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Shoreline Situation Report Northumberland County

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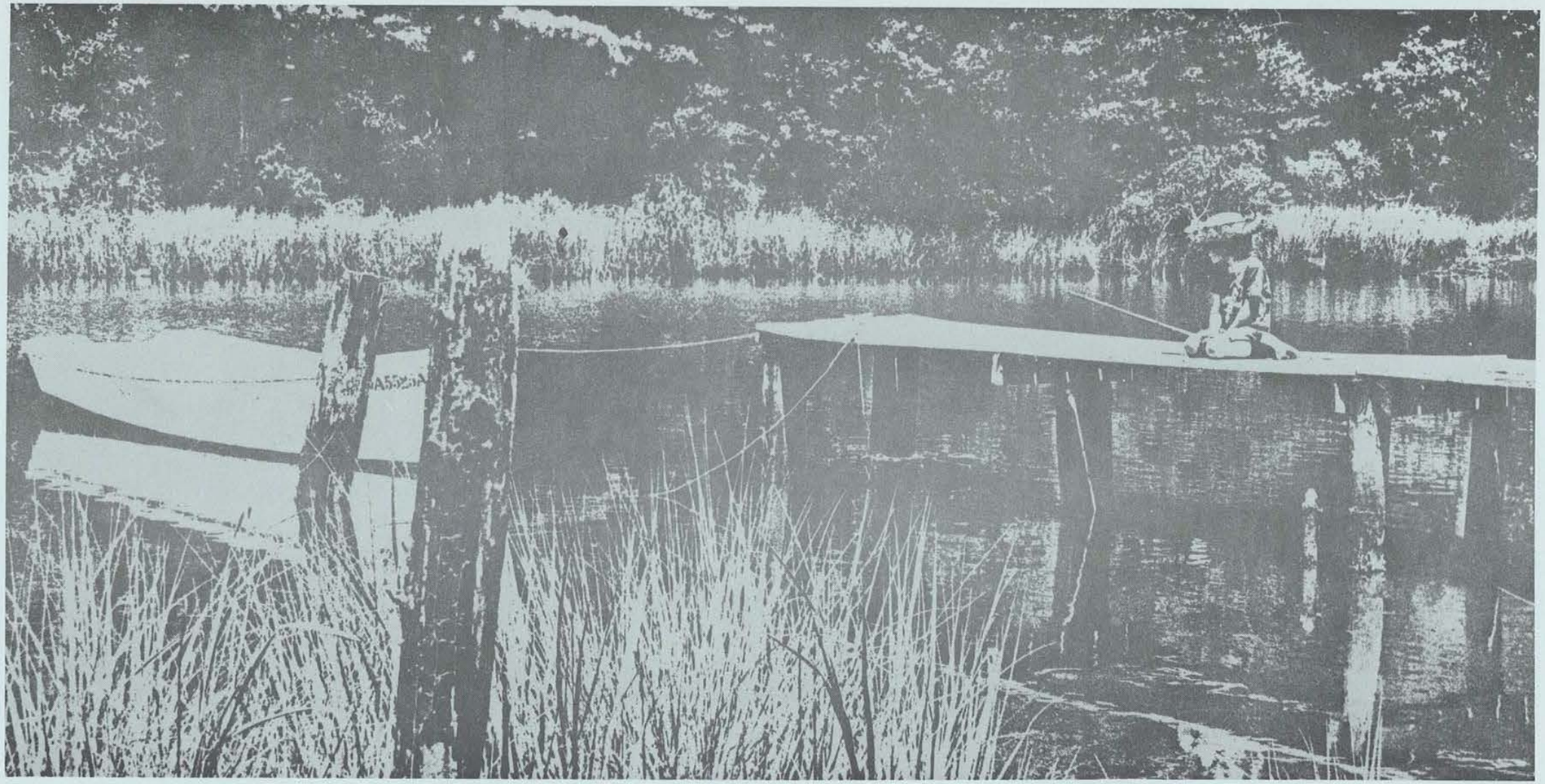
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Shoreline Situation Report

NORTHUMBERLAND COUNTY, VIRGINIA



Prepared and Published With Funds Provided to the Commonwealth by the Office of Coastal Zone Management,
National Oceanic and Atmospheric Administration, Grant No. 04-7-158-44041

Special Report In Applied Marine Science and Ocean Engineering Number 161 of the

VIRGINIA INSTITUTE OF MARINE SCIENCE
Gloucester Point, Virginia 23062

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CHAPTER 1
Introduction

CHAPTER 1

INTRODUCTION

1.1 PURPOSES AND GOALS

It is the objective of this report to supply an assessment, and at least a partial integration, of those important shoreland parameters and characteristics which will aid the planners and the managers of the shorelands in making the best decisions for the utilization of this limited and very valuable resource. The report gives particular attention to the problem of shore erosion and to recommendations concerning the alleviation of the impact of this problem. In addition, we have tried to include in our assessment a discussion of those factors which might significantly limit development of the shoreline and, in some instances, a discussion of some of the potential or alternate uses of the shoreline, particularly with respect to recreational use, since such information could aid potential users in the perception of a segment of the shoreline.

The basic advocacy of the authors in the preparation of the report is that the use of shorelands should be planned rather than haphazardly developed in response to the short term pressures and interests. Careful planning could reduce the conflicts which may be expected to arise between competing interests. Shoreland utilization in many areas of the country, and indeed in some places in Virginia, has proceeded in a manner such that the very elements which attracted people to the shore have been destroyed by the lack of planning and forethought.

The major man-induced uses of the shorelands are:

- -- Residential, commercial, or industrial development
- -- Recreation
- -- Transportation
- -- Waste disposal
- -- Extraction of living and non-living resources

Aside from the above uses, the shorelands serve various ecological functions.

The role of planners and managers is to optimize the utilization of the shorelands and to minimize the conflicts arising from competing demands. Furthermore, once a particular use has been decided upon for a given segment of shoreland, both the planners and the users want that selected use to operate in the most effective manner. A park planner, for example, wants the allotted space to fulfill the design most efficiently. We hope that the results of our work are useful to the planner in designing the beach by pointing out the technical feasibility of altering or enhancing the present configuration of the shore zone. Alternately, if the use were a residential development, we would hope our work would be useful in specifying the shore erosion problem and by indicating defenses likely to succeed in containing the erosion. In summary our objective is to provide a useful tool for enlightened utilization of a limited resource, the shorelands of the Commonwealth.

Shorelands planning occurs, either formally or informally, at all levels from the private owner of shoreland property to county governments, to planning districts and to the state and federal agency level. We feel our results will be useful at all these levels. Since the most basic level of comprehensive planning and zoning is at the county or city level, we have executed our report on that level although we realize some of the information may be most useful at a higher governmental level. The Commonwealth of Virginia has traditionally chosen to place as much as possible, the regulatory decision processes at the county level. The Virginia Wetlands Act of 1972 (Chapter 2.1, Title 62.1, Code of Virginia), for example, provides for the establishment of County Boards to act on applications for alterations of wetlands. Thus, our focus at the county level is intended to interface with and to support the existing or pending county regulatory mechanisms concerning activities in the shorelands zone.

1.2 ACKNOWLEDGEMENTS

This report has been prepared and published with funds provided to the Commonwealth by the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, grant number 04-7-158-44041. The Shoreline Situation Report series was originally developed in the Wetlands/Edges Program of the Chesapeake Research Consortium, Inc., as supported by the Research Applied to National Needs (RANN) program of the National Science Foundation. The completion of this report would have been impossible without the expert services of Beth Marshall, who typed several drafts of the manuscript, Bill Jenkins and Ken Thornberry, who prepared the photographs, and Sam White, who piloted the aircraft on the many photo acquisition and reconnaissance flights. Also we thank the numerous other persons who, through their direct aid, criticisms, and suggestions, have assisted our work.

CHAPTER 2
Approach Used and Elements Considered

CHAPTER 2

APPROACH USED AND ELEMENTS CONSIDERED

2.1 APPROACH TO THE PROBLEM

In the preparation of this report the authors utilized existing information wherever possible. For example, for such elements as water quality characteristics, zoning regulations, or flood hazard, we reviewed relevant reports by local, state, or federal agencies. Much of the desired information, particularly with respect to erosional characteristics, shoreland types, and use was not available, so we performed the field work and developed classification schemes. In order to analyze successfully the shoreline behavior we placed heavy reliance on low altitude, oblique, color, 35 mm photography. We photographed the entire shoreline of each county and cataloged the slides for easy access at VIMS, where they remain available for use. We then analyzed these photographic materials, along with existing conventional aerial photography and topographic and hydrographic maps, for the desired elements. We conducted field inspection over much of the shoreline, particularly at those locations where office analysis left questions unanswered. In some cases we took additional photographs along with the field visits to document the effectiveness of shoreline defenses.

The basic shoreline unit considered is called a subsegment, which may range from a few hundred feet to several thousand feet in length. The end points of the subsegments were generally chosen on physiographic consideration such as changes in the character of erosion or deposition. In those cases where a radical change in land use occurred, the point of change was taken as a boundary point of the subsegment. Segments are groups of subsegments. The boundaries for segments also were selected on physiographic units such as necks or peninsulas between major tidal creeks. Finally, the county itself is considered as a sum of shoreline segments.

The format of presentation in the report follows a sequence from general summary statements for the county (Chapter 3) to tabular segment summaries and finally detailed descriptions and maps for each subsegment (Chapter 4). The purpose in choosing this format was to allow selective use of the report since some users' needs will adequately be met with the summary overview of the county while others will require the detailed discussion of particular subsegments.

2.2 CHARACTERISTICS OF THE SHORELANDS INCLUDED IN THE STUDY

The characteristics which are included in this report are listed below followed by a discussion of our treatment of each.

a) Shorelands physiographic classification
b) Shorelands use classification
c) Shorelands ownership classification
d) Zoning
e) Water quality
f) Shore erosion and shoreline defenses
g) Limitations to shore use and potential or alternate shore uses
h) Distribution of marshes
i) Flood hazard levels
j) Shellfish leases and public shellfish grounds
k) Beach quality

a) Shorelands Physiographic Classification

The shorelands of the Chesapeake Bay System may be considered as being composed of three interacting physiographic elements: the fastlands, the shore and the nearshore. A graphic classification based on these three elements has been devised so that the types for each of the three elements portrayed side by side on a map may provide the opportunity to examine joint relationships among the elements. As an example, the application of the system permits the user to determine miles of high bluff shoreland interfacing with marsh in the shore zone.

For each subsegment there are two length measurements, the shore-nearshore interface or shoreline, and the fastland-shore interface. The two interface lengths differ most when the shore zone is embayed or extensive marsh. On the subsegment maps, a dotted line represents the fastland-shore interface when it differs from the shoreline. The fastland-shore interface length is the base for the fastland statistics.

Definitions:

Shore Zone

This is the zone of beaches and marshes. It is a buffer zone between the water body and the fastland. The seaward limit of the shore zone is the break in slope between the relatively steeper shoreface and the less steep nearshore zone. The approximate landward limit is a contour line representing one and a half times the mean tide range above mean low water (refer to Figure 1). In operation with topographic maps the inner fringe of the marsh symbols is taken as the landward limit.

The physiographic character of the marshes has also been separated into three types (see Figure 2). Fringe marsh is that which is less than 400 feet in width and which runs in a band parallel to the shore. Extensive marsh is that which has extensive acreage projecting into an estuary or river. An embayed marsh is a marsh which occupies a reentrant or drowned creek valley. The purpose in delineating these marsh types is that the effectiveness of the various functions of the marsh will, in part, be determined by type of exposure to the estuarine system. A fringe marsh may, for example, have maximum value as a buffer to wave erosion of the fastland. An extensive marsh, on the other hand, is likely a more efficient transporter of detritus and other food chain materials due to its greater drainage density than an embayed marsh. The central point is that planners, in the light of ongoing and future research, will desire to weight various functions of marshes and the physiographic delineation aids their decision making by denoting where the various types exist. The classification used is:

Beach
Marsh
  Fringe marsh, < 400 ft. (122 m) in width along shores
  Extensive marsh
  Embayed marsh, occupying a drowned valley or reentrant
  Artificially stabilized

Fastland Zone

The zone extending from the landward limit of the shore zone is termed the fastland. The fastland is relatively stable and is the site of most material development or construction. The

physiographic classification of the fastland is based upon the average slope of the land within 400 feet (122 m) of the fastland - shore boundary. The general classification is:

- Low shore, 20 ft. (6 m) or less of relief; with or without cliff
- Moderately low shore, 20-40 ft. (6-12 m) of relief; with or without cliff
- Moderately high shore, 40-60 ft. (12-18 m) of relief; with or without cliff
- High shore, 60 ft. (18 m) or more of relief; with or without cliff.

Two specially classified exceptions are sand dunes and areas of artificial fill.

Nearshore Zone

The nearshore zone extends from the shore zone to the 12-foot (MLW datum) contour. In the smaller tidal rivers the 6-foot depth is taken as the reference depth. The 12-foot depth is probably the maximum depth of significant sand transport by waves in the Chesapeake Bay area. Also, the distinct drop-off into the river channels begins roughly at the 12-foot depth. The nearshore zone includes any tidal flats.

The class limits for the nearshore zone classifications were chosen following a simple statistical study. The distance to the 12-foot underwater contour (isobath) was measured on the appropriate charts at one-mile intervals along the shorelines of Chesapeake Bay and the James, York, Rappahannock, and Potomac Rivers. Means and standard deviations for each of the separate regions and for the entire combined system were calculated and compared. Although the distributions were non-normal, they were generally comparable, allowing the data for the entire combined system to determine the class limits.

The calculated mean was 919 yards with a standard deviation of 1,003 yards. As our aim was to determine general, serviceable class limits, these calculated numbers were rounded to 900 and 1,000 yards respectively. The class limits were set at half the standard deviation (500 yards) each side of the mean. Using this procedure a narrow nearshore zone is one 0-400 yards in width, intermediate 400-1,400, and wide greater than 1,400.

The following definitions have no legal significance and were constructed for our classification purposes:

- Narrow, 12-ft. (3.7 m) isobath located < 400 yards from shore
- Intermediate, 12-ft. (3.7 m) isobath 400-1,400 yards from shore
- Wide, 12-ft. (3.7 m) isobath > 1,400 yards from shore

Subclasses: with or without bars
with or without tidal flats
with or without submerged vegetation

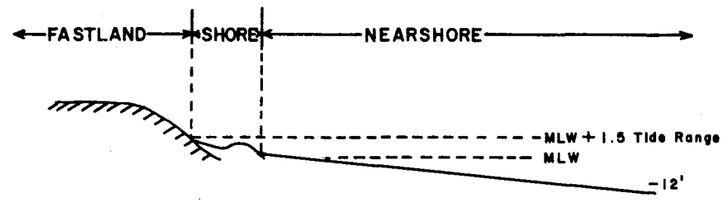


Figure 1

A profile of the three shorelands types.

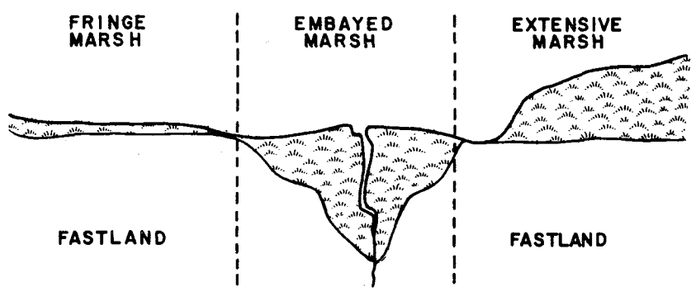


Figure 2

A plan view of the three marsh types.

b) Shorelands Use Classification

Fastland Zone

Residential

Includes all forms of residential use with the exception of farms and other isolated dwellings. In general, a residential area consists of four or more residential buildings adjacent to one another. Schools, churches, and isolated businesses may be included in a residential area.

Commercial

Includes buildings, parking areas, and other land directly related to retail and wholesale trade and business. This category includes small industry and other anomalous areas within the general commercial context. Marinas are considered commercial shore use.

Industrial

Includes all industrial and associated areas. Examples: warehouses, refineries, shipyards, power plants, railyards.

Governmental

Includes lands whose usage is specifically controlled, restricted, or regulated by governmental organizations: e.g., Camp Peary, Fort Story. Where applicable, the Governmental use category is modified to indicate the specific character of the use, e.g., residential, direct military, and so forth.

Recreational and Other Public Open Spaces

Includes designated outdoor recreation lands and miscellaneous open spaces. Examples: golf courses, tennis clubs, amusement parks, public beaches, race tracks, cemeteries, parks.

Preserved

Includes lands preserved or regulated for

environmental reasons, such as wildlife or wildfowl sanctuaries, fish and shellfish conservation grounds, or other uses that would preclude development.

Agricultural

Includes fields, pastures, croplands, and other agricultural areas.

Unmanaged

Includes all open or wooded lands not included in other classifications:

a) Open: brush land, dune areas, wastelands; less than 40% tree cover.
b) Wooded: more than 40% tree cover.

The shoreland use classification applies to the general usage of the fastland area to an arbitrary distance of half mile from the shore or beach zone or to some less distant, logical barrier. In multi-usage areas one must make a subjective selection as to the primary or controlling type of usage. For simplicity and convenience, managed woodlands are classified as "unmanaged, wooded" areas.

Shore Zone

Bathing
Boat launching
Bird watching
Waterfowl hunting

Nearshore Zone

Pound net fishing
Shellfishing
Sport fishing
Extraction of non-living resources
Boating
Water sports

c) Shorelands Ownership Classification

The shorelands ownership classification used has two main subdivisions, private and governmental, with the governmental further divided into federal, state, county, and town or city. Application of the classification is restricted to fastlands alone since the Virginia fastlands ownership extends to mean low water. All bottoms below mean low water are in State ownership.

d) Water Quality

The water quality sections of this report are based upon data abstracted from Virginia State Water Control Board's publication Water Quality Standards (November, 1974) and Water Quality Inventory (305 (b) Report) (April, 1976).

Additionally, where applicable, Virginia Bureau of Shellfish Sanitation data is used to assign ratings of satisfactory, intermediate, or unsatisfactory. These ratings are defined primarily in regard to number of coliform bacteria. For a rating of satisfactory the maximum limit is an MPN (Most Probable Number) of 70 per 100 ml. The upper limit for fecal coliforms is an MPN of 23. Usually any count above these limits results in an unsatisfactory rating, and, from the Bureau's standpoint, results in restricting the waters from the taking of shellfish for direct sale to the consumer.

There are instances however, when the total coliform MPN may exceed 70, although the fecal MPN does not exceed 23, and other conditions are acceptable. In these cases an intermediate rating may be assigned temporarily, and the area will be permitted to remain open pending an improvement in conditions.

Although the shellfish standards are somewhat more stringent than most of the other water quality standards, they are included because of the economic and ecological impacts of shellfish ground closures. Special care should be taken not to endanger the water quality in existing "satisfactory" areas.

e) Zoning

In cases where zoning regulations have been established the existing information pertaining to the shorelands has been included in the report.

f) Shore Erosion and Shoreline Defenses

The following ratings are used for shore erosion:

slight or none - less than 1 foot per year
moderate - - - - 1 to 3 feet per year
severe - - - - - greater than 3 feet per year

The locations with moderate and severe ratings are further specified as being critical or non-critical. The erosion is considered critical if buildings, roads, or other such structures are endangered.

The degree of erosion was determined by several means. In most locations the long term trend was determined using map comparisons of shoreline positions between the 1850's and the 1940's. In addition, aerial photographs of the late 1930's and recent years were utilized for an assessment of more recent conditions. Finally, in those areas experiencing severe erosion field inspections and interviews were held with local inhabitants.

The existing shoreline defenses were evaluated as to their effectiveness. In some cases repetitive visits were made to monitor the effectiveness of recent installations. In instances where existing structures are inadequate, we have given recommendations for alternate approaches. Furthermore, recommendations are given for defenses in those areas where none currently exist. The primary emphasis is placed on expected effectiveness with secondary consideration to cost.

g) Limitations to Shore Use and Potential or Alternate Shore Uses

In this section we point out specific factors which may impose significant limits on the type or extent of shoreline development. This may result in a restatement of other factors from elsewhere in the report, e.g., flood hazard or erosion, or this may be a discussion of some other factor pertaining to the particular area.

Also we have placed particular attention on the recreational potential of the shore zone. The possible development of artificial beach, erosion protection, etc., influence the evaluation of an area's potential. Similarly, potential alternate shore uses are occasionally noted.

h) Distribution of Marshes

The acreage and physiographic type of the marshes in each subsegment is listed. These estimates of acreages were obtained from topographic maps and should be considered only as approximations. Detailed county inventories of the wetlands are being conducted by the Virginia Institute of Marine Science under the authorization of the Virginia Wetlands Act of 1972 (Code of Virginia 62.1-13.4). These surveys include detailed acreages of the grass species composition within individual marsh systems. In Shoreline Situation Reports of counties that have had marsh inventories, the marsh number is indicated, thus allowing the user of the Shoreline Situation Report to key back to the formal marsh inventory for additional data. The independent material in this report is provided to indicate the physiographic type of marsh land and to serve as a rough guide to marsh distribution, pending a formal inventory. Additional information on wetlands characteristics may be found in Coastal Wetlands of Virginia: Interim Report No. 3, by G.M. Silberhorn, G.M. Dawes, and T.A. Barnard, Jr., SRAMSOE No. 46, 1974, and in other VIMS publications.

i) Flood Hazard Levels

The assessment of tidal flooding hazard for the whole of the Virginia tidal shoreland is still incomplete. However, the United States Army Corps of Enginners has prepared reports for a number of localities which were used in this report. Two tidal flood levels are customarily used to portray the hazard. The Intermediate Regional Flood is that flood with an average recurrence time of about 100 years. An analysis of past tidal floods indicates it to have an elevation of approximately 8 feet above mean water level in the Chesapeake Bay area. The Standard Project Flood level is established for land planning purposes which is placed at the highest probable flood level.

j) Shellfish Leases and Public Grounds

The data in this report show the leased and public shellfish grounds as portrayed in the Virginia State Water Control Board publication "Shellfish growing areas in the Commonwealth of Virginia: Public, leased and condemned," November, 1971, and as periodically updated in other similar reports. Since the condemnation areas change with time they are not to be taken as definitive. However, some insight to the conditions at the date of the report are available by a comparison between the shellfish grounds maps and the water quality maps for which water quality standards for shellfish were used.

k) Beach Quality

Beach quality is a subjective judgment based upon considerations such as the nature of the beach material, the length and width of the beach area, and the general aesthetic appeal of the beach setting.

CHAPTER 3
Present Shorelands Situation

CHAPTER 3

PRESENT SHORELANDS SITUATION OF NORTHUMBERLAND COUNTY, VIRGINIA

3.1 THE SHORELANDS OF NORTHUMBERLAND COUNTY

Northumberland County, located at the mouth of the Potomac River, is the northernmost Bay fronting county in Virginia. Its bounds are Indian Creek on the south, the Chesapeake Bay on the east, and the West Yeocomico River on the west. Numerous tidal rivers and creeks incise the county's shorelands. Altogether, there are 438.4 miles of shoreline in the county. The 1,560 acres of wetlands, including fringe, embayed, and extensive marshes, comprise eighty-five percent of the shore zone. (For a more detailed discussion, see "Northumberland County Tidal Marsh Inventory", Virginia Institute of Marine Science, 1975.) Ten percent of the shoreline is beach and the remaining five percent is artificially stabilized. There are several notable beaches in the county located along the Potomac River. Smith Point has very wide and clean beaches, as does the area west of Hog Island. Some of the extensive groin fields employed along the Potomac River have trapped sizeable fillets of sand, sometimes covering the entire groin. There are no public beaches in the county, though the public has access to the beach at Horn Harbor Campground.

The fastland of Northumberland County ranges from low shore to high shore with bluffs, with several areas of dunes and artificial fill. Basically the entire Bay and Potomac River fronting shorelands are low shore, with some dunes located at Smith Point. Bluffs are located along the heads of several tributaries. The numerous creeks and rivers located in the county have varied shorelands types, though the majority of the lands continue to be low shore.

The rural nature of the county is easily seen by the amount of unused and agricultural land along the shore. Basically, undeveloped land accounts for seventy-seven percent of the fastland. Residential use comprises twenty-one percent of the shorelands. The two centers of development are Lewisetta (at the mouth of the Coan River) and Reedville (along Cockrell Creek). Much residential strip development has occurred along several sections of the Potomac River (Figure 6). The remaining three percent of the fastland is made up of isolated commercial, industrial, and recreational areas. These commercial and industrial areas are marinas and other water related facilities, including the fish rendering plants on Cockrell Creek. The menhaden fleet is based on the peninsula on the east side of Cockrell Creek. There are numerous boat yards along the Great Wicomico River.

The nearshore and offshore zones receive intensive use by water sport enthusiasts, commercial and sport fishermen, and heavy commercial traffic. The numerous creeks and rivers are used for a variety of water sports and some commercial shipping.

According to the State Water Control Board, the waters of Northumberland County generally have good water quality. (i.e., meeting the 305 (b)(1)(B) criteria, which states that "navigable water shall be of the quality to provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water.") The several areas with water quality problems are Cockrell, Indian and Dymer Creeks, and the Great Wicomico River, all tributaries of the Chesapeake Bay. These problems are the result of a variety of causes; past and present municipal discharges into Cockrell, Indian and Dymer Creeks, past discharges from menhaden rendering plants into Cockrell Creek, and a natural oxygen depletion during late summer in the Great Wicomico River. Several areas in the county are closed to the taking of shellfish.

Much of the Bay and Potomac River fronting shoreline in Northumberland County has elevations of 5 feet and less. Such areas are very susceptible to flooding during periods of abnormally high water. Structures in several areas are endangered by flood waters and coincident wind induced wave run-up.

3.2 SHORELINE EROSION IN NORTHUMBERLAND COUNTY

The primary cause of erosion in the Chesapeake Bay system is wave action generated by local winds. The height and growth of waves is controlled by four factors: the overwater distance across which the wind blows (the fetch), the velocity of the wind, the duration of time that the wind blows, and the depth of the water. Maximum winds occur in the Chesapeake Bay area during storms and frontal passages. Northeast storms which occur during the fall, winter and spring generate waves which attack the western shore of the Bay. The winds and low barometric pressure associated with these "northeasters" have an indirect effect on erosion by forcing additional water into the Bay. This "storm surge" may be two or more feet above the normal tide level. When such high water levels occur, the wave induced erosion is concentrated higher on the fastland, above the natural buffer zone.

Besides the height of the waves, the direction at which they impinge upon the shore controls the magnitude of long shore transport. In theory, the transport of material along the beach is greatest when the waves break on the shoreline at an angle of forty-five degrees.

The erosional behavior of any particular segment of shoreline may be expected to vary from year to year depending upon the frequency and the intensity of storms. Also, since the long term trend is for a relative rise in sea level (0.01 feet per year), the rate of change for any section of shoreline is ever changing. For example, many areas over the past 100 years have had long periods of erosion followed by years of accretion. Though the net change for the area may be very small, the figure would not be a true indication of the rate of change for any particular year. It is important to remember that the rate of change (either loss or gain) is not constant.

The roles played by marshes and beaches in the physical processes of the coastline are important in the overall protection of the fastland from erosion. Both are natural buffers which serve to absorb incident wave energy and thereby inhibit erosion of the fastland. Beaches may change their configuration hour by hour, depending upon the conditions. The natural maintenance of beaches is attained at the expense of erosion of the fastland, either at the site or up-drift.

Man's activities along the shoreline can have a significant impact upon the natural processes of erosion and accretion that constantly take place. The stabilization of one area can have an adverse impact on both nearby sites and sites downdrift. For example, a structure in front of a cliff removes a sediment source from the system, possibly starving a beach downstream. Also, an incorrectly engineered and emplaced structure can increase erosion downstream and possibly endanger other structures. Any shore protective structure should be designed and emplaced by professionals. Where feasible, an area wide system of protection is preferred to individual efforts.

Shoreline erosion is a significant problem along much of the Chesapeake Bay and Potomac River shorelands of Northumberland County. According to "Shoreline Erosion in Tidewater Virginia" (VIMS, 1977), Northumberland County ranks 2nd among the Tidewater counties in loss of acres of shoreline for the past hundred years. The net loss is 3,270 acres, or an average erosion rate of 1.1 feet per year. The estimated volume of material lost to erosion during the past 100 years is 38,075,000 cubic yards.

Most areas directly bordering either the Chesapeake Bay or the Potomac River have moderate to severe erosion rates. (Map 1 shows the historical erosion for Northumberland County.) Overall, the Potomac River portion has eroded an average of 1.5 feet per year, as compared to 1.0 feet per year along the Bay.

Several areas on the Bay have historical erosion rates greater than five feet per year. The section of shoreline from Bluff Point to Jarvis Point (Segment 2) has an average erosion rate of 5.2 feet per year. Further north, the shoreline between Harveys and Towles Creeks (Segment 6) has been eroding at an average rate of 7.1 feet per year. The shoreline from Taskmakers Creek to near Smith Point (Subsegments 8A and 8B) has eroded at an average rate of 6.1 feet per year. These areas are mostly used for agriculture or are unmanaged woods. No structures are endangered.

Two sections of shoreline along the Potomac River have very high average erosion rates. From Balls Creek to Cod Creek (Segments 11 and 12), the shoreline has eroded at an average rate of 10.6 feet per year. This area is unmanaged woods. The adjacent shoreline from Cod Creek to Presley Creek (Segment 11) has an historical average erosion rate of 5.7 feet per year. However, this section is being developed for residential purposes and the shoreline has been mostly artificially stabilized. Several areas between stabilized sections are continuing to erode. One section of bulkhead is failing and scouring is occurring (Figures 12 and 13).

Though most significant erosion is due to wind generated waves, another type of erosion prevalent along Northumberland County's shoreline is due to rain runoff. In a rural county where so much shoreland is used for agriculture, it is commonplace to see the fields plowed as close to the shore as possible. It was noted during field investigations that several fields were plowed perpendicular to the shoreline with no buffer zone between the field and the shore (Figure 11). Such plowing invites rain runoff erosion and is a prime non-point sediment source to the river. Along a highly active shoreline such as found in Northumberland County, a green zone should be instituted in front of all fields. The green zone should be relatively wide and be planted in grasses that will hold the soil. Such buffer zones would greatly diminish the losses of material from rain runoff.

A variety of structures have been employed along Northumberland County's shoreline in an effort to combat the severe erosion. There are approximately 23.2 miles of protective structures in the county, many of which are located along the Bay and Potomac River shorelands. The most prevalent protective structures are groins, used in conjunction with either bulkhead or riprap. Most structures have been effective at halting erosion. However, some groin systems have not been successful at trapping buffer beaches, and several areas of bulkhead have failed and are being flanked.

