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by:

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INTRODUCTION

The purpose of this report is to provide a summary of the available information on the prehistoric archaeology of the area surrounding Churchmans Marsh in northern New Castle County, Delaware (Figure 1). Although the Churchmans March vicinity has been the focus of intensive research by both avocational and professional archaeologists for many years, no overall summary of the results of this research has ever been published. Since 1979, the University of Delaware Department of Anthropology, funded by the Survey and Planning Grant Program of the Delaware Division of Historical and Cultural Affairs, has been conducting a review of the available archaeological and geomorphological data from the area (Custer 1980, 1981) as well as field research. This report will summarize the results of this review and research and will present an analysis of the development of Churchmans Marsh and its surrounding environments, a presentation of the data on the archaeological sites surrounding the marsh, and a summary of the trends in prehistoric human adaptations in the area.

DEVELOPMENT OF CHURCHMANS MARSH AND SURROUNDING ENVIRONMENTS

The size and shape of Churchmans Marsh are constantly changing at present and have been changing for the past several thousand years. Located between Wilmington and Newark along Interstate Route 95 (Figure 2), much of the recent change in the marsh is due to modern development (Daiber et al. 1976). However, in the past, changes in the marsh's configuration can be related to factors such as sea level rise and late Quaternary climatic change. The geologic setting of Churchmans Marsh provides the basis for understanding the effects of these changes and is described below.

Located in the High Coastal Plain, Churchmans Marsh is the largest of several tidal marshes that extend from the confluence of the White Clay Creek and Christina River to the mouth of the Christina River below Wilmington (Daiber et al. 1976). Althougn little geological research has been carried out specifically to determine the origins of the marsh itself, numerous geological studies for other purposes reveal much about the development of Churchmans

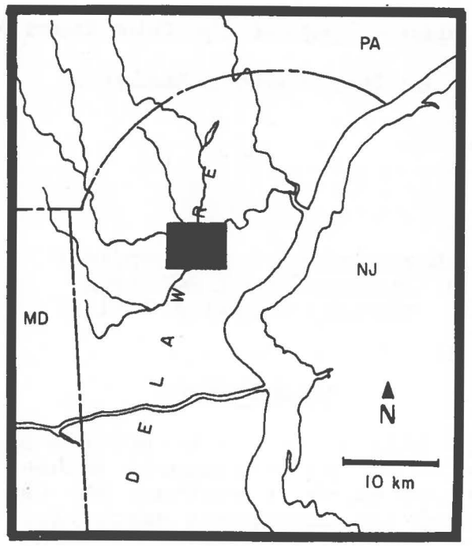

Figure 1: Study Area Location

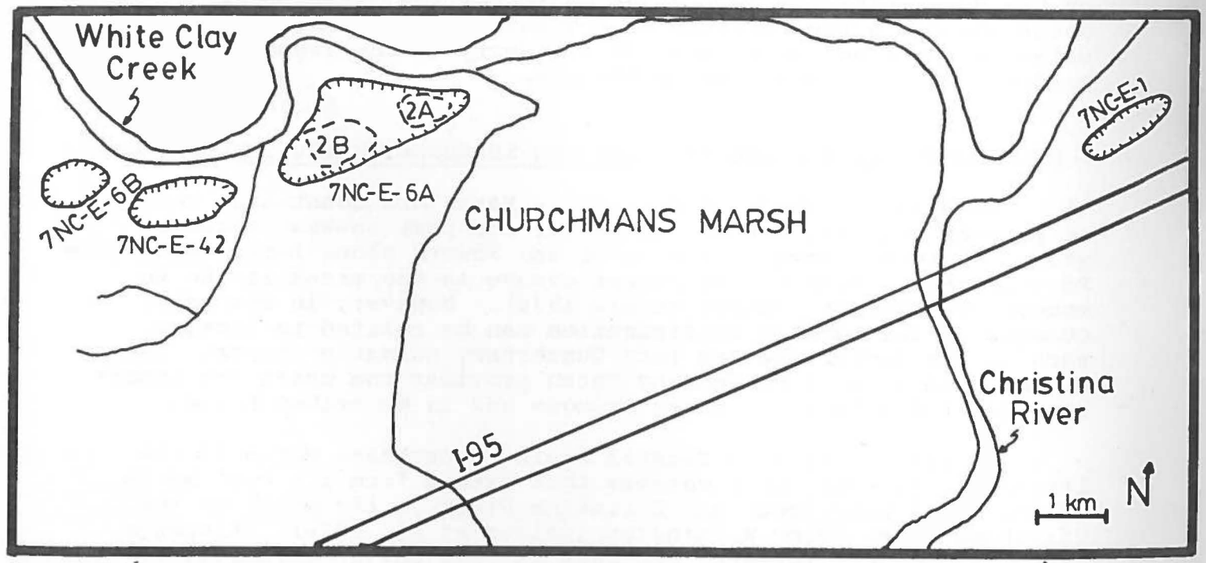

Figure 2: Site Locations in Churchmans Marsh Vicinity

Marsh. The United States Geological Survey Hydrologic Investigations Atlas series (Adams and Boggess 1964; Boggess and Adams 1963) notes that the sediments in the vicinity of the marsh include fluvial, lacustrine, paludal, and aeolian deposits of Pleistocene age in the headlands west of the Marsh (Figure 2), fluvial deposits of Cretaceous age and weathered gneiss at the margin of the headlands and the marsh and at the base of the stream channels of the White Clay Creek and Christina River; and marine tidal marsh sediments in the marsh itself. Delaware Geological Survey maps of the area (Woodruff and Thompson 1972, 1975) also indicate that the sediments surrounding Churchmans Marsh belong to the Potomac Formation which is Cretaceous in age and consists of variegated red, gray, purple, yellow, and white lignitic silts and clays containing interbedded sands and gravels. Unfortunately, neither of these descriptions provides information sufficiently specific to allow the study of the marsh's development. However, test drillings by the Delaware Department of Transportation (1959) for the construction of I-95, which crosses Churchmans Marsh, provide more specific data.

Figure 3 shows a geologic cross section of a portion of the western headlands and the marsh itself developed from the I-95 drillings. The headlands are capped by modern plowzones (Horizon II) with some underlying developing horizons. These modern soils contain most of the prehistoric archaeological deposits and will be discussed later in the report. Beneath the modern soils of the headlands are a series of well-developed illuviated argillic soils (Horizon III) which contain some gravels. Most of these argillic soils include the Pleistocene fluvial and aeolian soils described earlier (Boggess and Adams 1963). These compact silts and sands grade into Horizon V which includes a series of Pleistocene sands with extensive gravel and cobble deposits. Finally, the headlands are underlain by Cretaceous clays (Horizon IV) and Potomac Formation sands (Horizon VI). In the marsh area, modern tidal marsh deposits (Horizon I) are underlain by well-developed illuviated argillic horizons comparable to the previously described Horizon III in the headland area. However, these illuviated soils are much thinner in the marsh area and are immediately underlain by the Cretaceous clays (Horizon IV) and Potomac Formation sands (Horizon VI). No Pleistocene gravels (eg.- Horizon V) are present in the marsh area. In general, the cross-section described above was confirmed by a series of test excavations conducted along the headland margin in the summer of 1980 (Custer 1980:292-300).

The geologic cross-section described above provides some preliminary indications of the geomorphological processes that created Churchmans Marsh. The modern headlands are significantly higher in elevation than the adjacent marsh because of the presence of the extensive Pleistocene gravel deposits. These deposits are relatively erosion-resistant, compared to other local deposits, and are not present in the marsh area. Consequently, the low-lying area of marsh is developed upon a highly eroded base of

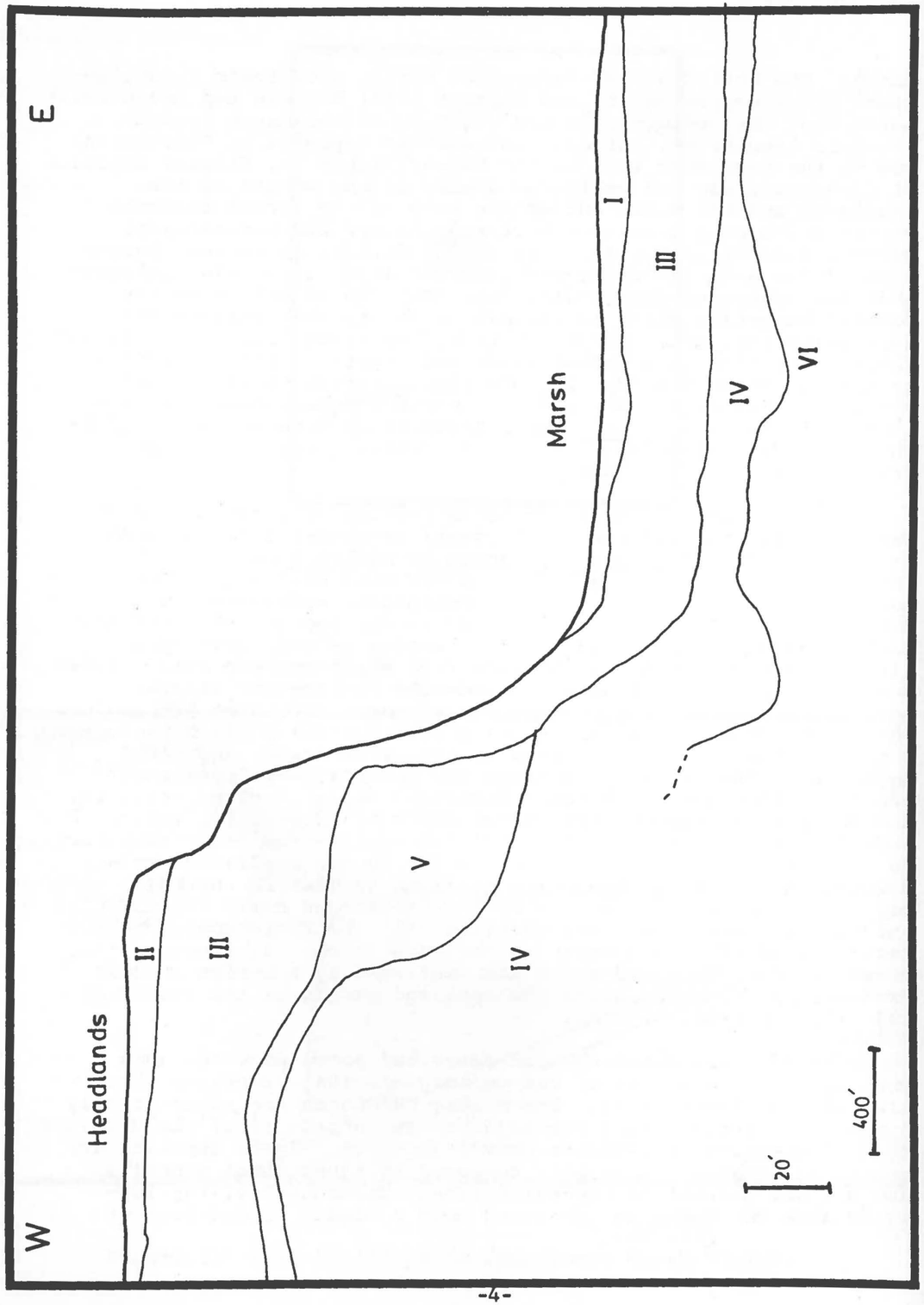

Figure 3: Geological Cross-Section of Churchmans Marsh

Key to Figure 3

Horizon I - Modern marsh deposits (soft, grey, organic silty clay with decayed vegetation)

Horizon II - Modern plow zone (brown silty clay, clay loam, or sandy clay)

Horizon III - Developing illuviated soils (light brown compact sand and silt with some gravel; silts and sands may be wind-blown in origin)

