

PREHISTORIC BACKGROUND

A summary review of the project area's prehistoric background is provided in this section. The first topic addressed is the chronological development of Delaware's prehistoric aboriginal cultures from the earliest occupation of the region around 10,000 B.C. until the time of contact with European settlers in the 17th century A.D. The second part discusses prehistoric settlement patterning in the vicinity and addresses the potential preservation of prehistoric sites underwater.

Prehistoric Cultural Development

Archeological investigations in Delaware and the Middle Atlantic region have served to identify the sequence of major cultural developments over the term of the Prehistoric Period. This has led to the establishment of a cultural chronology extending from the close of the last Pleistocene Ice Age to the early decades of European colonization. The known cultural developments may be interpreted as relating to influences from socio-cultural factors and variations in adaptive strategies associated with changes in the natural environment.

The prehistoric American Indians who inhabited Delaware followed lifeways that maintained a substantial degree of cultural continuity over a period of approximately 7,000 years (from about 10,000 B.C. to around 3000 B.C.). According to the archeological record, the culture of the aboriginal peoples subsequent to 3000 B.C. considerable elaboration and diversification.

Scientific archeological investigations in the region have shown that clearly identifiable developments in settlement patterning, technology, and social organization can be discerned over the period characterized by prehistoric cultural activity (Custer 1983, 1984). It is also apparent that the cultural traditions of Delaware's prehistoric inhabitants exhibited remarkable longevity and continuity until the arrival of European colonists early in the 1600's.

Through most of Delaware's prehistory, its American Indian inhabitants were generally organized into small bands. The nuclear family appears to have been the fundamental base of society, though multi-generational extended families were likely to have been the most common form of band organization. In general, these people followed a way of life that relied on hunting, fishing, and gathering of naturally occurring plant and animal foods.

In later prehistoric times, settlements of larger size developed indicating the emergence of more complex social organizations. Subsequent to about 1,000 years ago the practice of cultivating food crops came to be widely practiced. This developed into an important supplement to the earlier subsistence strategies that relied on natural food resources exclusively.

Archeological interpretations of the region's prehistory have traditionally recognized three major chronological periods. These were largely defined on the

basis of material technology as it could be readily discerned by variations in lithic implements, and by the presence or absence of diagnostic pottery types. The traditional tripartite arrangement is as follows: Paleoindian (circa 10,000 B.C. to 8000 B.C.), Archaic (c. 8000 B.C. to 1000 B.C.), and Woodland (c. 1000 B.C. to A.D. 1600). For an overall description of these prehistoric periods the reader may consult Thomas (1976).

With the great expansion of knowledge concerning the Middle Atlantic region's prehistory over the past decade, the traditional tripartite Paleoindian-Archaic-Woodland scheme has undergone considerable reassessment. Recent researchers have focused attention on the interrelationships between culture and the environment. This approach has led to the development of more meaningful interpretations of prehistoric societies than could be obtained from restricting scientific interest to material remains.

Custer (1983) provides a discussion of several important findings of this research. He has also combined the findings and insights of several fields of study and interpretive orientations, among them geography, environmental evolution, settlement patterning, and social organization. This approach has resulted in a more comprehensive and detailed understanding of Delaware's prehistory than existed before.

A variation on the traditional tripartite scheme for classifying the prehistoric chronological periods has been proposed by Custer (1983). His analysis makes distinctions largely according to evolutionary changes in the natural environment during the post-glacial era, and the resulting cultural adaptations in subsistence strategies and settlement distribution and types. This revised chronology of cultural periods is as follows: Paleoindian (circa 10,000 B.C. to 6500 B.C.), Archaic (c. 6500 B.C. to 3000 B.C.), Woodland I (c. 3000 B.C. to A.D. 1000), and Woodland II (c. A.D. 1000 to A.D. 1600).

It appears that the traditional terminology may be misleading and inadequately reflect Delaware's prehistoric cultural evolution in light of recent research. As a consequence, the sequence proposed by Custer will be utilized for the purposes of this discussion.

While cultural development and changes prior to about 3000 B.C. appear to have been limited in scope, advancements in technology did take place. According to the archeological record, technological developments were largely related to the lithic tool kit utilized by prehistoric peoples. Non-lithic technology probably underwent developmental change also, though evidence of that has not been sufficiently preserved in Delaware's archeological sites to have been recognized so far.

A commonly used means for identifying the chronological association of prehistoric cultural deposits is the type of lithic projectile points associated with a site. The term "projectile points" is generic and includes spear, dart, and arrow points attached at the end of a shaft in order to make a weapon useful

for hunting. This artifact group has been extensively collected, studied, and classified into chronological typologies. A variety of distinctive stylistic projectile point categories have been identified and dated.