Most shoreline structures have been located a sufficient distance inland not to be endangered by erosion. However, two houses at the mouth of Hull Creek have been severely damaged by erosion and by flood forces (Figure 10). Several other houses along the shoreline of Northumberland County, though not imminently endangered, will be affected by erosion in the next ten to fifteen years if the shoreline is not stabilized.

3.3 SHORE USE LIMITATIONS

Northumberland County has areas of high intensity use and many areas which are totally unused. Most development has occurred along several creeks and along several portions of the Potomac River. Much of the residential development is for second or vacation homes. Almost all of the Chesapeake Bay shorelands and much of the Potomac River shorelands are unused or are used for agriculture. The past development trends along the county's shorelands are the result of a combination of factors which continue to limit growth in the county and along its shorelands.

Most of the Chesapeake Bay shoreline and the Potomac River shoreline have severe historical erosion rates, one area having lost over ten feet per year. These high rates are mainly due to the direct exposure of the shoreline to wind induced wave attacks during storms. While residential areas along the Potomac River have been mostly artificially stabilized, erosion is continuing along the unused sections of shoreline.

Concurrent with the severe erosion along the Bay and Potomac River is the high flood hazard for most of these areas. Flooding in these sections is aggravated by wind induced waves during storms. Wave run-up during periods of elevated water levels can cause extensive damage to structures located significant distances inland. Since most of the affected shorelands have elevations of 5 to 10 feet, large portions of land can be inundated by flood waters.

Existing conditions in some areas restrict the amount and type of development which can take place. The dunes found along Smith Point are unique physiographic features which should be preserved. They not only offer flood protection but also serve as habitats for numerous forms of wildlife. Eighty-five percent of the shoreline is wetlands, either embayed, extensive, or fringe marsh. These areas are important erosion and flood control agents and also serve important ecological functions. Wetlands are protected by the Virginia Wetlands Act of 1972 and should not be disturbed where ever possible. The presence of marshes restrict access to the shoreline and thus tend to limit development.



Figure 3



Figure 4

FIGURE 3: Reedville, Subsegment 7F. The tip of the peninsula would be flooded during times of abnormally high water, damaging or destroying the structures. Cockrell Creek has high bacteriological counts due to septic tank leachate around Reedville.

FIGURE 4: Creek south of Taskmakers Creek, Subsegment 8A. Erosion along this section of the Chesapeake Bay can be a serious problem. The house has been protected by rubble riprap. Erosion had been quite evident until the shoreline was stabilized.

FIGURE 5: Smith Point, Subsegment 8B. This site has excellent sand beaches and shows evidence of dune formation.

FIGURE 6: Vir-Mar Beach, Segment 10. The groins have been effective in trapping buffer beaches. However, erosion is continuing along many bluff areas of the shoreline.

FIGURE 7: Marshalls Beach, Segment 11, ground view. The groins have been very successful in trapping sand. Beach material is coming from the eroding bluffs along this section of shoreline.

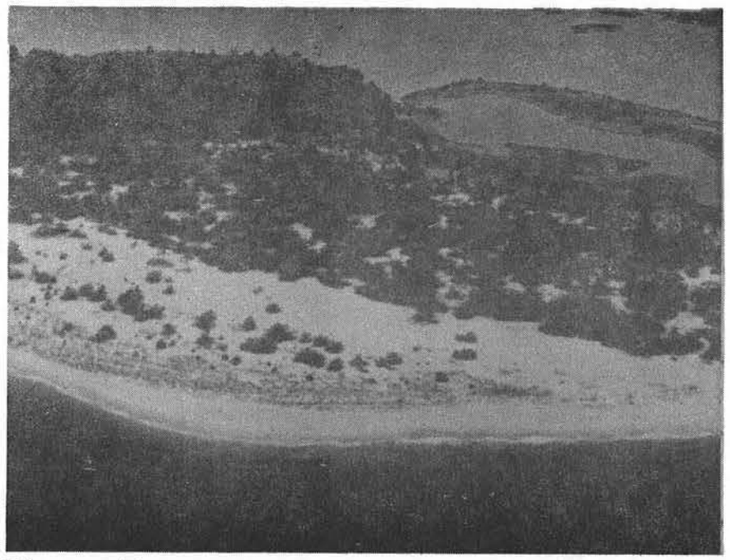


Figure 5

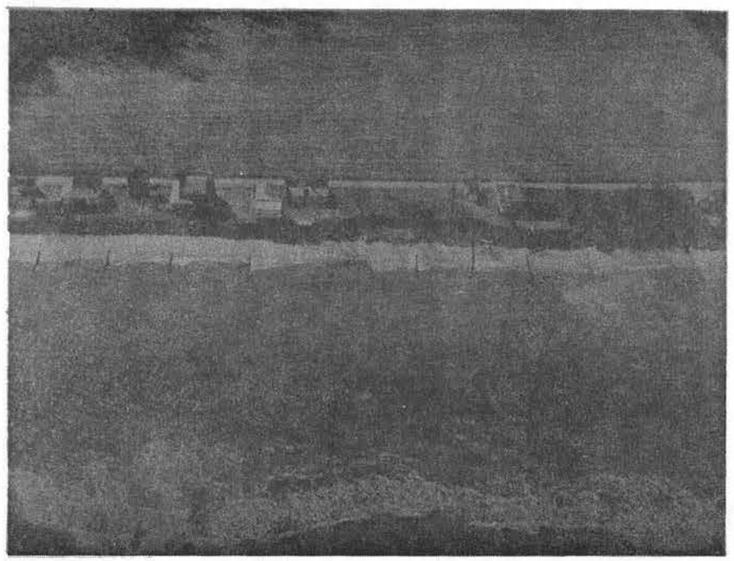


Figure 6

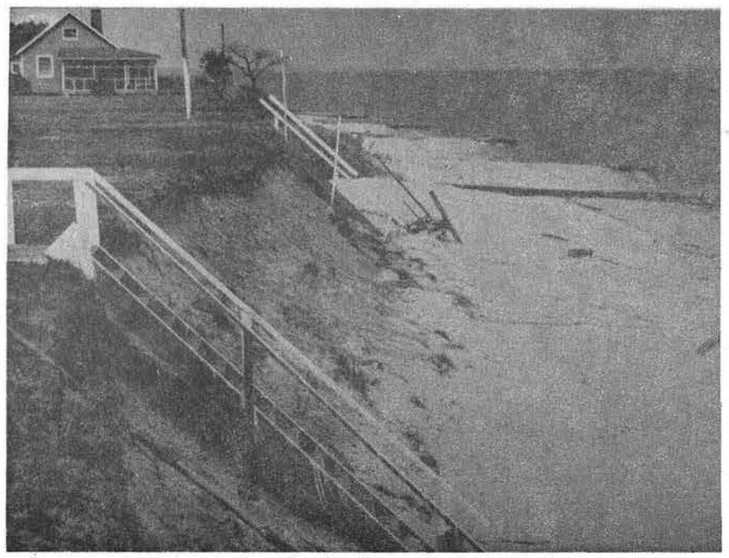


Figure 7

FIGURE 8: Cordreys Beach, Segment 11. The two new sections of bulkhead and groins need to be backfilled. Notice the evidence of past erosion.

FIGURE 9: Mouth of Rogers Creek, Segment 11. The variety of structures here tends to be self-defeating. Note the different angles which the groins approach the shoreline. A simplified, but well-engineered, plan of shoreline protection would probably be more effective.

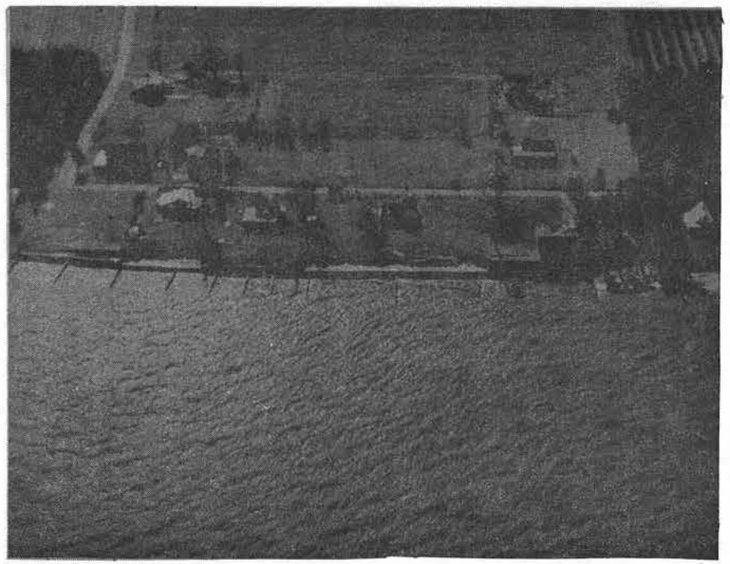


Figure 8

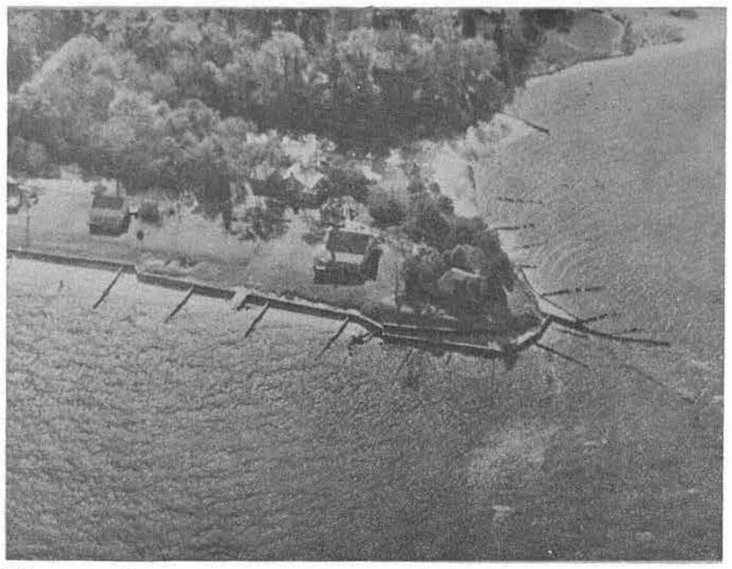


Figure 9

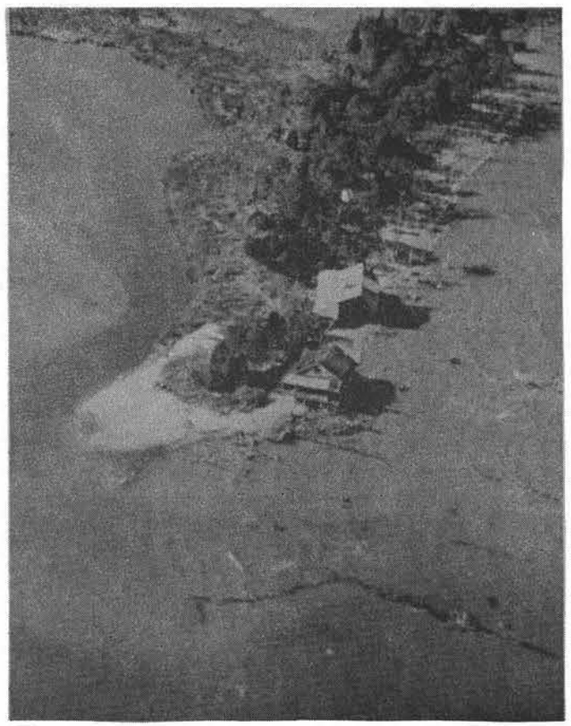


Figure 10

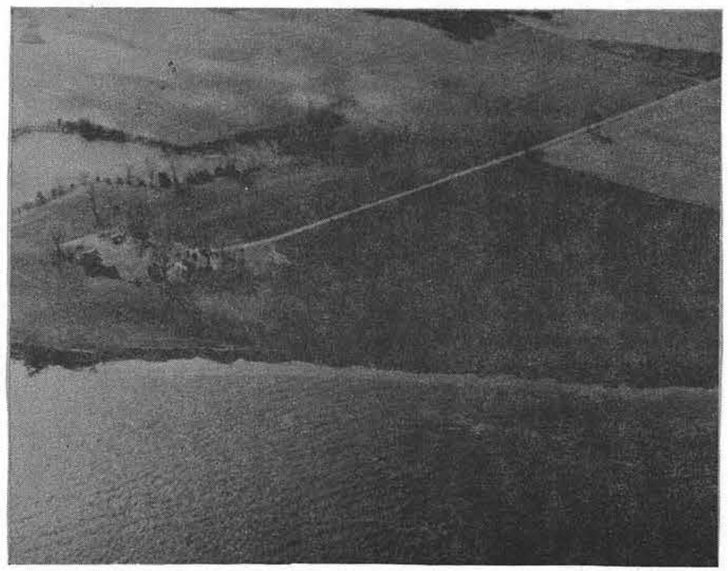


Figure 11

FIGURE 10: Mouth of Hull Creek, Segment 11. These two houses, damaged by continued erosion, have been abandoned.

FIGURE 11: Toward Corbin Pond, Segment 11. Continued erosion of the agricultural lands also causes pollution of the water, as fertilizers and insecticides are washed into the river.



Figure 12

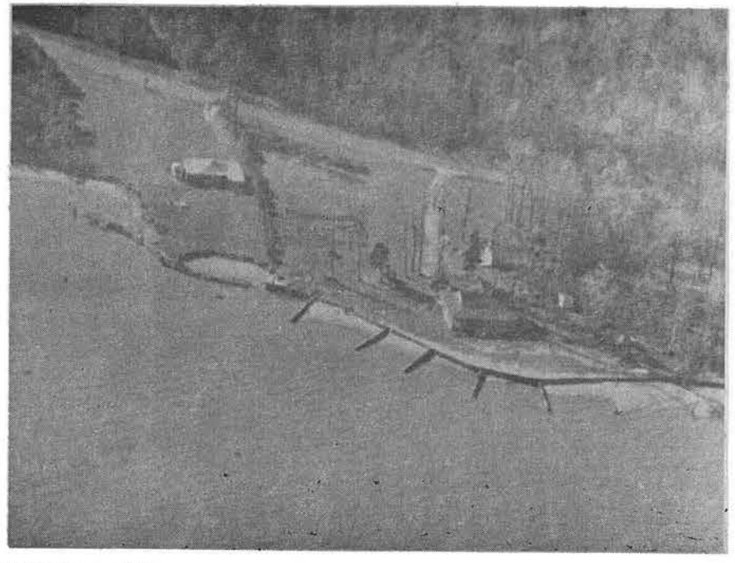


Figure 13

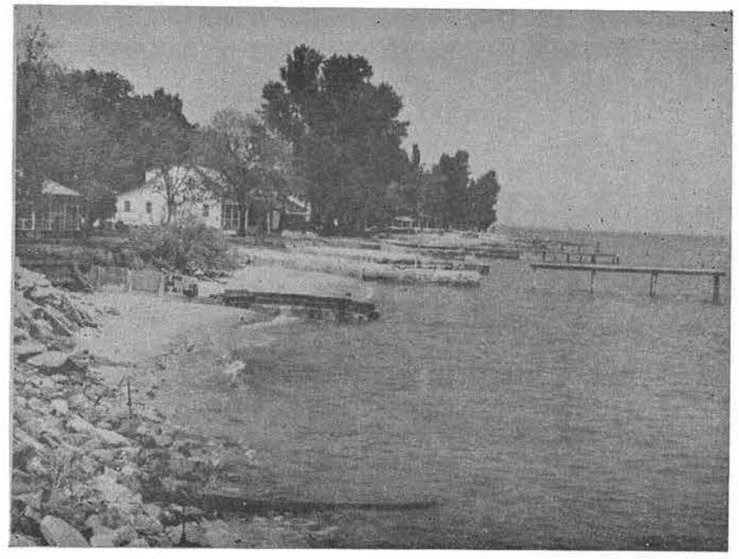


Figure 14

FIGURE 12: Bay Quarter Neck, Segment 11, ground view. The bulkhead has failed and the area behind is eroding.

FIGURE 13: Bay Quarter Neck, Segment 11. Aerial view of Figure 12. Notice the erosion behind the failed bulkhead.

FIGURE 14: Lewisetta, Segment 13. Various shore protection structures here include riprap, bulkhead, and groins. The groins have been built of concrete culverts, cinder blocks, and wood.

FIGURE 15: Mouth of Judith Sound, Segment 13. This area has been artificially stabilized using bulkhead and groins. Both have been effective. Notice the strip development along the shoreline.

FIGURE 16: East bank of Lodge Creek, Segment 15. This is a large marina facility for such a rural area.

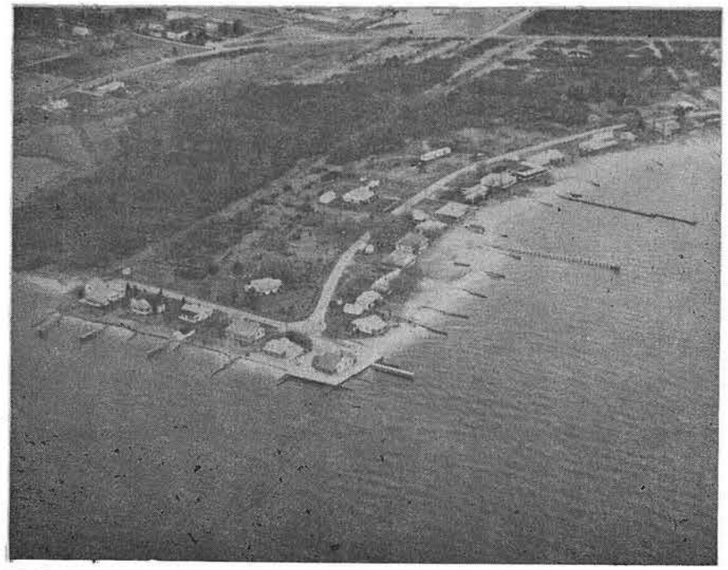


FIGURE 15

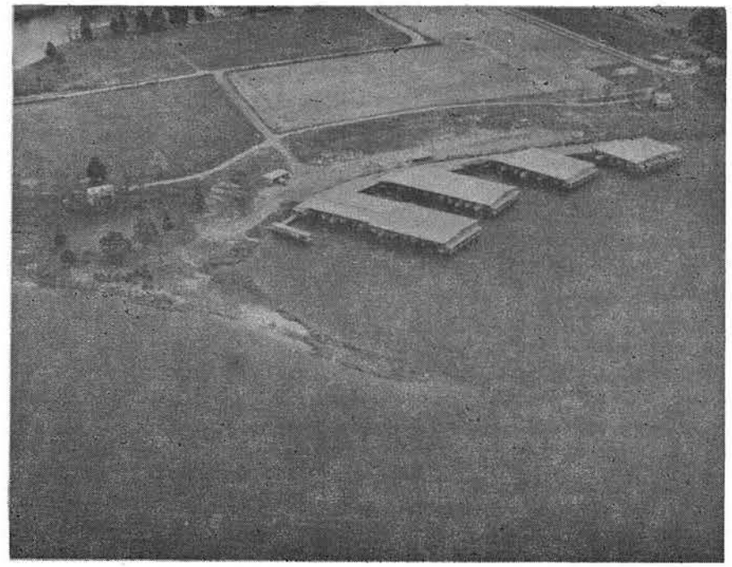


FIGURE 16

NORTHUMBERLAND COUNTY

MAP 1A

SEGMENT AND MAP INDEX

// = Segment Boundary
/ = Subsegment Boundary

1 HEAD OF INDIAN CREEK TO BLUFF POINT
2 BLUFF POINT TO JARVIS POINT
3 DIVIDING CREEK
4 HUGHLETT POINT TO DAMERON MARSH
5 DAMERON MARSH TO MOUTH OF MILL CREEK
6 MOUTH OF MILL CREEK TO MOUTH OF GREAT WICOMICO RIVER
7A MOUTH OF GREAT WICOMICO RIVER TO ROGUE POINT
7B ROGUE POINT TO EAGLE POINT
7C EAGLE POINT TO BETZE LANDING
7D BETZE LANDING TO GLEBE POINT
7E GLEBE POINT TO HAYNIE POINT
7F HAYNIE POINT TO FLEET POINT
8A FLEET POINT TO THE MOUTH OWENS POND
8B MOUTH OF OWENS POND TO SMITH POINT
9A SMITH POINT TO PEACHTREE POINT
9B PEACHTREE POINT TO HEAD OF LITTLE WICOMICO RIVER
9C HEAD OF LITTLE WICOMICO RIVER TO KING POINT
9D KING POINT TO SMITH POINT
10 SMITH POINT TO MOUTH OF CUBITT CREEK
11 CUBITT CREEK TO GREAT POINT
12 GREAT POINT TO HONEST POINT
13 HONEST POINT TO HOG ISLAND
14 HOG ISLAND TO BARN POINT
15 BARN POINT TO MUNDY POINT
16 MUNDY POINT TO COUNTY LINE

38° 00'
76° 30'
37° 45'
0 1 2 3 4

NORTHUMBERLAND COUNTY

MAP 1B

SHORELANDS TYPES

FASTLAND

- Low Shore
- Low Shore with Bluff
- Moderately Low Shore
- Moderately Low Shore with Bluff
- Moderately High Shore
- Moderately High Shore with Bluff
- High Shore
- High Shore with Bluff
- Dune

SHORE

- Beach
- Fringe Marsh
- Extensive Marsh
- Embayed Marsh
- Artificially Stabilized

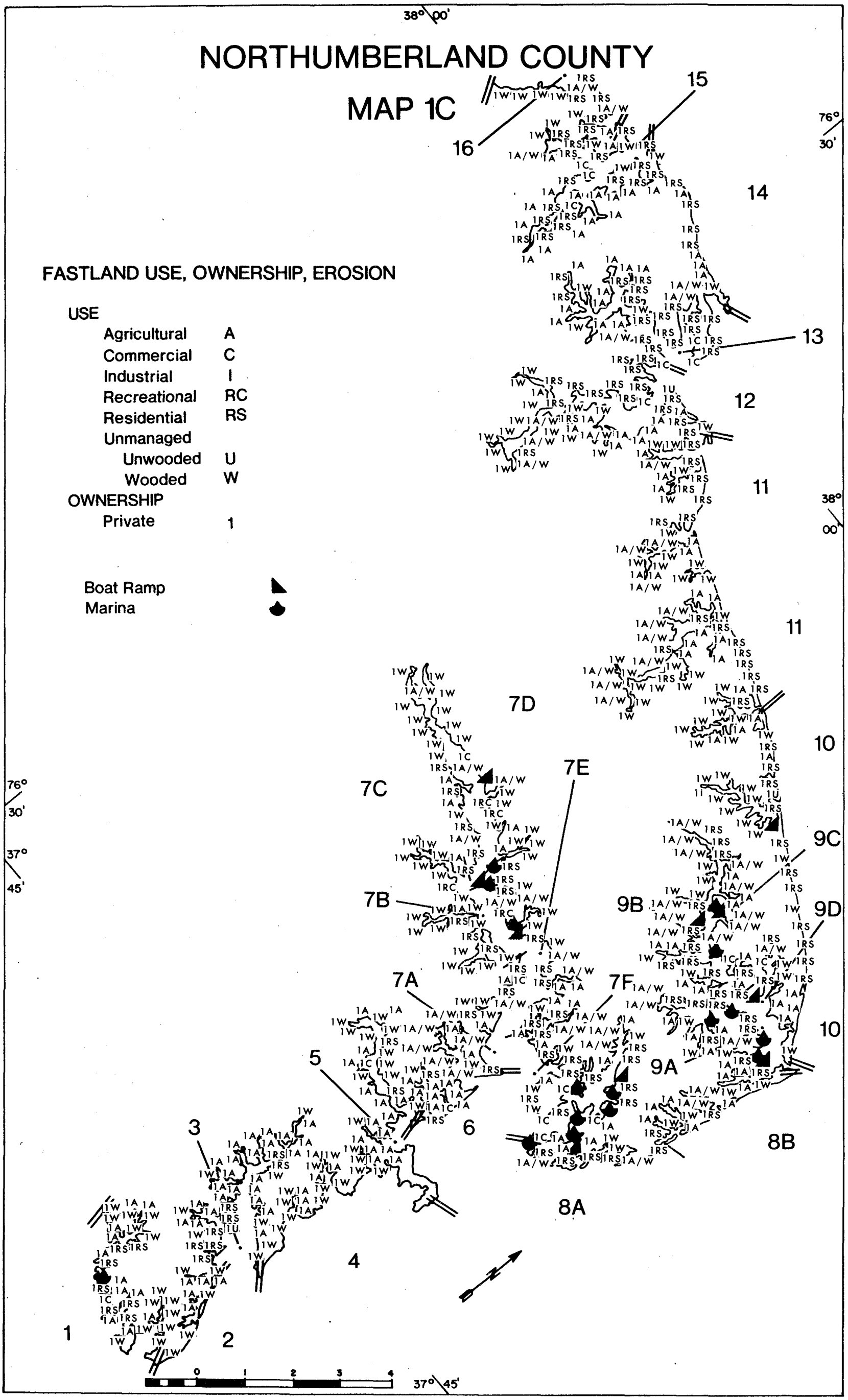
NEARSHORE

- Narrow
- Intermediate
- Wide

38° 00'
76° 30'
37° 45'
0 1 2 3 4

NORTHUMBERLAND COUNTY

MAP 1C



FASTLAND USE, OWNERSHIP, EROSION

USE	
Agricultural	A
Commercial	C
Industrial	I
Recreational	RC
Residential	RS
Unmanaged	
Unwooded	U
Wooded	W
OWNERSHIP	
Private	1

Boat Ramp

Marina

NORTHUMBERLAND COUNTY

MAP 1D

SHELLFISH GROUNDS AND SEWAGE DISCHARGE

Public Grounds

Leased Areas

Condemation Areas

■ Sewage Discharge

● Industrial Discharge

38° 00'

76° 30'

37° 45'

1 2 3 4

NORTHUMBERLAND COUNTY

MAP 1E

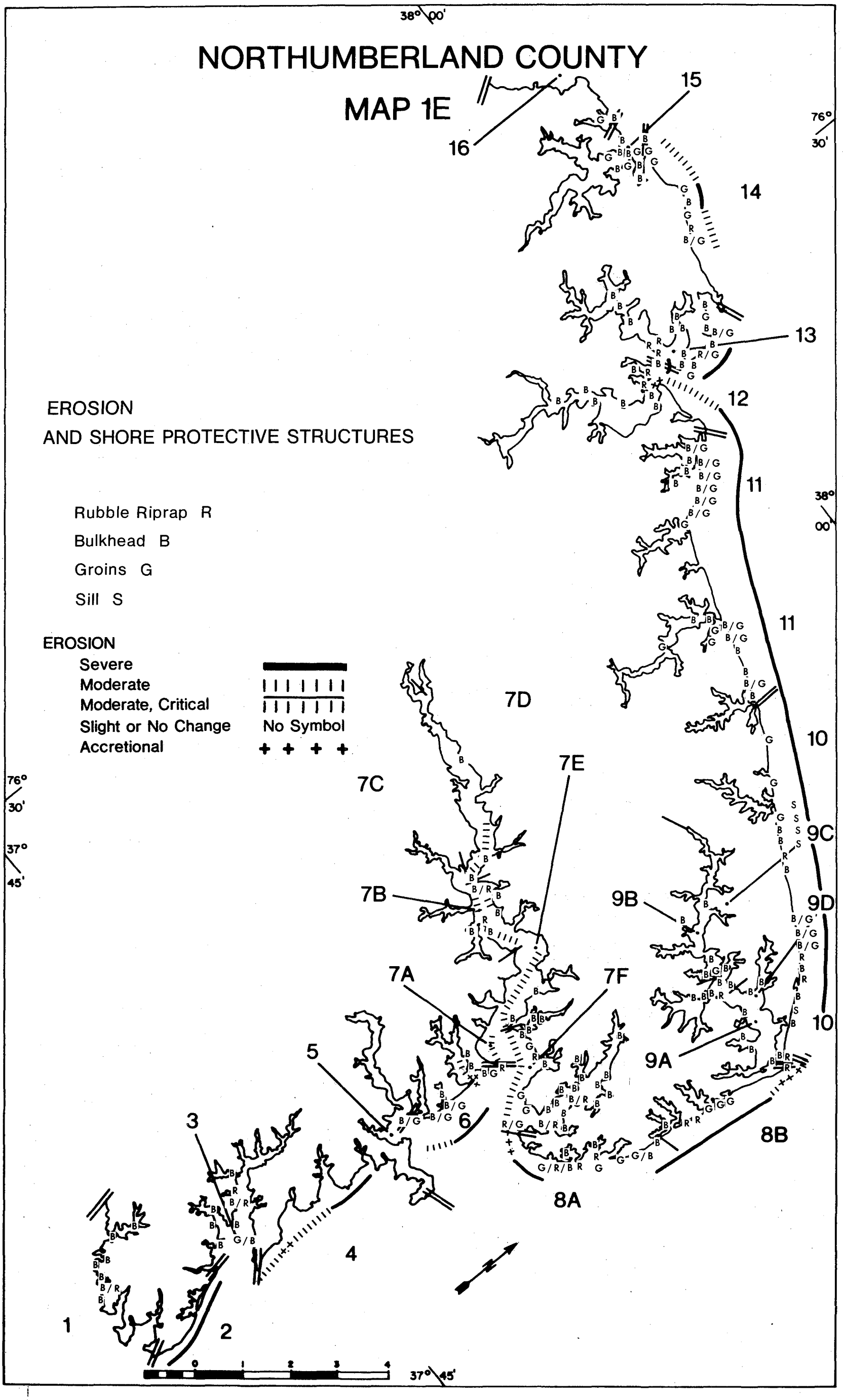


TABLE 1. SUMMARY OF NORTHUMBERLAND COUNTY SHORELANDS PHYSIOGRAPHY AND FASTLAND USE (STATUTE MILES)