Horizon IV - Cretaceous clays (red, grey stiff to hard mottled clay and silty clay)

Horizon V - Pleistocene sands and gravels (medium compact light yellow brown sand and silty clay with much coarse gravel)

Horizon VI - Potomac Formation (fine multi-color micaceous sands)

Source: Delaware Department of Transportation 1959

Cretaceous clays. The presence of a series of well-developed illuviated soils (Horizon III) in both marsh and headland areas indicates that both areas were subject to aeolian and some alluvial deposition more than 10,000 years ago (John Foss, University of Maryland Soils Laboratory, personal communication). Finally, poorly drained conditions developed in the marsh area and more aeolian deposition occurred in the headland areas. Given the fact that poorly drained conditions developed in the local area after the end of the Pleistocene (ca 10,000 years ago); it is hypothesized that these poorly drained conditions are related to post-Pleistocene sea level rise. Studies of similar swamp/marsh complexes in the Middle Atlantic, including Mattawoman and Zekhiah Swamps in the Lower Potomac River Valley of Maryland (Gardner 1976) and Dismal Swamp in Virginia and North Carolina (Rappleye and Gardner 1979; Whitehead 1972) have revealed how sea level rise is related to swamp/marsh formation processes. As sea level rises, interior water tables rise. When the water tables breech impermeable sediments, water is trapped on or near the surface of the ground. In the Churchmans Marsh case, local sea level rise and its effects on water tables have been documented (Belknap and Kraft 1977). Also, the Cretaceous clays provide the impermeable sediments to trap surface water (Boggess and Adams 1963). Therefore, it is suggested here that the formation of swamp/marsh conditions at Churchmans Marsh occurred in early Holocene times (ca 8000 - 6000 BC) when local water tables breeched the Cretaceous clays. More exact dating of these processes will be derived later from studies of the archaeological remains.

A review of the soils mapped by the Soil Conservation Service in the headlands area (Matthews and Lavoie 1970) indicate that by ca 6000 BC the basic drainage characteristics of the headlands and the marsh had stabilized. This stabilization is indicated by the presence of the well-developed argillic horizons and fragipan soils found throughout the headland areas. However, the stabilization does not imply a uniform series of soils and environments. Soils of the headlands are classified according to a variety of different drainage characteristics (Matthews and Lavoie 1970) and Figure 4 shows the distribution of well-drained and poorly-drained soils in the study area. These distributions of varied soils can be used to reconstruct past environments surrounding Churchmans Marsh.

In general, the well-drained soils noted in Figure 4 are likely to support either deciduous woodlands, open woodlands, or grasslands. Poorly-drained soils, on the other hand, support only woodlands (Allan et al. 1963). Combining these soil ratings with pollen analysis leads to a detailed reconstruction of the local paleoenvironment. Paleoenvironments are the result of interactions among climatic factors and edaphic factors (Odum 1971:264). Pollen data reveal climatic factors while the soil data indicated above reveal edaphic factors. The pollen record for northern Delaware has been described elsewhere (Custer and Wallace 1982; Custer et al. 1981; Custer n.d.) and are summarized below by climatic episodes along with the projected plant community distributions for the marsh environs.

Late Glacial Episode (12,000 BC - 8000 BC) - A mosaic of boreal forests, deciduous forests, and grasslands would be found throughout the marsh and headlands. Grasses and deciduous forests would have dominated the well-drained headland areas while coniferous species would be found in the poorly-drained sections of the headlands. Most likely, the marsh itself was not yet in existence at this time and the modern marsh zone would have supported a boreal woodland. The last of the Pleistocene gravels and sands were being deposited at this time. These gravels would provide a source of high quality raw materials for tool production throughout the human habitation of the marsh.

Pre-Boreal/Boreal Episodes (8000 BC - 6500 BC) - Throughout these episodes a boreal forest would have dominated both the headlands and the marsh area. The presence of some wind-blown soils with illuviated horizons, presumably dated to this episode, below marsh deposits indicate that the marsh was still not present in the area. Wind-blown soils would also indicate patchy open and denuded environments and dry climatic conditions throughout these episodes.

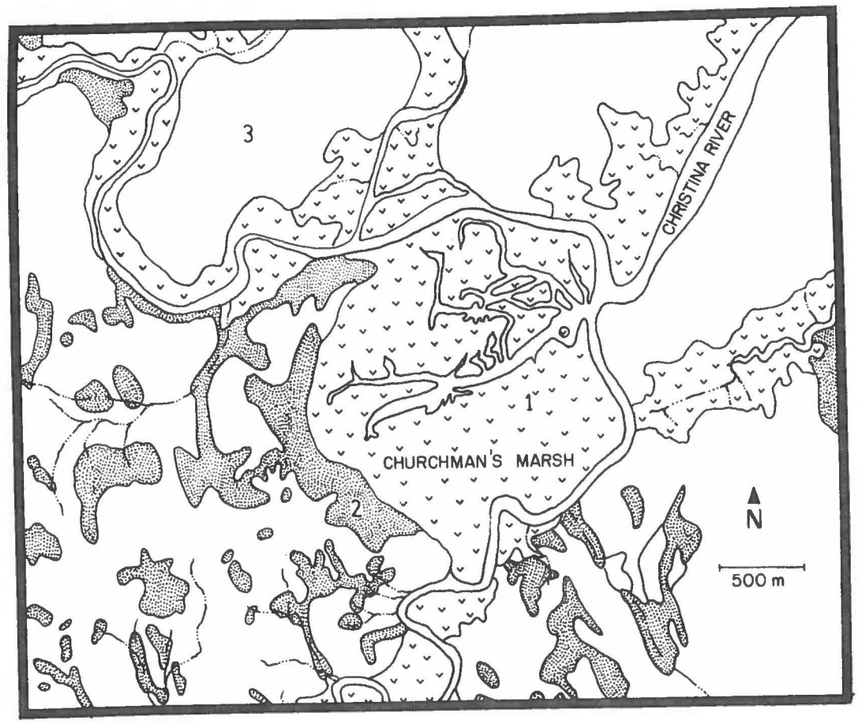

Figure 4: Soils of the Churchmans Marsh Area
(1-marsh; 2-woodland soils; 3-grassland soils)

Atlantic Episode (6500 BC - 3100 BC) - Wet and warm climatic conditions characterize this episode and pollen evidence indicates that mesic oak-hemlock woodlands are found throughout the headlands. Most likely, the water table became stranded above the Cretaceous clays sometime during this period. Also, using the previously noted Dismal Swamp and Mattawoman and Zekhiah Swamp studies as a model, it is likely that Churchmans Marsh is a freshwater non-tidal swamp at this time.

Sub-Boreal Episode (3100 BC - 800 BC) - The Sub-Boreal episode is characterized by the mid-postglacial xerothermic, the maximum warm and dry conditions of the Holocene. Xeric forests of oak and hickory would be found in the both well-drained and poorly-drained soils of the headlands with grasses and sedges interspersed in areas of well-drained soils. Some shrinking of the marsh may have occurred and it is likely that salt water and tidal conditions appear in the marsh at this time. The Sub-Boreal episode represents the period of maximum productivity of the Churchmans Marsh area.

Sub-Atlantic Episode (800 BC - present) - Modern mixed oak-chestnut and mixed mesophytic forests with associated hydrophytic communities appear during this episode throughout the headlands. Grasslands disappear in the headlands and brackish, tidal water is definitely present in the marsh.

From the descriptions above it can be seen that the environmental composition of the marsh itself has changed dramatically since the end of the Pleistocene. The archaeological sites described below reveal the human responses to these environmental changes.

ARCHAEOLOGICAL DATA FROM CHURCHMANS MARSH SITES

For many years the Churchmans Marsh vicinity has been the focus of avocational and professional archaeological interest (eg. - Crozier 1938). The vast majority of this work involved non-systematic surface collection and many of the artifacts discovered have been lost, or reside in unknown private collections with no provenience information. However, several large collections (eg. Omwake, Crozier, Wigglesworth) were donated to either the Island Field Museum or the University of Delaware and were available for analysis. Also, site-specific surface collections have been generated by more recent studies and are available at the Island Field Museum. Finally, collections from controlled excavations directed by various representatives of the Delaware Division of Historical and Cultural Affairs and the University of Delaware Department of Anthropology were available for analysis. From this large mass of data, site-specific collections (including surface-collected and excavated artifacts) from four site complexes (7NC-E-6a, 7NC-E-6b, 7NC-E-42, and 7NC-E-1) were selected for analysis. Figure 2 shows the location of these sites.

Before describing the archaeological data from these sites, collection analysis methods should be briefly described. In general, the methods utilized were similar to those used in the analysis of other prehistoric sites in the vicinity, such as the Green Valley Site Complex (Custer et al. 1981:4). Initial cataloging of artifacts was organized by provenience units and the artifact categories of projectile points/knives, bifaces, flake tools, unutilized flakes, fire-cracked rocks, ground stone tools, and ceramics were noted. Raw materials for lithic artifacts were noted and standard cultural-historical types of projectile points and ceramics were noted. Presence or absence of cortex on lithic artifacts was noted in order to discern between artifacts manufactured from local cobbles and artifacts manufactured from non-local primary sources. Additional attributes recorded for points and bifaces included length/width and width/thickness ratios, presence or absence of humps (irregular protrusions on the faces of points and bifaces surrounded by hinge and/or step fractures), and degree of resharpening. Finally, among the cryptocrystalline materials evidence of burning such as potlids, cracking, or reddening was recorded.

7NC-E-6A - Clyde Farm National Register District

Site 7NC-E-6A, traditionally known as the Clyde Farm Site, is currently listed on the National Register of Historic Places. Excavations were carried out under the direction of the Delaware Division of Historical and Cultural Affairs and Newark High School in two locations, noted as Areas 2A and 2B in the field notes. Also, test excavations were carried out in a wooded area along the White Clay Creek at the northern boundary of the site. Each area's collections and excavations are described below.

Area 2A is located on the eastern limits of 7NC-E-6A and 14 units were excavated through a plow zone to variable depths up to 20 cm into sandy sub-soil. Table 1 shows a summary catalogue of the artifacts from Area 2A and Figure 5 shows the diagnostic projectile points from Area 2A. The traditional chronological position of most of the projectile points depicted in Figure 5 would be Late Archaic (ca 3000 BC - 1000 BC) based on comparisons to dated types such as Bare Island stemmed, Poplar Island stemmed, Lackawaxen stemmed, and other narrow blade stemmed points of the Middle Atlantic region (Kinsey 1959, 1972; Ritchie 1961; Stephenson 1963; Wright 1973). However, more recent analyses (Custer 1981, n.d.) suggest that these stemmed points extend over a wider span of time. Stemmed points with narrow blades have been noted from Early and Middle Woodland contexts in the Upper Delaware (eg. Kinsey 1972, 1975). Also, excavations within Area 2B of the Clyde Farm Site (to be described later in this article) have shown a variety of stemmed projectile points in direct association with Early Woodland ceramics. Therefore, the stemmed points depicted in Figure 5 are interpreted here as diagnostic of the Late Archaic through Middle Woodland time periods. This period will be termed "Woodland I" (ca 3000 BC - AD 1000) to follow conventions established by the Delaware Bureau of Archaeology and Historic Preservation (see Custer 1981, n.d. for further elaboration). It should also be noted that Feature 1 in Area 2A includes Wolfe Neck and Hell Island ceramics which are dated to Early and Middle Woodland times (Artusy 1976) as well as nine stemmed points. Although the depositional context of the feature is not clear (it appears to be a large, shallow hearth), the association does add some credence to the hypothesis of Late Archaic-Middle Woodland dates for stemmed points with narrow blades.

