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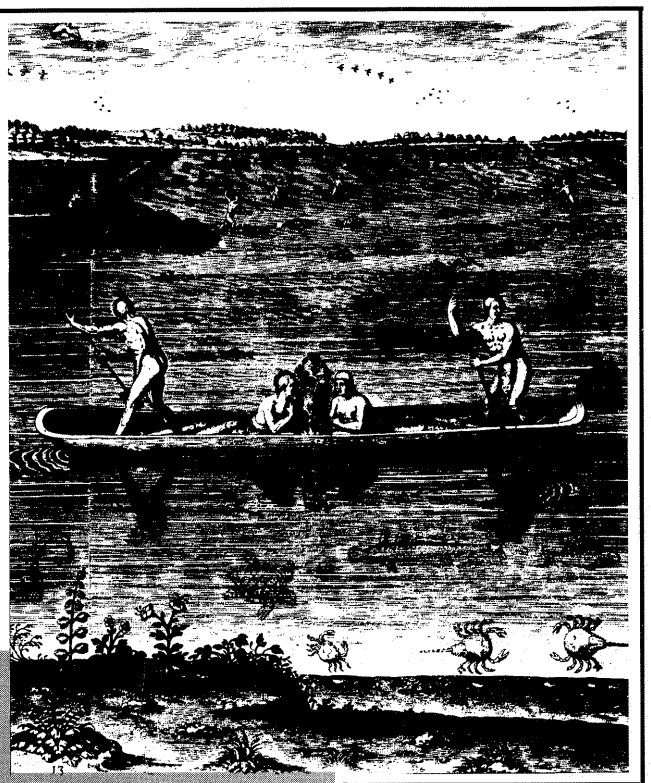
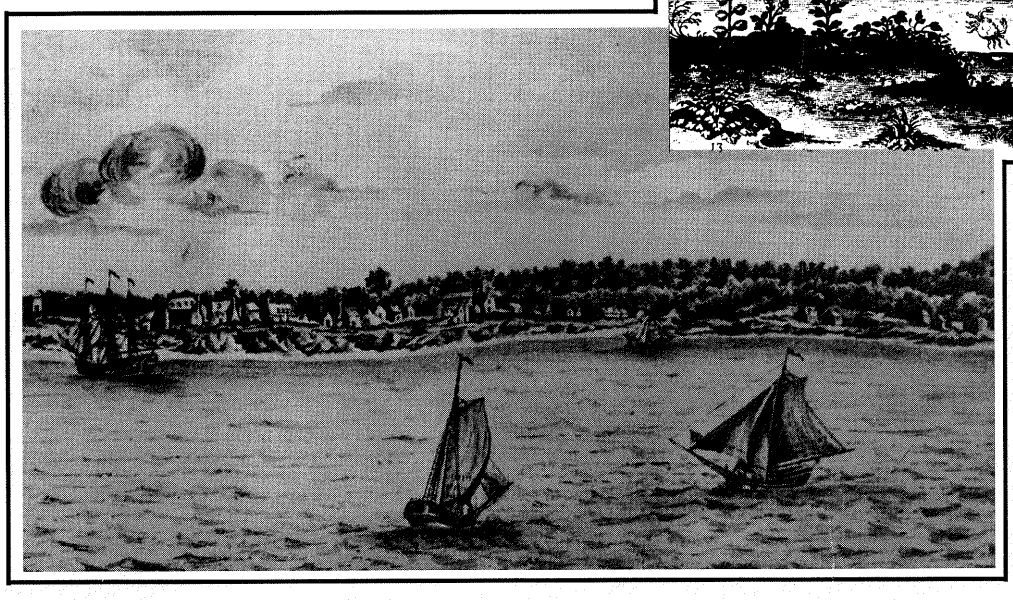
AN ASSESSMENT OF VIRGINIA'S UNDERWATER CULTURAL RESOURCES





Virginia Department of Historic Resources
Survey and Planning Report Series No. 3

The College Of
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AN ASSESSMENT OF VIRGINIA'S

UNDERWATER CULTURAL RESOURCES

Virginia Department of Historic Resources
Survey and Planning Report Series No. 3

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ABSTRACT

An assessment was made of what is known of, what can be learned from, and how best to manage the underwater cultural resources of the Commonwealth of Virginia. A total of 283 underwater sites were found recorded in the site files of the Virginia Department of Historic Resources. These consist of 181 sites with historic components and 90 with prehistoric components; 14 others have not been dated. Forty-six of the historic sites are "wrecks." Only three of the prehistoric sites appear to be fully submerged, as most are eroding along shorelines. These statistics give a clear measure of how underrepresented underwater resources are in official records. Locational models and historical records target sensitive areas for unidentified submerged sites. Future priorities should include surveys to inventory representative areas, commitments to the preservation and management of important known sites, and a program of information exchange with watermen.

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CHAPTER 1: Introduction

Statement of Purpose

"Underwater cultural resources" is a term that will mean little to average citizens, and even with some explanation a random poll would likely elicit many different notions. Any consistency in responses would almost certainly relate to the topics of shipwrecks or treasure. This misconception is pervasive and simple to understand, but its perpetuation is not in the best interest of Virginia's heritage. With a little effort, the official definition can become the popular definition, and we will be one giant step closer to securing the future of our finite underwater cultural resources.

The overriding goals of this report are, therefore, to document the variety and importance of things embraced by the term, and then to convey a sense of why and how such "resources" must be cared for. As this document is read and used, it will become clear that remains of historic houses, canals, and fish weirs not only are present in Virginia waters along with shipwrecks, but also that they can yield unique and significant information. We also intend to establish that there are probably just as many prehistoric Native American camps and watercraft in the state's waters as there are historic-period resources, and that they, too, deserve careful consideration.

The Scope of the Assessment and Working Definitions

The essence of our task is to assess the current state of knowledge concerning submerged cultural resources in Virginia. This includes compilation of temporal, spatial, and functional frameworks against which individual sites can be evaluated; an inventory and assessment of all officially recorded submerged sites; and formulation of recommendations for the long-term management of these resources. While this is a relatively straightforward mission in general, it was evident from the outset that more specific parameters and definitions were necessary to guide the work.

It has been estimated that 9% (9,573 km^2) of the surface area of Virginia, including state waters in the Atlantic, is covered by water. An unmeasured but substantial portion of this area is represented by artificially created lakes or ponds. For the purposes of this assessment, only naturally submerged lands were considered. From the Atlantic shore, Virginia waters are defined by the Marine Resources Commission as a zone 4.8 km (3 mi.) wide. In tidal waters, sites were considered submerged only if the greater part of them appeared to be inundated at mean high tide.

Even finer distinctions were necessary at times. Historic-period features such as dams, canals, mills, or bridges were considered only if they were submerged for the greater part of the year. Scatters of artifacts identified on shorelines were included only if the primary context of the material was considered to be from a truly submerged location. This served to disqualify scatters deposited when shoreline faces eroded and portions of dry sites (excluding bridges) collapsed into wetlands or waterways.

The judgements about whether a recorded site actually represented a submerged resource generally could only be as good as the information included on the official site record. Because this information is often incomplete or vague, the rule of thumb was to make conservative decisions. Conservative here meant taking precautions to include only the sites that could be defined with relative confidence as submerged, so as to avoid over-inflating the actual counts. In the end, we feel that the inventory on which this assessment is based is, indeed, grounded on fairly secure information.

Presentation of information is structured largely by the outline for historic contexts developed by the Department of Historic Resources (DHR) (1992). The agency requires that preservation documents adhere to the statewide context guidelines organized around the categories of place, time, and theme (function/type). In this way, a level of standardization is achieved that enables more immediate comparison of results among separate projects. The principal organizing element of this report is temporal affiliation, but the topics of place and theme are also addressed.

User's Guide

This report is viewed as an up-to-date statement of what is known of the state's underwater cultural resources and how they will best be treated in the future. It **is not** a comprehensive catalog of all underwater sites in Virginia; it **is not** a tour guide for avocational archaeologists, sport divers, or salvors; and it **is not** viewed as the last word on the subject. It is but a first step toward properly studying and managing such resources, and, more than anything, the document should guide managers responsible for the stewardship of underwater sites.

The results of the assessment are presented in a progression leading to the final chapter containing management recommendations. After this introduction, the next two chapters will present prehistoric and historic contexts, respectively. The contexts provide overviews of the chronology and kinds of sites known for each major time period. Chapter 4 describes the nature and distribution of sites that were officially recorded with the DHR at the time of this research, and serve as the basis for management decisions. In Chapter 5, areas are identified that likely contain either large numbers or unique kinds of sites. Finally, Chapter 6 contains a series of recommendations and guidelines for managing Virginia's underwater cultural resources.

CHAPTER 2: Prehistoric Context

Introduction

Shipwrecks have been the primary subject of "underwater archaeology." Prehistoric sites that for whatever reason came to be submerged have been by and large addressed only incidentally by "underwater archaeologists", even though they are of great interest and importance to many archaeologists. Logistical challenges, research costs, and questions of integrity have inhibited a comparable quest among prehistoric archaeologists for submerged site data. And even as this dichotomy is eroding, the same tradition has permeated underwater archaeology in Virginia.

While it is typical of archaeologists to shriek for more or for better information, it is probably fair to indulge the prehistoric archaeologists calling for submerged site data (Turner 1989, 1990; Hantman 1989; Klein and Klatka 1991). The number of recorded sites that are truly submerged is pitifully small, especially knowing what the total number must really be. The only recourse for building a context for submerged prehistoric resources has, therefore, been to rely much more heavily than one would prefer on terrestrial site data and geological reconstructions.

Virginia is not only a coastal state but also encompasses a large portion of Chesapeake Bay, the nation's most extensive estuary. These natural areas are part of the Coastal Plain physiographic province, which alone boasts a large share of the state's natural surface water area. Coastal waters have geologically been the most subject to significant change, and in this region the net effect has been transgression or flooding of extensive areas of formerly dry land. By extension, this province is most likely to contain the greater portion of submerged prehistoric sites in the state.

These circumstances demand a greater emphasis in this chapter on the Coastal Plain. Submerged resources in this province will span the range from basic habitations to specialized facilities, and from the earliest to the latest periods. West of the Coastal Plain, natural waterways flow through ancient channels that have experienced relatively little change, but changes that do occur can have a largely detrimental effect on archaeological sites. Most identifiable underwater resources in these waters are expected to be relatively recent and specialized in nature. Therefore, the resources of the western provinces will be more limited in number and in variety, outside of artificial impoundments.

The Paleoenvironmental Backdrop

The complex dynamic of changes associated with the evolution of marine and fresh waterways has played a veritable ecological sleight-of-hand. What is apparent to even the most careful observers today is not necessarily representative of past conditions. Therefore, attempts to interpret prehistoric cultural resources anywhere in the state often will only be as good as the reconstruction of past environmental conditions. Moreover, an appreciation of pertinent natural processes is important for understanding both how most sites came to be submerged and what the prospects for their preservation might be.

Coastal Environments

Sea level fluctuation is the principal agent of natural change in coastal regions of the Mid-Atlantic region, and since the end of the Pleistocene there has been a net rise in the base level (Figure 1). Along with the more obvious result of transgression or submergence, a rise in sea level also means that shorelines are eroded, stream gradients are lowered, and floral and faunal communities shift. This is no less true in the Chesapeake Bay estuary, which owes its very existence to this phenomenon. Long-term sea level data are scarce for Virginia such that extrapolations must be made from the results of studies in adjacent areas. These data are presented and interpreted primarily in terms of trends depicted as curves. The more laudable exercise of interpreting oscillations in the data (cf. Kraft 1985; Kellogg 1988; Waters 1993) must await additional local information. Even so, the *basic* trends described for neighboring areas appear to be generally true of Virginia's coastal waters (Kraft 1977; Newman and Munsart 1968; Finkelstein and Ferland 1987).

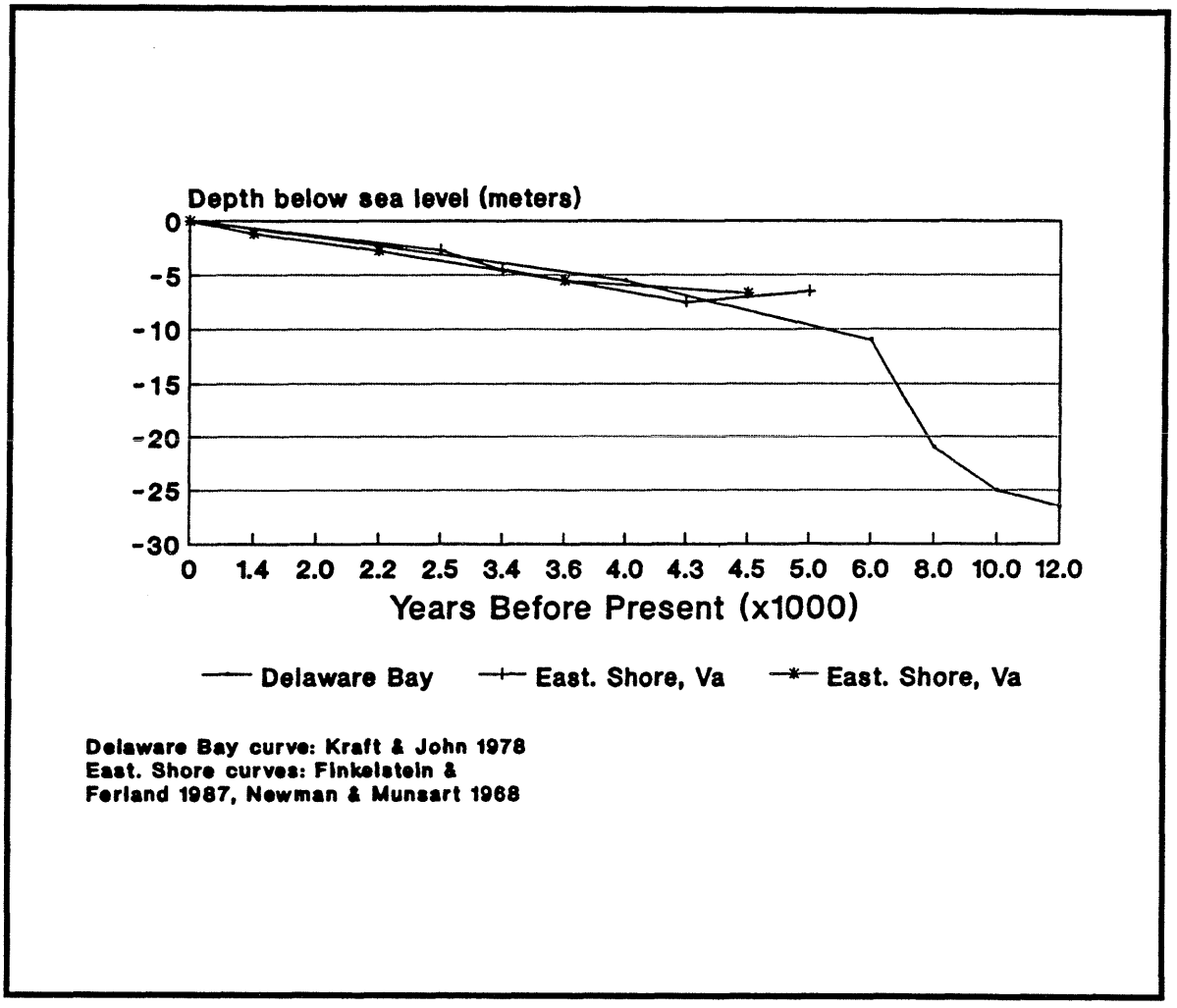

Figure 1. Proposed sea level curves for Virginia waters.

Before launching into a summary of environmental conditions in now-submerged areas, the reader should be introduced to certain qualifiers intrinsic to the use of sea level curves and reconstruction of inundated surfaces. The context and reliability of absolute dates are most crucial in interpreting sea level curves. Context must be understood in order to weigh the effects of local environmental conditions or, more specifically, how representative the dated context is of the area in general. Curves based on Chesapeake Bay samples cannot necessarily be extended to the continental shelf, at least not without careful calibration, owing to such factors as erosion and subsidence rates (Kellogg 1988). Reliability of dates relates primarily to the degree of potential error associated with a given date. Dates of low-carbon sediments or low-organic peats essentially represent composite dates from disparate material in one basic context, for instance, while dates of specific pieces of carbonized material are usually less ambiguous. Isolated shells are also suspect candidates for absolute dating given the potential for post-depositional transport. The most informative curves, therefore, are those based on multiple dated samples of individual items from representative contexts.

Also, there is seldom a direct correlation between present bathymetry and the pre-transgressive land surface. Most estimates concur that 10–20 m of former upland surfaces were reworked and redeposited on the continental shelf as sea level rose (Moir 1979). While this process had a decided leveling effect in upland areas, the opposite is believed to have occurred in low-lying settings like incised stream valleys. The ultimate effect was to distinctly smooth the former surface such that even modest reconstructions of pre-submergence conditions require considerable data from cores, seismic profiles, and other sub-bottom sampling methods. The point of this discussion has been to establish the limitations built into the descriptions of paleoenvironments that follow.

At the glacial maximum 18,000–15,000 years ago, before any human groups are known to have arrived in Virginia, sea level reached a low of 130 m below the present level, and the Atlantic shoreline was at least 100 km east of the present coast (Edwards and Merrill 1977:2). The coast at this time would have coincided with the upper margin of the continental slope. Major river valleys would have been deeply incised into the exposed shelf and would have descended the steep continental slope through large canyons (Figure 2). Between the major streams were upland divides from which tributary streams would have drained through smaller incised valleys. The shelf off of Virginia would have been marked by the channels and divides associated with the Delaware, Susquehanna, and James rivers. The leading edge of the continental glacier would have been approximately 240 km to the north at this point, or at about present-day Ohio and Pennsylvania. Spruce and pine-dominated boreal forests slowly began to be replaced by mesic temperate (deciduous) forests at this time (Delcourt and Delcourt 1985). The Chesapeake Bay did not exist then, and in the broad valley it now fills ran the Susquehanna River (Colman et al. 1990). Estuarine marshes and lagoons are not believed to have occurred on the exposed shelf at this time, given the very steep gradient of the streams. In fact, it is doubtful that saltwater encroached into the shelf portions of the valleys at all.

After the continental glacier began to retreat about 15,000 B.P., sea level rose at the very rapid rates of more than 100 cm/century to not less than 30 cm/century until 6000–5000 B.P. During this span, humans first settled the area, and the ancient Susquehanna river valley was flooded to form approximately 80% of the modern Chesapeake Bay. The hydrologic character of the shelf likely changed little before about 12,000 B.P., other than higher rates of stream discharge from the addition of glacial meltwater. In the Paleoindian period between about 12,000 and 10,000 B.P., sea level ranged from 30–24 m lower than the present level, putting the coastline 10–15 km east of today's Atlantic shore (see Figure 2). The incised channels of the Delaware, Susquehanna, and James rivers, along with the upland divides between them, would still have been prominent features of the exposed continental shelf. By this point, however, the Atlantic shore had encroached well onto the shelf where the relatively lower relief was conducive to the formation of estuarine environments. Core samples and remote sensing results confirm that lagoonal, deltaic, and marsh deposits occur rather widely on the continental shelf beginning as early as 11,000 B.P. (Moir 1979). It seems apparent, then, that the precursors of the modern Chesapeake and Delaware bays were at least emergent at this interval. Responding to regional climatic amelioration, coniferous boreal species were replaced by deciduous forests dominated by mesic species such as beech, hornbeam, elm, and more slowly with oak and hickory (Delcourt and Delcourt 1985).

The Early Archaic period (10,000–8500 B.P.) witnessed continuation of the same general pattern. The rate of sea level rise remained high but the base level was still 24–19 m lower than present. By the end of this period, the Atlantic shoreline had encroached to within 6–8 km of its present position and on the shelf the principal river valleys had either been completely submerged or completely embayed. In fact, the modern mouth of Chesapeake Bay would have been the site of a distinct embayment that flooded and effectively merged the lower channels of the James and Susquehanna rivers. The head of the expanding Chesapeake estuary at 9000 B.P. was probably still below the Rappahannock River mouth. Associated marshes, lagoons, spits, and barrier systems would have migrated landward with the encroaching sea. Above the head of the estuary, the major rivers are suspected to have meandered through well-defined valleys, which necessarily became more alluviated with a lowering of gradient. Vegetation is believed to have been dominated by mesic forests similar to that of the preceding period.

Through the Middle Archaic (8500–5000 B.P.), sea level rose to within 7–8 m of the present level and still at the rapid rate characteristic of any interval before

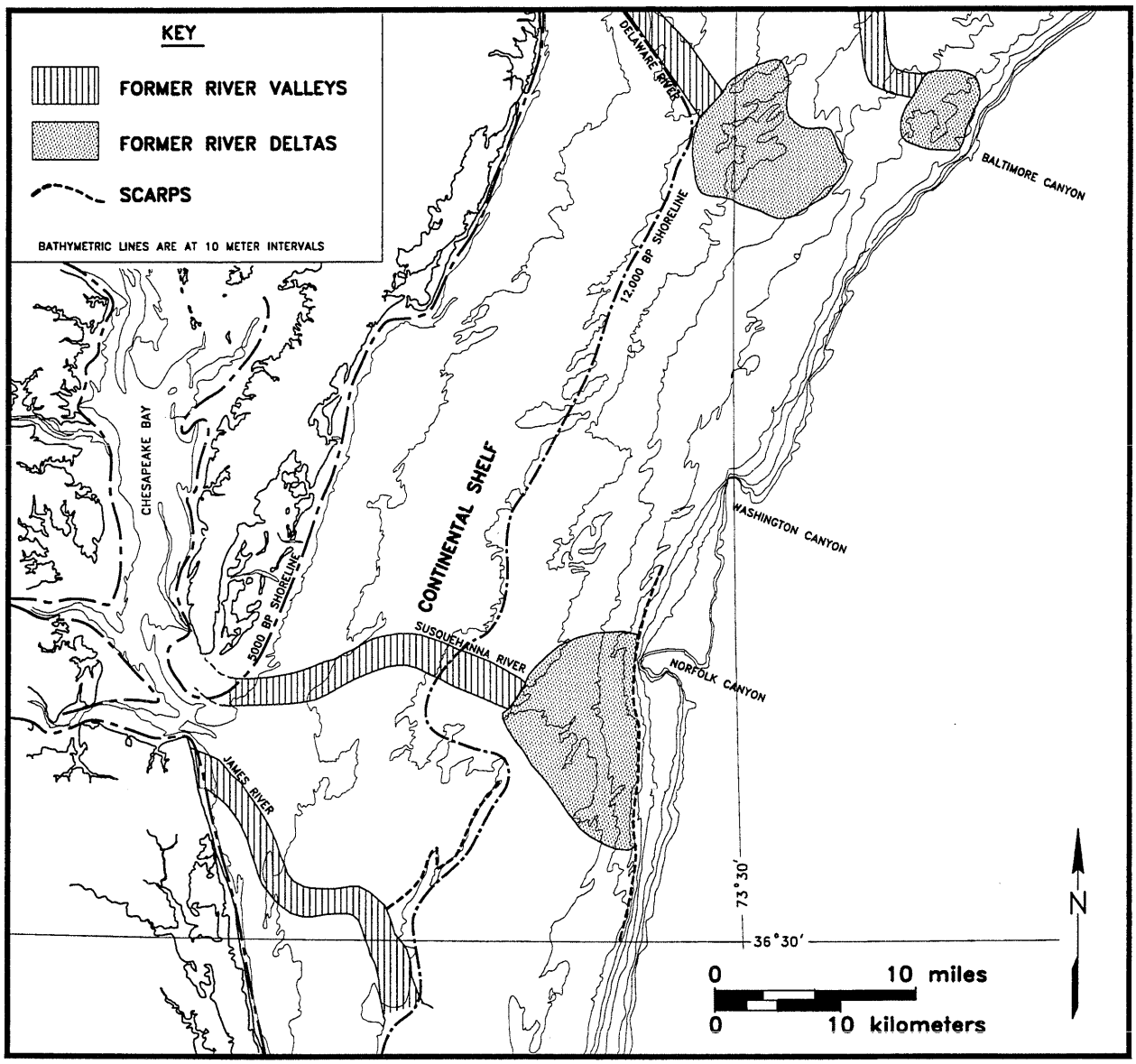

Figure 2. Reconstruction of major features and shorelines in now-submerged areas.

5000 B.P. Local data are too sparse to document the degree of sea level oscillation, if this occurred appreciably at all. The continental shelf was effectively inundated during this time, and the defining characteristics of the modern coast began to emerge (see Figure 2). The major river valleys were embayed westward of the Atlantic coastline to create the first significant incarnations of the Chesapeake and other bays. It has been estimated that the head of Chesapeake Bay at 8000 B.P. was in the vicinity of Smith Island, and by 5000 B.P. it had reached present-day Annapolis (Brush 1986). Drowning of interior stream valleys, marsh formation, *and* upland erosion would have continued at the margin of the expanding estuary. More xeric forests dominated by species such as oak and hickory were widespread at this time, but with localized occurrences of mesic and coniferous forests (Delcourt and Delcourt 1985).

The Late Archaic period (5000–3000 B.P.) corresponds with the initiation of a series of changes that mark the onset of the modern era. At the interval between 6000 and 5000 B.P., the rate of sea level rise

decreased to nearly half its earlier rate, signaling a period of initial stability in the region's coastal areas. This is most true of the major estuaries that symbolize the area today. It was only with a marked slowing of sea level rise that mature estuarine environments could become established, including the rich fishery that is intrinsic to them. Most histories of the estuaries acknowledge that their modern essence was achieved at this interval. After this point, the net rise in sea level continued, but most curves indicate that this was punctuated with a series of oscillations. It is the precise timing and amplitude of these ups and downs that are variable from one section of coastline to another due to the combined effects of local subsidence, rebound, sediment load, and shore morphology. By the end of this interval, the Chesapeake Bay had expanded to 80–90% of its modern extent. Quantities of shellfish appear for the first time in deposits of this age, signaling the time when they were available in numbers that would attract humans. Essentially modern forests were established during this interval, still characterized by a dominance of deciduous trees but with an ever-increasing proportion of pine (Delcourt and Delcourt 1985).

Through the remainder of the prehistoric era, represented by the Woodland period (3000–400 B.P.), sea level continued to rise, but at its slowest rate (20–15 cm/century) since the end of the Pleistocene. By about 2000 B.P., what we would all recognize as the modern bay was created. The estuarine environment was very extensive at this time, thus diminishing the patchiness of such areas in earlier periods, and elsewhere modern forest types were present. To be sure, environmental change occurred during this period but not to the degree seen in the preceding periods. We are handicapped by the coarseness of much of the available environmental data such that shorter term but potentially significant oscillations are seldom firmly documented. Delcourt and Delcourt (1985), for instance, have detected evidence of localized change in floral communities related to both natural and anthropogenic agents.

Beginning in the early historic period about 400 B.P., the rate of sea level rise increased to nearly equal Late Pleistocene/Early Holocene rates (Hicks and Crosby 1974; Kraft 1985:114). This change has surely meant a quickening of erosion at many shoreline sites, which appears to continue to the present (Hardaway et al. 1992). Development, channel dredging, and boat wakes also have contributed to the loss of archaeological sites over the past two centuries.

Many who have considered the site potential of the continental shelf express only limited optimism for the potential discovery of intact sites. An appreciation of the dynamic nature of shorelines has compelled them to acknowledge the damaging effect of erosion on most if not all submerged sites (Belknap and Kraft 1985; Kraft 1971; Stright 1990). Models for the shelf do surmise, however, that filled, relict channels offer the greatest potential for better-preserved sites (Pearson et al. 1986; Stright 1986). William Haag observed these processes in coastal North Carolina four decades ago and came to much the same conclusion. He recognized, however, in a more recent article that the sheltered estuaries, in much the same way as relict channels on the shelf, probably hold the greatest potential for better-preserved submerged sites (Haag 1975). This is particularly true for the Holocene, when most of the offshore areas were already inundated.

A working knowledge of this information is necessary for developing more realistic models of human adaptation. For instance, it allows us to better predict what the environment was like and where possible site locations might be at given times. Using the sea level curves as a guide, certain areas can be ruled out as available for habitation or for exploitation of specific food resources such as shellfish. In other words, for any given interval, inundated versus exposed landforms can be identified, as can potential resource-rich estuarine and open-water areas.

Non-Coastal Environments

The non-coastal (non-tidal) waters of Virginia are extensive and for the most part lie west of the Fall Line. (For the purposes of this study, recall that artificial impoundments such as reservoirs created by hydroelectric dams, municipal water supplies, and farm ponds are not considered.) These waters are represented primarily by streams, but they also include extensive wetlands such as the Dismal Swamp. Models for the evolution of these areas are not common, particularly any oriented to archaeological concerns. Some exceptions occur and will be summarized to provide an outline of key issues and trends.

The Dismal Swamp in the southeastern Coastal Plain of Virginia is the region's most extensive

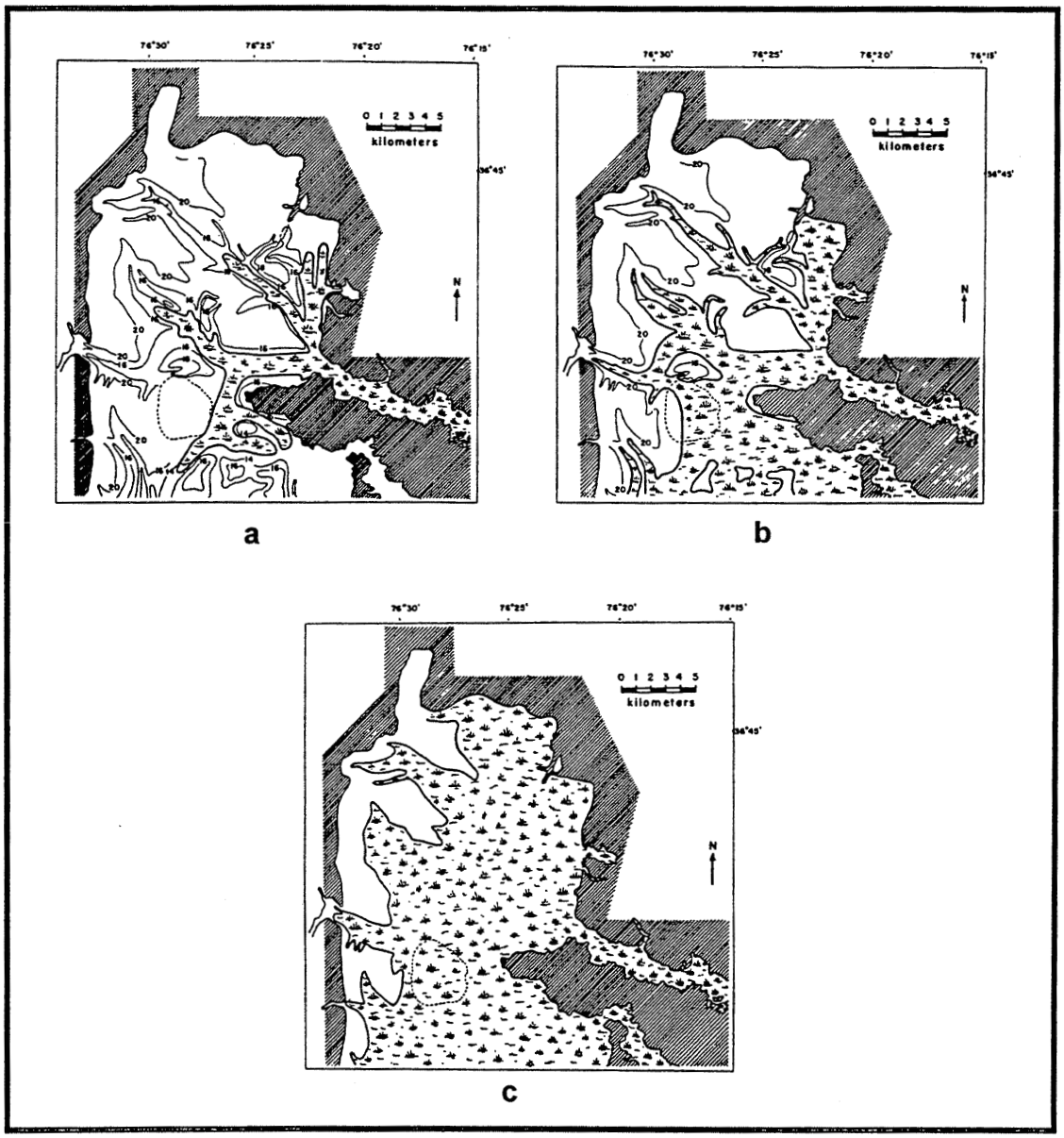

Figure 3. Developmental model of Dismal Swamp (a - ca. 6300 B.C.; b - ca. 4000 B.C.; and c - ca. 1500 B.C.) (after Whitehead and Oaks 1979:34–37).

freshwater wetland, a status which undoubtedly was familiar to prehistoric Native Americans. We are fortunate to have the benefit of paleoenvironmental reconstructions of the swamp's development (Whitehead and Oaks 1979) from which potential submerged site locations can be identified. The foremost clue to favorable site locations is the topography of the pre-swamp surface. At the close of the Pleistocene, this surface was represented by a level plain into which a dendritic system of stream valleys was incised. Well-drained areas along the margins of these streams were probably attractive sites for habitation. Like most of the outer Coastal Plain, formation of the Dismal Swamp wetland was closely linked to sea level fluctuations. Swamp development appears to have initiated after the Pleistocene, when the eastern segments of stream valleys began to fill and supported open-water marshes (Figure 3). The wetland gradually expanded westward, but for at least half of its history vestiges of stream channels were probably distinct in at least some portions of the swamp, and not until about 3500 B.P. were all topographic highs on the surface of the pre-swamp plain covered by peat. Therefore, much of the area now blanketed by peat was

not only available for habitation but was likely attractive for settlement, especially the better-drained elevations at wetland margins. This model is probably also applicable to other extensive wetlands in the Coastal Plain.

Interior stream valleys, especially west of the Coastal Plain, have relatively little potential for naturally submerged prehistoric sites. These areas are characteristically well-drained and rarely subject to extensive ponding. They do, however, offer tremendous potential for buried sites within floodplain deposits. Work by Larsen and Schuldenrein (1990) indicates that any given segment of a stream's course can have a different depositional history, depending on factors such as rates of runoff, vegetation, sediment source, and topography. This can be extended to the formation of fluvial wetlands, such that broadly applicable models for these regions are still out of reach.

The Archaeological Perspective

Attempts to model settlement or predict prehistoric site locations in now-submerged areas of the Mid-Atlantic have been rare. Probably the most ambitious attempt was made 15 years ago and considered the entirety of the continental shelf from Cape Hatteras north to the Bay of Fundy (Roberts 1979). At about the same time, a reconstruction of the shelf environment for the late Pleistocene/early Holocene was completed (Edwards and Merrill 1977). Since then, there have been no explicitly archaeological attempts to improve the picture for submerged areas in Virginia waters other than that of Blanton (1993, 1994) and his colleagues (Blanton et al. 1994) for the Chesapeake Bay. Just to the north, however, Kraft (1977, 1985) and others (Hoyt et al. 1990) have made major strides toward modeling natural conditions and potential site locations in and around Delaware Bay. Taking into account the preceding environmental factors, the efforts in the Delaware Bay area, and advances in Coastal Plain archaeology, the potential for submerged sites in Virginia waters will be outlined in this section.

Coastal Plain Models

Most overviews of Mid-Atlantic archaeology account for the effects of sea level fluctuation only in general terms, and they tend to be strongly reliant upon physical and natural science data in the absence of archaeological information. Regional models, for instance, acknowledge the 6000–5000 B.P. slowing of sea level rise by stating that the modern estuarine environment was effectively in place beginning then (Custer 1986; Potter 1993). That change is perceived to be very significant in the sense that stabilization of the estuaries after that point created conditions favorable for more intensive exploitation of coastal resources, especially shellfish and anadromous fish.

Reflective of the dearth of firm information on submerged sites, archaeologists have been left with the options of either ignoring them altogether or qualifying their models in the absence of the information. The latest summaries (Custer 1986, 1989; Waselkov 1982; Potter 1993) agree on several points, however. One is that the area of the Chesapeake Bay was not exceptionally attractive prior to the slowing of sea level rise about 5000 B.P. The view is that it was utilized as any other major stream valley would have been on the Atlantic slope. After 5000 B.P., the creation of the modern estuary ostensibly distinguished the area as a resource-rich zone. Shell middens all post-date this transition, and their appearance is taken to signify the point when estuarine resources first figured significantly into subsistence schedules and settlement organization. This new facet of local economies is believed to have been gradually refined by the subsequent Woodland period to the point that some groups were targeting specific shellfish species. So, beginning in the Late Archaic period, the resources of the Chesapeake estuary became an important cornerstone in the subsistence of local groups, persisting even as prominent supplements to horticultural economies of the Late Woodland period (Custer 1986; Kraft et al. 1978; Potter 1993). Absent in most discussions is whether this orientation would have emerged on areas of the continental shelf prior to its inundation, especially along the coastal strand.

Other statements regarding adaptation to the estuary exist, but they are to be found mostly in geological literature or in specialized studies by geoarchaeologists. In the Mid-Atlantic, pioneering work on the topic was conducted by John Kraft (1977, 1985) and his colleagues (Kraft et al. 1974, 1978; Kraft and John 1978). Their work is most notable for the lucid discussion of the implications of sea level changes on human settlement in and around Delaware Bay. Intensive coring in the vicinity of the Island Field Site and Cape Henlopen served to demonstrate the considerable scope of changes to the coastline (Kraft et al. 1978; Kraft 1985). By reconstructing the sequence

of events driven by sea level rise, it was possible to explain the presence and absence of shell middens at sites located near the present bay shore. These cases are particularly important for documentation of significant change in the configuration of the coast even *after* the slowing in sea level rise about 5000 B.P.

Archaeological study of the submerged continental shelf has fallen out of vogue, and little new information has emerged since a virtual explosion of studies from the late 1960s through the early 1980s. The cessation of this level of research is attributed in part to scant archaeological results; if anything, the archaeological evidence for sites off of the Mid-Atlantic coast is still circumstantial. Even so, the studies provided the opportunity to synthesize a tremendous amount of relevant geological information that is very useful for model-building.

The most ambitious of these projects was completed in 1979 and summarized archaeological, paleontological, and maritime information for the Atlantic shelf from the Bay of Fundy to Cape Hatteras (Roberts 1979). While no submerged prehistoric sites were noted, analyses of terrestrial site distribution, offshore peat deposits and fossil finds, buried stream valleys, and geological processes led to identification of high potential areas for such sites. In general, valleys in Mid-Atlantic waters were regarded as the most promising areas for intact submerged sites. For Virginia in particular, the James and Susquehanna were identified as having the greatest site potential (see Figure 2).

A more recent statement of the local implications of sea level change relative to prehistoric settlement is found in an article by Klein and Klatka (1991). In their discussion of Late Archaic settlement in Virginia, they express strong reservations about the utility of current models for coastal settings. In their own words, "The archaeological remnants indicative of the use of the saline portions of the rivers draining onto the Chesapeake Bay prior to the Late Archaic period may be submerged, buried beneath deposited sediments, destroyed by wave action, or located in modern environments that do not reflect the distributions of resources in earlier Holocene environments" (Klein and Klatka 1991:165). Their frustration over the lack of submerged site data is contrary to the more sanguine, but less realistic, statements more commonly found. Without honest appraisals such as theirs, modeling estuarine adaptations is oddly simplified through allusions to missing information or an incomplete record.

The effects of sea level rise have not been an exclusively coastal phenomenon. Implicit in any consideration of the issue is the effect it has on interior streams that feed the estuaries and specifically how stream gradients are reduced as the base level rises. This is recognized with increasing frequency at archaeological sites in fluvial, Coastal Plain settings. In Virginia, recent excavations along the interior, Chickahominy River have documented this occurrence (Blanton et al. 1994). Others in the Southeast have addressed this issue, too (cf. Coastal Environments, Inc. 1982; Brooks and Sassaman 1990), and together the results are a call for more routine attention to these influences.

In essence then, the current scheme for prehistoric coastal settlement in the Chesapeake region is necessarily general. When they are made, attempts to synthesize regional data tend to contrast conditions before and after 6000–5000 B.P., when sea level stabilized. For obvious reasons, possible submerged sites are seldom accounted for, and this omission is what keeps the models general in scope. An attempt to account for submerged sites will appear in the sections to follow. On a somewhat general, stage-by-stage basis, models will be developed that consider the entire coastal region as one system, including the now-submerged areas that were available for habitation.

Paleoindian (12,000–10,000 B.P.). It is conceivable that large portions of the home range of some Paleoindian bands are now submerged on the continental shelf, particularly for any that may have adopted a partial coastal subsistence focus. It follows that some or all of the principal sites of such bands, meaning base camps or aggregation sites, are in now-submerged settings. Predicting precisely where sites of this kind might have been established is difficult in the absence of modern terrestrial analogs. Assuming that the biotic richness of estuarine zones was an attraction to these early groups, it is reasonable to expect the larger sites to occur at or near the mouths of streams along the coastline. The outlets of the James, Susquehanna, and Delaware rivers are locations of this kind off of Virginia's modern shore. There are no known primary sources of cryptocrystalline stone that would have been available in submerged areas.

Records of sites in modern terrestrial settings are more relevant for predicting the locations of smaller camp/procurement sites offshore. In Delaware's Coastal Plain, Custer (1989) has noted the tendency to find small Paleoindian sites either (1) adjacent to interior wetlands, or (2) on former headlands at the confluence of major streams. A particular attraction of the latter locations are exposures of gravel/cobbles containing high-quality lithic material. There is no question that headlands were a feature of now-inundated uplands, and potentially some occurred in conjunction with secondary lithic sources. Presumably wetlands were present on level uplands in what was then the outer Coastal Plain, forming in part as the water table became elevated with sea level rise. These conditions, on a smaller scale, were likely consistent with the pattern observed on the Suffolk Scarp at the western margin of the Dismal Swamp.

A reasonable working model of Paleoindian settlement in these areas is, therefore, a modified version of that proposed for the Mid-Atlantic at large by Gardner (1980) and presented by Custer (1989) as a serial pattern. Quarry sites at primary lithic sources and attendant quarry reduction/base camps would not likely figure into a model for the continental shelf. Potentially, lithic reduction sites do occur at some sites near secondary sources, but they are not expected to figure centrally. The model should instead include coastal-oriented base camps with which are associated smaller upland and coastal procurement camps.

Sites predicted by Barber (1979) for this period in the study area include coastal shell middens, estuarine fishing camps and shell middens, interior fishing camps, and upland camps, all occurring in medium to low frequency. It is debatable whether this degree of coastal orientation would have occurred at this time. Custer (1986) suggests that a "modified interior" pattern was adopted, of the kind described by Fitzhugh (1975) in the maritime provinces of Canada. In this alternative model, groups seasonally adjust subsistence activities to interior or coastal resources.

In the end, we must propose two potential models of settlement to account for Paleoindian sites in now-submerged areas, a version of the traditional Custer serial model and a modified interior model. In either case, a substantial segment of the annual range of a Paleoindian band could lie in inundated areas. This implies the existence of many early sites in these areas, even at the generally low densities characteristic of the period. Whether any survive intact remains to be determined.

Archaic (10,000–3200 B.P.). Pronounced and important changes occurred through the 5,500-year span of the Archaic period, to the extent that treating this interval in sweeping, generalized terms obscures significant trends. Consistent with prevailing regional models, the discussion will emphasize the distinction between conditions preceding and following the slowing of sea level rise ca. 6000–5000 B.P.

The diminishing but still appreciable extent of exposed continental shelf surface must also be accounted for in early Holocene settlement/subsistence models. It requires us to consider the potential for significant portions of the territories of at least Early Archaic, and to a lesser extent Middle Archaic, groups to lie in inundated areas. The area of the "Eastern Shore," for instance, would have been close to double what it is today throughout much of the Early Archaic period. This 5,500-km^2 peninsula could well have supported two Early Archaic bands, especially given the relatively high carrying capacity for coastally oriented groups (cf. Anderson and Hanson 1988). By the end of the Middle Archaic period (5000 B.P.), the rising sea level, for all practical purposes, had inundated the entire shelf so that group ranges would have been akin to those of subsequent periods.

Gardner (1980) and Custer (1989) have argued for considerable consistency in the fundamental adaptive modes of Paleoindian and Early Archaic populations, and this perceived continuity carries over into settlement patterns. The pattern is not completely static, however, as Custer (1986, 1989) recognizes a trend toward diversification of site locations through "opportunistic expansion" into other settings through time. Early Archaic sites continue to occur adjacent to interior wetlands and on prominent headlands, but they also appear along stream courses. Currently accepted models assume that coastal/estuarine-oriented sites were not a component, or not a significant component, of adaptations at this time. This is based on (1) the sense that the rate of sea level rise inhibited creation of mature estuarine environments and (2) the lack of evidence for sites in these areas. Even with some expansion of site settings, the logistically oriented serial model is regarded as reflective of the pattern.

The trend toward diversification of site locations matured in the Middle Archaic period, and the serial model is no longer appropriate. Sites are known to occur adjacent to the emerging wetlands such as estuarine marshes and interior swamps and in floodplains, in addition to the locations typical of the preceding periods (Custer 1989). Such variation in site locations is taken to signify a shift to a "fusion-fission" model or, *sensu* Binford (1980), a forager-oriented pattern. Toward the end of this period, associated with the slowing of sea level rise, there is some acknowledgement in popular models of the potential for estuarine sites. Custer (1989) also explicitly predicts that many sites of this period lie buried in sediments along major streams and adjacent to early estuaries.

As an alternative, for the period 9000–6000 B.P., Barber (1979) anticipates in now-submerged areas the presence of coastal shell middens, estuarine fishing camps and shell middens, inland valley fishing and other camps, and upland camps. These predictions are expanded over the preceding period by the addition of camps in inland valley and upland settings, but expected site densities and sizes are consistent. In Barber's model, the expectation that coastal/estuarine-oriented sites occur at this time is considerably greater than in more current models. As noted, the prevailing models omit these sites due to the absence of archaeological examples and the assumption that attractive marine environments were not present. It would be unusual for groups to wholly ignore even emergent estuarine resources at any period, especially given the tendency toward "opportunistic expansion." It certainly seems clear from offshore studies that such environments were present. At least for the Early Archaic period, the modified interior version of the serial model may be appropriate.

To say that the empirical archaeological base for devising these models is weak would be an understatement. Most models are accompanied by fine print statements expressing their limitations due to this void. In the final analysis, it is obvious that the early Holocene (before 5000 B.P.) patterns are best modeled under two general scenarios. The first is reflective of the Early Archaic period and essentially represents an extension of the Paleoindian period, serially organized model. Just as before, these models must be extended well offshore into areas that were probably vital segments of group ranges. It is necessary, therefore, to at least consider the likelihood that coastal resources were important in the seasonal round of these groups. Many sites dating from the Early Archaic period would have been present in now-inundated areas. Most of the upland sites are probably deflated, but riverine/estuarine sites in sediment-filled lowlands may survive. By the Middle Archaic period, a fusion-fission pattern is apparent that permitted opportunistic, and probably seasonally scheduled, exploitation of many environments. Because it is fundamental to such a pattern, there is greater consensus that marine resources were at least being introduced as a staple of the subsistence base by this time. The terrestrial sample of sites dating from this time is more representative than that for earlier periods in the outer Coastal Plain, considering that the shoreline closely approximated the modern one. Nevertheless, it is safe to say that many sites were present in areas that are underwater now. Just as before, probably only those established in low-lying areas may have been protected by sedimentation.

The interval after about 5000 B.P., also bracketing the Late Archaic period, coincides with the onset of modern conditions. This was achieved when a significant slowing of sea level rise permitted a crucial level of equilibrium, which in turn allowed the formation of the rich estuarine environments that are a hallmark of the area today. More specifically, this environmental threshold marks the period after which the extensive Chesapeake Bay estuary can be recognized and physical changes were relatively minor. Therefore, attempts to model prehistoric settlement are viewed as less equivocal owing to the more familiar context and more complete record (fewer sites are obscured in inundated areas).

Present models are very clear in general about the nature of Late Archaic adaptations, as virtually all of them portray the pattern as "focal" in nature. This implies a distinct emphasis in the systems of the period, and the traditional one is riverine settings/resources. In some areas, especially farther south, this focus is extended to marine resources in coastal areas (Russo 1994). In the Mid-Atlantic, adhering to the models of Custer (1986, 1989), a riverine orientation is readily documented in interior locales, but the extent of any coastal/estuarine focus is debated. Late Archaic shell middens are reported along the Chesapeake Bay, but they are small and occur only infrequently. The tendency, based on archaeological evidence, is to conclude that estuarine resources were, indeed, a secondary element of the subsistence round

and, if anything, there was only an emergent focal adaptation to coastal resources. These observations have led Gardner (1980, 1982) and Custer (1989) to conclude that the emphasis in the focal models was on resources such as anadromous fish nearer the salt/freshwater transition, and any coastal/estuarine middens were representative of seasonal, short-term forays. In southeastern Virginia, for example, Gardner proposes an emphasis on interior wetlands such as the Dismal Swamp.

The scarcity of intensively utilized coastal sites like shell middens is puzzling in light of the evidence for extensive and rich estuarine environments by this time. Indeed, Barber (1979) expects coastal shell middens, and estuarine fishing camps and middens to occur in high frequencies at this time, along with an array of other interior sites.

It is true that the rate of land submergence slowed significantly after 5000 B.P., but considerable areas that would have represented the margins of major streams and brackish wetlands are now underwater. Blanton (1993, 1994) and his colleagues (Blanton et al. 1994) have argued elsewhere that many of the principal sites of this time are offshore in the Chesapeake Bay, and models based strictly on the terrestrial record are flawed (Figures 4 and 5). Although it remains to be verified, an alternative model would place base camp/aggregation sites, including shell middens, along stream/marsh margins, and the smaller contemporary sites known in the outer Coastal Plain would represent the associated procurement sites. This model could validate the expectation of a coastal focus in the area.

To summarize, the currently accepted Late Archaic model does not have a strong coastal component, assuming that the terrestrial model accurately reflects the overall pattern. New evidence may challenge this model, however, and require a variation based on coastal adaptation or one that incorporated both patterns through seasonal shifts. While the area submerged since this period may by limited by comparison, and the number of underwater sites accordingly small, among them may be key base camps that are central elements of the pattern. Evidence available now indicates that they commonly occur at the margins of submerged terraces in the bay.

Woodland (3200–400 B.P.). Predictive models for sites dating to the Woodland period are less relevant to a project concerned with underwater resources. By the beginning of this interval about 3000 B.P., sea level had risen to within 2.5 m of the present level, and by the time of European contact it was probably within 1 m. This obviously means that much fewer sites have been submerged and that the terrestrial record is largely adequate for developing settlement/subsistence models. Change to the coast and estuary margins have been significant enough, however, since the beginning of the period to be important, and these are a focus of this section.

Shell middens increased markedly as the Woodland period progressed, but not until the latter part of the Middle Woodland period did they appear as large accumulations. Until this time, then, the inferred pattern is a gradual elaboration of the Late Archaic trend, in which coastal resources played only a subordinate role in the subsistence system. In other words, there is no archaeological evidence for a truly coastally oriented pattern, but instead a dual pattern of scheduled shifts between the interior and estuaries. An obvious question is whether larger shell midden base camps from the first half of the Woodland period are underwater or lost to erosion and consequently lead to inaccurate models. At present, there is no strong evidence to suggest that this is the case.

The terminal Middle Woodland pattern is less ambiguous. Large shell middens that are interpreted as base camps are reported throughout the area in coastal and estuarine settings. Smaller middens that represent more ephemeral procurement sites also occur in these areas. Nearer the coast, Gardner (1982) proposes a fully coastal model, but up the bay in the Potomac area the pattern is more indicative of a seasonally timed shift in focus from the estuaries to the interior. There is no question that many Middle Woodland middens have been heavily damaged by shoreline erosion, and numerous small ones have likely been lost altogether. This means that some limitations are still imposed on our ability to accurately model settlement even at this late date.

