IV. RESEARCH DESIGN

A. INTRODUCTION

This chapter presents a discussion of the research design that was developed to guide the data gathering, analysis, and interpretative efforts of this study. The research design was structured to address several information needs that are widely employed in contemporary prehistoric archaeology. These themes include chronology, subsistence, settlement patterns (household, community, and regional levels), technology, and environmental adaptation. Questions of a more site-specific nature were also addressed.

The overall context for federally funded or permitted archaeological investigation is provided by the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716-44742). The standards were designed to provide a framework for organizing information in such a way as to provide a sound basis for decisions concerning the identification, evaluation, and treatment of cultural resources. Evaluation of historic properties under the standards requires the development of historic contexts that define the conceptual framework for a set of resources, or property types, that share a thematic or topical unity as well as relatively well-defined geographic and temporal limits. The importance of individual properties is determined within historic contexts, not in isolation; a significant archaeological site is one that can increase knowledge about a particular historic context. Historic contexts therefore include research questions or information needs which provide a framework for the evaluation and interpretation of individual sites.

Existing management plans for prehistoric resources (Custer 1986, 1994; Custer and De Santis 1986) provide the basic research context for the present study. The state and regional management plans (Custer 1986, 1994; Custer and De Santis 1986) were developed according to the Secretary of the Interior's Standards, and describe the associated site types for each period, together with settlement pattern models, which enables identification of predicted zones of archaeological sensitivity.

The research issues to developed for the investigation of the Whitby Branch Site are discussed below. These areas of concern focus on questions for the Woodland I period, as the Phase I and Phase II investigations indicated that the site's primary use occurred during that period.

B. RESEARCH QUESTIONS

1. Chronology

The chronology theme pertains to the basic temporal units of prehistory. The Phase I and Phase II investigations produced evidence that the Whitby Branch Site was used or occupied during the Woodland I period, which dates roughly from circa 3000 BC to AD 1000. It was expected that the proposed data recovery program would provide a much larger sample of culturally diagnostic

artifacts, thus enabling construction of a site-specific chronology that would serve as an important frame of reference for the larger generalized regional chronological sequence.

Any discussion of prehistoric chronology must address the various chronological schemes advanced by different archaeologists working in Delaware, the Middle Atlantic region, and the broader Eastern Woodlands culture area. Custer (1984) has divided the prehistory of Delaware into four periods: the Paleoindian period (ca. 12,000-6500 BC), the Archaic period (ca. 6500-3000 BC), the Woodland I period (ca. 3000 BC-AD 1000), and the Woodland II period (ca. AD 1000-1650). Many other regional archaeologists and state planning documents (e.g., Berger 1996; Chesler 1982; Dent 1995; Gardner 1987; Raber 1985; Stewart 1989; Virginia Department of Historic Resources 1992; Weissman 1986; Wesler 1985) work from the more familiar tripartite scheme of Paleoindian, Archaic, and Woodland, with the latter two periods assigned early, middle, and late subperiods. Readers unfamiliar with the Delaware system should be aware that Custer's Woodland I period includes what most archaeologists in the eastern United States define as the Late Archaic, Early Woodland, and Middle Woodland subperiods.

Custer (1994:4) argues that his scheme is based on linking common adaptations and lifeways. At the same time he admits that it blurs traditional chronological periods and subperiods and their familiar diagnostic assemblages. This report follows the Custer (1984, 1986, 1989, 1990, 1994, 1996a, 1996b) model, based on its widespread use in Delaware. A reasonable argument can be made for grouping the three subperiods of the traditional system into one cultural period, labeled Woodland I. As Willey and Phillips (1958:24-25) have commented, local sequences are the "very stuff of archaeology," and however obtained, "the local sequence has this important feature, it is local." Delaware's Woodland I period has been subdivided into a number of shorter cultural complexes that have distinctive traits and geographic limits. The Phase I and Phase II investigations indicated that the Whitby Branch Site would be an expression of the Wolfe Neck complex, which dates from circa 700-400 BC (Custer 1994).