Physiographic and use classification / Subsegment	SHORELANDS PHYSIOGRAPHY																		FASTLAND USE							TOTAL MILES	
	FASTLAND										SHORE					NEARSHORE											
	ARTIFICIAL FILL	DUNES	LOW SHORE	LOW SHORE WITH BLUFF	MODERATELY LOW SHORE	MODERATELY LOW SHORE WITH BLUFF	MODERATELY HIGH SHORE	MODERATELY HIGH SHORE WITH BLUFF	HIGH SHORE	HIGH SHORE WITH BLUFF	ARTIFICIALLY STABILIZED	BEACH	FRINGE MARSH	EMBAYED MARSH	EXTENSIVE MARSH	NARROW	INTERMEDIATE	WIDE	AGRICULTURAL	COMMERCIAL	INDUSTRIAL	RECREATIONAL	RESIDENTIAL	UNMANAGED, UNWOODED	UNMANAGED, WOODED	SHORE	FASTLAND
1	0.1		24.5								0.6	1.8	20.7	0.2	2.8	C R E E K			7.6	0.2		0.3	7.0		9.5	26.1	24.6
2			1.3									2.0			0.7	0.4	1.0	1.3	0.2						1.1	2.7	1.3
3	0.3		33.4								1.0	1.6	32.1	0.1	0.5	C R E E K			16.7				5.5	0.4	11.1	35.3	33.7
4			11.6									1.3	7.9		6.1		1.0	3.7	3.7						7.9	15.3	11.6
5			12.9	0.2	0.4		0.6		1.8			0.3	12.8	1.9	1.3		2.0		7.8	0.3			0.7		7.1	16.3	15.9
6	0.3	0.2	14.8	0.4							0.8	2.2	13.0	0.3			2.3		6.2	0.1			2.2	0.4	6.8	16.3	15.7
7A			6.3	0.8	0.8						0.1	2.1	4.8	0.5		R I V E R			2.7	0.1			1.2		3.9	7.5	7.9
7B			3.7	0.1	5.5	0.3	3.4		5.1		0.4	1.4	13.7	0.9		R I V E R			0.5				2.8		14.8	16.4	18.1
7C			2.7		7.8	0.1		1.2	1.2			0.3	7.8	4.6		R I V E R			0.8				1.8		10.4	12.7	13.0
7D	0.2		1.7		5.9	0.1	4.2		3.4		0.4		11.7	2.0		R I V E R			2.3	0.2		1.6	1.1		10.3	14.1	15.5
7E	0.1		4.1	0.4	7.3	0.5	1.1		0.7		0.5	0.9	9.9	1.4		R I V E R			4.3	0.2		0.9	1.1	0.4	7.3	12.7	14.2
7F	0.1		34.4	1.1							3.9	1.4	27.7	1.3		R I V E R			10.0	2.0	1.3	0.5	11.1	0.4	10.3	34.3	35.6
8A			13.1	0.4							0.9	3.2	8.5	0.3			2.8		3.5				3.6		6.4	12.9	13.5
8B		1.0	5.4	0.5							0.1	3.1	4.2	0.3			2.7	0.6	1.5				0.4		5.0	7.7	6.9
9A			22.4	1.0							0.7	1.1	19.6	1.7		R I V E R			8.5	0.3			4.9		9.7	23.1	23.4
9B	0.1		15.1	0.8	0.2						0.2	1.8	11.1	1.0		R I V E R			3.1				4.5		8.6	14.1	16.2
9C			15.6	0.4							0.1	0.5	11.7	1.4		R I V E R			6.7	0.3	0.1		2.3		6.6	13.7	16.0
9D			9.3	1.9							0.3	0.8	8.8	1.1		R I V E R			4.8	0.1			0.6		5.7	11.0	11.2
10	0.5	0.9	3.8	3.3							3.0	5.5		0.4			6.6	1.2	1.7				4.3	0.4	2.1	8.9	8.5
11	0.1	0.2	19.4	2.9	13.6	3.8	3.8	1.0	1.4	0.6	2.3	5.4	32.8	4.9			3.8	1.3	17.7				11.1		18.0	45.4	46.8
12			8.4	3.4	7.0	2.3	5.8	0.3	2.9	0.8	1.1	3.1	19.7	4.9			1.4		10.6	0.5	0.3		5.7	0.3	13.5	28.8	30.9
13			23.0	1.9	0.5						2.1	1.3	17.9	1.7	2.3		2.6		12.3	0.4			7.7		5.0	25.3	25.4
14			4.7	0.3							1.4	1.6	0.3	0.2	0.6		4.1		2.3				1.7		1.0	4.1	5.0
15	0.1		9.5	6.1	10.1	0.2	0.2		0.8		3.1	1.2	20.5	1.2		R I V E R			10.8	0.6	0.2		11.5		3.9	26.0	27.0
16			3.8		2.7	0.3	0.4		0.9		0.3	0.2	6.8	0.4		R I V E R			1.5		0.1		1.6	0.2	4.7	7.7	8.1
TOTAL	1.7	2.2	304.7	26.3	61.8	7.6	19.5	2.6	18.3	1.3	23.2	44.3	324.0	32.5	14.4	0.4	30.2	8.1	147.2	5.5	2.1	3.3	94.4	2.4	191.1	438.4	446.0
% of FASTLAND	1%	1%	68%	6%	14%	2%	4%	1%	4%	1%									33%	1%	1%	1%	21%	1%	43%		100%
% of SHORELINE											5%	10%	74%	8%	3%	1%	7%	2%								100%	

CHAPTER 4

4.1 Table of Subsegment Summaries

4.2 Segment and Subsegment Descriptions

4.3 Segment and Subsegment Maps

TABLE 2. SHORELINE SITUATION REPORT SUBSEGMENT SUMMARY FOR NORTHUMBERLAND COUNTY, VIRGINIA

SUBSEGMENT	SHORELANDS TYPE	SHORELANDS USE	FLOOD HAZARD	WATER QUALITY	BEACH QUALITY	SHORE EROSION SITUATION	ALTERNATE SHORE USE
1 HEAD OF INDIAN CREEK TO BLUFF POINT 26.1 miles (24.6 miles of fastland)	FASTLAND: Artificial fill 1% and low shore 99%. SHORE: Artificially stabilized 2%, beach 7%, fringe marsh 79%, embayed marsh 1%, and extensive marsh 11%. CREEK: Indian Creek has depths of 16 feet at the entrance graduating to 2 feet at the head.	FASTLAND: Agricultural 31%, commercial < 1%, recreational 1%, residential 28%, and unmanaged, wooded 39%. SHORE: Some private recreational use but mostly unused. CREEK: Some commercial traffic; sport boating and fishing.	High, critical. Many structures are below 5-foot elevations and are subject to flooding during periods of abnormally high water.	Unsatisfactory. Indian Creek is condemned for the taking of shellfish due to past and present point source pollutants.	Fair. The fastland in this segment has narrow, strip beaches fronting it.	Slight or no change. There are approximately 3,000 feet of artificially stabilized shoreline in this segment. Some structures may be for erosion protection, though the majority is for cosmetic purposes. There are approximately 3,000 feet of bulkhead in the segment. All structures appear to be effective.	Several of the wooded areas along Barnes Creek have potential for becoming low intensity recreational parks. Elsewhere in the segment there seems to be little land available or suitable for alternate use.
2 BLUFF POINT TO JARVIS POINT 2.7 miles (1.3 miles of fastland)	FASTLAND: Entirely low shore. SHORE: Beach 73% and extensive marsh 27%. NEARSHORE: Narrow 13%, intermediate 37%, and wide 50%.	FASTLAND: Agricultural 14% and unmanaged, wooded 86%. SHORE: Some recreational use but mostly unused. NEARSHORE: Sport boating and fishing.	High, noncritical. The entire segment has elevations of less than 5 feet and is exposed to direct wind and wave attacks from the Chesapeake Bay. There are no endangered structures.	Satisfactory. The Chesapeake Bay is experiencing good water quality. Some non-point source pollution does exist, but this is readily flushed into the Bay.	Good to fair. Though most of the beaches in this segment are narrow, Jarvis Point and one half mile south has wide, vegetated beaches.	Severe, noncritical. This segment has an historical erosion rate of 5.2 feet per year. There are no endangered or shore protective structures.	Low. The Bluff Point area could be developed as a low intensity recreational park. Elsewhere the existing agricultural use seems best suited for the area.
3 DIVIDING CREEK 35.3 miles (34.0 miles of fastland)	FASTLAND: Artificial fill 1% and low shore 99%. SHORE: Artificially stabilized 3%, beach 4%, fringe marsh 91%, embayed marsh <1%, and extensive marsh 1%. CREEK: Dividing Creek has depths of 14 feet in the approach, graduating to 6 feet at the head.	FASTLAND: Agricultural 50%, commercial < 1%, residential 16%, unmanaged, unwooded 1%, and unmanaged, wooded 33%. SHORE: Some private recreational use, but mostly unused. CREEK: Sport boating and fishing.	Moderate to high, critical. Though areas near the creek head have elevations of at least 10 feet, some structures are below 5-foot elevations. These structures are vulnerable to flooding during periods of abnormally high water.	Satisfactory to unsatisfactory. According to the State Water Control Board this area has good water quality. However, the Bureau of Shellfish Sanitation has condemned two portions of the creek for the taking of shellfish due to animal pollution.	Fair. There are several narrow, strip beaches in this segment.	Slight or no change to moderate, noncritical. Several areas at the mouth of Dividing Creek have historical erosion rates of 1.4 to 2.9 feet per year. One section of shoreline near Hughlett Point has been accreting at a rate of 1.5 feet per year. There are 5,200 feet of artificially stabilized shoreline in the segment. Most structures at the creek mouth are for erosion control, while those along the interior shorelines are for cosmetic purposes.	Low. The present rural agricultural usage will probably continue for this segment. There are few alternate demands for the shoreline at the present time.
4 HUGHLETT POINT TO DAMERON MARSH 15.3 miles (11.6 miles of fastland)	FASTLAND: Entirely low shore. SHORE: Beach 9%, fringe marsh 52%, and extensive marsh 39%. NEARSHORE: Intermediate 7% and wide 24%. The remainder of the nearshore zone is located along the creeks in this segment.	FASTLAND: Agricultural 32% and unmanaged, wooded 68%. SHORE: Mostly unused. NEARSHORE: Commercial shipping in the Bay, sport boating and fishing closer to shore.	High, critical. The entire segment is subject to flooding. The structures along the shoreline at Dameron Marsh and Ball Creek would be endangered by flood waters.	The Chesapeake Bay and Small Coastal Basins are generally of good water quality. Some non-point pollution may exist, but this is readily flushed into the Bay system.	Fair. Though most of the Bay shoreline has beaches, they are usually narrow and often vegetated. Beaches fronting areas of extensive marsh are often fairly wide.	Moderate to severe, noncritical. Most of the shoreline has a moderate erosion rate. The shoreline between Ball and Cloverdale Creeks is eroding at an historical rate of 3.0 feet per year. There are no endangered or shore protective structures.	Low. The area is rural in nature and seems best suited for such low intensity use.
5 DAMERON MARSH TO MOUTH OF MILL CREEK 16.3 miles (15.7 miles of fastland)	FASTLAND: Low shore 81%, low shore with bluff 1%, moderately low shore 3%, moderately high shore 4%, and high shore 11%. SHORE: Beach 2%, fringe marsh 78%, embayed marsh 12%, and extensive marsh 8%. NEARSHORE: Intermediate 12%. The remainder of the nearshore zone is located along Mill Creek.	FASTLAND: Agricultural 49%, commercial 2%, residential 5%, and unmanaged, wooded 44%. SHORE: Some private use in front of residences, but mostly unused. NEARSHORE: Commercial shipping in the Bay, sport boating and fishing in the creek and Bay.	Low to high, critical. The majority of the shorelands along Mill Creek are high enough to resist inundation by flood waters. However, several residences near Dameron Marsh are below 5-foot elevations and would be endangered by flooding.	The Chesapeake Bay and Small Coastal Basins generally have good water quality. Some non-point source pollution may exist, but this is readily flushed into the Bay system.	Fair. The few beaches located at the mouth of Mill Creek are narrow and vegetated.	There is little or no erosion in this segment. There are no endangered or shore protective structures.	Low. There seems to be little pressure for a change in the present agricultural use of the shorelands.
6 MOUTH OF MILL CREEK TO MOUTH OF THE GREAT WICOMICO RIVER 16.3 miles (15.7 miles of fastland)	FASTLAND: Artificial fill 2%, low shore 94%, low shore with bluff 3%, and dunes 1%. SHORE: Artificially stabilized 4%, beach 14%, fringe marsh 80%, and embayed marsh 2%. NEARSHORE: Intermediate 14%. The remainder of the nearshore zone is located along the creeks in this segment.	FASTLAND: Agricultural 39%, commercial < 1%, residential 14%, unmanaged, unwooded 2%, and unmanaged, wooded 43%. SHORE: Private recreational use. NEARSHORE: Commercial shipping in the Bay, sport boating and fishing in the creeks and Bay.	Low to moderate, critical. Much of the shoreline has elevations of 10 to 15 feet and would not be flooded. However, several structures in the segment are at or below the 5-foot contour and would be flooded during abnormally high waters.	Generally good. Some seasonal agricultural runoff may occur in areas, but this would be readily flushed into the Bay system.	Fair to good. The majority of the beaches are narrow and often vegetated. The mouths of the creeks in the segment have fairly wide, clean beaches.	Slight to severe, noncritical. Erosion is generally confined to the areas directly fronting the Chesapeake Bay. The spits at the mouths of Harveys and Cranes Creeks are accreting. The area between Harveys and Cranes Creeks has an historical erosion rate of 3.4 to 7.1 feet per year. There are approximately 4,000 feet of bulkhead, several sections of which are fronted by groin fields. All structures appear to be effective.	Low. The present agricultural use of the shorelands seems best suited for the segment. There is little demand for alternate development at the present time.

TABLE 2 (cont'd)

SUBSEGMENT	SHORELANDS TYPE	SHORELANDS USE	FLOOD HAZARD	WATER QUALITY	BEACH QUALITY	SHORE EROSION SITUATION	ALTERNATE SHORE USE
7A MOUTH OF GREAT WICOMICO RIVER TO ROGUE POINT 7.5 miles (7.9 miles of fastland)	FASTLAND: Low shore 80%, low shore with bluff 10%, and moderately low shore 10%. SHORE: Artificially stabilized 1%, beach 27%, fringe marsh 65%, and embayed marsh 7%. RIVER: This section of the Great Wicomico River has depths of at least 18 feet.	FASTLAND: Agricultural 35%, commercial 1%, residential 15%, and unmanaged, unwooded 49%. SHORE: Some private recreational use, but mostly unused. RIVER: Some commercial traffic, but mostly sport boating and fishing.	Low. The majority of the subsegment has elevations of at least 10 feet and is not subject to flooding.	The Great Wicomico River's sub-surface waters experience an oxygen depletion during the late summer months. This condition appears to be a natural phenomenon. The river does not meet the 305(b)(1)(B) report.	Fair to good. Beaches from the mouth of the river to Shell Creek are generally good.	Slight to moderate, noncritical. Erosion in the Sandy Point area is due to a combination of refracted wave energy from the southeast and direct waves from the northeast and northwest. There are approximately 300 feet of effective bulkhead in the subsegment.	Low. The agricultural use of the subsegment seems best for the present time. There appears to be little competition for any available shoreline.
7B ROGUE POINT TO EAGLE POINT 16.4 miles (18.1 miles of fastland)	FASTLAND: Low shore 20%, low shore with bluff 1%, moderately low shore 30%, moderately low shore with bluff 2%, moderately high shore 19%, and high shore 28%. SHORE: Artificially stabilized 2%, beach 9%, fringe marsh 84%, and embayed marsh 5%. RIVER: This subsegment of the Great Wicomico River has average depths of 12 feet.	FASTLAND: Agricultural 3%, residential 15%, and unmanaged, wooded 82%. SHORE: Some private recreational use, but mostly unused. RIVER: Sport boating and fishing.	Low, noncritical. With elevations of ten to thirty feet along the shoreline, the subsegment is not subject to flooding.	The Great Wicomico River's sub-surface waters experience an oxygen depletion during the late summer months. This condition appears to be a natural phenomenon. The river does not meet the 305(b)(1)(B) report.	Poor to fair. Most beaches are of fair width, though often vegetated.	Slight to moderate, noncritical. Most of the river-fronting shoreline is experiencing moderate erosion, while the area at the base of the bridge has been accreting. There are approximately 2,000 feet of effective bulkhead in the subsegment.	Moderate. The area from Rogue Point to Tipers Creek will probably continue to be developed for residential purposes. The Glebe Point area could be developed as a public recreational park.
7C EAGLE POINT TO BETZ LANDING 12.7 miles (13.0 miles of fastland)	FASTLAND: Low shore 21%, moderately low shore 60%, moderately low shore with bluff 1%, moderately high shore with bluff 9%, and high shore 9%. SHORE: Beach 2%, fringe marsh 62%, and embayed marsh 36%. RIVER: Narrow and shallow.	FASTLAND: Agricultural 6%, residential 14%, and unmanaged, wooded 80%. SHORE: Some private recreational use, but mostly unused. RIVER: Sport boating and fishing.	Low. The elevation of the shoreline protects the subsegment against flooding.	Unsatisfactory. The upper portion of the Great Wicomico River is closed to the taking of shellfish.	Poor. Eagle Point has narrow, strip beaches.	Slight or no change. Some erosion may occur due to downhill rain runoff and boat traffic on the river. There are no endangered or shore protective structures.	Low. Although there is much unused land in this area that could be developed, there is little pressure for such development.
7D BETZ LANDING TO GLEBE POINT 14.1 miles (15.5 miles of fastland)	FASTLAND: Artificial fill 1%, low shore 11%, moderately low shore 38%, moderately low shore with bluff 1%, moderately high shore 27%, and high shore 22%. SHORE: Artificially stabilized 3%, fringe marsh 83%, and embayed marsh 14%. RIVER: Too narrow and shallow for classification.	FASTLAND: Agricultural 15%, commercial 1%, recreational 11%, residential 7%, and unmanaged, wooded 66%. SHORE: Glebe Point is used for commercial and recreational purposes. The remainder of the subsegment is mostly unused. RIVER: Sport boating and fishing.	Low to moderate, noncritical. The majority of the shoreline has sufficient height to withstand flooding. However, several structures at Glebe Point would be flooded during periods of abnormally high waters.	Unsatisfactory. This portion of the Great Wicomico River is closed to the taking of shellfish.	There are no beaches in this subsegment.	Slight or no change to moderate, noncritical. The area from Betts Mill Creek to Glebe Point has an historical erosion rate of 2.4 feet per year. However much of this area is now artificially stabilized. There are approximately 2,000 feet of effective bulkhead in the subsegment.	Low. There seems to be little pressure for development along this section of the Great Wicomico River.
7E GLEBE POINT TO HAYNIE POINT 12.7 miles (14.2 miles of fastland)	FASTLAND: Artificial fill 1%, low shore 29%, low shore with bluff 3%, moderately low shore 51%, moderately low shore with bluff 3%, moderately high shore 8%, and high shore 5%. SHORE: Artificially stabilized 4%, beach 7%, fringe marsh 78%, and embayed marsh 11%. RIVER: The Great Wicomico River has average depths of 12 feet from Glebe Point to Collins Point, and 18 feet from Collins Point to Haynie Point.	FASTLAND: Agricultural 30%, commercial 2%, recreational 6%, residential 8%, unmanaged, wooded 51%. A gravel pit at the head of Warehouse Creek comprises less than 1% of the shorelands use. SHORE: Some recreational and commercial use around Glebe Point and recreational use at the mouth of Horn Harbor. RIVER: Sport boating and fishing.	Low to moderate, critical. Glebe Point has elevations of 5 feet or less. Many structures here would be flooded during periods of abnormally high water.	Unsatisfactory. The Great Wicomico River does not meet the 305(b)(1)(B) criteria.	Poor to fair. Most of the subsegment has narrow, vegetated beaches, with the exception of the campground at Horn Harbor, which has a wide clean beach.	Slight or no change to moderate, noncritical. Glebe Point has been accreting at an average historical rate of 1.3 feet per year. The bluffs at Blackwells and those west of Warehouse Creek to Haynie Point have historical erosion rates of 1.0 to 1.2 feet per year. There are approximately 2,800 feet of artificially stabilized shoreline in the subsegment, most of which appear to be effective.	Low. Though some sections of the subsegment could be developed for residential use, there appears to be little pressure for any substancial change in the present shore use.
7F HAYNIE POINT TO FLEET POINT 34.3 miles (35.6 miles of fastland)	FASTLAND: Artificial fill <1%, low shore 97%, and low shore with bluff 3%. SHORE: Artificially stabilized 11%, beach 4%, fringe marsh 81%, and embayed marsh 4%. RIVER: This portion of the river has average depths of 17 feet. The main branch of Cockrell Creek has depths of 12 feet to Reedville.	FASTLAND: Agricultural 28%, commercial 6%, industrial 4%, recreational 1%, residential 31%, unmanaged, unwooded 1%, and unmanaged, wooded 29%. SHORE: Commercial use (marinas and fish processing plants) and some private recreational use. RIVER: Commercial shipping and sport boating and fishing.	Low to moderate, critical. Haynie Point, the tip of the Reedville peninsula and several other areas are subject to inundation during periods of abnormally high water. Several structures at Reedville would be flooded during such storms.	Unsatisfactory. Cockrell Creek suffers from high bacteriological counts due to leachate from septic tanks around Reedville. The Great Wicomico River does not meet the 305(b)(1)(B) criteria.	Poor to fair. The beaches in this subsegment are narrow and often interspaced with fringe marsh.	Slight or no change to moderate, noncritical. The entire river-fronting shoreline has an average historical erosion rate of 2.0 to 2.7 feet per year. There are approximately 20,500 feet of artificially stabilized shoreline in the subsegment. Groins are used in conjunction with bulkhead or riprap in several areas. Most stabilization appears to be effective.	Low. It appears that most of the shoreline will eventually be developed for residential or commercial purposes.

TABLE 2(cont'd)

SUBSEGMENT	SHORELANDS TYPE	SHORELANDS USE	FLOOD HAZARD	WATER QUALITY	BEACH QUALITY	SHORE EROSION SITUATION	ALTERNATE SHORE USE
8A FLEET POINT TO THE MOUTH OF OWENS POND 12.9 miles (13.5 miles of fastland)	FASTLAND: Low shore 97% and low shore with bluff 3%. SHORE: Artificially stabilized 7%, beach 25%, fringe marsh 66%, and embayed marsh 2%. NEARSHORE: Intermediate 22%. The remainder of the nearshore zone is located along the creeks in the subsegment.	FASTLAND: Agricultural 26%, residential 27%, and unmanaged, wooded 47%. SHORE: Private recreational use at Chesapeake Beach and near Fleet Point. The remainder of the shore is mostly unused. NEARSHORE: Sport boating and fishing.	Moderate to severe, critical. Some structures at Chesapeake Beach and along Bull Neck are close to the shore and would be endangered by flooding.	Satisfactory. The Chesapeake Bay has good water quality. Any pollutants entering the creeks would be readily flushed into the Bay system.	Fair to good. There are several areas of wide, clean beaches in this subsegment.	Moderate to severe, noncritical. The marsh area at Fleet Point has an historical accretion rate of 1.6 feet per year. The Bay shoreline from Fleet Point to Chesapeake Beach has an average historical erosion rate of 3.4 to 6.1 feet per year. There are approximately 4,900 feet of effective stabilization in the subsegment. Groins are used in conjunction with riprap or bulkhead along many sections of the shoreline.	Low to moderate. Several wooded sections of Owens Pond could be developed as low intensity recreational parks. The beach between Taskmakers Creek and Chesapeake Beach could make a good public beach area.
8B MOUTH OF OWENS POND TO SMITH POINT 7.7 miles (6.9 miles of fastland)	FASTLAND: Dunes 15%, low shore 78%, and low shore with bluff 7%. SHORE: Artificially stabilized 1%, beach 40%, fringe marsh 55%, and embayed marsh 4%. NEARSHORE: Intermediate 35% and wide 8%. The remaining shoreline is located along Gaskin Pond.	FASTLAND: Agricultural 21%, residential 6%, and unmanaged, wooded 73%. SHORE: Some private recreational use, but mostly unused. NEARSHORE: Commercial shipping and fishing, and sport boating and fishing.	Moderate, noncritical. All structures in the subsegment are located at or above 10-foot elevations. Most flooding would occur at Smith Point.	Satisfactory. The Chesapeake Bay has good water quality.	Fair to good. The beaches at Smith Point are fairly wide with vegetated dunes behind.	Moderate to severe, noncritical. Most of the shoreline has an average historical erosion rate of 6.1 feet per year. The area just south of Smith Point has been accreting at an average rate of 1.2 feet per year. There are approximately 100 feet of riprap and 300 feet of groin fields in the subsegment. Some of the groins are only marginally effective at trapping sand.	Moderate. The dune area at Smith Point should be preserved. This area could be used as a low intensity recreational park.
9A SMITH POINT TO PEACHTREE POINT 23.1 miles (23.4 miles of fastland)	FASTLAND: Low shore 96% and low shore with bluff 4%. SHORE: Artificially stabilized 3%, beach 5%, fringe marsh 85%, and embayed marsh 7%. RIVER: This portion of the Little Wicomico River and Bridge Creek have average depths of 6 feet. Slough Creek and Rock Hole are generally shallow with depths of 2 to 3 feet.	FASTLAND: Agricultural 37%, commercial 1%, residential 21%, and unmanaged, wooded 41%. SHORE: Some private recreational and agricultural use, but mostly unused. RIVER: Sport boating and fishing.	Low. The majority of the shoreline has elevations of at least 10 feet.	No data. This section is not specifically mentioned in the Virginia State Water Control Board's 305(b) Report. It is thus assumed that the Little Wicomico River meets the 305(b)(1)(B) criteria.	Poor. There are only fringe beaches in this subsegment.	No data. Erosion along this portion of the river would be due to rain runoff and boat wakes. There are approximately 200 feet of riprap and 3,300 feet of bulkhead in this subsegment. These structures are for cosmetic purposes rather than for erosion control.	Low. There seems to be little demand for alternate use in this subsegment.
9B PEACHTREE POINT TO HEAD OF LITTLE WICOMICO RIVER 14.1 miles (16.2 miles of fastland)	FASTLAND: Artificial fill <1%, low shore 94%, low shore with bluff 5%, and moderately low shore 1%. SHORE: Artificially stabilized 2%, beach 13%, fringe marsh 78%, and embayed marsh 7%. RIVER: The Little Wicomico River has depths of 6 feet to Willis Creek, and depths of 2 to 4 feet at the head.	FASTLAND: Agricultural 19%, residential 28%, and unmanaged, wooded 53%. SHORE: Some private recreational use, but mostly unused. RIVER: Sport boating and fishing.	Low. The majority of the shoreline in this subsegment has elevations of at least 10 feet.	No data. The Little Wicomico River is not mentioned in the Virginia State Water Control Board's 305(b) Report. It is assumed that the river meets the 305(b)(1)(B) criteria.	Poor. There are only narrow, strip beaches in this subsegment.	No data. Erosion along this portion of the river would be due to rain runoff and boat wakes. There are approximately 1,200 feet of bulkhead in the subsegment. Two sections are for retaining fill.	Low. The shoreland along the navigable portion of the river and creeks have already been developed for residential use. Little alternate use seems likely for the unused sections of the subsegment.
9C HEAD OF LITTLE WICOMICO RIVER TO KING POINT 13.7 miles (16.0 miles of fastland)	FASTLAND: Low shore 97% and low shore with bluff 3%. SHORE: Artificially stabilized 1%, beach 4%, fringe marsh 85%, and embayed marsh 10%. RIVER: The main stream of the river has average depths of 6 feet.	FASTLAND: Agricultural 42%, commercial 2%, industrial 1%, residential 14%, and unmanaged, wooded 41%. SHORE: Private recreational use and some commercial use (marinas). RIVER: Sport boating and fishing.	Low. The majority of the shoreline has elevations of at least 10 feet.	No data. The Little Wicomico River is not mentioned in the Virginia State Water Control Board's 305(b) Report. It is assumed that the river meets the 305(b)(1)(B) criteria.	Poor. There are only fringe beaches in this subsegment.	No data. Several bluff areas are eroding due to rain runoff and boat wakes. There are approximately 700 feet of artificially stabilized shoreline in the subsegment, of which 50 feet is riprap. All structures appear to be effective.	Low. Any substantial change in the shore use would be at the sacrifice of the agricultural lands. No area in the subsegment appears to be suitable for public recreational use.
9D KING POINT TO MOUTH OF LITTLE WICOMICO RIVER 11.0 miles (11.2 miles of fastland)	FASTLAND: Low shore 83% and low shore with bluff 17%. SHORE: Artificially stabilized 3%, beach 7%, fringe marsh 80%, and embayed marsh 10%. RIVER: The main bodies of the river and Ellyson Creek have controlling depths of 6 feet.	FASTLAND: Agricultural 43%, commercial 1%, residential 6%, and unmanaged, wooded 50%. SHORE: Some private recreational and agricultural use, but mostly unused. RIVER: Sport boating and fishing.	Low. The majority of the shoreline has elevations of at least 10 feet.	No data. The Little Wicomico River is not mentioned in the Virginia State Water Control Board's 305(b) Report. It is assumed that the river meets the 305(b)(1)(B) criteria.	Poor to fair. There are several beaches of fair width near the riverward end of the entrance channel.	No data. The bluffs at the east side of the mouth of Ellyson Creek are eroding due to rain runoff and boat wakes. There are approximately 1,200 feet of riprap and 500 feet of bulkhead in the subsegment. All structures appear to be effective.	Low. The only section in the subsegment which could become a recreational area is from the old river entrance to the new channel at Smith Point. However, access to this area is difficult.
10 MOUTH OF LITTLE WICOMICO RIVER TO CUBITT CREEK 8.9 miles (8.5 miles of fastland)	FASTLAND: Artificial fill 6%, dunes 10%, low shore 45%, and low shore with bluff 39%. SHORE: Artificially stabilized 34%, beach 61%, and embayed marsh 5%. NEARSHORE: Intermediate 72% and wide 14%. The remainder of the nearshore zone is located along Flag Pond.	FASTLAND: Agricultural 20%, residential 50%, unmanaged, unwooded 5%, and unmanaged, wooded 25%. SHORE: Mostly private recreational use. NEARSHORE: Commercial traffic in the river channel, sport boating and fishing closer to shore.	Low. The majority of the shoreline has elevations of at least 10 feet.	This segment generally meets the State Water Control Board's 305(b)(1)(B) criteria.	Fair to good. Much sand has been trapped by the extensive groin fields employed along the shore.	Severe, noncritical. Smith Point has been accreting at an average rate of 1.2 feet per year. The remaining shoreline has an average erosion rate of 3.1 to 4.9 feet per year. There are approximately 15,900 feet of artificially stabilized shoreline. Groins have been used with bulkhead and riprap in many areas. There are two areas of experimental sills of sand bags being used to control the erosion.	Low. Some continued residential development is possible for several areas of the segment. There appears to be no areas suitable for alternate development.