By the Late Woodland and Protohistoric periods, both natural and cultural factors led to the location of

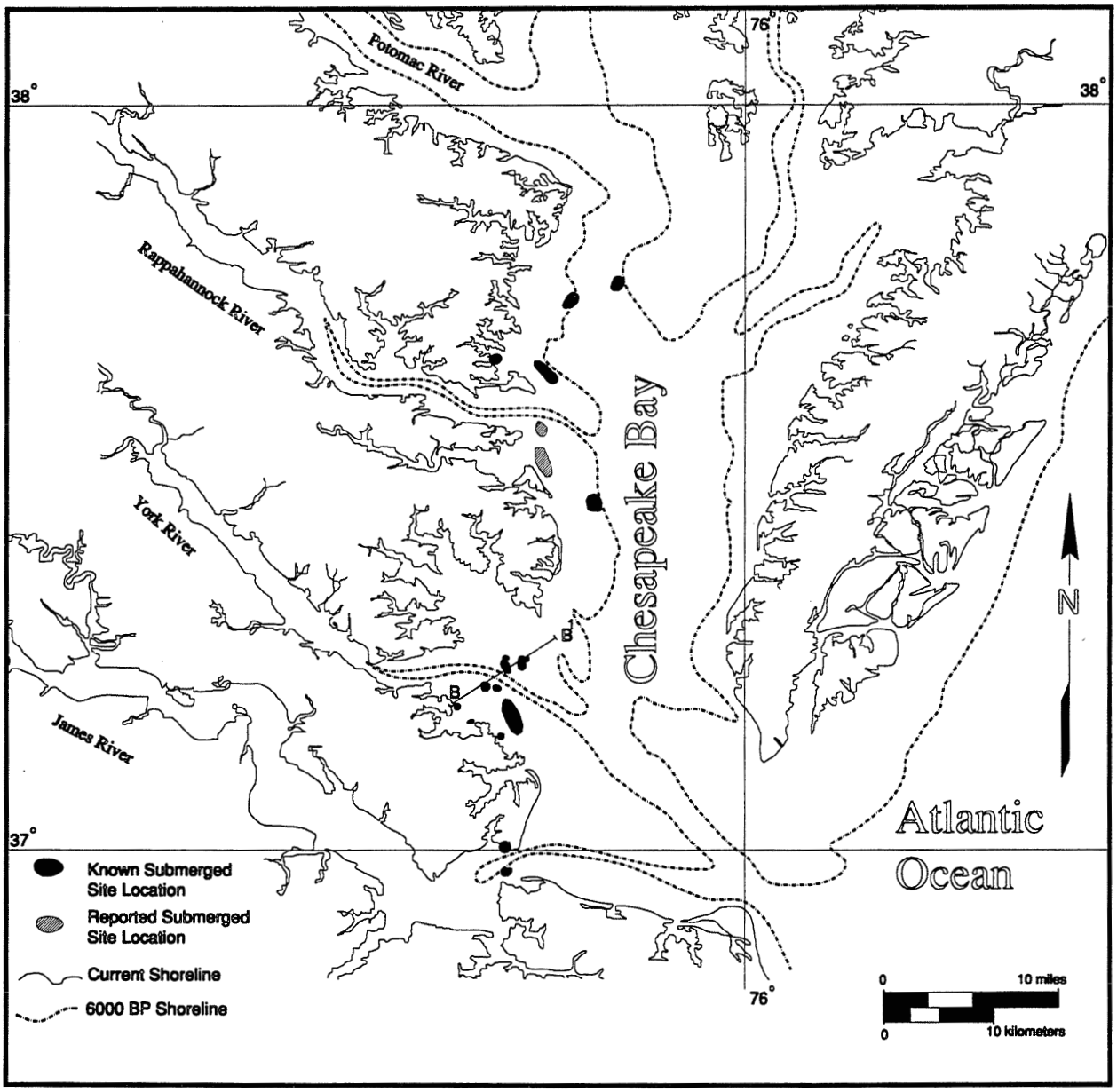

Figure 4. Locations of submerged prehistoric sites/site clusters in Chesapeake Bay (Blanton 1994).

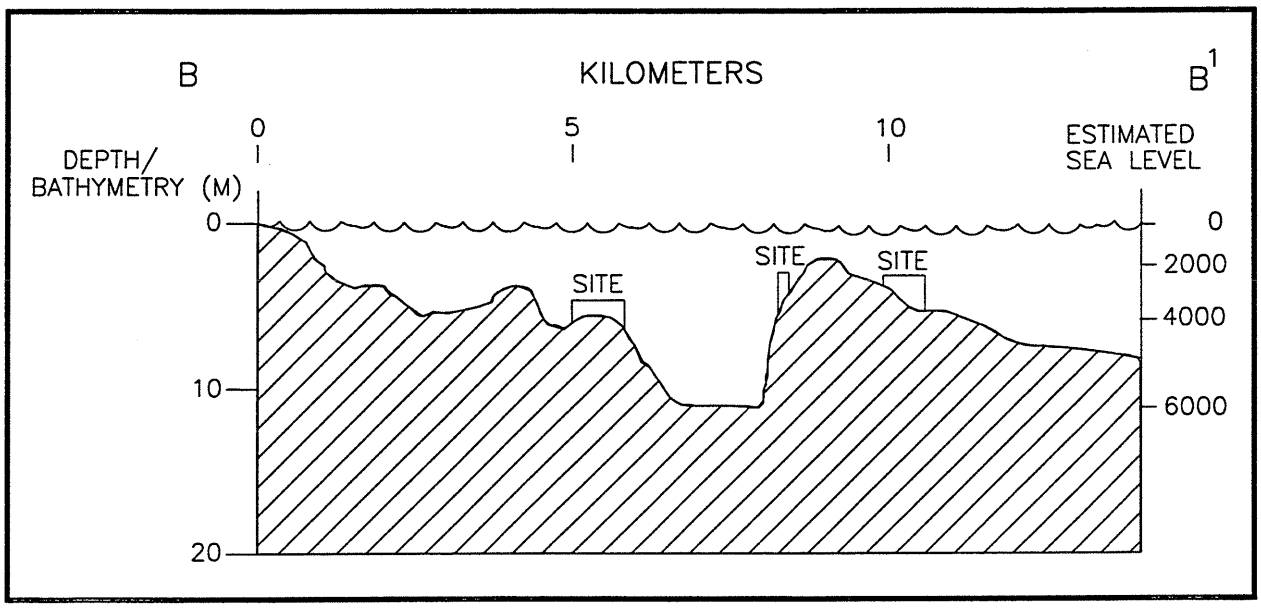

Figure 5. Cross-section of submerged site locations on York Spit (Blanton 1994).

sites in areas relatively safe from submergence. This is most true of the larger sites, which most models associate with specific soils conducive to primitive cultivation (Potter 1993; Turner 1992; Custer 1989). The typical locations of villages from this time are on relatively elevated terraces or necklands where the most arable soils are found. The lower-lying areas have soils that are permanently or seasonally water-logged and subject to flooding. Extensive shell scatters often accompany these sites, however, and indicate the continuing contribution of estuarine resources. They are believed to have served only to supplement horticultural produce and the food obtained by hunters, however. In other words, these groups were not supported wholly or even primarily by coastal resources. Smaller sites of this period, including small shell middens, do occur adjacent to wetlands such as marshes. Some of the sites established in these locations are potentially eroding, if not obscured by the advancing shoreline. They will be relatively few in number and their discovery will not alter the prevailing models.

Non-Coastal Plain Models

Non-coastal areas have not undergone systematic inundation as coastal areas have and, therefore, are seldom addressed in the same way. There are, however, aspects of environmental change across the region that have created the potential for site submergence in these areas. It has been widely observed that settlement-subsistence patterns became more focused on resource-rich zones such as exist adjacent to streams and wetlands, and this is most apparent beginning in the Late Archaic period. As more intensively occupied sites were established in these areas, they naturally were subject to effects of changes such as shifts in stream course and expansion of wetlands.

The coalescence of settlement in riverine/wetland zones can be expected to have encouraged establishment of facilities specific to these settings. Among these would have been features such as fish traps/weirs. It also would have favored use of watercraft for travel and transport of goods. These kinds of features and craft are documented archaeologically across the state almost exclusively in underwater settings. To date, virtually all of the fish weirs known in Virginia are located in Piedmont or mountain streams where rocky shoals are conducive to their construction. Other types almost certainly were constructed in Coastal Plain streams, perhaps as complex arrangements of stakes like the case of Boston's Boylston Street weir (Johnson 1942), but they are not yet documented. Native dugout canoes, conversely, are known only from Coastal Plain waters, although they would have been utilized farther west as well.

Freshwater wetlands have expanded and contracted according to shifting environmental regimes. Overall, however, there appears to have been a net expansion since the end of the Middle Archaic period. In the Coastal Plain, such expansion is also linked to groundwater movement as affected by sea level rise. A prime example of this effect is documented in the history of the Dismal Swamp in southeastern Virginia. Studies have shown that the swamp gradually expanded up until the historic period, when large portions were drained (Whitehead and Oaks 1979). Potentially, many sites established at the former margins of the wetland are now underwater or hidden by a blanket of peat or sediment.

The many sites established along freshwater streams are not likely to become permanently flooded, unless they are in locations over which brackish tidal waters have encroached. More typically, they are inundated only briefly and only at irregular intervals by major floods. Also, flood episodes can permanently alter the course of streams and thereby alter the physical relationship of the site and the primary channel. In each case, short-term flooding tends to have negative effects on the integrity of sites. Accounts abound of floodwaters scouring away protective layers of sediment to expose prehistoric features to weathering and looters (Mouer 1991). It is the more steady and slower process of bank erosion, however, that removes material from most streamside sites. Therefore, outside of the coastal zone, the only archaeological remains likely to become permanently submerged are artifacts that have been eroded and transported in the bedload of streams.

CHAPTER 3: Historic Context

The following historical narrative has been constructed with several objectives in mind: first, to present a chronology of significant events that emphasize the maritime history and development of Virginia; second, to draw special attention to those events in the maritime sphere that influenced, relate to, or elucidate broader social patterns, political developments, or technological trends in regional, national, and global history; and third, to describe particular incidents that resulted in the deposition of significant cultural resources, including those contained in the current inventory and others yet to be cataloged, on the submerged bottoms of the state.

Pre-1607

Although DHR guidelines for preparing historic contexts do not include a category for European exploration or occupation before the Jamestown settlement, a discussion of such activity seems appropriate in the maritime context in view of the documented activities of early European explorers as well as more recent speculation about pre-Columbian voyages to the New World. The discovery of such resources, if indeed any exist, obviously would be considered profoundly significant.

Most hypotheses regarding pre-Columbian voyages to the Western Hemisphere focus on the civilizations of Mesoamerica and Peru. Some, however, advance the notion that early voyagers—Romans and Norsemen, specifically—may have reached the Atlantic coast of North America near the latitude of the Chesapeake Bay. Since very little in the way of hard evidence has been advanced to prove these theories, scholars have refuted them with little difficulty. (The best "evidence" for a Roman landfall on the Mid-Atlantic coast has been the discovery of Roman coins in Protohistoric Native American burial assemblages in interior regions such as Kentucky and Tennessee. Scholars have argued persuasively, however, that such coins easily could have made their way into the ballast of English ships amongst stones dredged from English rivers. Ballast frequently was discarded in American rivers or other anchorages when these ships took on American cargoes for the homeward voyage [Newell cited in Frost 1993:50]. Coastal Indians could have collected the objects and exchanged them with interior tribes for other trade goods.)

While the various pre-Columbian theories may be dismissed rather summarily, documentary evidence of early Spanish activity in the region cannot be disclaimed so easily. Of particular interest is the colonizing voyage of Lucas Vasquez de Ayllon, an early sixteenth-century expedition that has led some researchers to postulate a substantially earlier European landfall and settlement at Jamestown than the one generally recognized.

A judge, auditor, and member of the *audiencia* of Santo Domingo, Ayllon had dispatched exploratory missions along the coast of mainland North America in 1521 and 1525. In June 1526, Ayllon himself assumed command of an expeditionary fleet composed of six ships, 500 to 600 people, and over 80 horses. After losing the capital ship while attempting to enter one river, the Spaniards proceeded to another large tributary, where they established a settlement that soon failed as a result of sickness, an early winter, and Ayllon's death. The colonists returned to Santo Domingo with only 150 survivors out of the original company.

Based on differences of opinion over key (and often ambiguous) points in various historical narratives, scholars have disagreed widely over the location of the settlement. While most place the colony in what is now South Carolina—even as far south as the Savannah River on the Georgia border—at least one has identified Jamestown as the settlement site, citing an early seventeenth-century *piloto mayor* of Spanish Florida who expressed the same conviction (Swanton 1918:39; Sauer 1971:73; Lowery 1901:166; Quattlebaum 1956:Appendices C and D; Shea 1886:240).

Equally tantalizing, though even less substantial in terms of documentary evidence, is the suggestion that an early Spanish vessel may have come to grief off Tangier Island in the Chesapeake Bay. An extremely low tide produced by a storm in 1926 revealed a wreck from which local oysterman reportedly tonged copper

plates and a battle ax. According to Baltimore newspaper accounts, experts at the Peabody museum who examined the weapon (which has since disappeared) deemed it to be a "Medieval pole ax" of "Latin origin." A modern historian has suggested that the wreck may be that of a Spanish vessel purported to have been lost in the area in 1611 (Shomette 1982:3–6; Lewis and Loomie 1953:57).

Less speculative regarding Spanish activity in the Chesapeake region than either the Ayllon settlement or the Tangier Island wreck is the Jesuit mission believed to have been established on the York River in 1570 (Lewis and Loomie 1953:15–55; Sauer 1971:221–25). The meager success of Jesuit missionary activity in Florida, the prospect of discovering a passage to China further north, and the presence of an Indian captive from the Chesapeake area who knew the coast prompted members of the order to forsake Florida and found a new mission in the bay region. Jesuit scholars who have researched the voyage have concluded that the expedition landed on the north shore of the James River, crossed the James-York Peninsula by foot, and established a mission on the southern bank of the York River (Lewis and Loomie 1953:40) (Figure 6). Like the Ayllon colony, this one was also short-lived. Five months after its establishment and the disappearance of the Indian guide, the native returned with a raiding party that wiped out all but one boy. The following year, a Spanish expedition returned to exact retribution, seizing a group of unsuspecting natives and hanging from the ship's rigging eight believed to have collaborated in the massacre.

European Settlement to Society (1607–1750)

Two factors that greatly influenced the development of Virginia in the colonial period were the geography of the Chesapeake region and the adoption of tobacco as a staple crop. The Chesapeake Bay and its tributaries constituted a system of waterways that offered ease of transportation to the interior, access to overseas shipping, and internal communication. The success of tobacco as a cash crop was directly related to the geography of the region and the development of maritime trade and transportation networks.

Typically packed and shipped in large hogsheads, tobacco was a cumbersome product that required vessels with large cargo-carrying capacity to reach overseas markets. At the same time, tobacco was a somewhat perishable commodity that could not easily withstand the rigors of overland conveyance to other colonies or distant harbors for transshipment. The physical characteristics of Tidewater Virginia suited the needs of the tobacco trade perfectly. "'Tis the Blessing of this Country..." an eighteenth-century observer remarked, "and fits it extremely for the Trade it carries on, that the Planters can deliver their Commodities at their own Back doors, as the whole Colony is interflowed by the most navigable Rivers in the World" (*William and Mary Quarterly [WMQ]* 15(1):147).

Apart from the clear advantages it offered, regional geography also created certain problems. In terms of defense, the same navigational conditions that facilitated trade and communication simultaneously posed a strategic dilemma. The entrances to the Chesapeake Bay and its major tributaries were too broad for forts or land batteries to control the shipping channels. The configuration of the bay region also had adverse consequences in terms of urban development. The planters' ability to deliver tobacco for export at or near their plantations obviated the need for ports and towns below the Fall Line. The absence of urban centers denied Tidewater Virginians many of the social and intellectual benefits of such development and may have encouraged the colony's cultural dependence on the mother country. The dispersed character of the population additionally contributed to the difficulty of providing adequate defense against waterborne enemy attack.

Tobacco represented the foundation of the Virginia economy throughout the colonial period. The annual volume of tobacco exports from the Chesapeake grew from 60,000 pounds in 1622 to 20,000,000 pounds at the turn of the eighteenth century to 100,000,000 pounds in 1775 (Middleton 1984:105–107). Huge fleets of ships (usually 150 to 200, but once as many as 300) sailed from the Chesapeake for England (sometimes twice a year before 1707, generally once a year thereafter) under armed escort (Middleton 1984:313–325). Since the vessels were heavily loaded with the bulky cargo on the homeward voyage, but lightly laden on the outward trip, the ships were able to transport significant numbers of European immigrants to the colonies, including indentured servants, political and military prisoners, and convicts (Middleton 1984:161–162).

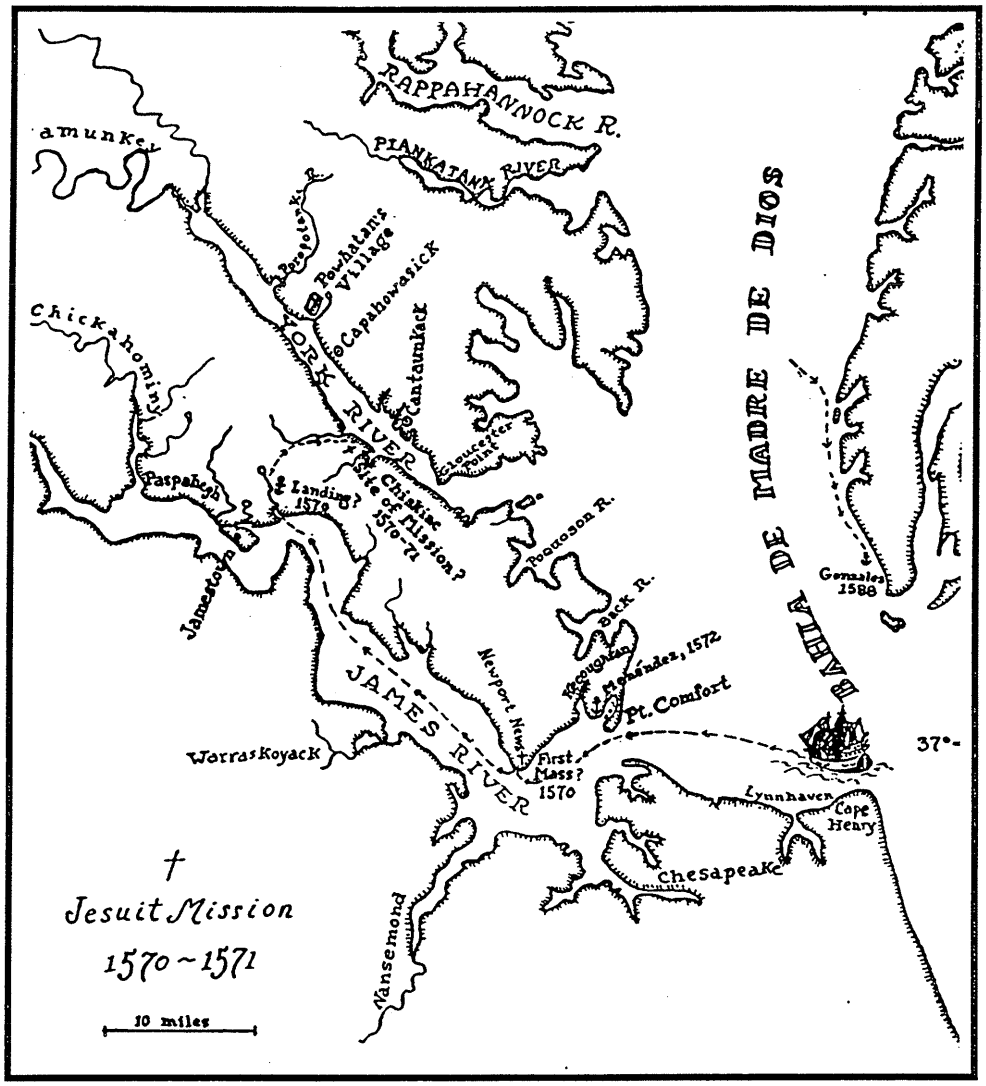

Figure 6. Suspected location of Spanish Jesuit Mission (Lewis and Loomie 1953:40).

Although the tobacco industry predominated, a trade that began to thrive in the early eighteenth century between the Chesapeake region and the West Indies had several important consequences. First, it promoted the diversification of Virginia's economy by providing markets for other local exports such as wheat, flour, corn, lumber, and pork (Middleton 1984:201). In addition, it fostered development of the local shipbuilding industry in order to meet the needs of the expanding markets (Goldenberg 1976:118–119; Middleton 1984:175). An increase in shipbuilding in turn stimulated the growth of auxiliary industries such as hemp, sailcloth, lumber, and naval stores.

Expansion of the West Indies trade also encouraged the growth of illicit commerce. British navigation laws prohibited most forms of exchange between American colonists and foreign countries, but the British West Indies by themselves could not consume the prodigious volume of colonial grain exports of which the Caribbean colonies of other nations were always in need. At the same time, the British West Indies could not adequately supply the colonial demand for Caribbean rum. Parliament passed the Molasses Act in 1733 in an effort to stop the trade with foreign colonies. But the more compelling imperative, the law of supply and demand, prevailed in the end, as

Anglo-Americans almost universally disregarded the legislation (Middleton 1984:205–206, 209–212).

Such defiance was by no means unprecedented. In fact, Virginians had been violating the Navigation Acts since their inception. Smuggling tobacco to foreign countries, loading it surreptitiously on foreign vessels in Virginia, concealing it from customs inspectors, forging customs certificates, and bribing officials were all activities undertaken by colonial Virginians mainly for the purpose of evading customs duties imposed by the royal government on the export of tobacco. In the pursuit of these illegal enterprises, Virginians were assisted, once again, by the geography of their region. The vast stretches of shoreline bordering the Chesapeake Bay and its tributaries as well as the Atlantic coast with its many banks and islands offered innumerable possibilities for conducting illicit trade with little fear of detection.

Contemporary authorities were well aware of the difficulties that the geography of the region created. The surveyor general of the customs for the American colonies reported to royal authorities in 1692 that "every vessel runs into a different bay, so that it is endless work for a diligent officer to keep an eye on them" (Sainsbury et al. 1860–:XIII, #2295, p. 660). In many cases, no amount of diligence could overcome the remoteness of customs officials from the areas of greatest illicit trade activity. Even if the government managed to station officers wherever vessels normally unloaded and took on goods, a contemporary informant contended, "10,000 Men Could not performe it. To Keep Shiping from Landing And taking of Good by Stelth" (cited in Dodson 1932:62-63). The problem that geography imposed on the policing of maritime trade in the greater Chesapeake area was never resolved adequately. In 1730 and again in 1743, Virginia governor William Gooch had to admit that "after all it is impossible altogether to prevent the running of...prohibited goods, when there are so many landing places remote from the inspection of any officer" (Gooch n.d.:1:Gooch to the Board of Trade, 23 July 1730, 3:Gooch to the Board of Trade, 22 August 1743; *Virginia Magazine of History and Biography* n.d.:III:118; Flippin 1924:16).

Colonial officials and visitors frequently remarked on the vital role played by sloops, shallops, and other small craft in the transportation system, both legal and illicit, of the Chesapeake colonies (Figure 7). As early as the mid-seventeenth century, an observer noted that the colony had "pinnaces, barks, great and small boats many hundreds, for most of their plantations stand upon the rivers' sides and up little creeks and but a small way into the land" (cited in Evans 1957:12). Nearly a century later Governor Gooch, responding to Board of "Trade queries concerning Virginia's commerce, also commented on the "small Shallops which are constantly employ'd in the Bay in transporting the Country Commodities from one River to another" (Gooch Correspondence n.d.:1, Gooch to the Board of Trade, 23 July 1730; vol. 3, Gooch to the Board of Trade, 22 August 1743).

Many of these craft were used to transport tobacco from small landings to large, transoceanic ships anchored in deep-water channels. These and other small vessels then conveyed arriving European and West Indian goods to various plantations, stores, or towns in the immediate vicinity and further upriver. The local iron industry also made extensive use of sloops and schooners to transport iron ore to foundries and to convey manufactured bars to larger vessels for export (Middleton 1984:187, 229–232). (The volume of iron exports from the Chesapeake comprised 90% of the total amount of pig iron shipped from the American colonies to Great Britain between 1730 and 1750 [Middleton 1984:189].)

Besides goods, colonists relied on various small craft to transport themselves across the colony's waters to visit friends, conduct official business, and attend meetings and church. Ferry services (licensed in Virginia as early as the 1640s) were established early on and generally consisted of two types: small sailing craft used to traverse large, open bodies of water such the broad mouths of Chesapeake tributaries and the bay itself and, to cross the more sheltered creeks and narrower sections of the rivers, small flats or scows that could be rowed, poled, or pulled on a rope from one bank to the other (Evans 1957:37–46; Middleton 1984:70–75).

For the coastal and West Indian trades, the fore-and-aft rigs of one-masted sloops and two- or more masted schooners served colonial Virginians particularly well (Figures 8 and 9). Sloops, the most common rig during most of the colonial era, were supplanted by schooners in the second half of the eighteenth century. Unlike the large tobacco ships for which speed was not a premium because they normally traveled in armed convoys, the generally unescorted vessels of the West Indian trade required speed and

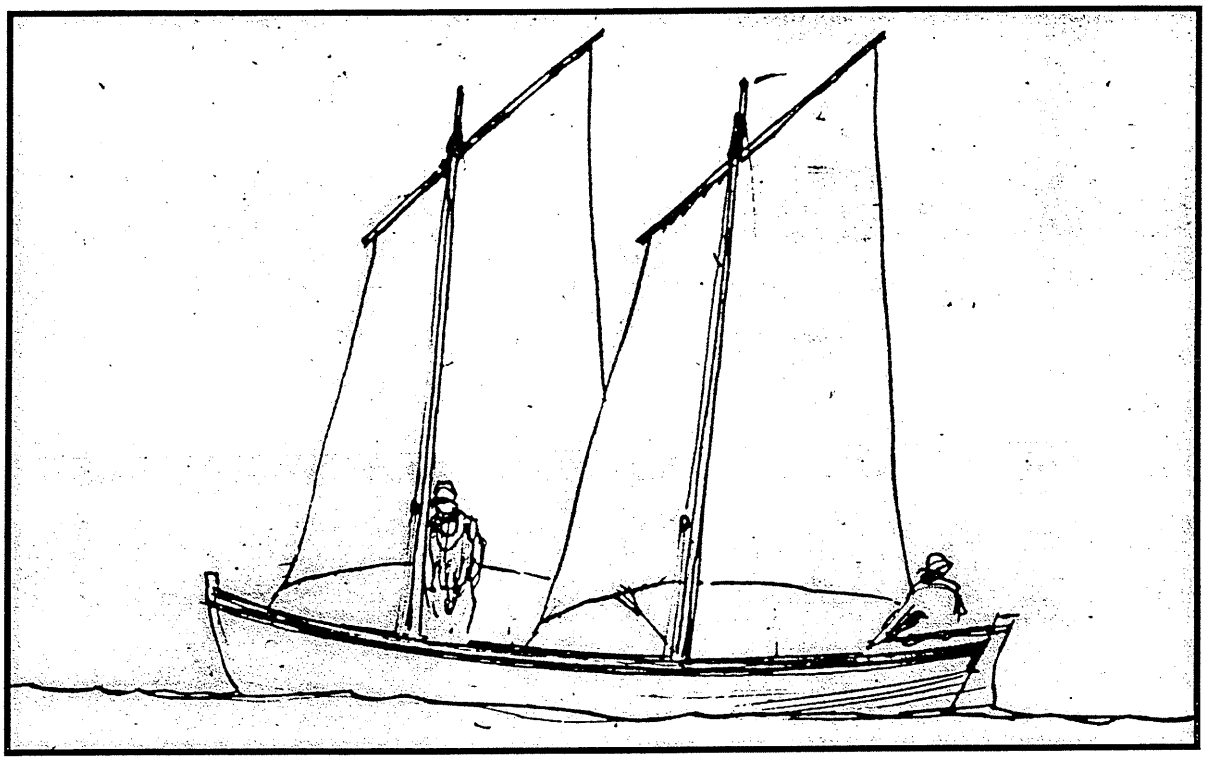

Figure 7. Shallop (Evans 1957:between 32–33).

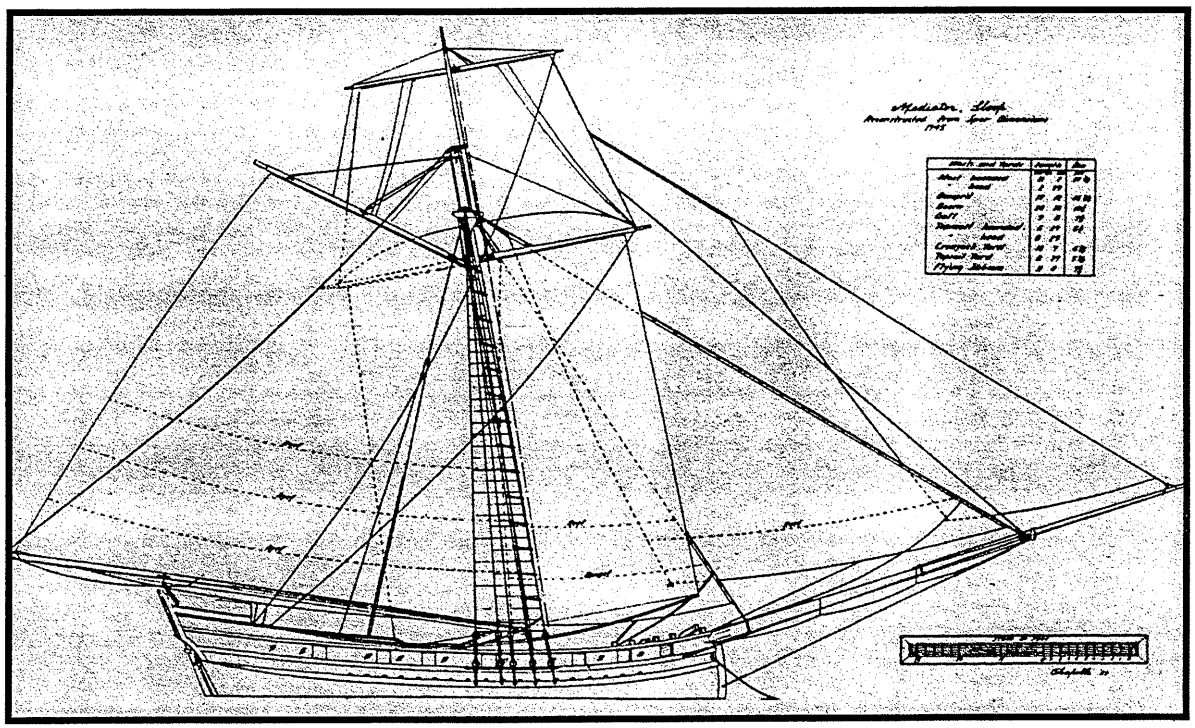

Figure 8. Virginia sloop HMS Mediator *(Evans 1957:between 32–33).*

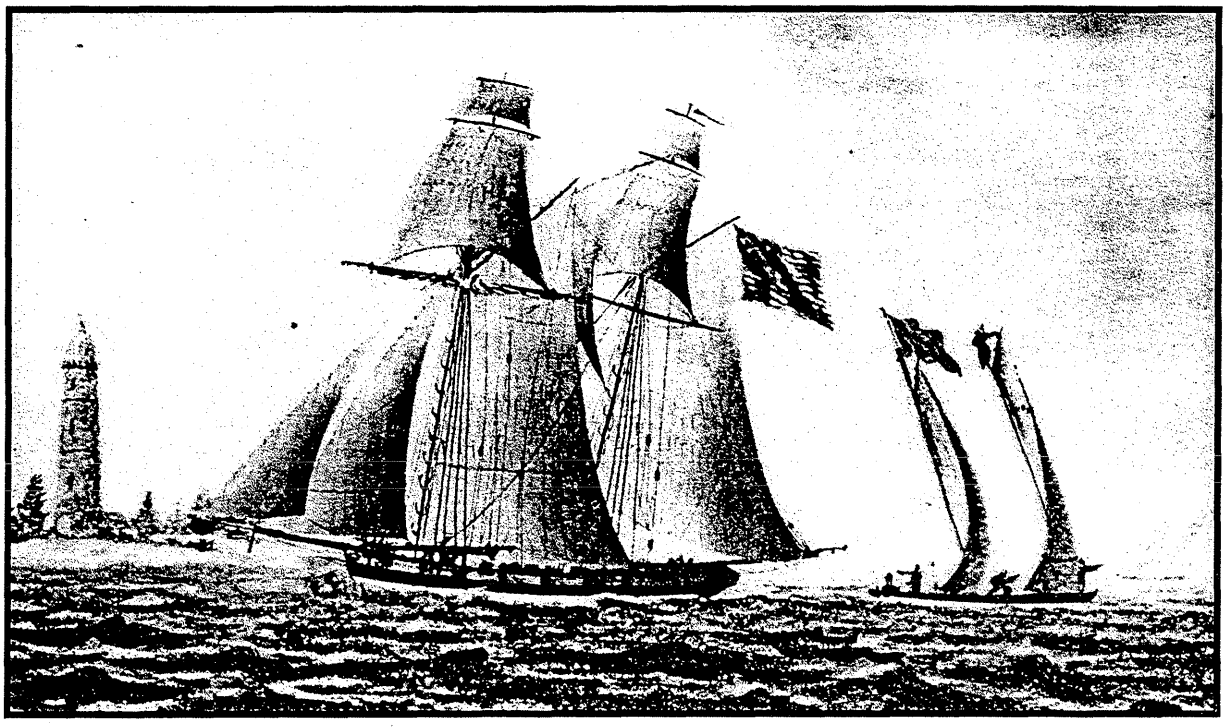

Figure 9. Schooner (Evans 1957:between 32–33).

maneuverability to avoid capture (Evans 1957:29). To meet these demands, shipbuilders began constructing vessels with sharper, faster hulls, which became famous as Chesapeake clipper-schooners (and, eventually, as Baltimore Clippers).

Through the early part of the eighteenth century, Virginians depended mainly on vessels from other regions, primarily New England and Bermuda, to carry their coastal and West Indian cargoes (Goldenberg 1976:118–119; Middleton 1984:199). But expansion of the Caribbean trade prompted local inhabitants to increase their shipbuilding capabilities accordingly. By the third decade of the eighteenth century, Chesapeake residents had assumed a significantly greater role in their seagoing commerce "to such a Degree," Virginia governor Alexander Spotswood reported, "as to carry in there [sic] own bottoms almost that whole Trade which used to be managed by the People of New England, Bermuda, and other Plantations" (Spotswood 1882–1885:II:154). (The word "bottom" in this context refers to ships and ship hulls; the same usage has continued down to the present day.)

Among the attributes that attracted investors, settlers, naval men, and government authorities to Virginia from the outset was not only the ease of transportation *within* the colony offered by the many deep-water tributaries but the ease of navigation *to* the colony as well. Unlike the rocky coasts of New England or the submerged reefs of the Caribbean and Florida, the approaches to the Chesapeake are characterized by a gently and, for the most part, uniformly sloping continental shelf. "A bolder and safer Coast is not known in the Universe," asserted Robert Beverly, a sentiment echoed by Sir William Berkeley who proclaimed that "fewer ships miscarry to going to Virginia, than to any Port at that distance in the world" (cited in Middleton 1984:35).

Despite Berkeley's glowing testimonial, ships did miscarry on their way to and from Virginia and on the colony's shores en route to other destinations. The causes of such mishaps were various. Some were accidental, involving storms or navigational errors. Squalls and gales that developed quickly and with little warning frequently caused wrecks, particularly on or

near the Virginia Capes and Middle Ground Shoals (Middleton 1984:56; Shomette 1982:13–15). In 1738, for instance, a ship carrying German colonists drove ashore in Lynnhaven Bay just inside the Capes; less than 60 of the original party of 300 survived (Shomette 1982:10). In 1747 over 50 indentured servants drowned when their ship capsized in a sudden storm in the Rappahannock River (Shomette 1982:15).

Hurricanes, such as those recorded in 1667 and 1749, were responsible for the loss of many ships and lives (Middleton 1984:55–56; Shomette 1982:15–16). The absence of navigational aids for most of the colonial period further contributed to the grounding of vessels on the shoals and islands of the coast, bay, and rivers. Proposed as early as 1720, a lighthouse at Cape Henry was not completed until 1792 (Middleton 1984:35). The first mariners' chart of the bay suitable for actual navigation was not produced until 1735, and the next significant updating not until 40 years later (Middleton 1984:84, 87).

Other sinkings were intentional, usually the result of warfare or raiding. In 1667, a Dutch squadron entered the James River and captured or burned ships from the English tobacco fleet (Sainsbury et al. 1860–:V, #1545, p. 490; Middleton 1984:314, 338). During Queen Anne's and King George's wars, French and Spanish privateers harassed English and colonial merchant shipping both within and outside the Capes, often burning their prizes after looting them (Middleton 1984:347–49, 353, 358, 360). In peacetime, many privateers turned to piracy and plagued Chesapeake shipping in a similar manner. Piracy plagued the region intermittently throughout the colonial period, but threatened the area most seriously between 1660 when Governor Berkeley described Virginia waters as being "full of pirates" and the early 1720s when Governor Spotswood declared the colony "secured against the attempts of pyrates...on its sea frontiers" (Sainsbury et al. XXXIII, #175, p. 85).

Colony to Nation (1750–1789)

Apart from the ordinary hazards of navigation, a number of discrete events added substantially and significantly to Virginia's inventory of submerged cultural resources in the latter half of the eighteenth century. Most concern naval engagements associated with the Revolution. One of the earliest in the period, however, involves the little known saga of an ill-fated Spanish treasure fleet.

In late August 1750, a Spanish fleet embarked from Havana with a cargo of gold and silver bullion and other valuable New World products, bound for Cadiz. Battered by a hurricane only days out at sea, the ships were buffeted and strewn along the coast of English North America from as far south as North Carolina to the Maryland-Virginia border on the Eastern Shore in the north. A few made safe harbor in Norfolk. Most wrecked or grounded along the coast. Two, including the 50-gun flagship *Galga*, stranded on the Eastern Shore, where they were looted (or salvaged, depending on one's interpretation of the documentary record) by local inhabitants. Although the flagship contained about 30 English prisoners (most of whom managed to escape when the ship grounded), colonial authorities generally assisted the Spaniards and facilitated safe passage for them and their goods to Cadiz (Margolin 1995).

Doubtless the single event in Virginia's history responsible for the accumulation of more significant underwater sites than any other was the Revolution. Moreover, the incidents that produced these submerged resources were not simply of local or regional import, but of enduring national significance. As one historian has remarked, the "losses of ships and men in the tidewater theater of operations...were perhaps as closely tied to the achievement of American independence as any other event of the war" (Shomette 1982:39).

One of the early highlights was Virginia governor Lord Dunmore's retreat from Hampton Roads in 1776 with a fleet of Royal Navy warships and vessels carrying loyalist refugees. Among those who withdrew with Dunmore was Andrew Sprowle, loyalist owner of the Gosport Shipyard in Portsmouth on the Elizabeth River. The Commonwealth of Virginia promptly confiscated Sprowle's property and began to operate the yard for the benefit of the newly established Virginia Navy (Foss 1984:12–13; Butt 1959:2).

For lack of sufficient men and sails to navigate all the vessels at his disposal, the governor ordered seven or eight to be torched or scuttled on the Norfolk flats to avoid enemy capture. Dunmore and his fleet proceeded to Gwynne's Island at the entrance of the Piankatank River, where they were driven off by cannon fire from shore-based Virginia militiamen. After losing or scuttling many additional vessels in Maryland waters, the governor's entourage eventually withdrew from the Chesapeake altogether, scuttling

several more ships near the Virginia Capes (Foss 1984:13–14; Shomette 1982:41–48).

The patriot cause suffered a series of critical setbacks in the maritime arena in 1779, 1780, and 1781. In May 1779, a British invasion fleet seized the Gosport Shipyard. Although a number of American warships and merchant vessels in the harbor were captured, the commander of the British land forces committed the tactical error of destroying the yard as well. For this he was chided by the admiral of the invasion fleet who pointed out that "the marine-yard was the most considerable one in America...large and extremely convenient....Five thousand loads of fine seasoned oak-knees for shipbuilding, an infinite quantity of plank, masts, cordage, and numbers of beautiful ships of war on the stocks, were at one time in a blaze" (George Collier quoted in Butt 1959:2–3; Foss 1984:16).

In 1780 British fleets entered the bay and wreaked havoc throughout Hampton Roads, destroying the Hampton waterfront, burning homes in Newport News, and occupying Portsmouth. The following year, the American turncoat Benedict Arnold, then commander of a British invasion force, captured Petersburg and burned American ships in the Appomattox River (Sands 1983:22; Shomette 1982:58). Next he moved to eradicate the main concentration of the Virginia Navy fleet anchored off Osborne's Landing in the James River. Outgunned by British ships and land batteries, the Americans sought to burn or sink as many of their own vessels as they could to prevent the ships from being captured. Four ships, five brigs, and numerous smaller craft were thus destroyed (Figure 10). Shortly thereafter, when Arnold attacked the Virginia Navy Yard on the Chickahominy River, the American commander likewise had no choice but to sacrifice his fleet to keep it from falling into enemy hands (Sands 1983:22; Shomette 1982:57–61; Foss 1984:16–17).

In July 1781, however, the tide of the naval war began to turn in the Americans' favor. A French naval fleet under the Comte de Grasse blockaded the entrance to Chesapeake Bay (Figure 11). In the famous Battle of the Capes on September 5, de Grasse defeated a British squadron commanded by Admiral Thomas Graves that had been sent to smash the blockade and relieve royal troops under General Charles Cornwallis at Yorktown. By early October, Cornwallis lay besieged by the combined armies of George Washington and French general Rochambeau (Sands 1983:46–49, 50–51,53; Shomette 1982:66–67).

To prevent an amphibious assault by the French, Cornwallis ordered the sinking of a line of ships along the Yorktown waterfront (Sands 1983:63; Shomette 1982:68–69) (Figure 12). Meanwhile, French and American batteries pounded the British. On October 10, gunners from a French battery west of the town succeeded in striking Cornwallis's flagship, HMS *Charon*, with "hot shot," setting it ablaze (Figure 13). The *Charon* drifted to the Gloucester side of the river, where she burned to the waterline and sank (Sands 1983:76–78; Shomette 1982:69).

On October 16, Cornwallis and his forces attempted to flee through the only escape route left to them, north across the river and through Gloucester, but a sudden squall spoiled their plans. Three days later, the British at Yorktown formally surrendered, but not before they had scuttled two Royal Navy warships and several transports to keep them out of American hands (Sands 1983:56–58, 82, 83–88; Shomette 1982:69–70).

In addition to the climactic events of the period, subtler changes that significantly affected the maritime development of the region also occurred. In the second half of the eighteenth century, schooners supplanted sloops as the primary coasting craft in the Chesapeake area. Local residents had modified the design to create a distinctive type that came to be known as "Virginia-built" or "Virginia-model" schooners. The advent of these Chesapeake Bay clipper-schooners, forerunners of the famous Baltimore Clippers of the next century, has been characterized by one maritime historian as "the most spectacular event in the history of naval architecture in the eighteenth century" (Middleton 1984:239).

As in previous decades, the principal consideration in design was speed, a trait further emphasized during the Revolution, when many schooners were pressed into service as privateers or blockade runners. As a result, schooner hulls became increasingly sharp to reduce drag, and rigging was modified to support an ever larger spread of sail. Shipbuilders in other parts of the country admired the appearance and sailing characteristics of the vessel and, around 1780, began constructing their own schooners in the "Virginia" style (Burgess 1963:103–104; Middleton 1984:239).

Figure 10. Sketch of battle in James River at Osbornes (Shomette 1982:59).

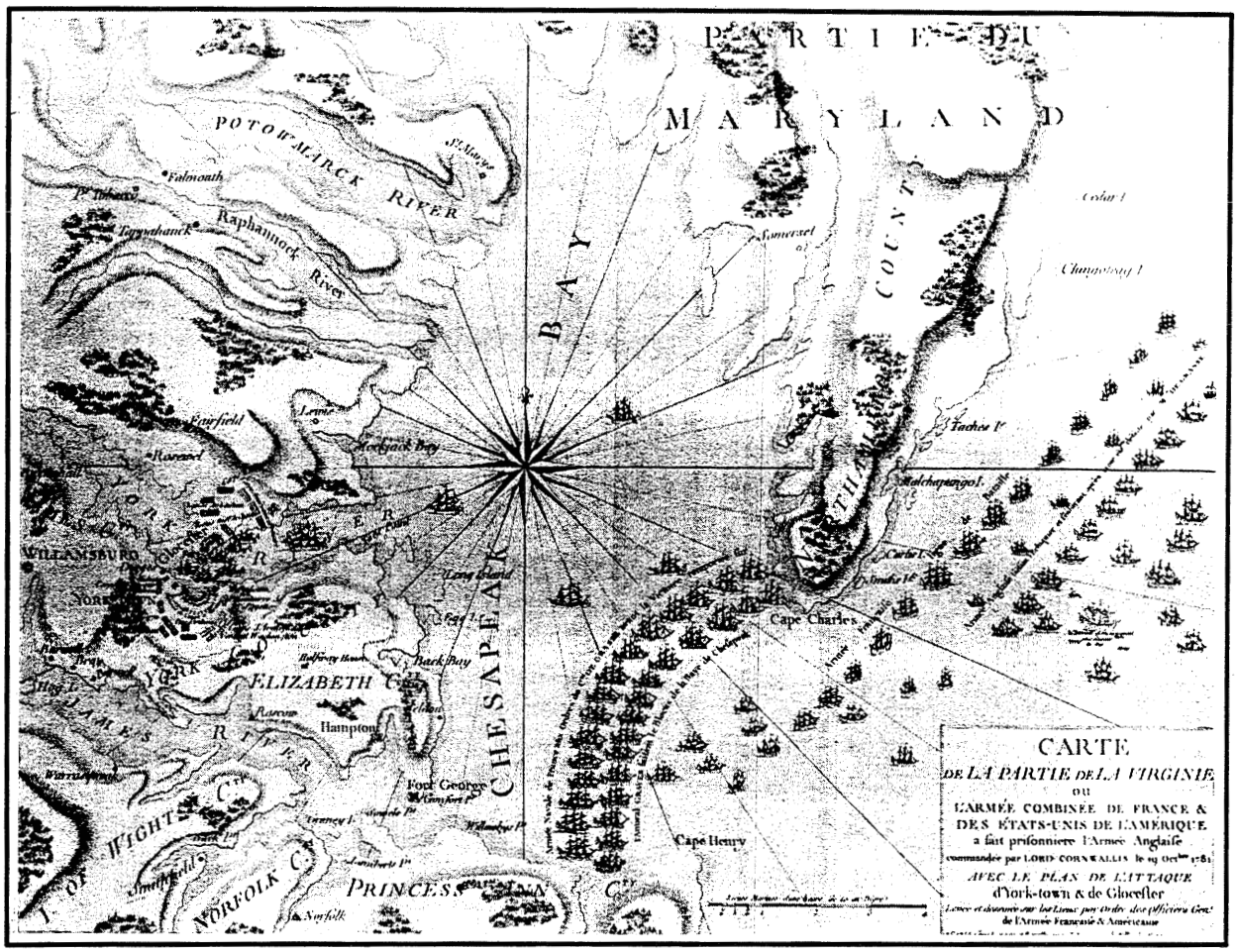

Figure 11. French map depicting de Grasse's fleet at the Virginia Capes (Sands 1983:27).

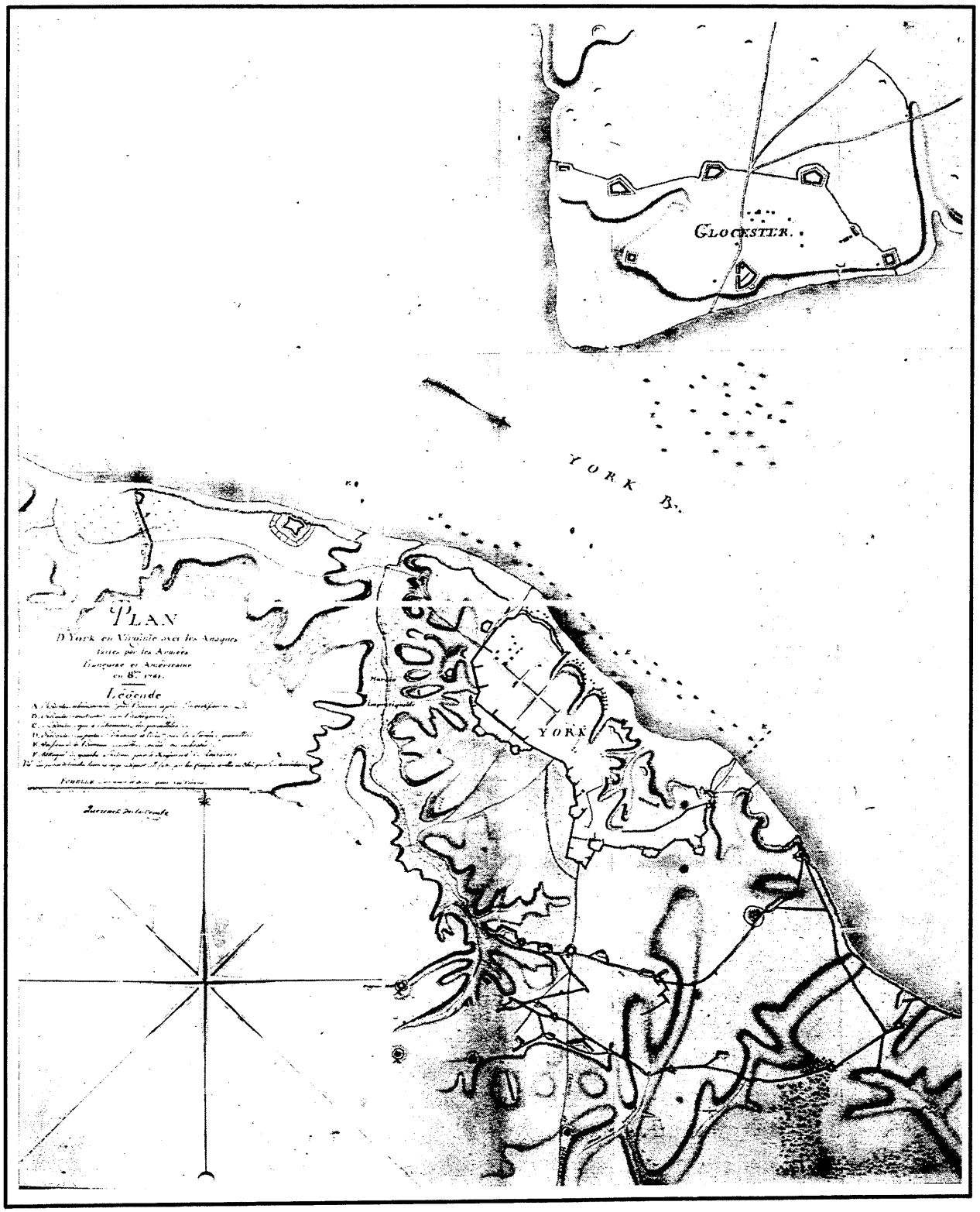

Figure 12. Plan of scuttled ships at Yorktown (Sands 1983:61).