In terms of chronological issues, Custer (1994:172) suggests that continued refinement of the temporal placement of diagnostic assemblages, especially linking projectile point types and ceramic types, is needed. More specifically, Custer (1994:172) questions what is commonly referred to as the "Coe Axiom," where one set of projectile and ceramic types is assumed to be linked with one prehistoric culture. Custer instead argues for allowance of variability in projectile point associations, i.e., any one group may have made more than one type. Dent (1995:214) has recently offered an explanation for some of this variability on Delaware sites, but certainly agrees that associations in the past were likely to have been variable.

Large-scale excavation at the Whitby Branch Site was designed to recover a large assemblage of tools and debitage that could be used to define a distinctive toolkit associated with the Woodland I complex(es) represented at the site. At least two distinct loci of activity were expected at the site, based on the Phase II investigations, and the Phase III excavation program was designed to sample both loci, which would offer an opportunity to compare different occupations and uses of the site during different portions of the Woodland I period.

In Custer's (1994:45) revised definition of Woodland I complexes, he has linked Wolfe Neck ware and various stemmed point types. Wolfe Neck ware is generally dated to 700-400 BC, although there is some indication that it may date as late as AD 250 (Custer 1994:44). After that terminal date it is replaced by Mockley ware, which is widely found in the Middle Atlantic region. There is also some additional indication that so-called refined Wolf Neck wares may be included within what Custer (1994:23, 1996b) refers to as the Black Rock complex I and II as defined for northern Delaware.

2. Subsistence

Evidence of subsistence practices from Woodland I sites in Delaware is somewhat sparse, but not totally absent. According to Custer (1994:128), common plant remains assignable to this period include hickory nut (*Carya* sp.), goosefoot (*Chenopodium* sp.), and pigweed (*Amaranthus* sp.). An even wider range of floral remains have been found at a few other Woodland I sites within Delaware. Some of these plant remains no doubt represented important food sources, and some had medicinal or other uses. Because of the scarcity of subsistence data for the Woodland I period, recovery of such data was defined as a priority for the Whitby Branch Site excavations.

The recovery of archaeobotanical remains is in a large measure dependent on the application of flotation recovery techniques. Flotation recovery has been successful at a few Middle Atlantic region sites (e.g., Dent and Kauffman 1985; LeeDecker et al. 1991; LeeDecker et al. 1996), thus significantly expanding the understanding of prehistoric subsistence practices. Botanical data, however, present a unique set of interpretive problems, and it does not necessarily follow that all seeds, charred or otherwise, recovered from archaeological contexts represent plants that were consumed or intentionally used by the site inhabitants (Holt 1991; Keepax 1977; Minnis 1981; Moeller 1986; Smith 1985). Custer (1994:130-131) has also specifically discussed this matter in relation to Delaware sites.

Relative to the Middle Atlantic region, botanical remains have been more frequently reported from sites in the Southeast, particularly from rockshelters and deeply buried sites. Yarnell and Black, using data from 60 sites in the Southeast (1985), have compiled an important database pertaining to the prehistoric use of plant foods. First, there is widespread evidence that nuts (hickory, walnut, acorn, etc.), greens (e.g., purslane and pokeweed), fleshy fruits, small grains, and seeds were used throughout the Archaic and Woodland periods. Seed-to-nutshell ratios (computed as the number of seeds per 100 grams of nutshell) showed a steady increase through the Archaic, Early Woodland, and Middle Woodland periods, but dropped during the Late Woodland. Yarnell and Black also observed that the seeds of plants used for greens (purslane and pokeweed) declined after the Middle Archaic, while the numbers of small-grain forb seeds (e.g., chenopod and amaranth) increased significantly during the Late Archaic and Woodland periods. Given these trends, they suggest that forb-grain utilization during the Late Archaic may have derived from the initial use of plants as greens (Yarnell and Black 1985). Subsistence practices at the Whitby Branch Site are expected to reflect this last pattern of increased utilization of small-grain resources. The presence or absence of floral remains at the Whitby Branch Site might additionally suggest the season of site occupation.