In addition to the Woodland I materials in Area 2A, there are also a number of triangular points and Minguannan ceramics. These artifacts would be associated with the traditional Late Woodland Period; however, following the terminology of the Delaware Bureau of Archaeology and Historic Preservation this period is known as "Woodland II" (ca AD 1000 - AD 1600). It should also be noted that the Minguannan ceramic series is a newly recognized Woodland II ceramic variety which is grit and/or sand-tempered with corded, wiped, and fabric-impressed exteriors. Designs are similar to those noted for the Townsend series (Griffith 1977). Technical descriptions are noted in several sources (Custer 1981, n.d.; Griffith and Custer n.d.).

Table 1: 7NC-E-6A, Area 2A - Summary Catalogue

CHIPPED STONE TOOLS:

Artifact Type	Quartz	Quartzite	Chert	Jasper	Rhyolite	Argillite	Other	TOTAL
Flakes	854	966	547	2701	15	256	51	5390
(cortex)	(58)	(163)	(77)	(185)			(5)	
Flake Tools	25	12(2)	9(4)	33(2)		1		80
Early Stage Bifaces		2	1					3
Late Stage Bifaces			1	1	1	1		4
Biface Fragments	4			5				9
Woodland I Points	3	6	3	3	1	4		20
Woodland II Points	1							1
Unidentified Points	3	3	1	1				8
TOTAL	890	989	562	2744	17	262	51	5515

GROUND STONE TOOLS:

254 Fire-cracked rocks, 1 spearthrower weight

CERAMICS:

1 Wolfe Neck/Susquehanna net-impressed body sherd, 1 Mockley cord-marked body sherd, 14 Hell Island body sherds, 44 Minguannan body sherds

Consideration of the horizontal distribution of the diagnostic artifacts from Area 2A reveals some information on the depositional context of the artifacts. Woodland II artifacts are present in most of the squares' plowzones; however, in a few cases Woodland II artifacts were buried below the plow zone in undisturbed contexts. Also, Woodland I artifacts were present in both buried in situ and plow zone contexts, sometimes in adjacent units. These distributions indicate a wide variation in deposition rates across a relatively limited area (less than 15 meters). Such variation is typical of aeolian deposits (Stewart 1982a) and will be seen in other areas surrounding Churchmans Marsh.

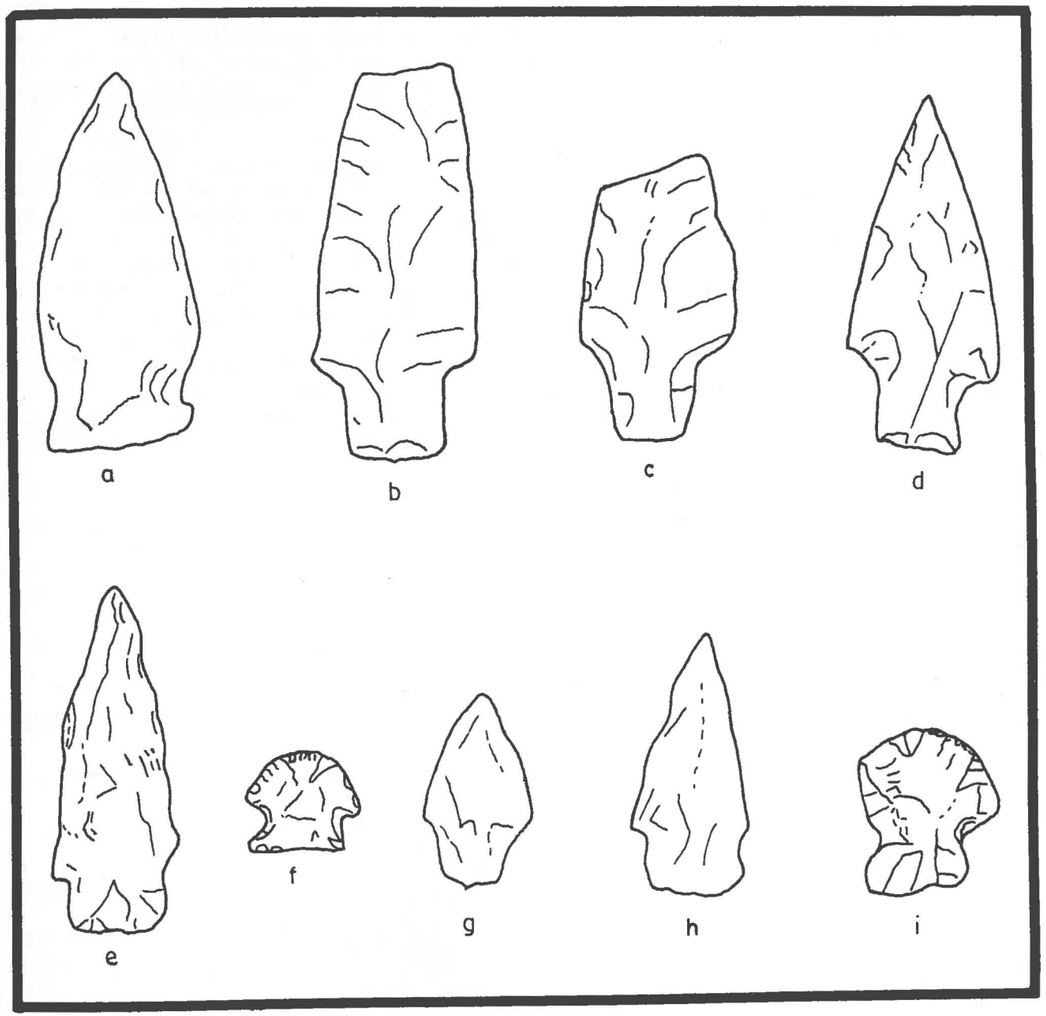

Figure 5: Projectile Points - 7NC-E-6A, Area 2A
a,h - argillite; b,c - ironstone;
d,f,i - jasper; e - rhyolite; g - quartz

Activities at Area 2A are revealed through patterns of lithic resource utilization. Mixing of Woodland I and II components in tne plow zone makes it difficult to carry out a detailed analysis of the flakes and debitage and excavated levels in the undisturbed soils yielded many fewer artifacts. Nonetheless, it can be noted that flakes with cortex are present indicating reduction of cobbles

at the site. Analysis of bifaces from the site provides more information. Appendix I provides a summary description of the 18 bifaces and biface fragments found in Area 2A. All but two of the bifaces are made of locally available materials. Of the twelve bifaces that can be characterized by reduction stage, three are early stage rejects and the remainder are middle stage rejects. Refitting of tool kits and manufacturing of bifaces seem to be important tool manufacturing activities. There are extensive cobble resources in the Churchmans Marsh area and tool manufacturing activities are probably similar to those described for the Green Valley Complex of sites (Custer, et al. 1981). However, the Clyde Farm assemblages from Area 2A have more varied tools and more ceramics, and are larger, indicating a more sedentary occupation at 7NC-E-6A, Area 2A. In sum, artifacts from Area 2A show the existence of both disturbed and undisturbed Woodland I and II landscapes with biface tool production being an important activity. Ceramics and varied flake tools suggest an associated base camp.

Area 2B of 7NC-E-6A is located on the highest point of land between the White Clay Creek and Churchmans Marsh and is located in the heart of the Clyde Farm National Register District. Numerous excavations were carried out in Area 2B and it represents the most intensively studied location adjacent to the marsh. The discussion of results of the excavations will consider, first of all, Delaware Bureau of Archaeology and Historic Preservation efforts prior to 1980 and then will consider current excavations by the University of Delaware Department of Anthropology. Excavations supervised by the Delaware Bureau of Archaeology and Historic Preservation focused on forty-six 2-meter squares which were excavated only through the plow zone in all but three cases. Table 2 shows a summary catalogue of the artifacts recovered and Figure 6 shows a sample of the projectile points recovered from Area 2B. It can be seen from an examination of projectile points and ceramics that Area 2B and Area 2A show the same range of diagnostic artifacts and both were apparently inhabited during Woodland I and Woodland II times. Considering the horizontal distribution of the diagnostic artifacts across the site it can be seen that depositional processes varied greatly across the site as was the case in Area 2A. Woodland I and Woodland II artifacts appear in plow zones in some units and in other units Woodland I artifacts, and landscapes, are buried and preserved below plow zone disturbances.

An additional indication of preserved cultural materials in sub-surface contexts includes a series of features encountered in Area 2B. Multiple excavations and record-keeping systems make it somewhat difficult to assess the exact nature of the features' depositional context; however, three good examples can be noted from the excavation records of the Bureau of Archaeology and Historic Preservation. All three were found within 10 cm of the bottom of the plow zone and were bowl-shaped depressions filled with a reddish-brown soil darker than the surrounding matrix.

Table 2: 7NC-E-6A, Area 2B - Summary Catalogue

CHIPPED STONE TOOLS:

Artifact Type	Quartz	Quartzite	Chert	Jasper	Rhyolite	Argillite	Other	TOTAL
Flakes (cortex)	667 (51)	756 (87)	571 (62)	3728 (332)	105	43	150	6020
Flake Tools	5	14	4	100	4		1	128
Early Stage Bifaces			2	1				3
Late Stage Bifaces			1	5	2	3	7	18
Biface Fragments	1	1	4	8				14
Woodland I Points		3	1	5	1	3	1	14
Unidentified Points	3		1	3		1	1	9
TOTAL	676	774	584	3850	112	50	160	6206

GROUND STONE TOOLS:

89 Fire-cracked rocks

CERAMICS:

1 steatite bowl fragment, 8 Marcey Creek body sherds, 3 Hell Island body sherds, 17 Minguannan body sherds, 1 Minguannan rim sherd, 1 Townsend body sherd

Figure 7 shows a cross-section of one of these features which contained flakes and some fire-cracked rock. One feature (Feature 1, N20E10, Unit #21) did contain a large Marcey Creek basal sherd with seven associated bifaces and a stemmed point of silicified sandstone or sidarite. These features are similar in configuration and content to features encountered at the Delaware Park Site (7NC-E-41) which is located less than 5 kilometers upstream from the Clyde Farm along the White Clay Creek. Thomas (1981) has hypothesized that these features represent shallow storage facilities reused as refuse pits and radiocarbon dates from the Delaware Park Site fall within the early parts of the Woodland I Period. The Marcey Creek ceramics from the Clyde Farm feature fall within this time interval and a similar age and function are ascribed to these features.