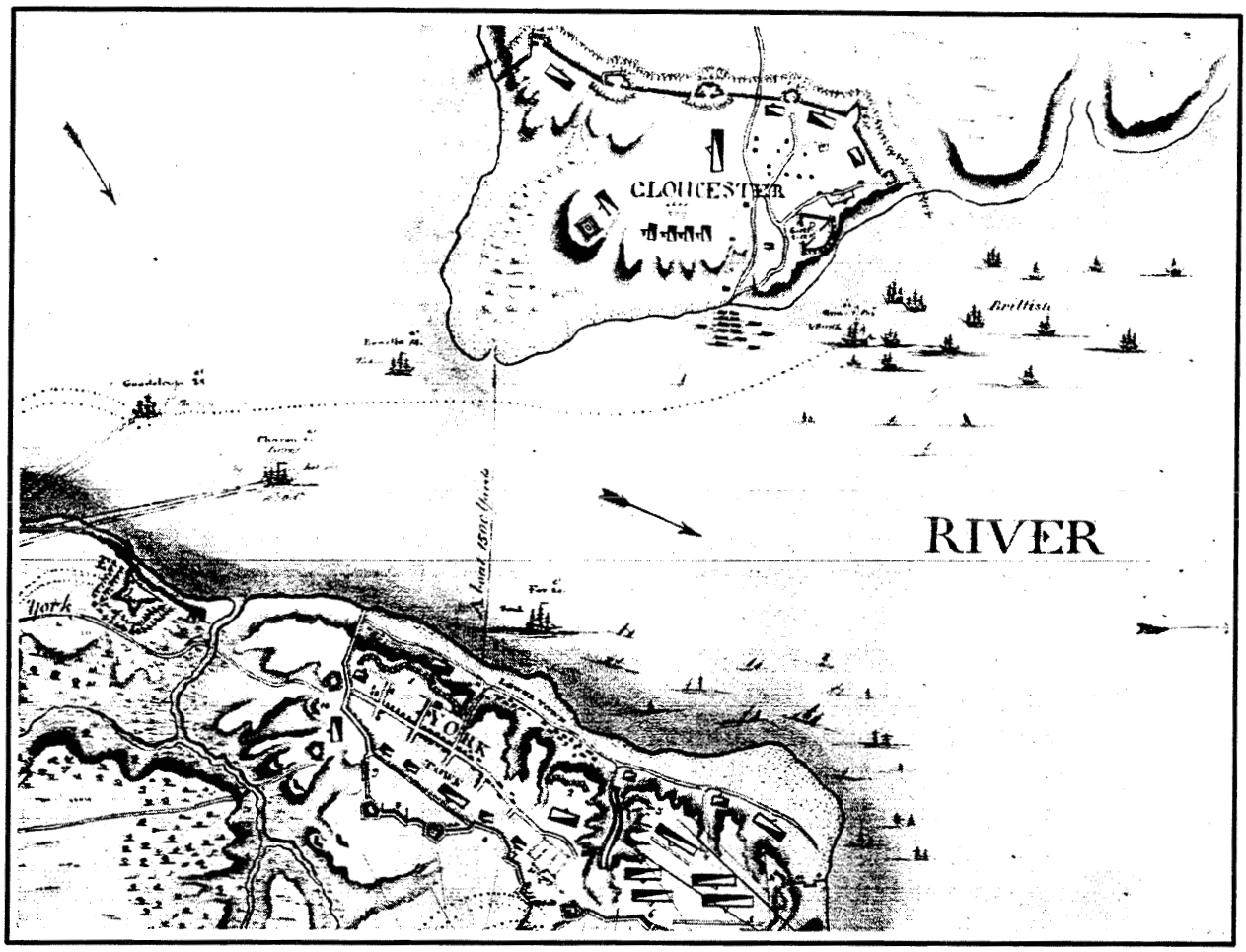

Figure 13. British map showing French fire directed at Charon *and* Guadaloupe *and line of scuttled ships along Yorktown Beach (Sands 1983:72–73).*

The expansion of the western frontier gave rise to vessel types specifically adapted to upland waterways. As the fertility of lands in the Tidewater region diminished and settlement spread westward, many tobacco farmers were no longer in a position to ship their produce directly from or near their own plantations. Planters who lived above the Fall Line of Virginia rivers depended on the establishment of warehouses and stores at the furthest inland extent of deep-water navigation. The virtually unprecedented need for river ports and exchange centers in Virginia gave rise to towns such as Georgetown and Alexandria on the Potomac, Richmond on the James, and Fredericksburg on the Rappahannock.

Among the American colonies, Virginia is distinguished as having the earliest documented accounts of upland river transportation, corresponding with westward frontier expansion in the 1750s (Terrell 1993:59). Conveying tobacco and other produce to upland entrepots from beyond the Fall Line required specialized watercraft that could safely traverse rapids, shoals, and small cascades. As a result, these mountain boats—or "bateaux," (also spelled "batteaux") as they generally were called in Virginia—were characterized by shallow draft, flat bottoms, narrow beam, and low freeboard. They also tended to be 40–60 ft. in length, double ended, with a high length-to-beam ratio of about 10:1. Since currents facilitated downstream travel without wind power but rendered a return trip by sail difficult, most mountain boats neither relied on nor were equipped with sails. Upstream travel normally was accomplished by poling or towing with ropes from shore.

Some vessels were never intended to make the return trip. Similar in dimensions and appearance to the bateaux except that they were square-ended, "gondolas" or "gundalows" were used most commonly on the Shenandoah River. Upon reaching their destination, these craft typically were sold for their lumber and broken up. A recent survey of early structures in one such terminus, Harper's Ferry, West Virginia, has yielded evidence of the use of gundalow parts in building construction (Trout 1993:1).

A distinctive type of upland boat was developed on the James River after the great flood of 1771. Attributed to Anthony and Benjamin Rucker, the invention of the James River bateau was meant to expedite the conveyance of tobacco hogsheads from upland plantations to Richmond (Figure 14). Like other craft of this type, these vessels were double ended and up to 60 ft. long, but they were even narrower with a shallower depth of hold than most other bateaux. The popularity of the design soon spread to the upland regions of other Virginia rivers—notably the Shenandoah, Potomac, Roanoke, and Rappahannock —and eventually into a half dozen southern and western states (Terrell 1993:61; Trout 1993:2–3).

Early National Period (1789–1830)

In the aftermath of the Revolution, both the Continental and Virginia navies were disbanded. The insults to and depredation upon American merchant ships by Barbary pirates in the Mediterranean, however, aroused public opinion and forced Congress to consider re-establishing an adequate naval force. A naval construction act of 1794 authorized the building of six frigates and founded the United States Navy. The work was spread among six facilities, with the building of the 36-gun *Chesapeake* assigned to the Gosport Shipyard (Butt 1959:3) (Figure 15).

Launched in 1799, the *Chesapeake* participated in the Quasi War with France, but is most noted for the indignity she suffered at the hands of British warship *Leopard*. Sailing out of the Chesapeake Bay in 1807, the American vessel was confronted by the *Leopard*, whose captain insisted that Commodore James Barron turn over three alleged deserters whom the commandant of the Norfolk Navy Yard had determined to be American nationals. When Barron refused, the *Leopard* opened fire. Having just undergone repairs, the *Chesapeake* was unprepared for battle and, except for one cannon shot, proved unable to defend herself. After three men had been killed and eighteen wounded, Barron surrendered. A subsequent court-martial found the commodore guilty of failing to clear his ship for action. The incident sparked a feud between Barron and the succeeding captain of the *Chesapeake*, Stephen Decatur, that ended with the famous 1820 duel that resulted in Decatur's death (Guttridge and Smith 1984:121–164, 289–296; Foss 1984:22–25). (It was at a Norfolk hotel in 1816 that Decatur offered the famous, frequently misquoted toast, "Our country! In her intercourse with foreign nations, may she always be in the right, and always successful, right or wrong" [Foss 1984:25]).

The repercussions of the *Chesapeake-Leopard* affair continued to be felt and contributed to the outbreak of war with England in 1812. Naval superiority allowed the British to control and effectively blockade Hampton Roads and the Chesapeake Bay throughout the conflict. However, American forces on Craney Island and aboard the USS *Constellation* in the Elizabeth River succeeded in repelling a concerted enemy attack in 1813, which prevented the British from seizing either the American warship or the critical Gosport Navy Yard.

The war also underscored the value of schooners as privateers since the "fast-sailing and weatherly schooner was good insurance of both prizes and escape....The hit-and-run privateer schooners...taught the Navy that speed in sailing meant survival when the odds were against them, or victory and the choice of position when the odds were favorable or even" (Chapelle 1949:241, 292). The popularity and development of schooners had continued in the Chesapeake region after the Revolution. Previously referred to as "Virginia built" or "Virginia model" vessels, these schooners came to be known as "pilot boats," a function that many of them performed, in the early years of the nineteenth century (Figure 16). The schooner is considered by some to have reached a state of near perfection, in terms of speed and overall design, during the War of 1812 (Middleton 1984:238; Burgess 1963:104).

In addition to the fast ocean-going schooners that conducted overseas trade and distinguished themselves as privateers, a less streamlined version of the vessel plied the waters of the bay and its tributaries in the freight and passenger trades. Designed less for speed

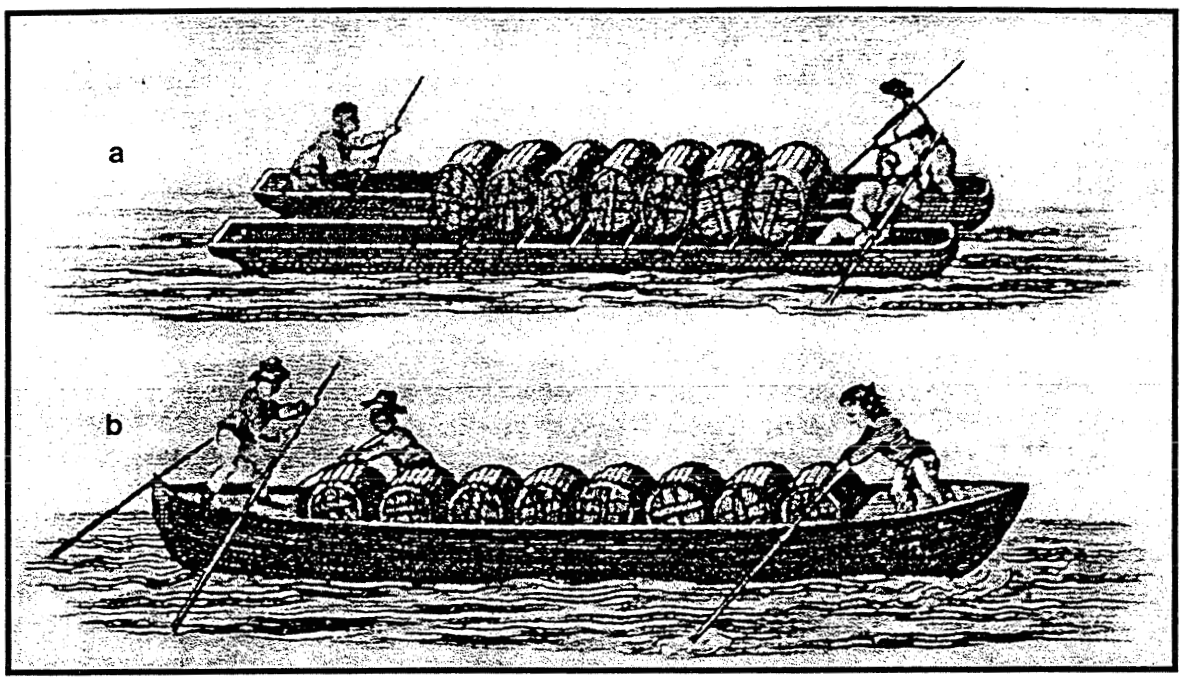

Figure 14. Tobacco bateaux: (a) Rose's bateau, (b) Rucker's bateau (Evans 1957:between 32–33).

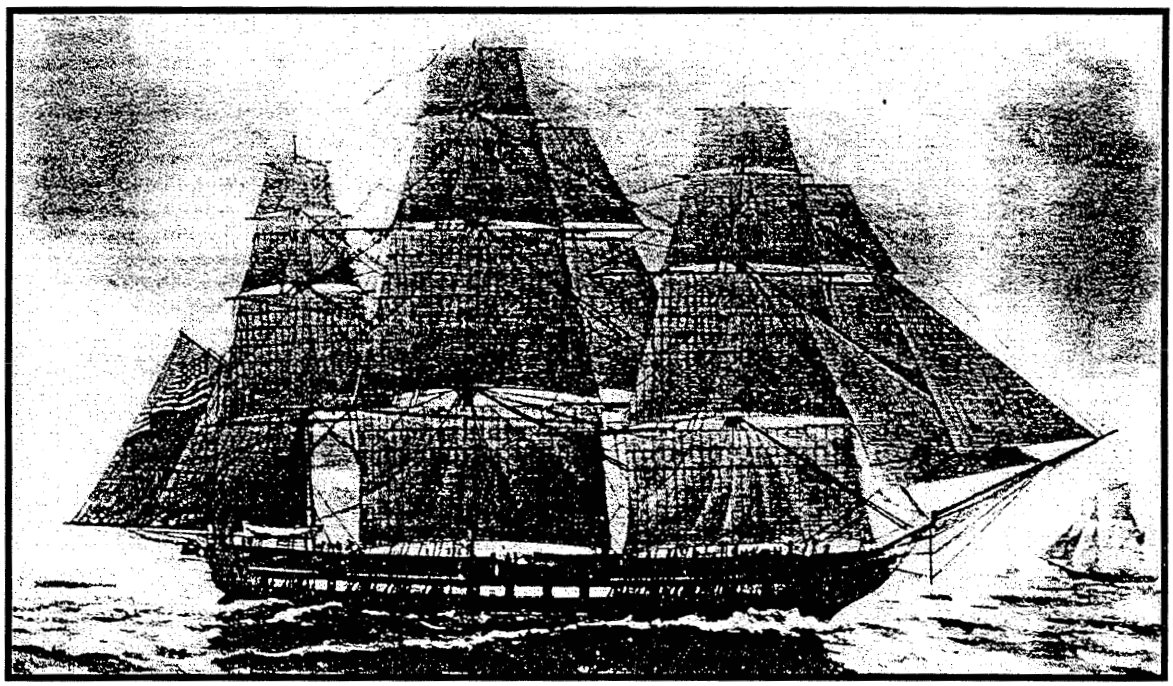

Figure 15. U.S. frigate Chesapeake *(Butt 1959:between 11–12).*

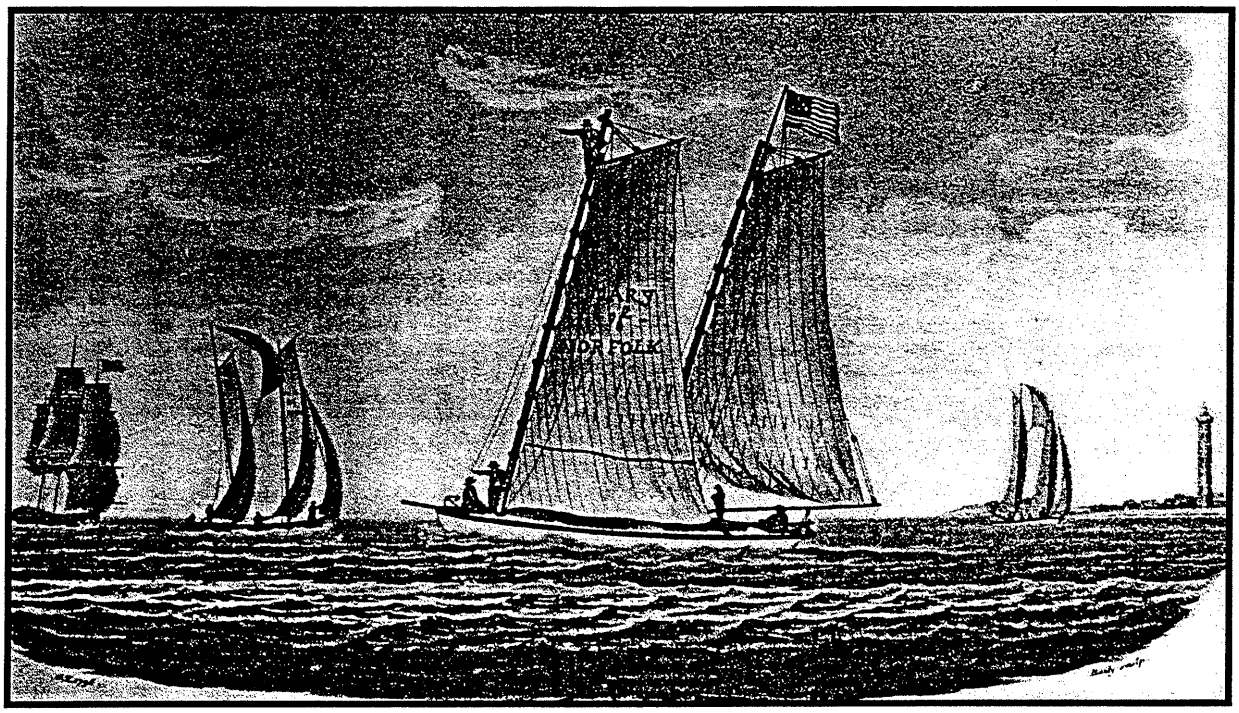

Figure 16. Virginia pilot boat (Evans 1957:between 32–33).

than cargo-carrying capacity, these schooners were smaller, more full-bodied, and less graceful in appearance than their seagoing counterparts. Many of these early nineteenth-century bay craft were constructed with shallow keels ("shoal-keel" schooners) in response to the increasing siltation of Chesapeake tributaries caused by the erosion of soil from expanded agriculture and settlement. A further consequence of this environmental phenomenon was the introduction of centerboards, or retractable keels, on bay schooners not long after the War of 1812 (Burgess 1963:104; Leone 1983:177).

Bay craft also played a significant role in the development of a local seafood industry. Long important as a means of supplementing the colonial diet, the harvesting of oysters became an established business enterprise in the late eighteenth century (Middleton 1984:67–69, 223). The vessel of choice for recovering and delivering the catch generally was a sailing version of the log canoe. As the demand for oysters expanded, so did the distance that oystermen had to travel to outlying markets. The need for both increased carrying capacity and greater seaworthiness required larger craft. Local boat builders obliged by adding more logs to produce a 35–40-ft. vessel, which became known as a "coasting canoe." An elaboration of the original Indian dugout, the coasting canoe continued in local favor until the 1850s and gave rise to other specialized bay craft such as the "brogan" and "bugeye" (Evans 1957:1; Burgess 1963:107).

The most significant technological development in the maritime sphere during the early national period was the introduction of steam propulsion. As early as 1795, a steam-powered packet boat operated on the Potomac between Georgetown and Alexandria (Shomette 1982:94). Steamboats quickly became popular in the Chesapeake area for the same reasons they did elsewhere along the Atlantic coast of the United States. Less seaworthy than their sailing counterparts, early steamers could only be navigated safely in relatively protected waterways, which partly explains why the maritime powers of Europe were slower to adopt the new technology. Unlike the coasts of England and France, the eastern seaboard of the U.S. contained thousands of miles of sheltered bays, rivers, and streams. Moreover, the U.S., in contrast to Britain and France, had a poorly developed road system so that steam vessels came to represent the only efficient and dependable means of transportation and communication in many areas (Brown 1961:x, 12–13).

The first steamboat to appear in lower Virginia, the *Washington*, arrived at Norfolk in May 1815. The following month, the *Eagle* became the first steam craft to traverse the length of the bay, sailing from Baltimore to Norfolk in 29 hours (Brown 1961:9; Burgess 1963:13, 14) (Figure 17). A line from Norfolk to Richmond was established in 1816, inaugurating a continuous extension of steamboat service by various small companies until virtually every port along the bay and its tributaries had freight and passenger connections to the larger entrepots of Norfolk, Baltimore, or Washington, D.C. (Brewington 1956:33–34).

Over time, several companies came to dominate and incorporate many of their competitors. One of the earliest and most enduring of these, the Weems Line (in operation from 1817 to 1904), established service between Baltimore and various landings on the Rappahannock River, including Fredericksburg in 1828. The Maryland & Virginia Steam Boat Company (MVSC) formed the same year, assimilating several rival services on the Baltimore–Norfolk route (Burgess 1963:15; Brown 1961:15).

The MVSC's principal aim was to connect Norfolk, Richmond, and Baltimore with routine steamboat service. To this end the company put in service the *Pocahontas* in 1829. One hundred thirty-seven feet long, with a beam of 30 ft. and draft of 11 ft., the steamboat was regarded by contemporaries as "in all respects a boat of the first class and...combines the most improved arrangements...on the score of elegance as comfort" (Brown 1961:16–17).

To improve navigation in the rivers above the Fall Line, Virginians of the early national period engaged in a variety of river modification procedures. One was the creation of sluices, or navigable channels, in rapids by removing or blasting away rocks so that boats could pass. Promoters of upland river transport also formed public and private companies to raise funds for the erection of wing dams, long mounds of rock that extended in wing-like fashion from river banks to conduct stream flow at low water into sluices or natural channels (Terrell 1993:60; Trout 1990:24). The logical extension of such channel modification efforts was the subsequent construction of canals such as the James River and Kanawha Canal, which allowed navigators to avoid rapids and shoals altogether and provided more direct connections between urban areas and waterways that previously had been separated by difficult terrain and great distances.

Antebellum Period (1830–1860)

Even after the advent of steam, commercial schooners continued to operate profitably as sailing packets for passengers and freight. Many smaller schooners were employed in the fishing and oystering industries, while two- and three-masted types regularly conducted trade along the Atlantic North American coast and in the West Indies (Burgess 1963:105).

A locally developed type popular among oystermen around mid-century was the Chesapeake Bay "pungy" or "pongee." Despite their humble function as carriers of shellfish and manure, pungies earned an international reputation for grace and beauty (Figure 18). An English Royal Navy officer described them in 1852 as "the most elegant and yacht-like merchant vessels in the world" and observed that "an English schooner...lying among some of the worst...looked liked a hog amid a herd of antelope" (cited in Burgess 1963:116). Derived from the Baltimore Clipper, the pungy was distinguished from its progenitor mainly by its smaller size and reduced standing rigging and is believed to have emerged as a distinct type in the 1840s (Burgess 1963:116).

While the steamship business generally continued to expand, such growth was by no means uninterrupted. Economic conditions in the final years of the 1830s, for instance, precipitated the demise of one of the preeminent early steamship companies. The effects of a national depression and competition from another nascent transportation system combined to strain the financial resources of the MVSC to the breaking point.

Ironically, railroads initially were introduced to the Chesapeake region in the 1830s to serve steamboats as feeders into the less accessible and less densely populated interior. By the end of the decade, however, the two modes of transportation were essentially vying with one another for the passenger trade that linked North and South, specifically, the route between Baltimore and the Roanoke River in North Carolina. The two main lines included both railroad and steamship components, but the "Lower Route" consisted chiefly of steamer connections with a rail segment, while the "Upper Route" was primarily a

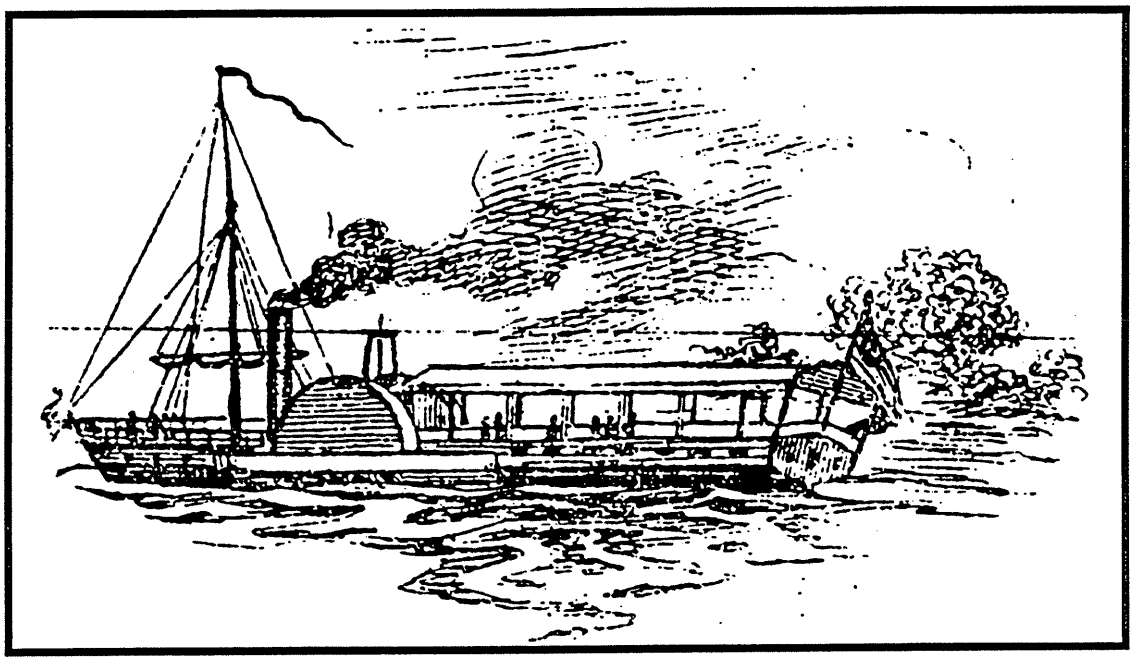

Figure 17. Steamboat Eagle *(Burgess 1963:13).*

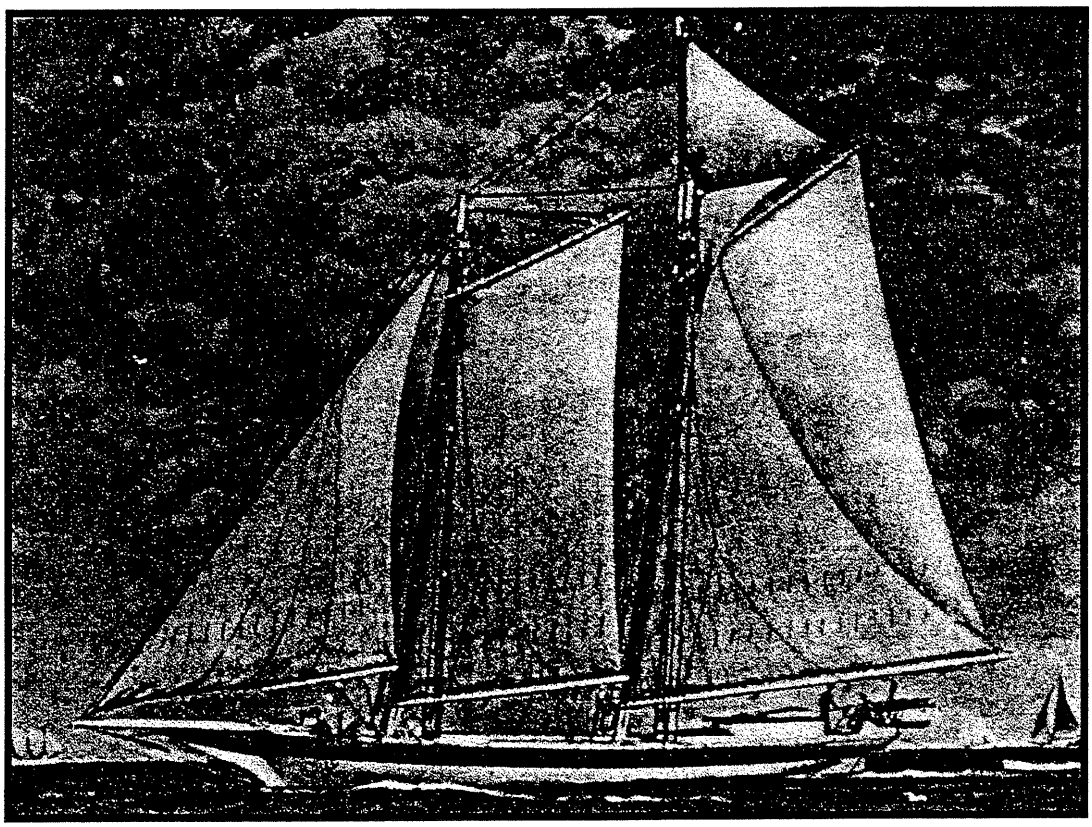

Figure 18. Pungy James A. Whiting *(Brewington 1956:88).*

railroad route with steamer and stagecoach connections (Brown 1961:15, 19–20).

The Panic of 1837 and competition from the Upper Route forced the MVSC out of business in 1840, but investors formed a successor line, the Baltimore Steam Packet Company, at about the same time. With a small fleet of steamships purchased from the MVSC and another financially strapped line, the new company, which came to be known as the Old Bay Line, initiated passenger and freight services in the Chesapeake that lasted over a century (Brown 1961:25–27). In addition to providing service out of Baltimore to Norfolk and Washington, the Old Bay Line established a subsidiary company, the Powhatan Line, to serve Richmond and Petersburg on the James River (Brown 1961:35).

Although steamboat service was popular and for the most part safe, the vessels nonetheless suffered from an assortment of mishaps. Fire was an ever-present danger, and the high-pressure steam boilers used to propel many steamboats were particularly susceptible to explosion. These two hazards alone were responsible for the deaths of approximately 1,000 people and the destruction an estimated 14% of all steam vessels operating in 1832 (Brown 1961:16). While the Chesapeake appears to have suffered relatively few of these disasters compared to other regions along the Atlantic and Gulf coasts, a number of them did occur, some with considerable loss of life (Shomette 1982:95–98; Brown 1961:16, 28–30, 42–43).

The decades before the Civil War witnessed significant changes in the steamship industry. The safe arrival in New York of two British ships operating primarily under steam power in 1838 confirmed the viability of transoceanic steam travel. In addition, technological advances enabled steamboat companies to improve safety aboard their vessels. In the 1840s, gaslight began to replace more hazardous forms of illumination such as candles, whale oil tapers, and kerosene lamps (Brown 1961:23, 35). Engine boilers were strengthened to reduce the danger of explosion. At the same time, engine power was boosted, increasing speed and reducing travel time considerably. In 1848 the steamer *Herald* required only 11 hours 30 minutes to make the same Baltimore-to-Norfolk run that took the *Eagle* 29 hours in 1815 (Brown 1961:10, 36).

Civil War (1861–1865)

Throughout the Civil War—from the weeks preceding the outbreak of hostilities to the final surrender—Virginia's James River played a central role in the strategic maneuvering of both the Union and the Confederacy. Northern general George B. McClellan deemed control of the river, gateway to Richmond, critical to the success of his Peninsular Campaign in 1862. Southern strategists realized that failure to block the enemy's navy on the James River at any point in the war would mean the loss of the Confederate capital and, most likely, the Southern cause.

The James River was not only the scene of the legendary "Battle of Ironclads," the most famous naval confrontation of its era, but also that of numerous other, less well known actions of comparable drama and consequence. Military actions on the river between 1861 and 1865 present a microcosm of most of the tactics, weapons, defenses, and vessel types that figured prominently in all of the national and international maritime theaters of the conflict and that changed the face of naval warfare forever (Margolin 1994).

Collectively, the vessels sunk in Virginia waters during the Civil War embrace all the major technological and tactical advances that revolutionized naval warfare in the nineteenth century. The *Cumberland*, the last United States warship to sail into battle, symbolizes the majesty and obsolescence of the great wooden men-of-war armed with their smooth-bore cannons. At the other end of the spectrum, the Confederate ironclads *Richmond, Virginia II,* and *Fredericksburg* epitomize the less aesthetic but more devastating and invincible wave of the future: armorclad, steam-powered, propeller-driven vessels outfitted with batteries of more accurate and destructive rifled guns. The commerce raider *Florida* represents a transitional phase along the evolutionary path, an unarmored cruiser outfitted with rifled armament and designed to operate under both sail and steam.

In a profound sense, the epic clash between the USS *Cumberland* and the CSS *Virginia* (alias *Merrimack*), both of which sank in Hampton Roads during the war, symbolizes both the splendor of

America's maritime tradition and the tragedy of a nation divided against itself. For though the two vessels shared a common origin and purpose, they eventually became locked in mortal combat that destroyed one ship and significantly damaged the other.

By the time of their encounter in 1862, the *Cumberland* was one of the more venerable ships in the federal fleet. Launched 20 years earlier from the Boston Navy Yard, the three-masted, 175-ft.-long warship had served as flagship of the Home, Mediterranean, and African Squadrons during the course of her distinguished career. Also a product of the Boston Navy Yard, the *Merrimack* was launched in 1855 as part of a new class of steam frigates widely regarded as "the superiors of any war vessel then possessed by any nation in the world" (Bennett 1896:141).

Before the outbreak of hostilities, both ships were stationed at the Gosport Navy Yard opposite Norfolk in Virginia's Elizabeth River near the entrance to the Chesapeake Bay. It was there, in April 1861, that a series of events transpired that contemporary journalist and politician Horace Greeley characterized as "the most shameful, cowardly, disastrous performance that stains the annals of the American Navy" (Long 1957:155). Acting on unsubstantiated rumors of an imminent attack by Southern secessionists, the commander of the federal forces at Gosport, Charles S. McCauley, ordered the abandonment and demolition of the yard as well as the scuttling of the *Merrimack* (Figure 19). Ironically, it was the officers of the USS *Cumberland* who sought to remove the *Merrimack* to safety and who pleaded unsuccessfully with McCauley to postpone the steam frigate's destruction until help could arrive (Young 1897:276; Selfridge 1893:178).

Confederate salvors raised the *Merrimack's* hull with little difficulty and removed the superstructure, replacing it with a heavily armored iron casemate. The conversion process, which included outfitting the *Merrimack* with a battery of new rifled guns, took almost a year. When it was completed, the contest between the *Cumberland* and the *Virginia* on March 8, 1862 marked the dawn of a new age in naval warfare. It was "a day," a *Virginia* gunner later recalled, "too beautiful to be bathed in the blood of our fellow man, but thus it was so" (Curtis 1957:7).

The battle was distinguished not only by an epochal demonstration of the superiority of armor-plated, steam-driven vessels over traditional wooden-hulled sailing warships, but also by the ferocity of the fighting and the bravery of the outmatched Union sailors. Despite devastating casualties and the certainty of impending doom after the *Virginia's* ram smashed a gaping hole in the wooden vessel's hull, participants reported that "no one flinched, but everyone went on loading and firing" until the Northern captain issued the order to abandon ship only moments before the *Cumberland* pitched forward and descended to the bottom of the James River with 121 members of her crew (O'Neil 1922:867, 879; Selfridge 1924:48) (Figure 20).

The following day's encounter between the Southern ironclad and her Northern counterpart, the *Monitor,* has commanded far more attention over the years, but that legendary battle, according to high-ranking naval officers, "upon which depended the whole course of the Civil War" might have ended very differently had it not been for the "epic valor of the *Cumberland*" in damaging the *Virginia* to a greater extent than any other vessel, including the *Monitor,* managed to do (Dudley P. Knox in Selfridge 1924:iv, v; Selfridge 1924:55-6; O'Neil 1922:878-79). The courage of the Northern crew inspired expressions of admiration even from her adversaries on the *Virginia,* one of whom later wrote, "No ship was ever fought more gallantly" (Lt. John Taylor Wood quoted in Johnson and Buel 1884-87:I:696; also see Parker 1985:275; Curtis 1957:8; Buchanan n.d.:2).

With the arrival of the *Monitor,* Union forces were able to avert disaster at the hands of the *Virginia.* Nevertheless, the power of the Southern ironclad was sufficient to induce apprehensive Union naval authorities to declare the James River off limits to Northern vessels and to discourage General McClellan from executing his bold plan for a lightning strike against Richmond. Citing the presence of the *Virginia* as the principal deterrent, the general explained his decision to adopt the more cautious and less expedient approach of proceeding up the York River "as probably safer, though less brilliant" (Daly 1957:159; Anderson 1962:79).

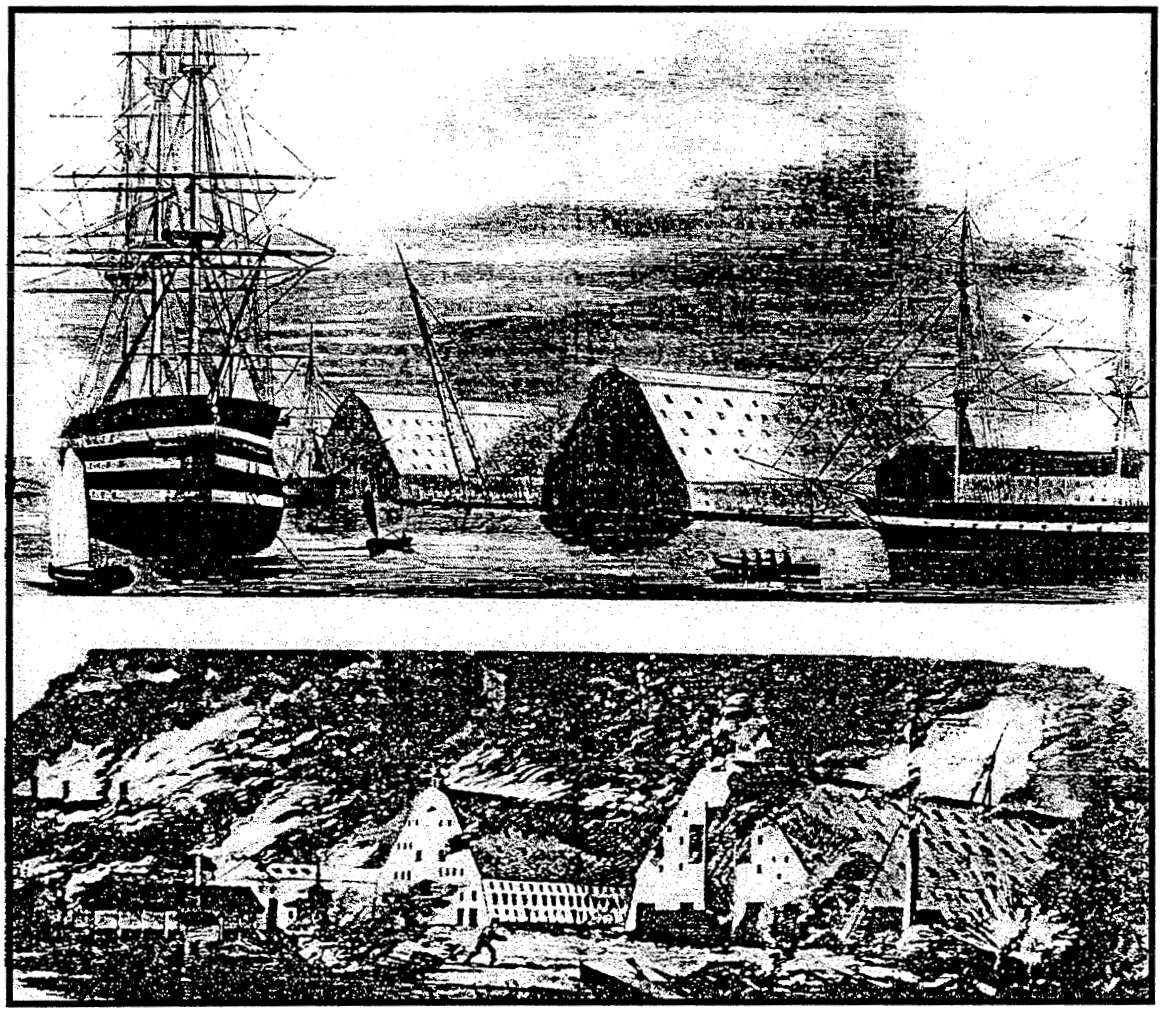

Figure 19. Gosport Navy Yard (Butt 1959:between 11–12).

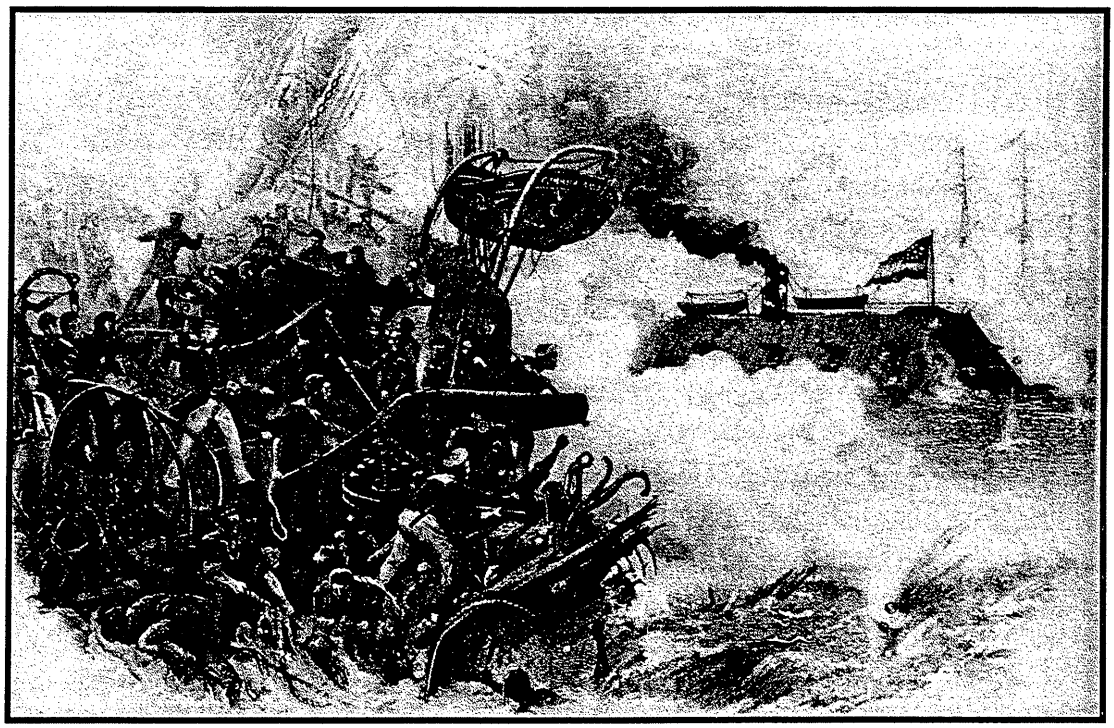

Figure 20. Sinking of USS Cumberland *(Shomette 1982:134).*

But the psychological advantage that the Confederates enjoyed in Hampton Roads was short-lived. By May Southern forces at Norfolk, believing that their position had grown precarious, decided to abandon the navy yard and redeploy the *Virginia* further upstream to protect Richmond. Because the ironclad's deep draft prevented her from ascending the river, however, the Southerners destroyed the vessel to preclude her falling into enemy hands. With the *Virginia* no longer a threat, Union forces were free to operate in the James River, and the Northern high command dispatched an assault force toward Richmond.

The scene of action now shifted to Drewry's Bluff, a fortified precipice about seven miles below Richmond, where the Confederates rapidly concentrated forces and bolstered defenses to protect the Southern capital (Robinson 1961:167–172). Beneath their gun battery on the bluff (Fort Darling), the Confederates placed a series of obstructions in the river to prevent the Union's James River fleet from advancing on Richmond. The barrier consisted of wooden pilings or "cages loaded with stone" supplemented by sunken wooden vessels including the steamers *Beaufort, Northampton,* and *Jamestown* (Parker 1985:307; Robinson 1961:172; Jones 1939:8; Shomette 1982:169) (Figure 21).

The obstacle proved to be a mixed blessing for the Southerners. It protected Richmond from a Union naval assault but at the same time prevented the Confederates from launching their own campaign to retake the James-York Peninsula. The situation became particularly frustrating in May 1864, when, having completed the construction of three ironclad warships at Richmond (the CSS *Richmond, Virginia II,* and *Fredericksburg*), the Southerners missed an opportunity to destroy the enemy's fleet of wooden gunboats. By the time Confederate army engineers finally blasted a passage through the obstructions, the opposing squadron had repositioned its wooden steamers downriver behind the safety of the Union ironclad monitors (Still 1971:168-74; Parker 1985 [1883]:356).

The Northern fleet was not entirely secure below the obstructions, however. Capitalizing on their advantage in underwater explosive technology, the Confederates detonated a 2,000-pound "torpedo", or submerged mine, from a shore-based battery, utterly destroying the Union gunboat *Commodore Jones* in May 1864 (United States Naval History Division

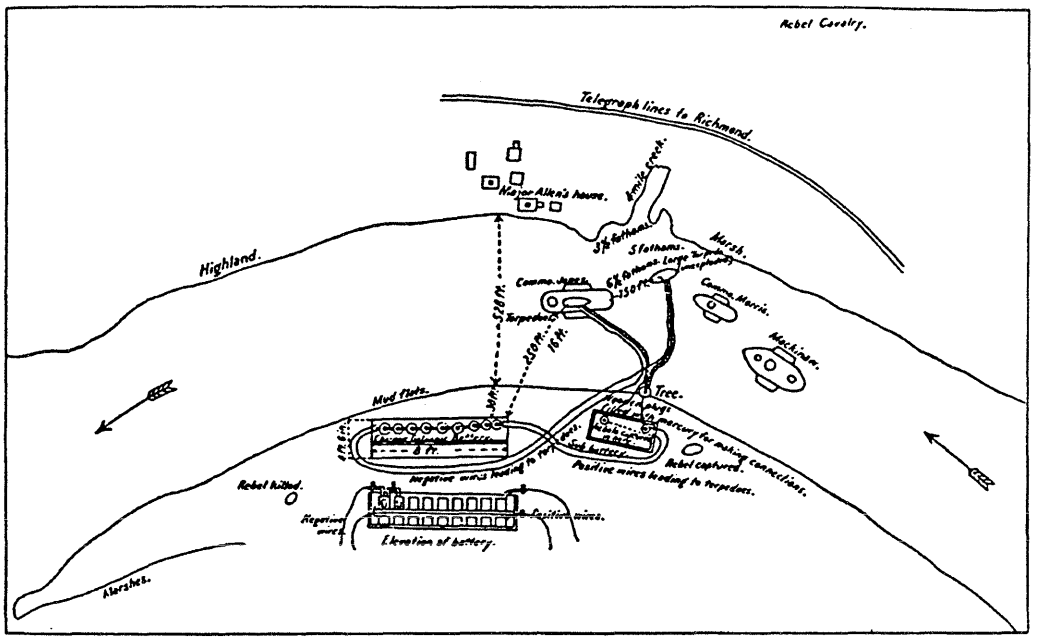

Figure 21. Contemporary sketch of Confederate galvanic batteries that destroyed USS Commodore Jones *(USNHD 1971:IV:57).*

[USNHD] 1971:4:56, 57; Barnes 1896:97–100; Parker 1985:353; Perry 1965:111-12) (see Figure 21). A similar fate befell Union General Benjamin Butler's floating headquarters, the USS *Greyhound,* half a year later several miles below Bermuda Hundred. Admiral David D. Porter, who was aboard the vessel when it was sunk by the explosion of a "coal torpedo," lamented that "in devices for blowing up vessels the Confederates were far ahead of us, putting Yankee ingenuity to shame" (USNHD 1971:4:136; 6:244).

The *Greyhound* was destroyed on November 27, 1864. The following day, another vessel, the Confederate commerce raider *Florida,* sank further downstream in the James near the wreck site of the *Cumberland.* First of the foreign-built Southern raiders, the CSS *Florida* was constructed secretly in Liverpool, England, contrary to British neutrality laws and despite vehement protests by the U.S. government (Figure 22). During two cruises in 1863 and 1864 she and her satellites (prizes converted into commerce raiders) accounted for 58 seizures (Owsley 1987:187-89). Confounding Union navy efforts to capture the raider on the high seas, the *Florida* along with her sister ship, the *Alabama,* succeeded in dealing a blow to the American merchant marine from which it has never recovered (Owsley 1987:12, 162–64; Dalzell 1940: 245-47).

The cruiser's career ended abruptly when she was rammed and hijacked by the USS *Wachussett,* in defiance of international law, from the Brazilian port of Bahia in October 1864 (Figure 23). Towed back to the United States, she sank mysteriously less than a month later at an anchorage not far from the final resting place of the *Cumberland* off lower Newport News. The official explanation was leakage and pump failure, but a more likely explanation seems to have been an attempt by the Union high command to quash the international furor that had been created as a result of the *Florida's* abduction from a neutral port.

Further upriver, apart from isolated incidents such as the *Commodore Jones* and *Greyhound* disasters and an abortive attempt to pass through the obstruction opening and attack Union commanding general Ulysses S. Grant's base at City Point in January 1865, a tense stalemate existed between the opposing forces on either side of the barrier in the upper James. Meanwhile, however, the Confederate predicament began to deteriorate rapidly. When Raphael Semmes, former captain of the raider *Alabama,* assumed command of the Confederate James River fleet in February, he lamented that "great discontent prevails" and that "boat loads" had defected (Semmes 1893:803-804; Still 1971:222). In addition to the deteriorating military fortunes of the Southern cause, hunger, inactivity,

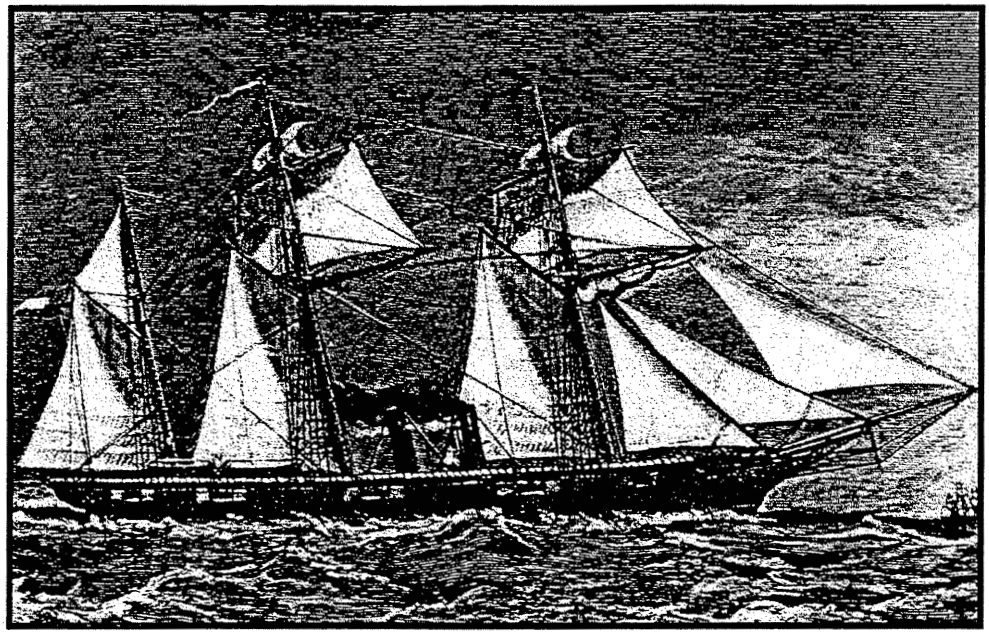

Figure 22. CSS Florida *(Owsley 1987:between 128–129).*

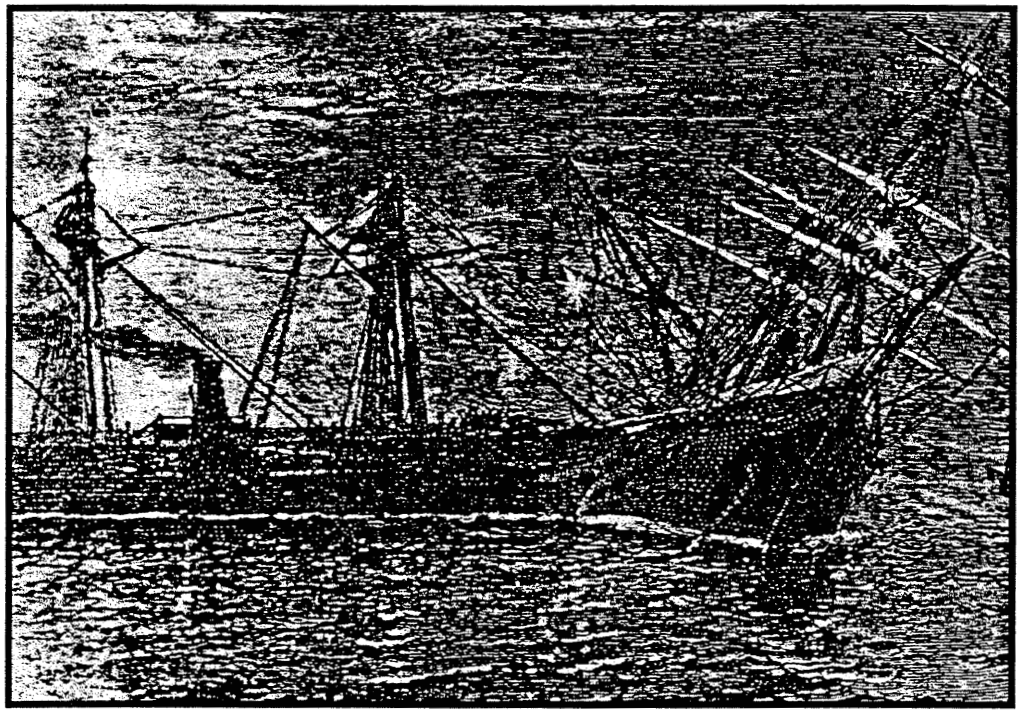

Figure 23. The Wachussett *ramming the* Florida *(Owsley 1987:between 128–129).*

and poor living conditions—especially aboard the ironclads—contributed to the declining morale (Parker 1985:369; Still 1971:98, 100).