Faunal remains are rare from Woodland I sites in Delaware. The exception to this rule is the recovery of shellfish remains from sites in appropriate locations of the state. It can nonetheless be projected that the Whitby Branch Site occupants were exploiting the standard major animal populations typical of the middle latitudes of the continent. Some examples of these species have been recovered at other Woodland I sites (see Custer 1994:131), and it seemed reasonable to expect that such remains might be recovered through further investigations at the Whitby Branch Site.

In a more indirect sense, recently developed techniques for the identification of residues on the surfaces of stone tools have raised the expectations of archaeologists that another avenue of inquiry into animal exploitation patterns is at hand. The results in this area have not yet matched initial expectations, and there is much uncertainty regarding the utility of these techniques for archaeological analysis (Dent 1995:173; Eisele et al. 1995; Inashima 1992; Kooyman et al. 1992; Smith and Wilson 1992).

A large-scale lithic residue analysis program for the Indian Creek Site collection in Maryland has highlighted the difficulties archaeologists face in the interpretation of lithic residue test results (LeeDecker et al. 1991). In that analysis, a two-stage approach was utilized. The first level of testing was a simple presence/absence test. This was followed by test procedures designed to determine species. The results of the program have called into question archaeologists' common notions regarding stone-tool form and function. Selection of the lithic specimens that were submitted for testing was guided in a large measure by the assumption that tools such as projectile points and formalized scrapers would yield the greatest amount of subsistence information. More than 500 specimens were tested at the Level I (presence/absence) stage, and this sample of the assemblage was heavily biased toward inclusion of formal tools. The remainder of the sample consisted of debitage, some of which was included as a control sample and some of which was selected because of size and formal characteristics that suggested potential use as expedient tools. The unexpected result of the analysis was the infrequency of positive findings for blood residue on points and scrapers, and the large amount of debitage that tested positive.

Although the test results suggest that visual inspection is not adequate to identify expedient tools in a lithic assemblage, it is important to appreciate that the processes by which animal residues might come in contact with a given lithic specimen extend beyond the killing and butchering of an animal. Any tool or debitage discarded in an area that was subsequently used for butchering might come in contact with blood from a slain carcass and ultimately yield a positive test result. Therefore the assumption that all lithic specimens that yield positive test residue results were used as tools is no more erroneous than the assumption that a positive reaction for a particular species implies cultural use of that species. The reagents used in the Level II analysis actually detect the presence of specific immunoglobulins which are present in all body fluids (blood, urine, and the like) and tissues (Newman 1990), so that the term "blood residue test" is somewhat misleading. Specific positive tests could reflect nothing more than the presence of animal urine, which might have been deposited on the surface of a stone tool without any human intervention. Because of the current uncertainty regarding the efficacy of residue testing, no samples from the Whitby Branch Site were submitted

for analysis; however, specimens that might be candidates for future testing were kept unwashed, with minimal handling.

3. Settlement Patterns

Settlement pattern studies in Delaware are focused at household, community, and regional levels (follows Custer 1994:172-174). The Whitby Branch Site was viewed as an embodiment of the household and community levels of Woodland I settlement as well as an element of the regional pattern. The following discussion addresses each of these three levels in relation to the Whitby Branch Site.