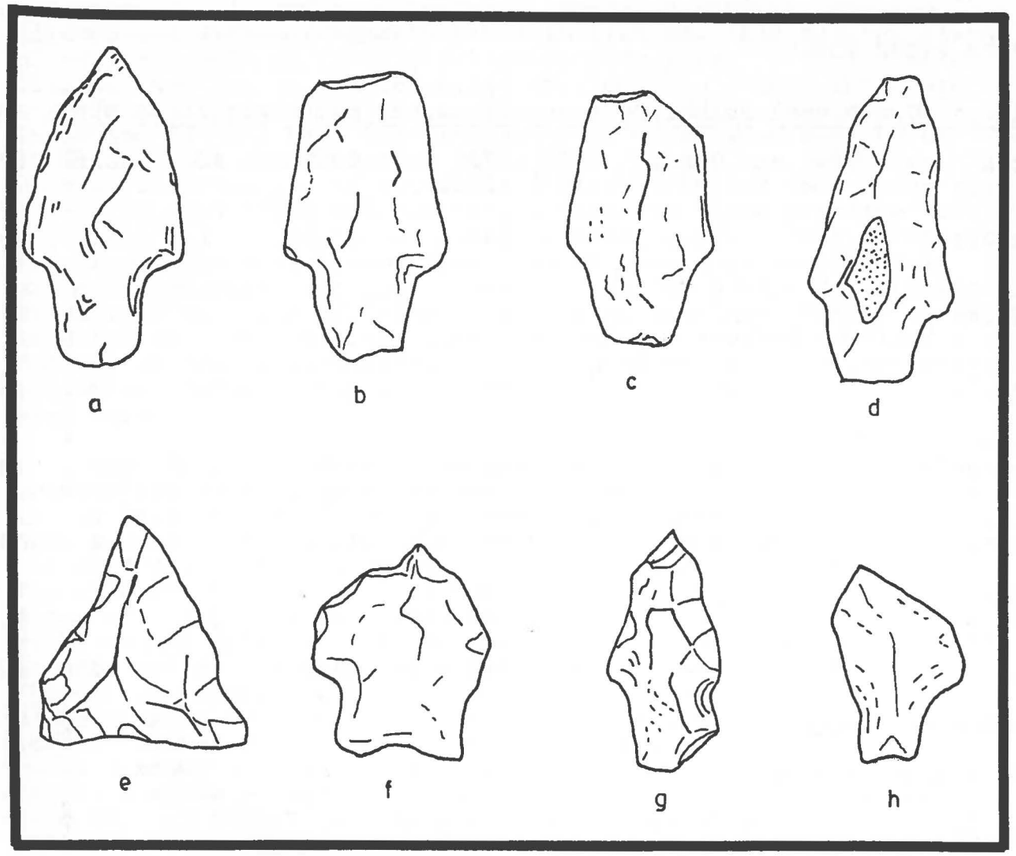

Figure 6: Projectile Points - 7NC-E-6A, Area 2B
a,e - chert; b - argillite; c,g - jasper;
d - sidarite; f - rhyolite; h - quartzite

The fact that most artifacts were recovered from a plow zone context that mixed Woodland II and Woodland I components again makes it difficult to analyze activities at Area 2B; however, some patterns can be noted. The presence of flakes with cortex indicates biface manufacturing from cobbles and analysis of bifaces, listed in Appendix I, provides further insights. Of the seventeen

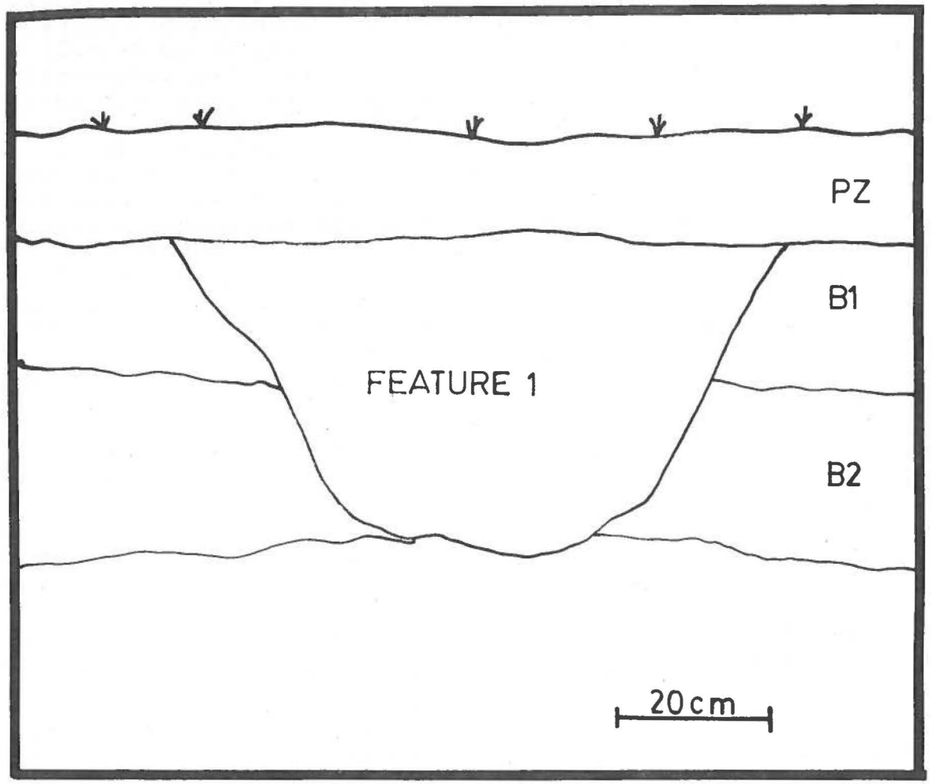

Figure 7: Feature 1 - 7NC-E-6A, Area 2B

bifaces recovered, seven were from the feature discussed previously and will be discussed separately. Of the ten non-feature bifaces, five are manufacturing rejects, three are highly utilized and re-sharpened discards, and two are tips that cannot be characterized. Significantly, two of the discards are non-local argillites and all of the rejects are locally-available materials. Culling of tools kits and biface replacement seem to be important activities and the presence of possible storage pits and ceramics suggests that Area 2B was a habitation area as well.

The seven bifaces found in Feature 1 are particularly interesting. The raw material is not locally available with the closest source of sidarite located on the Elk River on the Upper Eastern Shore of Maryland. A wide variety of reduction stages are also represented. Four of the bifaces (72/63/104a-d) are flakes with some initial edging and primary thinning accomplished. There are no indications that these bifaces are early stage rejects due to manufacturing errors or material flaws. Two additional bifaces (72/63/104e-f) are similar to the first four, but have transverse fractures. Finally, one biface (72/63/104g) is an early stage reject with a prominent hump on one face. It is interesting to note that all represent early stage bifaces; however, they represent quite different uses. Some were never finished into tools for no apparent reason while one represents a reject due to manufacturing error. The presence of transverse fractures on the remaining bifaces suggests use for cutting (Ahler 1971). It is suggested here that this assemblage represents a "curated" (Binford 1979) tool assemblage in the process of being utilized. Because the feature in which the bifaces were found may be a refuse pit, associated with discarded ceramics, it is suggested here that the bifaces were rejected and then replaced with bifaces manufactured on the site. The fact that three of the seven bifaces were candidates for rejection supports this contention as does the fact that the raw material from which the bifaces are manufactured is not of a high quality and has many pits and irregular inclusions. Presumably, this material was carried into the site from elsewhere and rejected in favor of the better quality cobble cherts and jaspers available in the Churchmans Marsh area.

Because the field records from earlier excavations in Area 2B were somewhat confusing, especially with regard to stratigraphy, a 2 meter x 2 meter unit was excavated in the center of the earlier excavations (S2W2) during the summers of 1981 and 1982 by the University of Delaware (Custer 1981:108-126). The plow zone was excavated as a unit and screened. Soils below the plow zone were excavated in arbitrary levels within natural soil horizons and all artifacts were mapped in situ with depths of each individual artifact recorded. In situ artifacts were recovered from soils below the plow zone along with two cultural features. Table 3 shows a summary cultural and natural stratigraphy for the unit.

Three natural soil horizons are present below the plow zone. The B1 horizon is a reddish brown loamy sand that seems to be aeolian in origin while the B2 horizon is an orange/yellow clay loam. Most likely, the clay in horizon B2 is pedogenic in origin and indicates some profile stability. Below the B2 horizon the soils are mainly clayey sands and very coarse sands of Pleistocene age. Levels 2 and 3 match with the B1 horizon and contain in situ living floors. Diagnostic artifacts are depicted in Figure 8 and include three stemmed projectile points and Dames Quarter ceramics which have been dated to ca 1000 BC - 700 BC (Artusy 1976:2). Figure 9 shows the excavation floor map for Level 2 and documents the association of stemmed points and Dames Quarter ceramics. Levels 4 and 5 contained a shallow basin-shaped feature similar to

Table 3: 7NC-E-6A, Area 2A, S2W2 - Cultural and Natural Stratigraphy

Below Datum Measurement	Soils	Levels	Diagnostics	Features
0				
.1	Plow Zone	Plow Zone		
.2				
.3				
.4	B1 Horizon	2	Dames Quarter ceramics stemmed points	
.5				
.6		3	Dames Quarter ceramics	
.7		4	Marcey Creek ceramics stemmed points	Feature 1 (1981)
.8	B2 Horizon	5	fishtail point	Feature 1 (1981)
.9		6		
1.0		7		
1.1		8		Feature 1 (1982)
1.2				Feature 1 (1982)
1.3				Feature 1 (1982)
1.4				(1982)
1.5				
1.6 (meters below datum)				

the one depicted in Figure 7. Within the feature were two stemmed projectile points, a fishtail (Kinsey 1972) projectile point, and Marcey Creek ceramics which have been dated to ca 1200 BC - 900 BC (Artusy 1976:2). Levels 6 - 8 contained few artifacts and little evidence of preserved living floors; however, beginning in Level 8 a second feature began and extended through four 10 cm levels into the Pleistocene sands. No diagnostic artifacts were recovered from this second feature in the unit. Sufficient charcoal for a radiocarbon date was recovered; however, at this writing the date from the sample is not available.

