

8.0 CONCLUSIONS

8.1 Summary of Findings

The archaeological site evaluation and data recovery investigations at the Blackbird Creek site (7NC-J-195D), in southern New Castle County, Delaware, represented a detailed examination of early American Indian occupation of the Delmarva Peninsula. The investigations were undertaken as part of the environmental review process associated with the Smyrna-to-Pine-Tree-Corners segment of SR 1. The work was carried out in compliance with federal legislation, employing a work plan designed specifically to mitigate the adverse effects of road construction on the archaeological remains at the site. In accordance with a Memorandum of Agreement developed in 1987 for the entire highway construction project, field work for the data recovery excavations was undertaken by the CR Division in the fall and winter of 1999-2000.

The Blackbird Creek site lay in the Coastal Plain uplands along the southern bank of Blackbird Creek. At the time of the archaeological investigation, the site area consisted of a fallow agricultural field adjacent to a recently demolished historical farmstead (7NC-J-202). Both historical and prehistoric components were present. In an effort to fully define site boundaries and to identify and characterize artifact concentrations, initial site evaluation work entailed the excavation of a 10-m-interval grid of shovel tests across the terrace landform on which the site occurred. Subsequently, 1-x-1 m test units were excavated to investigate artifact concentrations discovered in the shovel test survey and to locate subsurface features. Test unit excavation was followed by mechanical stripping of the plow zone from parts of the field in 3-m-wide trenches with the purpose of revealing cultural feature patterning. As a result, a group of closely-spaced prehistoric pit features containing Early Woodland ceramic wares was exposed and sampled. Based on these findings, the prehistoric component of the Blackbird Creek site was determined to retain sufficient integrity and research potential to meet eligibility criterion D for listing in the NRHP. The historical component of the site consisted of numerous posthole features and a widespread plow zone artifact scatter. The postholes were not associated with domestic or agricultural structures, but represented fence lines and corrals related to the nearby historical farmstead. The historical component of the site did not exhibit further research value and was found not eligible for NRHP listing. Subsequent data recovery investigations thus focused on the prehistoric component at the site, continuing with plow zone removal across a wide area beyond the initial 3-m trenches with the aim of exposing additional prehistoric features, revealing their horizontal patterning, and allowing detailed examination of their contents.

Stratigraphically, sediment deposits at the site consisted of a plow zone overlying culturally sterile subsoil with no intervening cultural deposition. Based on the types of artifacts found and their distributions across the landforms, it was apparent that occupations on the terrace above the creek at this location had been few and non-intensive. Almost all of the artifacts recovered from the site were from the plow zone. Numerous features were documented beneath the plow zone, ranging from natural disturbances related to tree growth or animal burrowing to pit features excavated by various people who had visited or occupied the site over the centuries. The most important features were the group of pits discovered in the

evaluation phase of the investigation concentrated along a terrace overlooking the creek floodplain. These features became the main focus of the analyses detailed in this report.

Few diagnostic artifacts were recovered. The diagnostic forms that are most frequently found on prehistoric sites in the region are projectile points, yet the small number of points from the Blackbird Creek investigation were heavily reworked or damaged, and none could be confidently ascribed to accepted types and used for dating. In contrast, ceramic sherds contained in the pit features, along with a series of secure and precise AMS dates, firmly placed the occupation represented by the features at the start of the Early Woodland period. The dates returned on charcoal from ten of the pit features were remarkably consistent, with a mathematically derived average date of 3002 ± 13 BP. The ceramics from the features consisted of the Early Woodland wares, Marcey Creek and Dames Quarter.

The pit features on the terrace exhibited distinctive and consistent shapes: most were round, with straight or steeply sloping sides and flat bottoms. The features were clustered on the terrace in an area with poorly drained soils, suggesting that they had served a distinct and specific purpose. The dates from the features, as well as their artifact contents and regularly spaced, linear distribution, further suggested that the pits were related temporally and functionally. Possible uses were reviewed in analyses based on the form and contents of the features themselves, comparative studies of similar features in other archaeological contexts, and ethnographic and ethnohistorical descriptions of various activities involving similar excavated pits. While an entirely convincing explanation was not found, evidence suggested that the features were related to the processing of natural resources, in particular the extraction of oils from nuts or fish. Several lines of evidence, including the creek terrace location, the poor drainage characteristics of the soils, and minor but systematic variations in the forms of the pits, suggested that an organized process of rendering oil from fish harvested seasonally from the creek was a likely interpretation.