a. Household Settlement Patterns

Household settlement studies in Delaware most often focus around the possible presence of pit houses (Custer 1994:46, 172-173), although there is currently considerable debate among archaeologists as to whether the origin of the features described as pit houses is natural or cultural (Custer 1994; Custer and Silber 1995; Liebknecht 1995; Mueller and Cavallo 1995; Schuldenrein 1995; Thomas 1995; Thurman 1987). The presence of these features in northern Delaware is detected through disruptions in normal site pedogenic processes, such as the presence of deep fill lenses, staining, and the like. Pit houses have been reported at Woodland I and Woodland II camps in northern Delaware. If the Whitby Branch Site represents a microband base camp, one would expect occupation of some duration by a very small number of nuclear families to have occurred, and it was therefore believed that the remains of pit houses might be encountered in further excavations at the site. Moreover, since the gravels in the Rumford soils in the eastern portion of the Whitby Branch Site would certainly have facilitated tree blow-downs, the Whitby Branch Site excavations might also offer an opportunity to further advance the debate on the question of a natural versus cultural origin for such features.

b. Community Settlement Patterns

Custer (1994:173) has stated that a great emphasis should be placed on searching for clear-cut examples of Woodland I macroband base camps. The further excavation of the Whitby Branch Site will not address this issue, and indeed Custer (1994:83) ultimately even questions whether such camps exist.

It was previously suggested that the Whitby Branch Site represented either a microband base camp or a procurement site of some sort. According to Custer (1994:155), procurement sites (limited-purpose resource extraction locations) yield few artifacts and tool types, are small in size, and contain few if any features. Microband base camps serve a more domestic and social purpose, yield many tool types and artifacts, are still somewhat small in size, but contain features such as pit houses and storage pits. Given Custer's (1994:155) discussions of the differences between the two types of sites, it was expected that the Whitby Branch Site would be assignable to the microband base

camp property type, based on the frequency and types of artifacts recovered during the Phase I and Phase II investigations.

The Whitby Branch Site also offered a unique opportunity to examine the uses of space within a small site that did not appear to contain a large number of components from many different time periods. Based on ethnographic information from various hunter-gather societies, and excavation data, Binford (1983) has identified a number of cross-cultural similarities in the way individuals and groups carry out tasks and discard debris in residential and nonresidential sites. Within a campsite, hearth areas are normally the foci around which a broad range of activities are carried out, and Binford (1983:149) suggests, in addition, that these activities were performed "according to a spatial pattern that appears to be universal." Site structure may be viewed as a conglomerate of individual modules that represent either distinct activities or social units. The representation of social structure in space is a culturally universal phenomenon, and occupation sites often contain a series of small areas of equivalent size and form that correspond to social units such as households or extended families.

The patterning of refuse deposits around hearths typically exhibits a concentric form. Small items, such as waste products from craft activities, are normally found between the hearth and the seating area, while larger items are discarded to a "toss zone" away from the primary seating and work area. There are a few basic patterns of refuse disposal among hunter-gatherers that account for the major patterns of archaeological site structure. These basic disposal modes include: (1) dropping or discarding objects in their place of use, (2) tossing individual items away from their place of use or consumption, and (3) dumping a group of items en masse. Small dumps often appear to have a "magnetic" effect, as they accumulate material from subsequent refuse disposal episodes (Binford 1983).

Distinct disposal patterns may be observed inside and outside of structures. While the concentric, or donut-shaped, pattern is typically left by groups around an outside hearth, greater effort is normally made to maintain the cleanliness of indoor domestic spaces. Small refuse dumps are often located immediately outside the door, left there after cleaning a domestic space. Activities that produce large amounts of waste material are typically located away from the primary living area, so that debris may be left in place, away from the everyday activities carried out in the primary living area. Sites that are intended for reuse, including the peripheral areas adjacent to the primary habitation areas, are typically cleaned of debris (Binford 1983). Ethnographic sources (e.g., Binford 1983; O'Connell 1987; Yellen 1977) provide an important context for interpretation of site structure; interpretation of behavioral patterns must be grounded on a comprehensive understanding of site formation processes (Schiffer 1987).

c. Regional Settlement Patterns

The Whitby Branch Site is obviously a single site and was only one component of a larger settlement system during the Woodland I period. It was expected that excavation of the site might offer data on season of occupation and thus clarify the two models for Woodland I regional settlement patterns proposed by Custer (1994:83-84). In the same sense, Custer (1994:174) has also suggested that

location of Woodland I sites along major drainages might reflect the migration of the freshwater/saltwater interface throughout this era along those rivers. Investigation of the Whitby Branch Site could offer some additional new data for the Appoquinimink River.