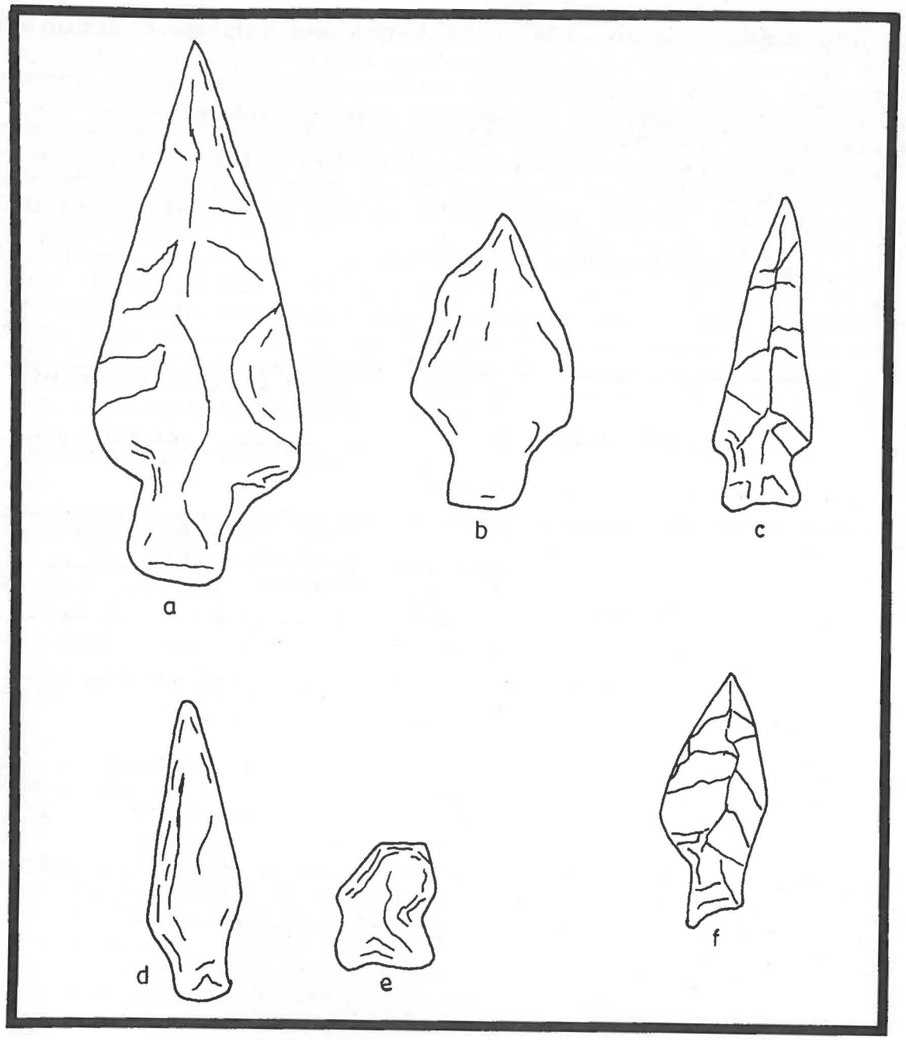

Figure 8: Projectile Points - 7NC-E-6A, Area 2B, S2W2

Level 2 - a-sidarite, b-argillite, c-jasper

Level 3 - a-rhyolite, e-quartz

Level 4 - f-chert

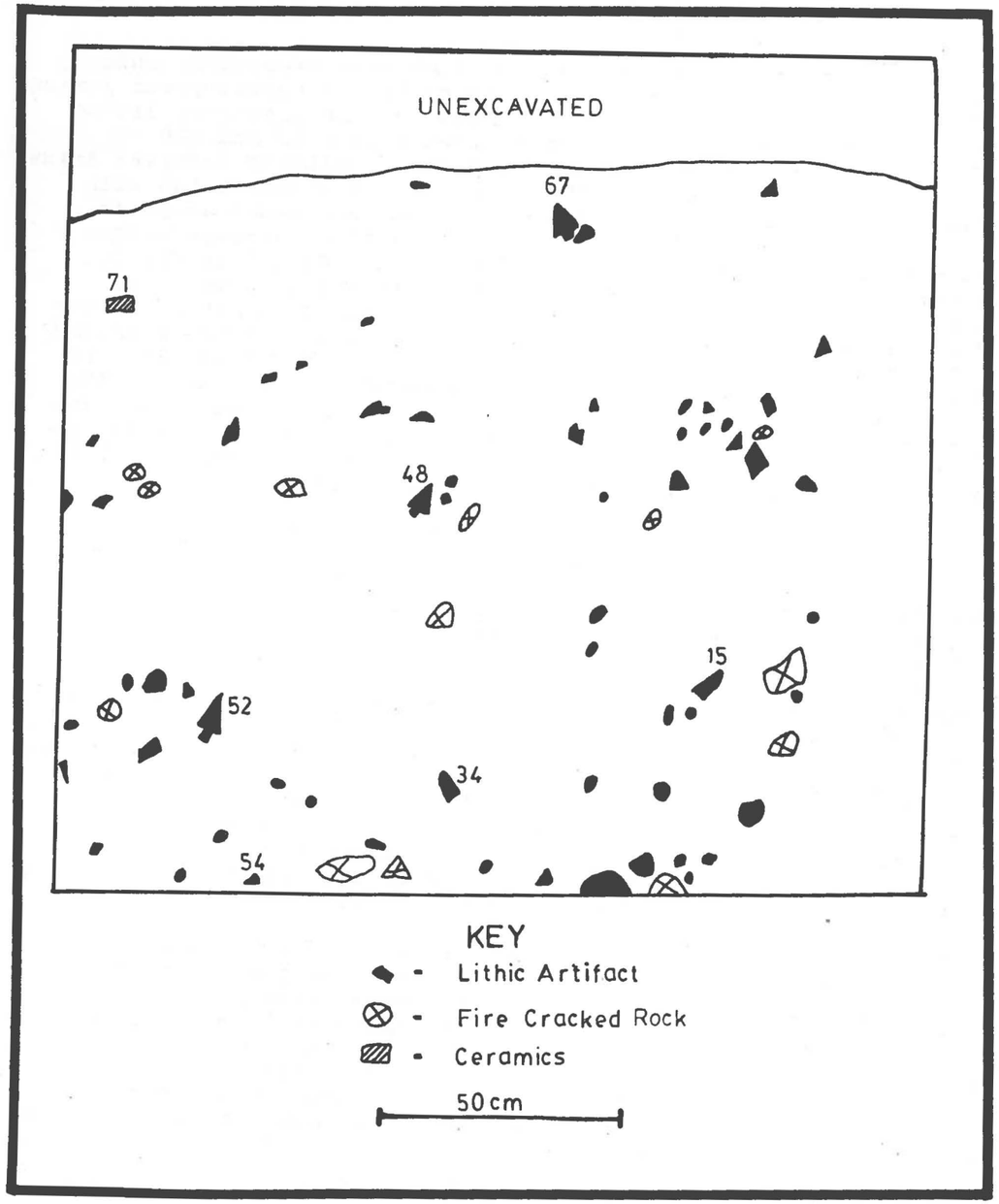

Figure 9: Level Map - 7NC-E-6a, Area 2B, S2W2, Level 2

71 - Dames Quarter ceramic sherd
48, 52, 67 - Projectile Points
15, 34 - Bifaces
54 - Flake Tool

The artifacts and associations from this excavation unit indicates that there are deep stratigraphy and superimposed living floors in Area 2B of 7NC-E-6A. Generally, the preserved living floors and the upper feature date between 1650 BC and 800 BC (Kinsey 1975:97; Kraft 1970:28-46, 1975:48; Ritchie 1959:48; Artusy 1976:1-2). The deeper feature is probably not associated with the higher living floors and features and represents an older occupation. Both features appear to be shallow storage/refuse pits analagous to those at the Delaware Park Site that date to a similar period. The association of points and ceramics is somewhat revealing. The large straight stemmed points of levels 2 and 4 would probably be classified as Late Archaic Bare Island projectile points (Kinsey 1959:129-131; Ritchie 1961:14-15) and would be considered indicative of pre-ceramic assemblages. The association of these points with developmental ceramics and fish-tail points, which traditionally would be considered as later in time than stemmed points, indicates that straight stemmed points are not necessarily diagnostic of the Late Archaic Period.

The final excavations at 7NC-E-6A to be discussed are a series of test excavations carried out in a wooded area along the bluff of the White Clay Creek bank that marks the northern boundary of the Clyde Farm National Register District. Five 2 meter x 2 meter units were excavated along the bank bluff by arbitrary 10 cm levels. Re-examination of the excavation unit profiles indicates that areas within 20 meters of the stream bank were never plowed and artifacts were found up to 40 cm below the surface. However, examination of the distribution of diagnostics through the arbitrary levels (Table 4) shows some mixing of Woodland I and II materials (Units B and C). This mixing may be attributed to natural processes such as tree falls, root disturbances, or erosion of the bluff edge (Stewart 1982a). Units A and D show no mixing and indicate in situ and possibly undisturbed deposits. Especially interesting is the presence of a European pipe stem from level 2 of Unit A which may indicate a Contact Period site.

Finally, before leaving the discussion of the archaeology of the Clyde Farm National Register District, the general surface collection from the sites should be briefly noted. Table 5 shows a summary catalogue of the collection. It should be noted that the earliest diagnostic materials are from the Middle Archaic Period (ca 6000 BC - 3000 BC) and the bulk of the diagnostic materials are from the Woodland I Period. Some Woodland II diagnostics are also noted and the entire range of Woodland I and Woodland II ceramics is also present.

7NC-E-6B

Site 7NC-E-6B is located approximately 2 km upstream from the Clyde Farm National Register District along the White Clay Creek (Figure 2) and was the site of the first controlled excavations in the Churchmans Marsh area by the Delaware Archaeological Board. Twenty units were excavated; eighteen only through the plow zone. No profile notes were available in the site notes; however, records

Table 4: 7NC-E-6A, Test Excavations - Catalogue of Diagnostics

Unit A:	Level 1 (0-10 cm)	- Minguannan ceramics
	Level 2 (10-20 cm)	- Minguannan ceramics
	Level 3 (20-30 cm)	- historic pipe stem
	Level 4 (30-40 cm)	- Minguannan ceramics
Unit B:	Level 1 (0-10 cm)	- Minguannan ceramics, Dames Quarter ceramics, fishtail point
	Level 2 (10-20 cm)	- stemmed point
	Level 3 (20-30 cm)	- stemmed point, Minguannan ceramics
	Level 4 (30-40 cm)	- Dames Quarter ceramics
	Level 5 (40-50 cm)	- no diagnostics
Unit C:	Level 1 (0-10 cm)	- side-notched point
	Level 2 (10-20 cm)	- Minguannan ceramics
	Level 3 (20-30 cm)	- no diagnostics
Unit D:	Level 1 (0-10 cm)	- Minguannan ceramics
	Level 2 (10-20 cm)	- Minguannan ceramics
	Level 3 (20-30 cm)	- no diagnostics
	Level 4 (30-40 cm)	- Woodland I ceramics (?)

for unit S2E0 do note a "brown hard clay" extending 20 cm below the plow zone. Excavations in this clay produced Dames Quarter ceramics indicating some buried Woodland I components. The remainder of the squares' plow zones produced a variety of Woodland I and II artifacts that are listed in Table 6. The mixing of components in the plow zone and the paucity of bifaces and tools make it difficult to assess activities. Although, it should be noted that flakes with and without cortex indicate tool production through various stages and ceramics may indicate habitation areas.

7NC-E-42

Site 7NC-E-42 is located midway between sites 7NC-E-6A and 7NC-E-6B along the White Clay Creek (Figure 2). At present, 7NC-E-42 is included within a power line right-of-way, dump, and gravel pit. Consequently, much of the site has been destroyed. Surface collections during the summer of 1980 in the vicinity of the gravel pit recovered numerous flakes and bifaces with the dominant raw materials being jasper, chert and quartz. Only two diagnostic artifacts were recovered: a bifurcate point from the Middle Archaic Period and a Woodland II triangular projectile point (Figure 10).

Subsequent test excavations by the University of Delaware in the area of the power line right-of-way during the summer of 1981 revealed further archaeological materials. Much of the area had been plowed and Woodland II artifacts including triangular points and Minguannan ceramics were found in the plow zones (Figure 10). Even more interesting is a small area along the bank of the White Clay Creek that was never plowed. Triangular points and Minguannan

Table 5: 7NC-E-6A, General Surface Collection - Summary Catalogue

CHIPPED STONE TOOLS:

Artifact Type	Quartz	Quartzite	Chert	Jasper	Rhyolite	Argillite	Other	TOTAL
Flakes	314	47	434	894		5	66	1760
(cortex)	(88)	(22)	(146)	(220)				
Flake Tools			7	28		1		36
Early Stage Bifaces	1	3	10	10			1	25
Late Stage Bifaces	6		7	8	1	9	1	32
Biface Fragments	8	9	5	38	1	6		67
Middle Archaic Points			1					1
Woodland I Points	7	1	5	10	1	4	1	29
Woodland II Points			1	2				3
Unidentified Points	25	6	12	20	3	6		72
TOTAL	361	66	482	1010	6	31	69	2025

CERAMICS:

12 Dames Quarter body sherds, 50 Mockley body sherds, 65 Minguannan body sherds, 2 Minguannan body sherds

ceramics were recovered from undisturbed sub-surface contexts (Figure 10) and Figure 11 shows an excavation unit plot with associated points and ceramics noted. Table 7 shows a summary catalogue from 7NC-E-42. Further excavations were carried out during the summer of 1982 and recovered a large number of artifacts from an undisturbed area of approximately 30 square meters. At this writing, analysis of the artifacts is just beginning. However, it can be noted that Woodland II and European Contact Period artifacts were recovered from undisturbed contexts and the major occupation of the unplowed area of 7NC-E-42 dates between AD 1300 and AD 1650. A more complete report on the artifacts from this site will be produced at a later date.