TABLE 2 (cont'd)

SUBSEGMENT	SHORELANDS TYPE	SHORELANDS USE	FLOOD HAZARD	WATER QUALITY	BEACH QUALITY	SHORE EROSION SITUATION	ALTERNATE SHORE USE
11 CUBITT CREEK TO GREAT POINT 45.4 miles (46.8 miles of fastland)	FASTLAND: Artificial fill <1%, dunes <1%, low shore 41%, low shore with bluff 6%, moderately low shore 29%, moderately low shore with bluff 8%, moderately high shore with bluff 2%, high shore 3%, and high shore with bluff 1%. SHORE: Artificially stabilized 5%, beach 12%, fringe marsh 72%, and embayed marsh 11%. NEARSHORE: Intermediate 8% and wide 3%. The remainder of the nearshore zone is located along the creeks in the segment.	FASTLAND: Agricultural 38%, residential 24%, and unmanaged, wooded 38%. SHORE: Some private recreational and agricultural use, but mostly unused. NEARSHORE: Commercial traffic, sport boating and fishing in the river. Sport boating and fishing in the creeks.	Moderate to high, critical. Much of the shoreline has elevations of only 5 feet and many structures are built on or below this contour.	This segment generally meets the State Water Control Board's 305 (b)(1)(B) criteria.	Poor to good. There are some wide, clean beaches in the segment.	Severe, critical and noncritical. This segment has an historical average erosion rate of 3.1 to 10.6 feet per year for the river-fronting shoreline. Several agricultural fields are experiencing erosion due to rain runoff and boat wakes. Two houses at the mouth of Hull Creek have been severely damaged by erosion and flood forces. Several other structures in this segment are endangered by continued erosion. There are approximately 12,200 feet of artificially stabilized shoreline in the segment. Most of the structures are groins or a combination of groins with bulkhead or riprap. Most appear to be effective.	Low. The river-fronting shoreline, being extremely vulnerable to erosion, would be costly to stabilize and develop. Cod Creek is in the process of being developed for residential purposes. Elsewhere in the segment there seems to be little alternate shore use potential.
12 GREAT POINT TO HONEST POINT 28.8 miles (30.9 miles of fastland)	FASTLAND: Low shore 27%, low shore with bluff 11%, moderately low shore 23%, moderately low shore with bluff 7%, moderately high shore 19%, moderately high shore with bluff 1%, high shore 9%, and high shore with bluff 3%. SHORE: Artificially stabilized 4%, beach 11%, fringe marsh 68%, and embayed marsh 17%. NEARSHORE: Intermediate 5%. The Coan River has average depths of 12 feet at the mouth, with depths of at least 6 feet along the main stream of the river.	FASTLAND: Agricultural 34%, commercial 2%, industrial 1%, residential 18%, unmanaged, unwooded 1%, and unmanaged, wooded 44%. SHORE: Some commercial use (marinas) and private recreational use, but mostly unused. NEARSHORE: Sport boating and fishing.	Low to high, critical. The areas near the mouth of Coan River and between Great and Walnut Points are susceptible to flooding during periods of abnormally high water. Several structures at the river mouth would be endangered by such storms.	This segment generally meets the State Water Control Board's 305 (b)(1)(B) criteria.	Poor to good. The only good beaches in this segment are from Balls Creek to Walnut Point. The beaches along the Coan River are narrow and often vegetated.	Slight or no change to severe, noncritical. The section of shoreline from Walnut Point to Great Point have historical average erosion rates of 2.5 to 10.6 feet per year. Honest Point has an average erosion rate of 4.0 feet per year. Rain runoff and boat wakes also affect portions of the shoreline. There are approximately 2,000 feet of riprap and 3,600 feet of bulkhead in the segment. Several areas of bulkhead have groins fronting the structures.	Low. There seems to be no immediate need for public recreational facilities in this section of the county. Little change in the rural nature of the shorelands is forseen.
13 HONEST POINT TO HOG ISLAND 25.3 miles (25.4 miles of fastland)	FASTLAND: Low shore 90%, low shore with bluff 8%, and moderately low shore 2%. SHORE: Artificially stabilized 8%, beach 5%, fringe marsh 71%, embayed marsh 7%, and extensive marsh 9%. NEARSHORE: Intermediate 10%. The remainder of the segment is located along The Glebe and Kingscote Creek, which have average depths of 6 feet.	FASTLAND: Agricultural 49%, commercial 1%, residential 30%, and unmanaged, wooded 20%. SHORE: Private recreational and agricultural use. Some portions, especially at the head of the creeks, are unused. NEARSHORE: Sport boating and fishing.	High, critical. Honest Point and Travis Point have elevations of less than 5 feet and are subject to flooding. All structures at these areas would be flooded during periods of abnormally high water.	This segment generally meets the State Water Control Board's 305 (b)(1)(B) criteria.	Poor to good. Most of the shoreline on Travis Point has good beaches which have been trapped by the groin fields. Elsewhere, there are only narrow, strip beaches.	Slight or no change to severe, noncritical. The Lewisetta area has an average erosion rate of 2.0 to 3.7 feet per year. There are approximately 11,200 feet of artificially stabilized shoreline in the segment. Most structures appear to be effective.	Low. Large sections of the shoreline have already been developed for residential and commercial purposes. The rural nature of the area would preclude the necessity of a public recreational park.
14 HOG ISLAND TO BARN POINT 4.1 miles (5.0 miles of fastland)	FASTLAND: Low shore 94% and low shore with bluff 6%. SHORE: Artificially stabilized 34%, beach 39%, fringe marsh 7%, embayed marsh 6%, and extensive marsh 14%. NEARSHORE: Intermediate 100%.	FASTLAND: Agricultural 46%, residential 34%, and unmanaged, wooded 20%. SHORE: Private recreational and agricultural use. NEARSHORE: Commercial shipping and fishing in the Potomac River, sport boating and fishing closer to shore.	Moderate, critical. The Hog Island marshes and fastland have elevations of 5 feet or less and are susceptible to flooding. Several structures in this area would be endangered by flooding during periods of abnormally high water.	This segment generally meets the State Water Control Board's 305 (b)(1)(B) criteria.	Fair to good. The beaches west of Hog Island have good width and clean sand. Some of the groins in front of the residential sections have trapped good fillets of sand.	Moderate to severe, noncritical. Historical average erosion rates for the segment are: Hog Island to Rt. 680 - 2.7 feet per year, west of Rt. 680 to Thicket Point - 3.7 feet per year, and Thicket Point to Barn Point - 2.0 feet per year. There are approximately 7,300 feet of groin fields in the segment. These structures are sometimes used in conjunction with bulkhead or riprap.	Low. Any major change in the use of the shorelands would be at the sacrifice of the agricultural lands.
15 BARN POINT TO MUNDY POINT 26.0 miles (27.0 miles of fastland)	FASTLAND: Artificial fill <1%, low shore 35%, low shore with bluff 23%, moderately low shore 37%, moderately low shore with bluff 1%, moderately high shore 1%, and high shore 3%. SHORE: Artificially stabilized 12%, beach 5%, fringe marsh 79%, and embayed marsh 4%. RIVER: The South Yeocomico River has depths of 12 feet. Lodge and Mill Creeks have depths of 6 to 3 feet.	FASTLAND: Agricultural 40%, commercial 2%, industrial 1%, residential 43%, and unmanaged, wooded 14%. SHORE: Mostly private recreational and agricultural use. The head of Mill Creek is unused, woods. RIVER: Sport boating and fishing.	Low to moderate, noncritical. The majority of the shoreline has elevations of at least 10 feet and is not subject to flooding. The marina facilities on Pea Neck and Mundy Point could be flooded during periods of abnormally high water.	This segment generally meets the State Water Control Board's 305(b)(1)(B) criteria. The Bureau of Shellfish Sanitation has closed Lodge Creek to the taking of shellfish.	Poor to fair. Ther There are several areas of good beaches which have been trapped by the groins in the segment.	No data. Erosion in this segment would be due to rain runoff or boat wakes. There are approximately 16,500 feet of artificially stabilized shoreline, several hundred feet of which is riprap and the remainder bulkhead. Groins have been used in several areas near the river mouth, often in conjunction with bulkhead.	Low. The majority of the shorelands are already used for agricultural and residential purposes. Any alternate development would be at the sacrifice of the agricultural lands.
16 MUNDY POINT TO THE COUNTY LINE 7.7 miles (8.1 miles of fastland)	FASTLAND: Low shore 47%, moderately low shore 33%, moderately low shore with bluff 4%, moderately high shore 5%, and high shore 11%. SHORE: Artificially stabilized 3%, beach 3%, fringe marsh 88%, and embayed marsh 6%. RIVER: The West Yeocomico River has depths of 6 feet.	FASTLAND: Agricultural 18%, industrial 2%, residential 20%, unmanaged, unwooded 2%, and unmanaged, wooded 58%. SHORE: Some private recreational use, but mostly unused. RIVER: Sport boating and fishing.	Low, noncritical. The majority of the shoreline has elevations of at least 10 feet and is not subject to flooding.	This segment generally meets the State Water Control Board's 305(b)(1)(B) criteria. The Bureau of Shellfish Sanitation has closed Hampton Hall Branch to the taking of shellfish.	Fair to good. Cedar and Oyster Shell Points have fairly wide, clean beaches.	Slight or no change to moderate, noncritical. Wilkins Point to Mundy Point has an historical average erosion rate of 2.3 feet per year. There are approximately 600 feet of bulkhead, 450 feet of groin fields and 150 feet of riprap in the segment. All structures appear to be effective.	Low. There seems to be little pressure for any alternate use in the shorelands of this segment.

SEGMENT 1

HEAD OF INDIAN CREEK TO BLUFF POINT

Map 2

EXTENT: 137,800 feet (26.1 mi.) of shoreline from the head of Indian Creek to Bluff Point, including Arthur Cove, and Bells, Henrys and Barnes Creeks. The segment also contains 130,100 feet (24.6 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Artificial fill 1% (0.1 mi.) and low shore 99% (24.5 mi.).
SHORE: Artificially stabilized 2% (0.6 mi.), beach 7% (1.8 mi.), fringe marsh 79% (20.7 mi.), embayed marsh 1% (0.2 mi.), and extensive marsh 11% (2.8 mi.).
CREEK: Indian Creek has depths of 16 feet at the approach, grading to shoals of 2 feet at the head.

SHORELANDS USE
FASTLAND: Agricultural 31% (7.6 mi.), commercial <1% (0.2 mi.), recreational 1% (0.3 mi.), residential 28% (7.0 mi.), and unmanaged, wooded 39% (9.5 mi.).
SHORE: Some private recreational use, but mostly unused.
CREEK: Some commercial traffic in the main stream, but mostly sport boating and fishing.

WIND AND SEA EXPOSURE: Indian Creek trends basically N - S at the head, then NW - SE. Most of the creek's shoreline is open to unlimited fetches from the southeast. Bluff Point is exposed to fetches across the Chesapeake Bay from the north through the east and south quadrants.

OWNERSHIP: Private.

FLOOD HAZARD: High, critical. Many structures are below 5-foot elevations and are subject to flooding during periods of abnormally high water.

WATER QUALITY: Unsatisfactory. Indian Creek is currently condemned for the taking of shellfish. In the past, Indian Creek has experienced water quality problems due to domestic sewage discharges from the Town of Kilmarnock. A sewage treatment plant was completed in April 1975 and is meeting permit limitations. However, some problems still exist due to leachate from faulty septic tanks, wastes from menhaden rendering plants, and late summer stratification of fresh and tidal waters.

BEACH QUALITY: The segment has narrow, strip beaches fronting the fastland. The beaches fronting marshes are fairly wide and have fine white sand.

PRESENT SHORE EROSION SITUATION
EROSION RATE: There appears to be little or no erosion in this segment.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 3,000 feet of bulkhead in this segment. Though some structures may be for erosion protection, most seem to be for cosmetic purposes. All seem to be effective.

OTHER SHORE STRUCTURES: There are numerous piers and several boat ramps in the segment.

SHORE USE LIMITATIONS:
The majority of the shoreline in this segment is already used for residential and agricultural purposes. Although thirty-nine percent of the fastland is unused, access to these areas is difficult. Also, with average elevations of 5 feet, flooding would be an ever-present danger to new shoreline development.

ALTERNATE SHORE USE:
Several areas on Barnes Creek have the potential of becoming low intensity recreational parks. These areas are mostly wooded, with several sections having extensive marshlands. Such parks could include nature trails along the shoreline and picnic areas.
Elsewhere in the segment, there seems to be little land that is available or suitable for any alternate use.

MAPS: USGS, 7.5 Min.Ser. (Topo.), FLEETS BAY Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 27Apr76 NL-1/1-69.

SEGMENT 2

BLUFF POINT TO JARVIS POINT

Map 2

EXTENT: 14,200 feet (2.7 mi.) of shoreline from Bluff Point to Jarvis Point, along the Chesapeake Bay. The segment includes 6,600 feet (1.3 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Entirely low shore.
SHORE: Beach 73% (2.0 mi.) and extensive marsh 27% (0.7 mi.).
NEARSHORE: Narrow 13%, intermediate 37%, and wide 50%.

SHORELANDS USE
FASTLAND: Agricultural 14% (0.2 mi.) and unmanaged, wooded 86% (1.1 mi.).
SHORE: Some recreational use such as waterfowl hunting in the marshes and sun-bathing, but mostly unused.
NEARSHORE: Sport boating and fishing.

WIND AND SEA EXPOSURE: The shoreline in this segment trends basically SSE - NNW. The entire segment is exposed to long fetches across the Bay.

OWNERSHIP: Private.

FLOOD HAZARD: High, noncritical. The entire segment has elevations of less than 5 feet and is exposed to direct wind and wave attacks from the Chesapeake Bay. There are no structures in the segment.

WATER QUALITY: Satisfactory. According to the State Water Control Board (305(b)Report), the Chesapeake Bay is experiencing good water quality. Some non-point source pollution may exist due to agricultural rain runoff. However, this would be washed into the Bay system and quickly dissipated.

BEACH QUALITY: Good to fair. Though most beaches in the segment are fair, Jarvis Point and a half mile stretch south of the Point have beaches of good width, though often with vegetation.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Severe, noncritical. According to a published VIMS report, this segment has an historical erosion rate of 5.2 feet per year.
ENDANGERED STRUCTURES:. None.
SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: None.

SHORE USE LIMITATIONS:
The extremely low elevation of the fastland and its concomitant severe flood hazard would limit the amount and type of shore use in the segment. Also, with such a severe erosion rate, no formal use of the adjacent fastland could be accomplished without an extensive shore protection effort.

ALTERNATE SHORE USE:
As stated in Segment 1, the Bluff Point area could be developed for a low intensity recreational park. Elsewhere, the existing agricultural use seems best suited for the area.

MAPS: USGS, 7.5 Min.Ser. (Topo.), FLEETS BAY Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 27Apr76 NL-2/70-91.

SEGMENT 3

DIVIDING CREEK

Maps 2 and 3

EXTENT: 186,500 feet (35.3 mi.) of shoreline along Dividing Creek, from Jarvis Point to Hughlett Point, including Jarvis, Prentise, and Lawrence Creeks. The segment also contains 179,800 feet (34.0 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Artificial fill 1% (0.3 mi.) and low shore 99% (33.7 mi.).
SHORE: Artificially stabilized 3% (1.0 mi.), beach 4% (1.6 mi.), fringe marsh 91% (32.1 mi.), embayed marsh < 1% (0.1 mi.), and extensive marsh 1% (0.5 mi.).
CREEK: Dividing Creek has depths of 14 feet in the approach, grading to depths of 6 feet at the head.

SHORELANDS USE
FASTLAND: Agricultural 50% (16.7 mi.), commercial < 1% (0.1 mi.), residential 16% (5.5 mi.), unmanaged, unwooded 1% (0.4 mi.), and unmanaged, wooded 33% (11.1 mi.).
SHORE: Some private recreational use, but mostly unused.
CREEK: Sport boating and fishing.

WIND AND SEA EXPOSURE: Dividing Creek trends basically N - S at the head, then NW - SE. The entrance of the creek is exposed to long fetches across the Bay from the east and southeast.

OWNERSHIP: Private.

FLOOD HAZARD: Moderate to high, critical. Though areas near the creek head have average elevations of 10 feet, some structures along the shoreline are below 5-foot elevations. These structures are vulnerable to flood damage during periods of abnormally high water.

WATER QUALITY: Unsatisfactory. According to the State Water Control Board, this area does not meet 305(b)(1)(B) criteria. The Department of Health has condemned two portions of the creek for the taking of shellfish due to animal pollution.

BEACH QUALITY: Fair. There are several strip beaches in this segment.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Slight or no change to moderate, noncritical. According to a published VIMS report, several areas at the mouth of Dividing Creek have historical erosion rates of 1.4 to 2.9 feet per year. One section of shoreline near Hughlett Point has been accreting at a rate of 1.5 feet per year.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 5,200 feet of artificially stabilized shoreline in the segment, most of which is bulkhead. There are several areas of riprap and several groin fields in the segment. Most structures at the creek mouth are for erosion control, while those along the interior shorelines are for cosmetic purposes. All structures appear to be effective.

OTHER SHORE STRUCTURES: There are numerous piers, boat ramps and boat sheds in the segment.

SHORE USE LIMITATIONS:
The Dividing Creek shorelands are predominately rural in nature. Residential development has located directly along the shoreline, with agriculture or woods behind. However, much of the shoreland is vulnerable to flooding, especially near the mouth of the creek. Such flood prone areas are not considered to have a prime development potential.

ALTERNATE SHORE USE:
Low. The present rural agricultural usage will probably continue for this segment. There are few alternate demands for the shoreline at the present time.

MAPS: USGS, 7.5 Min.Ser. (Topo.), FLEETS BAY Quadr., 1968,
USGS, 7.5 Min.Ser. (Topo.), REEDVILLE Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 27Apr76 NL-3/92-214.

SEGMENT 4

HUGHLETT POINT TO DAMERON MARSH

Maps 2 and 3

EXTENT: 80,700 feet (15.3 mi.) of shoreline from Hughlett Point to Dameron Marsh, including Ingram Cove, Ball and Cloverdale Creeks. The segment also contains 61,400 feet (11.6 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Entirely low shore.
SHORE: Beach 9% (1.3 mi.), fringe marsh 52% (7.9 mi.), and extensive marsh 39% (6.1 mi.).
NEARSHORE: Intermediate 7% and wide 24%. The remainder of the nearshore zone is located along the creeks in this segment.

SHORELANDS USE
FASTLAND: Agricultural 32% (3.7 mi.) and unmanaged, wooded 68% (7.9 mi.).
SHORE: Mostly unused.
NEARSHORE: Commercial shipping in the Bay; sport boating and fishing closer to shore.

WIND AND SEA EXPOSURE: This segment trends basically S - N; the creeks trend E - W. The segment is exposed to long fetches across the Bay from the northeast through the southeast quadrants.

OWNERSHIP: Private.

FLOOD HAZARD: High, critical. The entire segment is subject to flooding. The structures along the shoreline at Dameron Marsh and Ball Creek would be endangered by the flood waters.

WATER QUALITY: The Chesapeake Bay and the small coastal basins are generally of good water quality. Some non-point source pollution may exist due to agricultural runoff, but this is readily flushed into the Bay system. Ball Creek is currently condemned for the taking of shellfish.

BEACH QUALITY: Fair. Though most of the Bay-fronting shoreline has beaches, they are usually narrow and often vegetated. The beaches fronting areas of extensive marsh are often fairly wide.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Moderate to severe, noncritical. Most of the shoreline in the segment has a moderate erosion rate. However, the shoreline between Ball and Cloverdale Creeks has been eroding at an historical rate of 3.0 feet per year.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: There are several piers in the segment.

SHORE USE LIMITATIONS:
The fastland in this segment is very low, with elevations of no more than 5 feet and is subject to flooding. The extensive marsh systems and agricultural use limit alternate development of some portions of the segment.

ALTERNATE SHORE USE:
Low. The area is rural in nature and seems best suited for such low intensity use.

MAPS: USGS, 7.5 Min.Ser. (Topo.), FLEETS BAY Quadr., 1968,
USGS, 7.5 Min.Ser. (Topo.), REEDVILLE Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 27Apr76 NL-4/215-260.

SEGMENT 5

DAMERON MARSH TO MOUTH OF MILL CREEK

Maps 3 and 4

EXTENT: 86,200 feet (16.3 mi.) of shoreline from Dameron Marsh to the mouth of Mill Creek, including Mill Creek. The segment also contains 84,000 feet (15.7 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 81% (12.9 mi.), low shore with bluff 1% (0.2 mi.), moderately low shore 3% (0.4 mi.), moderately high shore 4% (0.6 mi.), and high shore 11% (1.8 mi.).
SHORE: Beach 2% (0.3 mi.), fringe marsh 78% (12.8 mi.), embayed marsh 12% (1.9 mi.), and extensive marsh 8% (1.3 mi.).
NEARSHORE: Intermediate 12%. The remainder of the shoreline is Mill Creek.

SHORELANDS USE
FASTLAND: Agricultural 49% (7.8 mi.), commercial 2% (0.3 mi.), residential 5% (0.7 mi.), and unmanaged, wooded 44% (7.1 mi.).
SHORE: Mostly unused, with some private use in front of residences.
NEARSHORE: Commercial shipping in the Bay, sport boating and fishing in the creek and Bay.

WIND AND SEA EXPOSURE: Mill Creek and Dameron Marsh trend basically E - W. The remainder of the segment lies in a N - S direction. The shoreline fronting the Bay is exposed to long fetches from the north through the south quadrants. Mill Creek is not exposed to direct wind or wave actions.

OWNERSHIP: Private.

FLOOD HAZARD: Low to high, critical. Basically, the shorelands of Mill Creek have sufficient height to resist inundation by flood waters. However, several residences at the creek mouth near Dameron Marsh are below 5-foot elevations and would be endangered by flooding.

WATER QUALITY: The Chesapeake Bay and the Small Coastal Basins generally have good water quality. Some non-point source pollution may exist due to agricultural runoff.

BEACH QUALITY: Fair. The few beaches located at the mouth of Mill Creek are narrow and vegetated.

PRESENT SHORE EROSION SITUATION
EROSION RATE: There is little or no erosion in this area.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: There are numerous piers and boat sheds in the segment.

SHORE USE LIMITATIONS:
The Mill Creek shorelands are rural in nature, ninety-three percent of the land being either agricultural or wooded. Due to the remoteness of the area from any major residential center, there seems to be little pressure for development of the segment.

ALTERNATE SHORE USE:
Low. As stated previously, there seems to be little pressure for a change in the present agricultural use of the shorelands.

MAPS: USGS, 7.5 Min.Ser. (Topo.), FLEETS BAY Quadr., 1968,
USGS, 7.5 Min.Ser. (Topo.), REEDVILLE Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 27Apr76 NL-5/261-266;
15Mar77 NL-5/267-332.

SEGMENT 6

MOUTH OF MILL CREEK
TO MOUTH OF GREAT WICOMICO RIVER

Map 4

EXTENT: 86,000 feet (16.3 mi.) of shoreline from the mouth of Mill Creek to the mouth of the Great Wicomico River, including Harveys, Towles and Cranes Creeks. The segment also contains 83,000 feet (15.7 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Artificial fill 2% (0.3 mi.), low shore 94% (14.8 mi.), low shore with bluff 3% (0.4 mi.), and dunes 1% (0.2 mi.).
SHORE: Artificially stabilized 4% (0.8 mi.), beach 14% (2.2 mi.), fringe marsh 80% (13.0 mi.), and embayed marsh 2% (0.3 mi.).
NEARSHORE: Intermediate 14%. The remainder of the nearshore zone is located along the creeks in this segment.

SHORELANDS USE
FASTLAND: Agricultural 39% (6.2 mi.), commercial <1% (0.1 mi.), residential 14% (2.2 mi.), unmanaged, unwooded 2% (0.4 mi.), and unmanaged, wooded 43% (6.8 mi.).
SHORE: Mostly private recreational use.
NEARSHORE: Commercial shipping in the Bay, sport boating and fishing on the creeks and Bay.

WIND AND SEA EXPOSURE: The Bay-fronting shoreline trends N - S. The creeks run in a E - W direction. The creeks are relatively protected from wind induced wave actions, although the Bay-fronting shoreline is exposed to long fetches from the north through the south quadrants.

OWNERSHIP: Private.

FLOOD HAZARD: Low to moderate, critical. Much of the shoreline has elevations of 10 to 15 feet, and would not be endangered by flooding. However, several structures in the segment, especially at Sandy Point, are located at or below the 5-foot contour. These structures would be endangered by abnormally high flood waters.

WATER QUALITY: Generally good. Some seasonal agricultural runoff may occur in areas, but this would be readily flushed into the Bay system.

BEACH QUALITY: Fair to good. The majority of the beaches are narrow and often vegetated. The mouths of the creeks in the segment have fairly wide, clean beaches.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Slight to severe, noncritical. Erosion is generally confined to those areas directly fronting the Chesapeake Bay. The spits at the mouth of Harveys and Cranes Creeks are accreting. The area from Harveys to Cranes Creek has an historical erosion rate of from 3.4 to 7.1 feet per year. The other Bay-fronting shorelands have moderate erosion rates.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 4,000 feet of bulkhead in the segment, several sections of which are fronted by groin fields. Two areas of bulkhead have rubble riprap protecting the base of the structures. All structures appear to be effective.

OTHER SHORE STRUCTURES: The marina on Towles Creek has covered docks for approximately 25 boats and open slips for 12 additional boats. There are several other piers and boat ramps in the segment.

SHORE USE LIMITATIONS:
The area is predominantly used for agriculture, with the exception of Sandy Point, which is a residential development. The eroding Bay shoreline would be expensive to develop.

ALTERNATE SHORE USE:
Low. The present agricultural use of the shorelands seems best suited for the segment. There is little demand for alternate development at the present time.

MAPS: USGS, 7.5 Min.Ser. (Topo.), REEDVILLE Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 15Mar77 NL-6/333-344;
350-406;
27Apr76 NL-6/345-349.

SUBSEGMENT 7A

MOUTH OF GREAT WICOMICO RIVER TO ROGUE POINT

Map 4

EXTENT: 39,700 feet (7.5 mi.) of shoreline from the mouth of the Great Wicomico River to Rogue Point, including Shell, Gougher and Penny Creeks. The subsegment also contains 41,500 feet (7.9 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 80% (6.3 mi.), low shore with bluff 10% (0.8 mi.), and moderately low shore 10% (0.8 mi.).
SHORE: Artificially stabilized 1% (0.1 mi.), beach 27% (2.1 mi.), fringe marsh 65% (4.8 mi.), and embayed marsh 7% (0.5 mi.).
RIVER: This section of the Great Wicomico River has depths of at least 18 feet.

SHORELANDS USE
FASTLAND: Agricultural 35% (2.7 mi.), commercial 1% (0.1 mi.), residential 15% (1.2 mi.), and unmanaged, unwooded 49% (3.9 mi.).
SHORE: Some private recreational use, but mostly unused.
RIVER: Some commercial traffic, but mostly sport boating and fishing.

WIND AND SEA EXPOSURE: The shoreline trends basically SE - NW in this subsegment. The subsegment is not directly exposed to fetches across the Bay, though waves from the very long SSE fetch refract into the Sandy Point area. Local fetches on the Great Wicomico River are: Sandy Point NW - 2.7 miles, and NE - 1.5 miles.

OWNERSHIP: Private.

FLOOD HAZARD: Low. The majority of the subsegment has elevations of at least 10 feet and is not subject to flooding.

WATER QUALITY: According to the State Water Control Board's "305(b)Report", the Great Wicomico River's sub-surface waters experience an oxygen depletion during the late summer months, rendering millions of oyster larvae immobile. This condition appears to be a natural phenomenon. Presently, the Great Wicomico River does not meet the 305(b)(1)(B) criteria.

BEACH QUALITY: Fair to good. Beaches from the mouth of the river to Shell Creek are generally good.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Slight to moderate, noncritical. Erosion in the Sandy Point area is due to a combination of refracted wave energy from the southeast and direct waves from the northwest and northeast. These waves are especially significant during periods of elevated water levels, as they overtop the narrow shore buffer zone and directly attack the fastland. Erosion is also a result of the great amount of boat traffic along the river.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 300 feet of bulkhead in the subsegment. All structures appear to be effective.

OTHER SHORE STRUCTURES: There are numerous piers and several boat ramps in the subsegment.

SHORE USE LIMITATIONS:
The existing use of Sandy Point for residential purposes would limit other development there. Elsewhere in the subsegment, the shorelands are used predominantly for agriculture, with several scattered residential areas. The present use, combined with the actively eroding shoreline along much of the subsegment, limits the amount and type of development.

ALTERNATE SHORE USE:
Low. The agricultural use of the subsegment seems best for the present time. There appears to be little competition for any available shoreline.

MAPS: USGS, 7.5 Min.Ser. (Topo.), REEDVILLE Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 15Mar77 NL-7A/407-447.

SUBSEGMENT 7B

ROGUE POINT TO EAGLE POINT

Maps 4 and 5

EXTENT: 86,600 feet (16.4 mi.) of shoreline from Rogue Point to Eagle Point, along the Great Wicomico River, including Barrett, Tipers and Balls Creeks. The subsegment also contains 95,500 feet (18.1 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 20% (3.7 mi.), low shore with bluff 1% (0.1 mi.), moderately low shore 30% (5.5 mi.), moderately low shore with bluff 2% (0.3 mi.), moderately high shore 19% (3.4 mi.), and high shore 28% (5.1 mi.).
SHORE: Artificially stabilized 2% (0.4 mi.), beach 9% (1.4 mi.), fringe marsh 84% (13.7 mi.), and embayed marsh 5% (0.9 mi.).
RIVER: This subsegment of the Great Wicomico River has average depths of 12 feet. The creeks included in the subsegment are navigable for small craft only.

SHORELANDS USE
FASTLAND: Agricultural 3% (0.5 mi.), residential 15% (2.8 mi.), and unmanaged, wooded 82% (14.8 mi.).
SHORE: Some private recreational use, but mostly unused.
RIVER: Sport boating and fishing.

WIND AND SEA EXPOSURE: The subsegment trends basically E - W. Barrett Creek runs NW - SE, Tipers and Balls Creeks run NE - SW. Some areas are subject to local fetches of less than 1 nautical mile from the northeast, east, and west.

OWNERSHIP: Private.

FLOOD HAZARD: Low, noncritical. With elevations of ten to thirty feet along the shoreline, the subsegment is not subject to flooding.

WATER QUALITY: According to the State Water Control Board's "305(b)Report", the Great Wicomico River's sub-surface waters experience an oxygen depletion during the late summer months, rendering millions of oyster larvae immobile. This condition appears to be a natural phenomenon.

Presently, the Great Wicomico River does not meet the 305(b)(1)(B) criteria.

BEACH QUALITY: Poor to fair. Most beaches are of fair width, though often vegetated.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Slight to moderate, noncritical. Most of the river-fronting shoreline is experiencing moderate erosion, while the area at the base of the bridge has been accreting. Most erosion is due to local wind induced waves during periods of elevated water levels.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 2,000 feet of bulkhead in the subsegment. All structures appear to be effective.

OTHER SHORE STRUCTURES: There are numerous piers in the subsegment.

SHORE USE LIMITATIONS:
Much of the shoreland east of the bridge, especially Barrett Creek, is gradually being developed for residential purposes. The remaining shorelands are wooded, often having bluffs along the shoreline. These areas would be difficult to develop and access to the shore would be limited. Also, the river-fronting shoreline has an historical erosion rate of 1.4 to 1.8 feet per year.

ALTERNATE SHORE USE:
Moderate. The area from Rogue Point to Tipers Creek will probably continue to be developed for residential purposes. The remaining shorelands will probably continue to be basically unused woods. However, that section of shoreland just east of the Glebe Point Bridge could be developed as a public park, with camping and picnicking facilities and hiking trails. There is enough space for adequate parking facilities and the section is close to the major route of transportation through the area.