4. Technology

The technology theme may be addressed primarily by analysis of the lithic technology, ceramic technology, and features represented at the site. Based on the identification of apparently well-preserved activity areas during the Phase II investigations, it was assumed that additional features would have been preserved at the Whitby Branch Site. The Phase III excavations focused on these features to recover information on the technology used by the site's prehistoric populations.

Stone tools and the debris from their manufacture, maintenance, and recycling comprise the lithic record of a society or culture. This record is a partial reflection of a group's technology—its strategies for interacting with its biophysical and social environments. How a group organizes its technology provides important insights into the economic and social structure of that society (Koldehoff 1987; Nelson 1991).

The five basic categories of information that can be derived from lithic artifacts are depositional, temporal/stylistic, functional, technological, and raw material information. These aspects of the lithic record are interrelated and cannot be completely separated from one another. Raw material analysis identifies the lithic materials that were manipulated; this information permits inferences to be drawn about procurement strategies and the related issues of exchange and settlement mobility. Custer (1994:174-175) remarks that expanded analysis of lithic procurement systems in particular is needed for the Woodland I period. Technological analysis examines tool design and methods of production, maintenance, and recycling; the information thus obtained helps to document the organization of technology and contributes to the understanding of such topics as site function. Functional analysis determines the tasks in which tools were employed; this information also helps to document the organization of technology and site function. Temporal/stylistic analysis provides chronological as well as other cultural information; unfortunately, only the most formalized stone tools (e.g., projectile points) are temporally diagnostic, and even these items tend to be less sensitive to temporal change or regional styles than are ceramics. Information about depositional processes helps to identify activity areas, toolkits, and larger-scale site formation processes; this information is derived from crossmending and plotting artifact distributions.

Ceramic technology is another issue that it was believed might be addressed with further data from the Whitby Branch Site. A large sherd of Wolfe Neck ware was recovered during the Phase II testing, and more were expected to be found during the Phase III investigation. Earlier types, such as Dames Quarter and Marcey Creek, were also expected. The type of surface treatment, such as cordmarking or net-marking, has piqued the interest of local prehistorians (e.g., Custer 1994:122), and offers a possible avenue toward understanding vessel function (use as storage vessels as opposed to cooking vessels). It was thought that further excavations might recover additional ceramics that would help in the understanding of Woodland I lifeways.

5. Environmental Adaptation

The environmental adaptation theme examines cultural response to environmental conditions. This has been a major issue in Delaware prehistoric archaeology, as well as in other regions of the world. Using the cultural ecology framework, it is assumed that the archaeological record will reflect cultural responses to changing environmental conditions. Specifically, these changes would be reflected in subsistence patterns, settlement strategies, and the composition of toolkits. Subsistence and settlement pattern issues, discussed above, pertain directly to the environmental adaptation theme.

Reconstruction of past environmental conditions provides the necessary context for examination of this theme. The Woodland I period contains two major environmental episodes, the Sub-Boreal and the Sub-Atlantic (Custer 1994:7) (see Chapter III). The former ranges from 3110 to 810 BC, and the latter prevails from 810 BC to AD 1000. Major arboreal constituents of the Sub-Boreal episode include a pine-oak-hickory association. The Sub-Atlantic includes an oak-alder-aspen association. Corresponding changes in climate and fauna are also linked to these two episodes. This is likewise extended to an interest in the effects of sea level rise and associated estuarine formation on prehistoric life. Archaeologists (e.g., Custer 1994:18) see major environmental changes during the course of the Woodland I period in Delaware.