Table 6: 7NC-E-6B - Summary Catalogue

CHIPPED STONE TOOLS:

Artifact Type	Quartz	Quartzite	Chert	Jasper	Rhyolite	Argillite	Other	TOTAL
Flakes	340	118	408	1890	2	34	63	2855
(cortex)	(47)	(24)	(113)	(185)				
Flake Tools	3	4	8	25			1	41
Early Stage Bifaces				6				6
Late Stage Bifaces	2	1			1	1		5
Biface Fragments	3	4	4	10	1	1	1	24
Woodland I Points	1	1	1	1			1	5
Woodland II Points				5				5
Unidentified Points	2		5			1		8
TOTAL	351	128	426	1937	4	37	66	2949

CERAMICS:

12 Dames Quarter body sherds, 1 Wolfe Neck/Susquehanna body sherd, 3 Mockley body sherds, 3 Hell Island body sherds, 242 Minguannan body sherds, 16 Minguannan rim sherds

7NC-E-1

Site 7NC-E-1 is located on the Christina River below the confluence of Churchmans Marsh and the White Clay Creek (Figure 2) and was first reported by J. E. Messick (1974). The site is now almost completely destroyed by modern development; however, various collections from the site were available for analysis and a short report was prepared by T. Zeisloft (1980). Table 8 shows a summary catalogue of the artifacts and Figure 12 shows a sampling of the diagnostic artifacts from the site. Because the collections are uncontrolled surface collections, it is difficult to assess activities at the site. Also, the virtual absence of debitage in the collection makes it difficult to understand tool production activities. However, bifaces from the site represent a variety of reduction stages.

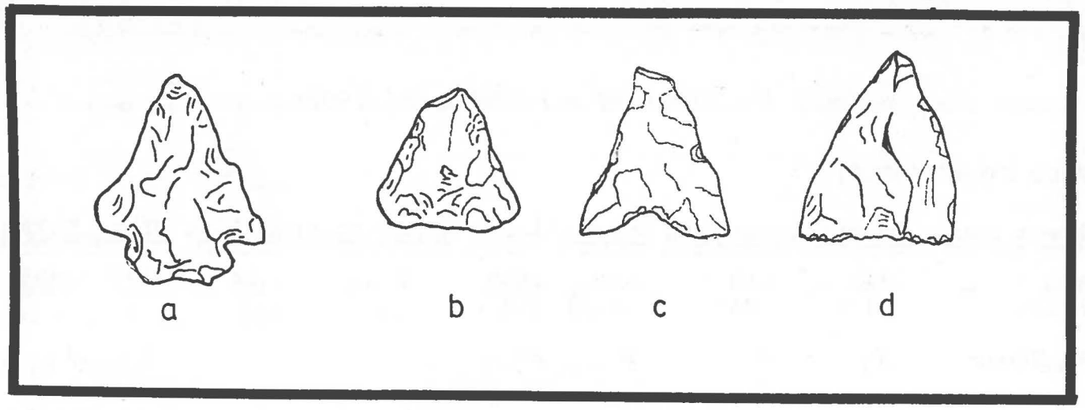

Figure 10: Projectile Points - 7NC-E-42
a,d-chert; b-quartz; c-jasper

Table 7: 7NC-E-42 - Summary Catalogue

CHIPPED STONE TOOLS:

Artifact Type	Quartz	Quartzite	Chert	Jasper	Rhyolite	Argillite	Other	TOTAL
Flakes	385	11	462	448		1	5	1312
(cortex)	(63)	(3)	(115)	(76)				
Flake Tools	2		3	2			2	9
Early Stage Bifaces		1						1
Late Stage Bifaces			1	2				3
Biface Fragments				4				4
Middle Archaic Point			1					1
Woodland II Points			1	5				6
Unidentified Points	1		1	1				3
TOTAL	388	12	469	462		1	7	1339

GROUND STONE TOOLS:

1 edge-ground cobble, 1 celt fragment, 53 fire-cracked rocks

CERAMICS:

50 Minguannan body sherds

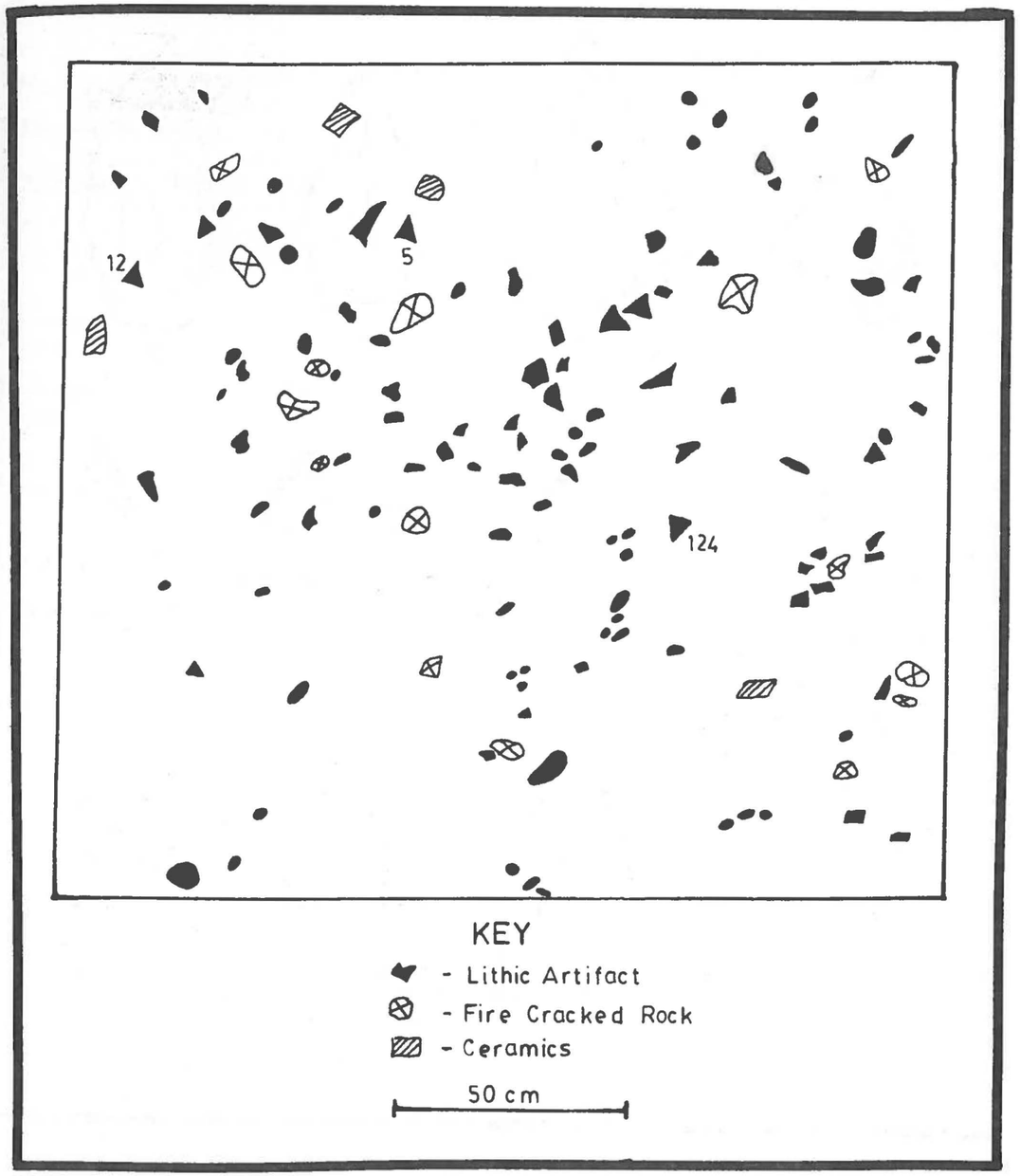

Figure 11: Level Map - 7NC-E-42
5,12,124 - Projectile Points
All ceramics are Minguannan

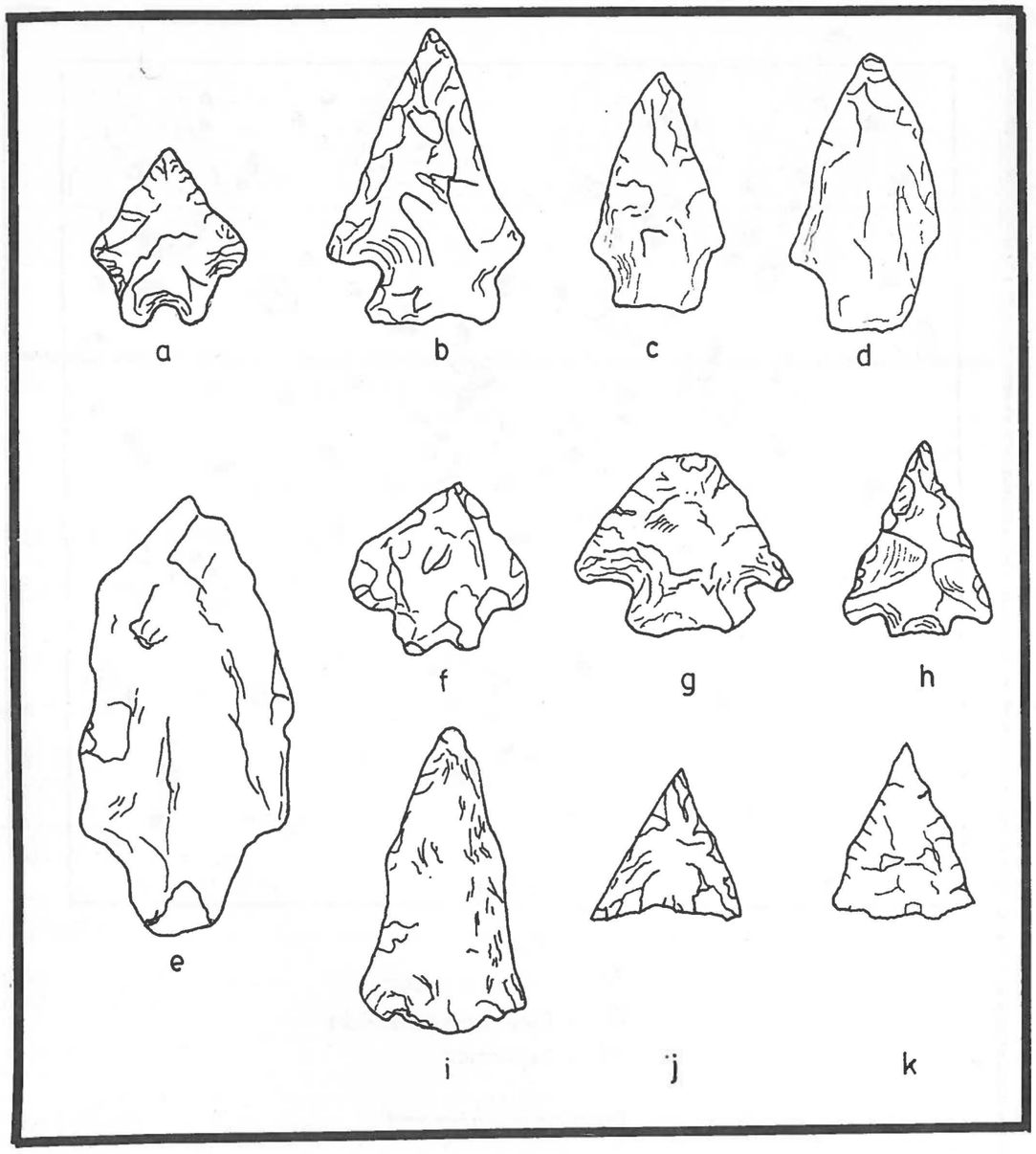

Figure 12: Diagnostic Artifacts - 7NC-E-1
a,c,g-jasper; b,j,k-chert;
d,e,i-quartzite; f,h-quartz

Table 8: 7NC-E-1 - Summary Catalogue

CHIPPED STONE TOOLS:

Artifact Type	Quartz	Quartzite	Chert	Jasper	Rhyolite	Argillite	Other	TOTAL
Flakes			1	7				8
Flake Tools	3		6	46	2	1		58
Early Stage Bifaces	4	3	5	10			3	25
Late Stage Bifaces		2		1	1	3		7
Middle Archaic Points	3							3
Woodland I Points	64	21	27	38	6	25	8	189
Woodland II Points	7	2	11	13		5		38
Unidentified Points	10	3	9	6		5	2	35
TOTAL	91	31	59	121	9	39	13	363

GROUND STONE TOOLS:

31 hammer stones, 1 celt fragment, 4 pestle fragments, 6 grooved axe fragments, 2 netsinkers, 2 spearthrower weight fragments, 1 gorget fragment

CERAMICS:

4 steatite bowl fragments, 1 Marcey Creek body sherd, 15 Wolfe Neck body sherds 1 Mockley body sherd, 6 Hell Island sherds, 52 Minguannan body sherds, 19 Minguannan rim sherds, 1 pipe bowl fragment

Figure 13 shows some early stage bifaces from 7NC-E-1 and the presence of cortex shows the use of local cobble resources for biface reduction. Also, late stage bifaces of non-local rhyolite and argillite are also present indicating culling of exhausted tools and their replacement with newly-made bifaces from local cobbles. It can be noted that the entire range of Woodland I and Woodland II ceramic types are present as well as a wide variety of ground stone tools. The presence of these artifacts suggests the presence of a base camp. In sum, the range of activities and materials at 7NC-E-1 is similar to other sites in the area.

