting data on prehistoric lifeways in the region. The reconnaissance level surveys show that there are some significant differences in site densities through the Atlantic Coast zone that are the result of

prehistoric settlement decisions, not archaeological sample biases. Future research will be focused on trying to understand and explain these differences.

The test excavations, particularly at 7S-K-46, show that there are sites with stratified components in good context in the Atlantic Coast Zone. And, these sites need not be shell midden sites or sites with abundant sub-surface features. Aeolian deposition can produce stratified sites where components can be separated based on vertical provenience data. When these sites are excavated with sufficient care, we can separate out these components for individual analysis, such as was done for the two Paleo-Indian and one Archaic components at 7S-K-46. Future work at this site, and others, will be seeking to take greater advantage of these well-stratified contexts and isolate other later Woodland I and Woodland II components for analysis. Also, more detailed debitage analysis and ecofact analysis on the component level will go far to enhance our understanding of prehistoric human adaptations in the Delaware Atlantic Coast Zone. In sum, this report provides a "peek" at what we are beginning to learn about southern Delaware's prehistoric cultures.

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APPENDIX I

SITES FROM ATLANTIC COAST RECONNAISSANCE SURVEY

Site #	Quad	Description
7S-G-94	Frankford	Woodland I, Procurement
7S-K-42	Frankford	Woodland I, Micro Band Base Camp
7S-K-43	Frankford	Procurement
7S-K-44	Frankford	Procurement
7S-K-45	Frankford	Procurement
7S-K-46	Frankford	Base Camp
7S-K-47	Frankford	Micro Band Base Camp, Woodland I
7S-K-48	Frankford	----------
7S-K-49	Frankford	Woodland II, Procurement
7S-K-50	Frankford	Historic 19th Century Tenant
7S-K-51	Frankford	Procurement, Woodland I
7S-K-52	Frankford	Woodland I Base Camp
7S-G-96	Fairmont	19th Century Tenant
7S-G-97	Fairmont	Procurement
7S-G-98	Fairmont	Procurement
7S-G-99	Fairmont	Woodland I, Procurement
7S-G-100	Fairmont	Historic
7S-G-101	Fairmont	Historic
7S-G-102	Fairmont	Woodland I/II Base Camp
7S-G-103	Fairmont	Procurement
7S-G-104	Fairmont	Base Camp
7S-G-105	Fairmont	----------
7S-G-106	Fairmont	Woodland I Base Camp
7S-G-107	Fairmont	Historic 18th Century
7S-G-108	Fairmont	Procurement
7S-G-109	Fairmont	Procurement
7S-G-110	Fairmont	----------
7S-G-111	Fairmont	Procurement
7S-G-112	Fairmont	Micro Band Base Camp, Woodland I
7S-G-113	Fairmont	Procurement
7S-G-114	Fairmont	Micro Band Base Camp
7S-G-115	Fairmont	Procurement--Base Camp
7S-G-116	Fairmont	Procurement
7S-G-117	Fairmont	18th Century Tenant
7S-G-118	Fairmont	Procurement
7S-G-119	Bethany	Woodland I/II, Procurement
7S-K-53	Bethany	Woodland, Procurement
7S-K-54	Bethany	Procurement
7S-K-55	Bethany	Historic Cemetery
7S-K-56	Bethany	19th Century Tenant
7S-G-83	Bethany	Procurement
7S-G-120	Rehoboth	Procurement
7S-K-57	Selbyville	----------
7S-K-58	Selbyville	Procurement
7S-K-59	Selbyville	Woodland I, Procurement
7S-K-60	Selbyville	Procurement, Woodland I
7S-K-61	Assawoman	Procurement, Woodland II
7S-K-62	Assawoman	19th Century Tenant
7S-K-63	Assawoman	19th Century Tenant

APPENDIX I (cont.)