It was thought that the Whitby Branch Site might contain information relevant to issues concerning environmental adaptation. It was anticipated that intensive excavation of the site might clarify issues such as Woodland I site selection, settlement patterns on the household and community level, and subsistence systems. Previous sections of this research design have discussed the potential of this site to address such questions.

More directly, however, the wetland area at the western boundary of the Whitby Branch Site was identified as a candidate for palynological analysis, as more than 1 meter of organic sediment has collected at the western edge of the site. Extraction of a continuous core, pollen identification, and radiocarbon assay of some samples could offer invaluable data on site ecology, which would add significantly to knowledge of the general ecology of northern Delaware. A pollen investigation was planned for the Phase III study; it was determined, however, that the sediments contained mostly modern material.

Understanding the local environment would lead to a much better idea of the parameters for prehistoric site selection. The Mid-Drainage Zone of Delaware is one of the richest ecological zones within the state (Custer 1986:15). Existing vegetation surrounding the site today suggests an ecotonal setting with access to both freshwater and tidal species. Direct comparison of resources exploited as opposed to resources that were locally available was considered to be at least theoretically possible with further excavations at the site and additional efforts to reconstruct the local site environment.

C. METHODOLOGY

1. Sampling Strategy and Field Methods

The sampling plan proposed for data recovery consisted of a three-step strategy to: (1) excavate block areas centered on artifact concentrations encountered during the Phase II fieldwork, (2) test site margins to provide a better definition of site boundaries, and (3) expand the block excavations as features and deposits were identified.

Phase II testing identified two highly productive loci which were targeted for block excavations. The first of these, identified as the West Block Excavation (Plate 2), was centered on Excavation Units 5, 10, and 15, located on the toeslope of the site landform. Excavation Units 5 and 10 contained fire-cracked rock features (Features 1 and 2, respectively) and high-density concentrations of lithic artifacts. The second block area, identified as the East Block Excavation, encompassed Excavation Unit 1, located at a higher elevation on the shoulder of the landform. Excavation Unit 1 yielded a three-quarter-grooved axe that is suggestive of early Woodland I forms.

Exploratory excavation units were placed east of the East Block Excavation to gain a finer-grained definition of the site edge in the area around Excavation Unit 2. Excavation Unit 2 contained a Wolfe Neck-like ceramic sherd datable to the middle phase of the Woodland I period.

The site was estimated to encompass an area of approximately 1,000 square meters. Data recovery excavations sampled approximately 12.5 percent of the site within the project limits, with an additional 2 percent tested during previous fieldwork, yielding a total sampled area of approximately 14.5 percent of the site. The distribution of test pits and excavation units from Phase I, II, and III fieldwork is shown in Figure 4 (see end pocket of this report).

Field techniques utilized during the Phase II testing program were retained for the data recovery fieldwork, allowing for compatibility of data from both phases of work. A horizontal grid system established during the testing program for provenience control was reestablished at the onset of the Phase III fieldwork and was used throughout the data recovery excavations.

Excavation was undertaken in the form of 1x1-meter squares, with all soil screened for artifacts through 6-millimeter (0.25-inch) hardware cloth. Soils were excavated in 10-centimeter levels across the site. Features and soil profiles were drawn to scale and photographed with black-and-white and color slide film. Photographs of the site locale and fieldwork in progress were also taken. Excavated soils were described according to standard USDA soil textural classes and Munsell soil color notation.

PLATE 2: West Block Excavation in Progress, View to Northeast, Site 7NC-G-151

Two-liter soil samples were collected in every excavated level from 25 percent of the measured excavation units and from all feature fill. Samples were collected from the southwestern corner of the excavation unit, providing a continuous column sample. These samples were processed for the recovery of archaeobotanical and faunal remains using the Dausman Flote-tech System, a water-separation flotation device (Plate 3). Upon separation of the light and heavy fractions (Plate 4), 40 processed samples were submitted for archaeobotanical analysis and identification.