On April 2, 1865 the breaching of Confederate general Robert E. Lee's Petersburg Line by Grant's forces instantly ended the tactical status quo on the James and sealed the fate of the South's James River Squadron. With Richmond open to attack by land, the Confederate high command resolved to abandon the capital. To prevent the vessels (and especially the ironclads) from falling into enemy hands, Navy Secretary Stephen Mallory ordered Squadron Commander Semmes to destroy the South's James River fleet (United States Office of Naval War Records 1894-1927, 1st ser., 12:191; Semmes 1893:809-10).

On the night of April 3, Semmes put the three ironclads to the torch and evacuated their crews on the wooden gunboats. Shortly thereafter, the Confederate mariners experienced "an explosion, like the shock of an earthquake" and, the captain reported, "the air was filled with missiles." With a seemingly incongruous aesthetic appreciation, Semmes later reported that "the spectacle was grand beyond description. Her shell rooms had been full...and as the shells exploded by twos and threes, and by the dozens, the pyrotechnic effect was very fine" (Semmes 1893:812).

From his perspective in Richmond, former captain of the ironclad *Richmond,* William Parker, offered a contrasting account. Amidst the alarm and confusion of the evacuation, widespread looting had broken out. "To add to the horror of the moment," Parker later recalled, "we now heard the explosions of the vessels and magazines, and this, with the screams and yells of the drunken demons in the streets, and the fires which were now breaking out in every direction, made it seem as though hell itself had broken loose" (Parker 1985:376).

Reconstruction and Growth (1865–1917)

In the decades following the Civil War, new vessel types rivaled and ultimately superseded the pungy as the work boats of choice among bay and river watermen and mariners. Although pungies continued to be built into the 1880s, they were replaced for the most part by boats that were cheaper to build, easier to handle, and better able to navigate shoal waters.

Whereas pungies descended from schooner origins, one of the two lines of successor vessels derived from the native log canoe tradition. The larger catches that resulted from the introduction of a new type of dredge in the 1860s prompted the construction of a more substantial sailing canoe known as a "brogan" (Figure 24). Forty to 50 ft. long, with a fixed bowsprit, forward cabin, bulkheads, partial decking, and a removable mainmast, the brogan represented a transitional stage in the evolution of the simple dugout canoe that culminated in the development of the "bugeye" (Brewington 1956:63; Burgess 1963:107).

The passage of a law in Maryland in the mid-1860s sanctioning the use of dredging equipment in water depths over 15 ft. induced watermen to seek even larger craft to provide the extra capacity required for more gear, bigger harvests, and additional living space for the longer offshore runs. Modifications to the brogan consequently produced the bugeye, which was fully decked, contained two additional wing logs, and featured a greater spread of sail (Figures 25 and 26). Described as "this most truly American craft" by one maritime historian, the bugeye preserved the vestigial dugout bottom until logs of sufficient size could no longer be easily procured (Brewington 1956:63–64; Burgess 1963:107–108).

The 1880s marked the peak of both the oyster industry and bugeye construction. Over 6,000 watermen were fishing the shallower waters of the bay for oysters with tongs, a scissor-like mechanism with tined iron rakes at the ends for scooping up shellfish from the bottom sediments. In addition to the tongers, other watermen operated over 2,500 dredge boats that collected oysters by dragging the bottom with weighted nets. Consisting mainly of bugeyes, the vessels of this fleet came to be known as "drudge boats" upon which poor food and living conditions, difficult and hazardous work, and exploitation and physical abuse of the hired (or shanghaied) help generally prevailed (Burgess 1963:142; Brewington 1956:171–173).

Besides the brutality characteristic of the "drudge boats" themselves, conflict between tongers and dredgers erupted into the "oyster wars" of the 1880s and 1890s. Dredge boats generally were restricted by Maryland and Virginia law to the deeper waters of the bay and its tributaries, but legislation did not stop them from encroaching on oyster beds reserved for tongers

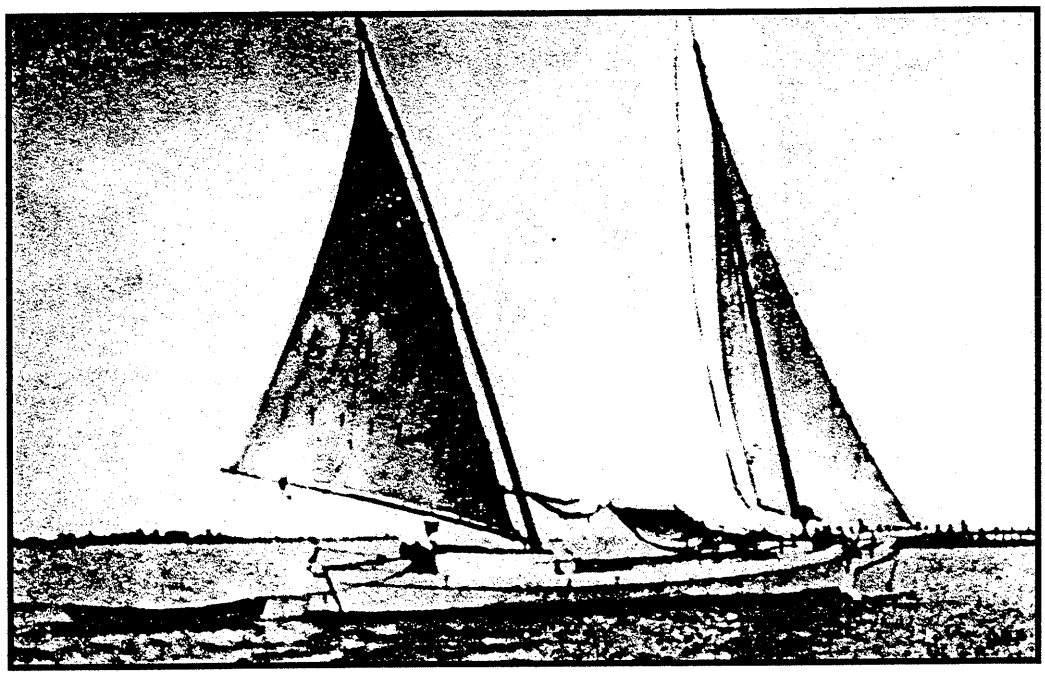

Figure 24. Brogan (Brewington 1956:75).

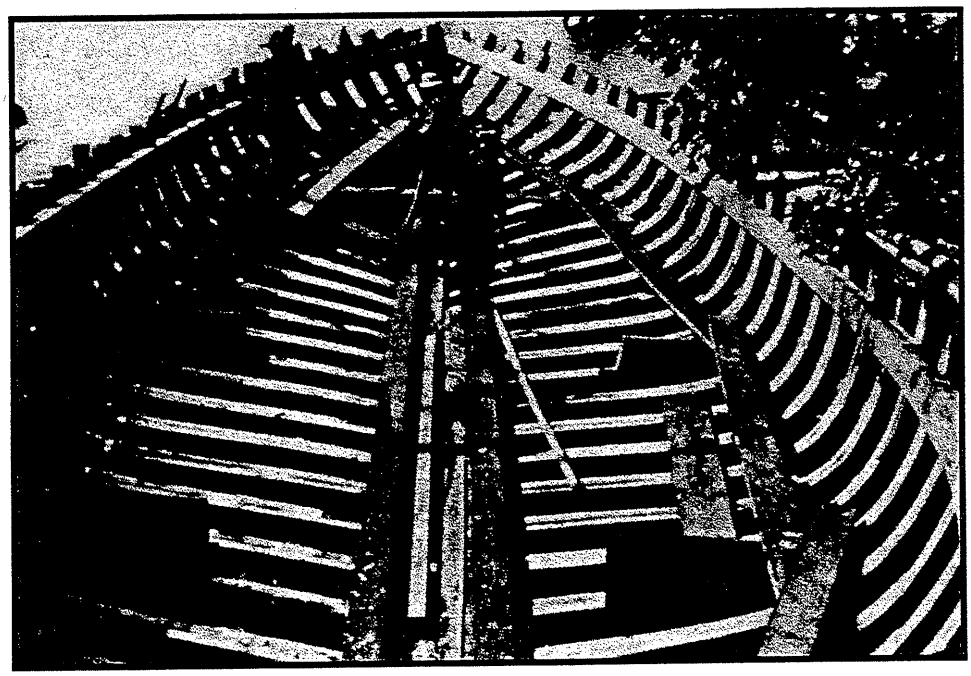

Figure 25. Bugeye frame (Brewington 1956:76).

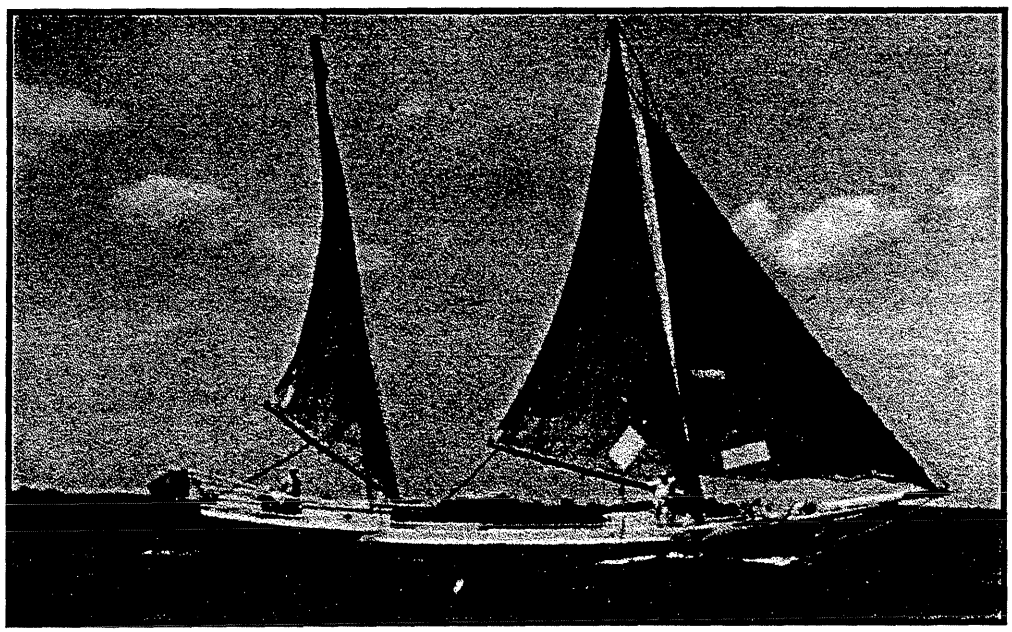

Figure 26. Bugeye Little Jennie *(Brewington 1956:78).*

or from driving the tongers off with gunfire. An 1886 issue of *Harper's Weekly* noted with droll irony that although "a more peaceful and unexciting occupation than the pursuit of the dumb and unresisting oyster can hardly be imagined...yet there is engaged in this quiet walk of life a class of as blood-thirsty pirates as ever drew cutlass or hoisted the black flag" (*Harper's Weekly* 27 January 1894:92) (Figure 27). The problem was more serious in Maryland, but Virginia, like her northern neighbor, maintained a small "oyster navy" which patrolled against poachers and reportedly sank an offending sloop in the Potomac River in 1892 (Brewington 1956:172–173; Burgess 1963:137–138).

Economic and environmental conditions apparently contributed to the development of a new oystering vessel, the "skipjack," in the 1890s (Figure 28). Believed to have evolved from flat or V-bottom skiffs once common on Maryland's lower Eastern Shore, the boats were named after fish that leap out of or play at the surface of the water, presumably because of the craft's quickness and maneuverability. The popularity of the vessels, which were smaller and cheaper to build than bugeyes, is thought to represent a response to the precarious national economy and more meager oyster catches (probably due to overfishing by dredgers) of the 1890s (*Harper's Weekly* 27 January 1894:92). Built almost exclusively on the Eastern Shore of Maryland and Virginia, skipjacks typically were shallow-draft and beamy and carried centerboards. They were and continue to be regarded by many as "the ideal sailing craft for the Chesapeake or similar waters" because of their excellent sailing qualities and durability (Brewington 1956:65; Burgess 1963:110–111).

Despite the decline of the pungy, the schooner survived and continued to play an integral role in the commerce of the region well into the twentieth century. In the late 1870s, coal emerged as a major export for the coastal trade of the region. The industrialization of the northeastern United States already was requiring immense quantities of the fuel for steam and gas production. In selecting Newport News Point on the James River as the eastern deep-water terminus for coal to be transported from West Virginia, Chesapeake and Ohio Railroad (C & O) magnate Collis B. Huntington extolled the virtues of the site as

> a point so designed and adapted by Nature, that it will require comparatively little at the hands of man to fit it for our purposes. The Roadstead (Hampton), well-known to all maritime circles, is large enough to float the ocean commerce of the world; it is easily approached in all winds and weather, without pilot or tow; it is never troubled by ice, and there is enough water to

> float any ship that sails the seas, and at the same time it is so sheltered that vessels can lie there in perfect safety at all seasons of the year (Brown 1946:57).

In addition to the C & O terminus at Newport News, coal arrived at Hampton Roads from the mines via the Norfolk and Western Railroad. Hundreds of three- to six-masted schooners—and even the only seven-masted schooner ever built—regularly called at the ports of Norfolk and Newport News in the late nineteenth and early twentieth century to collect coal for shipment mainly to the factory cities of New England (Brown 1946:58) (Figure 29). Since few schooners were built in the Chesapeake area after the turn of the century, a number of the vessels, typically larger than the bay variety, were imported from New England (Brewington 1956:139; Burgess 1963:54, 105).

An unusual type of schooner built expressly for the canal trade was the Chesapeake Bay "sailing ram." Described as "little more than a barge with sails," the ram's boxlike form was designed specifically to allow it to pass through the Chesapeake and Delaware Canal with large lumber cargoes from the Chesapeake and Carolinas (Figure 30). To match the 24-ft. width of the canal, the first 11 rams constructed between 1889 and 1900 had an average beam of 23.8 ft. Essentially a large canal boat fitted with a schooner rig, rams had straight sides, flat bottoms, and centerboards. Although constructed mainly for the canal trade, rams also engaged in the coastwise hauling of bulk cargoes such as coal, stone, fertilizer, and lumber (Brewington 1956:65; Burgess 1963:112–114).

In the two and a half decades following the Civil War, changes in the steamboat industry largely paralleled advances in naval technology. Iron replaced wood as the preferred material for hull construction, ultimately to be supplanted by steel; screw propellers superseded paddle wheels; and steam-assisted steering was adopted in favor of hand-operated helms. The Old Bay Line launched its last wooden-hulled ship in 1876 and its last paddle boat three years later. Other innovations enhanced the safety and comfort of steamboat travel. Electricity began to replace gas light on steamships in the late 1870s, and warmth, once furnished by pot-bellied stoves, eventually was supplied by steam-heated radiators (Brown 1961:55, 62, 66–67).

The Old Bay Line steamer *Georgia,* launched in 1887, incorporated many of the latest advances. Like other iron-sided ships, the *Georgia* could be built larger than most wooden vessels because of the sturdier hull material. The first screw-propelled passenger steamer in the Old Bay Line fleet, the 280-ft. craft was outfitted with steam steering, electric illumination, and steam-heated cabins. Typical of many of the American passenger steamers of her era, the *Georgia* was also lavishly ornamented and appointed (Brown 1961:68).

The 1890s represented the golden age of steamboat service in the Chesapeake and elsewhere in America. Hampton Roads had become a popular winter vacation retreat for northerners, and the Hygeia (now the Chamberlin) Hotel at Old Point Comfort had long been regarded as one of the most fashionable resorts in the South (Brown 1961:47, 71; Brewington 1956:131). The continued popularity of steamboats not only for essential travel but also for pleasure excursions offers insight regarding the character of an American society not yet completely transformed by the engines of industrialization and modernization. Reminiscing on the era, the son of an Old Bay Line executive remarked nostalgically in 1940, "In those days life was leisurely and we have lost forever a way of living and a mental attitude which the people of today will never know" (Brown 1961:71).

The final decade of the nineteenth century also marked the emergence of Hampton Roads as a naval and commercial shipbuilding center. In the 1880s the United States government, which had allowed its navy to deteriorate into virtual obsolescence after the Civil War, undertook an ambitious naval expansion and modernization program. In 1892, the Norfolk Navy Yard launched its first steel vessel and the nation's first battleship, the USS *Texas* (Burgess 1963:26; Foss 1984:48) (Figure 31).

Two years later the government awarded contracts to a neophyte in the industry, Newport News Shipbuilding and Drydock Company (just upriver from the C & O coal piers), to construct three gunboats. One of these, the *Nashville,* fired the first shot of the Spanish American War in 1898 (Brown 1946:38–39; Brown 1976:12; Tazewell 1986:40, 56) (Figure 32). Of critical importance to the growth of the company and the local community was the award of contracts in January 1896 for the building of two battleships, the

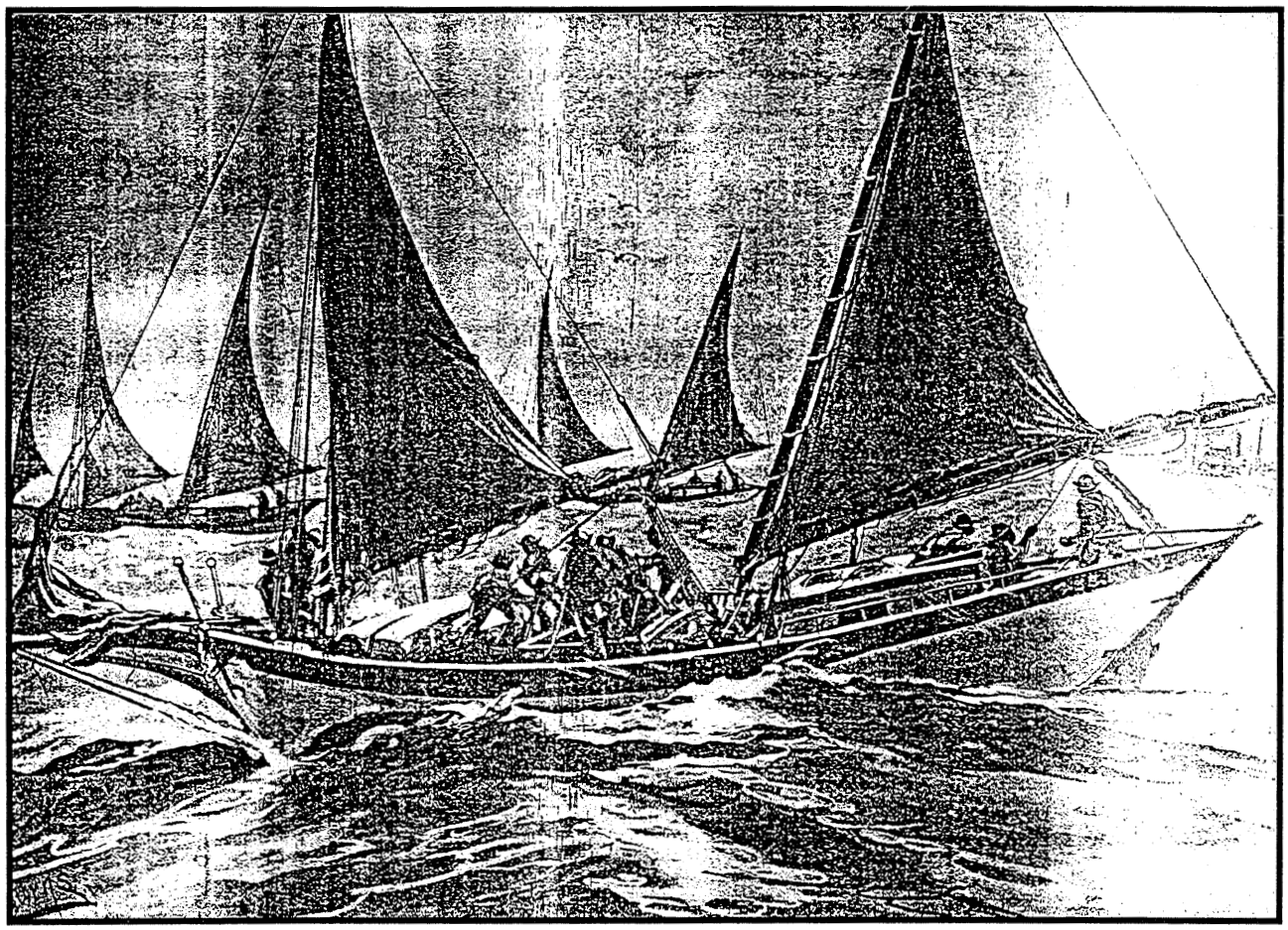

Figure 27. Oyster pirates (Harpers Weekly *1894:92).*

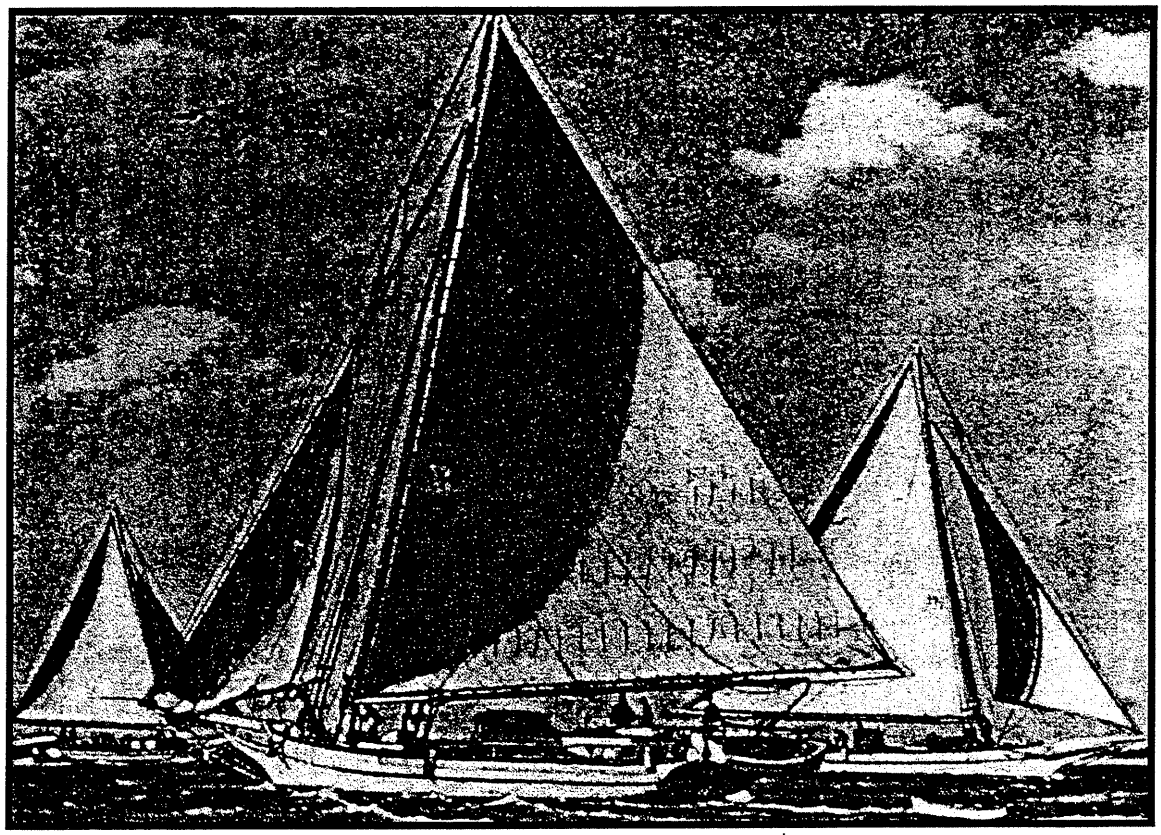

Figure 28. Skipjack Jesse Price *(Brewington 1956:102).*

Figure 29. Chesapeake and Ohio piers (Brown 1946:58).

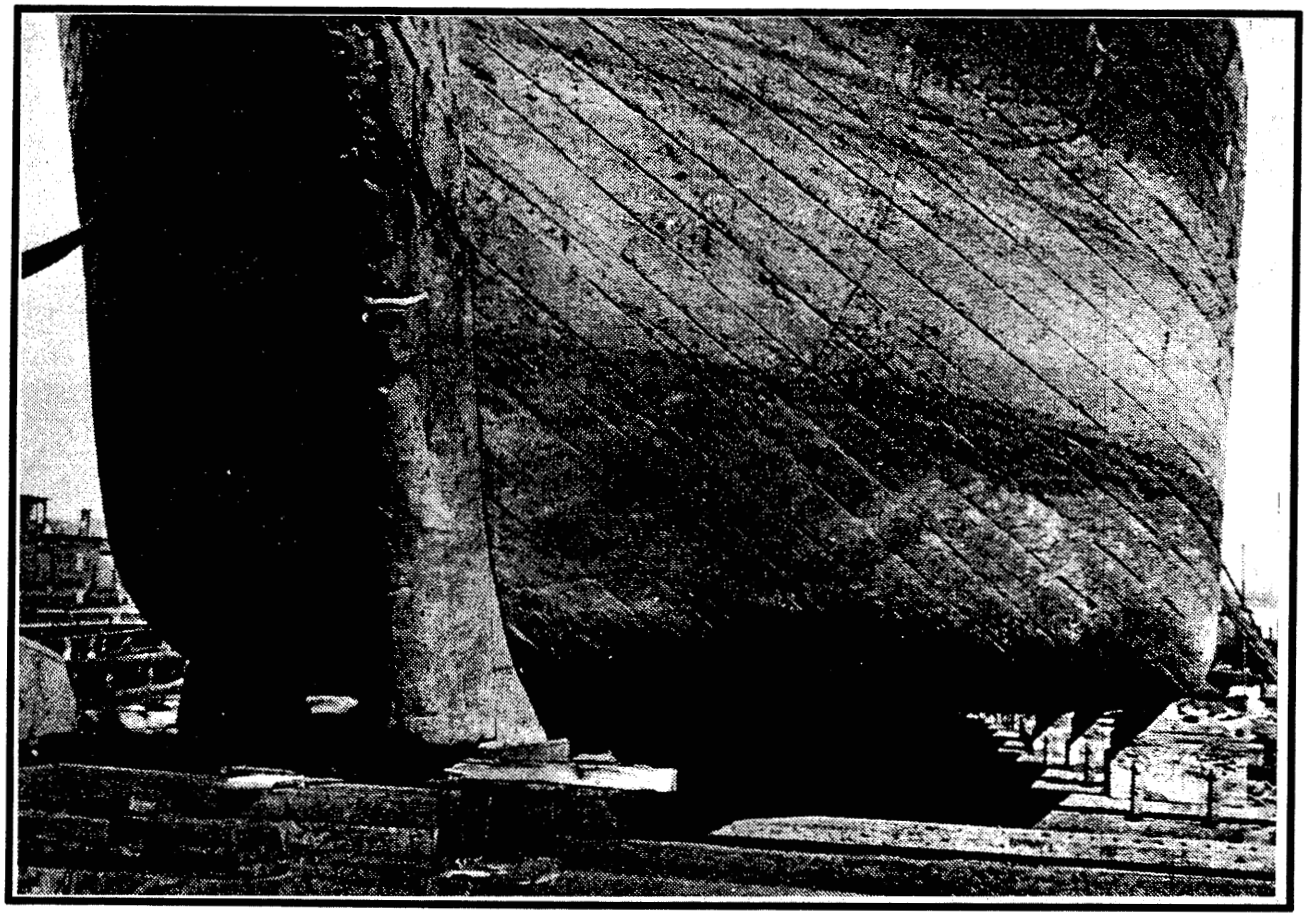

Figure 30. Bow of sailing ram Clarence A. Holland *(Burgess 1963:113).*

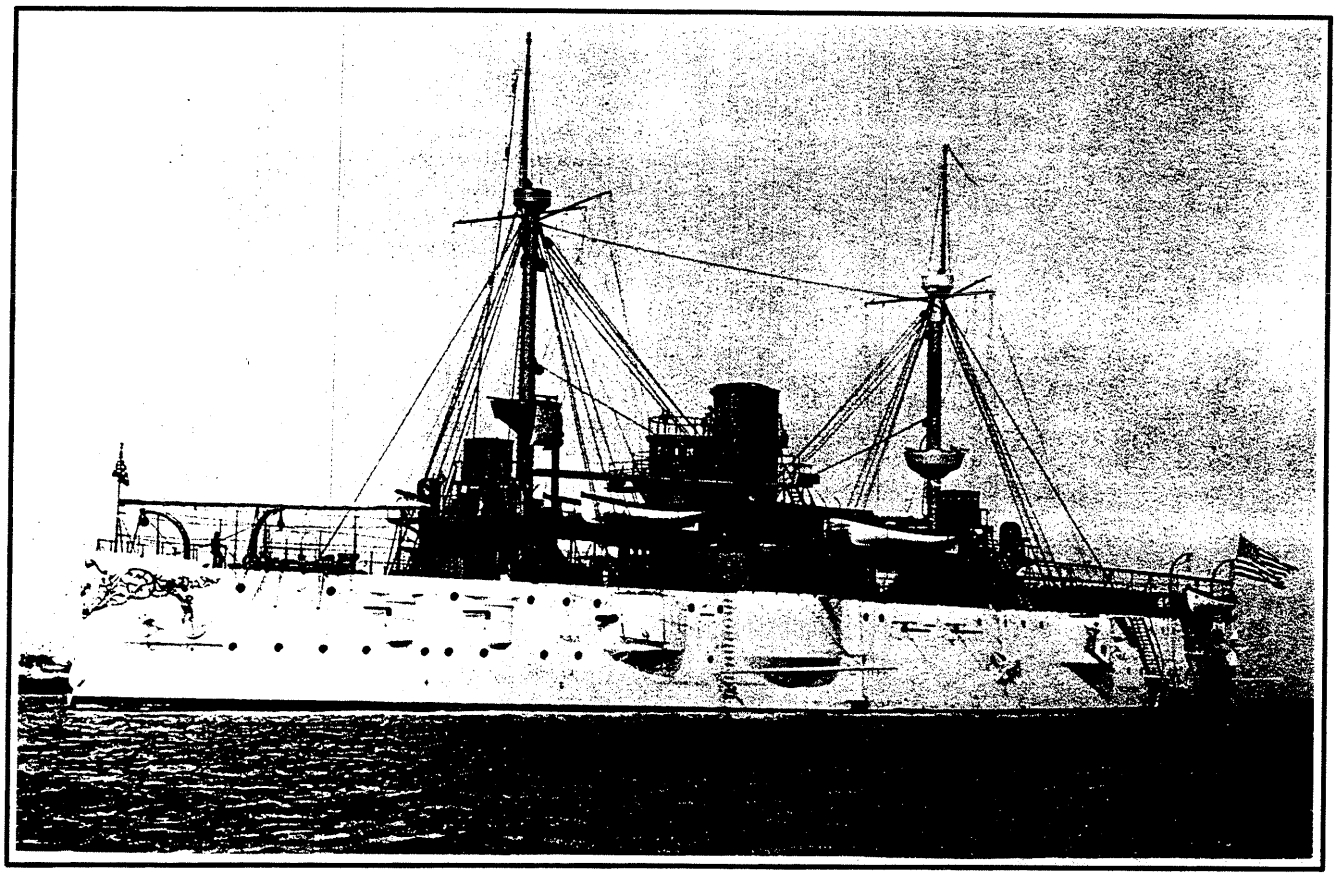

Figure 31. Battleship Texas *(Burgess 1963:26).*

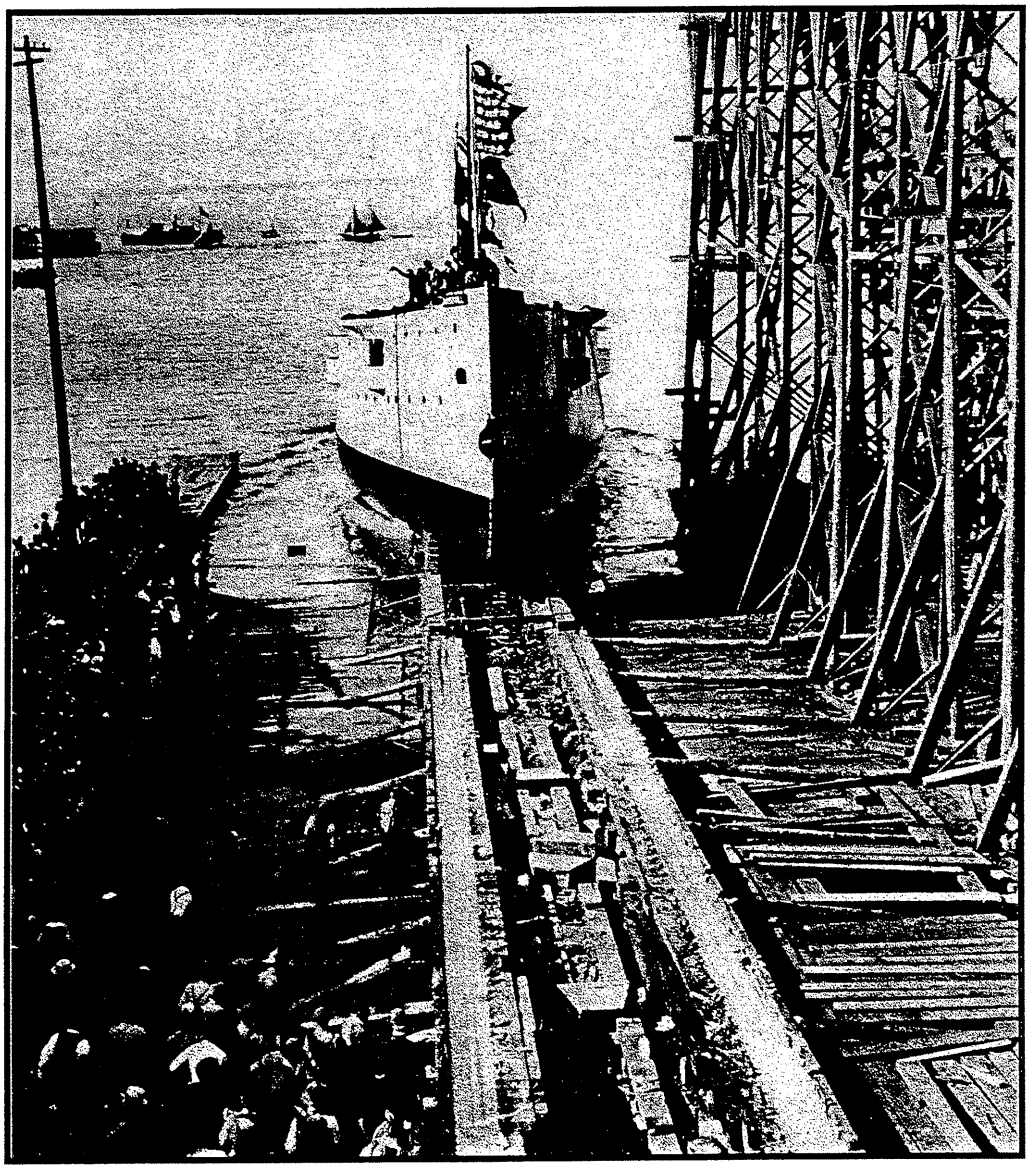

Figure 32. Gunboat Nashville *(Brown 1976:12).*

USS *Kearsarge* and *Kentucky*. The authorization spurred municipal advocates to introduce and pass a bill in the state's General Assembly for the incorporation of Newport News as a city the same month (Brown 1946:38–39).

Several events near the turn of the century enhanced the region's worldwide reputation as a maritime and naval hub. Celebrating the quadricentennial of the European discovery of America, ships representing eight sea powers from Europe and South America participated in the International Naval Rendezvous at Hampton Roads in 1893 (Brewington 1956:130; Foss 1984:50) (Figure 33). When war broke out with Spain five years later, the "Flying Squadron" of cruisers, battleships (including the *Texas*), and supplementary vessels stationed in Hampton Roads embarked for Cuba where it joined another American squadron in trouncing an outmatched Spanish fleet.

Having established itself as a premier naval power, the United States hosted another maritime convocation in Hampton Roads in 1907. The tercentennial Jamestown Exposition included an international naval review on May 13, commemorating the 300th

Figure 33. Lithograph of International Naval Rendezvous (Brewington 1956:130).

anniversary of the landfall of English settlers at Cape Henry. The U.S. contingent consisted of 16 battleships, seven of which had been produced by Newport News Shipbuilding (Foss 1984:49). The event was attended by U.S. president Theodore Roosevelt who returned to Hampton Roads later that year aboard the presidential yacht *Mayflower* to bid farewell to the "Great White Fleet" that the chief executive had sent on a global cruise to "show the flag" as a demonstration of American naval power. Roosevelt was on hand in the *Mayflower* once again when the fleet made its triumphant return to Hampton Roads fourteen and a half months later (Foss 1984:49–51). Both the Jamestown tercentennial and the celebration of the Great White Fleet's return proved boons to regional steamship services as well. In 1907, for example, the Old Bay Line carried more than 107,000 passengers, over twice the number it had conveyed the year before (Brown 1961:80).

Two significant technological developments in the maritime sphere took place in Virginia during the early years of the twentieth century. One was the birth of naval aviation. In 1910, civilian pilot Eugene Ely made the first aircraft takeoff from a ship, guiding his Curtiss-Hudson biplane off the deck of the cruiser *Birmingham* which, anchored off Old Point Comfort, had been outfitted for the purpose with an 83-ft. wooden flight deck (Foss 1984:46–47, 51–52; Tazewell 1986:79–80).

The other advance, in submarine technology, involved the construction of eight experimental submarines by Newport News Ship Building (Tazewell 1986:80–82). The vessels had been designed by Simon Lake, one of the early pioneers of undersea craft. When the U.S. government rejected Lake's design in favor of that of his chief competitor, Lake contracted with the Newport News yard to build six of the

vessels for sale to Czarist Russia. The U.S. Navy purchased the next two, one of which, the *Seal,* set speed and diving depth records during its sea trials in 1911.

The deliberate sinking in Virginia waters of two steel navy ships built in the late nineteenth century not only contributed significantly to the state's future submerged cultural resource base but demonstrated the speed with which contemporary technological advances were rendering relatively new construction obsolete. In February 1893, the Bath Iron Works of Bath, Maine, launched the *Katahdin,* an ironclad ram described by one U.S. senator as "the most wonderful craft ever made for naval warfare" (Sen. Eugene Hale in Budney 1994:17). Featuring a "turtle-backed" double hull with ballast tanks, 102 water-tight compartments, and two triple-expansion steam engines, the vessel exemplified some of the most sophisticated technology of her era (Budney 1994:20) (Figure 34).

Barely six years later, however, after the conclusion of the Spanish-American War, the *Katahdin* was permanently decommissioned. In 1909 she was towed to Rappahannock Spit in the Chesapeake Bay and intentionally sunk in a naval gunnery exercise (USNHD 1968 III:602–603; Budney 1994:19–21). Two years later the USS *Texas,* the nation's first battleship and pride of the Norfolk Navy Yard, met the same ignominious fate. Deemed outmoded by naval authorities, the vessel was renamed *San Marcos,* hauled to an area in the bay southwest of Tangier Island, and sunk by shell fire from the battleship *New Hampshire* 7.5 mi. away (Burgess 1963:26–29) (Figure 35).

World War I through World War II (1917–1945)

World War I came early to Hampton Roads when the German commerce raider *Prinz Eitel Friedrich* unexpectedly entered the bay and anchored off Newport News in March 1915 to unload 300 prisoners taken in the course of depredations against Allied merchant shipping. Among the captives were 23 Americans from the *William P. Frye,* a four-masted steel bark sunk by the cruiser in the South Atlantic barely two weeks earlier. Rather than risk a suicidal showdown with British warships hovering outside the Virginia Capes, the captain of the raider decided to intern his ship in the then neutral United States for the rest of the war. In April, the U.S. Coast Guard escorted the vessel to the U.S. Navy Yard at Portsmouth (Brown 1976: 43–47; Butt 1959:9).

Several days later, another German cruiser, the *Kronprinz Wilhelm,* steamed into Hampton Roads with 61 prisoners. She, too, was interned at Portsmouth for the duration of the war. Sailors from the two German vessels constructed a small compound containing houses, a church, a windmill, and a print shop that came to be known in the local area as "German Village." With U.S. entry into the war, the status of the seamen changed from internees to prisoners who were dispersed to various P.O.W. camps throughout the nation (Brown 1976:47–52; Butt 1959:9).

American participation in the conflict had a profound effect on the growth and development of the Hampton Roads area. The exigencies of war created a shortage of bottoms that precipitated a shipbuilding boom in the Chesapeake. The Norfolk Navy Yard expanded to include three new drydocks, and employment more than quadrupled from the prewar level (Butt 1959:9). Two new housing projects were built in Portsmouth to accommodate the workers.

Newport News experienced a similar boom. Under its emergency naval program, the government awarded Newport News Shipbuilding contracts in 1917 and 1918 to produce 25 destroyers. Employment at the yard burgeoned from a prewar level of about 7,600 to a peak of over 12,500 in 1919 (Tazewell 1986:103, 117). To provide affordable housing for the workers, the company built 473 houses with federal assistance between 1917 and 1920 in Hilton Village, a section of Newport News that has retained its distinctive character and appearance ever since. Distinguished as the "first government-subsidized housing project and one of the most successful," Hilton Village is currently listed on the National Register of Historic Places (Tazewell 1986:118–119).

In addition to warships and military support vessels, the nation also was in desperate need of new merchant construction to replace the bottoms that the Germans were sinking at an increasingly rapid rate (Burgess 1963:165). To relieve the shortage, the U.S. Shipping Board initiated a wooden shipbuilding program in 1917, reasoning that these craft, if sunk, would be cheaper and easier to replace than steel vessels. While Newport News Shipbuilding was turning out steel

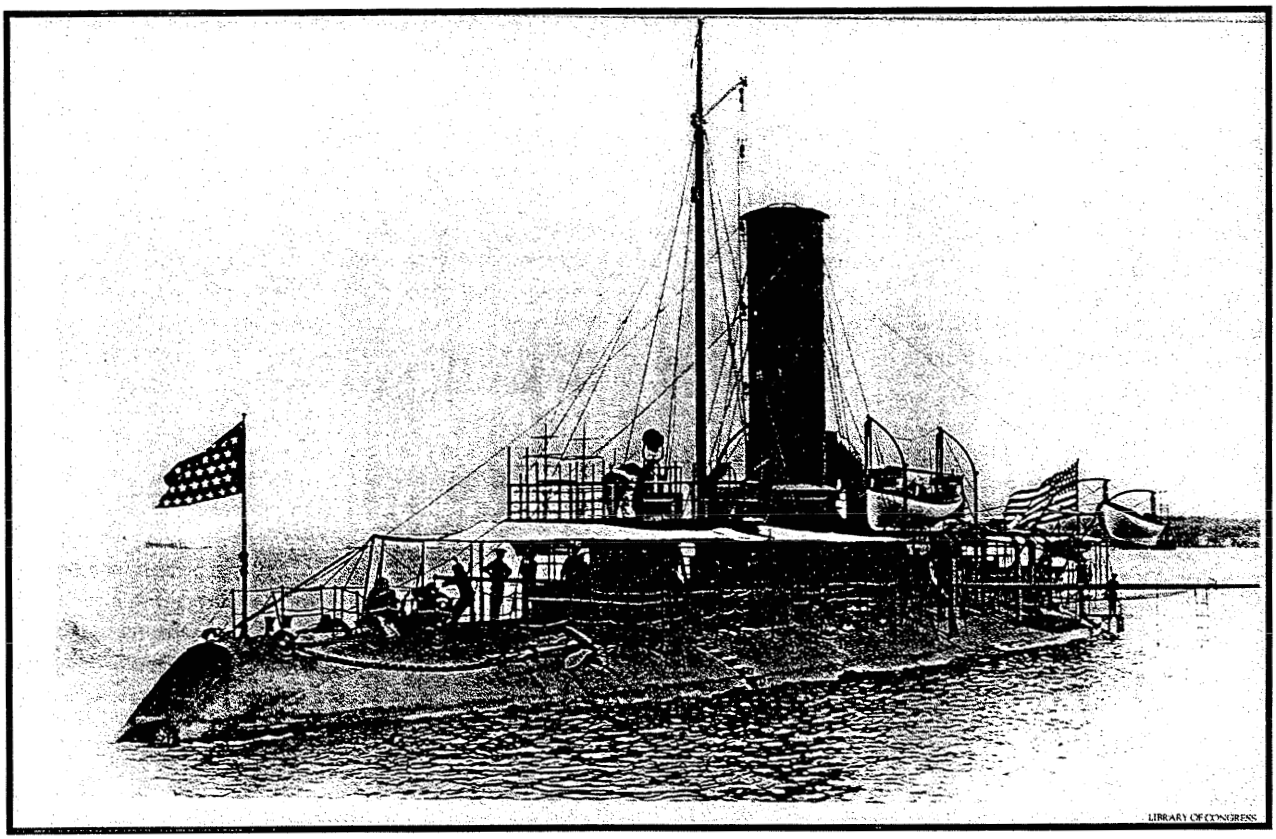

Figure 34. Ironclad ram Katahdin *(Budney 1994:20).*

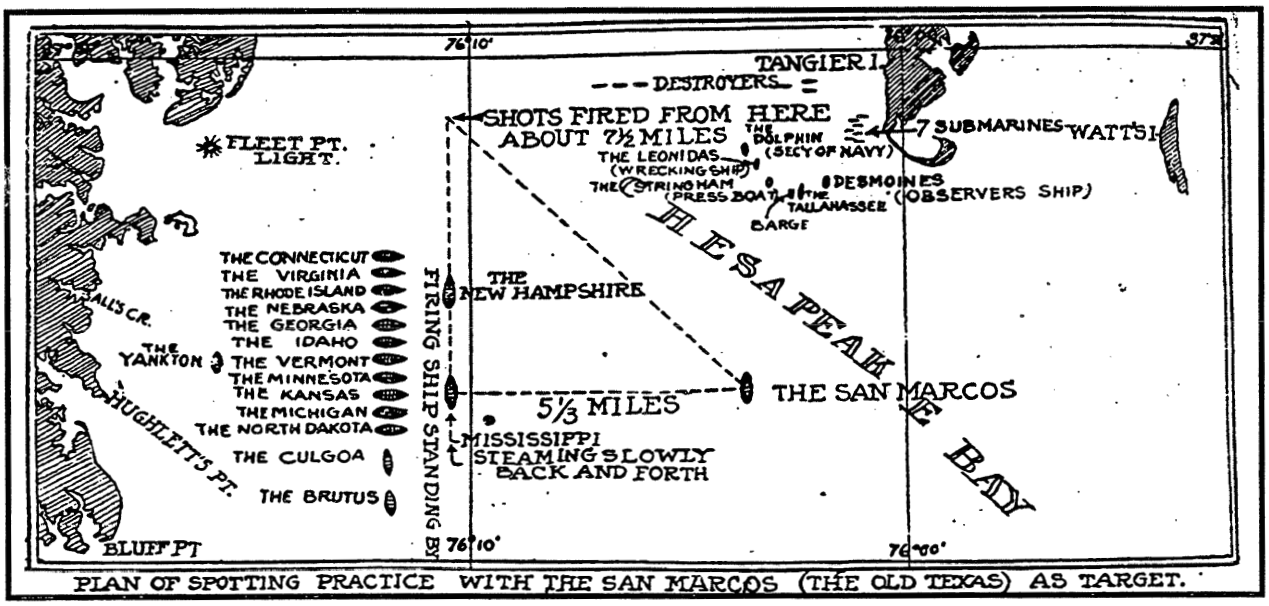

Figure 35. Contemporary plan of 1911 naval gunnery bombardment of San Marcos (ex-*USS* Texas) *(Burgess 1963:29).*

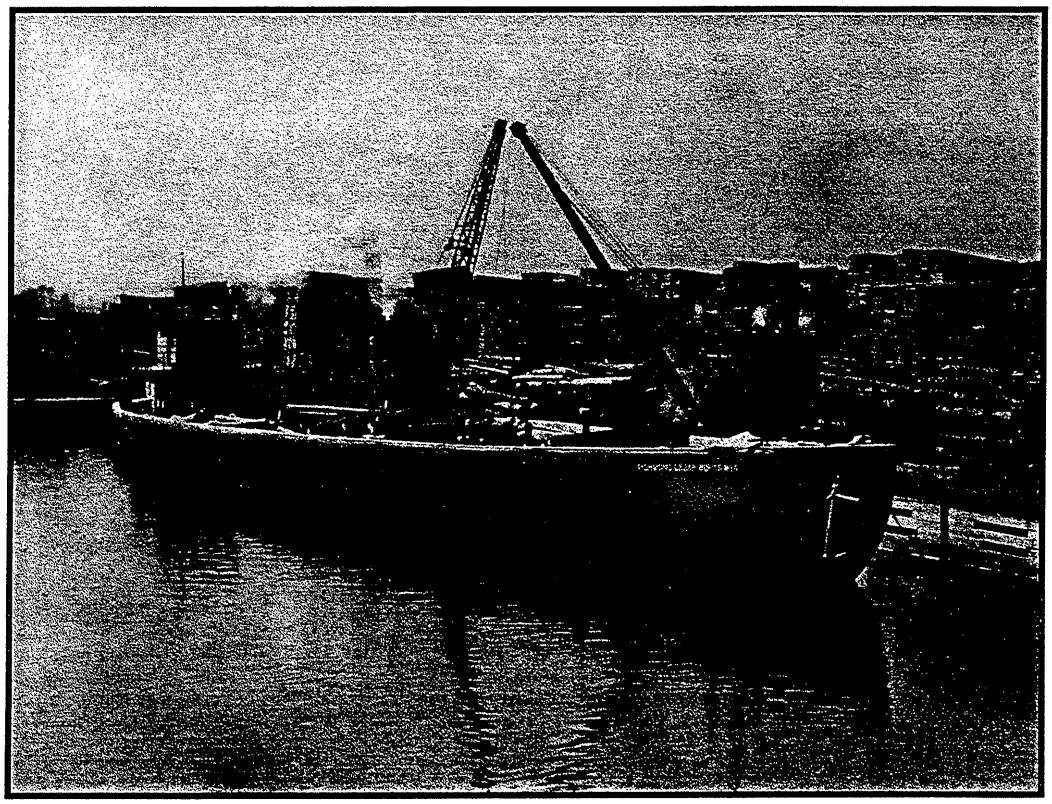

Figure 36. Log barge Richmond Cedar Works No. 4 *(Brown 1976:15).*

ships (including some merchantmen), the Newcomb Shipbuilding & Dry Dock Company built a plant on Sunset Creek in Hampton where it employed 830 workers in the construction and outfitting of 24wooden-hulled cargo carriers of the "Ferris" design for the Shipping Board (Burgess 1963:166–167).