The changes in configuration of chronologically diagnostic projectile points are indicative of technological development in the prehistoric lithic tool kit. The most ancient points are fluted spear heads that were fastened on the ends of shafts and were used as thrusting spears by the peoples of the Paleoindian cultural period. These spears had a very limited effective range.

The development of shorter and lighter throwing spears was a major technological advancement. With the assistance of a throwing stick ("atlatl"), shorter spears with smaller lithic points could be propelled over substantial distances with killing force. This was much more efficient for hunting than the exclusive use of thrusting spears. These throwing spears, or darts, were characterized by points that were stemmed or notched. They are generally diagnostic of Custer's Archaic and Woodland I cultural periods (Custer 1983).

The next major improvement in weaponry was the adoption of the bow and arrow. By this means a lightweight shaft tipped with a smaller triangular point could be propelled over greater distances using a bow. The "arrowhead" associated with this technology was characteristic of the latest major prehistoric period, Woodland II (Custer 1983).

Chronological sequences incorporating distinctive projectile point styles have been established throughout the United States. For prehistoric sites lacking pottery (which is not found in cultural deposits predating the Woodland I period), projectile points are the best diagnostic artifacts for identifying chronological association.

The other tools incorporated into the prehistoric people's lithic technology also underwent development and change over time. These were largely related to the availability of various food resources that occurred naturally in the Indians' environment. For example, during the Paleoindian period the region's cooler climate was not conducive to an abundance of edible plant foods that required processing to prepare them for consumption. It is therefore not surprising that lithic tools relating to the processing of plant foods are not common among the rare cultural remains of the Paleoindian era.

During post-glacial times the natural environment ameliorated and plant foods became substantially more abundant. A major portion of them, however, needed to be prepared to make them fit for human consumption. Archeological remains dating to those later times show that the prehistoric peoples substantially modified their lithic technology to include tools for processing plant foods.

The appearance of ceramics in the archeological record was formerly considered as the definitive trait of the traditional "Woodland" cultural period. However, Custer (1983) has chosen to define Woodland I on the basis of what

appear to be dramatic changes in the Indians' socio-cultural manifestations. Similarly, evidence of subsequent socio-cultural changes is employed to define Woodland II. That final stage of prehistoric cultural development is also marked by the adoption of horticultural practices (agriculture) as a supplement to the generalized traditional subsistence pattern dependent on hunting, gathering, and fishing.

It appears that the Woodland II aboriginals followed a modified seasonal round pattern of settlement in which the productivity of various food resources during the annular cycle was a major factor. The dependence on natural food resources was not total, however. The practice of horticulture became well established and Woodland II people occupied semi-permanent villages for a substantial portion of the year. Important food crops were maize, squash, and beans.

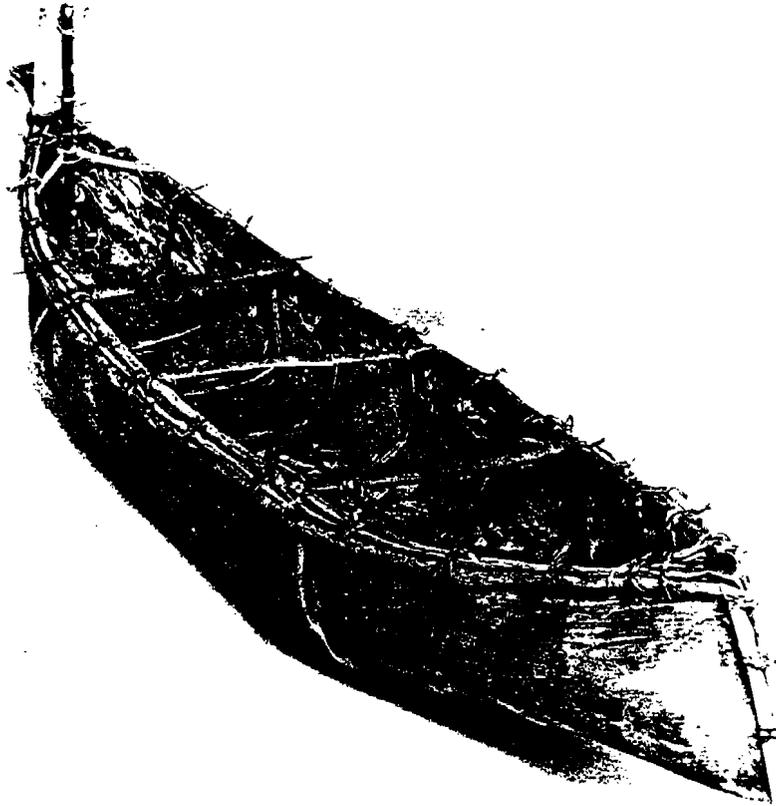
At the time of European contact the Indians of the Middle Atlantic region's coastal area were observed to fabricate and use dugout canoes for waterborne transportation (Roberts and Shackleton 1983). These canoes were made by hollowing out large tree trunks (Figure 5). From the Delaware River area northward Indian boat builders also constructed canoes made from the bark of trees. These were built by attaching an outer skin of birch or elm bark sections to a light weight framework of wood lashed with rawhide (Figure 6). Both types of watercraft were very efficient when used for fishing or travel over protected waters (Figures 7 and 8).