SITES FROM ATLANTIC COAST RECONNAISSANCE SURVEY

Site #	Quad	Description
7S-F-64	Millsboro	Procurement, Woodland I
7S-F-65	Millsboro	Procurement
7S-J-29	Millsboro	Procurement
7S-J-30	Millsboro	Procurement
7S-J-31	Millsboro	Procurement
7S-F-66	Millsboro	Procurement, Woodland II
7S-J-32	Millsboro	Procurement
7S-J-33	Millsboro	Procurement, Woodland II
7S-J-34	Millsboro	Procurement, Woodland II
7S-K-64	Millsboro	Procurement
7S-J-35	Whaleysville	Base Camp
7S-K-65	Frankford	----------
7S-K-66	Frankford	Woodland I/II, Procurement
7S-G-121	Rehoboth	Woodland II/Procurement
7S-G-122	Rehoboth	----------
7S-K-67	Selbyville	----------
7S-G-123	Fairmont	Woodland I/II, Base Camp
7S-G-125	Fairmont	18th Century Historic
7S-G-124	Fairmont	Woodland I/II, Base Camp
7S-K-68	Selbyville	19th Century Historic
7S-K-67	Selbyville	Procurement
7S-K-70	Selbyville	Woodland II/Base Camp
7S-K-71	Frankford	Procurement
7S-K-72	Frankford	Procurement
7S-K-73	Frankford	Procurement
7S-F-69	Harbeson	Procurement, Woodland I
7S-F-70	Harbeson	Base Camp, Woodland I
7S-G-126	Fairmont	19th Century
7S-G-127	Fairmont	Procurement
7S-G-128	Rehoboth	Procurement
7S-G-129	Fairmont	Procurement
7S-G-130	Fairmont	Historic
7S-K-75	Frankford	Base Camp
7S-K-76	Frankford	----------
7S-K-77	Frankford	----------
7S-K-78	Frankford	Procurement

APPENDIX II: SITES FROM LITTLE ASSAWOMAN BAY RECONNAISSANCE SURVEY

Site #	Quad	Description
001	Bethany	Prehistoric, Undetermined
002	Bethany	Late 19th Century
003	Assawoman	19th Century Cemetery
004	Assawoman	Prehistoric, Undetermined
005	Selbyville	Prehistoric, Undetermined
006	Assawoman	Late 19th and 20th Century
007	Assawoman	Prehistoric, Undetermined
008	Selbyville	Prehistoric, Undetermined/ Historic, Mid to Late 19th Century
009	Selbyville	Late 19th Century
010	Selbyville	Late 19th, Early 20th Century
011	Selbyville	Late 19th Century
012	Selbyville	Historic, Undetermined
013	Selbyville	Late 19th, Early 20th Century
014	Selbyville	Late 19th Century
015	Selbyville	Late 19th Century
016	Selbyville	Historic, Undetermined
017	Selbyville	Prehistoric, Undetermined
018	Selbyville	Prehistoric, Undetermined
019	Selbyville	Historic, Undetermined
020	Selbyville	Historic, Undetermined
021	Selbyville	Late 19th, Early 20th Century
022	Selbyville	Late 19th, Early 20th Century
023	Selbyville	Late 19th, Early 20th Century
024	Selbyville	Late 19th, Early 20th Century
025	Selbyville	Late 19th, Early 20th Century
026	Selbyville	Late 19th, Early 20th Century
027	Selbyville	Historic, Undetermined
028	Selbyville	20th Century
029	Selbyville	Late 19th, Early 20th Century
030	Selbyville	Historic, Undetermined
031	Selbyville	Historic, Undetermined
032	Selbyville	Historic, Undetermined
033	Selbyville	Late 19th Century
034	Selbyville	Late 19th, Early 20th Century
035	Selbyville	19th or 20th Century
036	Selbyville	Historic, Undetermined
037	Selbyville	19th or 20th Century
038	Selbyville	19th or 20th Century
039	Selbyville	20th Century
040	Selbyville	Historic, Undetermined
041	Selbyville	Historic, Undetermined
042	Selbyville	Historic, Undetermined
043	Selbyville	19th or 20th Century
044	Selbyville	Historic, Undetermined
045	Selbyville	Historic, Undetermined
046	Selbyville	19th or 20th Century
047	Selbyville	Historic, Undetermined

APPENDIX II (cont.)