The separation of light and heavy fractions from the soil matrix permitted the recovery of lithic material smaller than 6 millimeters that normally would not be retained in field situations due to the mesh size of the hardware cloth used to screen soil. Samples of this microlithic material, or microdebitage, were analyzed for comparative purposes with the general artifact assemblage.

Ten unprocessed samples were submitted for a suite of soil chemistry analyses which included tests for total phosphorus, pH, potassium, calcium, and manganese, and the Walkley-Black technique for measuring organic carbon. The identification and collection of carbonized wood and other organic materials was undertaken for radiocarbon dating. Five samples were submitted for analysis. Determination of archaeological age was also undertaken by the use of the oxidizable carbon ratio

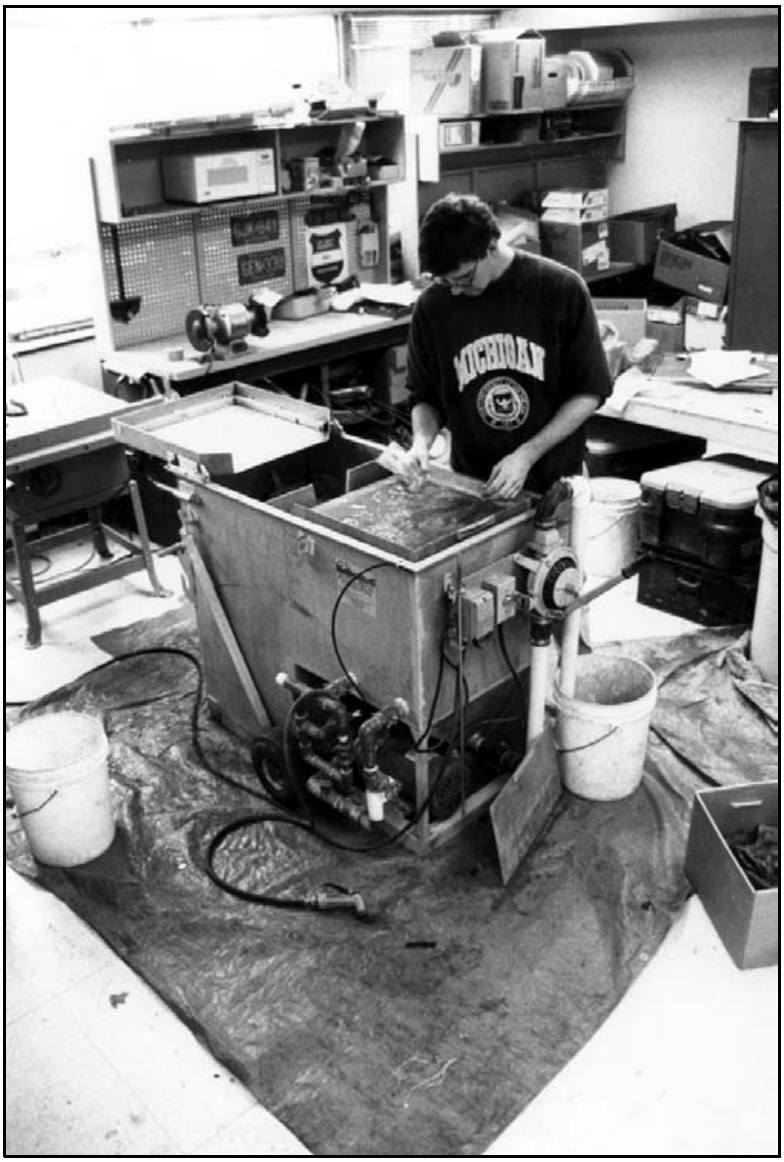

PLATE 3: Rob Shaw, Laboratory Technician, Operating Dausman Flotation Device in Berger's Laboratory, East Orange, New Jersey

PLATE 4: Sue Wong, Laboratory Technician, Sorting Flotation Fractions Through Graduated Screens

(OCR) technique. Ten unprocessed soil samples from a variety of feature and matrix contexts were subjected to this dating method. Given the reservations of the Delaware Historic Preservation Office, no analysis of residues on stone tools was planned. Artifacts, however, were collected and packaged in a manner appropriate for possible future testing.