The following concluding sections of the report further review the findings of the investigation and consider some of the implications of the analyses.

8.2 Research Contributions

8.2.1 Chronology

A suite of closely related AMS dates was one of the significant results of the investigations at the Blackbird Creek site. Ten dates were returned on samples from the pit features, exhibiting a narrow range from 2930 ± 40 BP (cal 2σ AD 1264 to 1010; Beta -149990) to 3090 ± 40 BP (cal 2σ AD 1439 to 1263; Beta -149983) and a pooled radiocarbon age of 3002 ± 13 . The dates, being from sealed features, provided secure results that were precise and consistent. Further, the dates correlated with accepted ranges of diagnostic artifacts from the features, which included examples of the early ceramic wares, Marcey Creek and Dames Quarter. No clear evidence for other substantial chronological components was recognized at the site. In sum, the temporal data indicated the presence of intact deposits representing a single cultural component comprising a very limited time span. Archaeological sites with focused data of this type are unusual in the region and represent significant research value.

8.2.2 Materiality and Technology

Ceramic Technology

Artifact assemblages were recovered from the site that shed light on a key period of technological change in the region, the introduction a new form of rigid container technology, pottery. Ceramic sherds from the site consisted of examples of the earliest stages of ceramic use in the region, the wares often being termed “experimental,” reflecting the novelty and innovation seen in the period. While the collection was not extensive in terms of the number of sherds, it was notable for several findings that helped define the wares. First, a secure and focused set of AMS dates was associated with the artifacts, refining their temporal context. Further, clear evidence of manufacturing characteristics was documented in the Dames Quarter sample, including modeled construction and matting or fiber impressions on several basal sherds. Indications of a piedmont-orientation were observed including the flat-bottomed form of the vessels and the modeling techniques used in manufacture, both of which were specific attributes of the original wares in piedmont regions. Additional influence was seen in the use of materials for temper such as steatite and black stone (hornblende or quattz diorite), that are typically associated with piedmont areas.

The results of petrographic analysis of thin sections from archaeological sherds and local clays, moreover, suggested that the pots could have been made by people in the immediate vicinity of the site. In addition, the two wares, Marcey Creek and Dames Quarter, may not have been mutually exclusive in terms of their manufacture and use. While the data did not provide clear evidence, the fact that the pots may have been manufactured locally and the presence of the sherds together in sealed features suggested that they may have been contemporary, manufactured and used at the same time. Alternatively, their co-occurrence may exemplify the technological transition between the wares. If we assume that the gravel-tempered Dames Quarter vessels were fashioned directly on the Marcey Creek model, replacing steatite as temper with a different type of stone, although still of piedmont origin, would have been a likely step in the process of transition.

The ceramics from the Blackbird Creek site were examples of the earliest wares in the Middle Atlantic region, and as such they may provide evidence concerning the speed with which ceramic technology spread throughout the region. The dates associated with the sherds at the site clustered around 3000 BP and were among the earliest that have been reported for the wares. While less clear, the modeled rather than coil constructed forms were possibly examples of the original manufacturing technique. The data thus suggested that the ceramics at the site were early manifestations of the new container technology, appearing in Delaware not long after their initial appearance in the region overall. Researchers have assumed that ceramics originated in the Middle Atlantic in piedmont areas, occurring geographically in rough correspondence with steatite sources and areas in which steatite bowls were most prevalent. The advent of ceramics in this region appears to have been similar to their introduction in the Southeast, 2,000 years earlier, in that initially the items were linked to steatite exchange in both regions. Yet the parallels do not necessarily run deeply. Evidence suggests that widespread adoption of ceramic technology in the Southeast was slow to develop. In contrast, more rapid acceptance of the technology seems to have occurred in the Middle Atlantic region, and the data from Blackbird Creek may be among the earliest examples of the distribution.