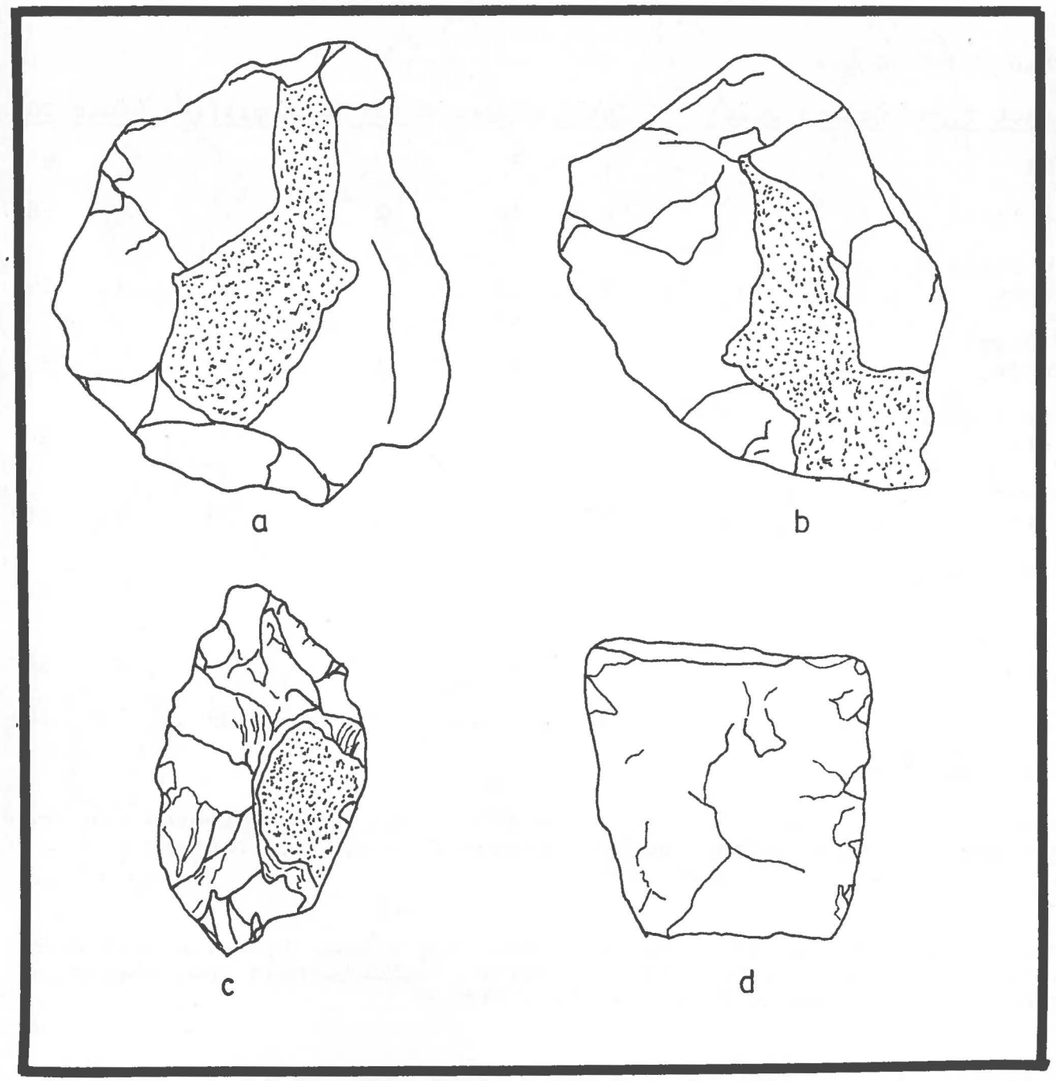

Figure 13: Early Stage Bifaces - 7NC-E-1
a,b-sidarite; c,d-jasper

COMPARATIVE ANALYSIS, SUMMARY, AND CONCLUSIONS

Analysis of the site data presented above reveals numerous aspects of human adaptations in-the Churchmans Marsh area during the period between 6500 BC and AD 1650. These patterns of man-land relationships are described below along with a discussion of the regional importance of cultural-historical and paleo-environmental data from Churchmans Marsh.

Settlement and Adaptation Patterns

The data from the sites described above can be combined to investigate human utilization of the Churchmans Marsh area through time. Probably the best way to analyze these data is to consider them from a local and regional perspective by comparing the sites to other sites in the area. The two major local sites and site complexes used here for comparison are the previously mentioned Delaware Park Site (7NC-E-41) excavated by Thomas (1981) and the Green Valley Site Complex located approximately 10 kilometers up-stream from Churchmans Marsh along the White Clay Creek (Custer et al. 1981). Both the Delaware Park Site and the Green Valley Site Complex have been recognized as base camp sites with their major occupations occurring during the Woodland I Period. In spite of this similarity, there are differences among the sites. The Delaware Park Site with its storage features, semi-subterranean pit houses, varied tool forms, and large amount of artifacts clearly represents a habitation area. On the other hand, the sites of the Green Valley Complex are smaller, do not contain any features, and although the overall range of tool forms is comparable, the Green Valley Complex sites contain many more artifacts associated with early stage tool production. Correlating the similarities and differences with social units, the Green Valley Site Complex has been characterized as a series of "micro-band base camps" associated with tool kit maintenance while the Delaware Park Site is considered a "macro-band base camp" associated with a relatively sedentary adaptation (Custer n.d.).

Examination of tool and debitage percentages among the Churchmans Marsh sites and others noted above provides some insights on activity patterning and Table 9 shows the tool and debitage percentages for related sites. It can be seen that there is very little variation among the sites. This similarity of all sites considered underscores their identification as base camps where tool production was an important activity. Variation in tool production activities may be expected, however, between the micro-band and macro-band base camps (ie. between the Green Valley Site Complex and all other sites under consideration). Analysis of the artifacts from the Green Valley Complex indicated that high cortex percentages were indicative of tool production areas, especially initial stages of biface production (Custer et al. 1981:24-25). Table 10 shows cortex percentages for all sites under consideration. Cortex percentages vary among the sites and a difference-of-proportion statistical test (Parsons 1974:445-449) was applied to see which differences were significant. Table 11 lists the results of these

Table 9: Comparative Tool and Debitage Percentages

Site	% Tools	% Debitage	Total Artifacts	Citation
7NC-D-54	5	95	1288	Custer et al. (1981:9, Table 1)
7NC-D-55A	8	92	132	Custer et al. (1981:12, Table 5)
7NC-D-55B	3	97	2304	Custer et al. (1981:16, Table 7)
7NC-D-62	6	94	475	Custer et al. (1981:23, Table 10)
7NC-E-41	6	94	8511	Thomas (1981:ix/121-ix/133)
7NC-E-6A (Area 2A)	2	98	5515	
7NC-E-6A (Area 2B)	3	97	6206	
7NC-E-6B	3	97	2949	
7NC-E-42	2	98	1339	

Table 10: Comparative Raw Material and Cortex Percentages

	Sites							
	7NC-D-54	7NC-D-55A	7NC-D-55B	7NC-D-62	7NC-E-6A (Area 2A)	7NC-E-6A (Area 2B)	7NC-E-6B	7NC-E-42
% Cortex	28	45	29	41	9	8	13	19
% Non-Cortex	72	55	71	59	91	92	87	81

tests. Using a 5% confidence interval, all combinations of comparisons showed significant differences except 7NC-D-55A/7NC-D-62 and 7NC-D-55B/7NC-D-54. As a result, the sites can be ranked and scaled according to cortex percentages as shown in Table 12.

Table 11: Results of Difference-of-Proportion Tests

7NC-D-54	XXXXX						
7NC-D-55A	4.05	XXXXX					
7NC-D-55B	.62	3.90	XXXXX				
7NC-D-62	6.19	.83	5.22	XXXXX			
7NC-E-6A (Area 2A)	19.00	13.85	22.22	21.33	XXXXX		
7NC-E-6A (Area 2B)	20.00	14.80	26.25	23.57	2.00	XXXXX	
7NC-E-6B	25.00	10.32	11.43	14.74	5.71	7.14	XXXXX
7NC-E-42	5.62	7.03	6.66	9.56	11.11	36.66	5.00
	7NC-D-54	7NC-D-55A	7NC-D-55B	7NC-D-62	7NC-E-6A (2A)	7NC-E-6A (2B)	7NC-E-6B

Table 12: Ranking of Sites by Cortex Percentages

Cortex %	Sites	Social Units	Activities
5%	7NC-E-6A (2A)	Macro-Band	Generalized Base Camp
10%	7NC-E-6A (2B)		
15%	7NC-E-6B		
20%	7NC-E-42		
25%			
30%	7NC-D-55B, 7NC-D-54		
35%			
40%			
45%	7NC-D-62, 7NC-D-55A	Micro-Band	Specialized Base Camp (Lithic Production)

The ranking of sites noted in Table 12 may be interpreted as a reflection of the variety of activities carried out at the sites under consideration. The sites with the highest cortex percentages (7NC-D-55A, 7NC-D-62) are more closely associated with early stage tool production and it is interesting to note that they showed no

clear-cut separation of habitation and tool production areas (Custer et al. 1981:12-13, 23-24). In contrast, sites 7NC-D-55B and 7NC-D-54 showed clearly delimited habitation activities and included more evidence of culling of tool kits and later stages of tool production (Custer et al. 1981:8-12, 23-24). Additional data are not available for 7NC-E-42 and 7NC-E-6B; however, it can be noted that the higher proportions of ceramics at these sites, compared to the Green Valley sites, may indicate more generalized habitation locales with longer-term occupations. Finally, the two sub-areas (2A and 2B) of 7NC-E-6A, with their large numbers of ceramics and storage features, show the greatest evidence of relatively semi-sedentary base camps primarily used as habitation areas. Although comparable data are not available for the Delaware Park Site (7NC-E-41), it is hypothesized that it would fall on the continuum close to 7NC-E-6A. In sum, the variety of tool forms, relative frequencies of tools and debitage, size, and location of the sites under consideration led to their characterization as base camps. However, more subtle differences in terms of relative frequencies of early stage tool production (as indicated by cortex percentages) and the presence of features and ceramics show that some of the base camps are more generalized habitation areas than others. The larger size of the more generalized camp sites suggests the presence of multiple social units while the more specialized sites are much smaller. This variation, noted in Table 12, underscores the validity of the initial macro-band/micro-band distinction in the Fall Line Zone (Custer n.d.).