MAPS: USGS, 7.5 Min.Ser. (Topo.), REEDVILLE Quadr., 1968,
USGS, 7.5 Min.Ser. (Topo.), LANCASTER Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 15Mar77 NL-7B/448-476.

SUBSEGMENT 7C

EAGLE POINT TO BETZ LANDING

Map 5

EXTENT: 67,200 feet (12.7 mi.) of shoreline along the Great Wicomico River from Eagle Point to Betz Landing, including Bush Mill Stream. The subsegment also contains 68,900 feet (13.0 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 21% (2.7 mi.), moderately low shore 60% (7.8 mi.), moderately low shore with bluff 1% (0.1 mi.), moderately high shore with bluff 9% (1.2 mi.), and high shore 9% (1.2 mi.).
SHORE: Beach 2% (0.3 mi.), fringe marsh 62% (7.8 mi.), and embayed marsh 36% (4.6 mi.).
RIVER: Narrow and shallow.

SHORELANDS USE
FASTLAND: Agricultural 6% (0.8 mi.), residential 14% (1.8 mi.), and unmanaged, wooded 80% (10.4 mi.).
SHORE: Some private recreational and agricultural use, but mostly unused.
RIVER: Sport boating and fishing.

WIND AND SEA EXPOSURE: The shoreline in this subsegment trends basically SE - NW, then E - W. The area is not exposed to significant wind or wave actions.

OWNERSHIP: Private.

FLOOD HAZARD: Low. The elevation of the shoreline protects the subsegment against flooding.

WATER QUALITY: Unsatisfactory. The upper section of the Great Wicomico River is closed to the taking of shellfish, according to the State Department of Shellfish Sanitation

BEACH QUALITY: Poor. Eagle Point has narrow, strip beaches.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Slight or no change. Some site specific erosion may occur due to downhill rain runoff and boat traffic on the river.

ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: There are several piers in the subsegment.

SHORE USE LIMITATIONS:
The fastland in this subsegment is rural in nature, eighty percent being wooded. Generally, most areas along the shore are unaccessible from the interior roads. Also, the shallow depths of the river in much of the subsegment would prohibit all but very small craft from using the waterway.

ALTERNATE SHORE USE:
Low. Though there is much unused land in this area that could be developed, there is little pressure for such development. Little change in the use of the shoreline seems evident for the near future.

MAPS: USGS, 7.5 Min.Ser. (Topo.), REEDVILLE Quadr., 1968,
USGS, 7.5 Min.Ser. (Topo.), LANCASTER Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 15Mar77 NL-7C/477-492;
28Mar77 NL-7C/493-521.

SUBSEGMENT 7D

BETZ LANDING TO GLEBE POINT

Map 5

EXTENT: 74,400 feet (14.1 mi.) of shoreline along the Great Wicomico River, from Betz Landing to Glebe Point, including Blackwells and Betts Mill Creeks. The subsegment also contains 81,800 feet (15.5 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Artificial fill 1% (0.2 mi.), low shore 11% (1.7 mi.), moderately low shore 38% (5.9 mi.), moderately low shore with bluff 1% (0.1 mi.), moderately high shore 27% (4.2 mi.), and high shore 22% (3.4 mi.).
SHORE: Artificially stabilized 3% (0.4 mi.), fringe marsh 83% (11.7 mi.), and embayed marsh 14% (2.0 mi.).
RIVER: This portion of the river is navigable only by small craft.

SHORELANDS USE
FASTLAND: Agricultural 15% (2.3 mi.), commercial 1% (0.2 mi.), recreational 11% (1.6 mi.), residential 7% (1.1 mi.), and unmanaged, wooded 66% (10.3 mi.).
SHORE: Mostly unused, except at Glebe Point, which is used for commercial and recreational purposes, and Camp Kittamaqund, which is used for recreational purposes.
RIVER: Sport boating and fishing.

WIND AND SEA EXPOSURE: The shoreline trends basically W - E. This area is not exposed to wind or wave actions.

OWNERSHIP: Private.

FLOOD HAZARD: Low to moderate, noncritical. Most sections of the shoreline in this subsegment are of sufficient height to withstand flood waters. However, several structures at Glebe Point are endangered by flood waters during periods of abnormally high water.

WATER QUALITY: Unsatisfactory. This section of the Great Wicomico River is closed to the taking of shellfish.

BEACH QUALITY: There are no beaches in the subsegment.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Slight or no change to moderate, noncritical. The area from Betts Mill Creek to Glebe Point has an average historical erosion rate of 2.4 feet per year. However, much of this area is now artificially stabilized. The only sections actively eroding are several bluff areas near Betts Mill Creek.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 2,000 feet of effective bulkhead in the subsegment.

OTHER SHORE STRUCTURES: There are several piers, boat sheds, and boat ramps in the subsegment.

SHORE USE LIMITATIONS:
The upper reaches of the Great Wicomico River are predominantly woods with little access to the shoreline. Glebe Point is already developed for residential and commercial use. As already stated, several sections with bluffs along the shoreline are actively eroding.

ALTERNATE SHORE USE:
Low. There seems to be little further pressure for development along this section of the Great Wicomico River.

MAPS: USGS, 7.5 Min.Ser. (Topo.), LANCASTER Quadr., 1968,
USGS, 7.5 Min.Ser. (Topo.), REEDVILLE Quadr., 1968,
USGS, 7.5 Min.Ser. (Topo.), HEATHSVILLE Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 28Mar77 NL-7D/522-559.

SUBSEGMENT 7E

GLEBE POINT TO HAYNIE POINT

Maps 4 and 5

EXTENT: 67,100 feet (12.7 mi.) of shoreline along the Great Wicomico River, from Glebe Point to Haynie Point, including Coles and Warehouse Creeks, and Horn Harbor. The subsegment also contains 74,800 feet (14.2 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Artificial fill 1% (0.1 mi.), low shore 29% (4.1 mi.), low shore with bluff 3% (0.4 mi.), moderately low shore 51% (7.3 mi.), moderately low shore with bluff 3% (0.5 mi.), moderately high shore 8% (1.1 mi.), and high shore 5% (0.7 mi.).

SHORE: Artificially stabilized 4% (0.5 mi.), beach 7% (0.9 mi.), fringe marsh 78% (9.9 mi.), and embayed marsh 11% (1.4 mi.).

RIVER: The Great Wicomico River, from Glebe Point to Collins Point has average depths of 12 feet. From Collins Point to Haynie Point the river depth is about 18 feet.

SHORELANDS USE

FASTLAND: Agricultural 30% (4.3 mi.), commercial 2% (0.2 mi.), recreational 6% (0.9 mi.), residential 8% (1.1 mi.), unmanaged, wooded 51% (7.3 mi.). A gravel pit at the head of Warehouse Creek comprises less than 1% of the shorelands use.

SHORE: Mostly unused. Some recreational and commercial use around Glebe Point and recreational use near the mouth of Horn Harbor.

RIVER: Sport boating and fishing.

WIND AND SEA EXPOSURE: The shoreline trends basically W - E, then NW - SE in the subsegment. The shoreline is exposed to local fetches of 2 to 3 miles.

OWNERSHIP: Private.

FLOOD HAZARD: Low to moderate, critical. Most areas of the subsegment have elevations of greater than 10 feet, with the exception of Glebe Point which has elevations of 5 feet or less. Many structures are below the 5-foot contour here and would be flooded during periods of abnormally high water.

WATER QUALITY: Unsatisfactory. According to the State Water Control Board's 305(b)Report the Great Wicomico River's subsurface waters experience an oxygen depletion during the late summer months, rendering millions of oyster larvae immobile. This condition appears to be a natural phenomenon. Presently, the river does not meet the 305(b)(1)(B) criteria.

BEACH QUALITY: Poor to fair. The campground near Horn Harbor has a wide, clean beach. The remainder of the beaches in the subsegment are narrow and often vegetated.

PRESENT SHORE EROSION SITUATION

EROSION RATE: Slight or no change to moderate, noncritical. Glebe Point is accreting at an average historical rate of 1.3 feet per year. The bluffs at Blackwells and those west of Warehouse Creek to Haynie Point have historical erosion rates of 1.0 to 1.2 feet per year.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: There are approximately 2,800 feet of artificially stabilized shoreline in this subsegment, 300 feet of which is riprap and the remainder bulkhead. The campground near Horn Harbor is protected by several groins, and one area of bulkhead is fronted by a groin field. All structures appear to be effective, except for part of the bulkhead near Haynie Point, which is in danger of failing.

OTHER SHORE STRUCTURES: There are numerous piers, boat sheds and boat ramps in the subsegment. The boat yard at Glebe Point has a marine railway and several piers.

SHORE USE LIMITATIONS:

Glebe Point and several other sections of this subsegment are already developed for residential and commercial purposes, which limits other shore uses. The moderate erosion which is occurring along much of the river-fronting shoreline limits the use of those areas unless protective measures are taken.

ALTERNATE SHORE USE:

Low. Though some residential development is possible for sections of the subsegment, there seems to be little pressure for any substantial change in the present shore use.

MAPS: USGS, 7.5 Min.Ser. (Topo.), REEDVILLE Quadr., 1968.

N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 28Mar77 NL-7E/560-598.

Ground-VIMS 20Apr77 NL-7E/ 19- 38.

SUBSEGMENT 7F

HAYNIE POINT TO FLEET POINT

Maps 4 and 6

EXTENT: 181,100 feet (34.3 mi.) of shoreline along the Great Wicomico River from Haynie Point to Fleet Point, including Whays, Reason and Cockrell Creeks. The subsegment also contains 188,200 feet (35.6 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Artificial fill <1% (0.1 mi.), low shore 97% (34.4 mi.), and low shore with bluff 3% (1.1 mi.).
SHORE: Artificially stabilized 11% (3.9 mi.), beach 4% (1.4 mi.), fringe marsh 81% (27.7 mi.), and embayed marsh 4% (1.3 mi.).
RIVER: The Great Wicomico River has depths of 17 feet or more at the entrance extending 5 miles upstream. The main branch of Cockrell Creek has depths of 12 feet to Reedville.

SHORELANDS USE
FASTLAND: Agricultural 28% (10.0 mi.), commercial 6% (2.0 mi.), industrial 4% (1.3 mi.), recreational 1% (0.5 mi.), residential 31% (11.1 mi.), unmanaged, unwooded 1% (0.4 mi.), and unmanaged, wooded 29% (10.3 mi.).
SHORE: Commercial use (marinas and fish processing plants) and some private recreational use in the residential areas.
RIVER: Commercial shipping and sport boating and fishing.

WIND AND SEA EXPOSURE: The river trends basically NW - SE in the subsegment. Whays, Reason, and Cockrell Creeks all trend S - N from the mouth to head. Most of the river-fronting shoreline in this subsegment is exposed to unlimited fetches across the Bay from the southeast. Local fetches of less than a mile from the west and north affect many areas.

OWNERSHIP: Private.

FLOOD HAZARD: Low to moderate, critical. Although most areas have sufficient elevations to resist flooding, Haynie Point, the tip of the Reedville peninsula, and several other areas in the subsegment are subject to inundation during periods of abnormally high water. Several structures at Reedville would be vulnerable to flood damage during such storms.

WATER QUALITY: Unsatisfactory. Cockrell Creek suffers from high bacteriological counts due to leachate from septic tanks around Reedville. The creek also suffers from low dissolved oxygen values, which are mainly attributable to thick bottom sediments resulting from past menhaden rendering plants. The Great Wicomico River's sub-surface waters experience an oxygen depletion during the late summer months.

BEACH QUALITY: Poor to fair. The beaches in this subsegment are usually narrow and are often interspaced with fringe marsh.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Slight or no change to moderate, noncritical. The entire river-fronting shoreline has an historical average erosion rate of 2.0 to 2.7 feet per year. Erosion also occurs along some unprotected portions of Whays and Cockrell Creeks due to rain runoff and boat wakes.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 20,500 feet of artificially stabilized shoreline in the subsegment, several thousand feet of which are either riprap or groin fields and the remainder bulkhead. Groins are also used in conjunction with bulkhead or riprap along several sections of the shoreline. Most structures appear to be effective at combatting erosion or holding fill. However, some bulkhead at several dilapidated industrial sites on Cockrell Creek no longer serve any erosion control purpose.

OTHER SHORE STRUCTURES: There are many piers, boat sheds and boat ramps in the subsegment, most of which are located along Whays and Cockrells Creeks.

SHORE USE LIMITATIONS:
Approximately seventy percent of the shorelands in this subsegment are already used for a variety of purposes, limiting alternate use. These activities are mostly centered on Cockrell and Whays Creeks, though development is taking place along all reaches of shoreline.

ALTERNATE SHORE USE:
Low. There is little available shoreland along the creeks for other development. It appears that most of the shoreline will eventually be developed for residential or commercial purposes. Care should be taken to ensure against pollutants entering the water and further damaging the ecology of this section of the river.

MAPS: USGS, 7.5 Min.Ser. (Topo.), REEDVILLE Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 28Mar77 NL-7F/599-762.

Ground-VIMS 20Apr77 NL-7F/ 83- 86.

SUBSEGMENT 8A

FLEET POINT TO THE MOUTH OF OWENS POND

Maps 6 and 7

EXTENT: 68,500 feet (12.9 mi.) of shoreline along the Chesapeake Bay from Fleet Point to the mouth of Owens Pond, including Taskmakers Creek and Owens Pond. The subsegment also includes 71,400 feet (13.5 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 97% (13.1 mi.) and low shore with bluff 3% (0.4 mi.).
SHORE: Artificially stabilized 7% (0.9 mi.), beach 25% (3.2 mi.), fringe marsh 66% (8.5 mi.), and embayed marsh 2% (0.3 mi.).
NEARSHORE: Intermediate 22%. The remainder of the nearshore zone is located along the creeks in the subsegment.

SHORELANDS USE
FASTLAND: Agricultural 26% (3.5 mi.), residential 27% (3.6 mi.), and unmanaged, wooded 47% (6.4 mi.).
SHORE: Private recreational use at Chesapeake Beach and near Fleet Point; elsewhere, mostly unused.
NEARSHORE: Commercial shipping and fishing, and pleasure boating and fishing.

WIND AND SEA EXPOSURE: The shoreline trends basically SW - NE in the subsegment. Long fetches from the NE through the SE quadrants affect the Bay-fronting shoreline.

OWNERSHIP: Private.

FLOOD HAZARD: Moderate to severe, critical. Most residences are above 10-foot elevations and are thus not susceptible to flooding. However, some structures at Chesapeake Beach and along Bull Neck are close to the shore and would be endangered by flooding.

WATER QUALITY: Satisfactory. The Chesapeake Bay has good water quality. Any pollutants entering the creeks would be readily flushed into the Bay system.

BEACH QUALITY: Fair to good. There are several areas of wide clean beaches in this subsegment.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Moderate to severe, noncritical. The marsh area at Fleet Point has an historical accretion rate of 1.6 feet per year. The Bay shoreline from Fleet Point to Chesapeake Beach has a severe average historical erosion rate of 3.4 to 6.1 feet per year. However, much of this shoreline has been artificially stabilized.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 4,900 feet of artificially stabilized shoreline in the subsegment, most of which is riprap or groin fields. Groins are used in conjunction with riprap or bulkhead along many sections of the shoreline. All structures appear to be effective.

OTHER SHORE STRUCTURES: There are numerous piers in the subsegment.

SHORE USE LIMITATIONS:
Much of the Bay-fronting shoreline has already been developed for residential purposes. Overcrowded residential development would tend to despoil the natural beauty of the shore. Another factor limiting the development of the shorelands here is the severe erosion along unprotected stretches of the shoreline. Any shoreland development would first have to ensure against this force of nature.

ALTERNATE SHORE USE:
Low to moderate. Most areas along the Bay have already been developed. However, several wooded sections of Owens Pond could be developed as recreational parks, with picnic facilities and hiking trails. Also, the beach between Taskmakers Creek and Chesapeake Beach could make a good public beach. Both facilities and ample parking would have to be provided for such a recreational beach.

MAPS: USGS, 7.5 Min.Ser. (Topo.), REEDVILLE Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 27Apr76 NL-8A/763-792.

Ground-VIMS 11Nov74 NL-8A/ 15- 17.

SUBSEGMENT 8B

MOUTH OF OWENS POND TO SMITH POINT

Maps 6 and 7

EXTENT: 40,600 feet (7.7 mi.) of shoreline along the Chesapeake Bay from the mouth of Owens Pond to Smith Point, including Gaskin Pond. The subsegment also includes 36,400 feet (6.9 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Dunes 15% (1.0 mi.), low shore 78% (5.4 mi.), and low shore with bluff 7% (0.5 mi.).
SHORE: Artificially stabilized 1% (0.1 mi.), beach 40% (3.1 mi.), fringe marsh 55% (4.2 mi.), and embayed marsh 4% (0.3 mi.).
NEARSHORE: Intermediate 35% and wide 8%. The remaining shoreline is located on Gaskin Pond.

SHORELANDS USE
FASTLAND: Agricultural 21% (1.5 mi.), residential 6% (0.4 mi.), and unmanaged, wooded 73% (5.0 mi.).
SHORE: Mostly unused, some private recreation at the residential areas.
NEARSHORE: Commercial shipping and fishing, and sport boating and fishing.

WIND AND SEA EXPOSURE: The subsegment trends basically SW - NE. The shoreline is exposed to fetches from the NE through the S quadrants.

OWNERSHIP: Private.

FLOOD HAZARD: Moderate, noncritical. All structures in the subsegment are located at elevations of around 10 feet or greater. Most flooding would occur at Smith Point.

WATER QUALITY: Satisfactory. The Chesapeake Bay has good water quality.

BEACH QUALITY: Fair to good. The beaches at Smith Point are fairly wide with vegetated dunes behind.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Moderate to severe, noncritical. Most of the shoreline has an historical average

erosion rate of 6.1 feet per year. The area just south of Smith Point has been accreting at an average rate of 1.2 feet per year.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 400 feet of artificially stabilized shoreline in the subsegment, 100 feet of which is riprap and the remainder is groins. There is a riprap jetty at the mouth of the Little Wicomico River. All riprap appears to be effective. Some of the groins are only marginally effective at trapping sand.

OTHER SHORE STRUCTURES: None.

SHORE USE LIMITATIONS:
This subsegment has a valuable dune area near Smith Point, which should not be destroyed. This section of land is also fairly narrow, which would limit development. The half mile strip of land at the mouth of Owens Pond is very low and susceptible to flooding. Much of the remaining shoreland is interspaced with lakes near the shore, which limits the amount of Bay-fronting shoreline available for development.

ALTERNATE SHORE USE:
Moderate. The dune area at Smith Point should be preserved. The area could be used as a low density park; however, care should be taken to ensure that the dune system remains undamaged.

MAPS: USGS, 7.5 Min.Ser. (Topo.), REEDVILLE Quadr., 1968,
USGS, 7.5 Min.Ser. (Topo.), BURGESS Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 27Apr76 NL-8B/793-827.

SUBSEGMENT 9A

SMITH POINT TO PEACHTREE POINT

Map 7

EXTENT: 121,800 feet (23.1 mi.) of shoreline along the Little Wicomico River from Smith Point to Peachtree Point, including Rock Hole, Slough, Sharps and Bridge Creeks. The subsegment also contains 123,600 feet (23.4 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 96% (22.4 mi.) and low shore with bluff 4% (1.0 mi.).
SHORE: Artificially stabilized 3% (0.7 mi.), beach 5% (1.1 mi.), fringe marsh 85% (19.6 mi.), and embayed marsh 7% (1.7 mi.).
RIVER: The Little Wicomico River has controlling depths of 6 feet at the entrance channel and for a distance of approximately four miles upstream. Bridge Creek has controlling depths of 6 feet along the majority of the creek. Slough Creek and Rock Hole are generally shallow, with average depths of 2 to 3 feet.

SHORELANDS USE
FASTLAND: Agricultural 37% (8.5 mi.), commercial 1% (0.3 mi.), residential 21% (4.9 mi.), and unmanaged, wooded 41% (23.4 mi.).
SHORE: Some private recreational and commercial use, but mostly unused.
RIVER: Sport boating and fishing.

WIND AND SEA EXPOSURE: The main stream trends in an E - W direction and the creeks run N - S. The Little Wicomico River is not exposed to direct wind induced wave attacks.

OWNERSHIP: Private.

FLOOD HAZARD: Low. The majority of the subsegment has elevations of at least 10 feet along the shoreline.

WATER QUALITY: No data. This section is not specifically mentioned in the Virginia State Water Control Board's 305(b)Report. It is thus assumed that the Little Wicomico River meets the 305(b)(1)(B) criteria.

BEACH QUALITY: Poor. There are only fringe beaches in this subsegment.

PRESENT SHORE EROSION SITUATION
EROSION RATE: No data. Erosion along this portion of the river would be due to rain runoff and boat wakes.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 3,500 feet of artificially stabilized shoreline in the subsegment, 200 feet of which is rubble riprap and the remainder bulkhead. These structures, though effective, are mainly for cosmetic purposes rather than for erosion control.

OTHER SHORE STRUCTURES: The two marinas located along Slough Creek have open and covered slips and several launching ramps. There are numerous piers along the remainder of the shoreline. A ferry dock is located at Sunnybank.

SHORE USE LIMITATIONS:
More than one-fifth of the shoreline is already used for residential development. The eastern bank of Rock Hole is a narrow strip of land bordering on the Chesapeake Bay. The low elevation and the presence of valuable dunes along this stretch of land limit the area's use potential. Along other sections of the subsegment, the agricultural lands would have to be sacrificed for development.

ALTERNATE SHORE USE:
Low. As stated in Subsegment 8B, the strip of land at Smith Point should be preserved in its natural state, both for its beauty and its flood control characteristics. There seems to be little alternate shore use suitable for the subsegment.

MAPS: USGS, 7.5 Min.Ser. (Topo.), BURGESS Quadr., 1968,
USGS, 7.5 Min.Ser. (Topo.), REEDVILLE Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 28Mar77 NL-9A/828-884.

SUBSEGMENT 9B

PEACHTREE POINT TO HEAD OF LITTLE WICOMICO RIVER

Maps 7 and 8

EXTENT: 74,700 feet (14.1 mi.) of shoreline from Peachtree Point to the head of the Little Wicomico River, including Back, Cod, Sloop and Willis Creeks and Hansons Cove. The subsegment also includes 85,400 feet (16.2 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Artificial fill < 1% (0.1 mi.), low shore 94% (15.1 mi.), low shore with bluff 5% (0.8 mi.), and moderately low shore 1% (0.2 mi.).
SHORE: Artificially stabilized 2% (0.2 mi.), beach 13% (1.8 mi.), fringe marsh 78% (11.1 mi.), and embayed marsh 7% (1.0 mi.).
RIVER: The Little Wicomico River has depths of 6 feet to Willis Creek, and depths of 2 to 4 feet at the head.

SHORELANDS USE
FASTLAND: Agricultural 19% (3.1 mi.), residential 28% (4.5 mi.), and unmanaged, wooded 53% (8.6 mi.).
SHORE: Some private recreational use, but mostly unused.
RIVER: Sport boating and fishing.

WIND AND SEA EXPOSURE: The main stream of the river trends basically E - W, then SE - NW toward the head. The creeks included in the subsegment trend NE - SW. The Little Wicomico River is not exposed to significant wind induced wave actions.

OWNERSHIP: Private.

FLOOD HAZARD: Low. The majority of the shoreline has elevations of at least 10 feet.

WATER QUALITY: No data. The Little Wicomico River is not mentioned in the Virginia State Water Control Board's 305(b)Report. It is assumed that the river meets the 305(b)(1)(B) criteria.

BEACH QUALITY: Poor. There are only narrow, strip beaches in this subsegment.

PRESENT SHORE EROSION SITUATION
EROSION RATE: No data. Erosion along this portion of the river would be due to rain runoff and boat wakes.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 1,200 feet of effective bulkhead in the subsegment. Two sections are for retaining fill, while the remainder appears to be for cosmetic purposes rather than for erosion control.

OTHER SHORE STRUCTURES: There are numerous piers and boat sheds as well as a concrete boat ramp in the subsegment.

SHORE USE LIMITATIONS:
This subsegment is predominantly rural in nature, seventy-two percent of the shorelands are either being used for agriculture or are wooded. The remaining twenty-eight percent of the shorelands are residential areas. Much of the residential development has taken place along the river-fronting shoreline from Willis Creek to Peachtree Point. The present use would limit other development in the subsegment. The unused shorelands near the head of the river do not have good access to the river channel and are thus not prime targets for water-related development.

ALTERNATE SHORE USE:
Low. The shorelands bordering on sections of the river which are navigable by small craft have already been mostly developed for residential purposes. Little alternative use seems likely for unused sections of the subsegment.

MAPS: USGS, 7.5 Min.Ser. (Topo.), BURGESS Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 28Mar77 NL-9B/885-925.

SUBSEGMENT 9C

HEAD OF LITTLE WICOMICO RIVER TO KING POINT

Maps 7 and 8

EXTENT: 72,800 feet (13.7 mi.) of shoreline from the head of the Little Wicomico River to King Point, including Sawmill and Spring Coves, and Spences and Bridgemans Creeks. The subsegment also contains 84,500 feet (16.0 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 97% (15.6 mi.) and low shore with bluff 3% (0.4 mi.).
SHORE: Artificially stabilized 1% (0.1 mi.), beach 4% (0.5 mi.), fringe marsh 85% (11.7 mi.), and embayed marsh 10% (1.4 mi.).
RIVER: Too narrow and shallow for classification. The main stream of the river has depths of about 6 feet.

SHORELANDS USE
FASTLAND: Agricultural 42% (6.7 mi.), commercial 2% (0.3 mi.), industrial 1% (0.1 mi.), residential 14% (2.3 mi.), and unmanaged, wooded 41% (6.6 mi.).
SHORE: Private recreational use and some commercial use (marinas).
RIVER: Sport boating and fishing.

WIND AND SEA EXPOSURE: The shoreline trends basically NW - SE, while the creeks run mainly N - S. The river is not subject to notable wind or wave actions.

OWNERSHIP: Private.

FLOOD HAZARD: Low. The majority of the shoreline has elevations of at least 10 feet.

WATER QUALITY: No data. This section is not specifically mentioned in the State Water Control Board's 305(b)Report. It is thus assumed that the Little Wicomico River meets the 305(b)(1)(B) criteria.

BEACH QUALITY: Poor. There are only fringe beaches in the subsegment.

PRESENT SHORE EROSION SITUATION
EROSION RATE: No data. Field investigations show that several bluff areas are eroding due to a combination of rain runoff and boat wakes. In at least one area, agricultural fields have been plowed perpendicular to the shoreline, which greatly increases rain runoff erosion. Also, it was noted that several fields do not have adequate "green zones" between the field and the shoreline. These vegetated buffer zones are necessary to lessen the erosion rate and the concurrent agricultural runoff pollution of the nearby waters.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 700 feet of artificially stabilized shoreline in the subsegment, 50 feet of which is rubble riprap and the remainder bulkhead. All structures appear to be effective.

OTHER SHORE STRUCTURES: There are numerous piers, several boat ramps, and two marine railways in this subsegment.

SHORE USE LIMITATIONS:
This subsegment is predominantly rural, with eighty-three percent of the shorelands either used for agriculture or are unused woods. Residential development and several marine railways are located along the river from Spring Cove to King Point. The shallow waters at the head of the river are not very conducive to residential development; however, some development is occurring here. Care should be taken to ensure that the marshes at the river head are not damaged by such development.

ALTERNATE SHORE USE:
Low. Any substantial change in the shore use would be at the sacrifice of the agricultural lands along the river. No areas in the subsegment seem suitable for public recreational use.

MAPS: USGS, 7.5 Min.Ser. (Topo.), BURGESS Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 11Nov76 NL-9C/926-1012.

SUBSEGMENT 9D

KING POINT TO MOUTH OF LITTLE WICOMICO RIVER

Maps 7 and 8

EXTENT: 58,200 feet (11.0 mi.) of shoreline from King Point to the mouth of the Little Wicomico River, including Ellyson Creek. The subsegment also contains 59,200 feet (11.2 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 83% (9.3 mi.) and low shore with bluff 17% (1.9 mi.).
SHORE: Artificially stabilized 3% (0.3 mi.), beach 7% (0.8 mi.), fringe marsh 80% (8.8 mi.), and embayed marsh 10% (1.1 mi.).
RIVER: The main bodies of the Little Wicomico River and Ellyson Creek have controlling depths of 6 feet.

SHORELANDS USE
FASTLAND: Agricultural 43% (4.8 mi.), commercial 1% (0.1 mi.), residential 6% (0.6 mi.), and unmanaged, wooded 50% (5.7 mi.).
SHORE: Some private recreational and agricultural use, but mostly unused.
RIVER: Sport boating and fishing.

WIND AND SEA EXPOSURE: The river trends basically W - E in this subsegment. Ellyson Creek runs from NW - SE. The subsegment is not exposed to significant wind or wave actions.

OWNERSHIP: Private.

FLOOD HAZARD: Low. The majority of the shoreline has elevations of 10 feet and is not subject to flooding.

WATER QUALITY: No data. The Little Wicomico River is not mentioned in the State Water Control Board's 305(b)Report. Therefore, it is assumed that the river meets the 305(b)(1)(B) criteria.

BEACH QUALITY: Poor to fair. The beaches in this subsegment are narrow and often interspaced with fringing marsh. There are several beaches of fair width near the riverward end of the channel entrance. However, access is difficult.

PRESENT SHORE EROSION SITUATION
EROSION RATE: No data. The shoreline appears mostly stable, except at the east side of the mouth of Ellyson Creek. There, rain runoff and boat wakes are eroding a low bluff area. The situation is worsened by the incorrect plowing of the agricultural field at the shore. Correct contour plowing plus a "green zone" buffer between the field and shore would do much to alleviate the erosion.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 1,700 feet of artificially stabilized shoreline in the subsegment, 1,200 feet of which is rubble riprap and the remainder is bulkhead. All structures appear effective.

OTHER SHORE STRUCTURES: There are numerous piers, several boat sheds, and a ferry dock in the subsegment.

SHORE USE LIMITATIONS:
Ninety-three percent of the shorelands in this subsegment are either woods or are used for agriculture. Any development would be at the sacrifice of these areas. Existing development indicates a tendency toward construction near the inland roads rather than the shoreline.

ALTERNATE SHORE USE:
Low. The river-fronting shorelands are used for agriculture. The only section in the subsegment which could become a park would be the area from the old river entrance to the new channel at Smith Point. However, access to this area is limited.

MAPS: USGS, 7.5 Min.Ser. (Topo.), BURGESS Quadr., 1968.
N.O.S., #12225 (formerly 1223), 1:80,000 scale, CHESAPEAKE BAY, Wolf Trap to Smith Point, VA, 25th ed., 1973.