Although the first Newcomb hull was not completed until over two months after the armistice and comparatively few of the wooden ships were finished before the end of the war nationwide, some of these vessels saw subsequent service in the carrying trade of the Chesapeake. Most, however, were relegated to idle fleets such as those established in the James and Potomac rivers (Burgess 1963:167–168). Other products of the World War I shipbuilding boom that continued to play a vital role in the commerce of the region were sailing schooners that hauled mainly coal but also other bulk cargoes such as lumber, fertilizer, fish scrap, and bricks through World War II (Burgess 1963:54). Some vessels that predated the war also remained in use, albeit in somewhat altered form. The Richmond Cedar Works of Norfolk County cut down a number of late nineteenth-century hulls, including the former U.S. gunboat *Nashville,* for use as lumber barges (Brown 1976:15) (Figure 36).

The interval between world wars also marked the end of the steamboat transportation age in the Chesapeake (Burgess 1963:73–74, 82; Brewington 1956:44). Competition from railroads and, by the late 1920s, from automobiles, trucks, and diesel-engine powerboats had weakened the industry considerably; the Depression dealt the death blow to all the remaining services except the Old Bay Line. In 1932, for example, the Baltimore and Virginia Steamboat Company declared bankruptcy, laid up nine vessels, and put approximately 400 men out of work. Paradoxically, the increase in automobile traffic created a greater call for ferry services to transport people and freight across the bay and the rivers where, before the construction of modern bridges and tunnels, cars and trucks could not take them (Brewington 1956:58).

The loss of employment in the steamboat business was overshadowed by the more widespread effects of

a decline in the naval construction industry following World War I. The predictable reduction in government contract work was exacerbated by the 1922 Washington Naval Treaty, an international agreement to limit the number and size of vessels in the navies of the maritime powers (Brown 1976:66; Tazewell 1986:122). Although neither Newport News Shipbuilding nor the Norfolk Navy Yard operated on scale comparable to the levels of either the First or Second World wars, both yards managed to remain active.

Newport News Shipbuilding tried to compensate for the cancellation of approximately $70 million worth of navy contracts by diversifying into other enterprises (Brown 1976:66–72; Tazewell 1986:122–132). Yard president Homer Ferguson bid low to win the contract to refurbish the *Leviathan,* a former German passenger liner seized by the United States and converted into a troop ship in World War I. The task of re-converting the vessel into a luxury liner, which has been described as "the biggest repair job ever undertaken" to that time, was completed in 1923 at a loss of over a million dollars, as Ferguson anticipated, but it employed more than 2,000 men for over a year and kept the shipyard afloat at a critical time (Brown 1976:68; Tazewell 1986:127). To get through the lean years of the 1920s, the yard also built 10 grand pleasure yachts, seven major passenger ships, a Coast Guard cutter, and the last passenger steamboat ever built at Newport News, the Chesapeake liner *Yorktown,* in addition to producing railroad boxcars, hydraulic turbines, wind tunnels for the National Aeronautics and Space Administration, and a variety of other items (Brown 1976:95; Tazewell 1986:122–132).

The Norfolk Navy Yard also suffered severe cutbacks as a result of the war's end and subsequent arms limitation treaty. From a zenith of 11,000 workers in 1919, employment plummeted to just over 2,500 by 1924 (Foss 1984:80). The yard maintained an operating status mainly by performing repairs and renovations of existing vessels. Among the ships overhauled in Norfolk during the interval between world wars was the USS *Arizona,* the sinking of which at Pearl Harbor on December 7, 1941, precipitated formal American entry into World War II. Originally launched in 1916, the *Arizona* was renovated extensively at the Norfolk yard between 1929 and 1931 (Butt 1959:21).

Another development that helped keep the Norfolk Navy Yard and, eventually, Newport News Shipbuilding operative was the evolution of naval aviation (Foss 1984:80; Hagan 1991:272–273; Tazewell 1986:80, 143). Between 1919 and 1922, the Norfolk Navy Yard converted the collier *Jupiter* into the navy's first aircraft carrier, the USS *Langley.* In 1921, General William "Billy" Mitchell demonstrated the effectiveness of aircraft against capital ships by sinking the battleship *Ostfriesland* and several other former German war vessels in dramatic bombing exercises off the Virginia Capes. Mitchell had prepared his aerial squadron for the demonstration by conducting practice bombing runs on the hulk of the *San Marcos,* ex-USS *Texas,* in the Chesapeake Bay (Burgess 1963:27; Gentile 1992:182–188).

Due to fiscal and naval conservatism, however, the nation was slow to develop its carrier program (Foss 1984:80–81; Hagan 1991:272–273, 283; Tazewell 1986:80, 143, 148). It was not until 1934 that the government commissioned its first carrier designed and built as such. The distinction of producing the USS *Ranger,* "the first American ship built as an aircraft carrier from the keel up," went to Newport News Shipbuilding. Shortly thereafter, the Newport News yard launched what would become perhaps the two most famous warships of World War II. "Saviors of the Pacific" in 1941–1942, the carriers *Yorktown* and *Enterprise* were commissioned in 1937 and 1938, respectively.

The full shipbuilding capabilities of the region were called upon once again during World War II. In June 1940, former Secretary of the Navy, then President Franklin D. Roosevelt signed a "two-ocean" naval construction bill to prepare for the possibility of war in both the Atlantic and Pacific. The following month, the chief executive arrived in Hampton Roads aboard the presidential yacht *Potomac* to pay a personal visit to the Norfolk Navy Yard, Naval Operating Base, and Naval Air Station (Foss 1984:85–86).

During the course of the war, the Norfolk Navy Yard built 101 new ships and landing craft in addition to converting, modifying, or repairing 6,850 naval vessels. To accomplish this monumental undertaking, the physical extent of the yard more than doubled, and

the size of the work force almost quadrupled compared to its World War I peak (Butt 1959:10–11).

The war had a comparable impact on Newport News. Responding to the call for action after Pearl Harbor, Newport News Shipbuilding took on all the navy work it could handle. Its production of eight aircraft carriers in less than two and a half years (approximately one every 90 days) has been described as "perhaps the most extraordinary feat of shipbuilding in the Second World War" (Tazewell 1986:165). In addition to the carriers, the company also built the battleship *Indiana,* eight cruisers, and 29 landing ships. Thousands of civilians flocked to the shipyard for work, boosting the population of Newport News from 37,000 to 60,000 in just over two years.

Early in the war, German submarines targeted merchant shipping along America's Atlantic coast. Rescue ships and aircraft normally brought the survivors of attacks in Virginia and North Carolina waters to one of several naval facilities in Norfolk for comfort and medical attention. The Germans also employed U-boats to lay mines near the entrances of Atlantic coast harbors. In June 1942, sunbathing vacationers and residents of Virginia Beach witnessed a series of mine explosions 6 mi. offshore that sank two merchant ships and damaged two others. American forces exacted a measure of retribution by sinking the Nazi submarine U-85 and the vessel responsible for laying the mines off Virginia Beach, U-701. The burial at Hampton National Cemetery of 29 German sailors killed in the attack on the U-85 was kept secret, for intelligence purposes, for the remainder of the war (Foss 1984:90–91; Gentile 1992:85–87, 131–133).

Local shipping operations were profoundly affected by the war as well. In 1942 the federal government's War Shipping Administration proceeded to appropriate all available sound-class steamers along the eastern seaboard, including four of the Old Bay Line's most recent acquisitions. All underwent extensive modification in preparation for war service. England was in especially urgent need of bottoms that could be put to use as hospital ships, training craft, and short-distance cargo haulers. Of two Old Bay Line craft dispatched to Great Britain in a destroyer-escorted convoy, one, the Newport News–built *Yorktown,* was sunk en route during a U-boat attack that sent four ships and 131 men to the bottom (Brown 1961:105–111).

The colorful career of the other Old Bay Line steamer that participated in the convoy in many ways reflects the regional maritime, national, and global history of the era. Constructed in 1927 as part of a modernization program initiated by Old Bay Line president S. Davies Warfield, the steamer *Florida,* like her sister ships *State of Maryland* and *State of Virginia,* was made of steel and outfitted with coal-burning engines. Renamed the *President Warfield* after the line executive's death that same year, the vessel was converted to an oil burner in 1933 (Brown 1961:91–93, 1976:154).

During the Prohibition era, a Coast Guard cutter fired a shot across the *Warfield*'s bow, forcing the vessel to submit to a search which, much to the embarrassment of company officials, yielded a carload of whiskey (Brown 1961:94). Shortly after American entry into World War II, the *Warfield,* like her Old Bay Line cohort *Yorktown,* was renovated extensively for military service. Surviving the U-boat attack that sank the *Yorktown,* the *Warfield* completed the trans-Atlantic voyage and served American and British forces in the European theater as a barracks and operations boat (Brown 1961:102–112, 1976:155–156).

After the war, the bay steamer made the return passage to the United States and was relegated to a fleet of idle vessels moored in the James River (Brown 1961:113, 1976:156). In 1947, she was purchased by a front group for the Jewish nationalist organization, Haganah, and sailed back to Europe. Originally licensed to carry no more than 540 passengers on the Chesapeake Bay, the *Warfield* picked up over 4,500 Jewish refugees—concentration camp survivors and other misplaced persons from the war—in southern France and headed east across the Mediterranean for the Zionist homeland (Brown 1961:116–120, 1976:156–157).

Renamed *Exodus 1947* by her determined crew of young Jewish nationalists, the former bay steamer was shadowed throughout the voyage by units of the British navy. As the mandatory power in Palestine at the time, Great Britain prohibited Jewish immigration. Upon entering Palestinian waters, Royal Navy destroyers "closed not too gently on either side of the crowded steamer" and forcefully boarded the *Exodus,* killing three and injuring 217. The hapless refugees were taken to detention camps in Cyprus or returned to European points of embarkation. The damaged vessel

was towed to Haifa harbor, where she eventually burned and sank. Although the effort to land Jewish refugees in the Holy Land failed, the incident focused worldwide attention on the plight of the Holocaust survivors and contributed to United States and United Nations recognition of the sovereign state of Israel in May 1948 (Brown 1961:120–124, 1976:157–161).

The role played by the *President Warfield* in the momentous events of the era has been summarized by one of the premier maritime historians of the Chesapeake Bay, who wrote: "no ship has ever participated in more bizarre events...the little one-time passenger steamer, beloved...by countless Chesapeake travelers, became in turn a valiant warship serving the cause of peace, a desperate blockade runner dealing in human hopes, and finally, the symbol of the birth of a nation" (Brown 1976:161).

The New Dominion (Since 1945)

As had been the case after the First World War, the years following World War II brought a severe reduction in the demand for shipbuilding (Tazewell 1986:192). As thousands of workers left to begin new peacetime jobs, Newport News Shipbuilding relied on relatively small jobs to provide security for its workers. The majority of this work consisted of repairs or conversions; new construction accounted for only a third of the yard's work. The conversion of the *West Point* from a troop transport to the passenger liner *America* in 1946 typified much of the peacetime activity of the yard.

With the advent of the jet age, the U.S. Navy initiated a program to design and build a line of "supercarriers" capable of handling the most modern aircraft. One such carrier, the USS *United States,* was approved and funded by Congress in 1948 and the keel was laid on April 18, 1949. A controversial decision by Secretary of Defense Louis Johnson brought a cancellation of the contract a mere five days later. The prevailing sentiment for reductions in defense spending was quickly altered by the Communist invasion of South Korea and the development of nuclear weapons by the Russians in 1949.

As Dwight D. Eisenhower entered the White House and attitudes regarding military preparedness changed, monies again became available for shipbuilding. Newport News Shipbuilding was awarded contracts for several supercarriers beginning with the *Forrestal* in 1951. During this time, the shipyard also produced the largest passenger ship ever built in the nation. Christened the *United States,* this grand liner established the world record for transatlantic crossings on her maiden voyage in 1952. Ironically, the completion of the *United States* coincided with the decline of the romantic passenger ship. Soon most travellers would embrace jet aircraft as the preferred mode of transportation for their transoceanic voyages.

The arrival of the Nuclear Age and intensification of the Cold War enabled Newport News Shipbuilding to secure its foreseeable future in the 1950s. The award for several nuclear-powered submarines, augmenting the nuclear carriers, resulted in the expansion of operations and facilities. Apart from defense contracts, the closing of the Suez Canal in 1956 created an increased need for oil tankers which the yard helped to satisfy by the end of the decade.

The 1960s saw the expansion of nuclear-powered ship construction in response to the continuation of the Cold War. During this time, the shipyard merged with Tenneco, a Texas-based corporation with the financial capability and management structure to handle the ever larger and more complex naval construction projects. Nevertheless, many disputes arose between the yard and the government over procurement, cost estimates, and scheduling. These difficulties encouraged the shipyard to seek other commercial markets in the 1970s. The construction of large "supertankers" became an important part of the yard's work.

The mainstay of the yard's business, and the economy of Hampton Roads more generally, remained and continues to be defense contracts, however. The fall of communism in the late 1980s and the end of the Cold War combined with a sluggish U.S. economy and concern over the national deficit has led to significant reductions in defense spending. Despite growing apprehension over profitability in relation to an everchanging economic and political climate, shipbuilding in Hampton Roads remains the area's most important financial resource.

While the state's shipbuilding and naval support industries have both prospered and struggled to remain viable in the postwar years, as had been the case since the beginning of the historic period, natural forces continued to take their toll on watercraft in the region,

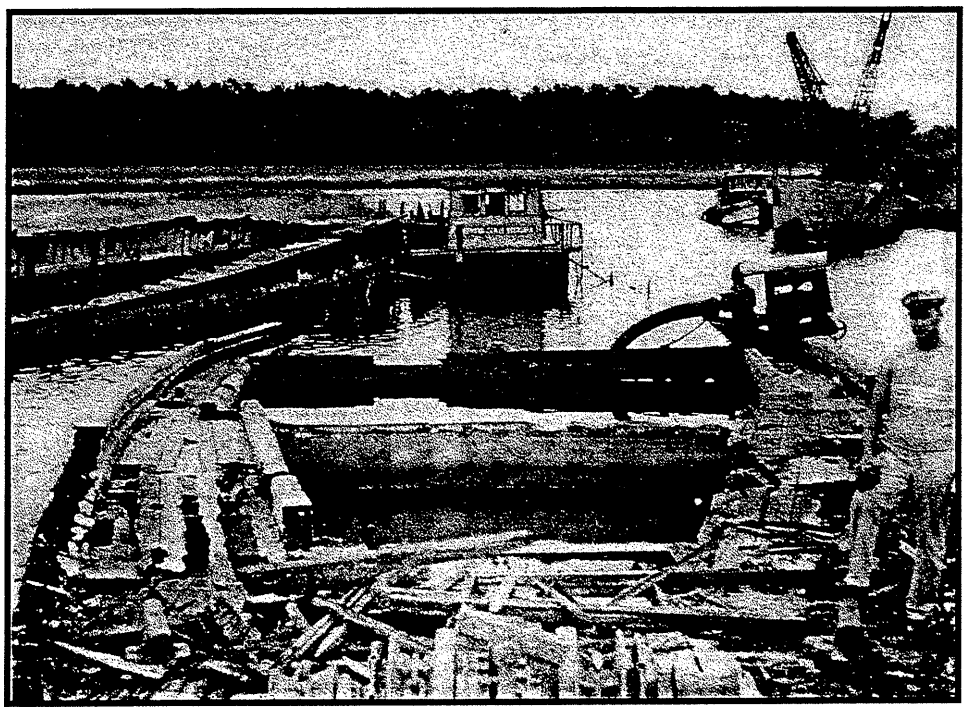

Figure 37. Abandoned gunboat Nashville *(Brown 1976:16).*

periodically adding to the state's submerged cultural resource inventory. In 1955, a number of the nineteenth-century steamers that the Richmond Cedar Works had converted to barges, including the ex-Coast Guard cutter *Onandaga* and the former Portsmouth-to-Norfolk ferry *City of Portsmouth,* were sunk by a hurricane at Gilmerton, Virginia (Burgess 1963:171–172). Around the same time, other historic vessels that had been modified by the lumber company were being dismantled more systematically. A 1958 article described how the "once proud U.S. Gunboat *Nashville*" had been sold for scrap "along with four or five other ancient hulls" to a North Carolina "shipbreaker" who was reducing them piece by piece (Figure 37):

> In a shallow backwash of the of the river near Camden Mills and the busy Atlantic Intracoastal Waterway, this little ghost fleet is slowly dwindling away as its owner proceeds to cut up the worn-out hulks into chunks of plate small enough to handle (Brown 1976:11–16).

The Archaeological Perspective

Despite Virginia's rich maritime heritage, archaeologists have undertaken relatively little in the way of systematic investigation to discover and examine the abundance of vital cultural resources that lie submerged in state bottomlands. Much of the work to date has consisted of legally mandated surveys performed in connection with proposed bottom-disturbing activities such as channel dredging, spoil dumping, bridge construction, and cable or sewer line crossings.

Some of these surveys have been performed in areas where there was no specific reason to suspect the presence of significant resources. Although other investigations were conducted in areas for which there was compelling evidence of historical sensitivity, much of this work did not proceed beyond the site identification level. Consequently, many anomalies recorded solely on the basis of remote sensing (some

of which have been designated as actual sites) have never been investigated firsthand.

Most of the deliberate, systematic work of search and survey has pertained to historically documented shipwrecks. A limited amount of activity, however, has been dedicated to the discovery of submerged resources related to prominent terrestrial sites (Margolin 1986:205–211). Three attempts to discover potential offshore components of historic land sites all concern well-known seventeenth-century settlements on the northern bank of the James River.

Two of these projects involved efforts to locate remnants of the original Jamestown settlement, specifically the fort, thought to possibly lie in the waters of the James River as a result of erosion. The first project was conducted in the mid-1950s at a time when the principles and techniques of careful underwater survey and excavation had yet to be developed. The methods and results, therefore, were crude and imprecise. Attempts to conduct fixed-interval testing using a power-operated clam shell bucket resulted in 65 random "drops," or uncontrolled scoops, the locations of which were plotted from shore-based transits. Although the project produced no evidence of the fort per se, seventeenth-century artifacts were recovered in 19 of the drops, almost all within 200 ft. of the seawall (Cotter 1958:17–18).

A more recent effort to locate potential submerged components of early Jamestown employed technology considerably more advanced than that used in the 1950s (Hobbs et al. 1994). In 1992, researchers sponsored by the Virginia Institute of Marine Science and the Thomas Smythe Foundation used side-scan sonar to examine the shallows off Jamestown Island and detected a rectilinear anomaly that, the team speculated, might represent the outline of a bastion, building, or foundation (Hobbs et al. 1994). Attempts to verify the target through firsthand examination some months later proved inconclusive. The exercise was complicated by the presence in the area of more recent debris and likely will require systematic excavation to produce more definitive results.

Methodical testing for a site of similar antiquity in the James River was performed in 1978. At the request of Colonial Williamsburg Foundation (CWF) archaeologists working at Martin's Hundred, staff members with the Virginia Research Center for Archaeology's (VRCA) underwater section attempted to determine the riverward extent of Wolstenholme Towne, an early seventeenth-century village discovered between the Carter's Grove mansion and a bluff overlooking the James River. The observation of archaeological features protruding from the eroded face of the bluff prompted speculation about how far offshore the town might have extended three and a half centuries earlier and whether material evidence of the settlement could be recovered. Archaeologists hoped that excavating a series of test pits along several transects perpendicular to the shoreline would yield diagnostic artifacts that could be associated with the village and geographically plotted to suggest site boundaries in the submerged area.

Unfortunately, no such assemblage was recovered, probably due to the dynamics of the erosion process in the local area where the river chronically undercuts the bluff, causing tons of sediment to cascade downward to the beach or into the water. Any seventeenth-century cultural remains (which likely were not very substantial to begin with) would then have been subjected to the damaging effects of brackish water, waves, and currents. Despite the absence of relevant cultural remains, investigators were able to discern, on the basis of geological evidence, the approximate contours of a pre-existing promontory that may have extended 100 yd. or more into the river in the early 1600s. This information enabled CWF archaeologists to refine previous estimates regarding the size and population of Wolstenhlome Towne in 1619 (Noël Hume 1982:258–260).

Apart from these few examples, most of the underwater archaeological activity undertaken in Virginia has involved the search for or investigation of shipwrecks associated with the Revolutionary and Civil wars. The state's best known and largest concentration of significant underwater sites lies in the York River near Yorktown, remnants of the battle so closely associated with American independence. Attempts to salvage the sunken vessels date back to the months following the Revolution and were pursued intermittently throughout the nineteenth and twentieth centuries (Sands 1983:116–121).

In 1934 and 1935, the National Park Service in conjunction with the newly founded Mariners' Museum conducted a major artifact recovery project on several of the wreck sites (Ferguson 1939). A helmeted diver operating off a barge outfitted with a winch and a clam shell bucket managed to recover cannons, swivel

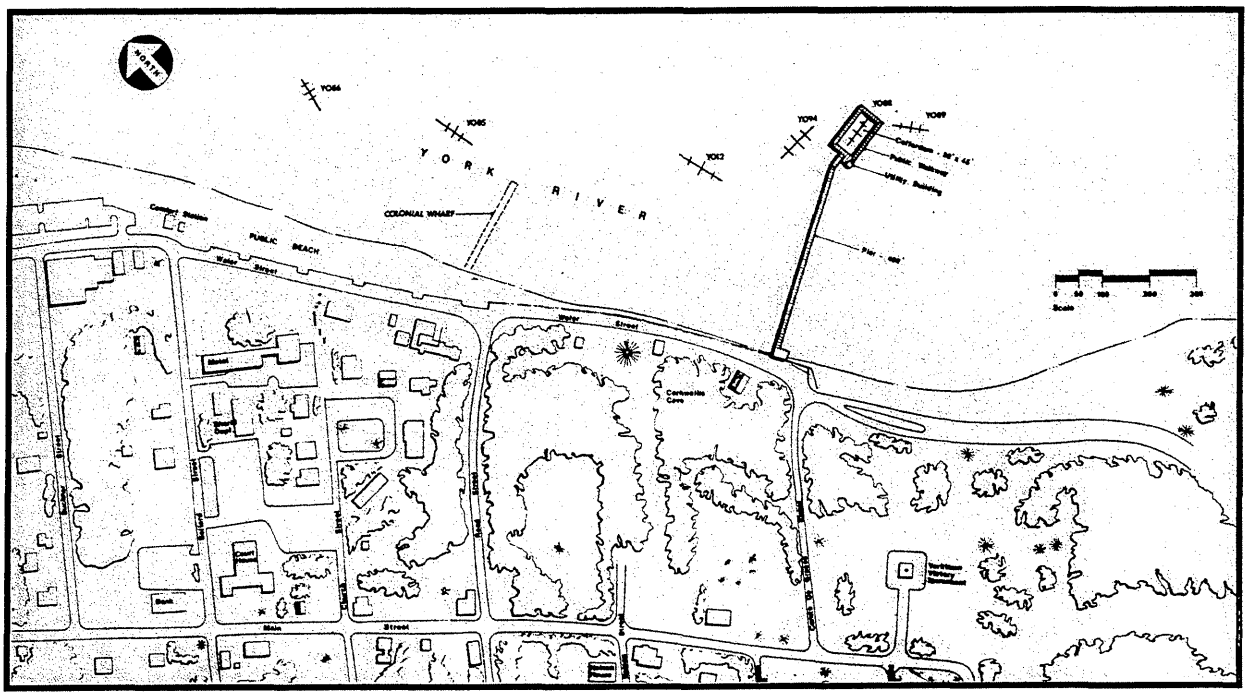

Figure 38. Location of shipwrecks at Yorktown (Sands 1983:164).

guns, and nearly 200 glass bottles from two wrecks on the Yorktown side and one on the Gloucester side of the river. Little attention was devoted to recording site locations, artifact provenience, or construction features, however. Nor did the recovered assemblage benefit from very sophisticated conservation treatment; nevertheless, a surprising number of artifacts have survived in remarkably good condition (Sands 1983:125–131).

Intensive relic hunting by sport divers on what came to be known as the Cornwallis Cave Wreck (44YO12) alarmed archaeologists and preservationists in the mid-1970s. Fearing that the site might be lost entirely, the Virginia State Legislature was persuaded to enact an underwater antiquities law in 1976 to protect 44YO12 and other, as yet undiscovered submerged historic sites. Diving investigations of 44YO12 that summer by the American Institute of Nautical Archaeology established the general date, dimensions, and state of preservation of the site and indicated the difficulty of conducting controlled archaeological operations under the conditions of strong current and poor visibility that prevail in most of the bay's tributaries (Bass et al. 1976).

Two years later the VRCA assembled its own group of diving archaeologists to conduct a systematic survey of the river, with the object of locating as many sunken vessels associated with the Yorktown engagement as possible. In addition to 44YO12, investigators identified seven shipwreck sites believed to have been related to the Battle of Yorktown. Lying in a line approximately parallel to the Yorktown beach, six of the sites (including 44YO12) undoubtedly represent vessels scuttled by the British to prevent a French amphibious assault in 1781 (Figure 38). Of the two sites located on the Gloucester side, one (44GL106) contained a six-pounder iron cannon, which was raised (and has since been conserved), and the other (44GL136) was thought to represent the remains of Cornwallis's flagship, HMS *Charon*.

The 1979 and 1980 field seasons were devoted mainly to more detailed investigations of two of the sites located in the 1978 survey. The removal of sediment (using a small suction dredge) from a series of athwartships trenches and subsequent mapping of features on 44YO85 demonstrated that controlled excavation and accurate recording could be accomplished despite adverse environmental

conditions (Hazzard 1982) (Figure 39). The fieldwork further indicated that diagnostic hull features and artifacts can survive in remarkably good condition even in poorly preserved sites.

The principal objective of the 1980 season was to determine whether 44GL136 actually represented the remains of HMS *Charon*. Although the vessel was known to have burned extensively before sinking and preliminary analysis of 44GL136 indicated that less than 10% of the hull had been preserved, investigators hoped that positive identification, based primarily on the examination of construction details, might still be possible. In the end, careful study and recording of site features, comparison of the recorded characteristics with extant builder's plans, and supporting evidence provided by diagnostic artifacts permitted a joint team of VRCA and Texas A & M archaeologists to assert confidently that 44GL136 did in fact constitute the wreckage of Cornwallis's flagship (Steffy et al. 1981).

One of the early goals of the Yorktown Shipwreck Archaeological Project was to identify the best preserved of the Revolutionary War sites for full excavation and, possibly, recovery and display. Such an ambitious project on a historic ship has been completed successfully only rarely worldwide (see, e.g., Franzen 1960; Rule 1986) and was determined to be cost prohibitive for the Yorktown project. In lieu of full recovery, however, a large steel enclosure, or cofferdam, was constructed around 44YO88, the best preserved of the sites surveyed in 1978. The purpose of the cofferdam was twofold: first, to create a controlled environment within the enclosure that would facilitate excavation and recording and, second, to provide the public with a unique opportunity to view an underwater excavation in progress (Broadwater 1980, 1988, 1992).

Clarification of the water within the enclosure was regarded as an achievable objective that would serve both ends. Unfortunately, efforts along these lines were only partially successful. The installation of a filtration system improved underwater visibility considerably, but not to a degree that would permit photogrammetric recording (as was originally anticipated) or viewing of the wreck and excavation activities from the surface. Nevertheless, the increased visibility, absence of currents and stinging nettles, and protection afforded to the integrity of the site by the steel walls of the cofferdam all represented significant advantages.

The only other documented attempts to locate the remains of sunken Revolutionary War vessels in Virginia have focused on the Chickahominy Shipyard. In 1977, an independent researcher located the remains of a vessel (44JC50) believed to date to the Revolution offshore of the Chickahominy Shipyard Site (44JC14) (VRCA 1978; Short 1977a, 1977b). Recent investigations by a team from East Carolina University included a side-scan sonar survey, which reportedly produced partial profiles of two vessels projecting above the bottom (*Richmond Times Dispatch* 20 May 1994).

Unlike the investigations of submerged resources related to the Revolution, which have focused mainly on the York River, the search for and examination of Civil War wrecks has been confined almost exclusively to the James River. And, whereas the impetus, personnel, and funding for the Yorktown project came mainly from public sources, the private sector has provided most of the support and expertise with regard to the James River Civil War sites.

Except for several private and government-sponsored salvage efforts conducted intermittently in the decades following the Civil War, the remains of all the vessels sunk in the James River during the conflict lay largely forgotten on the river bottom for well over a century. But in 1980, Clive Cussler, popular novelist and chairman a private maritime heritage preservation group known as the National Underwater and Marine Agency (NUMA) undertook to locate the wrecks in a cooperative venture with Virginia state archaeologists that summer.

Failing to uncover evidence of either ship, NUMA contracted the following year with Underwater Archaeological Joint Ventures (UAJV) to pursue the search once again. Through a combination of historical research, assistance from local watermen, and systematic remote sensing, UAJV succeeded in locating two promising wreck sites, both approximately 65 ft. deep, in the main shipping channel of the James River off lower Newport News (Margolin 1987:54–56; UAJV 1982). Subsequent examination yielded compelling evidence—in the form of site dimensions, construction features, and diagnostic artifacts—that the wrecks in question did indeed represent the remains of the *Cumberland* and the *Florida* (Margolin 1987:57, 84; UAJV 1982). More recent investigations of the two sites sponsored by the U.S. Navy essentially have

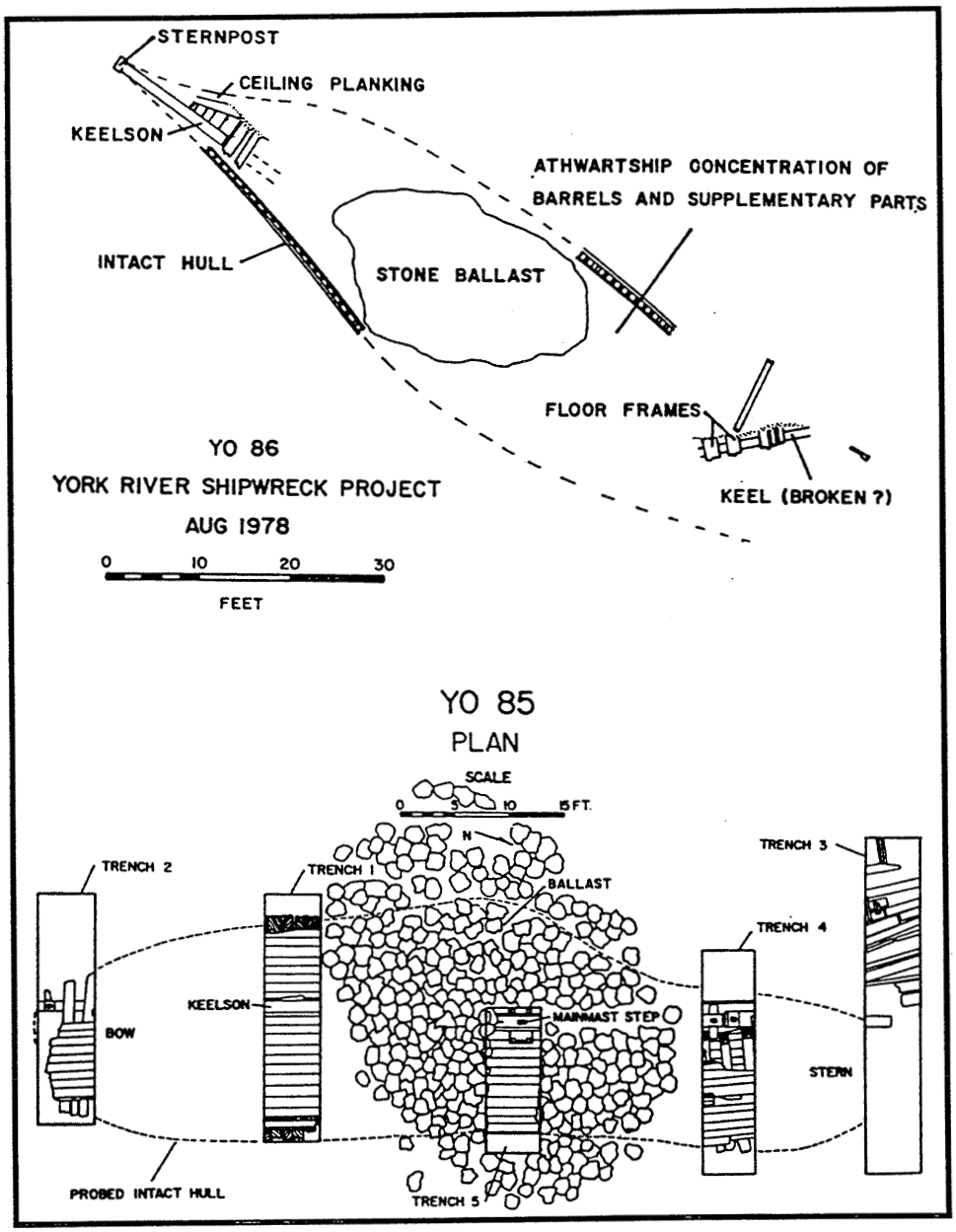

Figure 39. Yorktown shipwreck plan views (44YO85 and 44YO86) (Sands 1983:166).

confirmed the original findings while yielding little new information (Watts 1987; James et al. 1994).

The discovery of an 1881 map indicating the locations of ships from the Confederate James River Squadron that had been scuttled adjacent to Drewry's Bluff during the war prompted NUMA and UAJV to search for sunken Civil War vessels in the upper James River in 1982 (Margolin 1994; UAJV 1982). UAJV conducted a remote sensing survey using a gradiometer. By plotting the data to the same scale as the map, the results of the survey could be compared directly to the 1881 chart by superimposing an overlay that indicated a close conformance between the gradiometer targets and the locations of the ironclads *Fredericksburg* and *Virginia II* and, to a lesser degree, the steamer *Northampton* as recorded in the nineteenth century. Similar procedures conducted further downstream during the same project and a subsequent one in 1985 produced evidence of two additional sites thought to represent the remains of the CSS *Richmond* and the USS *Commodore Jones*.

With the termination of the DHR's nautical unit and in the absence of funding for underwater projects more generally, little work other than "Section 106," or government mandated cultural resource management (CRM), surveys has been conducted since the late 1980s.

CHAPTER 4: Assessment of Known Underwater Resources

Introduction

The assessment presented here of known resources, coupled with the preceding contexts, forms the essential core of the project. The basic goal of this chapter is to summarize relevant details of all officially recorded underwater sites in Virginia and then to characterize the nature of the current record.

Three student interns were responsible for systematically reviewing the files of all recorded sites at the DHR, determining which sites qualified as "underwater", and for transcribing a standard set of information from the site records to coded data sheets. The coded information was then entered into a project data file created using Paradox relational database software. From this file, a set of standard reports along with various unique reports were generated to facilitate the assessment of known sites reported in this chapter (Appendix A).

The data file consists of 28 separate "fields" defined to accept specific categories of information. Beyond the official site number, which serves as a unique designation, the fields were established to record locational, physical, temporal, functional, and status data. Predefined, standardized codes were established for most of the fields to insure consistency and minimize errors. Brief descriptions of the fields are provided in Table 1; a copy of the project codebook is on file with the DHR and the WMCAR.

The set of fields was defined in order to compile as complete a record of current sites as possible, but in reality site records tend to be incomplete and of highly variable quality. Certain obvious locational and temporal factors were simple enough to extrapolate if necessary, and Universal Transverse Mercator (UTM) coordinates were obtainable from site locations on topographic quadrangles. Otherwise, the temptation to infer correct entries from sketchy information was avoided to minimize error.

Probably the greatest challenge of this process was determining which sites should be considered "underwater." Many shoreline or tidal flat sites are not permanently submerged and often represent scatters of redeposited artifacts from eroding bluffs. To circumvent this problem, criteria were established for making the determinations. Shoreline or wetland sites would be included if the reported scatters were field-checked by professional archaeologists or if obvious features were present to signify a definite site location; Coastal Plain sites also had to be judged to lie below the level of mean high tide.

Overall Patterns

A total of 283 sites officially recorded with the DHR can safely be classified as underwater, comprising approximately 1% of the total number of recorded sites (estimated by the DHR at 27,500). The greater portion (66%) of these are located in the Northern Coastal Plain (Figure 40). Considered together with sites on the Eastern Shore, 80% of all underwater sites are located in the Coastal Plain physiographic province. Underwater sites generally are scarce outside of the Coastal Plain.

Summarized according to body of water, the same pattern is confirmed (see Figure 40). Coastal Plain waters have inundated most of the sites, and the York River and Chesapeake Bay each boast over 20% of the known sites. Although many rivers traverse more than one physiographic province, the majority of sites in such streams as the James and Rappahannock rivers fall within their Coastal Plain segments.

Some of the observed patterns reflect survey or other biases and not actual distributions, as will be elaborated in the final chapter. This is true in the case of the York River and the Atlantic Ocean, for which variable survey intensities have created misleading patterns (for instance, no one actually expects the relatively limited bottom area of the York River to hold more sites than either the Chesapeake Bay or the Atlantic Ocean!). Immediately, then, it has become evident that the current data are not

Field Name	Description
Site:	Site number
Province:	Location of site by physiographic province
Region:	Location of site by regions as defined in statewide contexts
City/County:	Location of site by current local government jurisdictions (consistent with site number designations)
Water:	Location of site by primary water body
Quadrangle:	USGS 7.5' quadrangle on which a site is recorded
UTM Zone:	UTM grid zone
Easting:	UTM east coordinate for a site
Northing:	UTM north coordinate for a site
TDI1:	Loran coordinate
TDI2:	Loran coordinate
Size Axis 1:	Site dimension in meters along one axis
Size Axis 2:	Site dimension in meters along second axis
Depth:	Depth of site below mean sea level in meters
Condition:	Last reported condition of site; example: looted, eroded, well preserved, etc.
Culture Era:	Whether the site is "Prehistoric" or "Historic"
Time Period:	Age of the site according to predefined statewide temporal contexts (Note: presented only as a date range and not by a period name)
Nationality:	Nation or major culture group under which a vessel or other feature last served
Cultural Theme:	The most general functional category a site conforms to according to predefined, statewide thematic contexts
Property Type:	More specific functional categories which are also largely predefined in the statewide thematic contexts
Function:	The most specific functional classification under this scheme

Table 1. Description of data fields.

Field Name	Description
Class I:	First level of descriptive information for a site, intended to clarify the more general functional categories
Class II:	Supplements the Class I descriptive field
Source:	The primary source of information for this site such as site form, informant, etc.
Depository:	The primary location of information for this site such as field records, artifacts, etc.
Level of Investigation:	The kind or intensity of investigation for a site such as informant interview, field-checked, excavation, etc.
NRHP Status:	The current NRHP status of a site; for example: eligible, ineligible, listed, etc.
State Status:	The current state-level register status for as site, similar to above

Table 1 (continued). Description of data fields.

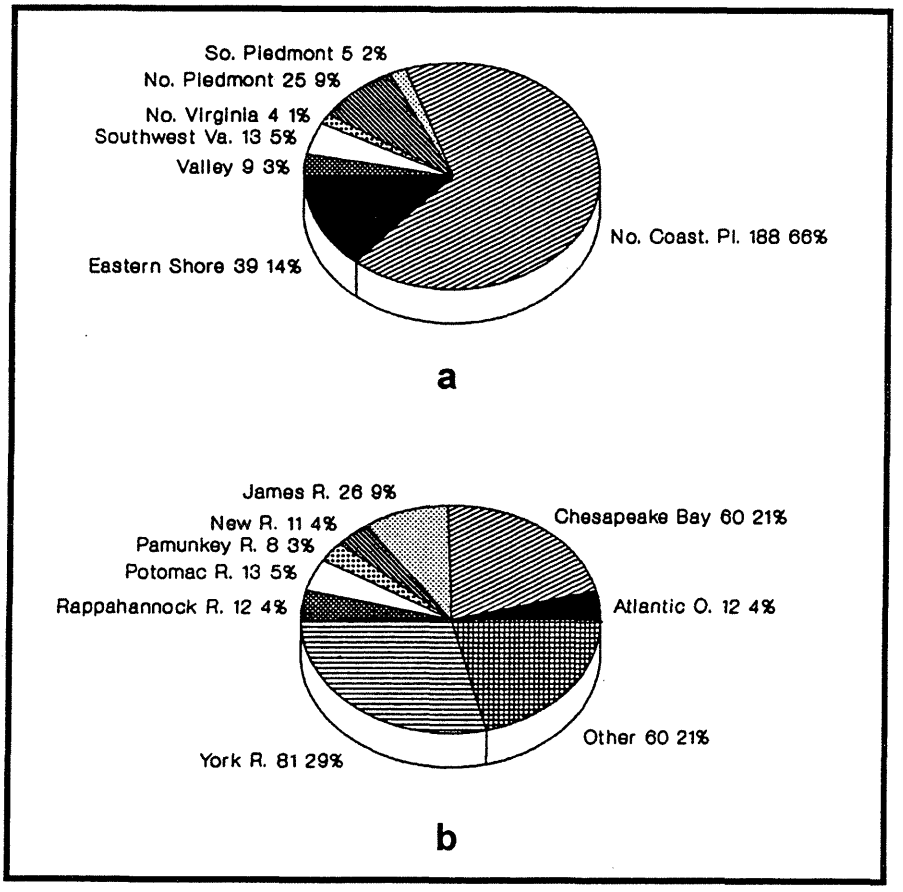

Figure 40. Summary of all sites by region (a) and by body of water (b).

representative of the true population of underwater sites. The inflated site count in the York River derives from the problem of assigning official site numbers to unchecked, remotely sensed anomalies.

Examined according to broad temporal categories, other suspicious patterns appear. In the current sample, historic-period underwater sites outnumber prehistoric underwater sites almost exactly 2:1. It is clear enough that the number of wrecks and related sites that litter the bottom in Virginia waters is considerable and that many prehistoric sites are forever lost to erosion, but it is unlikely that the true ratio is this skewed. It was also observed that the number of historic sites is higher relative to the number of prehistoric sites in western (non–Coastal Plain) regions, where sea-level rise has not been a factor (Figure 41).

Twenty-four sites are not identifiable as either prehistoric or historic in age. Twenty-two of this group are stone fish weirs in Piedmont or Mountain streams. Weirs of this kind are known to have been used by Native Americans, probably since prehistoric times, but they were also built or reused by historic immigrants. Because the form from one period to another is essentially the same, there are seldom obvious diagnostic traits. Another of these sites (44YO244) represents graves of undetermined age eroding at the York River shoreline. The last undetermined site is apparently a boat wreck (described as "nautical"), but the site record is otherwise sketchy.

Known Prehistoric Resources

General Observations

Of the total number of underwater sites on record, 82 (29%) are prehistoric. This number does not include the 22 fish weirs of undetermined age that might also date from prehistoric periods. This gives a density statewide of only one prehistoric site per 110 km^2 of submerged area. Against density measures for terrestrial sites, the underwater figure is conspicuously low. Large-scale surveys throughout Virginia, for instance, consistently document higher prehistoric site densities. Knowing that a net rise in sea level has acted to submerge more sites in the Coastal Plain than in any other province, this incongruity is even more revealing of the present bias. In the waters of the Atlantic and the Chesapeake Bay, only 25 sites are known at a density of one site per 60 km^2.

Only three prehistoric sites in the present sample are permanently submerged, meaning that they are underwater even at low tide. These alone are obviously not representative of the kinds or density of prehistoric sites on the state's submerged lands. At the same time, it is easy to understand why these numbers are low, since standard surveys do not examine submerged bottomlands and remote sensing methods so widely employed cannot effectively identify them. Recent reports by Blanton (1994), however, establish that impressive numbers and kinds of sites are located in wholly submerged areas and must be the subject of future study.

The distribution of known prehistoric sites suffers from the same biases cited for the overall sample. Sites in areas submerged by the Atlantic Ocean (n=3) (Eastern Shore) are clearly underrepresented (Figures 42 and 43) (see Figure 41) with respect to the total number settled and, likewise, probably misrepresent the actual number that survive on the continental shelf. The York River, on the other hand, has an anomalously high prehistoric site count relative to other major tributaries of the bay. As another example, prehistoric sites outnumber historic sites in all sections of the Coastal Plain except the Northern Coastal Plain. It is likely that actual numbers in this region, which encompasses the entire western shore of the Chesapeake Bay, are much higher. An inspection of Figure 43 makes more localized sampling deficiencies apparent, most notably in the Hampton Roads, Back Bay, and Potomac areas. Other locales, conversely, show deceptively large samples, such as Accomack, Gloucester, Northampton, and York counties, the only ones with more than five recorded sites. In every instance, these biases are suspected to be a product of uneven survey coverage. The remaining tendencies are otherwise to be expected. This is most true of the low site density west of the Coastal Plain, where fluvial environments are much more stable.

The prehistoric site sample was subdivided according to simple functional categories for the purposes of analysis. "Camps" represent the most ephemeral and functionally ambiguous sites; they are commonly described on official site forms as "lithic

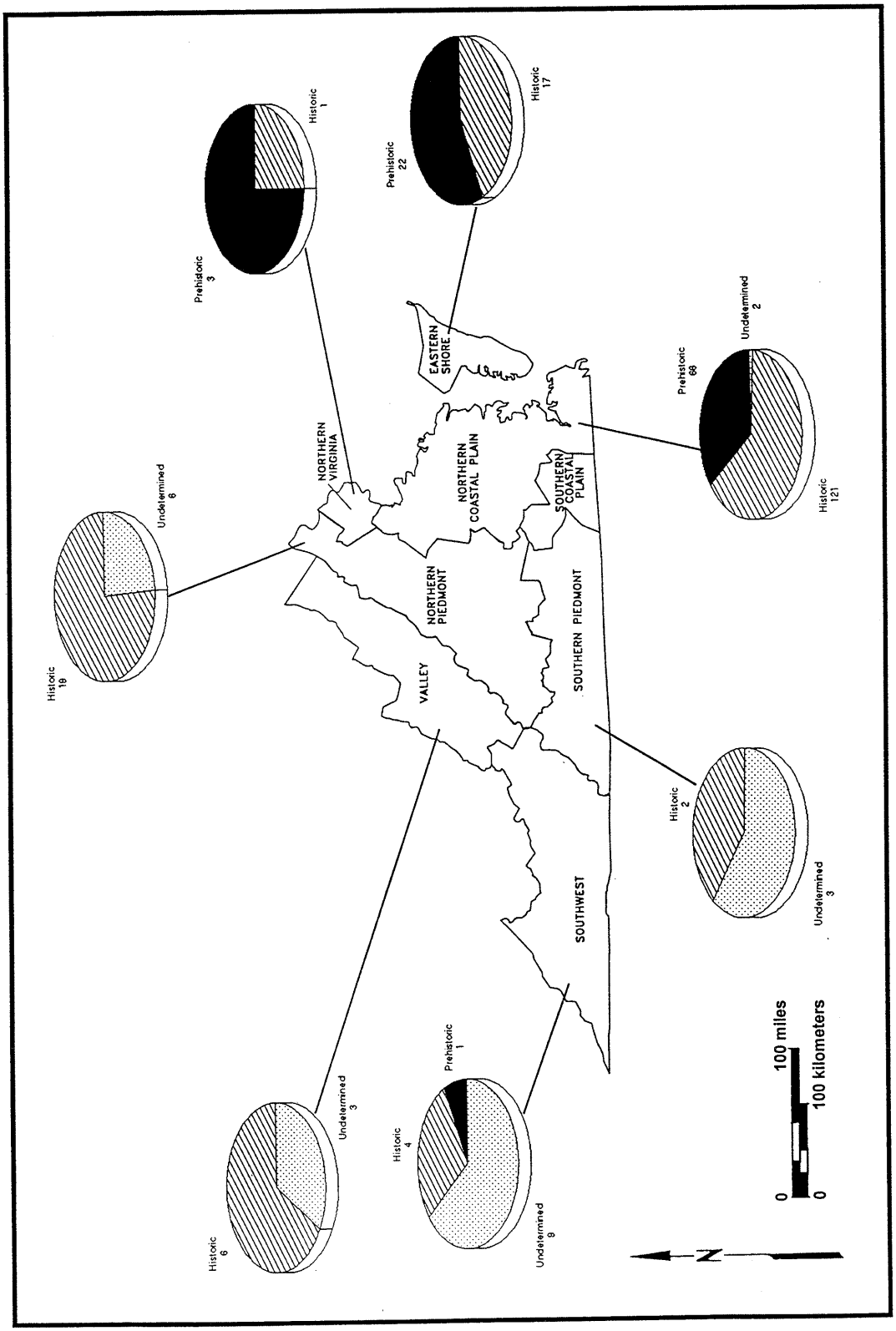

Figure 41. Distribution of sites by region and era.

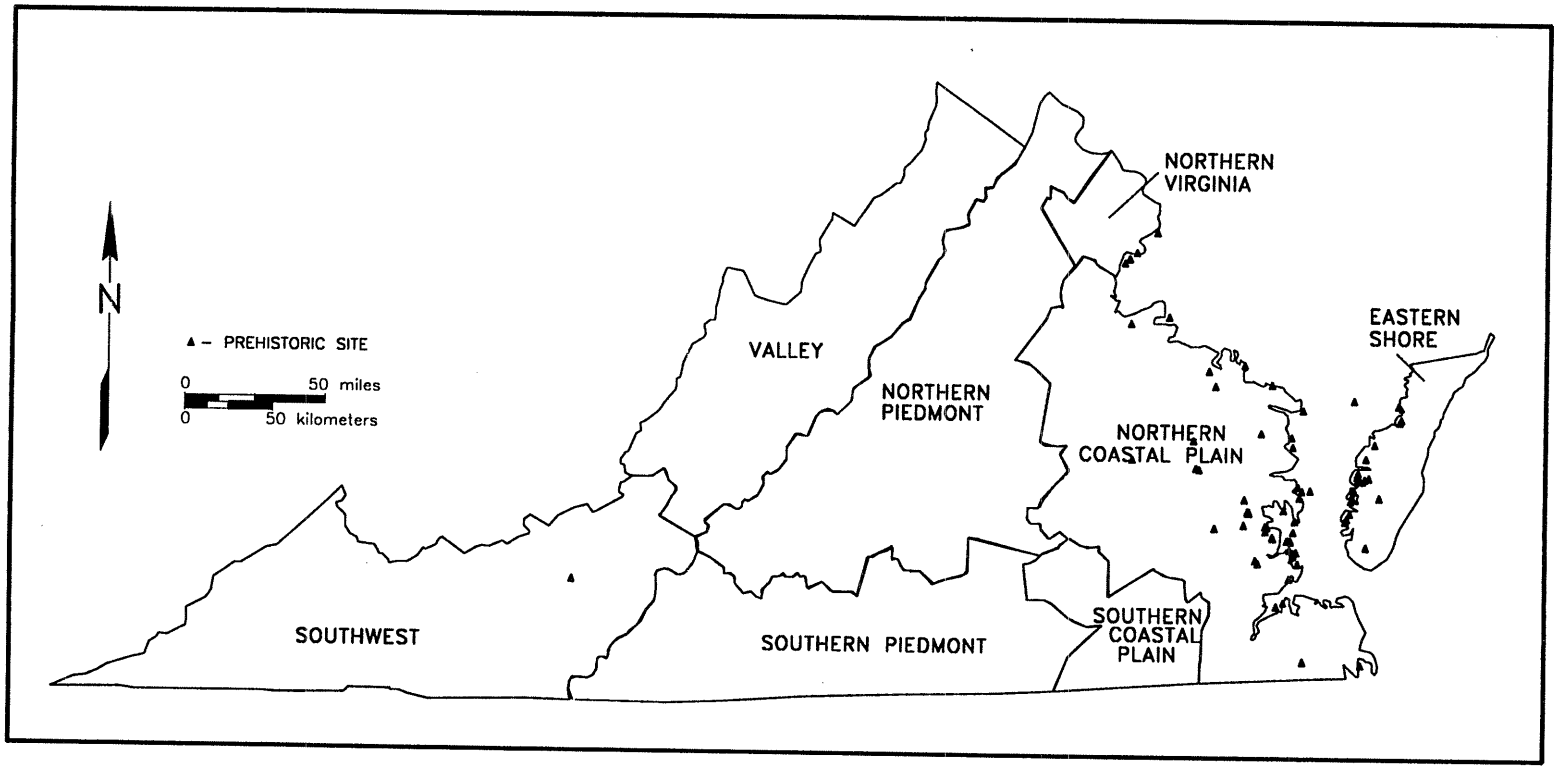

Figure 42. Regional distribution of prehistoric sites.