Ultimately, the impetus for adoption of ceramics in the Middle Atlantic is unclear, as is the reason for the long delay following their appearance in the Southeast. Theories have been advanced regarding the effects of prevailing social systems on the timing of the introduction, suggesting that Middle Atlantic societies were not geared toward generating the surpluses that would have made ceramics useful for resource processing and storing, or that there were fewer transegalitarian societies present in the region engaged in the forms of prestige and feasting activity that have been proposed as the force behind ceramic adoption in other regions. Yet when ceramics did appear in the region, they were more directly imitative of existing containers than in the Southeast, copying not only the wide, flat-bottomed and lug-handled form of stone bowls, but employing parts of the bowls themselves in the form of steatite as temper.

The Relationship between Material Culture and Society

Manufacturing technology is often viewed as a planned sequence intended to generate items having a standard design or form. Models of sequence such as the *chaîne opératoire* are sometimes used to assess these technologies and their effects on society and individuals. The models describe not only standard sequences, but may further attempt to account for what has been referred to as situational variability, or the possibility that changes in the implementation of a design may result from such things as variations in raw material, craftsmanship, or personal choice (Bleed 2001). This approach may be viewed as part of a wider concern regarding the relationship between cultural tradition and the individual. Some current anthropological theories hold that social relations are manifested and reinforced through everyday activities, present in both the immediate context of material culture and within a framework of tradition, beliefs and values. The core of this dynamic is the relationship between individuality and tradition, sometimes referred to as agency. Technology is embedded in culture; it is traditional, and therefore constrained by culture, yet not blindly determined by it. The notion of dependent invention in the acceptance of ceramic technology has been cited as an example of individual craftsmen serving as agents, selecting those parts of a new technology that they view as acceptable or appropriate rather than receiving the technology in its entirety (Bedard 2011; Clark and Gosser 1995).

A standard design or form is recognized in the earliest ceramics from archaeological sites across the Middle Atlantic region—a wide opening, shallow depth, straight sides, a flat bottom, modeled construction with a heel at the base, and lug handles. The form is consistent and repetitive, and as such it is constrained, probably by more than the requirements of function alone. While some constraints may have been related to the non-utilitarian, ceremonial or symbolic uses to which the earliest vessels were put, in total they exemplify the overarching notion of social *habitus* or the socio-cultural forms that limit individual expression. Situational variability may soon have been introduced to the system in this region as potters working outside the original, ceremonially oriented sphere would have found steatite difficult to obtain for more general use as temper. The experimentation phase recognized by researchers in the 1970s and '80s represented a period of selection, as individuals worked within the original forms, still producing wide-mouthed, flat-bottomed vessels, but used various materials for temper, some of which, like the black stone in Dames Quarter, maintained the piedmont orientation of the original wares. Eventually

experimentation waned and a standard practice again developed, as sand-tempered wares such as Accokeek spread across the region in a general lack of variation, following a move away from ceremonial/prestige functions of the containers toward everyday uses. Personal choice, or individual agency, is seen in the selection of temper during the experimental period as ceramics broke from the traditional, ceremonial role. Further, although many researchers see little substantial change in subsistence practices as a result of the introduction of ceramics, their appearance would have become the motivating factor in new food preparation practices, such as longer cooking times using direct heating, and thus as some theorists note, the objects themselves would have become the agents of change.

8.2.3 Intra-site Patterning and Social Organization

Site Structure

Several lines of evidence were advanced during the current investigation to suggest that the round, flat-bottomed pits located on the terrace above the creek had been used in rendering oil, probably from fish. The site was located along a third-order stream that would have offered good spawning habitat for fish such as blueback herring, while the physical configuration of the stream directly in front of the site would have been ideal for intercepting and harvesting these fish. The shapes of the pit features and the moisture retaining nature of the soils into which they had been excavated would have been appropriate for stockpiling decomposing fish remains and for using indirect cooking procedures to render the resulting oils. The sizes of the thermally altered stones that were associated with the pits, as well as the purposeful selection of sandstone and quartzite, stones that represented minority types within the Blackbird Creek steam bed but were well-suited for repeated heating and cooling, indicated intensive indirect heating activity. The regular spatial patterning of the pits suggested that the features may have served multiple, staged uses throughout the spawning season as fish were captured and subsequently processed. The round, flat-bottomed pit form may also have been designed for below-ground storage of the final oil product, presumably in flat-bottomed ceramic vessels, evidence for which was prominent in direct association with the features.