FIGURE 5
Indians Fabricating a Dugout Canoe (circa 1590)



(Alexander 1976)

FIGURE 6
Indian Canoe Made From Elm Bark (circa 1820)



(Roberts and Shackelton 1983)

FIGURE 7
Indian Dugout Canoe and Bark Canoes (circa 1650)



(Tyler 1955)

FIGURE 8

Indians Using a Dugout Canoe for Fishing (circa 1590)



(Alexander 1976)

During the period of early contact with Europeans, the aboriginal inhabitants of Delaware generally did not resist colonial settlement. There was, however, at least one major incident of conflict when the Dutch colony named "Swanendael" at present day Lewes was wiped out by Indians in 1632.

Despite that incident, European interest in the Delaware Bay region continued. It became an area of substantial importance to early colonial settlement in the Middle Atlantic region. In 1638, the European colonization of Delaware was permanently established with the founding of the New Sweden settlement at present day Wilmington.

Even though most of Delaware's aboriginal inhabitants accepted the European presence and engaged in active trading, unforeseen consequences resulted. Much of the American Indian population subsequently died as a consequence of diseases inadvertently introduced from Europe. Many of the surviving bands migrated to locations further inland away from the European colonial settlements. Others stayed in Delaware where their descendants still reside, particularly in the southeastern part of the state.

Settlement Distribution, Known Sites, and Potential Preservation

There have been no underwater prehistoric archeological investigations conducted in the vicinity of the project area. As a consequence, the information on which this discussion is based must be derived from other relevant studies. They include research relating to upland prehistoric cultural deposits, coastal and marine geological studies, and geotechnical borings made in the river crossing areas.

The food resource potential of the project area vicinity during the initial part of the prehistoric period was probably less than later after the climate had warmed. Prior to the creation of marshes in the vicinity due to rising sea level, the surrounding terrain would probably have consisted almost entirely of forested uplands.

Prior to about 4000 B.C. the project area's terrain was dissected by narrow stream valleys carrying the ancestral Smyrna River, Mill Creek, and Leipsic River. Those watercourses were then free running upland streams confined to narrow valleys bounded by uplands. Within their valleys, each of the three may have meandered to some degree. The food resources exploited by the aboriginal inhabitants would probably have been limited to upland game animals, and wild fruits and nuts, all of which varied in availability on a seasonal basis.

For several millennia following the initial human settlement of the region, the population of the project area vicinity was probably very low. During that time span, east of present day Delaware Bay there was a vast coastal plain that may have been more attractive to settlement. Portions of that ancestral coastal plain probably would have been covered by grasslands and may have been thickly populated by grazing herd animals. That type of resource base is likely to have

more attractive to the prehistoric hunters of those times than the more limited food resources of the interior forested uplands.

However, as the centuries passed the ancestral coastal plain's progressive inundation by rising sea level would have forced its aboriginal inhabitants to migrate westward towards higher ground. One likely consequence of this would have been an increase in the project area's human population.

By around 4000 B.C. the rising level of Delaware Bay had resulted in the development of estuarine marshes along the lower watercourses of eastern Delaware. A result of the inundation process would have been a substantial increase in the amount of shellfish, fin fish, and water fowl in the vicinity. The increase of food resources would have greatly enhanced the carrying capacity of the area for supporting a human population who obtained food by hunting, gathering, and fishing.

Previous archaeological investigations have identified several prehistoric sites in the vicinity of the project area. These sites are situated on level upland terrain and are predominantly located near the valleys of the Smyrna River, Mill Creek and Leipsic River.

It has generally been found that sites of prehistoric occupation in the project area vicinity tend to be located near reliable sources of fresh water. Proximity to exploitable natural resources was an important consideration, also. For example, an estuarine waterway containing edible shellfish would have been a desirable exploitable resource.

Another important factor for site location was terrain suitable for habitation. For example, evidence of aboriginal camp sites is more likely to be found on level well drained terrain than on moist or sloping terrain. However, as discussed earlier in the section on environmental setting, possible reasons for the lack of reported sites in moist or wetland terrain include the failure to look for or recognize them.