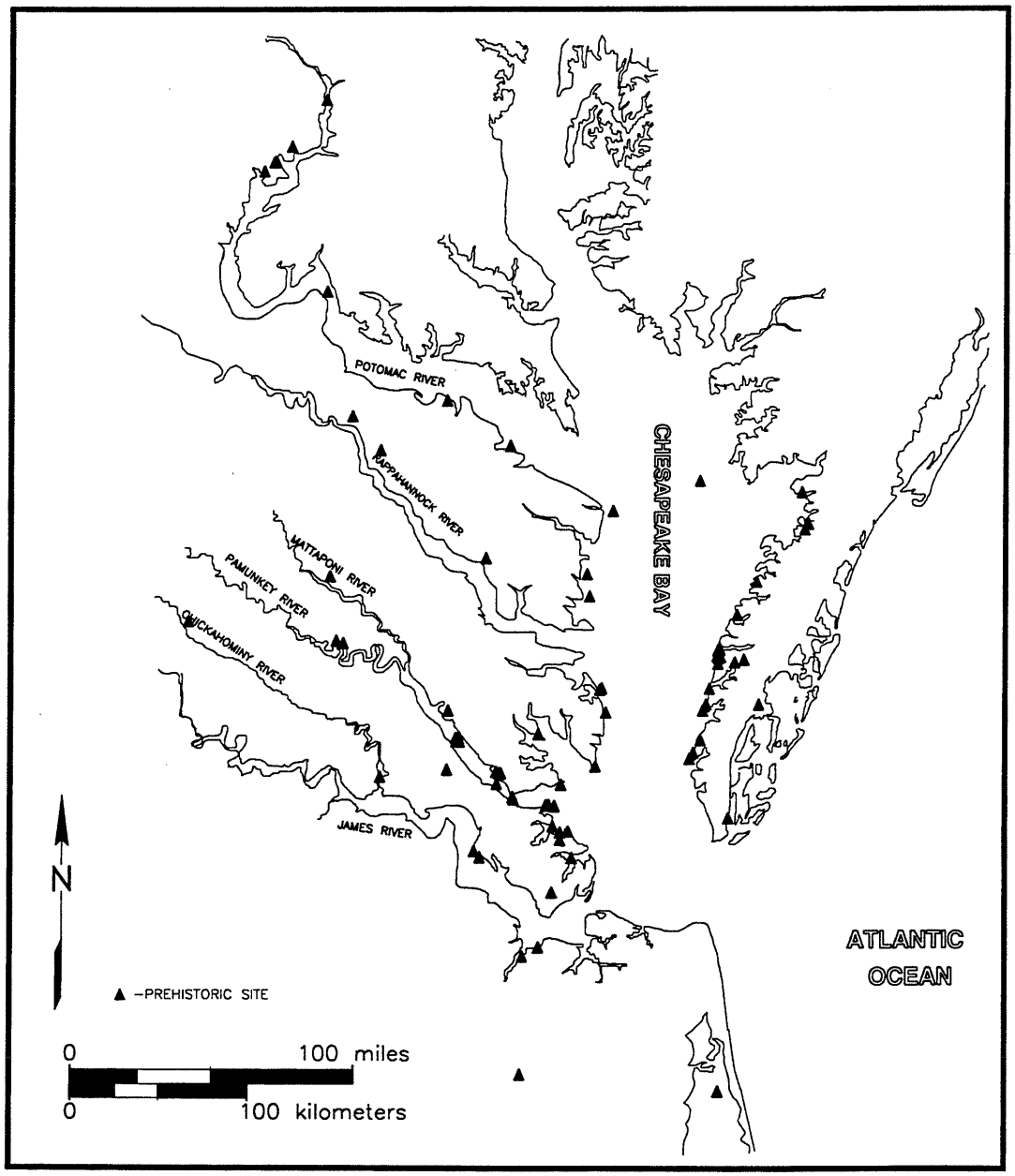

Figure 43. Distribution of prehistoric sites in the Coastal Plain.

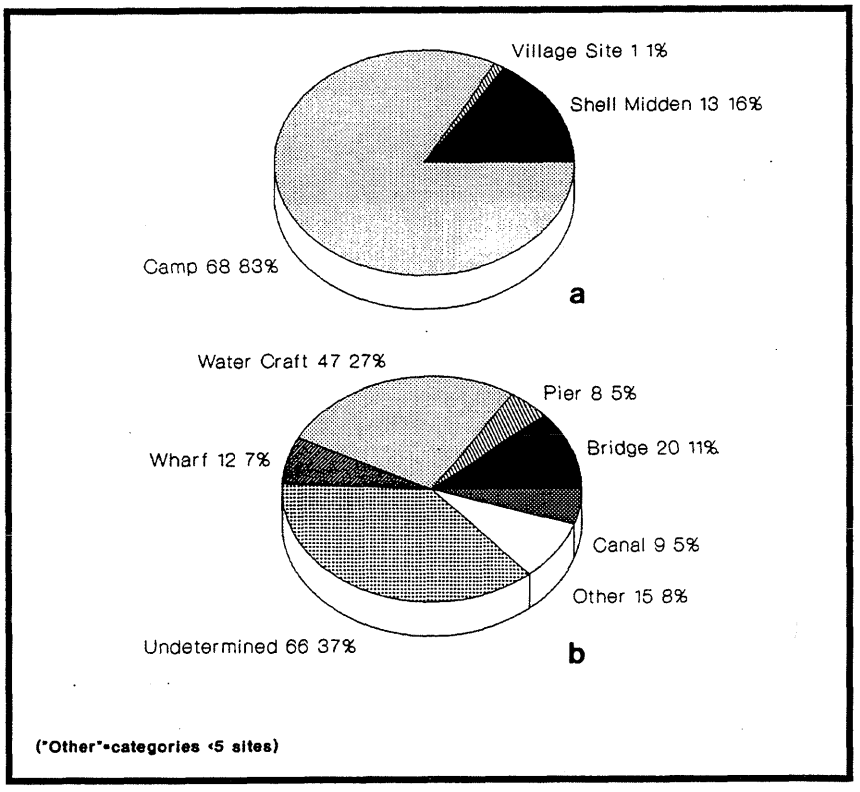

Figure 44. Summary of prehistoric sites (a) and historic sites (b) by function.

scatters" or "procurement camps." "Shell middens" represent sites with notable accumulations or scatters of shell. While some are small, several of these might be considered the most reliable candidates for more permanently occupied "base camps." One "village" site is included. This designation is taken from the official site record, and appears to be based on relatively high artifact density, site size, and the potential for features. (Readers should recall that many of the temporally indeterminate sites identified as "fish weirs" might date from prehistoric periods.)

The relative proportions of different prehistoric site types is consistent with basic expectations. Most common are camps (83%), followed in order of frequency by food processing (shell middens) and villages (Figure 44). It should be understood that these numbers are not necessarily representative of the true population.

The sample of prehistoric sites also exhibits the expected temporal patterns, but only taking a view formed from the terrestrial record. Overall, multicomponent sites are the rule, and there is the usual challenge in making firm statements concerning diachronic change. Results had to be summarized in terms of "potential components" in an attempt to narrow the ranges (Figure 45). In other words, the dated intervals organizing the two histograms represent the temporal subdivisions defined by the DHR. The assessment results, however, required longer intervals for dating multicomponent sites (Figure 46a). The disparate ranges were accommodated in Figure 45 by counting each site every time its occupation interval overlapped with the shorter, predefined DHR intervals. Generally speaking, sites with Woodland components are the most common, and they tend to create peaks in frequency where date ranges are broadest (see Figure

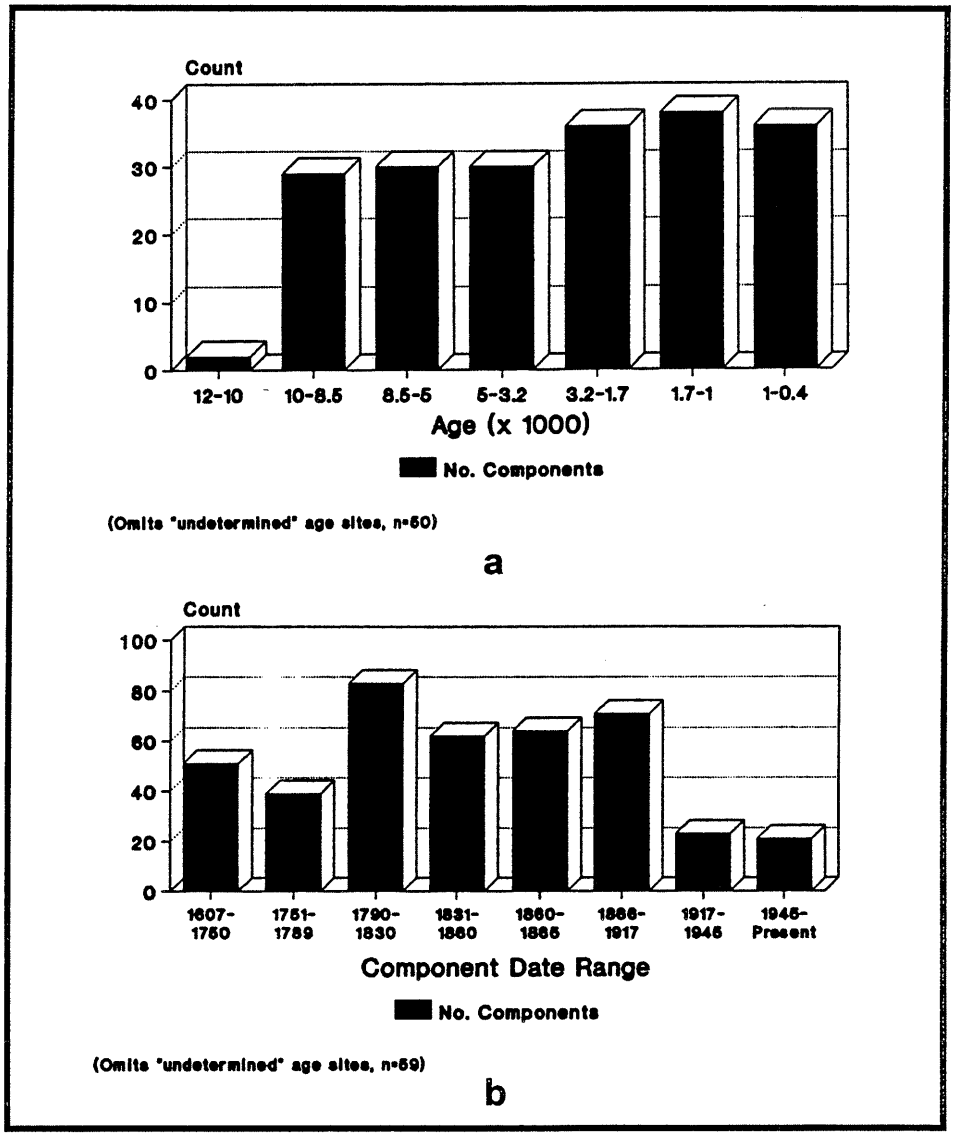

Figure 45. Summary of prehistoric sites (a) and historic sites (b) by potential components.

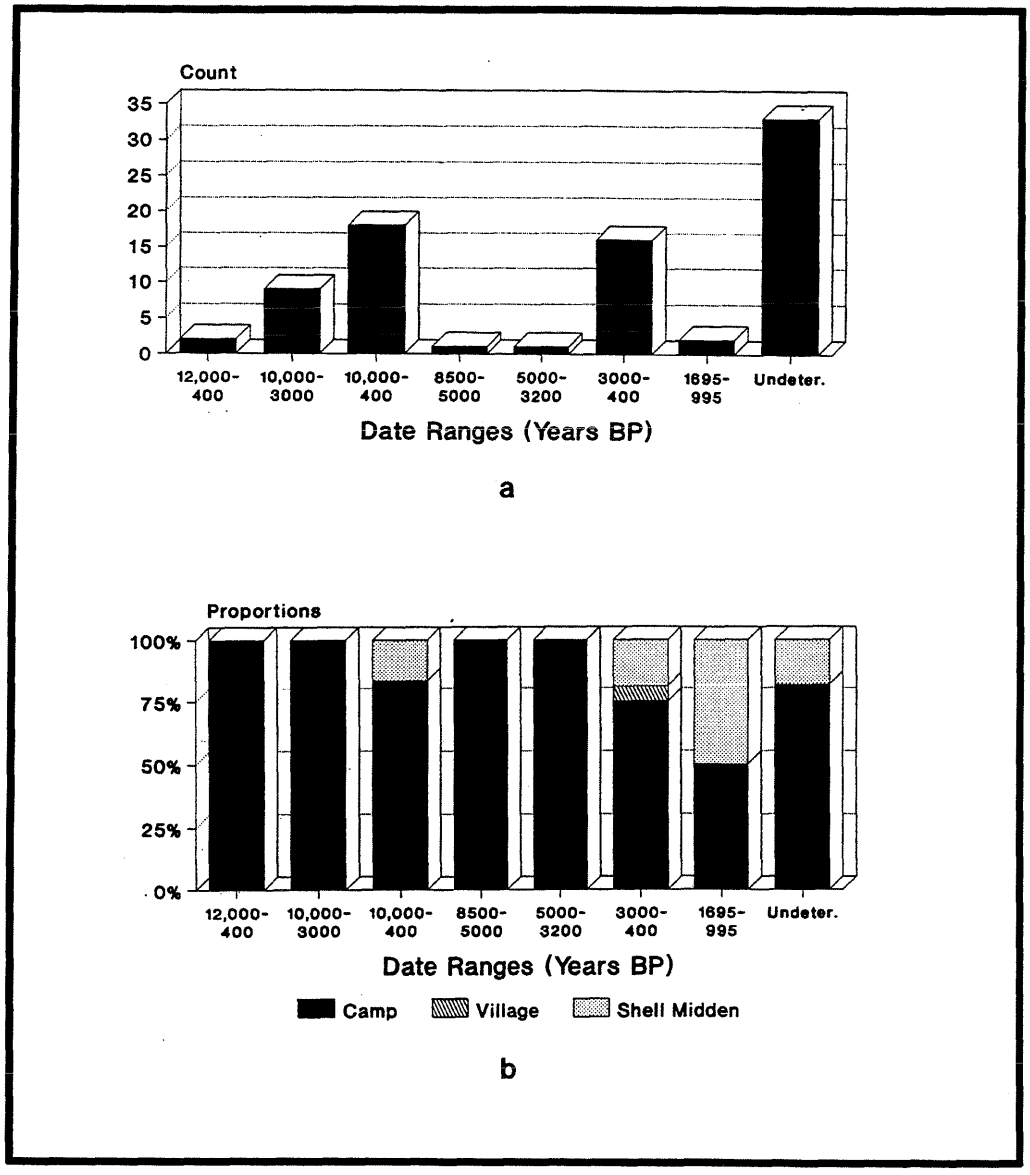

Figure 46. Summary of prehistoric sites by period (a) and by period and type (b).

46a). These are followed in order of frequency by Archaic and then Paleoindian sites. Actual expectations with respect to frequency of components in submerged areas should be different. Certainly Archaic and potentially Paleoindian sites should be more common than Woodland sites, since now-submerged areas were available for habitation only at these times.

Paleoindian Sites

Two (2%) prehistoric sites are reported to have Paleoindian components, but they are also multicomponent sites with occupations that extend up to the time of European contact (see Figures 45 and 46). Both are classified as camps, one located in Mathews County and the other in Northumberland County on the western side of the bay. The diagnostic items at both sites are fluted points of fine cryptocrystalline materials found on active beaches, presumably eroded from the adjacent intact soils. The Mathews site is being eroded from a low-lying area blanketed in places by marsh. It is difficult to state accurately what the topography was like in the late Pleistocene, but it does not appear to represent a headland of the kind described by Custer (1989). The Northumberland site location could have been a prominent landform. Both sites directly front the bay and probably overlooked the now-submerged Susquehanna River valley.

Archaic Sites

Archaic components (n=31) are much more common than Paleoindian components, as they occur at 38% of all prehistoric sites (see Figures 45 and 46). Site records often do not present sufficient information to determine specific Archaic periods, but some details are evident. Only 10 of the sites date strictly to the Archaic period, between 10,000-3000 B.P., with one of these datable only to the Late Archaic period and another only to the Middle Archaic period. Two of the components occur on sites with both Paleoindian and Woodland components, and another 18 occur in conjunction with Woodland occupations.

Surmising the precise site type represented by the Archaic components is complicated by the presence of other occupations. All of those with date ranges limited to the Archaic period, however, are classified as camps (see Figure 46). Among those with date ranges that extend into the Woodland period, there are also shell middens, but these are features that likely postdate the Archaic period. The absence of Archaic middens is consistent with models for the period based on terrestrial site data. Base camps are notably lacking, however, among known terrestrial sites and the shoreline sites in this sample. Alluding to the context discussion, it is not inconceivable for these kinds of sites to lie offshore in permanently submerged areas.

Archaic components show variation in density from location to location, again reflecting biases noted earlier. In the Eastern Shore region, they outnumber Woodland components 1.4:1, but in the Northern Coastal Plain the reverse is true, with Woodland components predominant at the ratio of 1.5:1; in northern Virginia, they occur in equal proportions. The numbers of Archaic sites relative to later sites is more balanced when viewed within drainages. In fact, they are essentially equal for all waters except the York River, where Woodland sites outnumber them 2.3:1. The contrasts in numbers of Archaic sites between drainages is almost certainly due to survey emphasis.

Woodland Sites

The number of sites with Woodland components (n=38) increases, in turn, over the number with Archaic components (see Figures 45 and 46). Just over half (53%) of the sites with Woodland occupations also have components dating from earlier periods. Of those dated only to the Woodland period (n=18), the occupations (based on the information available) tend to span the entire temporal range. Two sites are noted as dating specifically to the Middle Woodland period.

The sites with Woodland components exhibit the greatest variety in types (see Figure 46). Overall, camps (80%) are the most common site type, followed by seven shell middens and one village. At least some of the middens are potential village or base camp sites, but others are described as small, low-density scatters. The one village site in the city of Hampton is given a date range spanning the Woodland period. With respect to site type, the Woodland sample is probably quite representative of the submerged sites of that period. Most village sites were probably purposely situated on well-drained sites to the extent that the relatively minimal rise in sea level since the end of the Middle Woodland period has not been great enough to actually inundate them. This cannot necessarily be assumed as true of more impermanent, procurement sites, especially those established for procurement of estuarine resources.

The locations of Woodland sites is variable just as is true of Archaic sites and for the same reasons. Referring to the discussion of Archaic component distributions, the general nature of the pattern is similar only with the relative proportion reversed in certain areas. In short, Woodland components are the most common in the Northern Coastal Plain, while on the Eastern Shore Archaic components are more abundant. They are also more common in the York River drainage, while in others they occur in comparable numbers with Archaic components.

Undetermined

The category of temporally "undetermined" prehistoric sites bears discussion if for no reason other than the fact that it contains more sites (n=33) than those of known age (see Figure 46). Reasonable effort was made to reduce the number of sites in this category by carefully reviewing lists of artifacts for diagnostic items and seeking information from sources other than official site forms. Even so, the number remains substantial simply due to unevenness in the quality of information, the level of investigation, and the low density and visibility of many of the sites.

At one level, it would seem safe to assume that the majority of sites in this group are typical "lithic scatters" that represent small procurement sites. It would be a mistake, however, to make this a working assumption until field checks are completed. There is a chance that some in this category are scatters deflated from terrestrial sites or represent material transported by water from the original deposit. Six of this group are shell middens and as such are representative of more specific activities. There appear to be no significant patterns or bias in the distribution of "undetermined" sites by region or drainage.

Summary

The facts concerning the current official record of submerged prehistoric sites are generally clear enough, but some observations merit emphasis since they have bearing on the utility of the current sample and will figure ultimately into management recommendations.

1. Considerable sample bias is evident. At one level, it simply reflects variation in the intensity of fieldwork from region to region, county to county, and drainage to drainage. It is worth noting again as an example that the York River and York County have considerably more recorded sites than any other county or stream The Atlantic Ocean/Eastern Shore area has, in contrast, a frightfully low sample given the extent of area encompassed.

   On another level, the composition of the sample in terms of temporal components contradicts intuitive/modeled expectations of submerged prehistoric sites. The current sample contains slightly more Woodland components than Archaic at a ratio of 1.2:1, "undetermined" age sites notwithstanding. Paleoindian sites are very rare and occur relative to Archaic and Woodland components at the ratio of .03:1. According to realistic models that take into account the rate of sea level rise relative to component age ranges, the basic expectation would certainly be for Archaic sites to significantly outnumber Woodland sites and potentially for Paleoindian sites to be represented at a much higher relative frequency.

2. Related to the first issue is the paucity of truly submerged sites in the present sample. The reasons, of course, are not mysterious: (a) it is difficult to locate sites due largely to water conditions, (b) searches for prehistoric sites are not elements of traditional local underwater studies, and (c) submerged areas are not routinely the subject of compliance-oriented surveys. There is all likelihood, however, that systematic surveys with this goal in mind would mean great strides toward rectifying much of the current bias, and suggestions will be offered in the concluding chapter.

Known Historic Resources

General Observations

For purposes of analysis, the submerged cultural resources of the historic period (n=177) may be classified broadly into six groups (Figure 47). The largest category of identified resources comprises "watercraft" (27%), which includes all types of vessels intended for water transport regardless of size, stage of completion, or cause of inundation. The second largest group of identified resources, "maritime support facilities" (17%), consists mainly of the submerged remains of waterfront structures (such as piers, docks, wharves, warehouses, and ferry landings) and channel

alteration or enhancement devices (e.g., sluices, wing dams, and canals) intended to improve navigation. "Road/Rail-related" (12%) pertains to methods of conveyance other than waterborne transport and generally consists of bridges, fords, and river crossings. The "domestic" category (5%) embraces mostly inundated dwellings, but also includes terrestrial sites such as temporary or seasonal camps, wells, storage and production areas, and cemeteries.

The "other" category comprises site types that represent less than 5% of the total. Although few in number, the sites that constitute the balance of the "other" class are not without interest. They include, for example, the moat surrounding Fort Monroe (44HT27), portions of two forts from earlier periods (44PG16 and 44PG65), a nineteenth-century hotel (44NH181), a mine (44PO98), and a hunting camp (44VB148). Collectively, these sites illustrate the variety and geographical diversity of cultural resources that can fall under the "submerged" heading. (Just as they apply in the prehistoric site sample, at least some of the fish weirs of unknown age could be historic features.)

The fact that the "undetermined" group constitutes the largest category of all (35%) epitomizes the difficulty inherent in the identification and classification of underwater resources. Many magnetic or sonar anomalies have been identified as sites solely on the evidence of ambiguous remote sensing data, a procedure that has resulted in survey biases discussed in greater detail below (see section entitled "Quality of the Data Base"). The more fundamental and enduring problem, though, is that submerged sites are, quite simply, difficult to distinguish even under the best of circumstances. In Virginia's tidal waters, where teredo worms (marine borers) thrive, wooden vessels and structures of any antiquity generally survive only to the extent that they become submerged in an anaerobic environment of mud or silt. The portions of these sites that are visible to divers in the region's typically murky waters or, in the shallows, to observers from shore at low tide commonly are decayed and limited in extent. Trained investigators, let alone uninstructed lay persons, often experience considerable difficulty in attempting to identify such partial and decomposed remains.

To the degree that identification has been possible, however, the available data generally confirm the reliability of historic context as a predictor of the location and relative preponderance of the various site types. It comes as no surprise, for example, that the vast majority of historic sites are situated in the Northern Coastal Plain and Eastern Shore regions (see Figures 40 and 41). In addition to containing more shoreline and water surface area than any others, these areas also boast the longest histories of settlement and commercial activity in the commonwealth and, indeed, the nation. Even after the colonial period, the Northern Coastal Plain remained, and continues to be, the state's commercial and population center.

Similarly, the geographic distribution of sites by function generally corresponds to regions suggested by historic context and local topography (Figure 47). Thus, the great majority of watercraft sites are found in the eastern, most aqueous part of the state (specifically, the Northern Coastal Plain and Eastern Shore); canals have been identified mainly in areas above the fall line in the northern and southern Piedmont and southwest Virginia; and, although it comprises only 3% of the state's total submerged cultural resource inventory, the northwestern, or Valley, district contains a significant number of bridges, fords, and river crossings critical to the extension of transportation networks in that region during the historic period.

While the general location of site types largely conforms to the patterns suggested by history and geography, the total inventory of underwater sites is woefully deficient compared to the number and variety of sites that documentary sources indicate must exist. The data regarding historic context attest to the presence of submerged sites from periods, in places, and of types for which there are no or few archaeologically confirmed examples. Figure 48, a portion of a late eighteenth-century nautical chart, depicts various shoals in the lower bay and along the lower Eastern Shore that were notorious for snaring vessels that wandered off course or were cast away in storms (Middleton 1984:56). Yet, remarkably, the current inventory contains virtually no watercraft sites in these or any other areas of the bay or the Atlantic Ocean for any historic period (Figures 49 and 50).

Equally revealing is the chronological distribution of watercraft sites as depicted in Figure 51. Note that the time line begins at 1700, which is to say that for all the dozens, hundreds, and perhaps thousands of wrecks that must have occurred in the colony during the seventeenth century, not a single one (with the possible exceptions of some dugout canoes) has been located.

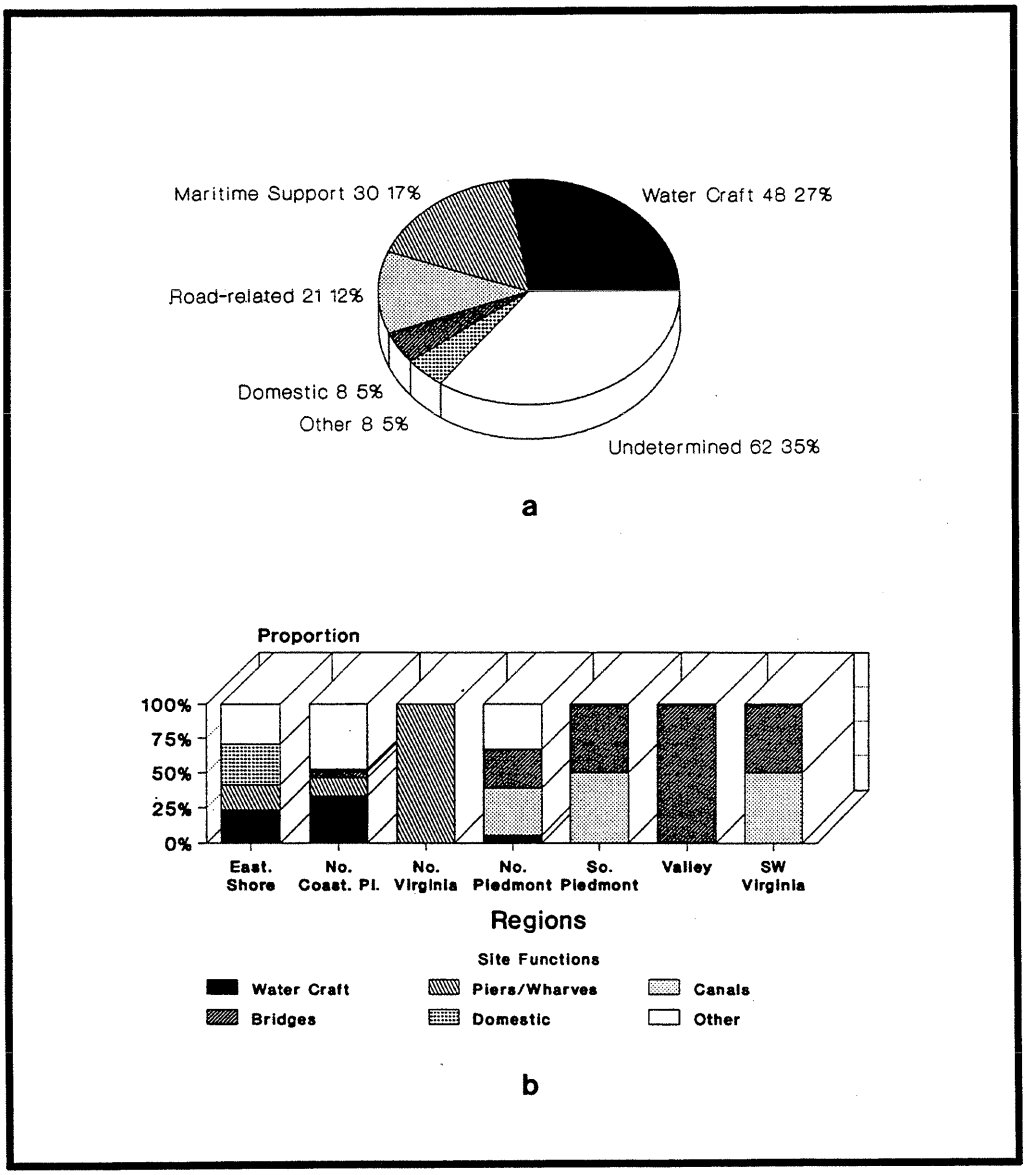

Figure 47. Summary of historic sites by group (a) and historic site functions by region (b).

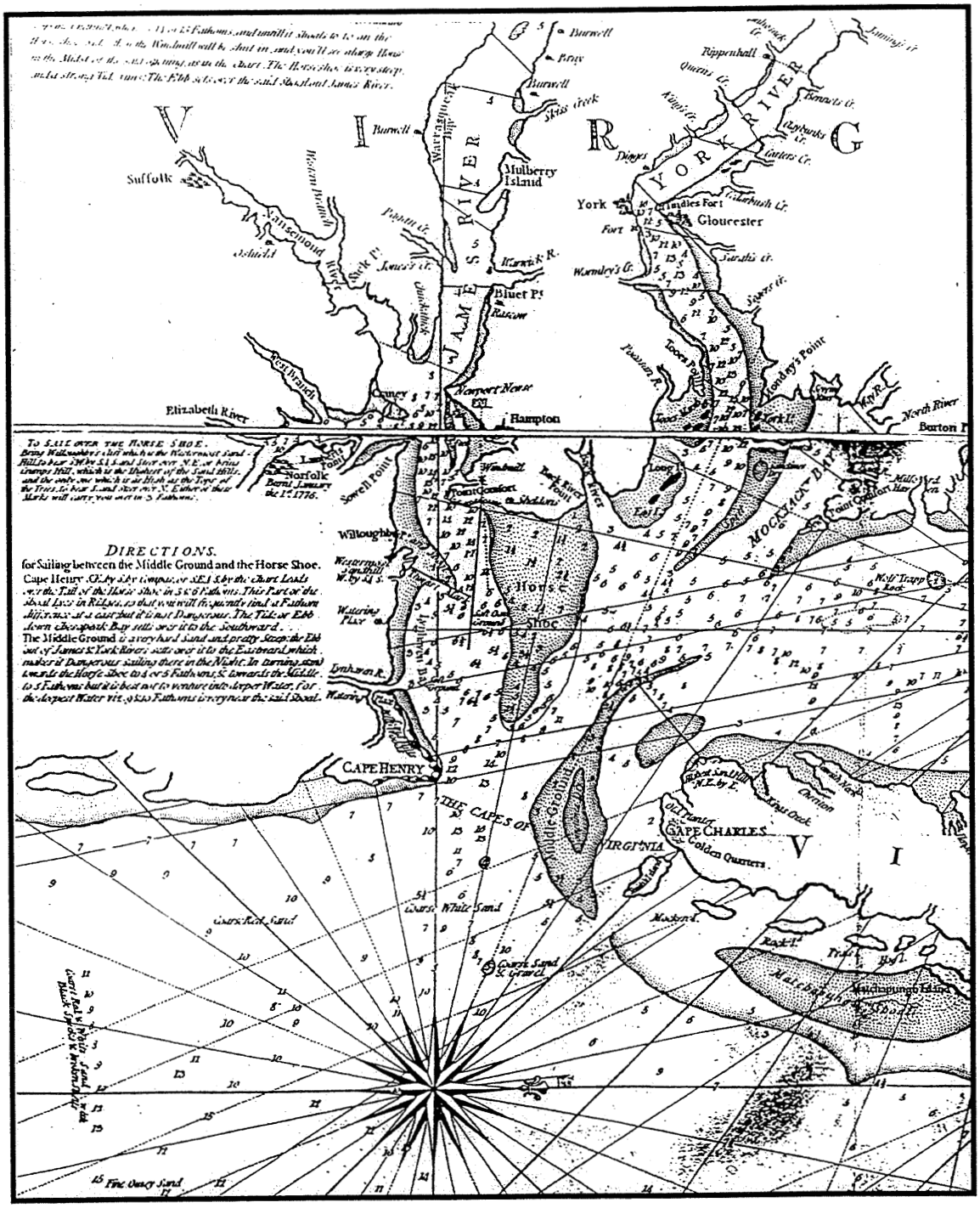

Figure 48. A portion of Anthony Smith's New and Accurate Chart of the Bay of Chesapeake, drawn in 1776 (Middleton 1984:79).

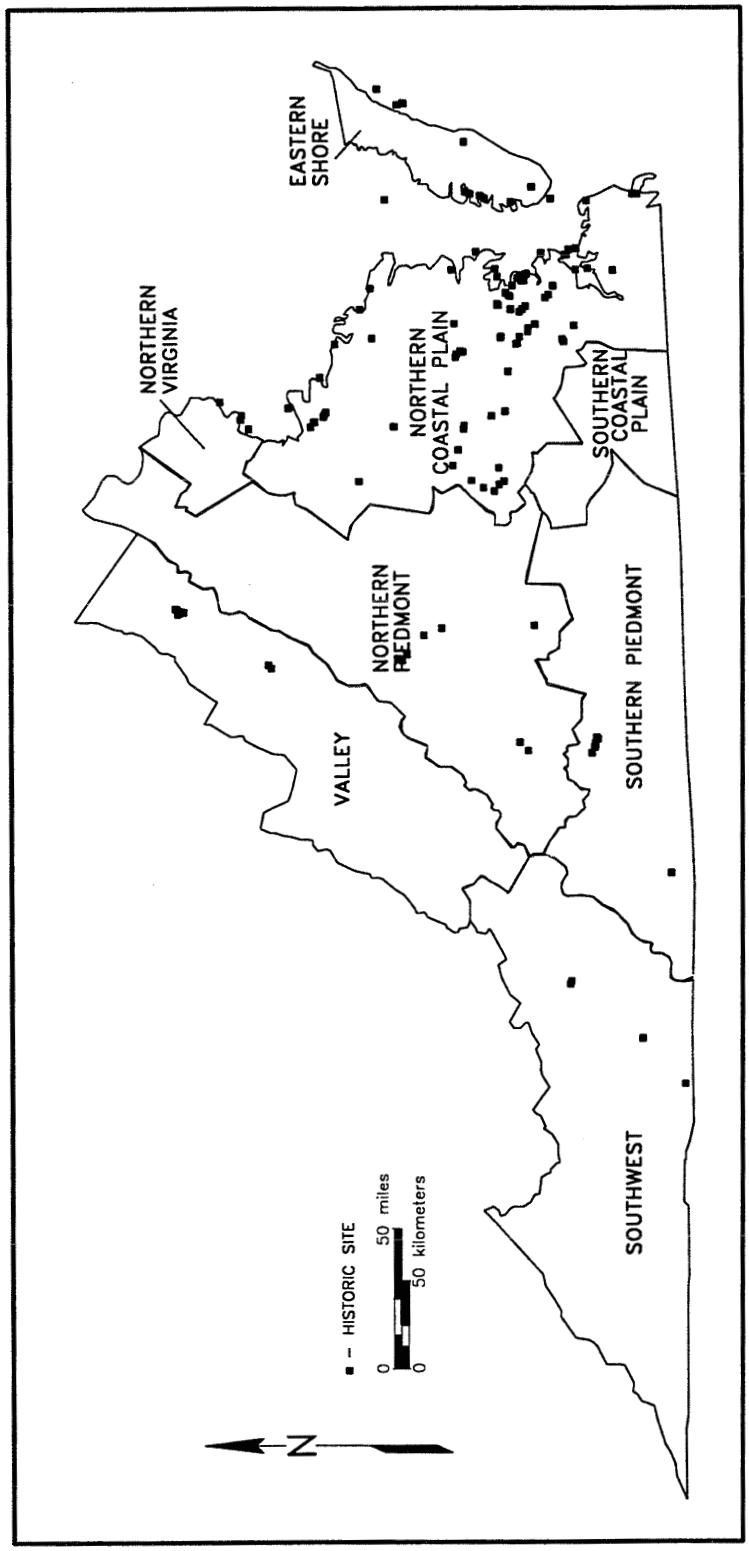

Figure 49. Regional distribution of historic sites.

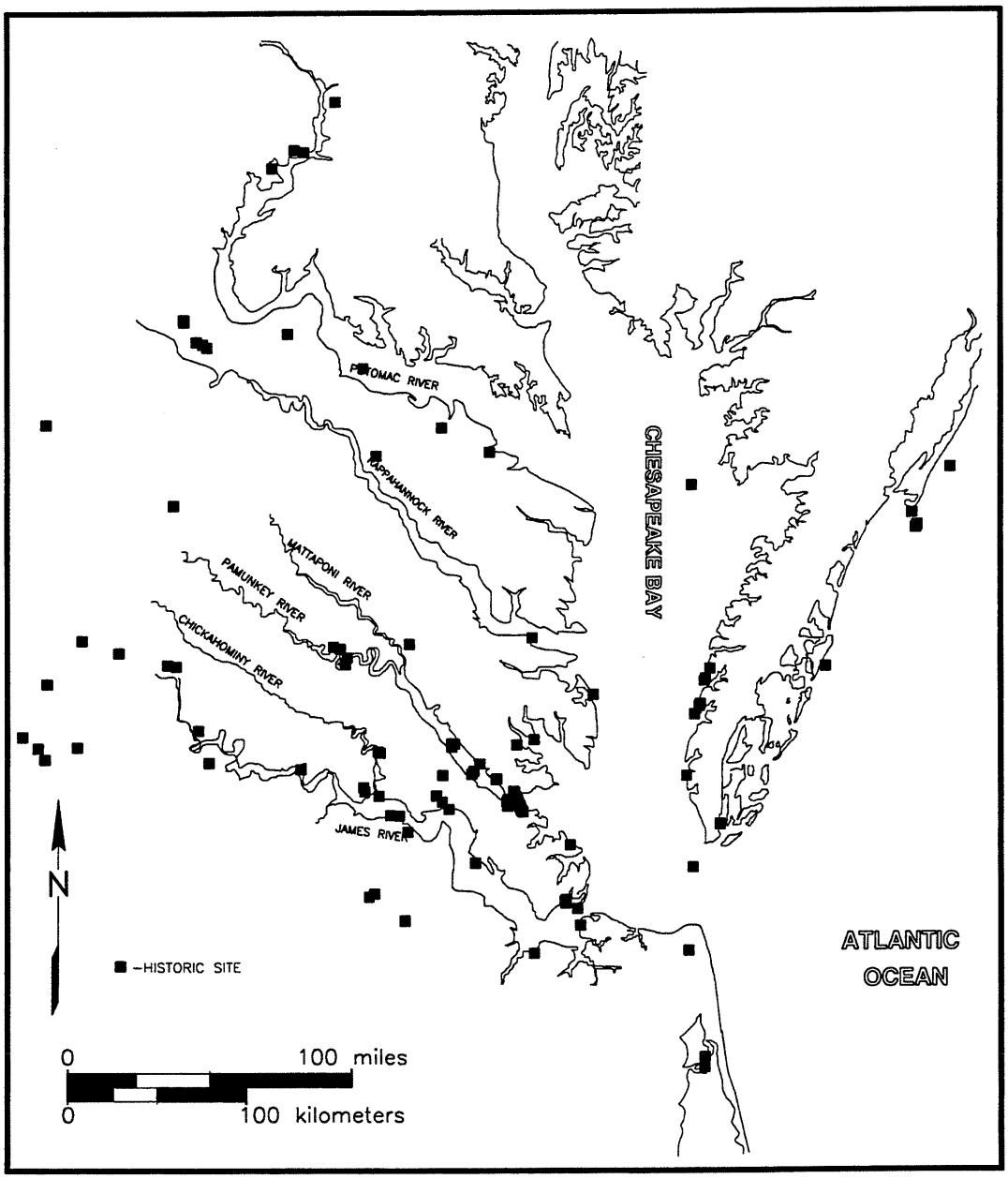

Figure 50. Distribution of historic sites in the Coastal Plain.

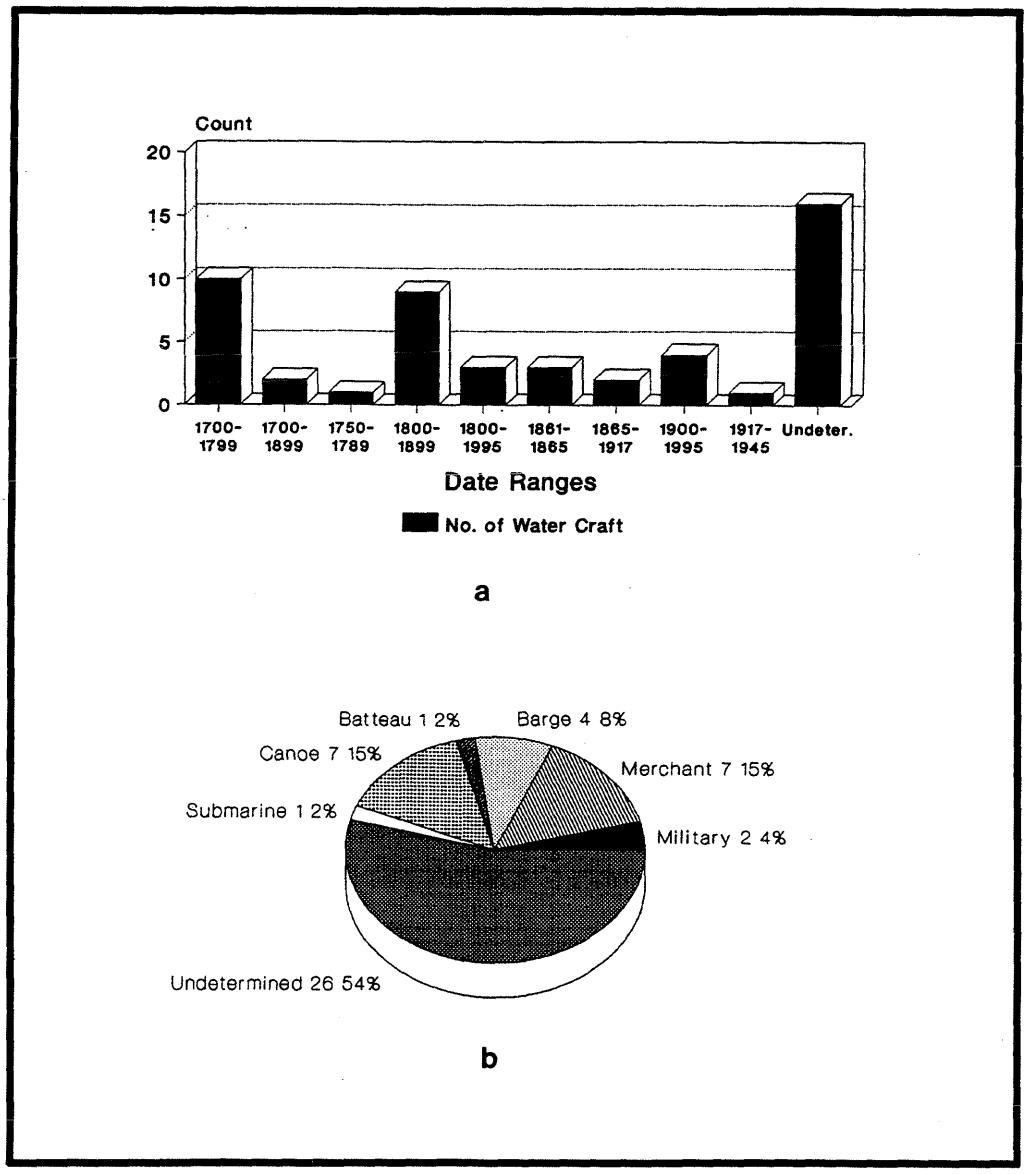

Figure 51. Summary of historic water craft (a) by period and (b) by type. (Watercraft dated from information on site records.)

Moreover, although the chart might appear to suggest that the eighteenth century is well represented throughout, in fact not one vessel in the inventory can be demonstrated to have sunk before the Revolution.

Figure 51 also manifests a comparable inadequacy in the comprehensiveness of the inventory in terms of vessel types. The index of sites includes no craft that were instrumental in the settlement of the region during the colonial period. Nor does it contain (with the possible exceptions of the merchant ships at Yorktown) any ships known to have participated in the tobacco, West Indian, slave, or coastal trades before the Civil War. Also essentially unrepresented are any of the specific types that were developed in or distinctive to the region, such as Virginia-built schooners (pilot boats), bugeyes, pungies, or skipjacks. Lastly, there are no archaeologically documented sites related to early steam navigation or, excluding the CSS *Florida,* that demonstrate the transition from sail to steam.

Quality of the Database

Some of the deficiencies and imbalance in the inventory reflect problems or biases in the database. Figure 40, for example, indicates a disproportionate number of sites in the York River. The explanation has less to do with an abundance of resources in the tributary—although it is certainly a fertile area in that respect—than the reality that, archaeologically speaking, the York River constitutes the most extensively surveyed body of water in the state.

In addition to the wreck sites identified during the Yorktown Shipwreck Archaeological Project, Figure 52 indicates suspected sites recorded along two corridors representing proposed bridge crossing alternates. The fact that these are labeled "potential" as opposed to "confirmed" shipwrecks is significant. Most of these sites were so designated exclusively on the basis of remote sensing data without the benefit of firsthand investigation. While the possibility cannot be discounted that all the anomalies actually represent shipwrecks, neither can the contrary supposition. Without direct confirmation, the identification of these targets as archaeological sites must be regarded with some skepticism.

Until such time as they are confirmed, the presence of such "sites" in the database skews analyses of the information in favor of both a particular body of water and the vessel type classified as "undetermined." When these anomalies are removed from the database, a different picture emerges. Though still significant, the percentage of York River sites decreases from 30% of the state's total to 14%. The number of "undetermined" sites declines from 49 to 19.

Analysis of the inventory further indicates that, overall, the quality of information in the database is unrefined with respect to both date and type. Significantly, the largest categories in Figure 51a are the vaguest, those covering the entire eighteenth and nineteenth centuries and, biggest and most nebulous of all, "Undetermined." Similarly, "Undetermined" accounts for the majority of sites in Figure 51b.

To a great extent, this ambiguity may be attributed to the difficulty, mentioned earlier, of identifying submerged sites by function or age, particularly on the basis of investigations that proceed no further than the reconnaissance level. But another explanation reflects the wide disparity in the quantity and quality of information that exists for various sites and the manner in which sites have been designated. Some sites have been documented extensively, both in terms of on-site recording and historical background research. Others have never been verified, however, either because they were projected from maps or historical accounts, or recorded exclusively on the basis of remote sensing data. Consequently, while many sites have been cataloged on the strength of detailed observation, recording, and research, others have been designated merely on the grounds of informed speculation.

In terms of temporal and functional comprehensiveness, the inventory may be characterized as patchy at best. As indicated above, many periods and vessel types are totally unrepresented. A fair number of ships associated with the Revolutionary and Civil wars have been identified and investigated, but few other eras are well or clearly represented in the aggregate.

Topographically, the distribution of sites is uneven as well. Figure 50 demonstrates that most sites in the inventory have been identified in shoreline or near-shore areas. Many of these resources have been recorded as a consequence of random observation or, in the course of archaeological work on land, as submerged components of what are essentially terrestrial sites. In either circumstance, the

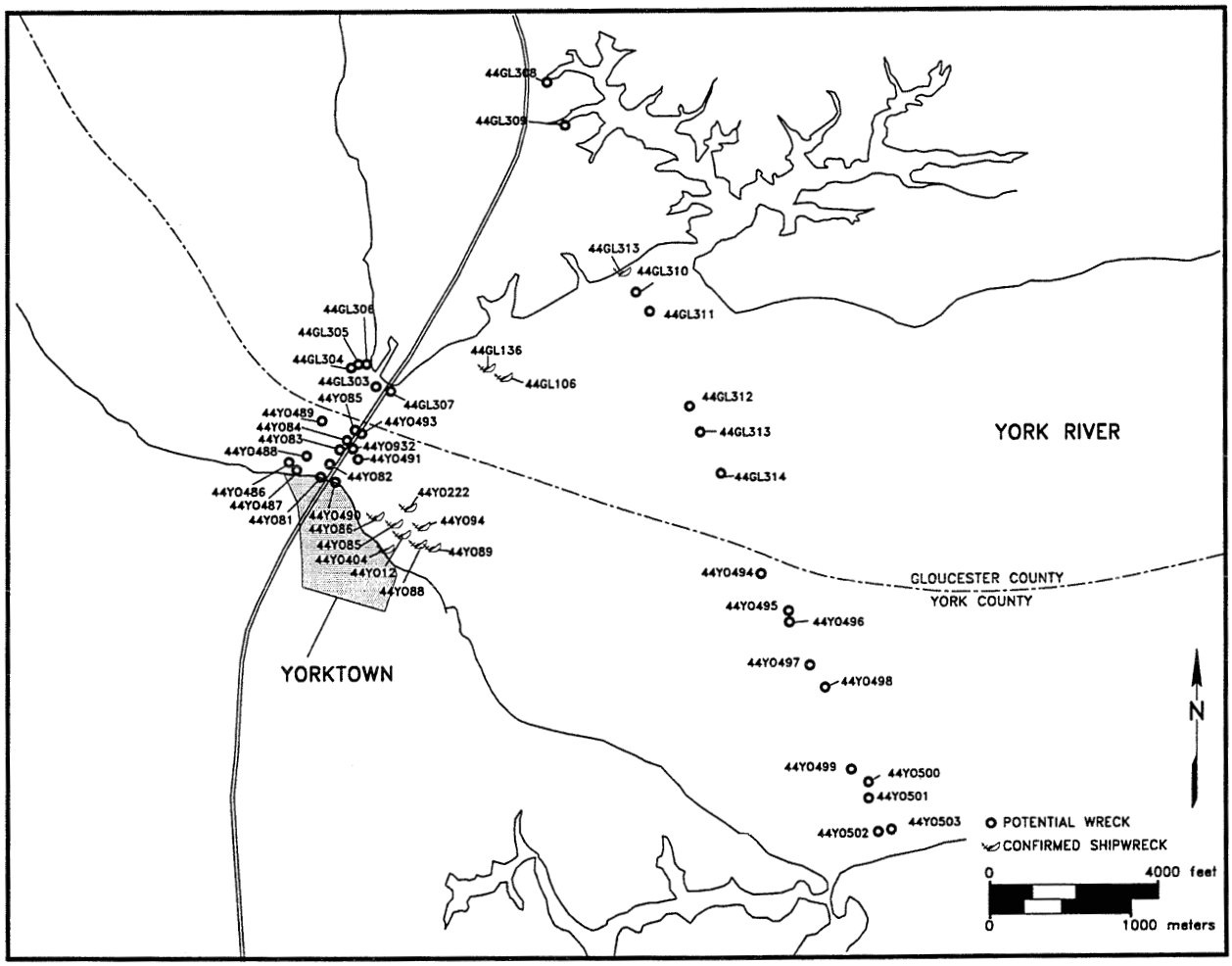

Figure 52. Distribution of known sites in the York River near Yorktown.

discoveries or identifications have been largely accidental or incidental, not the results of investigations designed to detect submerged resources.