From the above analysis it can be seen that the sites from the Churchmans Marsh area represent some of the largest, most sedentary sites in the local area, if not all of northern Delaware. The Clyde Farm National Register District (7NC-E-6A) represents the major habitation location, most likely a semi-sedentary base camp. The earliest known occupation of the marsh area occurs ca 6500 BC and is marked by the appearance of bifurcate projectile points. From the earlier analysis of the soils and environments this would correlate with the initial formation of a fresh water swamp in the area. These Middle Archaic materials are few in number compared to later materials and no large sites in buried contexts are noted.

By 3000 BC, the core area of 7NC-E-6A was being utilized as a base camp and local population seems to have grown at a rapid rate throughout the Woodland I Period as indicated by a marked increase in the size and number of sites with Woodland I components. Use of storage facilities indicates intensification of food production systems and production of surpluses, probably based on the intensive gathering of wild plant foods as indicated by the Woodland I storage features of the Delaware Park Site (Thomas 1981). The beginning of the increased use of the marsh environs, population growth, intensification of production, and use of storage facilities coincides with the mid-postglacial xeroxthermic climatic interval and may be interpreted as part of a response to changing environments. The establishment of brackish and tidal conditions in the marsh and the increase of grasslands and forest/grassland interfaces in the headlands made the marsh a highly productive

locale. Also, the presence of abundant surface water may have been a critical factor attracting social units to the marsh area during the maximum warm/dry conditions. Similar patterns have been noted in the adjacent Piedmont Uplands (Custer and Wallace 1982) as well as along the Fall Line Zone in Maryland (Thomas and Payne 1981) and New Jersey (Cross 1956; Cavallo 1982). During this period contacts with other areas are also intensified through trade and exchange as indicated by the presence of non-local lithic materials such as rhyolite and argillite. The non-local materials are primarily in the form of discarded and exhausted tools with no debitage present, thus indicating that processing of non-local materials was not accomplished at these sites. Intensification of exchange networks may be correlated with social pressures attendant upon population pressure and resource stress (Braun and Plog 1982); however, these pressures are not sufficient to cause the development of more complex social organizations as seen in other areas of Delaware (Custer 1982).

From 3000 BC to AD 1600 there seems to be little change in settlement patterns in the marsh area. Woodland I and II artifacts are usually found together on the same sites and this continuity of settlement locations indicates a continuity of adaptations as well. Similar patterns have been noted for the Piedmont Uplands and includes both base camps and smaller associated processing sites (Custer and Wallace 1982). This continuity is quite different from settlement pattern shifts seen at comparable times in the lower Susquehanna Valley (Graybill 1973); lower Potomac Valley (Gardner 1976; Stewart and Gardner 1978), lower Delaware Valley (Stewart 1982b, 1982c) and southern Delaware (Custer n.d.). The shifts in these adjacent areas are traditionally related to the onset of horticulture; therefore, the absence of such a shift in the Churchmans Marsh area may indicate that horticulture never played a large role in food production systems in the local area and, possibly, northern Delaware as a whole. Ethnohistorical observations (Becker 1976, 1980) of the Unami Delaware note a hunting-gathering subsistence base and support this contention. Thus, the richness of the marsh environment and processes of socio-cultural evolution in the Churchmans Marsh area brought about a dramatic cultural change ca 3000 BC that established a highly efficient adaptation that lasted almost 5000 years until European Contact. Hopefully, future fieldwork and research will shed more light on the particulars of this efficient and conservative adaptation.

Implications for Regional Chronology

The findings from Churchmans Marsh have two important implications for chronology in the Middle Atlantic region. The first implication concerns the presence of various styles of ceramics in the marsh area, that have not been noted previously for northern Delaware. Marcey Creek, Dames Quarter, Wolfe Neck/Susquehanna, Mockley, Hell Island, and Minguannon ceramics are noted for the Churchmans Marsh area and there is considerable overlap of these ceramic types and types noted in chronologies

from adjacent areas (Artusy 1976; Smith 1978). Therefore, the ceramic chronology for northern Delaware would correspond to general regional trends. Especially important is the presence of Hell Island ceramics, a late Woodland I variety (Artusy 1976; Griffith 1981) which has been viewed as the technological precursor to Minguannon ceramics (Custer n.d.). The fact that the spatial ranges of these two ceramic types overlap supports this contention.

The second implication for regional chronology concerns the projectile points associated with the ceramics noted above. Feature 1 (Area 2A of 7NC-E-6A) and living floors in undisturbed and sealed stratigraphic contexts, as well as Feature 1 (S2W2, Area 2B of 7NC-E-6A) all contained instances of stemmed projectile points associated with traditional "Early Woodland" ceramics. Similar assemblages from features at the Delaware Park Site have also been dated to "Early Woodland" times (post ca 1000 BC) as noted by Thomas (1981). Using the traditional cultural-historical literature (eg. Kinsey 1959, 1972, 1975; Stephenson 1963) these projectile points would be considered "Bare Island/Lackawaxen" varieties and placed in a "Late Archaic" time frame (ca 3000 BC - 1000 BC). Indeed, these narrow-blade, stemmed projectile points are often used as diagnostic markers of "pre-Broadspear" or "Terminal Archaic" components and "horizons" with time ranges as narrow as 1000 years (Kinsey 1972) or less (Steponaitis 1980). However, the findings from 7NC-E-6A and Delaware Park indicate that these projectile point styles have a much longer time span of use and are not "Late Archaic" diagnostics. It is hypothesized here that the time range of narrow-blade stemmed points of various lengths and base configurations may be to AD 0, or later. If this is true, concepts of distinctive "broadspear" and "fishtail" cultures and technologies need much rethinking.

Implications for Regional Paleoenvironmental Studies

The combination of archaeological and geomorphological data from Churchmans Marsh yields observations of interest for regional paleoenvironmental reconstructions. The presence of some early Holocene, and possibly Late Pleistocene, wind-blown sediments beneath modern marsh deposits and the fact that the earliest occupations of the marsh environs post-date 7000 BC indicates that the formation of Churchmans Marsh itself dates to early Holocene times. This age would correspond to other swamp/marsh formation processes in the Middle Atlantic region such as Dismal Swamp (Rappleye and Gardner 1979; Whitehead 1972) and Mattawoman and Zekehiah Swamps (Gardner 1976). The development of these marshes in early Holocene times would represent an important event for groups adapting to new post-Pleistocene environments on the Middle Atlantic Coastal Plain.

The presence of wind-blown soils in the Churchmans Marsh area also has important implications. Two episodes of aeolian deposition are present. The first is associated with soils older than 10,000 years which underlie the marsh sediments and overlie Pleistocene

gravels and sands. It is suggested here that this episode of aeolian deposition corresponds to the Pre-Boreal/Boreal Episodes and is related to similarly dated wind blown deposits noted by Foss et al. (1978) on the Eastern Shore of Maryland and wind-blown sediments dated to between 9500 BC and 5800 BC from a sinkhole in northern New Castle County, Delaware (Custer 1981). The second episode of aeolian deposition dates to between 3000 BC and AD 0, based on dates of ceramics within these deposits at 7NC-E-6A, Area 2B, and archaeological sites throughout the marsh environs are both buried and eroded during this interval. Similarly dated events are noted at the Abbott Farm, near Trenton, New Jersey (Stewart 1982a, 1981) and these events, which are associated with dry/hot climatic shifts, can be added to the growing list of evidence for dramatic mid-Holocene climatic change (Curry and Custer 1982).

In conclusion, the Churchmans Marsh area has yielded significant information on prehistoric adaptations and, as a source of future data, deserves preservation and protection.

ACKNOWLEDGEMENTS

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APPENDIX I: Biface Descriptions

7NC-E-6A (Area 2)

Catalogue #	Raw Material	Stage	Length	Width	L/W Ratio	Thickness	W/Th Ratio	Comments
72/63/1a	jasper	early	--	--	--	19	----	Early stage manufacturing reject; broken down the medial plane
72/63/1b	jasper	middle	--	43	--	15	2.86	Cortex on one face, many hinges around cortex, secondary thinning and edging completed, broken in half, middle stage reject
72/63/2a	quartzite	middle-late	--	--	--	--	----	tip
72/63/2b	quartz	late	--	--	--	--	----	tip
72/63/2c	jasper	middle-late	--	--	--	--	----	tip
72/63/2d	jasper	middle	--	--	--	--	----	edge fragment, middle stage edging complete
72/63/3a	jasper	middle	--	27	--	12	2.25	snapped in middle, edging complete, manufacturing error, reject
72/63/3b	argillite	middle	--	33	--	12	2.75	hinges along thickest edge, manufacturing reject
72/63/8	chert	middle-late	--	31	--	8	3.87	snapped base fragment, manufacturing reject
72/63/17	conglomerate-quartzite	early	--	60	--	17	3.53	mainly worked along one face, steps along line of coarse conglomerate fragments, early stage reject due to material

7NC-E-6A (Area 2A) - cont'd.

Catalogue #	Raw Material	Stage	Length	Width	L/W Ratio	Thickness	W/Th Ratio	Comments
72/63/20	chert	early	55	27	2.03	17	1.58	very large hump on one face surrounded by hinges, reject due to manufacturing errors
72/63/31	jasper	late	--	--	----	--	----	tip
72/63/42a	jasper	late	--	--	----	--	----	edge fragment
72/63/42b	jasper	middle	--	25	----	14	1.78	humps on both faces with many hinges and steps, reject due to failure at secondary thinning
72/63/44	argillite	late	51	19	2.68	9	2.11	very badly weathered
72/63/58a	quartz	middle	--	26	----	10	2.60	snapped blade, reject due to mistake in secondary thinning
72/63/58b	quartz	early-middle	--	27	----	12	2.25	early reject, snapped, probably broken during primary thinning
72/63/58c	chert	middle	--	27	----	15	1.80	very thick along one edge with many steps, rejected due to failure of secondary thinning

7NC-E-6A (Area 2B)

72/63/6	quartzite	early	92	49	1.87	21	2.33	early stage reject due to material flaws
72/63/104a	silicified sandstone	early	71	41	1.73	14	2.93	flake with initial edging, no flaws, not reject

7NC-E-6A (Area 2B) - cont'd.

Catalogue #	Raw Material	Stage	Length	Width	L/W Ratio	Thickness	W/Th Ratio	Comments
72/63/104b	sidarite	middle	58	41	1.41	13	3.15	edged and initial thinning partly accomplished, no flaws or reject
72/63/104c	sidarite	middle	84	38	2.21	18	2.11	same as above
72/63/104d	sidarite	middle	91	42	2.16	21	2.00	same as above
72/63/104e	sidarite	middle	93	43	2.16	21	2.04	same as above, but with transverse fracture
72/63/104f	sidarite	middle	--	43	----	16	2.69	same as above
72/63/104g	sidarite	early	67	42	1.59	7	6.00	early stage reject with hump
72/63/109	siltstone	middle	72	41	1.76	24	1.71	reject due to hump and over-shot flake that removed edge section
72/63/111	jasper	middle	--	--	----	--	----	tip
72/63/112	argillite	late	--	23	----	7	3.29	late stage discard, heavily reworked
72/63/131a	chert	middle	45	35	1.29	13	2.69	manufacturing reject with step fractures
72/63/131b	jasper	early	44	35	1.26	17	2.06	manufacturing reject with hinges, minimal work on ventral surface
72/63/134	jasper	middle	--	--	----	--	----	tip
72/63/136	chert	late	32	14	2.29	8	1.75	late stage discard, heavily reworked

7NC-E-6A (Area 2B) - cont'd.

Catalogue #	Raw Material	Stage	Length	Width	L/W Ratio	Thickness	W/Th Ratio	Comments
72/63/139	sidarite	late	60	23	2.61	10	2.30	late stage stemmed preform, rejected due to hump
72/63/143	argillite	late	62	25	2.48	7	3.57	worn late stage discard, heavily reworked