Site #	Quad	Description
048	Assawoman	19th or 20th Century
049	Selbyville	Historic, Undetermined
050	Selbyville	Historic, Undetermined
051	Selbyville	19th or 20th Century
052	Selbyville	Historic
053	Assawoman	Historic
054	Assawoman	Historic
055	Assawoman	Historic
056	Assawoman	Historic
057	Assawoman	19th Century Cemetery
058	Assawoman	19th or 20th Century
059	Assawoman	19th or 20th Century
060	Assawoman	19th or 20th Century
061	Assawoman	Prehistoric, Undetermined
062	Assawoman	20th Century
063	Assawoman	Historic
064	Frankford	19th or 20th Century
065	Frankford	Historic, Undetermined
066	Selbyville	19th Century
067	Selbyville	Historic
068	Selbyville	19th or 20th Century
069	Selbyville	19th or 20th Century
070	Selbyville	19th or 20th Century
071	Selbyville	19th or 20th Century
072	Selbyville	19th or 20th Century
073	Selbyville	19th or 20th Century
074	Selbyville	19th or 20th Century
075	Selbyville	19th or 20th Century
076	Selbyville	19th or 20th Century
077	Selbyville	19th or 20th Century
078	Selbyville	19th or 20th Century
079	Selbyville	19th or 20th Century
080	Selbyville	19th or 20th Century
081	Selbyville	19th or 20th Century
082	Selbyville	19th or 20th Century
083	Selbyville	19th or 20th Century
084	Selbyville	19th or 20th Century
085	Selbyville	19th or 20th Century
086	Selbyville	19th or 20th Century
087	Selbyville	19th or 20th Century
088	Selbyville	19th or 20th Century
089	Selbyville	19th or 20th Century
090	Selbyville	19th or 20th Century
091	Selbyville	19th or 20th Century
092	Selbyville	19th or 20th Century
093	Frankford	19th or 20th Century
094	Frankford	19th or 20th Century
095	Frankford	19th or 20th Century
096	Frankford	19th or 20th Century
097	Frankford	19th or 20th Century

APPENDIX II (cont.)

Site #	Quad	Description
098	Frankford	19th or 20th Century
099	Frankford	19th or 20th Century
100	Frankford	Prehistoric, Undetermined
101	Frankford	19th or 20th Century
102	Frankford	19th or 20th Century
103	Frankford	19th or 20th Century
104	Frankford	19th or 20th Century
105	Frankford	19th or 20th Century
106	Bethany Beach	19th or 20th Century
107	Bethany Beach	19th or 20th Century
108	Bethany Beach	19th or 20th Century
109	Bethany Beach	19th or 20th Century
110	Bethany Beach	19th or 20th Century
111	Bethany Beach	19th or 20th Century
112	Bethany Beach	19th or 20th Century
113	Bethany Beach	19th or 20th Century
114	Bethany Beach	19th or 20th Century
115	Bethany Beach	19th or 20th Century
116	Bethany Beach	19th or 20th Century
117	Bethany Beach	19th or 20th Century
118	Bethany Beach	19th or 20th Century
119	Bethany Beach	19th or 20th Century
120	Assawoman	19th or 20th Century
121	Assawoman	19th or 20th Century
122	Selbyville	20th Century
123	Selbyville	20th Century
124	Selbyville	19th or 20th Century
125	Selbyville	19th or 20th Century
126	Selbyville	19th or 29th Century
127	Selbyville	19th or 20th Century
128	Selbyville	19th or 20th Century
129	Selbyville	19th or 20th Century
130	Selbyville	19th or 20th Century
131	Selbyville	19th or 20th Century
132	Selbyville	19th or 20th Century
133	Selbyville	19th or 20th Century
134	Selbyville	19th or 20th Century
135	Selbyville	19th or 20th Century
136	Selbyville	19th or 20th Century
137	Selbyville	19th or 20th Century
138	Selbyville	19th or 20th Century
139	Selbyville	19th or 20th Century
140	Selbyville	19th or 20th Century
141	Selbyville	Late 18th Century
142	Selbyville	20th Century
143	Selbyville	20th Century
144	Selbyville	19th or 20th Century
145	Selbyville	Early 20th Century
146	Selbyville	Early 20th Century
147	Selbyville	Early 20th Century

APPENDIX II (cont.)

Site #	Quad	Description
148	Selbyville	Early 20th Century
149	Selbyville	Early 20th Century
150	Selbyville	Early 20th Century
151	Selbyville	Early 20th Century
152	Selbyville	Early 20th Century
153	Assawoman	Late 19th, Early 20th Century
154	Assawoman	Late 19th, Early 20th Century
155	Assawoman	Late 19th, Early 20th Century
156	Assawoman	Late 19th, Early 20th Century
157	Assawoman	Late 19th, Early 20th Century
158	Bethany Beach	Early 20th Century
159	Bethany Beach	Prehistoric, Undetermined
160	Selbyville	Prehistoric, Undetermined
161	Selbyville	20th Century
162	Selbyville	20th Century
163	Frankford	20th Century
164	Selbyville	20th Century
165	Selbyville	20th Century
166	Selbyville	20th Century
167	Frankford	20th Century
168	Frankford	20th Century
169	Frankford	Late 19th, Early 20th Century
170	Frankford	Late 19th, Early 20th Century
171	Frankford	Late 19th, Early 20th Century
172	Frankford	Late 19th, Early 20th Century
173	Frankford	Historic, Late 18th, Early 19th Century Prehistoric, Undetermined
174	Frankford	Late 19th, Early 20th Century
175	Frankford	20th Century