PHOTOS: Aerial-VIMS 30Nov76 NL-9D/1013-1052.

SEGMENT 10

MOUTH OF LITTLE WICOMICO RIVER
TO MOUTH OF CUBITT CREEK

Maps 7, 8, and 9

EXTENT: 47,300 feet (8.9 mi.) of shoreline along the Potomac River from the mouth of the Little Wicomico River to the mouth of Cubitt Creek. The segment also includes 44,700 feet (8.5 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Artificial fill 6% (0.5 mi.), dunes 10% (0.9 mi.), low shore 45% (3.8 mi.), and low shore with bluff 39% (3.3 mi.).
SHORE: Artificially stabilized 34% (3.0 mi.), beach 61% (5.5 mi.), and embayed marsh 5% (0.4 mi.).
NEARSHORE: Intermediate 72% and wide 14%. The remainder of the nearshore zone is located along Flag Pond.

SHORELANDS USE
FASTLAND: Agricultural 20% (1.7 mi.), residential 50% (4.3 mi.), unmanaged, unwooded 5% (0.4 mi.), and unmanaged, wooded 25% (8.5 mi.).
SHORE: Mostly private recreational use.
NEARSHORE: Commercial traffic in the river channel, sport boating and fishing closer to shore.

WIND AND SEA EXPOSURE: The shoreline trends basically SE - NW in this segment. This portion of the river is exposed to fetches across the Bay from the northeast and east, and to significant fetches from the northwest along the Potomac River.

OWNERSHIP: Private.

FLOOD HAZARD: Low. The majority of the shoreline has elevations of at least 10 feet and is not subject to flooding.

WATER QUALITY: This segment generally meets the State Water Control Board's 305(b)(1)(B) criteria.

BEACH QUALITY: Fair to good. Most of the shoreline has nice wide and clean beaches. Much sand has been trapped by the extensive groin systems employed along the shore.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Severe, noncritical. The shoreline near Smith Point has been accreting at an historical average rate of 1.2 feet per year. The remaining shoreline has a severe historical average erosion rate of 3.1 to 4.9 feet per year.
ENDANGERED STRUCTURES: None. Most residential areas have been artificially stabilized.
SHORE PROTECTIVE STRUCTURES: There are approximately 15,900 feet of artificially stabilized shoreline in this segment. Groins have been employed with both bulkheads and riprap in many areas. There are two areas where experimental sand bag sills have been used to control the erosion. Most structures appear to be effective in halting erosion. However, several groins have been flanked in some areas and are in danger of failing.

OTHER SHORE STRUCTURES: There are no piers in the segment. The only structures along the shoreline are a wooden ramp, a private hauling ramp, and several platforms over the beach.

SHORE USE LIMITATIONS:
Approximately fifty percent of the shorelands in the segment have already been developed for residential purposes. This is mainly strip development, usually only affecting the one to two hundred feet of land adjacent to the shore. Agricultural fields and wooded lands back such areas. These residential areas are mostly second or vacation homes.
Almost the entire shoreline has a severe erosion rate, and undeveloped areas are still eroding. Adequate protection of the shoreline is a necessary prerequisite to any construction along most of this shoreline.

ALTERNATE SHORE USE:
Low. Some continued residential development is possible for several areas of the segment. However, the rural nature of the shorelands will probably remain unchanged. There are no areas suitable for other alternate development.

MAPS: USGS, 7.5 Min.Ser. (Topo.), BURGESS Quadr., 1968.
N.O.S., #12233 (formerly 557), 1:40,000 scale, POTOMAC RIVER, Chesapeake Bay to Piney Point, VA-MD, 18th ed., 1973.

PHOTOS: Aerial-VIMS 30Nov76 NL-10/1053-1195.
Ground-VIMS 6Nov74 NL-10/ 1- 14.

SEGMENT 11

CUBITT CREEK TO GREAT POINT

Maps 9 and 10

EXTENT: 239,800 feet (45.4 mi.) of shoreline along the Potomac River from Cubitt Creek to Great Point, including Cubitt, Hull, Presley, and Cod Creeks. The segment also contains 247,000 feet (46.8 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Artificial fill < 1% (0.1 mi.), dunes < 1% (0.2 mi.), low shore 41% (19.4 mi.), low shore with bluff 6% (2.9 mi.), moderately low shore 29% (13.6 mi.), moderately low shore with bluff 8% (3.8 mi.), moderately high shore 8% (3.8 mi.), moderately high shore with bluff 2% (1.0 mi.), high shore 3% (1.4 mi.), and high shore with bluff 1% (0.6 mi.).
SHORE: Artificially stabilized 5% (2.3 mi.), beach 12% (5.4 mi.), fringe marsh 72% (32.8 mi.), and embayed marsh 11% (4.9 mi.).
NEARSHORE: Intermediate 8% and wide 3%. The remainder of the nearshore zone is located along the creeks in the segment.

SHORELANDS USE
FASTLAND: Agricultural 38% (17.7 mi.), residential 24% (11.1 mi.), and unmanaged, wooded 38% (18.0 mi.).
SHORE: Some private recreational and agricultural use, but mostly unused.
NEARSHORE: Commercial traffic, sport boating and fishing along the river. Sport boating and fishing in the creeks.

WIND AND SEA EXPOSURE: The river shoreline in this segment trends basically SE - NW. The creeks run N - S from the mouth to the head. The river-fronting shoreline is exposed to fetches across the Bay from the northeast and east, and also to significant fetches from the northwest, along the Potomac River.

OWNERSHIP: Private.

FLOOD HAZARD: Moderate to high, critical. Much of the shoreline has elevations of only 5 feet and is susceptible to flooding. Many structures are on or below the 5-foot contour and could be flooded during periods of abnormally high water.

WATER QUALITY: This segment generally meets the State Water Control Board's 305(b)(1)(B) criteria.

BEACH QUALITY: Poor to good. There are many good wide and clean beaches in the segment.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Severe, critical and noncritical. This segment has an historical average erosion rate of 3.1 to 10.6 feet per year for the river-fronting shoreline. However, forty-five percent of this shoreline has been stabilized.

Several agricultural fields along the shoreline are actively eroding. These areas do not have adequate buffer zones (green zones) between the plowed fields and the shore. Also, several fields have been plowed perpendicular rather than parallel to shore. This aids both wave and rain runoff erosion. (Scouring along several fields gives evidence of the rain runoff erosion.)
ENDANGERED STRUCTURES: Two houses at the mouth of Hull Creek have been severely damaged by erosion and flood forces. Several other structures in this segment are endangered by continued erosion.
SHORE PROTECTIVE STRUCTURES: There are approximately 12,200 feet of artificially stabilized shoreline in the segment, most of which is groin fields or a combination of groins and bulkhead or riprap. Stabilized areas on the creeks are usually bulkhead. While most structures appear to be effective, many areas between stabilized sections have accelerated erosion rates which threaten the integrity of the structures. Also, several groin fields, especially at Cordreys Beach, have been ineffective at trapping buffer beaches.

OTHER SHORE STRUCTURES: There are numerous piers in the segment, most of which are located along the creeks.

SHORE USE LIMITATIONS:
The entire river-fronting shoreline has a severe historical erosion rate. Any new development along this section of shoreline would have to cope with this problem. Also, the creeks in the segment are mostly unnavigable, which would tend to limit water-related development.

ALTERNATE SHORE USE:
Low. Bay Quarter Neck and the Cod Creek area are being developed for residential purposes. Much of Hull Neck, especially along the river, is already developed. Elsewhere in the segment, the shorelands are either used for agriculture or are unused. The rural nature of the area would make a public recreational park unnecessary.

MAPS: USGS, 7.5 Min.Ser. (Topo.), BURGESS Quadr., 1968,
USGS, 7.5 Min.Ser. (Topo.), HEATHSVILLE Quadr., 1968.
N.O.S., #12233 (formerly 557), 1:40,000 scale, POTOMAC RIVER, Chesapeake Bay to Piney Point, VA-MD, 18th ed., 1973.

PHOTOS: Aerial-VIMS 30Nov76 NL-11/1196-1482.

Ground-VIMS 20Apr77 NL-11/ 39- 66.

SEGMENT 12

GREAT POINT TO HONEST POINT

Maps 10 and 11

EXTENT: 151,800 feet (28.8 mi.) of shoreline along the Coan River, from Great Point to Honest Point. The segment also includes 163,200 feet (30.9 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 27% (8.4 mi.), low shore with bluff 11% (3.4 mi.), moderately low shore 23% (7.0 mi.), moderately low shore with bluff 7% (2.3 mi.), moderately high shore 19% (5.8 mi.), moderately high shore with bluff 1% (0.3 mi.), high shore 9% (2.9 mi.), and high shore with bluff 3% (0.8 mi.).
SHORE: Artificially stabilized 4% (1.1 mi.), beach 11% (3.1 mi.), fringe marsh 68% (19.7 mi.), and embayed marsh 17% (4.9 mi.).
NEARSHORE: Intermediate 5%. The Coan River has average depths of 12 feet at the mouth, with depths of at least 6 feet along the main stream of the river to Nokomis.

SHORELANDS USE
FASTLAND: Agricultural 34% (10.6 mi.), commercial 2% (0.5 mi.), industrial 1% (0.3 mi.), residential 18% (5.7 mi.), unmanaged, unwooded 1% (0.3 mi.), and unmanaged, wooded 44% (13.5 mi.).
SHORE: Some commercial use at the several marinas and private recreational use in front of residences; elsewhere, mostly unused.
NEARSHORE: Sport boating and fishing.

WIND AND SEA EXPOSURE: The shoreline trends basically E - W in the segment. The Coan River trends basically NNE - SSW through several meanders. Fetches at Walnut Point are NE - 7.1 nm and ENE - 8.3 nm.

OWNERSHIP: Private.

FLOOD HAZARD: Low to high, critical. Most of the shorelands along the Coan River have elevations of 10 to 70 feet and are not vulnerable to flooding. However, the areas near the mouth of the river and between Great and Walnut Points are highly susceptible to inundation during periods of abnormally high water. Several structures at the river mouth are located at elevations of less than 5 feet and are endangered.

WATER QUALITY: This segment generally meets the State Water Control Board's 305(b)(1)(B) criteria.

BEACH QUALITY: Poor to good. The only good beaches in this segment are from Balls Creek to Walnut Point. Most of this area has fairly wide beaches with clean sand. The beaches along the Coan River are usually narrow and are often vegetated.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Slight or no change to severe, noncritical. The majority of shoreline erosion in this segment has centered along the Potomac River fronting shoreline. The section from Walnut Point to Great Point have historical average erosion rates of 2.5 to 10.6 feet per year. Honest Point has an average erosion rate of 4.0 feet per year. Erosion is also a problem for much of the shoreline from Boathouse Pond to Walnut Point. Rain runoff and boat wakes attack the vulnerable bluffs along this section of shoreline and are causing slight to moderate erosion. Several agricultural fields near the shoreline in this area have not left a buffer zone of vegetated land between the fields and the shore. One field is plowed perpendicular to the shoreline. Such farming techniques contribute to rain runoff erosion and the resulting water pollution from fertilizers, insecticides and herbicides.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 5,600 feet of artificially stabilized shoreline in the segment, 2,000 feet of which is riprap and the remainder bulkhead. Several areas of bulkhead have groins fronting the structures. A bulkhead at the mouth of Balls Creek has separated from the fastland and now gives little erosion protection. A cosmetic bulkhead at Walnut Point is dilapidated. Elsewhere, all structures appear to be effective.

OTHER SHORE STRUCTURES: There are numerous private piers and boat sheds along the Coan River. Several marinas near Honest Point and Stevens Point have open slips for numerous boats. The marina at Stevens Point has a marine railway.

SHORE USE LIMITATIONS:
The Potomac river-fronting shoreline has a moderate to severe erosion rate. This area is presently used for agriculture. Walnut Point is unused. Most of the land near the mouth of the Coan River is already used, either for agriculture, residences, or industry. Existing use here would limit other types of development. The majority of unused land is located along the head of the river. The moderately high to high bluffs found along the shoreline in these areas would hamper any formal use of the land.

ALTERNATE SHORE USE:
Low. There seems to be no immediate need for any type of public recreational facilities in this section of the county. Though some continued isolated development in areas of the segment is possible, little change in the rural nature of the shorelands is foreseen.

MAPS: USGS, 7.5 Min.Ser. (Topo.), HEATHSVILLE Quadr., 1968.
N.O.S., #12233 (formerly 557), 1:40,000 scale, POTOMAC RIVER, Chesapeake Bay to Piney Point, VA-MD, 18th ed., 1973.

PHOTOS: Aerial-VIMS 30Nov76 NL-12/1483-1649,
1Dec76 NL-12/1650-1664.
Ground-VIMS 20Apr77 NL-12/ 67- 70.

SEGMENT 13

HONEST POINT TO HOG ISLAND

Maps 11 and 12

EXTENT: 133,600 feet (25.3 mi.) of shoreline from Honest Point to Hog Island, including The Glebe, Wrights Cove, Kingscote Creek and Judith Sound. The segment also contains 134,300 feet (25.4 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 90% (23.0 mi.), low shore with bluff 8% (1.9 mi.), and moderately low shore 2% (0.5 mi.).
SHORE: Artificially stabilized 8% (2.1 mi.), beach 5% (1.3 mi.), fringe marsh 71% (17.9 mi.), embayed marsh 7% (1.7 mi.), and extensive marsh 9% (2.3 mi.).
NEARSHORE: Intermediate 10%. The remainder of the nearshore zone is located along The Glebe and Kingscote Creek, which have average depths of 6 feet.

SHORELANDS USE
FASTLAND: Agricultural 49% (12.3 mi.), commercial 1% (0.4 mi.), residential 30% (7.7 mi.), and unmanaged, wooded 20% (5.0 mi.).
SHORE: Private recreational and agricultural use. Some portions, especially at the head of the creeks, are unused.
NEARSHORE: Sport boating and fishing.

WIND AND SEA EXPOSURE: The shoreline trends basically S - N. The Glebe trends E - W, and Kingscote Creek runs SE - NW. Travis Point is exposed to fetches from the N - 7.7 nm, and NE - 6.0 nm across the Potomac River, and from the east across the Bay.

OWNERSHIP: Private.

FLOOD HAZARD: High, critical. Honest Point and Travis Point, with elevations of less than 5 feet, are susceptible to flooding. All structures at these areas would be flooded during abnormally high water.

WATER QUALITY: This segment generally meets the State Water Control Board's 305(b)(1)(B) criteria.

BEACH QUALITY: Poor to good. Most of the shoreline on Travis Point in Judith Sound has good beaches that have been trapped by the groins there. Elsewhere, there are only narrow strip beaches.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Slight or no change to severe, noncritical. The Lewisetta section of Travis Point has an historical average erosion rate of 2.0 to 3.7 feet per year. However, this area is mostly artificially stabilized and erosion is not a present problem.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 11,200 feet of artificially stabilized shoreline in this segment, most of which is bulkhead. There are several small areas of riprap along the shore and many groins at Travis Point. An old bulkhead at Cowart has separated from the fastland and offers little erosion protection. Elsewhere in the segment, most structures appear to be effective.

OTHER SHORE STRUCTURES: There are many piers and boat sheds in the residential subdivisions along The Glebe. The marinas on Travis Point have open slips for many boats and have several boat ramps.

SHORE USE LIMITATIONS:
The Travis Point area and much of the shoreline along the north bank of The Glebe are already developed for residential purposes. A total of thirty percent of the shorelands in this segment are used for residences, either summer homes or primary dwellings. Almost fifty percent of the shorelands are used for agriculture. There are generally only isolated sections of unmanaged woods along the shoreline, much of which is found at the head of the creeks. Therefore, there is a limited supply of unused land available for development in this area.

ALTERNATE SHORE USE:
Low. Large sections of the shorelands have already been developed for residential and commercial purposes. The rural nature of the area would preclude the necessity of establishing a public recreational park along the shoreline.

MAPS: USGS, 7.5 Min.Ser. (Topo.), HEATHSVILLE Quadr., 1968,
USGS, 7.5 Min.Ser. (Topo.), ST. GEORGE ISLAND Quadr., 1968, PI 1973,
USGS, 7.5 Min.Ser. (Topo.), LOTTSBURG Quadr., 1968.
N.O.S., #12233 (formerly 557), 1:40,000 scale, POTOMAC RIVER, Chesapeake Bay to Piney Point, VA-MD, 18th ed., 1973.

PHOTOS: Aerial-VIMS 1Dec76 NL-13/1665-1680,
28Mar77 NL-13/1681-1741.

Ground-VIMS 20Apr77 NL-13/ 71- 82.

SEGMENT 14

HOG ISLAND TO BARN POINT

Maps 12 and 13

EXTENT: 21,800 feet (4.1 mi.) of shoreline along the Potomac River from Hog Island to Barn Point. The segment includes 26,600 feet (5.0 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 94% (4.7 mi.) and low shore with bluff 6% (0.3 mi.).
SHORE: Artificially stabilized 34% (1.4 mi.), beach 39% (1.6 mi.), fringe marsh 7% (0.3 mi.), embayed marsh 6% (0.2 mi.), and extensive marsh 14% (0.6 mi.).
NEARSHORE: Intermediate 100%.

SHORELANDS USE
FASTLAND: Agricultural 46% (2.3 mi.), residential 34% (1.7 mi.), and unmanaged, wooded 20% (1.0 mi.).
SHORE: Mostly private recreational and agricultural use.
NEARSHORE: Commercial shipping and fishing in the Potomac River channel, sport boating and fishing closer to shore.

WIND AND SEA EXPOSURE: The shoreline trends ESE - WNW from Hog Island to Thicket Point, then E - W from Thicket Point to Barn Point. Fetches at Thicket Point are N - 7.0 nm, NE - 6.6 nm, and east across the Bay.

OWNERSHIP: Private.

FLOOD HAZARD: Moderate, critical. Much of the shoreline has elevations of 10 feet and are not susceptible to floods. However, the Hog Island marshes and fastland have elevations of 5 feet or less and are moderately susceptible to flooding. Several structures are located at 5-foot elevations and would be endangered during periods of abnormally high water.

WATER QUALITY: This segment generally meets the State Water Control Board's 305(b)(1)(B) criteria.

BEACH QUALITY: Fair to good. The beaches west of Hog Island have good width and clean sand. Some of the groins in front of residential sections have trapped nice fillets of sand.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Moderate to severe, noncritical. Historical average erosion rates for the area are:

Hog Island to Rt. 680 - - - - - 2.7 ft/yr.
West of Rt. 680 to Thicket Pt. - 3.7 ft/yr.
Thicket Pt. to Barn Pt. - - - - 2.0 ft/yr.

Erosion is continuing in some areas of the segment, but most sections have been artificially stabilized.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 7,300 feet of groin fields in the segment. These structures are sometimes used in conjunction with bulkhead or riprap. Half of the groins have been effective in trapping significant amounts of sand. A groin field east of Thicket Point is ineffective, and erosion is continuing along this area of shoreline.

OTHER SHORE STRUCTURES: There are several piers and a boat ramp in the segment.

SHORE USE LIMITATIONS:
The river-fronting shorelands from near Route 680 to Barn Point are almost entirely used for residential purposes. The Cherry Point Neck shorelands are agricultural areas. The only unused lands in the segment are very small stretches of woods along the shore and behind several ponds. The present shore use would limit the amount and type of other development.
Another limiting factor in shore development would be the vulnerability of unused sections of shoreline to erosion. With moderate to severe erosion rates along the entire segment, any other user of the area would have to first stabilize the shoreline.

ALTERNATE SHORE USE:
Low. Any major change in the use of the segment would be at the sacrifice of the agricultural areas. There appears to be little need for such a change for the foreseeable future.

MAPS: USGS, 7.5 Min.Ser. (Topo.), ST. GEORGE ISLAND Quadr., 1968,
USGS, 7.5 Min.Ser. (Topo.), KINSALE Quadr., 1968.
N.O.S., #12233 (formerly 557), 1:40,000 scale, POTOMAC RIVER, Chesapeake Bay to Piney Point, VA-MD, 18th ed., 1973.

PHOTOS: Aerial-VIMS 28Mar77 NL-14/1742-1782.

SEGMENT 15

BARN POINT TO MUNDY POINT

Map 13

EXTENT: 137,100 feet (26.0 mi.) of shoreline along the South Yeocomico River from Barn Point to Mundy Point, including Lodge and Mill Creeks. The subsegment also contains 142,500 feet (27.0 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Artificial fill <1% (0.1 mi.), low shore 35% (9.5 mi.), low shore with bluff 23% (6.1 mi.), moderately low shore 37% (10.1 mi.), moderately low shore with bluff 1% (0.2 mi.), moderately high shore 1% (0.2 mi.), and high shore 3% (0.8 mi.).
SHORE: Artificially stabilized 12% (3.1 mi.), beach 5% (1.2 mi.), fringe marsh 79% (20.5 mi.), and embayed marsh 4% (1.2 mi.).
RIVER: The South Yeocomico River has average depths of 12 feet. Lodge and Mill Creeks have depths of 6 feet grading to 3 feet.

SHORELANDS USE
FASTLAND: Agricultural 40% (10.8 mi.), commercial 2% (0.6 mi.), industrial 1% (0.2 mi.), residential 43% (11.5 mi.), and unmanaged, wooded 14% (3.9 mi.).
SHORE: Mostly private recreational and agricultural use. The head of Mill Creek is unused woods.
RIVER: Sport boating and fishing.

WIND AND SEA EXPOSURE: The South Yeocomico River trends basically N - S. The fetch at Mundy Point is NE - 7.5 nm.

OWNERSHIP: Private.

FLOOD HAZARD: Low to moderate, noncritical. The majority of the shoreline has elevations of at least 10 feet and is not subject to flooding. The marina facilities on Pea Neck and Mundy Point could be flooded during periods of abnormally high water.

WATER QUALITY: Lodge Creek is closed to the taking of shellfish, however it does meet the State Water Control Board's 305(b)(1)(B) criteria.

BEACH QUALITY: Poor to fair. There are several areas with nice beaches in the segment. However, the beaches are very small and are usually trapped by groins.

PRESENT SHORE EROSION SITUATION
EROSION RATE: No data. Though there may be some isolated erosion due to rain runoff and boat wakes, the shorelands in this segment appear to be mostly stable.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 16,500 feet of artificially stabilized shoreline in the segment, several hundred feet of which is rubble riprap and the remainder bulkhead. Groins have been employed in several areas near the river mouth, often in conjunction with bulkhead. Though most structures seem to be effective, some groin fields have been unsuccessful at trapping buffer beaches.

OTHER SHORE STRUCTURES: There are numerous piers and boat sheds, and several boat ramps and marine railways in the segment.

SHORE USE LIMITATIONS:
Half of the shorelands of Mill and Lodge Creeks border on unnavigable waters, which would limit development in these areas. Eighty-six percent of the fastland in this segment is already either formally developed or is used for agriculture. Most unused land is located along the shallow creek heads.

ALTERNATE SHORE USE:
Low. As is true for most areas along the shorelands of Northumberland County, the majority of usable land is already consumed, either for residences or agriculture. The unused areas generally have untenable elevations, poor access, and shallow water. Such conditions are not conducive to development unless all other lands in the vicinity are totally and intensely developed.

MAPS: USGS, 7.5 Min.Ser. (Topo.), KINSALE Quadr., 1968,
USGS, 7.5 Min.Ser. (Topo.), LOTTSBURG Quadr., 1968.
N.O.S., #12233 (formerly 557), 1:40,000 scale, POTOMAC RIVER, Chesapeake Bay to Piney Point, VA-MD, 18th ed., 1973.

PHOTOS: Aerial-VIMS 28Mar77 NL-15/1783-1815, 1Dec76 NL-15/1816-1889.

SEGMENT 16

MUNDY POINT TO THE COUNTY LINE

Map 13

EXTENT: 40,500 feet (7.7 mi.) of shoreline along the West Yeocomico River from Mundy Point to the Northumberland - Westmoreland County line at the head of Hampton Hall Branch. The segment also contains 42,900 feet (8.1 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 47% (3.8 mi.), moderately low shore 33% (2.7 mi.), moderately low shore with bluff 4% (0.3 mi.), moderately high shore 5% (0.4 mi.), and high shore 11% (0.9 mi.).
SHORE: Artificially stabilized 3% (0.3 mi.), beach 3% (0.2 mi.), fringe marsh 88% (6.8 mi.), and embayed marsh 6% (0.4 mi.).
RIVER: The West Yeocomico River has average depths of 6 feet. Hampton Hall Branch is very narrow and shallow.

SHORELANDS USE
FASTLAND: Agricultural 18% (1.5 mi.), industrial 2% (0.1 mi.), residential 20% (1.6 mi.), unmanaged, unwooded 2% (0.2 mi.), and unmanaged, wooded 58% (4.7 mi.).
SHORE: Some private recreational use, but mostly unused.
RIVER: Sport boating and fishing.

WIND AND SEA EXPOSURE: The West Yeocomico River trends basically E - W, and Hampton Hall Branch runs NE - SW. The fetch at Long Point is NE - 8.0 nm. However, the narrowness of the river would diminish the effects of any wind generated waves in this area.

OWNERSHIP: Private.

FLOOD HAZARD: Low, noncritical. The majority of the shoreline has elevations of at least 10 feet and would not be subject to flooding.

WATER QUALITY: Hampton Hall Branch is closed to the taking of shellfish, although it meets the State Water Control Board's 305(b)(1)(B) criteria.

BEACH QUALITY: Fair to good. The only beaches in this segment are at Cedar and Oyster Shell Point. These beaches, though fairly wide and clean, are not large enough for any public recreational usage.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Slight or no change to moderate, noncritical. The only area of historical erosion in the segment is from Wilkins Creek to Mundy Point, which has an average rate of 2.3 feet per year. No data is available for much of the segment, though field investigations indicate no appreciable erosion is occurring.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are approximately 1,300 feet of artificially stabilized shoreline in the segment, of which 600 feet is bulkhead, 450 feet is groin fields, and 150 feet is riprap. All structures appear to be effective.

OTHER SHORE STRUCTURES: There are several piers in the segment.

SHORE USE LIMITATIONS:
Most of Hampton Hall Branch is very narrow and shallow, and is unnavigable. Those shorelands bordering the West Yeocomico River are mostly already used for agriculture and residences. This is also true of Wilkins Creek.

ALTERNATE SHORE USE:
Low. The only area of largely undeveloped land is along Hampton Hall Branch. However, high elevations along the shoreline, shallow water and little access to the land limit the uses of the area. Since there are other lands in the county more suitable for development, there seems to be little pressure for any large changes in the present shorelands use.

MAPS: USGS, 7.5 Min.Ser. (Topo.), KINSALE Quadr., 1968.
N.O.S., #12233 (formerly 557), 1:40,000 scale, POTOMAC RIVER, Chesapeake Bay to Piney Point, VA-MD, 18th ed., 1973.

PHOTOS: Aerial-VIMS 1Dec76 NL-16/1890-1918.

76° 20'

Harveys

DIVIDING CREEK

Lawrence Cove

Ditchley

Cem

Prentice Creek

Hughlett Point

Kent Point

Jarvis Cr

Jarvis Point

Lynhams

BLUFF POINT NECK

Bluff Point Ch

Warehouse Point

Kilmarnock Wharf

Byrdton

Course

Golf

Arthur Cove

Grace Point

Cove

Cr

Henrys Creek

Barnes Creek

Bluff Point

Tidal Flat

Lees

CREEK

Neck

DYMER

Johnson Cove

Hunts Cove

Lees Cove

Rones Bay

CREEK

Grog Island

NORTHUMBERLAND CO

LANCASTER CO

4

3

2

1

37° 42' 30"

37° 42' 30"

MAP 2A

FLEETS BAY QUADR.