All the documented prehistoric occupation sites known to exist in the vicinity of the three bridge crossings are situated on upland terrain near watercourses. These locations are generally level and well drained, making them suitable for habitation. Their settings allowed easy access to stream valleys and marshes as well as interior uplands. No prehistoric sites have been found so far in the vicinity's low lying and thickly vegetated stream valleys.

Known prehistoric sites in and near the project area include camps ranging in size from very small to large. The prehistoric cultural deposits found in and near the Delaware Route 1 Corridor all date to the Archaic, Woodland I, and Woodland II periods. Most of these sites served as temporary microband base camps (Bachman and others 1988).

Since the aboriginal inhabitants of the vicinity probably practiced a seasonal round of migration during most of the prehistoric period, locations of settlement sites are likely to have been shifted from season to season according

to the availability of various natural food resources. Even though the people of the Woodland II period were more sedentary because of their horticultural subsistence practices, they also occupied smaller temporary sites for non-agricultural resource exploitation activities such as gathering, hunting, and fishing.

While aboriginal cultural deposits are relatively abundant in the upland terrain of the surrounding region, it remains unknown whether prehistoric cultural remains are preserved intact beneath the submerged terrain of the project area vicinity. It is most accurate to observe that no evidence of their presence has been found inside the three bridge crossings.

The three stream valleys in the project area are relatively narrow and had generally steep sides prior to their inundation. On the other hand, there is terrain nearby that would have been quite suitable for settlement. This appears to indicate that aboriginal sites are most likely to have been situated in those places where they have already been found, the generally level uplands adjacent to stream valleys.

In addition, the chronology of aboriginal population movement towards higher elevations that was probably forced by sea level rise should be considered. Prior to around 4000 B.C., the project area consisted of interior uplands remote from the coastal plain tidewater zone. Vast lands that are likely to have been more attractive to aboriginal settlement lay towards the east. By the time rising sea level had inundated those eastern lands, the development of prehistoric culture had entered the Archaic period. As a consequence, it may be that Paleoindian and later cultural remains predating 4000 B.C. are most likely to be absent from the project area vicinity.

The environmental evolution of eastern Delaware suggests that submerged prehistoric sites may be preserved further downstream from the project area vicinity and/or beneath the waters of Delaware Bay. The known distributional patterning of prehistoric sites in the Middle Atlantic region suggests that Paleoindian and pre-4000 B.C. Archaic sites were most commonly located along the courses of Pleistocene and early Holocene streams (Custer 1983, 1984). That association is probably valid also for ancient watercourse alignments that are presently submerged beneath Delaware Bay.

The extensive shoreline erosion associated with sea level rise must have disturbed or destroyed the integrity of many prehistoric cultural deposits. Following their submergence, however, surviving cultural remains may have been buried under thick layers of marshy or sedimentary deposits and subsequently protected. It appears, therefore, that a reasonable potential exists for prehistoric artifacts and sites having varying degrees of integrity to be present at suitable locations on or beneath the floor of Delaware Bay.

The rising level of Delaware Bay would have completely inundated the three bridge crossing areas no later than approximately 1,000 years ago. That would

have been about five millennia after the initial development of estuarine marshes in the vicinity which began about 4000 B.C.

The greatest intensity of prehistoric cultural activity in the vicinity appears to have occurred subsequent to the total inundation of the bridge crossing areas about 1,000 years ago. Prior to the development of estuarine marshes, the project area vicinity was wooded inland terrain containing only upland forest food resources. Accordingly, its capacity for sustaining human habitation would have been more limited than later, and its occupation by prehistoric peoples was probably of limited intensity and duration.

After estuaries and marshes developed in the area, the exploitable subsistence resources would have been of greater abundance and included estuarine as well as terrestrial foods. The potential intensity and duration of prehistoric settlement would have been correspondingly greater from that time onward.

The available geotechnical borings appear to indicate a low potential for submerged prehistoric sites being preserved in the three project areas, each of which are discussed in more detail in the individual bridge crossing sections later in this report. The stream valleys were generally narrow and because evidence of marshland peat deposits is lacking, it appears that the former subaerial surfaces were subject to the destructive effects of both stream meanders and shoreline erosion prior to and during inundation from rising sea level. Because the stream valleys were deeply incised and not very wide, those destructive forces probably would have affected most of the project area's presently submerged terrain that was suitable for prehistoric occupation.

It appears that the probability is low that intact prehistoric cultural remains dating prior to 4000 B.C. are present in any of the three bridge crossing areas.