While conclusive evidence was not present to verify this theory, analysis of the distribution of the features revealed clear patterns of functional interrelationships that had direct implications for the size and duration of occupation, or the number of people working at the site and how long they may have stayed there. The linear arrangement of the pits along the bluff-side terrace appeared to have been designed to take advantage of surface run off in a part of the site where subsurface drainage was poor. The features exhibited a seemingly distinct layout based on their shapes. Two smaller basin-shaped pits were flanked on both sides by larger, cylindrical-to-bell-shaped pits. A third sub-type, with steep-sides and flat-bottoms, occurred along both outer ends of the feature line. Were this arrangement of pits indeed involved in the rendering of fish oil, the smaller, basin-shaped features may have been hearth locations that served either as cooking features or for heating stone for the rendering process. The hearths would have been flanked by either side by deeper pit features, used perhaps for holding decomposing fish. And located on the margins of the linear pattern would have been processing pits where oils could be rendered through indirect heating.

Whether or not this interpretation is entirely accurate, the distinctive and regular spatial patterning of the features clearly suggested an intentional division of space. Moreover, the formal shapes of the features and the significant labor investment required to construct them pointed to a level of planning and by extension, an intensity of intended use that would justify that investment.

Complexity and Heterarchy

Conventional models of settlement organization in Delmarva at the end of the Late Archaic period and the start of the Early Woodland have been criticized as rigid and deterministic. An appropriate alternative description of the social organization behind settlement in the region might involve a notion of non-progressive development of social complexity, a perspective that suggests there is not an inevitable, evolutionary scale of development within socio-cultural systems. A progressive scale of complexity implies a hierarchical system in which the elements of society are arranged in some form of regularized, dependent order. Models that have typically been cited as the basis of settlement patterning in the Middle Atlantic—base-camp/support-camp settlements or macro-band/micro-band settlements—are examples of hierarchical systems, carrying implications of dependency and ranked ordering among the components. In contrast to this form of strict ordering, heterarchical systems are composed of elements that may be both independent and interdependent. A heterarchical social organization would include settlements whose relationships might vary depending on the specific conditions present during the occupations, whether environmental, seasonal, social, political, ceremonial, or some combination of factors. Unlike the pyramidal structure of the hierarchical macro-band/micro-band model, a heterarchical structure would typically be flat, with associations between the elements extending laterally in most cases rather than vertically. The context of such relationships is described as situational and the duration short-term. As an element of a heterarchical system, the Blackbird Creek occupation would not necessarily be linked in a dependent relationship to a larger settlement—part of a fission/fusion structure governed by seasonality, for example. While the people living at the site may have been part of a larger polity, as Dent and others have suggested were beginning to form at the end of the Late Archaic, and while the occupation may have been seasonally structured around seasonal resources such as the spawning runs of fish, in the end there was little evidence connecting the site on a functional basis with any other specific location.

Ceramics from the site may also bear on the notion of social complexity. Several researchers have argued an essentially economic basis for the way ceramics were adopted in the Middle Atlantic, implying the presence of a hierarchical socio-political organization in which certain groups controlled steatite exchange systems and later were responsible for the earliest pottery in the region (Bedard 2011; Klein 1997). Using steatite for temper and mimicking the form of undecorated stone bowls would have linked the new ceramic containers as closely as possible to the controlling groups, allowing those groups to maintain influence through their domination of access to and exchange of the artifacts as well as the materials from which the artifacts were made. The presence of experimental wares at the Blackbird Creek site, particularly the grit-tempered ceramic known as Dames Quarter, suggested that the people working at the site were not necessarily dependent on the original source areas, either directly or through exchange networks. They may have obtained an alternative form of

temper, black hornblende or quartz diorite, from gravels in the area or from groups in the Delaware Piedmont with whom they were engaged differing, interdependent relationships.