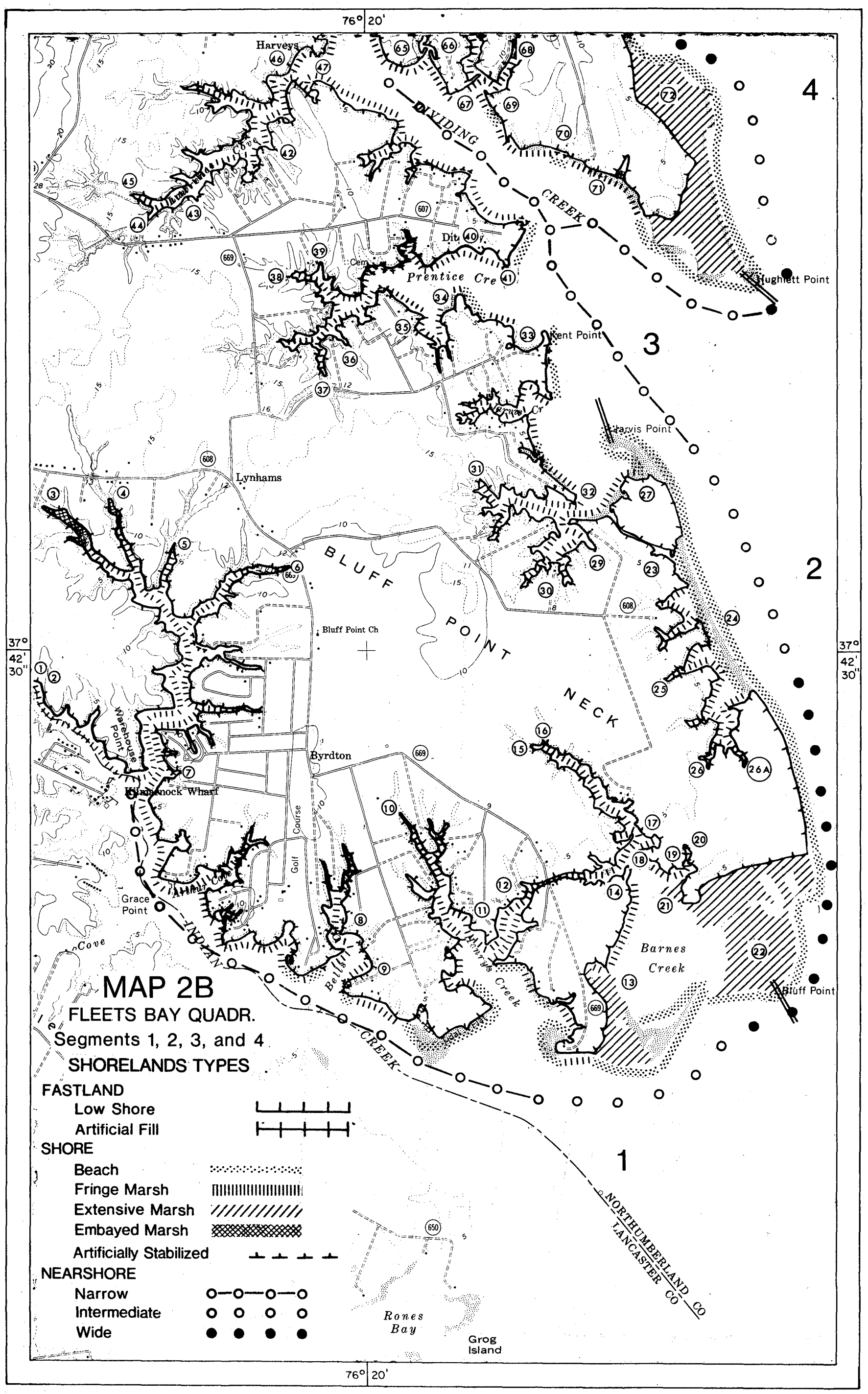
Segments 1, 2, 3 and 4

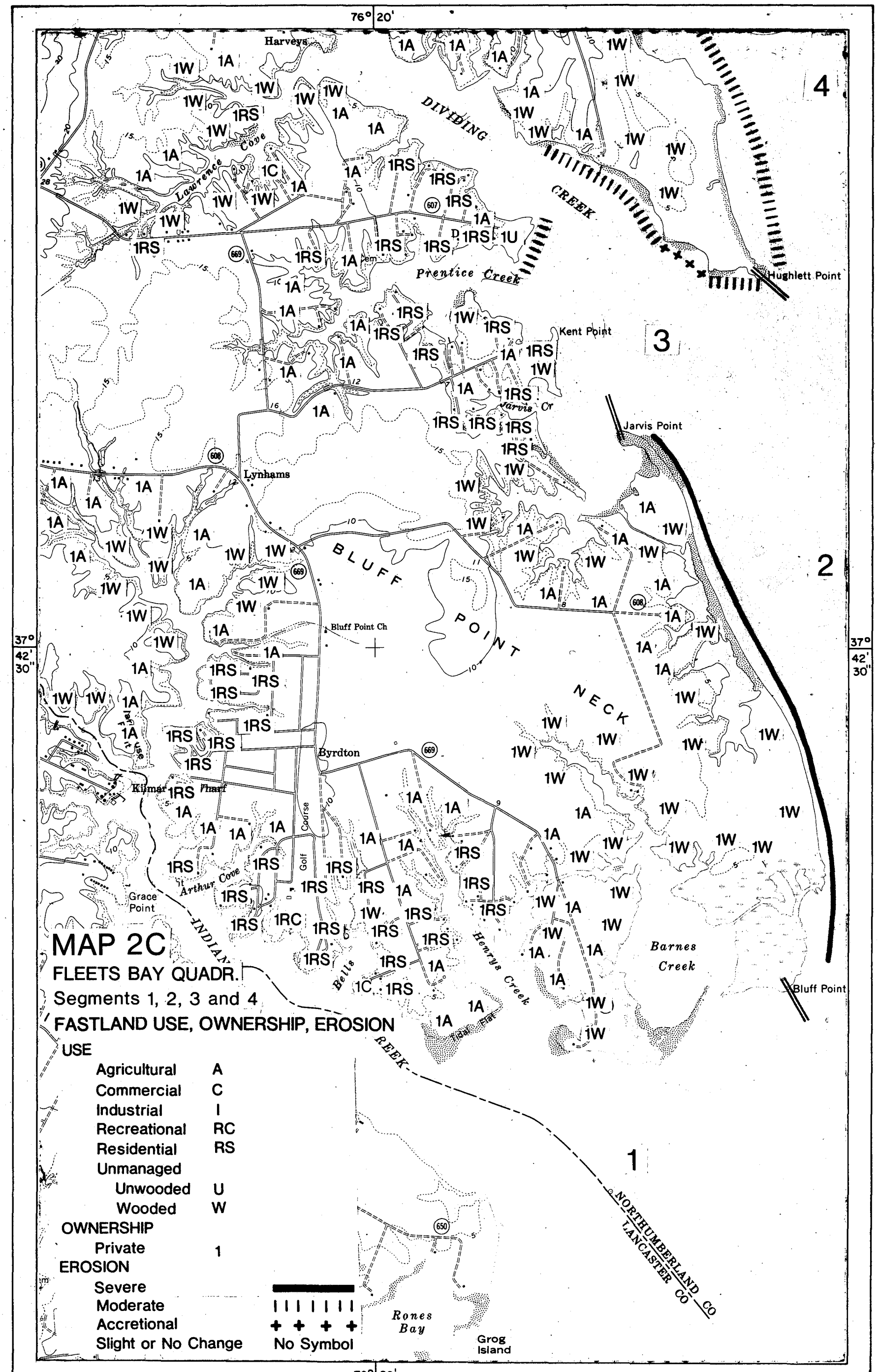
TOPOGRAPHY AND CULTURE

// = Segment Boundary

/ = Subsegment Boundary

76° 20'


76° 20'
37° 42' 30"
Harveys
Lynhams
Byrdton
Grace Point
Warehouse Point
Hudnall Cove
Golf Course
Bell Cr
Merrys Creek
Barnes Creek
Bluff Point Ch
BLUFF POINT NECK
Hughlett Point
Kent Point
Jarvis Point
Bluff Point
Rones Bay
Grog Island
DIVIDING CREEK
NANJEMOY CREEK
NORTHUMBERLAND CO
LANCASTER CO
Prentice Cre
4
3
2
1
MAP 2B
FLEETS BAY QUADR.
Segments 1, 2, 3, and 4
SHORELANDS TYPES
FASTLAND
Low Shore
Artificial Fill
SHORE
Beach
Fringe Marsh
Extensive Marsh
Embayed Marsh
Artificially Stabilized
NEARSHORE
Narrow
Intermediate
Wide


76° 20'
37° 42' 30"
Harveys
DIVIDING CREEK
Hughlett Point
Kent Point
Prentice Creek
Jarvis Cr
Jarvis Point
Lynhams
BLUFF POINT NECK
Bluff Point Ch
Byrdton
Golf Course
Kilmar Wharf
Lawrence Cove
Arthur Cove
Grace Point
INDIAN REEK
Bells
Henrys Creek
Barnes Creek
Bluff Point
Rones Bay
Grog Island
NORTHUMBERLAND CO
LANCASTER CO
4
3
2
1
MAP 2C
FLEETS BAY QUADR.
Segments 1, 2, 3 and 4
FASTLAND USE, OWNERSHIP, EROSION
USE
Agricultural A
Commercial C
Industrial I
Recreational RC
Residential RS
Unmanaged
Unwooded U
Wooded W
OWNERSHIP
Private 1
EROSION
Severe
Moderate
Accretional
Slight or No Change
No Symbol

76° 20'

5

4

3

Ball Neck

Cloverdale Creek

Damron Marsh

Tidal Flat

Gravel Pit

Cem

Ball Creek

Creek

Dividing

Katy Pt Cove

Salt Pond

Highland Landing

Hardings

Ingram Cove

MAP 3A

FLEETS BAY AND REEDVILLE QUADS.

Segments 4 and 5

TOPOGRAPHY AND CULTURE

// = Segment Boundary

/ = Subsegment Boundary

37° 45'

37° 47'

76° 20'

76° 20'

37° 45'

37° 47'

5

4

3

Ball Neck

Gravel Pit

Tidal Flat

Cem

Salty Pt Cove

Highland Landing

Hardings

Salt Pond

Ingram Cove

Creek

MAP 3B

FLEETS BAY AND REEDVILLE QUADS.

Segments 4 and 5

SHORELANDS TYPES

FASTLAND

- Low Shore
- Low Shore with Bluff

SHORE

- Beach
- Fringe Marsh
- Extensive Marsh
- Embayed Marsh
- Artificially Stabilized

NEARSHORE

- Intermediate
- Wide

76° 20'

5

4

3

Ball Neck

Cloverdale Creek

Ball Creek

Marty Pt. Creek

Diving Creek

Ingram Cove

Dameron Marsh

Tidal Flat

Gravel Pit

Cem

Salt Pond

Hardings

Highland Landing

Tidal

MAP 3C

FLEETS BAY AND REEDVILLE QUADS.

Segments 4 and 5

FASTLAND USE, OWNERSHIP, EROSION

USE

- Agricultural — A
- Unmanaged Wooded — W

OWNERSHIP

- Private — 1

EROSION

- Severe
- Moderate
- Slight or No Change — No Symbol

37° 45'

37° 47'

76° 20'

MAP 4A

REEDVILLE QUADR.

Segments and Subsegments

5, 6, 7A, 7B, 7E and 7F

TOPOGRAPHY AND CULTURE

// = Segment Boundary

/ = Subsegment Boundary

76° 20'

37° 50'

7B

7A

7E

7F

6

5

WICOMICO RIVER

MILL CREEK

HARVEYS NECK

Barrett Creek

Lee Dale Shores

Mila

Penny Cr

Neck

Horn Harbor

Warehouse Cr

Shiloh Cem

Gravel Pit

Ferry Point

Rogue Point

Collins

Whays Creek

Haynie Point

Gougher Cr

Shell Cr

Sandy Point

Cranes Bailey Prong Creek

Little Sandy Point

Towles Cr

Harveys Creek

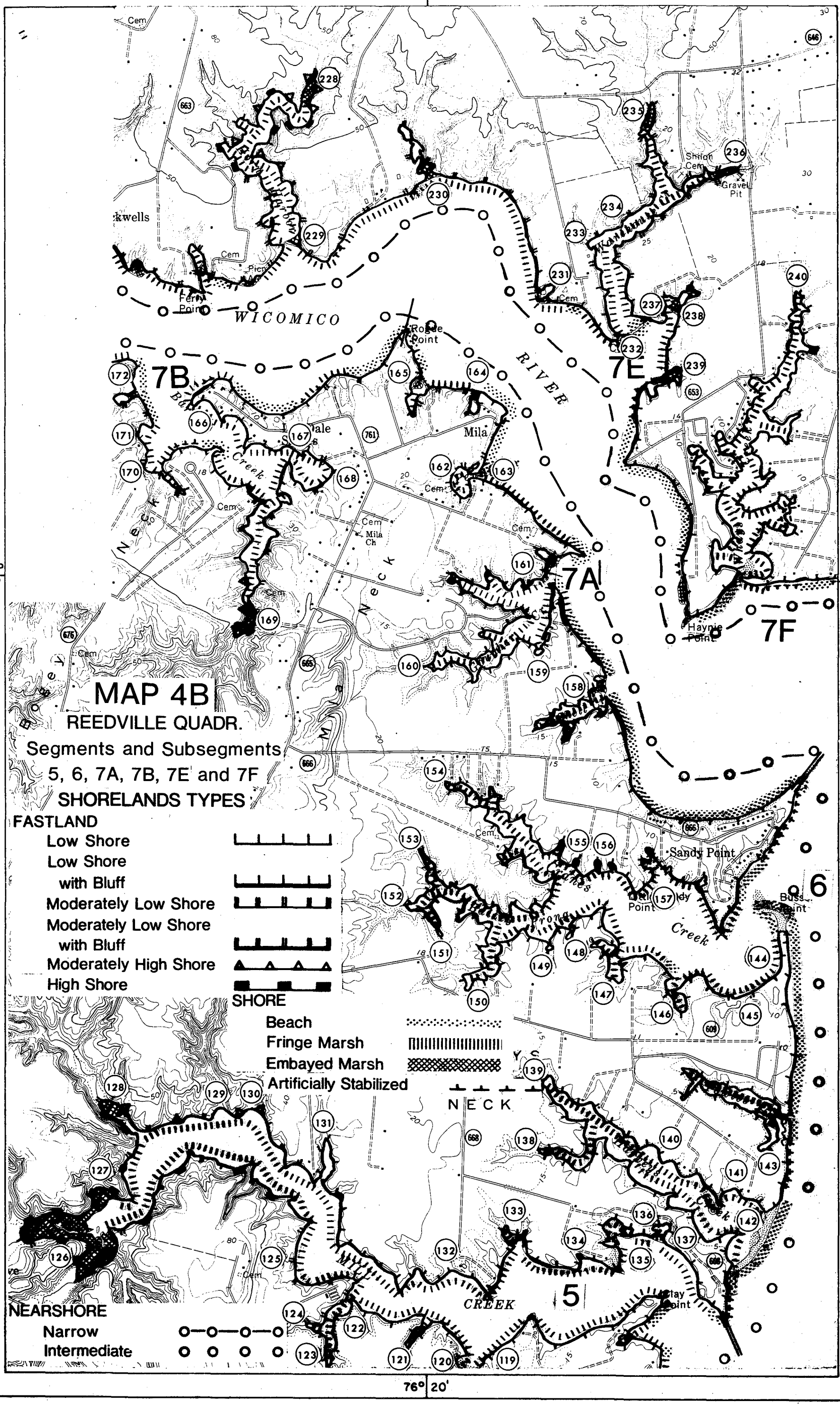
Clay Point

Cem

Mila Ch

Picnic Area

663 646 761 653 676 665 666 609 668


76° 20'
37° 50'
MAP 4B
REEDVILLE QUADR.
Segments and Subsegments
5, 6, 7A, 7B, 7E and 7F
SHORELANDS TYPES
FASTLAND
Low Shore
Low Shore with Bluff
Moderately Low Shore
Moderately Low Shore with Bluff
Moderately High Shore
High Shore
SHORE
Beach
Fringe Marsh
Embayed Marsh
Artificially Stabilized
NEARSHORE
Narrow
Intermediate
WICOMICO RIVER
7B
7E
7A
7F
6
5
Rogue Point
Mila
Haynie Point
Sandy Point
Buss Point
Stay Point
Ferry Point
Shilon Cem
Gravel Pit
Mila Ch
Cem
Creek
NECK
CREEK

76° 20'

MAP 4C

REEDVILLE QUADR.

Segments and Subsegments

5, 6, 7A, 7B, 7E, and 7F

FASTLAND USE, OWNERSHIP, EROSION

USE

Agricultural	A
Commercial	C
Industrial	I
Recreational	RC
Residential	RS
Unmanaged	
Unwooded	U
Wooded	W

OWNERSHIP

Private	1

EROSION

Severe	
Moderate	
Slight or No Change	
Accretional	
No Symbol	

37° 50'

76° 20'

MAP 5A

REEDVILLE, LANCASTER, BURGESS AND HEATHSVILLE QUADS.

Subsegments 7B, 7C, 7D and 7E

TOPOGRAPHY AND CULTURE

// = Segment Boundary

/ = Subsegment Boundary

76° 22' 30"

37° 52' 30"

7D

7C

7E

7B

GREAT WICOMICO RIVER

Blackwells Cr

Betts Mill Creek

Balls Creek

Balls Cr

Bush Mill Stream

Batz Landing

Deep Landing

Indian Pt

Cooper Landing

Cedar Pt

Island Pt

Camp Kittamaquund

Kittamaquund

Sampsons Wharf

Coopers Landing

Picnic Area

Golf Course

Eagle Point

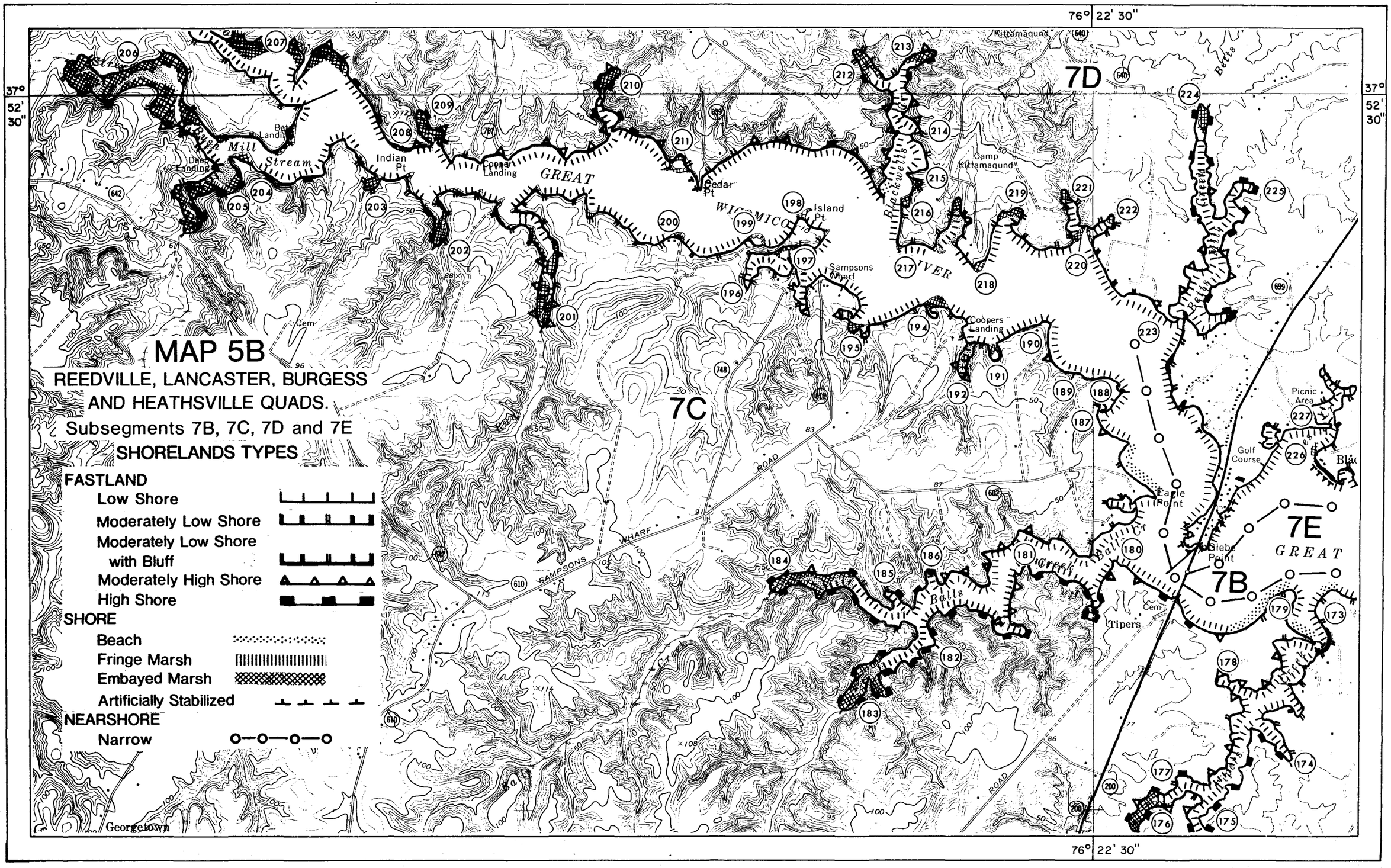
Glebe Point

Tipers

Cem

SAMPSONS WHARF ROAD

Georgetown


76° 22' 30"
37° 52' 30"
7D
7C
7E
7B
MAP 5B
REEDVILLE, LANCASTER, BURGESS AND HEATHSVILLE QUADS.
Subsegments 7B, 7C, 7D and 7E
SHORELANDS TYPES
FASTLAND
Low Shore
Moderately Low Shore
Moderately Low Shore with Bluff
Moderately High Shore
High Shore
SHORE
Beach
Fringe Marsh
Embayed Marsh
Artificially Stabilized
NEARSHORE
Narrow
Kittamaqund
Camp Kittamaqund
Indian Pt
Cedar Pt
Island Pt
Sampsons Wharf
Coopers Landing
Deep Landing
Cedar Landing
Golf Course
Picnic Area
Eagle Point
Siebe Point
Tipers
Cem
Balls Creek
Blackwells Creek
Betts Creek
Great Wicomico River
Sampsons Wharf Road
Georgetown

MAP 5C

REEDVILLE. LANCASTER, BURGESS AND HEATHSVILLE QUADS.

Subsegments 7B, 7C, 7D and 7E

FASTLAND USE, OWNERSHIP, EROSION

USE	
Agricultural	A
Commercial	C
Recreational	RC
Residential	RS
Unmanaged Wooded	W
OWNERSHIP	
Private	1
EROSION	
Moderate	| | | | | | |
Slight or No Change	No Symbol
Accretional	+ + + +

MAP 6A

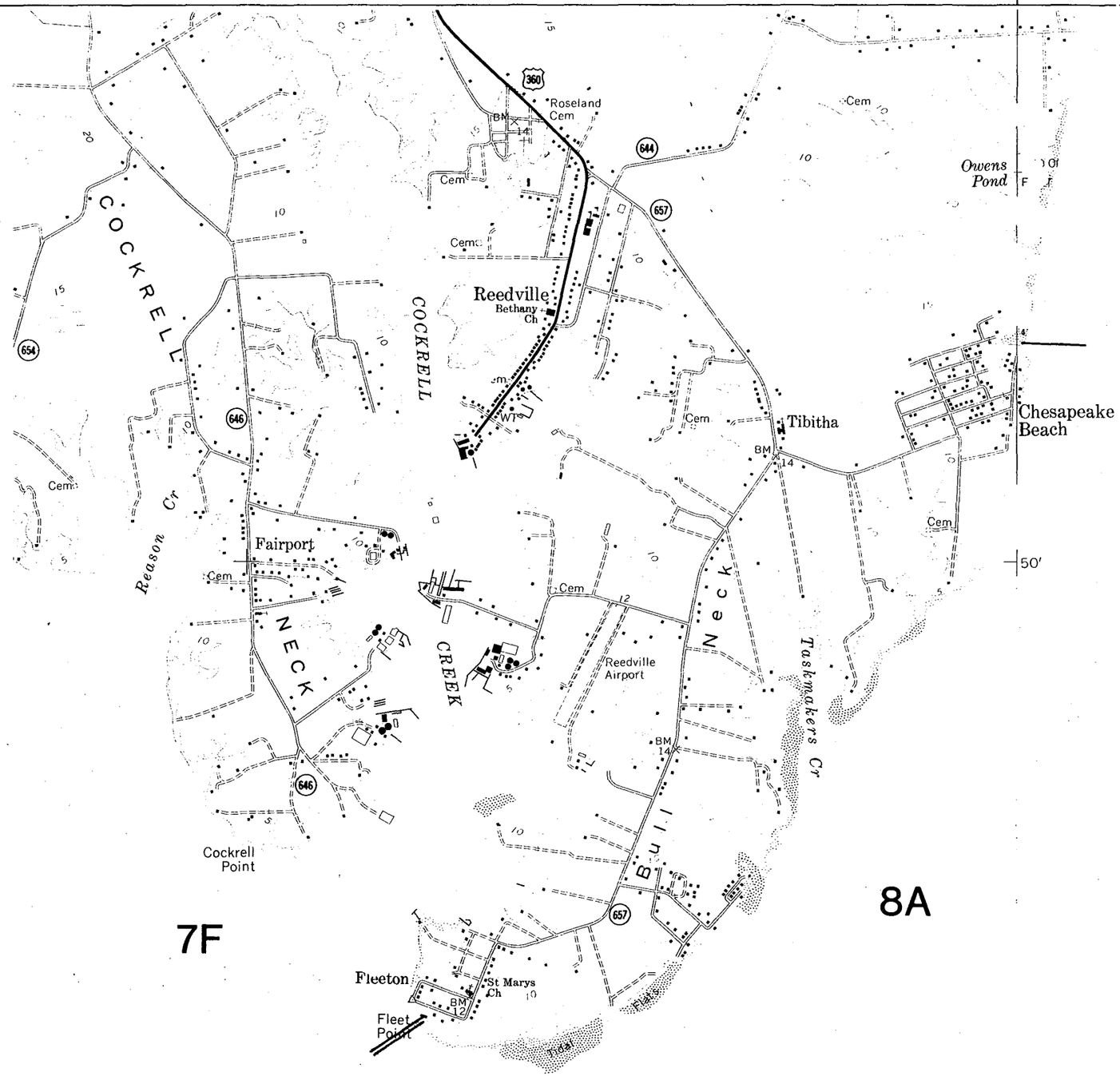
REEDVILLE QUADR.

Subsegments 7F, 8A and 8B

TOPOGRAPHY AND CULTURE

// = Segment Boundary

/ = Subsegment Boundary



MAP 6B

REEDVILLE QUADR.

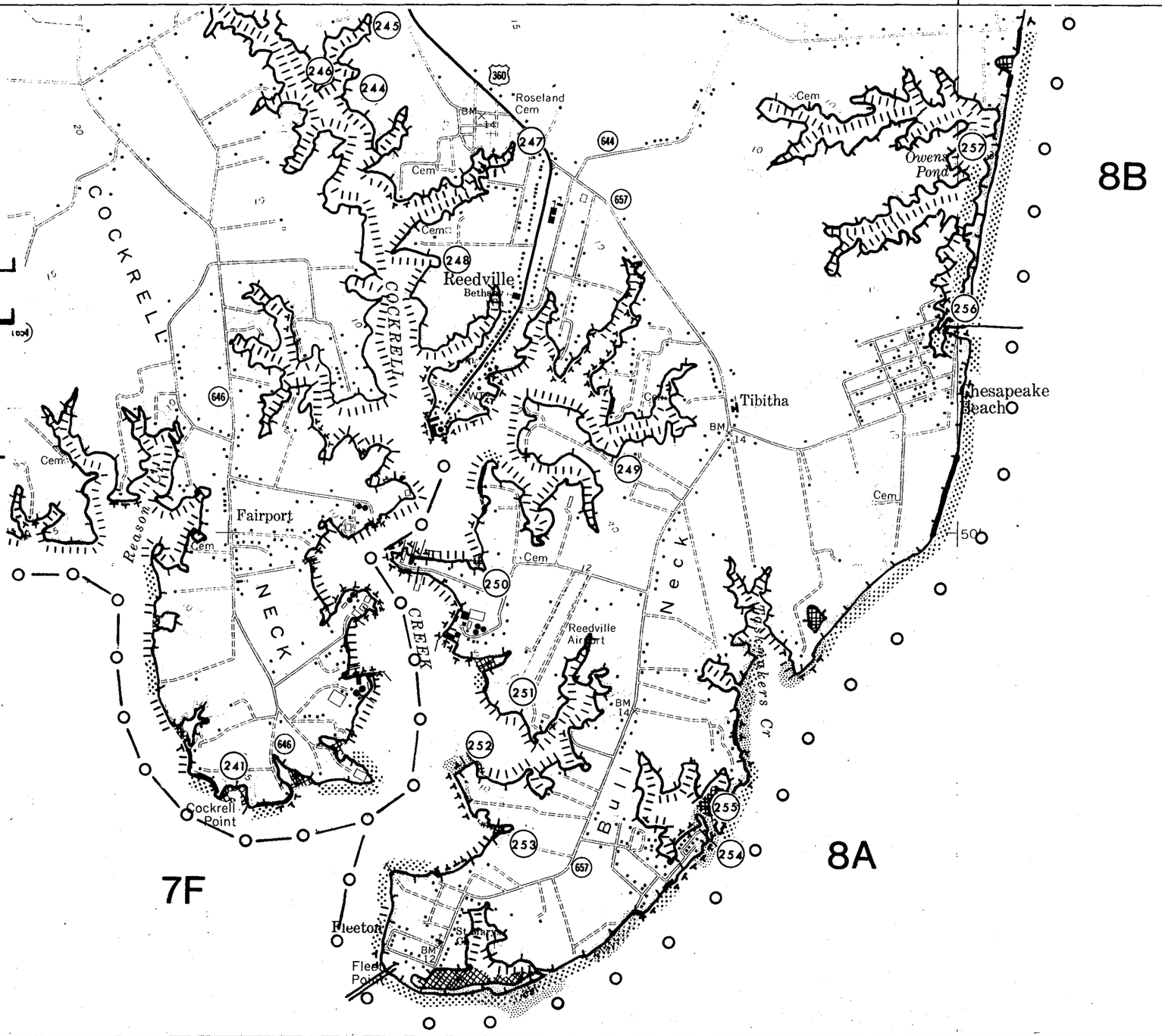
Subsegments 7F, 8A and 8B

SHORELANDS TYPES

FASTLAND
- Low Shore
- Low Shore with Bluff

SHORE
- Beach
- Fringe Marsh
- Embayed Marsh
- Artificially Stabilized

NEARSHORE
- Narrow
- Intermediate



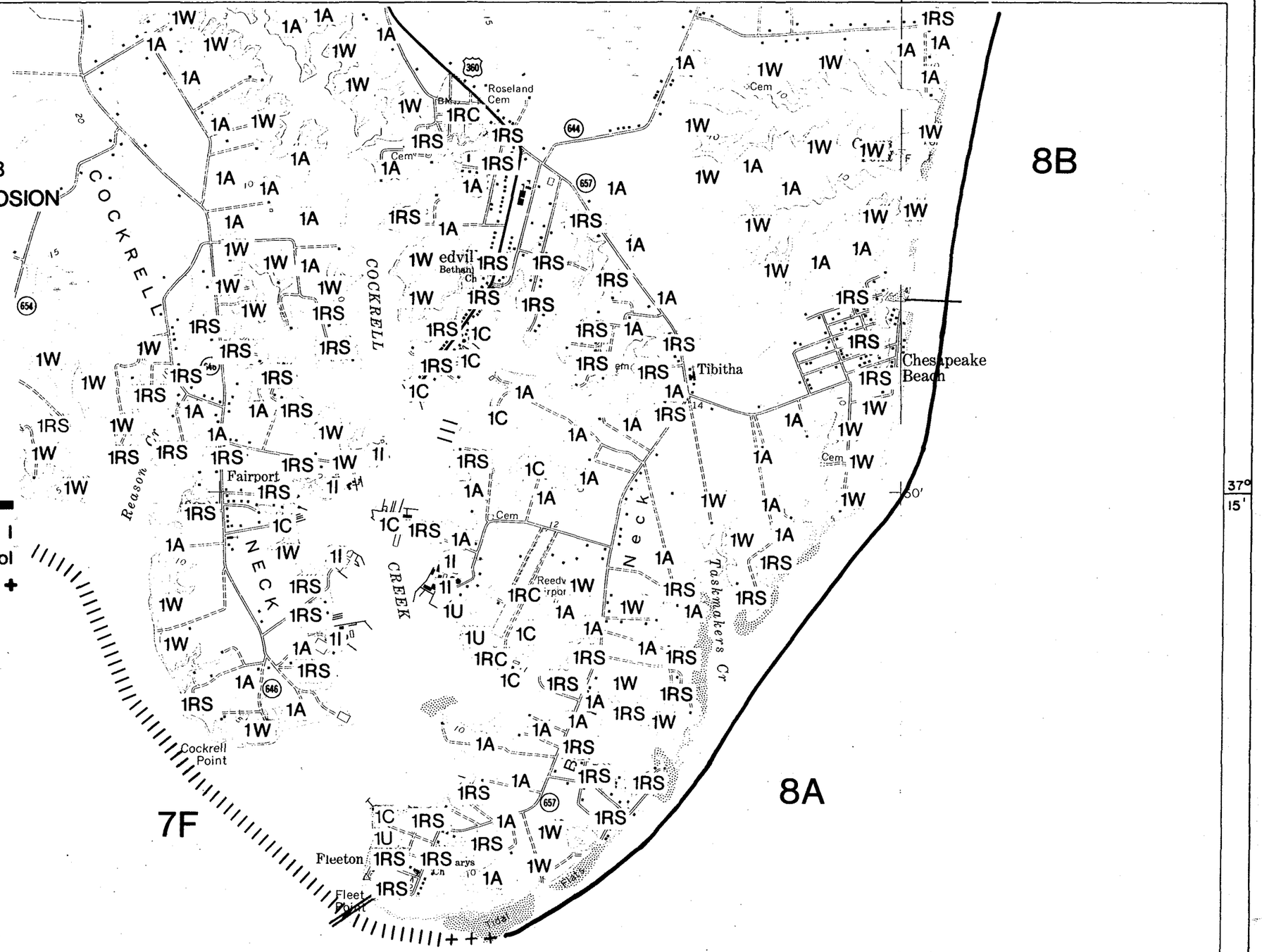
MAP 6C

REEDVILLE QUADR.