2. Artifact Processing and Analytical Methods

A substantial artifact collection from the site had already been processed and analyzed for the preceding Phase I and Phase II investigations. In order to take full advantage of the existing analytical information, the artifact processing and analysis for the data recovery program followed the same overall laboratory procedures. This allowed integration of new information into the database already established for the site.

The artifact collections were processed for eventual storage and curation by the Delaware State Museum. Artifacts were assigned accession numbers according to the system utilized by the Island Field Museum. The assigned accession numbers for Site 7NC-G-151 are as follows:

Accession Number	*Phase of Work*
96/10	I
96/16	II
96/33	III

In addition to the accession numbers, unique catalog numbers indicating field provenience within the site were also assigned. Because different sequences of catalog numbers were used in different phases of fieldwork, references to catalog numbers in the text also include the accession number as a prefix.

After having been cleaning, the tools and diagnostic artifacts were marked with the accession number and catalog number, for example "96/16/1." Tools and ceramics were then separated from the debitage and the material was cataloged by the appropriate analyst or laboratory technician. After analysis, the collections were sorted according to major classes (bifaces, unifaces, cobble tools, cores, debitage, fire-cracked rock, etc.) and placed in resealable plastic bags with an acid-free card containing the full site provenience, the date of excavation, the excavator's initials, the catalog number, and the accession number.

Artifact cataloging and tabulation were accomplished by a computerized database system developed by Berger. The database was developed using the MicroRim, Inc., R:BASE System V relational database software package, which runs on IBM-PC XT and compatible microcomputers. The overall database for this project contains three principal files: (i) provenience, (ii) prehistoric artifacts, and (iii) debitage mass analysis data.

Full field provenience information was included in the provenience file: Catalog Number, Site, Unit, Unit Level, Stratum, Feature, Feature Level, Quadrant, and North and East. The majority of these information fields were taken directly from the excavation records and are therefore self-

explanatory. During fieldwork, a sequence of catalog numbers was assigned to the provenience list, so that each unique provenience could be identified by a single number. North and East coordinates are assigned to all excavation units and are based on the grid established during Phase II fieldwork. In addition, a Notes field was added to the database to accommodate additional explanatory information about specific artifacts. Additional fields to identify block excavations were subsequently added to the provenience table to facilitate analysis of intrasite patterning.

Berger's cataloging system for prehistoric artifacts has been formalized in a system known as Lithica (Taylor et al. 1997). The analytical approach applied can be described as technomorphological; that is, artifacts are grouped into *classes* and then further divided into *types* based upon key morphological attributes, which are linked to or indicative of particular stone-tool production or reduction strategies. However, a function(s) can be assigned to each artifact class and type. More detailed functional assessments of artifacts can be made by recording specific observations about use-wear and tool morphology. Data derived from experimental and ethnoarchaeological research are relied upon in the identification and interpretation of artifact classes and types. The works of Callahan (1979), Clark (1986), Crabtree (1972), Flenniken (1981), Gould (1980), and Parry (1987) are drawn upon most heavily. Descriptions of the tool and debitage types are contained in Chapter VII.

For prehistoric pottery sherds the following attributes were recorded: vessel portion, temper, exterior and interior surface treatment, count, and weight to the nearest tenth of a gram. Sherds were assigned to established Delaware ware types, if possible. Standard references on ceramic types for the region are found in Custer (1984), Dent (1995), Griffith (1982), and Wise (1975).