In fact, no body of water in the state, including the York River, can be said to have been surveyed systematically and comprehensively. The virtual absence of archaeologically confirmed wreck sites in those portions of the Chesapeake Bay and Atlantic Ocean that lie in Virginia waters attests to the reality that little survey work has been conducted in these areas; that historical data have not been applied to them; and that informants, specifically watermen, are not providing DHR with the benefit of their knowledge concerning site locations.

Threats

Submerged sites are no less threatened than terrestrial sites, but often the nature of the threats is very different. Without field examination, which was beyond the scope of this project, their assessment must necessarily be general in scope and risk stating the obvious at times. The nature of potential or known threats that can affect prehistoric versus historic sites in the present sample often appears distinct, and the following discussion is structured accordingly. It is our suspicion that this distinction is reflective of sample biases, however, and as the prehistoric records expand into offshore areas the contrast will become largely irrelevant.

Prehistoric Sites

The single greatest threat to prehistoric sites in this sample is shoreline erosion; 66 (75%) of the known sites are explicitly listed as suffering from erosion. In this case, the concern is for sites that are now undergoing the process of inundation, although the effects have acted on all habitation sites that lie underwater. Erosion is presently of paramount concern since the vast majority of the known prehistoric sites are situated along a shoreline. The process is a natural one over which we have little control, even though human activities can exacerbate the problem in places. Naturally, rates of erosion vary according to factors of topography, soil type, and wind direction/exposure. In Virginia, the rates of erosion in the Chesapeake estuary vary from 0.2–1.7 yd.^{3}/ft./year but average about 0.8 yd.^{3}/ft./year. The effects are worse where relief is the greatest, as cliffs and bluffs are more subject to damage from undercutting and subsequent collapse. Even in low-relief areas, where most of the sites included here are found, erosion has a distinct leveling effect, and at least the upper 30 cm can be expected to be truncated and reworked.

Vandalism is another clear threat to many prehistoric sites, but at present is limited almost entirely to those at the shoreline; this is equally problematic along freshwater streams and in artificial impoundments. There can often be expected a direct relationship between the degree of exposure from erosion and the attention from vandals. Erosion acts to expose the sites initially, and the constant reworking of beach deposits makes daily collection profitable. Sites 44NB165 and 44NB166 were specifically noted as heavily collected beach sites. Of course, casual collecting by avocational archaeologists is relatively harmless, especially when they are willing to report find locations, but the exposures can also reveal rich, intact deposits to less scrupulous collectors that are willing to loot them. Truly underwater sites are not threatened in this way.

Commercial fishing methods that disturb bottom sediments pose a potential threat. Possibly worthy of closer monitoring in this regard would be trawling, dredging, and tonging activities. Two factors act to mitigate much of the potential effects of these activities, however. One is the expectation that most prehistoric sites that retain intact deposits are buried by a mantle of redeposited sediment that resulted from the leveling effect of transgression. In that tonging and dredging disturbances are largely superficial makes them a low-level threat. The second and related factor is the lengthy history and intensity of fishing with these methods in Virginia waters. They have been such a vital element of the fishing industry of the region that the eventual effect has been to produce a "tong/dredge zone" analogous to a plowzone in most terrestrial settings.

Channel maintenance is also a potential concern, but gauging the effects with examples and reliable information must await focused investigation. Only one prehistoric site is reported to have suffered from dredging to date. Suffice it to say, dredging either new or old channels removes massive volumes of bottom sediment, often from areas in or adjacent to submerged stream channels. It is precisely these areas that have high site potential and this degree of bottom disturbance that potentially will disturb the most significant sites.

Historic Sites

Unlike submerged prehistoric sites, for which the natural force of erosion constitutes the greatest threat, historic sites, especially shipwrecks, are most endangered by human agents. In some cases, the damage done is accidental or incidental. Because shellfish often strike on wreckage, tonging for clams and oysters undoubtedly, though not always intentionally, adversely affects the integrity of many underwater sites. Marine construction also has negative impacts. It seems likely, for instance, that resources associated with the Revolutionary War siege of Yorktown were damaged or destroyed during construction of the Coleman Bridge and offshore facilities at the Naval Weapons Station. More recently, one of the line of scuttled ships along the Yorktown beach, 44YO94, suffered damage when a large concrete piling for a cruise ship mooring "dolphin" was inadvertently dropped through it (UAJV 1985a:7).

Sometimes damage to submerged historic properties occurs as a result of simple ignorance regarding the significance of the resource that is being destroyed. In 1939, for example, the *Richmond Times-Dispatch* reported that "tons of dynamite" were used in a federally funded dredging project to deepen the James River channel in the Drewry's Bluff area. The presence of wrecks from the Confederate James River Squadron was known, but hardly anyone seemed concerned about

the damage the vessels might suffer. In fact, it was the dredgers' specific intention to "blast those buried ships into a million splinters" (Jones 1939:8; Margolin 1994). Even a half century ago, though, when historical preservation was much less a part of the national consciousness than it is today, at least one enlightened individual—in this case, the reporter who covered the event—realized that "the tiny bits of historic old ships left by mighty dynamite charges have no story to tell when they rise to the surface" (Jones 1939:9; Margolin 1994).

Even when the presence of significant historic resources is well documented, there is no guarantee of protection from damage by human activities. Environmental and historic preservation legislation in place since the 1960s and 1970s requires federal agencies to take the effects of their projects on cultural resources into account, but does not require that those resources always be protected. Nor does the review process always work as intended. Activities in which the action itself is not expected to affect historic resources are often exempted (by agreement or simply in practice) from review. In 1993, it was assumed that maintenance dredging of an existing channel in the area of well-documented Civil War resources in the James River near Drewery's Bluff would not cause further damage than had already been caused. This assumption was proven incorrect when efforts to clear channel obstructions in advance of dredging resulted in removal, displacement, and partial destruction of several large components of vessels apparently from the Civil War era (*Daily Press* 24 March 1993). This instance required all agencies involved in environmental reviews to rethink that assumption and to review habitual maintenance dredging as well as dredging new, wider or deeper channels.

Even when destructive operations such as these do not take place before actual sediment removal, the assumption that dredge heads burrow no deeper and remove no more sediment than the previous dredging procedure must be regarded with skepticism. Moreover, the secondary sloping effect of channel dredging, which can expose or undercut resources closer inshore, must also be taken into account (see, e.g., UAJV 1983:48–49, 95). In the future, commercial pressures to dredge in order to expand port facilities and deepen ship channels will pose a continuing and likely increasing threat.

A more insidious and, potentially, equally damaging threat involves the looting of historic wreck sites for personal collections or sale on increasingly lucrative naval, maritime, and Civil War antiquities markets. The few documented examples undoubtedly represent only the tip of the proverbial iceberg as far as the true proportions of statewide plundering of submerged resources are concerned. Ironically, it was the looting of one of the Revolutionary War vessels at Yorktown, the Cornwallis Cave Wreck (44YO12), in the 1970s that spurred state officials to pass an underwater (and subsequently, terrestrial) antiquities act to protect the Commonwealth's cultural resources.

In 1989–1990, private preservationists took the initiative to protect significant Civil War shipwrecks once again, this time against the depredations of Civil War relic hunters. Following the archaeological discovery of the *Cumberland* and *Florida* in 1981, some clammers began tonging the sites for artifacts to sell to collectors. A few of the objects were advertised for sale in national magazines. Members of the CNHS noticed the ads and alerted the FBI, which raided two antique dealers and confiscated the looted property. Federal indictments led to the first convictions ever in the United States on charges of plundering submerged historic sites (*Daily Press* 1990a, 1990b).

Largely overshadowed by the urgent dangers posed by human agents, the threats to submerged resources from erosion, scouring, and other natural forces also can be significant. The results of the Wolstenholme Towne Offshore Survey, the presence of domestic wells lying submerged off the Eastern Shore, and the foundation remains at Burwell's Landing all demonstrate the dramatic effects that shoreline erosion can have on historic land sites (Hazzard and Margolin 1979; Luccketti and Straube 1987; Kelso 1984).

By the same token, current flow and channel movement can have an equally detrimental impact on resources that have remained submerged since their initial deposition. Recent studies of previously investigated shipwrecks suggest that current flow may be having an observable effect on some of the state's most significant cultural resources. Visitors to the *Florida* site in 1993, for example, reported considerable sedimentary overburden in places where 1981 investigators indicated substantial exposure and scouring. While the apparent recent deposition may be

considered cause for optimism in the short run, the observable change over time suggests a somewhat unstable and potentially destructive environment that should be monitored regularly. Of perhaps even greater immediate concern are the Revolutionary War wrecks at the Chickahominy Shipyard site. A 1994 inspection has revealed that site components embedded in the riverbank may be on the verge of collapse due to undercutting (*Richmond Times-Dispatch* 1994).

Significance

Statements of site significance with respect to either the Virginia Landmarks Register or the National Register of Historic Places are based solely on information provided on site record forms.

Two prehistoric sites are on both the state and national registers: 44KW23 and 44KW24 (Table 2). These two sites are exposed by erosion in tidal flats of the Pamunkey River, within the boundaries of the Pamunkey Indian reservation. The sites appear to date primarily from the Woodland period. They retain the potential for intact deposits and are associated with a known Native American group. A third prehistoric site is recorded as potentially eligible for the state and national registers. Site 44FX231 is an extensive Middle–Late Woodland site that is eroding into Pohick Bay. Field observations indicate that the submerged portions of the site potentially retain intact deposits.

Historic sites are better represented in these categories. Four are recorded as potentially eligible for the state and national registers, 12 are on both the state and national registers, and one is on only the state register. (see Table 2). Potentially eligible sites are located in Northampton and Prince George counties, and the city of Newport News. The two in Northampton County are terrestrial sites on the shore of the Chesapeake Bay that could have underwater elements. Site 44NH8 is a seventeenth-century domestic midden eroding on the eastern shore of the bay, and 44NH278 is a complex consisting of a quarantine station established in the nineteenth century and adjacent World War II coastal defenses. Site 44PG16 is an eighteenth-century fort eroding into the James River. The USS *Cumberland* (44NN73) and CSS *Florida* (44NN72)—two sites of undisputed regional, national, and even international significance—are eligible for the NRHP but are not yet officially registered. Site 44NN73 is listed only on the state register; 44NN72 is potentially eligible for both registers.

The registered sites are distributed among six counties. The site in Prince George County is the seventeenth-century fortification at Flowerdew Hundred (44PG65), partially lost to erosion by the James River. The Williamsburg site represents eighteenth-century College Landing (44WB3), a former wharf complex with corduroy roads and docks. In James City County are the colonial shipyard on the Chickahominy River (44JC14) and an associated wreck (44JC50); more recent surveys have identified an additional shipwreck at the site (VRCA 1978; *Richmond Times-Dispatch* 1994). A nineteenth-century schooner in the Pamunkey River (44KW26) may yet prove to be significant, but for now it appears to be listed on the National Register merely because it lies within the boundaries of the Pamunkey Indian Reservation Archaeological District.

Some inconsistency appears to exist with regard to Revolutionary War shipwrecks discovered in the York River. Site survey forms indicate that the following vessel remains in that group have been placed on the National Register: 44YO12, 44YO85, 44YO86, 44YO88, 44YO89, and 44YO94. Site 44YO508, the remains of a colonial-era wharf, has also been registered. Equally deserving of inclusion, it would seem, are the wreck sites 44GL106 (provenience of an eighteenth-century cannon), 44GL136 (HMS *Charon*), and 44YO222 (an apparently well-preserved deep water site) and 44YO245 (the colonial wharf at Yorktown), none of which, according to site survey forms, have been placed on the Register.

Even the limited information on many of the other site record forms is sufficient to reveal that a large portion of the known sites could be determined eligible for the official registers. Until formal determinations are made, they should be given the benefit of the doubt and protected to the extent possible.

Site	Description	State Status	National Status
44FX231	Middle-Late Woodland prehistoric	Potential	Potential
44JC14	Colonial Shipyard, Chickahominy River	Registered	Registered
44JC50	18th-century shipwreck, Chickahominy River	Registered	Registered
44KW23	Prehistoric habitation, Pamunkey Reservation	Registered	Registered
44KW24	Prehistoric habitation, Pamunkey Reservation	Registered	Registered
44KW26	19th-century schooner wreck	Registered	Registered
44NH8	17th-century midden	Potential	Potential
44NH278	19th/20th-century quarantine station; World War II coastal defenses	Potential	Potential
44NN72	CSS *Florida* shipwreck	Potential	Potential
44NN73	USS *Cumberland* shipwreck	Registered	Potential
44PG16	18th-century Fort Powhatan	Potential	Potential
44PG65	17th-century fortification at Flowerdew	Registered	Registered
44WB3	College Landing	Registered	Registered
44YO12	Cornwallis Cave 18th-century wreck (YSNHD*)	Registered	Registered
44YO85	18th-century wreck at Yorktown (YSNHD)	Registered	Registered
44YO86	18th-century wreck at Yorktown (YSNHD)	Registered	Registered
44YO88	18th-century wreck at Yorktown (YSNHD)	Registered	Registered
44YO89	18th-century wreck at Yorktown (YSNHD)	Registered	Registered
44YO94	18th-century wreck at Yorktown (YSNHD)	Registered	Registered
44YO508	Wharf at Yorktown (YSNHD)	Registered	Registered

(* "YSNHD" = Yorktown Shipwrecks National Historic District)

Table 2. Summary of potential or known State or National Register sites.

CHAPTER 5:
Identification of Sensitive Areas

Introduction

Identification of sensitive areas in terms of underwater cultural resources is based on current models as much as on actual site information; this information has been provided in Chapters 2 through 4. The current records are too insufficient and subject to bias to approach the task in any other way. In this sense, the "identification" process is instead a projection or informed prediction from which to begin the process of comprehensive management.

The predictions will only go so far as to distinguish high versus low sensitivity areas. To refine the definitions further would be misleading given sample biases and general coarseness of the cultural contexts and paleoenvironmental reconstruction. A series of figures are included to show the locations of these areas.

Prehistoric Resources

The discussion of sensitive areas for prehistoric site locations will proceed on two levels. The first addresses general physical settings statewide that should be regarded as sensitive. On the other level, potentially sensitive settings are described according to temporal divisions, since there is a direct relationship between environmental/landscape changes through time and which locations are more or less sensitive in different periods.

There are certain settings that should be regarded as sensitive for underwater prehistoric sites regardless of location or time period. These settings rate highly in this regard because current models identify them as the places where the destructive effects of erosion have been relatively minimal and, therefore, where more intact deposits may eventually be found. Elsewhere, the effects of erosion are expected to have been too severe to leave significant potential for intact sites.

The most obvious of these settings, based on the current sample (75% of known sites are shoreline sites) and on direct observations, are shorelines. It is here that erosion is presently active and most severe, and where previously dry sites are undergoing the process of inundation. Naturally, this problem is most urgent in the coastal/estuarine zone, where sea level fluctuation is driving the process. Other publications (Horton and Eichbaum 1991) draw attention to the issue for other reasons (usually linked to bay quality), and several studies provide in-depth analyses of the process (Hardaway et al. 1992). The rate and effect of shoreline erosion are not uniform, such that sites along certain sections of shoreline are more vulnerable than others. Shoreline studies consistently describe the greatest rates of erosion along the south shores of rivers and the western shore of the bay that are most exposed to northerly winds. Realistically, almost no steps can be taken to eliminate this impact, since it is such a large-scale natural process. Site-specific measures may be considered for a few particularly important sites, however, such as seawalls or rip-rap. Perhaps the most pragmatic steps to take are systematic survey of the most active shorelines and sophisticated studies of the effects of the process on archaeological sites. This latter measure will lead to much better understanding of how sites were affected by marine transgression region-wide and where better preserved sites may be found.

Another sensitive area appears to be submerged terraces adjacent to flooded stream channels (Figure 53). Blanton (1994) has recently compiled information from watermen who consistently recover prehistoric artifacts from such locations (see Figures 4 and 5). Terraces above the 10-m bathymetric contour in the Chesapeake Bay support the most sites thus far. These settings include submerged spits such as those at the outlets of the Rappahannock and York rivers. There is still an open question concerning the integrity of sites on the terraces. Descriptions from watermen indicate that conditions vary from heavily deflated lag deposits to minimally disturbed mud and peat.

Most models addressing the potential for intact submerged sites in any region are unanimous in predicting the high potential for sites within submerged, sediment-filled stream valleys (see Figure 53) (Barber

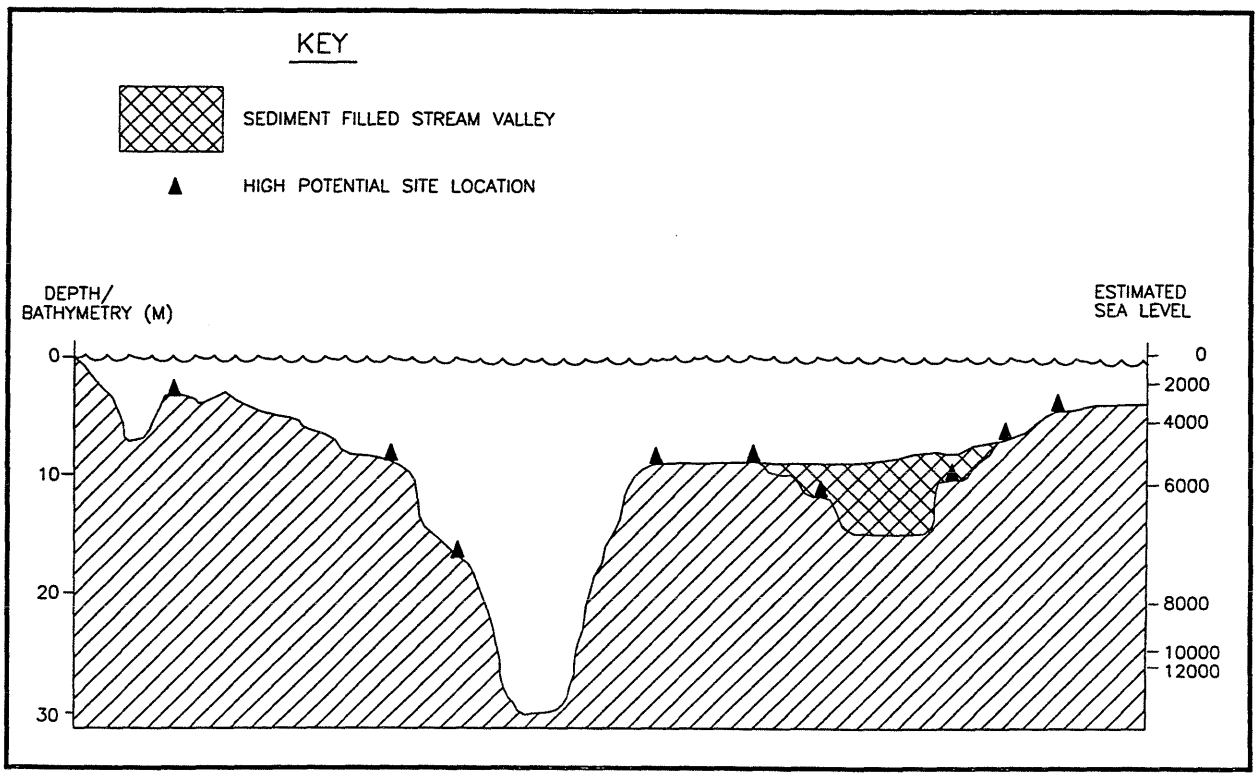

Figure 53. Idealized cross-section showing high-potential site locations.

1979; Pearson et al. 1986; Coastal Environments, Inc. 1982). Portions of the valley floors, including low terraces, are expected to have become buried by alluvially deposited sediment as stream gradients were lowered by rising sea level. Sites in these areas would consequently be protected by the mantle of sediment from severe erosion during actual inundation. Primary and tributary valleys of this kind abound on the submerged continental shelf and within major embayments. Many, however, are obscured completely by bottom sediments and can only be located by remote sensing. The principal valleys identified in Virginia waters are those of the Susquehanna and James rivers (Barber 1979; Colman et al. 1990).

The final general setting that can be considered sensitive is low-energy wetlands both on the coast and in the interior. Examples of such settings are interior swamps, tidal marshes, and sheltered bays and sounds. These areas are subject to expansion under certain conditions and in the process can cover once-dry archaeological sites. The Dismal Swamp, for example, is known to have steadily expanded for several millennia (Whitehead and Oaks 1979), as have many areas of tidal marsh (Finkelstein and Hardaway 1988). Also, the more extensive examples of wetlands probably encouraged, if not required, use of water craft to move from place to place. It is in these areas more than any other place that abandoned dugout canoes may be found in numbers. In fact, many of the reported canoes are from just these kinds of areas (McCary 1964). Finally, these areas will have the greatest promise for "wet sites" in the state. These sites were slowly inundated, and the wet conditions have acted to preserve a much broader array of organic material culture and subsistence remains than survives on dry sites (Purdy 1988). Existing geological studies or problem-oriented surveys can identify the now-obscured locations in these areas that would have been potential site locations.

Paleoindian

Truncation of submerged uplands on the continental shelf is assumed to have eroded and reworked virtually all sites of this age in those areas. Terrestrial surveys

have indicated that favored upland locations included the margins of interior wetlands and headlands at stream junctions. Heavy disturbance through erosion is also suspected to be typical of sites along now-inundated coastlines (see Figure 2).

Areas on the shelf with relatively high site potential are formerly low-lying areas, best exemplified by incised stream valleys. Extending terrestrial observations to these settings, specific locations of high potential should be buried stream terraces, elevated floodplain landforms such as levees, and the elevated rims of wetlands. Features of this kind can be expected in the filled valleys of larger rivers like the James and Susquehanna but also those of at least some smaller tributaries. Perhaps coincidental, but worthy of note, is the concentration of megafaunal fossils in proximity to stream courses (Moir 1979).

Any minimally disturbed areas flanking estuarine wetlands are also potential high-sensitivity locations. There is no strong consensus about the extent of such areas at this early period, however. At this time, they would have probably been restricted to the embayed mouths of streams near the coast. Most, if not all, of these environments would have been present on the shelf beyond the 4.8-km (3-mi.) limit defining Virginia's offshore waters.

Archaic

Archaic-period sites can be expected to occur with the greatest frequency in submerged areas over sites of other periods. Over the 7,000-year span of this period, extensive areas were still dry and available for habitation, and settlement of a wider range of settings occurred as the subsistence base broadened. Many of the upland interstream divides, however, have been heavily eroded by a transgressive shoreline just as they were during the Paleoindian period. The extent of these effects on the landscape dictates the degree of success we can expect in finding intact sites. The more promising locations, again, are filled stream valleys and lower-energy marine environments.

Recent research has documented Archaic sites on submerged terraces that formerly represented uplands overlooking stream valleys (Blanton 1993, 1994; Blanton et al. 1994) (see Figures 4 and 5). The degree of preservation at these sites remains unestablished, but at present the conditions appear to be variable.

In freshwater streams, fish weirs may have been constructed as early as the Archaic period. The sections of streams with the greatest potential for these kinds of features are shoals. Otherwise, freshwater streams hold little promise for intact sites. Sections of freshwater wetlands like the Dismal Swamp also potentially contain Archaic sites. Now-submerged elevations in the swamp may have attracted settlement at this time, especially near outlets or open channels.

Woodland

Areas in coastal regions with the highest potential for Woodland sites are near-shore settings, since only these locations were exposed during the span of this period. This study and other research have identified very few truly submerged Woodland sites. Most are known from shoreline exposures. They are likely also present just offshore, but because sediment and water obscure them from pedestrian collectors and the waters are too shallow for watermen, they are seldom identified. Occasionally, truncated features come to light at such sites including burials and pit features (Blanton et al. 1993; Fuchs 1994). These locations are vulnerable to damage from waterfront construction such as piers, groins, and seawalls.

Freshwater streams and wetlands also have some potential for Woodland sites, although they are seldom identified. Shoals in streams are the most obvious locations based on the relatively common occurrence of fish weirs. The other documented kinds of "sites" are finds of dugout canoes in Coastal Plain wetlands. These wetlands have undocumented potential for "wet sites," either where entire sites have been inundated, or where debris has been discarded in waterlogged areas adjacent to dry sites.

Historic Resources

Sensitive areas pertaining to historic-period sites correspond to three general categories: (1) documented sites or site groups that have received official recognition and at least nominal protection, (2) documented sites or site groups that have *not* benefitted from formal designation and protection, and (3) sites or site groups that have yet to be discovered but whose likely existence may be inferred from documentary evidence and/or hydrographic and bathymetric features in the study area.

The first group is best exemplified by the Revolutionary War shipwrecks incorporated into the Yorktown Shipwrecks National Historic District, a 6.4-km (4-mi.) stretch of the York River extending from the Yorktown bank to the Gloucester shore, with Yorktown as the lengthwise midpoint. The district was established not only to protect those wrecks already located and investigated but other sites that have yet to be discovered, including additional ships recorded as having been sunk during the Yorktown battle as well as vessels lost in the area due to storms and assorted mishaps throughout the historic period. Another officially recognized sensitive area related to the Revolution is the Chickahominy Shipyard, which includes not only sunken vessels and a terrestrial component but remnants of a launching way as well.

The second group is somewhat more varied in terms of status. It includes known wrecks, some of which have received site designations and some of which have not. All are Civil War wrecks in the James River. None have been accorded the National Register status they deserve. All are threatened. The *Florida* and the *Cumberland* together comprise a sensitive zone because of their close proximity to one another off lower Newport News. The area immediately surrounding the Union warship should be regarded as sensitive, too, because of the nature of her demise and the probable dispersing effects of subsequent salvage efforts. The *Cumberland* itself must be considered particularly sensitive since the wreck constitutes a war grave.

The entire upper James River, from Richmond as far downriver as City Point, could be deemed a sensitive area. Certainly specific locations such as Drewry's Bluff, Chaffin's Bluff, and Jones Neck, where important wrecks from the Union and Confederate James River squadrons have been both historically and archaeologically documented, must be considered sensitive. The continuing threats from channel maintenance and alteration point up the need to monitor these sites conscientiously.

The final category consists of areas that are likely to contain significant submerged resources, even where none may have been located or specifically documented as having been lost. Figure 48, the eighteenth-century nautical chart of the lower Chesapeake depicts the shoals—Middle Ground, Horse Shoe, Matchipungo, Wolf Trap, York Spit, etc.—upon which mariners of the historic period periodically grounded. Although no such sites are listed in the current inventory, they surely exist; consequently, all shallows near the main channels and entrances to the bay, rivers, and creeks should be regarded as potentially fertile. The bottom contour at which wrecks might be expected to lie cannot be predicted with accuracy, however, since factors such as the size and draft of the vessel, weather conditions at the time of the accident, and the migration of shoals over time would vary in each instance.

CHAPTER 6: Recommendations for Management of Underwater Cultural Resources

Introduction

The culmination of the assessment is represented by this chapter, as formulation of a well-founded set of management recommendations has been a primary goal from the outset. Certain key management issues have emerged through the course of the study, and these broad topics serve to organize the chapter. Priorities shift, however, depending on whether prehistoric or historic resources are under consideration, and steps are taken to make the reader aware of the differences.

Enhancing and Refining the Database

Gathering and Synthesizing Information

Two approaches for expanding and improving the database are recommended. The first entails consolidating information from another existing data reserve and could be accomplished in a relatively short time frame without an enormous expenditure of human or financial resources. The second would require a long-term commitment geared toward cultivating cooperative relationships with knowledgeable informants.

1. In 1979–1980 the VRCA commissioned two researchers, Ransom True and Robert Fleming, to conduct a literature search for the purpose of compiling an inventory of recorded shipwrecks in Virginia throughout the historic period. True was assigned the 1607–1815 period, and Fleming undertook to document the post–1815 era. The results of those efforts consist of hundreds of data sheets (one per wreck, organized alphabetically by vessel name) and a series of maps indicating the approximate locations of the post–1815 sites. The forms provide for the recording of a wealth of detailed information concerning vessel type, means of propulsion, and nationality ; captain, owner, and manufacturer; date, location, and cause of sinking; and ultimate disposition (e.g., salvaged, broken up, etc.). Some forms reflect accounts that are vague and sketchy; others contain information that is detailed, fairly precise, and quite possibly accurate.

   For all practical purposes, however, the data sheets are unmanageable in their present form. Computerization would permit sorting, storing, and analyzing the material in a manner similar to the current assessment. The addition of this information would add substantially and significantly to the database. It could provide future field investigators with information necessary to seek specific types of resources from particular periods that are absent from or poorly represented in the current inventory.

   In the short term, it would provide preservation planners additional information concerning high-potential and high-sensitivity areas as well as specific wreck locations. It is also possible that some of the Fleming and True data may correspond directly to sites in the current inventory for which little or no background information is provided. The combination of data from the historical research and existing site reports could permit preservationists to make more informed evaluations regarding the significance of particular sites without expending resources on time-consuming and costly field investigations.

2. The second, more ambitious strategy, seeking the cooperation of knowledgeable informants, would require a greater investment of time and effort and, most likely, considerable patience before it produced tangible benefits. Where this approach has been successfully employed, however, it has reaped significant dividends (Margolin 1987; Blanton 1993b, 1994; Blanton et al. 1994). Many watermen, particularly clammers, have accumulated a wealth of knowledge about submerged cultural resources based on their daily tonging or dredging of the region's river, bay, and ocean bottoms.

Unfortunately, the watermen generally have been reluctant to share this information with historic preservationists for several reasons.

Of foremost concern and the greatest challenge to overcome are misunderstandings of (1) the motives of scholars or managers acting in an "official" capacity, and (2) the potential outcome of official collaboration. Collectively, watermen see themselves as a group under siege, as market pressures and environmental degradation are seemingly conspiring to end their way of life. The level of tension in their ranks has grown as a consequence, and implementation of even the most modest official measures to preserve the fishery have met with emotional criticism. The current uneasy climate in relations between watermen and fisheries/environmental officials extends to varying degrees to other relations correctly or incorrectly construed as "official." They simply fear additional levels of regulation.

A general reluctance to freely cooperate with official cultural resource managers more recently stems from perceptions formed in the wake of the highly publicized trial of watermen charged with looting Civil War wrecks. One of us (Blanton) has observed considerable frustration and confusion among watermen over the incident. Some contacts have reported that there were watermen dumping any items tonged from the bottom that might be regarded as artifacts, in somewhat hysterical efforts to avoid prosecution! Others simply refuse to share information. Suffice it to say that a great deal of trepidation and misunderstanding exists concerning the interests of preservationists.

Under these circumstances, the single most essential component to a successful campaign to gain the cooperation of watermen is **education**. This is crucial to allay unfounded fears, to convey the true intent and reach of current historic preservation statutes, and cultivate the general interest of watermen in preserving and recording the state's heritage. Specific measures to consider are:

a) Printed leaflets and public programs, specifically targeting watermen, outlining statewide goals and their role in the process.

b) Meetings with the leadership of local waterman groups to devise a mutually beneficial strategy for collecting information.

In every case, it will be important to take a non-threatening stance. A heavy-handed approach is certain to only alienate these important constituents. A philosophy akin to that adopted for farming activities should be considered, the essence of which is that watermen routinely inflict only superficial damage to sites and that much of the impacts have long been made. A sense of partnership, reinforced with public awards and accolades, will go a long way toward achieving the ultimate goal.

Establishing Site Criteria

1. In order to refine the database and provide for greater consistency in classification, the DHR also needs to establish explicit criteria for determining which resources should be cataloged as actual sites. At present, the inventory contains "sites" that have never been confirmed or, in some cases, located. Projecting the positions of historic sites from documentary or cartographic evidence has proven to be an extremely important and potentially rewarding exercise. Nevertheless, creating at least a nominal distinction between confirmed and suspected sites would seem to be advisable for purposes of preservation planning and data analysis. Such discernment would be particularly appropriate in the case of targets identified solely on the basis of remote sensing, since Phase II investigations of such anomalies have proven to be mostly of limited or negligible archaeological value (see, e.g., Ocean Surveys, Inc., et al. 1990; Stevens et al. 1987; UAJV 1985b, 1987).

2. As our inventory of known underwater sites proceeded, it became necessary to exercise a considerable degree of judgement in determining which sites to include. It is not always clear whether a site is "underwater" or not, or more commonly the extent to which a site is

submerged. This is most true of shoreline sites (and the great majority of prehistoric sites are in this category).

To resolve many of the questions, professionals should be required and avocational archaeologists encouraged to state whether a site has, or potentially has, intact underwater elements. These assessments can be made by considering shoreline topography, a knowledge of nearby sites, and observations of beach-level conditions. The crux of the issue is whether shoreline artifacts are derived from underwater or terrestrial contexts. Their determinations should be included on site forms.

Prioritizing Sites

Beyond cataloging and classification, adequate preservation planning for submerged cultural resources will require at least two additional procedures: first, the establishment of a set of objectives and criteria for determining which types of sites should be given priority consideration and, second, the identification of specific sites, known or suspected, that meet these criteria.

Prehistoric Priorities

1. Expanding the record of underwater prehistoric sites is a clear priority, as truly submerged prehistoric sites are severely underrepresented at this time. From the current site files, only three prehistoric sites may be fully submerged, and Blanton (1994) has worked with watermen to record another 18 sites. The context prepared for this project indicates that the potential is very high in Virginia waters for such sites and that the present sample is far from representative.

   Little would be gained by too strongly emphasizing specific components or site types, since the records are so incomplete. If any components are deemphasized, they should be Middle or Late Woodland, since terrestrial samples for these periods more likely approximate the true population. Such is hardly the case prior to the Middle Woodland, when considerable portions of now-inundated land were available for habitation.

It should also be clear by now that not all underwater sites will retain appreciable integrity and, in fact, well-preserved sites may be the exception rather than the rule. This knowledge should direct any specific searches to locations that current models predict will have better preservation potential. To briefly reiterate, these areas are filled stream valleys and former low-energy marine environments.

Surveys designed to locate underwater prehistoric sites will benefit from the use of advanced remote sensing technology (Stright 1990). Sub-bottom profiling devices are crucial for locating filled channels and potentially buried shell middens. Side-scan sonar can provide high-resolution images of present bottom conditions including basic topography and surface debris. An awareness is important, however, that this technology can only serve as an aid to the search, by narrowing the areas that have better potential.

Actual site location will always require field checks and/or sampling. The option of diving on potential sites is expected to offer little return. Local coastal/tidal waters are notoriously sediment-laden and murky, especially during certain seasons, to the point that visibility on the bottom is often zero. For these reasons, remote sampling strategies will need to be devised. Large volume core or box samplers offer some potential when utilized from surface vessels, conceivably in much the same way as shovel tests. Air lifts operated by divers also can fairly efficiently open larger tests, but the manpower and cost burdens will be higher. Finally, clam tongs may yet prove to be the most efficient remote sampling technique, once modifications improve the rate of small artifact recovery. Finally, standards must be established for accurately recording the locations of tests and sites; at this time Loran coordinates seem most feasible.

Although partially submerged shoreline sites are much better represented in the current records, they deserve further consideration. First, systematic surveys of extensive, continuous sections of shoreline should be considered. These locations do not routinely fall within

compliance-oriented survey areas, yet they clearly have tremendous site potential. This kind of survey would quickly result in representative samples of sites for these areas and would be much more cost-effective to conduct than deep water surveys. Sections of shoreline that should be prioritized are those exposed to northerly or northeasterly winds and suffer from the most severe degradation (Hardaway et al. 1992). Such areas include the Atlantic coast, the western shore of the bay, and the southern shores of major rivers.

All of these sites are threatened by erosion, but this natural process is not one we can expect to directly manage or change. Only selected sites can be scheduled for effective protective measures such as rip-rapping or sea wall construction, or as a last option "mitigation" through data recovery. The sites that should potentially be considered should, minimally, have suffered little, should be eligible for the National Register of Historic Places, and should physically be conducive to protective measures. Ultimately, decisions about which sites to protect will have to be made on a case-by-case basis. A component of any shoreline studies should be a comprehensive analysis of the effects of shoreline erosion. The extent to which terrestrial archaeological deposits are impacted by inundation in different settings, either from marine transgression or lakeside erosion, will be important to understand both from a management and research standpoint.

2. It would be misleading and impractical to set firm priorities on the kinds of prehistoric sites deserving identification or research, since any information would be helpful at this point. So unlike the specific list of priorities presented later for historic sites, the prehistoric priorities have a more general or categorical character.

   a) Each of the three officially recorded submerged sites, and most if not all of the 18 sites described by Blanton (1994) deserve further investigation. Among the official sites, 44YO11 shows the greatest potential owing to its clearly submerged setting and the apparent density of artifacts. The central goal of work on these sites should be to confirm that they are, indeed, sites rather than secondary deposits and to assess the integrity of their deposits.

   b) Identification and evaluation of additional underwater prehistoric sites is a clear priority overall. The prospects for sites in the open, deeper waters of Chesapeake Bay, major rivers, and the Atlantic should be readily apparent. Approaches for identifying these sites have been described.

      The potential of shallower and more restricted wetlands is likely less obvious. In reality, these areas may prove equal to less sheltered waters in site potential. For this reason, the open water and saturated deposits of wetlands such as Dismal Swamp, fringing tidal marshes, Back Bay, and sounds or lagoons behind barrier islands merit systematic survey. In addition to sites with earlier components, these shallow water settings have the potential for well-preserved Woodland sites, including some that fall into the "wet site" category.

   c) Conspicuously rare in current records are finds of Native American water craft, namely dugout canoes. The occasional reports of their discovery confirm that they survive in Virginia waters and wetlands (McCary 1964) and in neighboring states. In most cases they are exposed in muck or peat deposits in tidal marshes. The scarcity of finds is probably a factor of difficulty in recognition and the limited exposure of unvegetated marsh deposits. Specific surveys or an aspect of general surveys should be to identify, record, and preserve a larger sample of these resources.

   d) The undated weirs in Piedmont and Mountain streams should be more closely evaluated. Samples from timbers can be dated and engineering features examined to better assess age and cultural associations.

   e) Considerations should be given to establishing statewide policy for incorporating identification and evaluation of underwater prehistoric cultural resources into compliance requirements. Intensive and large-scale activities such as dredging,

commercial dock/terminal construction, and bridge/tunnel construction significantly disturb underwater deposits and often require permits. Most surveys in advance of such projects are directed to the identification of historic resources such as shipwrecks, and not prehistoric sites.

Historic Priorities

A fundamental goal should be to preserve a representative sample of the various site types for each of the designated temporal periods. In making these determinations, basic National Register criteria regarding association with important historical events and personalities and the elucidation of historical problems still comprise useful guides in choosing, if necessary, between otherwise similar or equal resources. Thus, to present a hypothetical example, preservation planners might accord precedence to wing dams constructed by Thomas Jefferson or Confederate engineers over similar structures built by anonymous individuals for ordinary purposes.

Among the various site types, however, we recommend that, for the historic period, special consideration be given to watercraft for reasons of cultural and technological uniqueness and generally superior preservation. In contrast to terrestrial sites, archaeological examples of historic watercraft are found, with few exceptions, *only* in the underwater environment. Also, apart from the potential value or distinctiveness of specific resources, there is nothing *inherently* significant about submerged terrestrial sites. Consequently, as a rule, these resources should be judged by the same criteria used to evaluate the significance of any land site.

Two mitigating circumstances should be borne in mind, however. One is the possibility of superior preservation of terrestrial resources in the submerged environment. But the dynamics of the submergence process normally militate against such preservation. Historic land sites typically become inundated as a result of shoreline erosion in which the most destructive forces of current flow and wave action impact directly on the land at the water surface. Wave and current movement in these high-energy environments continue to affect those areas most recently exposed and may have a secondary effect of undercutting banks and bluffs (see, e.g., Hazzard and Margolin 1979; Noël Hume 1982:258–260; Trout 1993). Thus, the same forces that uncover and inundate these sites often severely damage or destroy them in the process. Situations in which historic terrestrial sites can become submerged without suffering extensive deterioration usually involve relatively quick and controlled inundation—flooding a lowland area to create a reservoir, for example—or submergence of a low-energy environment such as a marsh or other wetland where the effects of waves and currents would be minimal.

The other situation in which submerged terrestrial sites may offer special potential apart from the normal criteria is when the resources can be demonstrated to have served a special maritime-related function, as a dockside warehouse or entrepot for commerce from the interior, for instance. Such sites are exceptionally scarce in the current inventory. One of the few good examples is the remains of an eighteenth-century warehouse uncovered during excavations at the water's edge of the Burwell's Ferry Landing site (44JC40) on the Kingsmill Plantation tract adjacent to the James River (see Kelso 1984:139). In addition to the brick foundation of the structure itself, a row of wooden pilings cutting through the site offers evidence of subsequent adaptation to shoreline erosion by the construction of a wharf, dock, or pier in the same location.

In a fashion similar to domestic sites, members of the class of resources designated as "Road/Rail-related" assume no special significance when they are or become submerged. In essence, they represent mere extensions of land transportation networks that happen to cross over or through water. The principle would apply to collapsed bridges which, apart from singular historical associations, would seem to warrant special consideration only if few or no standing examples of the type were known to exist. Many others are fords or river crossings with no present evidence of structural or artifactual remains (e.g., 44MY262, 44MY263). Naturally, the special relevance of such a site to a military engagement, westward migration, or other historically significant event must be considered. The possibility that these sites may contain or be located near wreckage, debris, stores, or encampments associated with their use also must be taken into account. In the absence of such evidence or affiliation, however, the indispensability of such resources should not be assumed.

Clearly, the category of underwater resources represented by maritime support facilities is important, if only because such sites are unlikely to be discovered in other than submerged contexts. Certain factors argue against according these resources the same value, on the whole, as watercraft. Because of their location at or near the shoreline, these structures generally have been subjected to the most severe forces of erosion that characterize the land/water interface. Consequently, preservation and structural integrity normally are limited at best. Also, it is apparent that, from a functional point of view, maritime support facilities are subsidiary to the category of resources that they were intended to serve: the vessels that carried goods and people, facilitated communication, and enabled inhabitants to maintain cultural and commercial contact with other regions, countries, and continents.

Submerged watercraft also possess unique archaeological value. By now, most preservationists are familiar with the "time capsule" aspect of shipwrecks, that is, their capacity for providing unimpeachable dating contexts, maintaining site integrity, and preserving materials, particularly organic ones, that normally do not survive in terrestrial environments (e.g., Noël Hume 1969:189–190). Less well appreciated is the fact that the construction and outfitting of vessels traditionally has represented one of the highest and most complex forms of technology in seagoing societies throughout history (Muckelroy 1978:3, 230; Bass 1983:92).

Furthermore, the way vessels were built and supplied can reveal much about the cultures that assembled and utilized them. Evidence of shortcuts in construction, the use of inferior materials, or time-saving design modifications may be indicative of significant social, economic, political, or ecological changes on a local, regional, or even hemispheric level.

Lastly, historic watercraft represent a mindset, a cultural orientation that is essentially lost to us today. These vessels embody a maritime consciousness, a focus on the rivers, bays, and oceans as principal arenas of life: highways of commerce, communication, and social interaction both within the colony or state and with the outside world; sources of sustenance in terms of food that could be gathered, consumed, and/or sold; and the venue where decisive battles were fought, dreams and fortunes were realized, and disaster struck in the form of shipwreck, pirates, and invading foreign fleets. No other type of site can help us recapture this cultural perspective in quite the same way.

With these considerations in mind, we have developed a short index of individual sites and site groups from the historic period, known or believed to exist in the state, that we regard as particularly deserving of attention and/or protection. The index is organized in four categories according to the extent to which these resources have been documented historically and in DHR site survey files as well as physically located and investigated.

1. Known sites in the state site survey files, i.e., submerged resources that have been documented, located, and, at least to some extent, investigated:

   a) Yorktown shipwrecks (44YO12, 44YO85, 44YO86, 44YO88, 44YO89, 44YO94, 44YO222, 44GL136, and 44GL106). The largest, best preserved, and most extensively documented assemblage of eighteenth-century vessels on the continent. Comprises vessels sunk during decisive naval engagement of the American Revolution, including Cornwallis's flagship, merchant ships scuttled to prevent French amphibious assault, and deep-water wreck of uncertain affiliation that may be exceptionally well preserved.

   b) Colonial Wharf at Yorktown (44YO245). Known to have been in use as early as 1749, it constitutes the best known example of its type in the state. Consists of a 200-ft. long framework composed of timber cribs filled with stones. Recorded in 1940–1941 by a National Park Service official who provided rare documentation of a structure that also served as a commercial and social hub during the colonial era (Hatch 1942).

   c) Chickahominy Shipyard (44JC14 and 44JC50). At least two shipwrecks, remains of launching ramp, and foundations of small structure on land comprise elements of shipyard complex established in 1777 to construct vessels for Virginia Navy (VRCA 1978). Destroyed by British in 1781. Either of principal components—American-made Revolutionary War ships or shipyard

facilities—would qualify individually for special consideration.

d) USS *Cumberland* and CSS *Florida* (44NN72 and 44NN73). Wooden warship sunk by ironclad *Merrimack* in dramatic battle and highly successful Confederate commerce raider that stirred international controversy during and after Civil War. Both sites clearly meet National Register criteria and should be on it. Both have been looted since discovery and are demonstrably vulnerable. Sites could be monitored easily from Newport News City Hall. *Cumberland* constitutes war grave.

Two other military sites in this category at present cannot be considered as vital as those listed above, but they may prove to be significant upon further investigation: Fort Powhatan (44PG16) and a multicomponent, coastal defense/quarantine site on the Eastern Shore (44NH278). Fort Powhatan is primarily a land site but contains potential submerged Revolutionary War, War of 1812, and Civil War components offshore in the James River. The Eastern Shore site was built in 1891 and is thought to possibly contain evidence of epidemic burials or cremations from early in this century. The site also includes a World War I component apparently submerged in the Atlantic Ocean as well as relatively intact World War II bunkers and battery pedestals on shore. As the new millennium approaches, these monuments to what arguably has been most brutal century in history will assume added significance.

2. Known sites *not* in the state site survey files:

a) Civil War shipwrecks at Drewry's and Chaffin's bluffs and Jones Neck in the James River. Believed to include Confederate ironclads *Fredericksburg, Virginia II,* and *Richmond* as well as an early victim of mine warfare, USS *Commodore Jones*. Identified on basis of remote sensing verification of map projections, limited firsthand underwater observation, and probing. Threatened by Corps of Engineers maintenance dredging, plans to widen and deepen river channel, and relic hunting.

b) USS *Texas* in Chesapeake Bay. No doubt highly disarticulated but still historically significant as first U.S. battleship, first steel ship produced by Norfolk Navy Yard, participant in Spanish-American War, and target in historic naval aviation experiment.

3. Sites in the state survey files that are documented historically but have yet to be located or investigated:

a) Revolutionary War shipwrecks at mouth of Hampton River (44HT15). Recorded as having been scuttled by Americans across river channel to prevent British assault on Hampton. Vessels may have been American-made and could include specialized, local types not represented in current inventory.

b) Revolutionary War shipwrecks at Osborne's Landing in James River (44CF99). Ships destroyed by Virginia Navy to prevent capture by British forces under Benedict Arnold. May include variety of American-made vessels. Possibly covered by terrestrial sediments due to construction of Dutch Gap Canal and movement of James River channel in last two centuries.

c) Sites that have been neither located nor positively identified in state site survey files:

General:

(1) Any watercraft from the seventeenth or early eighteenth centuries.

(2) Types significant to, developed in, or distinctive to the region: e.g., Bermuda sloops, clipper/schooners, pilot boats, pungies, bugeyes, skipjacks, rams, etc. Significance should be considered with regard to whether vessel type is represented in accessible public and private collections (e.g., Mariners' Museum, Waterman's Museum, etc.).

Specific:

(1) 1667 tobacco ships sunk by Dutch in James River. Discovery might represent earliest European ships on eastern coast of U.S.

(2) *Bristow,* sunk in York River ca. late 1690s. Vessel that carried Governor Berkeley back to England to answer charges concerning his handling of Bacon's Rebellion.

(3) Ships from 1750 Spanish plate fleet sunk on the Eastern Shore. Hull remains could be substantially more extensive than those discovered in tropical waters and thus could represent abnormally well preserved remains of period Spanish warship and smaller merchant vessel.

(4) USS *Greyhound* in James River. Served unusual and distinguished function as headquarters ship for Union General Butler during Civil War. Cause of destruction, believed to be "coal torpedo," never confirmed.