Landscape

Evidence from the Blackbird Creek site investigation corroborated patterns observed in the literature of Early Woodland settlement throughout the Middle Atlantic region. Despite seeming variations in site distributions across the region, certain material culture characteristics appear to be consistent in archaeological contexts from the period, including the presence of relatively few artifacts, and in particular little lithic debitage; the introduction and initial surge in use of ceramic containers; and the emergence of large pit features implying large scale processing activities and storage, in turn implying efficiency (or in Dent's term, intensification) in resource procurement. Further, group size often appeared to have been small. These characteristics vary from data developed from Late Archaic site contexts that indicate greater population and an emphasis on lithic tool kits. The differences imply an alternative view of the landscape that may have been less an environmental response than a cultural variation, following the theory that landscapes are dynamic, culturally constructed worlds (Anschuetz et al. 2001).

Environmental adaptation has been an important theme in the development of conventional settlement models in Delaware. Various researchers have proposed models that emphasize the movement of people between different environmental zones, which in the Delaware coastal plain occur close together. For the people who occupied the Blackbird Creek site, however, the location was more than just a point in the natural environment. They came to the creek for a specific reason, perhaps to harvest fish during seasonal spawning runs. But the choice of the location highlights the ability of the individuals to make decisions, to plan and control their lives, a trait we all exhibit. The site became part of the personal landscape of the inhabitants. In this sense, the people who lived there altered the landscape from a natural environment to a culturally conceived world. They brought with them implements of a material technology, ceramic containers, not previously used in the region. Forming tools from soil in this way would have further changed their relationship with the landscape. Patterns of movement across the land would have been altered due to the fragility of the pots. Storing or caching the containers and their contents or knowledge of specific clay sources would have influenced the character of settlement. And finally, social relationships regarding the manufacture of ceramic containers may have altered personal relationships within social groups or between communities, fostering what one researcher called "substantial, durable changes to the natural world" (Boivin 2008:136).

8.3 Future Directions

The research conducted at the Blackbird Creek site provided valuable information about a variety of aspects of American Indian life in Delaware in the era before European settlement. The study, as detailed in this report, included analyses of a large amount of data collected in the field and lab investigations, and from these analyses developed interpretations about how people lived at the site. Continuing evaluation of the analytical methods and techniques used in the study also resulted in an appraisal of the processes employed.

8.3.1 AMS Dating

AMS assays contributed significantly to placing the Blackbird Creek site within the regional chronological framework, and aided in the recognition that round, flat-bottomed pit features were probably contemporary. These assays also contributed to a refined understanding of the chronology of the two early ceramic wares identified at the site. The success of this technique at the Blackbird Creek site owed largely to the context of the submitted samples. All of the samples, derived from small fragments of wood charcoal many of which were obtained from soil flotation, were recovered from sealed pit feature contexts contained within dense clayey soils with little evidence of disturbances such as animal burrows or root channels. Similar analyses were conducted at the nearby Sandom Branch site complex, Frederick Lodge site complex, and the Black Diamond site, all located within the Smyrna-to-Pine Tree Corners segment of SR 1 (Versar 2011a, b, and c). While the AMS dates obtained from these sites were accurate, many did not align well with dates that were expected based on associated diagnostic artifacts and stratigraphic contexts. Aside from preservation issues related to organic materials in the generally acidic soils, the discrepancies were considered to have been largely due to mixed depositional contexts. Most of the assays were derived from carbon in bulk sediments obtained from near surface feature contexts, such as thermally altered stone concentrations, or directly from natural stratigraphic contexts within test units consisting of sandy matrices and active bioturbation.

