RESEARCH DESIGN

This research was accomplished in order to gather information concerning the presence of historically significant cultural resources in the alignments of three proposed highway bridges. The primary objective was to determine whether or not the project area contained cultural resources that were of sufficient historical significance to merit nomination to the National Register of Historic Places.

Related objectives included establishing the historical context of the three bridge crossing areas, determining the distribution and potential significance of submerged cultural resources contained in those areas, and evaluating the potentially significant sites that would be affected by construction. The approach taken was to conduct an underwater archeological identification and evaluation investigation.

Six major methods were implemented to accomplish the objectives. They consisted of literature and background research, predictive modeling, remote sensing survey and interpretation, site evaluation excavations, data analysis, and preparation of a technical report.

The first method involved the conduct of original research concerning the underwater environment and cultural background of the three bridge crossings. This work was structured to compile information rather than test specific hypotheses.

The background research, however, led to the formulation of a hypothesis. That work provided insights for developing a predictive model concerning the distribution of one category of submerged cultural deposits, underwater sites associated with riverine landings. The basis for the site location predictive model is discussed later in the sections on natural setting and historical background.

The site location predictive model examined potential interrelationships between the patterning of upland terrain physiography along rivers and the distribution of underwater archeological deposits. It predicted that submerged concentrations of cultural materials would be associated with terrain having the potential to serve as landing places along navigable waterways.

The natural setting of Delaware's navigable inland tidal waterways is widely characterized by large areas of wetland bordering rivers and creeks. In terms of watercraft transportation, these wetlands present an obstacle for the transfer of cargo and passengers to and from upland locations. Transfers, however, are readily accomplished at places where upland terrain reaches to the edge of waterways. In Delaware the term "fast land" is used to designate those locations where upland terrain borders tidal waterways.

Fast land terrain features have been important loci of cultural activity in the tidewater region of Delaware. From the beginning of the colonial period

onwards, they were selected for the establishment of landings. Until the second quarter of the 20th century, riverine watercraft were an important commercial transportation mode for carrying goods and personnel along Delaware's navigable tidal waterways. The limited number of fast land locations where transfers could be made between the uplands and watercraft were often associated with settlements and developed as sites of commercial activity. A review of maps illustrating Delaware's riverine system shows the frequent use of the term "Landing" in local place names.

In addition to commercial and settlement locations, small private landings were established at farms that bordered navigable waterways. These landing places provided access to and from the rural farms for the purposes of moving products to market and communicating with riverfront communities where economic and social activities were concentrated.

Activities related to transferring materials between shore and watercraft frequently resulted in artifacts being deposited onto submerged terrain in the vicinity. The reasons for this deposition of cultural materials varied but may be heuristically classified as either purposeful or accidental. Regardless of the reason, the focusing of cultural activity at landing sites resulted in the deposit of archeological materials both on land and underwater at and near those locations.

Given the long history and abundance of community and agricultural settlement in Delaware, it is possible to propose a predictive model concerning the relationship between fast land terrain features and underwater cultural deposits. For example, it may be predicted that public and private landings will be a common type of cultural resource site along Delaware's navigable tidal waterways. It may be further predicted that landings will have existed at some time or another at a substantial percentage of the fast land locations along navigable waterways. And finally, it may be predicted that at those places where landings were formerly or are presently located, the archeological cultural deposits associated with them are likely to have an underwater component.

This predictive model was developed during the background research conducted for this investigation. It is by no means all-inclusive of underwater archeological deposits since it does not address other types of resources such as sunken vessels. The science of underwater archeology has developed in incremental stages, however, and this was an effort to make a measure of progress along the path of advancement.

A discussion of the utility of this model for predicting the distribution of underwater archeological sites is presented in the report's concluding summary. That discussion provides an assessment of the value of the model in light of the field work results.

The third major method employed in this research was remote sensing survey and interpretation. This method was used to map the distribution of cultural

materials in the project area and to make a preliminary assessment of their potential historical significance. The specific techniques and equipment employed are discussed later in this report.

The fourth method employed was site testing excavations. That was performed to evaluate the archeological and historical significance of sites located during the remote sensing survey. The various techniques employed to accomplish this work are also described later.

The data and other information compiled and artifacts collected during the field work were analyzed to determine their cultural associations and potential for contributing information important to prehistory or history. This method also evaluated the archeological sites in terms of the criteria for nomination to the National Register.

The final method employed was preparation of the technical report. It was written to provide a permanent documentary record of the investigation in a format adhering to Federal and Delaware guidelines.

There were three general categories of results expected to be produced by this study. These included an overview of the project area's documented prehistory and history with interpretations concerning the potential presence of cultural materials of archeological interest. The second expected results category was a detailed inventory of the distribution of cultural materials and sites in the project area as determined by remote sensing. The third results category was a body of empirical information concerning the types and amounts of cultural materials and their relationships to fast land physiographic features in and adjacent to the underwater terrain being investigated. According to the predictive model, it could be expected that cultural materials would be concentrated near fast land physiographic features while submerged terrain at greater distances from fast land would usually contain substantially fewer cultural remains.

The archeological investigations were guided by this research design. In addition to standard underwater archeological procedures, original and previously untried methods were developed to overcome obstacles encountered in the field. The natural environment of much of the project area consisted of tidelands which made it necessary to utilize special techniques for accomplishing the site evaluation work in mud flat terrain. This innovative set of procedures may be termed "Mud Flat Archeology."

The conduct of Mud Flat Archeology involves the application of several techniques common to underwater and terrestrial archeological field work. However, it also necessitates the use of others that are distinctive to itself. One result of this investigation was the development of practical techniques for the practice of field archeology in mud flat environments. These may prove useful in future archeological investigations conducted in tidal waterways that are characterized by terrain that is alternately submerged at high tide and left

exposed as mud flat at low tide.

The investigation's collection of data and artifacts has been prepared for long term curatorial storage. At the completion of the work it was transmitted to the Delaware Department of Transportation for final disposition.