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APPENDIX A

ERA	PERIOD	SITE	REGION	BODY OF WATER	PROPERTY TYPE	FUNCTION
HISTORIC	1600-1699 AD	44NH42	EASTERN SHORE	CHESAPEAKE BAY	SINGLE DWELLINGS	RESIDENCE
		44NH59	EASTERN SHORE	CHESAPEAKE BAY	UNDETERMINED	UNDETERMINED
		44NH60	EASTERN SHORE	CHESAPEAKE BAY	HOUSING	HOUSE
		44NH8	EASTERN SHORE	CHESAPEAKE BAY	UNDETERMINED	UNDETERMINED
		44SY33	NORTH. COASTAL PLAIN	JAMES RIVER	SECONDARY DOMESTIC STRUCTURES	WELL
						Total by Period: 5
	1607-1750 AD	44AC6	EASTERN SHORE	CHESAPEAKE BAY, TRIBUTARY	WATER-RELATED	WHARF
		44NH179	EASTERN SHORE	CHESAPEAKE BAY	SECONDARY DOMESTIC STRUCTURES	WELL
		44NH233	EASTERN SHORE	ATLANTIC OCEAN	HOUSING	HOUSE
		44PG65	NORTH. COASTAL PLAIN	JAMES RIVER	FORTIFICATIONS	GARRISON FORT
		44SK6	NORTH. COASTAL PLAIN	JAMES RIVER	UNDETERMINED	UNDETERMINED
		44SY120	NORTH. COASTAL PLAIN	JAMES RIVER	WATER-RELATED	PIER
		44SY37	NORTH. COASTAL PLAIN	JAMES RIVER	WATER-RELATED	PIER
		44WB3	NORTH. COASTAL PLAIN	JAMES RIVER, TRIBUTARY	ROAD-RELATED/PEDESTRIAN	UNDETERMINED
						Total by Period: 8
	1700-1799 AD	44AM70	NORTHERN PIEDMONT	APPOMATOX RIVER	WATER-RELATED	UNDETERMINED
		44AM71	NORTHERN PIEDMONT	APPOMATOX RIVER	WATER-RELATED	UNDETERMINED
		44AM72	NORTHERN PIEDMONT	APPOMATOX RIVER	WATER-RELATED	UNDETERMINED
		44AM73	NORTHERN PIEDMONT	APPOMATOX RIVER	WATER-RELATED	UNDETERMINED
		44GL106	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44GL136	NORTH. COASTAL PLAIN	YORK RIVER	MILITARY FACILITIES	BATTLESHIP
		44GL152	NORTH. COASTAL PLAIN	WARE RIVER	UNDETERMINED	UNDETERMINED
		44IW61	NORTH. COASTAL PLAIN	UNDETERMINED	WATER-RELATED	WATER-CRAFT
		44JC50	NORTH. COASTAL PLAIN	CHICKAHOMINY RIVER	WATER-RELATED	WATER-CRAFT
		44MT17	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	UNDETERMINED	UNDETERMINED
		44MY262	SOUTHWEST VIRGINIA	NEW RIVER	ROAD-RELATED/VEHICLE	BRIDGE
		44MY263	SOUTHWEST VIRGINIA	NEW RIVER	ROAD-RELATED/VEHICLE	BRIDGE
		44NK60	NORTH. COASTAL PLAIN	PAMUNKEY RIVER	WATER-RELATED	PIER
		44NK65	NORTH. COASTAL PLAIN	PAMUNKEY RIVER	WATER-RELATED	WHARF
		44SY129	NORTH. COASTAL PLAIN	UNDETERMINED	WATER-RELATED	WATER-CRAFT
		44YO12	NORTH. COASTAL PLAIN	YORK RIVER	WATER-RELATED	WATER-CRAFT
		44YO245	NORTH. COASTAL PLAIN	YORK RIVER	WATER-RELATED	WHARF
		44YO508	NORTH. COASTAL PLAIN	YORK RIVER	WATER-RELATED	WHARF

ERA	PERIOD	SITE	REGION	BODY OF WATER	PROPERTY TYPE	FUNCTION
HISTORIC	1700-1799 AD	44YO85	NORTH. COASTAL PLAIN	YORK RIVER	WATER-RELATED	WATER-CRAFT
		44YO86	NORTH. COASTAL PLAIN	YORK RIVER	WATER-RELATED	WATER-CRAFT
		44YO88	NORTH. COASTAL PLAIN	YORK RIVER	WATER-RELATED	WATER-CRAFT
		44YO89	NORTH. COASTAL PLAIN	YORK RIVER	WATER-RELATED	WATER-CRAFT
		44YO94	NORTH. COASTAL PLAIN	YORK RIVER	WATER-RELATED	WATER-CRAFT
						Total by Period: 23
	1700-1899 AD	44AC404	EASTERN SHORE	ATLANTIC OCEAN	WATER-RELATED	WATER-CRAFT
		44FK327	VALLEY	OPEQUON CREEK	ROAD-RELATED/VEHICLE	BRIDGE
		44FX731	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	UNDETERMINED	UNDETERMINED
		44JC318	NORTH. COASTAL PLAIN	CHICKAHOMINY RIVER	WATER-RELATED	WHARF
		44KQ65	NORTH. COASTAL PLAIN	MATTAPONI RIVER	WATER-RELATED	UNDETERMINED
		44PG16	NORTH. COASTAL PLAIN	JAMES RIVER	FORTIFICATIONS	MILITARY POST
		44RD81	NORTH. COASTAL PLAIN	RAPPAHANNOCK RIVER	UNDETERMINED	UNDETERMINED
		44SP183	NORTH. COASTAL PLAIN	RAPPAHANNOCK RIVER	ROAD-RELATED/PEDESTRIAN	BRIDGE
		44SP189	NORTH. COASTAL PLAIN	RAPPAHANNOCK RIVER	WATER-RELATED	WHARF
		44SY130	NORTH. COASTAL PLAIN	UNDETERMINED	WATER-RELATED	WATER-CRAFT
		44WM66	NORTH. COASTAL PLAIN	POTOMAC RIVER	SINGLE DWELLINGS	HOUSE
						Total by Period: 11
	1700-1995 AD	44AX114	NORTHERN VIRGINIA	POTOMAC RIVER	WATER-RELATED	WHARF
		44ST139	NORTH. COASTAL PLAIN	POTOMAC RIVER, TRIBUTARY	GOVERNMENTAL HISTORY	UNDETERMINED
						Total by Period: 2
	1750-1789 AD	44CF99	NORTH. COASTAL PLAIN	JAMES RIVER	WATER-RELATED	WATER-CRAFT
		44HT15	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	MILITARY FACILITIES	BATTLEFIELD
		44JC14	NORTH. COASTAL PLAIN	CHICKAHOMINY RIVER	SHIPYARDS	NAVAL BASE
						Total by Period: 3
	1789-1830 AD	44PO104	NORTHERN PIEDMONT	APPOMATOX RIVER	CANAL SYSTEMS	CANAL
						Total by Period: 1
	1800-1899 AD	44AB399	NORTHERN PIEDMONT	RIVANNA RIVER	ROAD-RELATED/PEDESTRIAN	BRIDGE
		44AB400	NORTHERN PIEDMONT	RIVANNA RIVER	ROAD-RELATED/PEDESTRIAN	BRIDGE
		44AB403	NORTHERN PIEDMONT	RIVANNA RIVER	CANAL SYSTEMS	CANAL
		44AH175	NORTHERN PIEDMONT	JAMES RIVER	ROAD-RELATED/PEDESTRIAN	BRIDGE

ERA	PERIOD	SITE	REGION	BODY OF WATER	PROPERTY TYPE	FUNCTION
HISTORIC	1800-1899 AD	44CA3	SOUTHWEST VIRGINIA	NEW RIVER	CANAL SYSTEMS	CANAL
		44CF117	NORTH. COASTAL PLAIN	JAMES RIVER	WATER-RELATED	WATER-CRAFT
		44CP76	NORTHERN PIEDMONT	ROANOKE RIVER	CANAL SYSTEMS	CANAL
		44CP77	NORTHERN PIEDMONT	ROANOKE RIVER	CANAL SYSTEMS	CANAL
		44CP78	NORTHERN PIEDMONT	ROANOKE RIVER	CANAL SYSTEMS	CANAL
		44FK348	VALLEY	OPEQUON CREEK, TRIBUTARY	ROAD-RELATED/VEHICLE	BRIDGE
		44FK349	VALLEY	OPEQUON CREEK, TRIBUTARY	ROAD-RELATED/VEHICLE	BRIDGE
		44FK350	VALLEY	OPEQUON CREEK, TRIBUTARY	ROAD-RELATED/VEHICLE	BRIDGE
		44FK416	VALLEY	OPEQUON CREEK	ROAD-RELATED/VEHICLE	BRIDGE
		44FK443	VALLEY	OPEQUON CREEK	ROAD-RELATED/VEHICLE	BRIDGE
		44FV18	NORTHERN PIEDMONT	RIVANNA RIVER	WATER-RELATED	WATER-CRAFT
		44FV69	NORTHERN PIEDMONT	RIVANNA RIVER	WATER-RELATED	UNDETERMINED
		44GL102	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	UNDETERMINED	WATER-CRAFT
		44GL303	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	WHARF
		44GL309	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	WATER-CRAFT
		44HE466	NORTH. COASTAL PLAIN	JAMES RIVER	WATER-RELATED	WATER-CRAFT
		44HT27	NORTH. COASTAL PLAIN	MOAT	MILITARY FACILITIES	MILITARY POST
		44HT54	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	WATER-RELATED	WATER-CRAFT
		44KW26	NORTH. COASTAL PLAIN	PAMUNKEY RIVER	WATER-RELATED	WATER-CRAFT
		44NH181	EASTERN SHORE	CHESAPEAKE BAY	RESORTS	HOTEL
		44NH223	EASTERN SHORE	CHESAPEAKE BAY, TRIBUTARY	UNDETERMINED	UNDETERMINED
		44NH331	EASTERN SHORE	ATLANTIC OCEAN	SECONDARY DOMESTIC STRUCTURES	WELL
		44NK50	NORTH. COASTAL PLAIN	PAMUNKEY TRIBUTARY	WATER-RELATED	PIER
		44NN104	NORTH. COASTAL PLAIN	JAMES RIVER	WATER-RELATED	WATER-CRAFT
		44PO98	NORTHERN PIEDMONT	JAMES RIVER, TRIBUTARY	MINES (MINERAL)	UNDETERMINED
		44PY17	SOUTHERN PIEDMONT	ROANOKE RIVER	CANAL SYSTEMS	CANAL
		44SP187	NORTH. COASTAL PLAIN	RAPPAHANNOCK RIVER	RAIL-RELATED	BRIDGE
		44ST141	NORTH. COASTAL PLAIN	RAPPAHANNOCK RIVER	ROAD-RELATED/PEDESTRIAN	BRIDGE
		44YO404	NORTH. COASTAL PLAIN	YORK RIVER	WATER-RELATED	WATER-CRAFT
						Total by Period: 33
	1800-1995 AD	44GL262	NORTH. COASTAL PLAIN	YORK RIVER, TRIBUTARY	UNDETERMINED	UNDETERMINED
		44GL307	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	WHARF
		44GL308	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	WATER-CRAFT
		44GL385	NORTH. COASTAL PLAIN	YORK RIVER, TRIBUTARY	UNDETERMINED	UNDETERMINED
		44HT17	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	WATER-RELATED	PIER

ERA	PERIOD	SITE	REGION	BODY OF WATER	PROPERTY TYPE	FUNCTION
HISTORIC	1800-1995 AD	44HT18	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	WATER-RELATED	WATER-CRAFT
		44HT19	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	WATER-RELATED	WHARF
		44JC516	NORTH. COASTAL PLAIN	JAMES RIVER	WATER-RELATED	PIER
		44NN276	NORTH. COASTAL PLAIN	JAMES RIVER	STRUCTURES	UNDETERMINED
		44ST140	NORTH. COASTAL PLAIN	POTOMAC RIVER, TRIBUTARY	WATER-RELATED	WATER-CRAFT
		44YO490	NORTH. COASTAL PLAIN	YORK RIVER	WATER-RELATED	WHARF
						Total by Period: 11
	1830-1860 AD	44CF136	NORTH. COASTAL PLAIN	APPOMATOX RIVER	ROAD-RELATED/PEDESTRIAN	BRIDGE
		44LS109	NORTHERN PIEDMONT	NORTH ANNA RIVER, TRIBUTARY	MINES (MINERAL)	UNDETERMINED
		44ST133	NORTH. COASTAL PLAIN	RAPPAHANNOCK RIVER	ROAD-RELATED/PEDESTRIAN	BRIDGE
						Total by Period: 3
	1861-1865 AD	44AH196	NORTHERN PIEDMONT	JAMES RIVER	RAIL-RELATED	BRIDGE
		44CE252	NORTH. COASTAL PLAIN	NORTH ANNA RIVER	MILITARY FACILITIES	BRIDGE
		44NN65	NORTH. COASTAL PLAIN	JAMES RIVER	WATER-RELATED	WATER-CRAFT
		44NN72	NORTH. COASTAL PLAIN	JAMES RIVER	WATER-RELATED	WATER-CRAFT
		44NN73	NORTH. COASTAL PLAIN	JAMES RIVER	WATER-RELATED	WATER-CRAFT
						Total by Period: 5
	1865-1917 AD	44AC139	EASTERN SHORE	ATLANTIC OCEAN	WATER-RELATED	WATER-CRAFT
		44AC414	EASTERN SHORE	ATLANTIC OCEAN	WATER-RELATED	PIER
		44CF66	NORTH. COASTAL PLAIN	UNDETERMINED	MINES (MINERAL)	UNDETERMINED
		44HE578	NORTH. COASTAL PLAIN	JAMES RIVER	WATER-RELATED	WATER-CRAFT
						Total by Period: 4
	1900-1995 AD	44AB402	NORTHERN PIEDMONT	RIVANNA RIVER	ROAD-RELATED/VEHICLE	BRIDGE
		44CC309	NORTH. COASTAL PLAIN	JAMES RIVER, TRIBUTARY	WATER-RELATED	WATER-CRAFT
		44CC313	NORTH. COASTAL PLAIN	JAMES RIVER, TRIBUTARY	WATER-RELATED	WATER-CRAFT
		44FX1306	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	WATER-RELATED	PIER
		44MX18	NORTH. COASTAL PLAIN	RAPPAHANNOCK RIVER, TRIBUTARY	WATER-RELATED	WATER-CRAFT
		44VB148	NORTH. COASTAL PLAIN	BACK BAY	OUTDOOR RECREATION FACILITIES	HUNTING CAMP SITE
		44VB153	NORTH. COASTAL PLAIN	BACK BAY	WATER-RELATED	UNDETERMINED
		44WM238	NORTH. COASTAL PLAIN	YEOCOMICO RIVER	WATER-RELATED	WATER-CRAFT
						Total by Period: 8

ERA	PERIOD	SITE	REGION	BODY OF WATER	PROPERTY TYPE	FUNCTION
HISTORIC	1917-1945 AD	44NH278	EASTERN SHORE	CHESAPEAKE BAY	WATER-RELATED	WHARF
		44NR15	NORTH. COASTAL PLAIN	CHESAPEAKE BAY	WATER-RELATED	WATER-CRAFT
					Total by Period:	2
	UNDETERMINED	44AC202	NORTH. COASTAL PLAIN	ATLANTIC OCEAN	WATER-RELATED	WATER-CRAFT
		44AC403	EASTERN SHORE	ATLANTIC OCEAN	WATER-RELATED	WATER-CRAFT
		44AC413	EASTERN SHORE	ATLANTIC OCEAN	WATER-RELATED	WATER-CRAFT
		44CP73	NORTHERN PIEDMONT	ROANOKE RIVER	CANAL SYSTEMS	CANAL
		44FX1324	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	WATER-RELATED	WATER-CRAFT
		44FX1337	NORTH. COASTAL PLAIN	POTOMAC RIVER	WATER-RELATED	UNDETERMINED
		44GL101	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	WATER-RELATED	WATER-CRAFT
		44GL13	NORTH. COASTAL PLAIN	YORK RIVER	WATER-RELATED	WATER-CRAFT
		44GL302	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44GL304	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44GL305	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44GL306	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
antity		44GL310	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	WATER-CRAFT
---		44GL311	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44GL312	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44GL313	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	WATER-CRAFT
		44GL314	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44HR72	SOUTHERN PIEDMONT	SMITH RIVER	ROAD-RELATED/PEDESTRIAN	BRIDGE
		44JC133	NORTH. COASTAL PLAIN	JAMES RIVER	WATER-RELATED	UNDETERMINED
		44KW23	NORTH. COASTAL PLAIN	PAMUNKEY RIVER	UNDETERMINED	UNDETERMINED
		44KW24	NORTH. COASTAL PLAIN	PAMUNKEY RIVER	UNDETERMINED	UNDETERMINED
		44NH3	EASTERN SHORE	CHESAPEAKE BAY	UNDETERMINED	UNDETERMINED
		44PE14	SOUTHWEST VIRGINIA	APPOMATOX RIVER	CANAL SYSTEMS	CANAL
		44SP120	NORTH. COASTAL PLAIN	POTOMAC RIVER, TRIBUTARY	WATER-RELATED	WATER-CRAFT
		44VB90	NORTH. COASTAL PLAIN	ATLANTIC OCEAN	WATER-RELATED	WATER-CRAFT
		44WM156	NORTH. COASTAL PLAIN	POTOMAC RIVER, TRIBUTARY	WATER-RELATED	WATER-CRAFT
		44YO157	NORTH. COASTAL PLAIN	CHESAPEAKE BAY	UNDETERMINED	UNDETERMINED
		44YO191	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO192	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO194	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO195	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO222	NORTH. COASTAL PLAIN	YORK RIVER	WATER-RELATED	WATER-CRAFT

ERA	PERIOD	SITE	REGION	BODY OF WATER	PROPERTY TYPE	FUNCTION
HISTORIC	UNDETERMINED	44YO250	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO479	NORTH. COASTAL PLAIN	YORK RIVER	WATER-RELATED	WATER-CRAFT
		44YO480	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO481	NORTH. COASTAL PLAIN	YORK RIVER	WATER-RELATED	UNDETERMINED
		44YO482	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO483	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO484	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO485	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO486	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO487	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO488	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO489	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO491	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO492	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO493	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO494	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO495	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO496	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO497	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO498	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO499	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO500	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO501	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO502	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO503	NORTH. COASTAL PLAIN	YORK RIVER	UNDETERMINED	UNDETERMINED
		44YO532	NORTH. COASTAL PLAIN	YORK RIVER, TRIBUTARY	WATER-RELATED	UNDETERMINED
						Total by Period: 58
						Total by Era: 177
PREHISTORIC	10,000-3000 BP	44AC136	EASTERN SHORE	ATLANTIC OCEAN	CAMPS	UNDETERMINED
		44AC152	EASTERN SHORE	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44AC6	EASTERN SHORE	CHESAPEAKE BAY, TRIBUTARY	CAMPS	UNDETERMINED
		44CS25	NORTH. COASTAL PLAIN	LAKE DRUMMOND	CAMPS	UNDETERMINED
		44GL6	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
		44NH166	EASTERN SHORE	CHESAPEAKE BAY	CAMPS	UNDETERMINED

ERA	PERIOD	SITE	REGION	BODY OF WATER	PROPERTY TYPE	FUNCTION
PREHISTORIC	10,000-3000 BP	44NH222	EASTERN SHORE	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44YO152	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
		44YO5	NORTH. COASTAL PLAIN	CHESAPEAKE BAY	CAMPS	UNDETERMINED
						Total by Period: 9
	10,000-400 BP	44AC49	EASTERN SHORE	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44AC50	EASTERN SHORE	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44GL386	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
		44LA155	NORTH. COASTAL PLAIN	RAPPAHANNOCK RIVER	CAMPS	UNDETERMINED
		44NB166	NORTH. COASTAL PLAIN	POTOMAC RIVER	CAMPS	UNDETERMINED
		44NB222	NORTH. COASTAL PLAIN	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44NB224	NORTH. COASTAL PLAIN	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44NH116	EASTERN SHORE	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44NH221	EASTERN SHORE	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44NH3	EASTERN SHORE	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44NN105	NORTH. COASTAL PLAIN	JAMES RIVER	FOOD PROCESSING	UNDETERMINED
		44PW126	NORTHERN VIRGINIA	POTOMAC RIVER, TRIBUTARY	CAMPS	UNDETERMINED
		44PW3	NORTHERN VIRGINIA	POTOMAC RIVER, TRIBUTARY	CAMPS	UNDETERMINED
		44RD81	NORTH. COASTAL PLAIN	RAPPAHANNOCK RIVER	CAMPS	UNDETERMINED
		44SK150	NORTH. COASTAL PLAIN	NANSEMOND RIVER	CAMPS	UNDETERMINED
		44VB192	NORTH. COASTAL PLAIN	BACK BAY	FOOD PROCESSING	UNDETERMINED
		44WM122	NORTH. COASTAL PLAIN	POTOMAC RIVER, TRIBUTARY	FOOD PROCESSING	UNDETERMINED
		44YO11	NORTH. COASTAL PLAIN	CHESAPEAKE BAY	CAMPS	UNDETERMINED
						Total by Period: 18
	12,000-400 BP	44MT6	NORTH. COASTAL PLAIN	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44NB165	NORTH. COASTAL PLAIN	CHESAPEAKE BAY	CAMPS	UNDETERMINED
						Total by Period: 2
	1695-995 BP	44GL262	NORTH. COASTAL PLAIN	YORK RIVER, TRIBUTARY	FOOD PROCESSING	UNDETERMINED
		44YO251	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
						Total by Period: 2
	3000-400 BP	44AC14	EASTERN SHORE	CHESAPEAKE BAY, TRIBUTARY	FOOD PROCESSING	UNDETERMINED
		44AC355	EASTERN SHORE	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44FX231	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	CAMPS	UNDETERMINED

ERA	PERIOD	SITE	REGION	BODY OF WATER	PROPERTY TYPE	FUNCTION
PREHISTORIC	3000-400 BP	44GL362	NORTH. COASTAL PLAIN	YORK RIVER	FOOD PROCESSING	UNDETERMINED
		44GL385	NORTH. COASTAL PLAIN	YORK RIVER, TRIBUTARY	CAMPS	UNDETERMINED
		44HT30	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	UNDETERMINED	VILLAGE SITE
		44KG1	NORTH. COASTAL PLAIN	POTOMAC RIVER	FOOD PROCESSING	UNDETERMINED
		44KQ5	NORTH. COASTAL PLAIN	MATTAPONI RIVER	CAMPS	UNDETERMINED
		44KW23	NORTH. COASTAL PLAIN	PAMUNKEY RIVER	CAMPS	UNDETERMINED
		44MT24	NORTH. COASTAL PLAIN	UNDETERMINED	CAMPS	UNDETERMINED
		44WM28	NORTH. COASTAL PLAIN	RAPPAHANNOCK RIVER	CAMPS	UNDETERMINED
		44YO158	NORTH. COASTAL PLAIN	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44YO164	NORTH. COASTAL PLAIN	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44YO165	NORTH. COASTAL PLAIN	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44YO191	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
		44YO254	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
						Total by Period: 16
	5000-3200 BP	44MT18	NORTH. COASTAL PLAIN	CHESAPEAKE BAY	CAMPS	UNDETERMINED
						Total by Period: 1
	8500-5000 BP	44YO168	NORTH. COASTAL PLAIN	CHESAPEAKE BAY	CAMPS	UNDETERMINED
						Total by Period: 1
	UNDETERMINED	44AC162	EASTERN SHORE	CHESAPEAKE BAY, TRIBUTARY	CAMPS	UNDETERMINED
		44AC213	EASTERN SHORE	CHESAPEAKE BAY, TRIBUTARY	CAMPS	UNDETERMINED
		44AC356	EASTERN SHORE	CHESAPEAKE BAY, TRIBUTARY	CAMPS	UNDETERMINED
		44AC357	EASTERN SHORE	CHESAPEAKE BAY, TRIBUTARY	CAMPS	UNDETERMINED
		44AC393	EASTERN SHORE	CHESAPEAKE BAY, TRIBUTARY	CAMPS	UNDETERMINED
		44AX53	NORTHERN VIRGINIA	POTOMAC RIVER	CAMPS	UNDETERMINED
		44FX731	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	CAMPS	UNDETERMINED
		44GL152	NORTH. COASTAL PLAIN	WARE RIVER	CAMPS	UNDETERMINED
		44GL316	NORTH. COASTAL PLAIN	YORK RIVER, TRIBUTARY	FOOD PROCESSING	UNDETERMINED
		44GL364	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
		44HE72	NORTH. COASTAL PLAIN	POND (UNNAMED)	CAMPS	UNDETERMINED
		44JC142	NORTH. COASTAL PLAIN	CHICKAHOMINY RIVER	FOOD PROCESSING	UNDETERMINED
		44KW24	NORTH. COASTAL PLAIN	PAMUNKEY RIVER	CAMPS	UNDETERMINED
		44MT16	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	CAMPS	UNDETERMINED
		44MT17	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	FOOD PROCESSING	UNDETERMINED

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ERA	PERIOD	SITE	REGION	BODY OF WATER	PROPERTY TYPE	FUNCTION
PREHISTORIC	UNDETERMINED	44NH225	EASTERN SHORE	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44NH234	EASTERN SHORE	ATLANTIC OCEAN	CAMPS	UNDETERMINED
		44NH44	EASTERN SHORE	CHESAPEAKE BAY, TRIBUTARY	FOOD PROCESSING	UNDETERMINED
		44NH54	EASTERN SHORE	ATLANTIC OCEAN	CAMPS	UNDETERMINED
		44NH63	EASTERN SHORE	CHESAPEAKE BAY	CAMPS	UNDETERMINED
		44NN276	NORTH. COASTAL PLAIN	JAMES RIVER	FOOD PROCESSING	UNDETERMINED
		44SK6	NORTH. COASTAL PLAIN	JAMES RIVER	CAMPS	UNDETERMINED
		44YO155	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	FOOD PROCESSING	UNDETERMINED
		44YO173	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
		44YO174	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
		44YO175	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
		44YO176	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
		44YO177	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
		44YO190	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
		44YO192	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
		44YO194	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
		44YO195	NORTH. COASTAL PLAIN	YORK RIVER	CAMPS	UNDETERMINED
		44YO532	NORTH. COASTAL PLAIN	YORK RIVER, TRIBUTARY	CAMPS	UNDETERMINED
					Total by Period:	33
					Total by Era:	82
UNDETERMINED	UNDETERMINED	44CA50	SOUTHWEST VIRGINIA	NEW RIVER	FISHING FACILITIES	FISHING GROUND
		44CP72	NORTHERN PIEDMONT	ROANOKE RIVER	FISHING FACILITIES	FISHING GROUND
		44CP79	NORTHERN PIEDMONT	ROANOKE RIVER	FISHING FACILITIES	FISHING GROUND
		44CU17	NORTHERN PIEDMONT	RIPADAN RIVER	FISHING FACILITIES	FISHING GROUND
		44CU18	NORTHERN PIEDMONT	RIPADAN RIVER	FISHING FACILITIES	FISHING GROUND
		44FQ78	NORTHERN PIEDMONT	RAPPAHANNOCK RIVER, TRIBUTARY	FISHING FACILITIES	FISHING GROUND
		44GL185	NORTH. COASTAL PLAIN	CHESAPEAKE BAY, TRIBUTARY	UNDETERMINED	UNDETERMINED
		44GY51	SOUTHWEST VIRGINIA	NEW RIVER	FISHING FACILITIES	FISHING GROUND
		44GY52	SOUTHWEST VIRGINIA	NEW RIVER	FISHING FACILITIES	FISHING GROUND
		44GY53	SOUTHWEST VIRGINIA	NEW RIVER	FISHING FACILITIES	FISHING GROUND
		44GY54	SOUTHWEST VIRGINIA	NEW RIVER	FISHING FACILITIES	FISHING GROUND
		44GY55	SOUTHWEST VIRGINIA	NEW RIVER	FISHING FACILITIES	FISHING GROUND
		44GY56	SOUTHWEST VIRGINIA	NEW RIVER	FISHING FACILITIES	FISHING GROUND
		44HR73	SOUTHERN PIEDMONT	SMITH RIVER	FISHING FACILITIES	FISHING GROUND

ERA	PERIOD	SITE	REGION	BODY OF WATER	PROPERTY TYPE	FUNCTION
UNDETERMINED	UNDETERMINED	44LS106	NORTHERN PIEDMONT	SOUTH ANNA RIVER	FISHING FACILITIES	FISHING GROUND
		44PA10	VALLEY	SHENANDOAH RIVER	FISHING FACILITIES	FISHING GROUND
		44PA164	VALLEY	SHENANDOAH RIVER	FISHING FACILITIES	FISHING GROUND
		44PA166	VALLEY	SHENANDOAH RIVER	FISHING FACILITIES	FISHING GROUND
		44PU21	SOUTHWEST VIRGINIA	NEW RIVER	FISHING FACILITIES	FISHING GROUND
		44PY2	SOUTHERN PIEDMONT	BANNISTER RIVER	FISHING FACILITIES	FISHING GROUND
		44PY24	SOUTHERN PIEDMONT	PIG RIVER	FISHING FACILITIES	FISHING GROUND
		44ST189	NORTH. COASTAL PLAIN	RAPPAHANNOCK RIVER	FISHING FACILITIES	FISHING GROUND
		44TZ126	SOUTHWEST VIRGINIA	BLUESTONE RIVER	FISHING FACILITIES	FISHING GROUND
		44YO244	NORTH. COASTAL PLAIN	YORK RIVER	GRAVES	UNDETERMINED

Total by Period: 24

Total by Era: 24

TOTAL SITES: 283

REGION	BODY OF WATER	SITE	PERIOD	PROPERTY TYPE	FUNCTION
EASTERN SHORE	ATLANTIC OCEAN	44AC136	10,000-3000 BP	CAMPS	UNDETERMINED
		44AC139	1865-1917 AD	WATER-RELATED	WATER-CRAFT
		44AC403	UNDETERMINED	WATER-RELATED	WATER-CRAFT
		44AC404	1700-1899 AD	WATER-RELATED	WATER-CRAFT
		44AC413	UNDETERMINED	WATER-RELATED	WATER-CRAFT
		44AC414	1865-1917 AD	WATER-RELATED	PIER
		44NH233	1607-1750 AD	HOUSING	HOUSE
		44NH234	UNDETERMINED	CAMPS	UNDETERMINED
		44NH331	1800-1899 AD	SECONDARY DOMESTIC STRUCTURES	WELL
		44NH54	UNDETERMINED	CAMPS	UNDETERMINED
					Body of Water Total: 10
	CHESAPEAKE BAY	44AC152	10,000-3000 BP	CAMPS	UNDETERMINED
		44AC355	3000-400 BP	CAMPS	UNDETERMINED
		44AC49	10,000-400 BP	CAMPS	UNDETERMINED
		44AC50	10,000-400 BP	CAMPS	UNDETERMINED
		44NH116	10,000-400 BP	CAMPS	UNDETERMINED
		44NH166	10,000-3000 BP	CAMPS	UNDETERMINED
		44NH179	1607-1750 AD	SECONDARY DOMESTIC STRUCTURES	WELL
		44NH181	1800-1899 AD	RESORTS	HOTEL
		44NH221	10,000-400 BP	CAMPS	UNDETERMINED
		44NH222	10,000-3000 BP	CAMPS	UNDETERMINED
		44NH225	UNDETERMINED	CAMPS	UNDETERMINED
		44NH278	1917-1945 AD	WATER-RELATED	WHARF
		44NH3	10,000-400 BP	CAMPS	UNDETERMINED
			UNDETERMINED	UNDETERMINED	UNDETERMINED
		44NH42	1600-1699 AD	SINGLE DWELLINGS	RESIDENCE
		44NH59	1600-1699 AD	UNDETERMINED	UNDETERMINED
		44NH60	1600-1699 AD	HOUSING	HOUSE
		44NH63	UNDETERMINED	CAMPS	UNDETERMINED
		44NH8	1600-1699 AD	UNDETERMINED	UNDETERMINED
					Body of Water Total: 19
	CHESAPEAKE BAY, TRIBUTARY	44AC14	3000-400 BP	FOOD PROCESSING	UNDETERMINED
		44AC162	UNDETERMINED	CAMPS	UNDETERMINED

REGION	BODY OF WATER	SITE	PERIOD	PROPERTY TYPE	FUNCTION	
EASTERN SHORE	CHESAPEAKE BAY, TRIBUTARY	44AC213	UNDETERMINED	CAMPS	UNDETERMINED	
		44AC356	UNDETERMINED	CAMPS	UNDETERMINED	
		44AC357	UNDETERMINED	CAMPS	UNDETERMINED	
		44AC393	UNDETERMINED	CAMPS	UNDETERMINED	
		44AC6	10,000-3000 BP	CAMPS	UNDETERMINED	
			1607-1750 AD	WATER-RELATED	WHARF	
		44NH223	1800-1899 AD	UNDETERMINED	UNDETERMINED	
		44NH44	UNDETERMINED	FOOD PROCESSING	UNDETERMINED	
					Body of Water Total:	10
					Region Total:	39
NORTH. COASTAL PLAIN	APPOMATOX RIVER	44CF136	1830-1860 AD	ROAD-RELATED/PEDESTRIAN	BRIDGE	
					Body of Water Total:	1
	ATLANTIC OCEAN	44AC202	UNDETERMINED	WATER-RELATED	WATER-CRAFT	
		44VB90	UNDETERMINED	WATER-RELATED	WATER-CRAFT	
					Body of Water Total:	2
	BACK BAY	44VB148	1900-1995 AD	OUTDOOR RECREATION FACILITIES	HUNTING CAMP SITE	
		44VB153	1900-1995 AD	WATER-RELATED	UNDETERMINED	
		44VB192	10,000-400 BP	FOOD PROCESSING	UNDETERMINED	
					Body of Water Total:	3
	CHESAPEAKE BAY	44MT18	5000-3200 BP	CAMPS	UNDETERMINED	
		44MT6	12,000-400 BP	CAMPS	UNDETERMINED	
		44NB165	12,000-400 BP	CAMPS	UNDETERMINED	
		44NB222	10,000-400 BP	CAMPS	UNDETERMINED	
		44NB224	10,000-400 BP	CAMPS	UNDETERMINED	
		44NR15	1917-1945 AD	WATER-RELATED	WATER-CRAFT	
		44YO11	10,000-400 BP	CAMPS	UNDETERMINED	
		44YO157	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO158	3000-400 BP	CAMPS	UNDETERMINED	
		44YO164	3000-400 BP	CAMPS	UNDETERMINED	
		44YO165	3000-400 BP	CAMPS	UNDETERMINED	
		44YO168	8500-5000 BP	CAMPS	UNDETERMINED	

REGION	BODY OF WATER	SITE	PERIOD	PROPERTY TYPE	FUNCTION
NORTH. COASTAL PLAIN	CHESAPEAKE BAY	44YO5	10,000-3000 BP	CAMPS	UNDETERMINED
					Body of Water Total: 13
	CHESAPEAKE BAY, TRIBUTARY	44FX1306	1900-1995 AD	WATER-RELATED	PIER
		44FX1324	UNDETERMINED	WATER-RELATED	WATER-CRAFT
		44FX231	3000-400 BP	CAMPS	UNDETERMINED
		44FX731	1700-1899 AD	UNDETERMINED	UNDETERMINED
			UNDETERMINED	CAMPS	UNDETERMINED
		44GL101	UNDETERMINED	WATER-RELATED	WATER-CRAFT
		44GL102	1800-1899 AD	UNDETERMINED	WATER-CRAFT
		44GL185	UNDETERMINED	UNDETERMINED	UNDETERMINED
		44HT15	1750-1789 AD	MILITARY FACILITIES	BATTLEFIELD
		44HT17	1800-1995 AD	WATER-RELATED	PIER
		44HT18	1800-1995 AD	WATER-RELATED	WATER-CRAFT
		44HT19	1800-1995 AD	WATER-RELATED	WHARF
		44HT30	3000-400 BP	UNDETERMINED	VILLAGE SITE
		44HT54	1800-1899 AD	WATER-RELATED	WATER-CRAFT
		44MT16	UNDETERMINED	CAMPS	UNDETERMINED
		44MT17	1700-1799 AD	UNDETERMINED	UNDETERMINED
			UNDETERMINED	FOOD PROCESSING	UNDETERMINED
		44YO155	UNDETERMINED	FOOD PROCESSING	UNDETERMINED
					Body of Water Total: 18
	CHICKAHOMINY RIVER	44JC14	1750-1789 AD	SHIPYARDS	NAVAL BASE
		44JC142	UNDETERMINED	FOOD PROCESSING	UNDETERMINED
		44JC318	1700-1899 AD	WATER-RELATED	WHARF
		44JC50	1700-1799 AD	WATER-RELATED	WATER-CRAFT
					Body of Water Total: 4
	JAMES RIVER	44CF117	1800-1899 AD	WATER-RELATED	WATER-CRAFT
		44CF99	1750-1789 AD	WATER-RELATED	WATER-CRAFT
		44HE466	1800-1899 AD	WATER-RELATED	WATER-CRAFT
		44HE578	1865-1917 AD	WATER-RELATED	WATER-CRAFT
		44JC133	UNDETERMINED	WATER-RELATED	UNDETERMINED
		44JC516	1800-1995 AD	WATER-RELATED	PIER
		44NN104	1800-1899 AD	WATER-RELATED	WATER-CRAFT

REGION	BODY OF WATER	SITE	PERIOD	PROPERTY TYPE	FUNCTION	
NORTH. COASTAL PLAIN	JAMES RIVER	44NN105	10,000-400 BP	FOOD PROCESSING	UNDETERMINED	
		44NN276	1800-1995 AD	STRUCTURES	UNDETERMINED	
			UNDETERMINED	FOOD PROCESSING	UNDETERMINED	
		44NN65	1861-1865 AD	WATER-RELATED	WATER-CRAFT	
		44NN72	1861-1865 AD	WATER-RELATED	WATER-CRAFT	
		44NN73	1861-1865 AD	WATER-RELATED	WATER-CRAFT	
		44PG16	1700-1899 AD	FORTIFICATIONS	MILITARY POST	
		44PG65	1607-1750 AD	FORTIFICATIONS	GARRISON FORT	
		44SK6	1607-1750 AD	UNDETERMINED	UNDETERMINED	
			UNDETERMINED	CAMPS	UNDETERMINED	
		44SY120	1607-1750 AD	WATER-RELATED	PIER	
		44SY33	1600-1699 AD	SECONDARY DOMESTIC STRUCTURES	WELL	
		44SY37	1607-1750 AD	WATER-RELATED	PIER	
					Body of Water Total:	20
	JAMES RIVER, TRIBUTARY	44CC309	1900-1995 AD	WATER-RELATED	WATER-CRAFT	
		44CC313	1900-1995 AD	WATER-RELATED	WATER-CRAFT	
		44WB3	1607-1750 AD	ROAD-RELATED/PEDESTRIAN	UNDETERMINED	
					Body of Water Total:	3
	LAKE DRUMMOND	44CS25	10,000-3000 BP	CAMPS	UNDETERMINED	
					Body of Water Total:	1
	MATTAPONI RIVER	44KQ5	3000-400 BP	CAMPS	UNDETERMINED	
		44KQ65	1700-1899 AD	WATER-RELATED	UNDETERMINED	
					Body of Water Total:	2
	MOAT	44HT27	1800-1899 AD	MILITARY FACILITIES	MILITARY POST	
					Body of Water Total:	1
	NANSEMOND RIVER	44SK150	10,000-400 BP	CAMPS	UNDETERMINED	
					Body of Water Total:	1
	NORTH ANNA RIVER	44CE252	1861-1865 AD	MILITARY FACILITIES	BRIDGE	
					Body of Water Total:	1

REGION	BODY OF WATER	SITE	PERIOD	PROPERTY TYPE	FUNCTION	
NORTH. COASTAL PLAIN	PAMUNKEY RIVER	44KW23	3000-400 BP	CAMPS	UNDETERMINED	
			UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44KW24	UNDETERMINED	CAMPS	UNDETERMINED	
				UNDETERMINED	UNDETERMINED	
		44KW26	1800-1899 AD	WATER-RELATED	WATER-CRAFT	
		44NK60	1700-1799 AD	WATER-RELATED	PIER	
		44NK65	1700-1799 AD	WATER-RELATED	WHARF	
					Body of Water Total:	7
	PAMUNKEY TRIBUTARY	44NK50	1800-1899 AD	WATER-RELATED	PIER	
					Body of Water Total:	1
	POND (UNNAMED)	44HE72	UNDETERMINED	CAMPS	UNDETERMINED	
					Body of Water Total:	1
	POTOMAC RIVER	44FX1337	UNDETERMINED	WATER-RELATED	UNDETERMINED	
		44KG1	3000-400 BP	FOOD PROCESSING	UNDETERMINED	
		44NB166	10,000-400 BP	CAMPS	UNDETERMINED	
		44WM66	1700-1899 AD	SINGLE DWELLINGS	HOUSE	
					Body of Water Total:	4
	POTOMAC RIVER, TRIBUTARY	44SP120	UNDETERMINED	WATER-RELATED	WATER-CRAFT	
		44ST139	1700-1995 AD	GOVERNMENTAL HISTORY	UNDETERMINED	
		44ST140	1800-1995 AD	WATER-RELATED	WATER-CRAFT	
		44WM122	10,000-400 BP	FOOD PROCESSING	UNDETERMINED	
		44WM156	UNDETERMINED	WATER-RELATED	WATER-CRAFT	
					Body of Water Total:	5
	RAPPAHANNOCK RIVER	44LA155	10,000-400 BP	CAMPS	UNDETERMINED	
		44RD81	10,000-400 BP	CAMPS	UNDETERMINED	
			1700-1899 AD	UNDETERMINED	UNDETERMINED	
		44SP183	1700-1899 AD	ROAD-RELATED/PEDESTRIAN	BRIDGE	
		44SP187	1800-1899 AD	RAIL-RELATED	BRIDGE	
		44SP189	1700-1899 AD	WATER-RELATED	WHARF	
		44ST133	1830-1860 AD	ROAD-RELATED/PEDESTRIAN	BRIDGE	
		44ST141	1800-1899 AD	ROAD-RELATED/PEDESTRIAN	BRIDGE	

REGION	BODY OF WATER	SITE	PERIOD	PROPERTY TYPE	FUNCTION	
NORTH. COASTAL PLAIN	RAPPAHANNOCK RIVER	44ST189	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
		44WM28	3000-400 BP	CAMPS	UNDETERMINED	
					Body of Water Total:	10
	RAPPAHANNOCK RIVER, TRIBUTARY	44MX18	1900-1995 AD	WATER-RELATED	WATER-CRAFT	
					Body of Water Total:	1
	UNDETERMINED	44CF66	1865-1917 AD	MINES (MINERAL)	UNDETERMINED	
		44IW61	1700-1799 AD	WATER-RELATED	WATER-CRAFT	
		44MT24	3000-400 BP	CAMPS	UNDETERMINED	
		44SY129	1700-1799 AD	WATER-RELATED	WATER-CRAFT	
		44SY130	1700-1899 AD	WATER-RELATED	WATER-CRAFT	
					Body of Water Total:	5
	WARE RIVER	44GL152	1700-1799 AD	UNDETERMINED	UNDETERMINED	
			UNDETERMINED	CAMPS	UNDETERMINED	
					Body of Water Total:	2
	YEOCOMICO RIVER	44WM238	1900-1995 AD	WATER-RELATED	WATER-CRAFT	
					Body of Water Total:	1
	YORK RIVER	44GL106	1700-1799 AD	UNDETERMINED	UNDETERMINED	
		44GL13	UNDETERMINED	WATER-RELATED	WATER-CRAFT	
		44GL136	1700-1799 AD	MILITARY FACILITIES	BATTLESHIP	
		44GL302	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44GL303	1800-1899 AD	UNDETERMINED	WHARF	
		44GL304	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44GL305	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44GL306	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44GL307	1800-1995 AD	UNDETERMINED	WHARF	
		44GL308	1800-1995 AD	UNDETERMINED	WATER-CRAFT	
		44GL309	1800-1899 AD	UNDETERMINED	WATER-CRAFT	
		44GL310	UNDETERMINED	UNDETERMINED	WATER-CRAFT	
		44GL311	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44GL312	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44GL313	UNDETERMINED	UNDETERMINED	WATER-CRAFT	

REGION	BODY OF WATER	SITE	PERIOD	PROPERTY TYPE	FUNCTION
NORTH. COASTAL PLAIN	YORK RIVER	44GL314	UNDETERMINED	UNDETERMINED	UNDETERMINED
		44GL362	3000-400 BP	FOOD PROCESSING	UNDETERMINED
		44GL364	UNDETERMINED	CAMPS	UNDETERMINED
		44GL386	10,000-400 BP	CAMPS	UNDETERMINED
		44GL6	10,000-3000 BP	CAMPS	UNDETERMINED
		44YO12	1700-1799 AD	WATER-RELATED	WATER-CRAFT
		44YO152	10,000-3000 BP	CAMPS	UNDETERMINED
		44YO173	UNDETERMINED	CAMPS	UNDETERMINED
		44YO174	UNDETERMINED	CAMPS	UNDETERMINED
		44YO175	UNDETERMINED	CAMPS	UNDETERMINED
		44YO176	UNDETERMINED	CAMPS	UNDETERMINED
		44YO177	UNDETERMINED	CAMPS	UNDETERMINED
		44YO190	UNDETERMINED	CAMPS	UNDETERMINED
		44YO191	3000-400 BP	CAMPS	UNDETERMINED
			UNDETERMINED	UNDETERMINED	UNDETERMINED
		44YO192	UNDETERMINED	CAMPS	UNDETERMINED
				UNDETERMINED	UNDETERMINED
		44YO194	UNDETERMINED	CAMPS	UNDETERMINED
				UNDETERMINED	UNDETERMINED
		44YO195	UNDETERMINED	CAMPS	UNDETERMINED
				UNDETERMINED	UNDETERMINED
		44YO222	UNDETERMINED	WATER-RELATED	WATER-CRAFT
		44YO244	UNDETERMINED	GRAVES	UNDETERMINED
		44YO245	1700-1799 AD	WATER-RELATED	WHARF
		44YO250	UNDETERMINED	UNDETERMINED	UNDETERMINED
		44YO251	1695-995 BP	CAMPS	UNDETERMINED
		44YO254	3000-400 BP	CAMPS	UNDETERMINED
		44YO404	1800-1899 AD	WATER-RELATED	WATER-CRAFT
		44YO479	UNDETERMINED	WATER-RELATED	WATER-CRAFT
		44YO480	UNDETERMINED	UNDETERMINED	UNDETERMINED
		44YO481	UNDETERMINED	WATER-RELATED	UNDETERMINED
		44YO482	UNDETERMINED	UNDETERMINED	UNDETERMINED
		44YO483	UNDETERMINED	UNDETERMINED	UNDETERMINED
		44YO484	UNDETERMINED	UNDETERMINED	UNDETERMINED
		44YO485	UNDETERMINED	UNDETERMINED	UNDETERMINED
		44YO486	UNDETERMINED	UNDETERMINED	UNDETERMINED

REGION	BODY OF WATER	SITE	PERIOD	PROPERTY TYPE	FUNCTION	
NORTH. COASTAL PLAIN	YORK RIVER	44YO487	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO488	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO489	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO490	1800-1995 AD	WATER-RELATED	WHARF	
		44YO491	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO492	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO493	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO494	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO495	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO496	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO497	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO498	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO499	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO500	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO501	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO502	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO503	UNDETERMINED	UNDETERMINED	UNDETERMINED	
		44YO508	1700-1799 AD	WATER-RELATED	WHARF	
		44YO85	1700-1799 AD	WATER-RELATED	WATER-CRAFT	
		44YO86	1700-1799 AD	WATER-RELATED	WATER-CRAFT	
		44YO88	1700-1799 AD	WATER-RELATED	WATER-CRAFT	
		44YO89	1700-1799 AD	WATER-RELATED	WATER-CRAFT	
		44YO94	1700-1799 AD	WATER-RELATED	WATER-CRAFT	
					Body of Water Total:	74
	YORK RIVER, TRIBUTARY	44GL262	1695-995 BP	FOOD PROCESSING	UNDETERMINED	
			1800-1995 AD	UNDETERMINED	UNDETERMINED	
		44GL316	UNDETERMINED	FOOD PROCESSING	UNDETERMINED	
		44GL385	1800-1995 AD	UNDETERMINED	UNDETERMINED	
			3000-400 BP	CAMPS	UNDETERMINED	
		44YO532	UNDETERMINED	CAMPS	UNDETERMINED	
				WATER-RELATED	UNDETERMINED	
					Body of Water Total:	7
					Region Total:	188

REGION	BODY OF WATER	SITE	PERIOD	PROPERTY TYPE	FUNCTION	
NORTHERN PIEDMONT	APPOMATOX RIVER	44AM70	1700-1799 AD	WATER-RELATED	UNDETERMINED	
		44AM71	1700-1799 AD	WATER-RELATED	UNDETERMINED	
		44AM72	1700-1799 AD	WATER-RELATED	UNDETERMINED	
		44AM73	1700-1799 AD	WATER-RELATED	UNDETERMINED	
		44PO104	1789-1830 AD	CANAL SYSTEMS	CANAL	
					Body of Water Total:	5
	JAMES RIVER	44AH175	1800-1899 AD	ROAD-RELATED/PEDESTRIAN	BRIDGE	
		44AH196	1861-1865 AD	RAIL-RELATED	BRIDGE	
					Body of Water Total:	2
	JAMES RIVER, TRIBUTARY	44PO98	1800-1899 AD	MINES (MINERAL)	UNDETERMINED	
					Body of Water Total:	1
	NORTH ANNA RIVER, TRIBUTARY	44LS109	1830-1860 AD	MINES (MINERAL)	UNDETERMINED	
					Body of Water Total:	1
	RAPPAHANNOCK RIVER, TRIBUTARY	44FQ78	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
					Body of Water Total:	1
	RIPADAN RIVER	44CU17	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
		44CU18	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
					Body of Water Total:	2
	RIVANNA RIVER	44AB399	1800-1899 AD	ROAD-RELATED/PEDESTRIAN	BRIDGE	
		44AB400	1800-1899 AD	ROAD-RELATED/PEDESTRIAN	BRIDGE	
		44AB402	1900-1995 AD	ROAD-RELATED/VEHICLE	BRIDGE	
		44AB403	1800-1899 AD	CANAL SYSTEMS	CANAL	
		44FV18	1800-1899 AD	WATER-RELATED	WATER-CRAFT	
		44FV69	1800-1899 AD	WATER-RELATED	UNDETERMINED	
					Body of Water Total:	6
	ROANOKE RIVER	44CP72	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
		44CP73	UNDETERMINED	CANAL SYSTEMS	CANAL	
		44CP76	1800-1899 AD	CANAL SYSTEMS	CANAL	
		44CP77	1800-1899 AD	CANAL SYSTEMS	CANAL	

REGION	BODY OF WATER	SITE	PERIOD	PROPERTY TYPE	FUNCTION	
NORTHERN PIEDMONT	ROANOKE RIVER	44CP78	1800-1899 AD	CANAL SYSTEMS	CANAL	
		44CP79	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
					Body of Water Total:	6
	SOUTH ANNA RIVER	44LS106	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
					Body of Water Total:	1
					Region Total:	25
NORTHERN VIRGINIA	POTOMAC RIVER	44AX114	1700-1995 AD	WATER-RELATED	WHARF	
		44AX53	UNDETERMINED	CAMPS	UNDETERMINED	
					Body of Water Total:	2
	POTOMAC RIVER, TRIBUTARY	44PW126	10,000-400 BP	CAMPS	UNDETERMINED	
		44PW3	10,000-400 BP	CAMPS	UNDETERMINED	
					Body of Water Total:	2
					Region Total:	4
SOUTHERN PIEDMONT	BANNISTER RIVER	44PY2	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
					Body of Water Total:	1
	PIG RIVER	44PY24	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
					Body of Water Total:	1
	ROANOKE RIVER	44PY17	1800-1899 AD	CANAL SYSTEMS	CANAL	
					Body of Water Total:	1
	SMITH RIVER	44HR72	UNDETERMINED	ROAD-RELATED/PEDESTRIAN	BRIDGE	
		44HR73	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
					Body of Water Total:	2
					Region Total:	5
SOUTHWEST VIRGINIA	APPOMATOX RIVER	44PE14	UNDETERMINED	CANAL SYSTEMS	CANAL	

REGION	BODY OF WATER	SITE	PERIOD	PROPERTY TYPE	FUNCTION	
					Body of Water Total:	1
SOUTHWEST VIRGINIA	BLUESTONE RIVER	44TZ126	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
					Body of Water Total:	1
	NEW RIVER	44CA3	1800-1899 AD	CANAL SYSTEMS	CANAL	
		44CA50	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
		44GY51	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
		44GY52	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
		44GY53	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
		44GY54	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
		44GY55	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
		44GY56	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
		44MY262	1700-1799 AD	ROAD-RELATED/VEHICLE	BRIDGE	
		44MY263	1700-1799 AD	ROAD-RELATED/VEHICLE	BRIDGE	
		44PU21	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
					Body of Water Total:	11
					Region Total:	13
VALLEY	OPEQUON CREEK	44FK327	1700-1899 AD	ROAD-RELATED/VEHICLE	BRIDGE	
		44FK416	1800-1899 AD	ROAD-RELATED/VEHICLE	BRIDGE	
		44FK443	1800-1899 AD	ROAD-RELATED/VEHICLE	BRIDGE	
					Body of Water Total:	3
	OPEQUON CREEK, TRIBUTARY	44FK348	1800-1899 AD	ROAD-RELATED/VEHICLE	BRIDGE	
		44FK349	1800-1899 AD	ROAD-RELATED/VEHICLE	BRIDGE	
		44FK350	1800-1899 AD	ROAD-RELATED/VEHICLE	BRIDGE	
					Body of Water Total:	3
	SHENANDOAH RIVER	44PA10	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
		44PA164	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
		44PA166	UNDETERMINED	FISHING FACILITIES	FISHING GROUND	
					Body of Water Total:	3

REGION	BODY OF WATER	SITE	PERIOD	PROPERTY TYPE	FUNCTION

Region Total: 9

TOTAL SITES: 283