The AMS process is a valuable analytical procedure that can elicit absolute chronological data from very small fragments of organic material. Features and artifacts cannot normally be dated directly. Rather, they are dated on the basis of their association with material from which absolute dates can be obtained, such as a fragment of burned wood or other carbonized material. In every case, the relationship between the material that is dated and the artifact must be clear. In contrast to material submitted for AMS dating, the contexts of specimens that can be dated through conventional radiocarbon assay are often easier to demonstrate since the material is present in large pieces. Small, free carbon particles occurring in sediment matrices are more susceptible to post-depositional movement, and consequently, more scrutiny must be applied to their contexts. Aspects of sediment character, the size of the targeted particles, potential issues of soil chemistry and preservation, as well as natural or cultural disturbance processes, should all be accounted for in order to obtain the most effective use of this analytical technique. The value of AMS dating is undeniable, and we recommend that more resources be devoted to establishing the fine-grained chronologies offered by the dating technique, yet we further urge that close attention be paid to obtaining samples from discrete, carefully documented contexts.

8.3.2 Ceramic Thin Section Studies

The petrographic study of ceramic thin sections conducted as part of the current investigation resulted in a detailed catalog of the mineralogical constituents of temper and clay in a sample of sherds from the site. Similarities between the pastes of the artifacts and a local clay sample had implications for ceramic manufacturing locale and raw material sourcing. While the sample for this study was small and focused on the immediate site vicinity, a more comprehensive study that includes a broader geographical area would add to a small but growing database of clay sources, and would contribute to a better understanding of prehistoric American Indian ceramic manufacturing. Such a study, combined with a

synthesis of ceramic petrographic analyses that have been published to date, could utilize curated ceramics and systematic clay sampling to focus on particular wares and geographic areas. Additionally, this type of analysis lends itself to stand-alone study that could be conducted outside of the constraints of a typical cultural resource management investigation. Overall, the current study demonstrated that useful data may be anticipated from similar or even more ambitious analyses in the future.

8.4 Final Conclusions

In conclusion, the archaeological investigations undertaken on behalf of DeIDOT at the Blackbird Creek site have been successfully completed (Figure 8-1). The testing program indicated that valuable information about Delaware prehistory was present in the proposed highway right-of-way. The data recovery program included retrieval of the information using specific research questions as a guide to the investigations. The adverse effects of the proposed construction were mitigated by the research conducted at the sites. It is thereby held that the goals of the archaeological investigations at the Blackbird Creek site have been satisfactorily achieved.



Figure 8-1. Data Recovery Excavation Area Following Plow Zone Removal.

Our investigation of the Blackbird Creek site showed that 3,000 years ago people came to this section of the creek to acquire critical resources from the immediate environment. They dug specially designed pits in a planned manner across a terrace overlooking the creek, harvested plants or animals, possibly fish that they caught in the narrow creek, and they processed the harvest in additional pits using heated stones. The pits and fragments of heated stone and ceramic containers became the major physical traces of these past activities that we encountered during our archaeological investigations. The group of people who left this

material was small and their stay along the creek appears to have been brief. While they may have returned for more than one visit, they did so only a few times.

Examining small sites such as the occupation at Blackbird Creek is a critical part of understanding American Indian life ways from the past. Added to the greater archaeological record, these studies can help provide a clearer picture of the resources exploited by the people, how patterns of exploitation may have changed over time, and how that change may have affected dynamics within the social groups. From a practical standpoint, archaeologists often find that while small sites do not contain the volume of rich archaeological data—artifacts and features—recovered from larger settlements, it may be easier to recognize imprint of small groups of people from the more discrete traces of their activities. Less evidence may sometimes mean that the lives of the people at small sites can be more readily understood.

And it is, of course, those people, the American Indians who once made Delaware their home, who are the focus of our inquiry. As archaeologists we necessarily focus on the tangible aspects of the past, the remains of material culture. Pit features, fragments of heated rock, and ceramic sherds provide the evidence we use to comprehend past ways of life. While we may focus on measuring, counting, and manipulating our data, we should not lose sight of the living individuals who created the archaeological record. Archaeology may be the study of things, of physical remains, but it is ultimately a part of anthropology, the study of human beings. However informative and detailed our analyses, we must recall that our ultimate goal is to arrive at an appreciation of the people who are manifested in the archaeological record.

Thus, small sites in upland areas remain a valuable part of the archaeological record of the region, and their study should not be neglected in the future. The information collected from them may be particular, but it adds incrementally to the existing database of previously recorded occupations, bringing the patterns of use of the region throughout prehistory into increasingly clarity.