Subsegments 7F, 8A and 8B

FASTLAND USE, OWNERSHIP, EROSION

USE	
Agricultural	A
Commercial	C
Industrial	I
Recreational	RC
Residential	RS
Unmanaged	
Unwooded	U
Wooded	W
OWNERSHIP	
Private	1
EROSION	
Severe	▬▬▬
Moderate	| | | | | |
Slight or No Change	No Symbol
Accretional	+ + + +



MAP 7A

REEDVILLE AND BURGESS QUADS.

Segment and Subsegments

8B, 9A, 9B, 9C, and 10

TOPOGRAPHY AND CULTURE

// = Segment Boundary

/ = Subsegment Boundary

76° 15'

37° 52' 30"

10

9D

9A

9B

9C

8B

Ginny Beach

ST MARYS CO.
NORTHUMBERLAND CO.

Ellyson Creek

Spences Cr

Bridgemans Back Cr

LITTLE WICOMICO RIV.

Wilkins Creek

Sloop Cr

Flood Pt

Greenfield Point

Peachtree Point

King Pt

Kayan

FERRY

Sunnybank

Horse Pond

Sharps Cr

Bamboo Island

Smith Pt

CHESAPEAKE BAY

Slough Cr

Hole Rock

Smith Pt

Cod Creek

Back Cr

Gravel Pit

Bridge Cr

BRIDGE NECK

Bridge Neck

Folly

Cem

Beverlyville

Lilian

Bell Swamp

Gaskin Pond

BM 110

BM 13

BM 14

BM 15

4192

193

MAP 7B

REEDVILLE AND BURGESS QUADS.

Segment and Subsegments

8B, 9A, 9B, 9C, and 10

SHORELANDS TYPES

FASTLAND

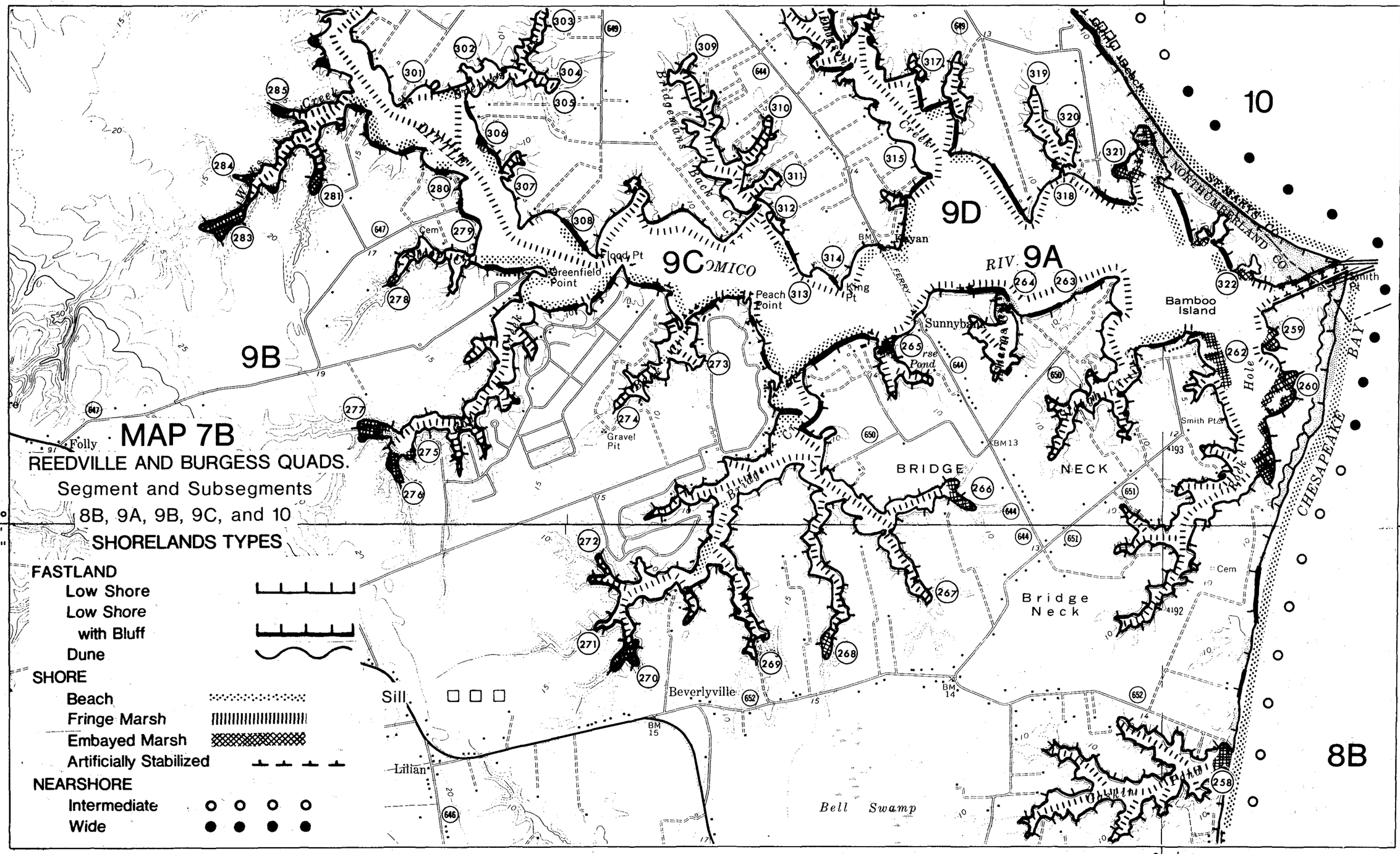
- Low Shore
- Low Shore with Bluff
- Dune

SHORE

- Beach
- Fringe Marsh
- Embayed Marsh
- Artificially Stabilized

NEARSHORE

- Intermediate
- Wide



MAP 7C

REEDVILLE AND BURGESS QUADS.

Segment and Subsegments

8B, 9A, 9B, 9C, and 10

FASTLAND USE, OWNERSHIP, EROSION

USE		
	Agricultural	A
	Commercial	C
	Residential	RS
	Unmanaged Wooded	W
OWNERSHIP		
	Private	1
EROSION		
	Severe	▬▬▬
	Moderate	| | | | | |
	Slight or No Change	No Symbol
	Accretional	+ + + +

MAP 8A

BURGESS QUADR.

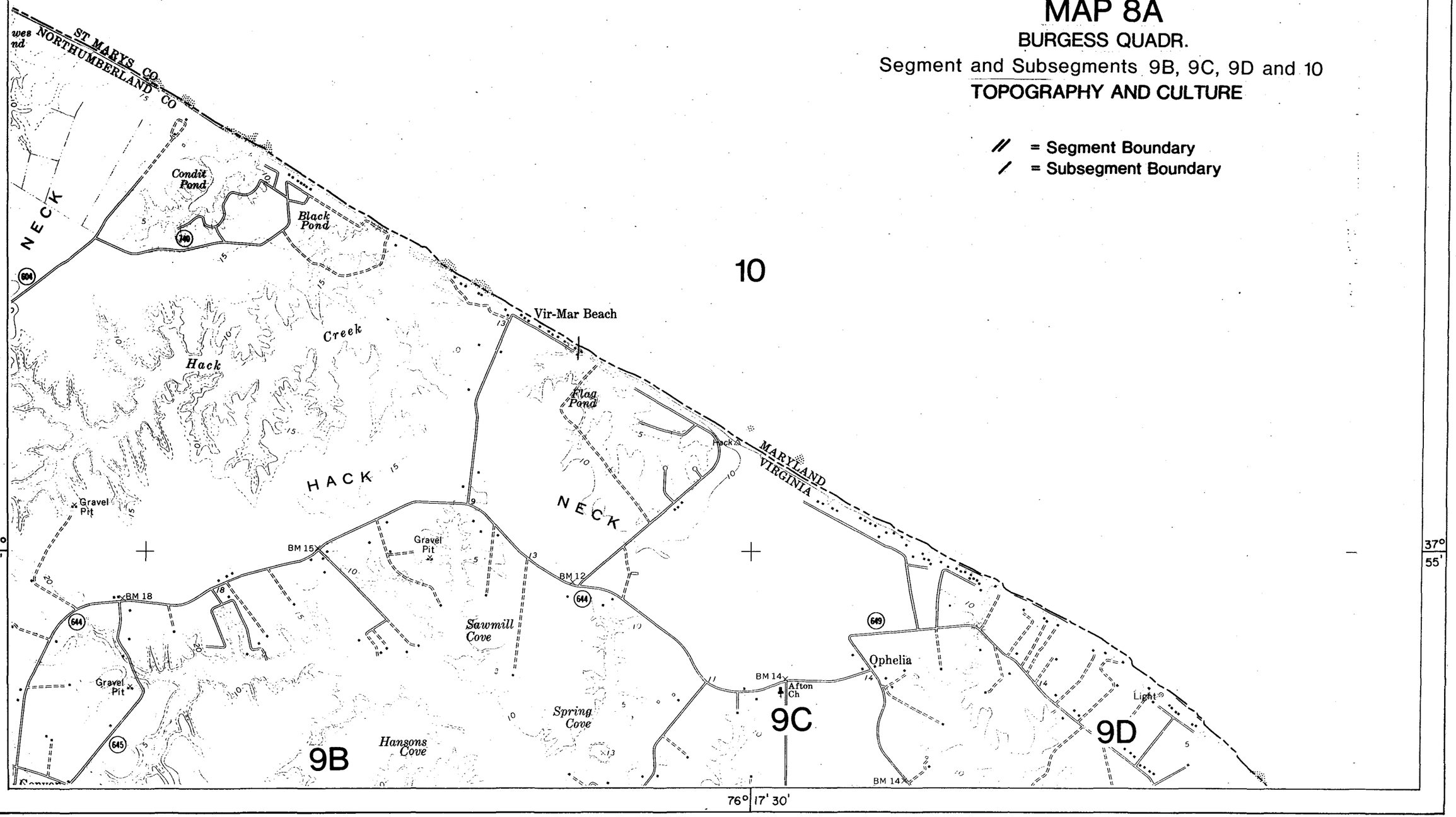
Segment and Subsegments 9B, 9C, 9D and 10

TOPOGRAPHY AND CULTURE

// = Segment Boundary

/ = Subsegment Boundary

10



MAP 8B

BURGESS QUADR.

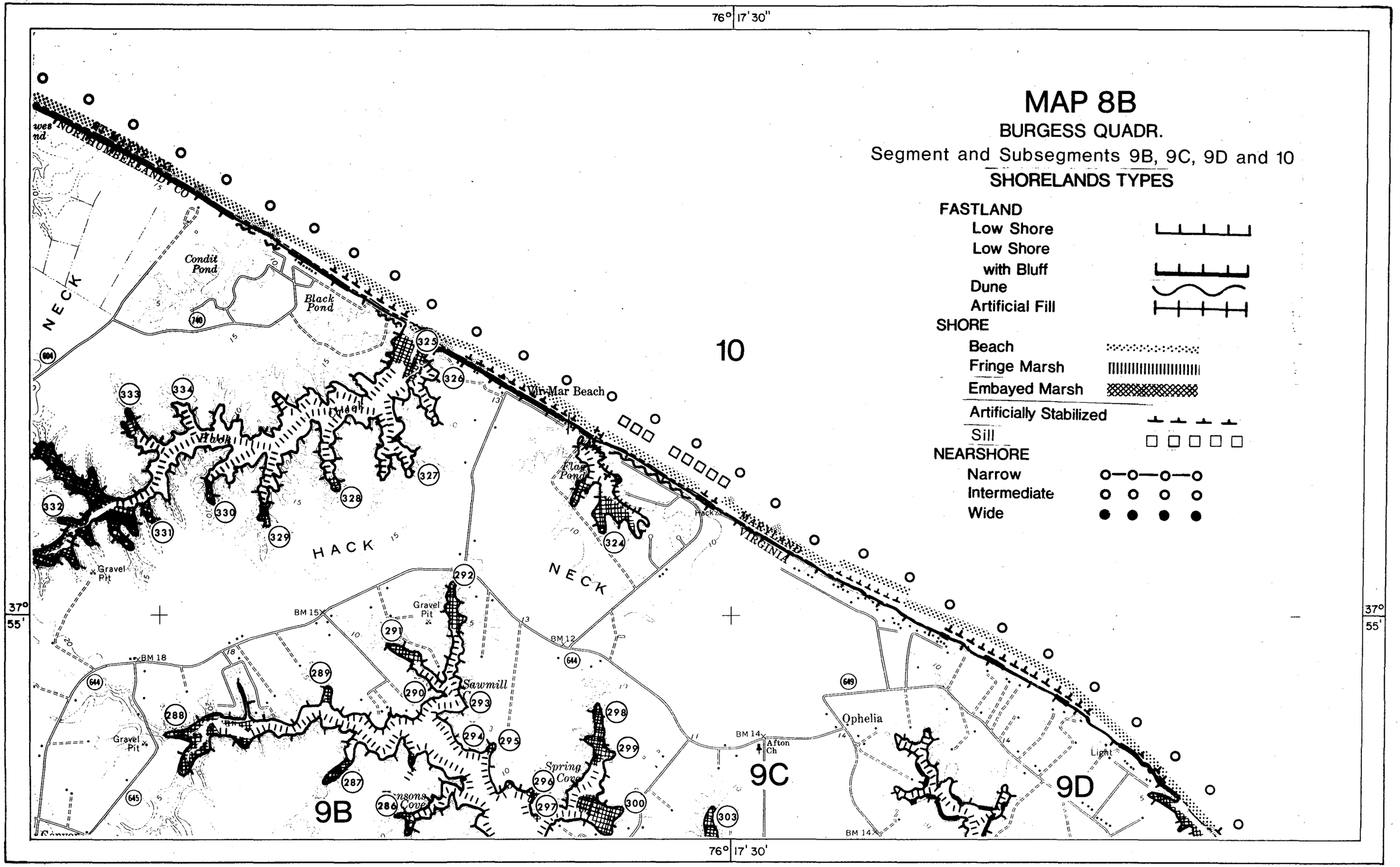
Segment and Subsegments 9B, 9C, 9D and 10

SHORELANDS TYPES

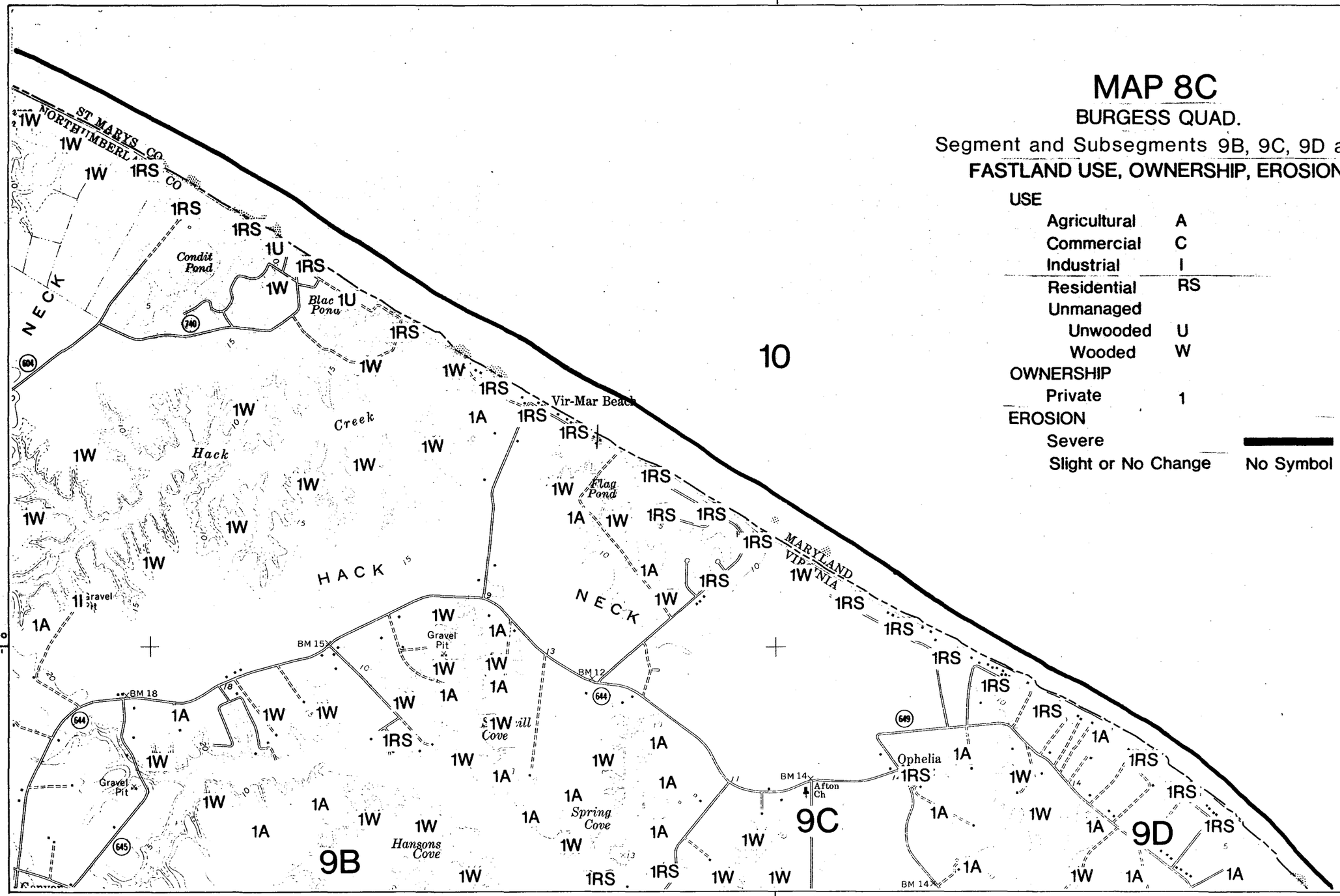
FASTLAND
- Low Shore
- Low Shore with Bluff
- Dune
- Artificial Fill

SHORE
- Beach
- Fringe Marsh
- Embayed Marsh
- Artificially Stabilized
- Sill

NEARSHORE
- Narrow
- Intermediate
- Wide



76° 17' 30"



10

MAP 8C

BURGESS QUAD.

Segment and Subsegments 9B, 9C, 9D and 10

FASTLAND USE, OWNERSHIP, EROSION

USE	
Agricultural	A
Commercial	C
Industrial	I
Residential	RS
Unmanaged	
Unwooded	U
Wooded	W
OWNERSHIP	
Private	1
EROSION	
Severe	
Slight or No Change	No Symbol

37° 55'

76° 17' 30"

76° 22' 30"

11

10

ST MARYS CO
NORTHUMBERLAND CO

Cordreys Beach

Cordreys Beach

Tidal Flat

Marshalls Beach

Bridgeman Cr

Rogers Cr

Grave+

HULL NECK

Fountain Cove

Fleets Cove

Floyds Cove

Spring Cove

HULL NECK

Creek

Cubit

MOB

CREEK

Brents Landing

Gravel Pit

Gravel Pits

Mill Creek

Sydnors Millpond

Edwardsville

Fairfields Cem

Cem

Gravel Pit

640

604

645

MAP 9A

BURGESS AND HEATHSVILLE QUADS.

Segments 10 and 11

TOPOGRAPHY AND CULTURE

// = Segment Boundary

/ = Subsegment Boundary

37° 55'

76° 22' 30"

72

76° 22' 30"

11

10

ST MARYS CO

Cordreys Beach

Cordreys Beach

Tidal Flat

Marshall's Beach

Gravel

HULL NECK

HULL NECK

HULL

MOB

Cem

Cem

Spring Cr

Sydnors Millpond

Mill Creek

Gravel Pit

Gravel Pit

MAP 9B

BURGESS AND HEATHSVILLE QUADS

Segments 10 and 11

SHORELANDS TYPES

FASTLAND

- Low Shore
- Low Shore with Bluff
- Moderately Low Shore
- Moderately Low Shore with Bluff
- Moderately High Shore
- Moderately High Shore with Bluff
- Dune

NEARSHORE

- Intermediate

SHORE

- Beach
- Fringe Marsh
- Embayed Marsh
- Artificially Stabilized

37° 55'

37° 55'

76° 22' 30"

76° 22' 30"

11

10

ST MARYS CO
NORTHUMBERLAND

Cordreys Beach

Tidal Flat

Marshalls Beach

Bridgeman Cr

Rogers Cr

HULL NECK

Fountain Cove

Fleets Cove

Floyds Cove

Spring Cove

HULL CREEK

HULL NECK

Cubitt Creek

MOB

Mill Creek

Sydnors Millpond

Gravel Pit

Fairfields Cem

Cem

Landing

37° 55'

MAP 9C

BURGESS AND HEATHSVILLE QUADS.

Segments 10 and 11

FASTLAND USE, OWNERSHIP, EROSION

USE

Agricultural	A
Residential	RS
Unmanaged Wooded	W

OWNERSHIP

Private	1

EROSION

Severe	
Slight or No Change	No Symbol

76° 22' 30"

74

76° 25'

ST MARYS
NORTHUMBER

12

CO

11

MARYLAND
VIRGINIA

Great P

Balls Cr

Cod Creek

Bay

Quarter

Neck

Tidal Flat

Presley Creek

Corbin Pond

Neuman Neck

Fountain Gate

Creek

Cem

Sissons Corner

Smithland Ch

Browings Millpond

Luttrels Corner

Presley

Cem

630

631

691

751

636

629

MAP 10A

HEATHSVILLE QUADR.

Segments 11 and 12

TOPOGRAPHY AND CULTURE

// = Segment Boundary

/ = Subsegment Boundary

37° 57' 30"

76° 25'

75

76° 25'

ST MARYS
NORTHUMBERLAND CO

12

11

MARYLAND
VIRGINIA

Balls Creek

Fox Creek

Bay Quarter Neck

Creek

Neuman Neck

Fountain Gate

Dorrings Millpond

Luttrels Corner

Cem

Cem

Presley

Presley

385 382 384 383 630 378 379 380 691 751 375 631 381 376 374 365 366 367 368 369 636 373 630 631 372 370 371 629 636

37° 57' 30"

37° 57' 30"

MAP 10B

HEATHSVILLE QUADR.

Segments 11 and 12

SHORELANDS TYPES

FASTLAND

- Low Shore
- Low Shore with Bluff
- Moderately Low Shore with Bluff
- Dune

SHORE

- Beach
- Fringe Marsh
- Embayed Marsh
- Artificially Stabilized

NEARSHORE

- Narrow
- Wide

76° 25'

76° 25'

37° 57' 30"

ST MARYS
NORTHUMBER

12

11

CO

Balls Cr

Creek

Cod Bay

Quarter Neck

Presley Creek

Corbin Pond

Neuman Neck

Fountain Gate

Downings Millpond

Luttrels Corner

Cem

MARYLAND
VIRGINIA

Tidal Flat

1W 1A 1RS

630 631 636 629

MAP 10C

BURGESS AND HEATHSVILLE QUADS.

BM117 Segments 11 and 12

FASTLAND USE, OWNERSHIP, EROSION

USE	
Agricultural	A
Residential	RS
Unmanaged Wooded	W
OWNERSHIP	
Private	1
EROSION	
Severe	▬▬▬
Moderate	▮▮▮▮▮▮
Slight or No Change	No Symbol

76° 25'

76° 30'

38° 00'

CHERRY POINT NECK

Travis Point

ST MARYS CO - NORTHUMBERLAND CO

Lewisetta

Kingscote Creek

Travis Pt

Cowart Cem

NECK

Wrights Cove

Glebe

The

Honest Pt

Glebe Creek

Tidal Flat

BM 6

Walnut Pt

Killneck Cr

Stevens Pt

RIVER

Sandpit

Lake

Boathouse Pond

Landing Field

COAN

BM 22

Bundick

Mill Creek

Popes Pt

Hawk Nest Pt

Cem

River

Nokomis

Landing Strip

Forrest Landing

Coan

Hamlins Corner

BM 10

Rowes Landing

Stream

MAP 11A

HEATHSVILLE, ST. GEORGE ISLAND, LOTTSBERG AND KINSALE QUADS.

Segments 12 and 13

TOPOGRAPHY AND CULTURE

// = Segment Boundary

/ = Subsegment Boundary

76° 30'

76° 30'

38° 00'

CHERRY POINT NECK

NECK

ST MARYS CO
NORTHUMBERLAND CO

Travis Point

Lewisetta

Kingscote Creek

Cowart Cem

Travis Pt

Wilkerson Cove

The Glebe

Honest Pt

Glebe Creek

Walnut Pt

XBM 6

Stevens Pt

Lake

RIVER

COAN

BM 22

Boathouse Pond

Landing Fld

Burdick

Millstone Creek

Popes Pt

Nest Pt

Cem

BM 41

Volkania

Forrest Landing

Coan

Rowes Landing

MAP 11B

HEATHSVILLE, ST. GEORGE ISLAND, LOTTSBURG AND KINSALE QUADS.

Segments 12 and 13

SHORELANDS TYPES

High Shore
High Shore with Bluff

SHORE
- Beach
- Fringe Marsh
- Embayed Marsh
- Extensive Marsh

NEARSHORE
- Intermediate

FASTLAND
- Low Shore
- Low Shore with Bluff
- Moderately Low Shore
- Moderately Low Shore with Bluff
- Moderately High Shore
- Moderately High Shore with Bluff

76° 30'

MAP 11C

HEATHSVILLE, ST. GEORGE ISLAND, LOTTSBERG AND KINSALE QUADS.

Segments 12 and 13

FASTLAND USE, OWNERSHIP, EROSION

USE	
Agricultural	A
Commercial	C
Industrial	I
Residential	RS
Unmanaged	
Wooded	W
OWNERSHIP	
Private	1
EROSION	
Severe	
Moderate	
Slight or No Change	No Symbol
Accretional	

76° 30'

38° 00'

CHERRY POINT NECK

NECK

Wrights Cove

Glebe

The

Glebe Creek

Kingscote Creek

Travis Point

Lewisetta

Cowart

Cem

Travis Pt

Honest Pt

Walnut Pt

Tidal Flat

BM 6

Killneck Cr

Stevens Pt

Sandpit

Lake

RIVER

ST MARYS CO

NORTHUMBERLAND CO

Mill Creek

Pundic

Popes Pt

Hawk Nest Pt

Headly Cove

River

COAN

Boathouse Pond

Landing Field

Landing Strip

Nokomis

Forrest Landing

Coan

Hamlins Corner

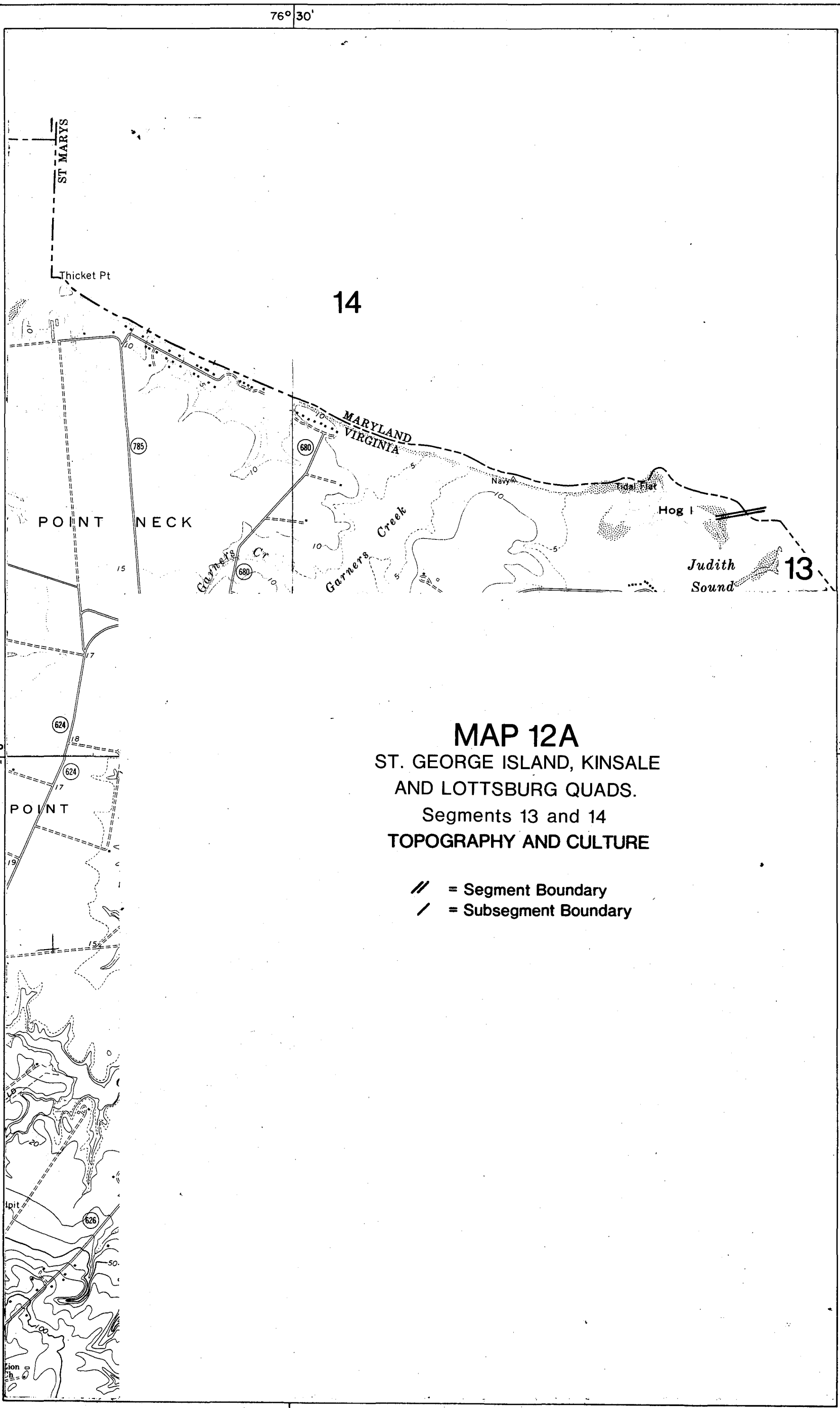
Rowes Landing

BM 110

BM 41

RM 22

624 625 614 612 634 629 360



MAP 12A

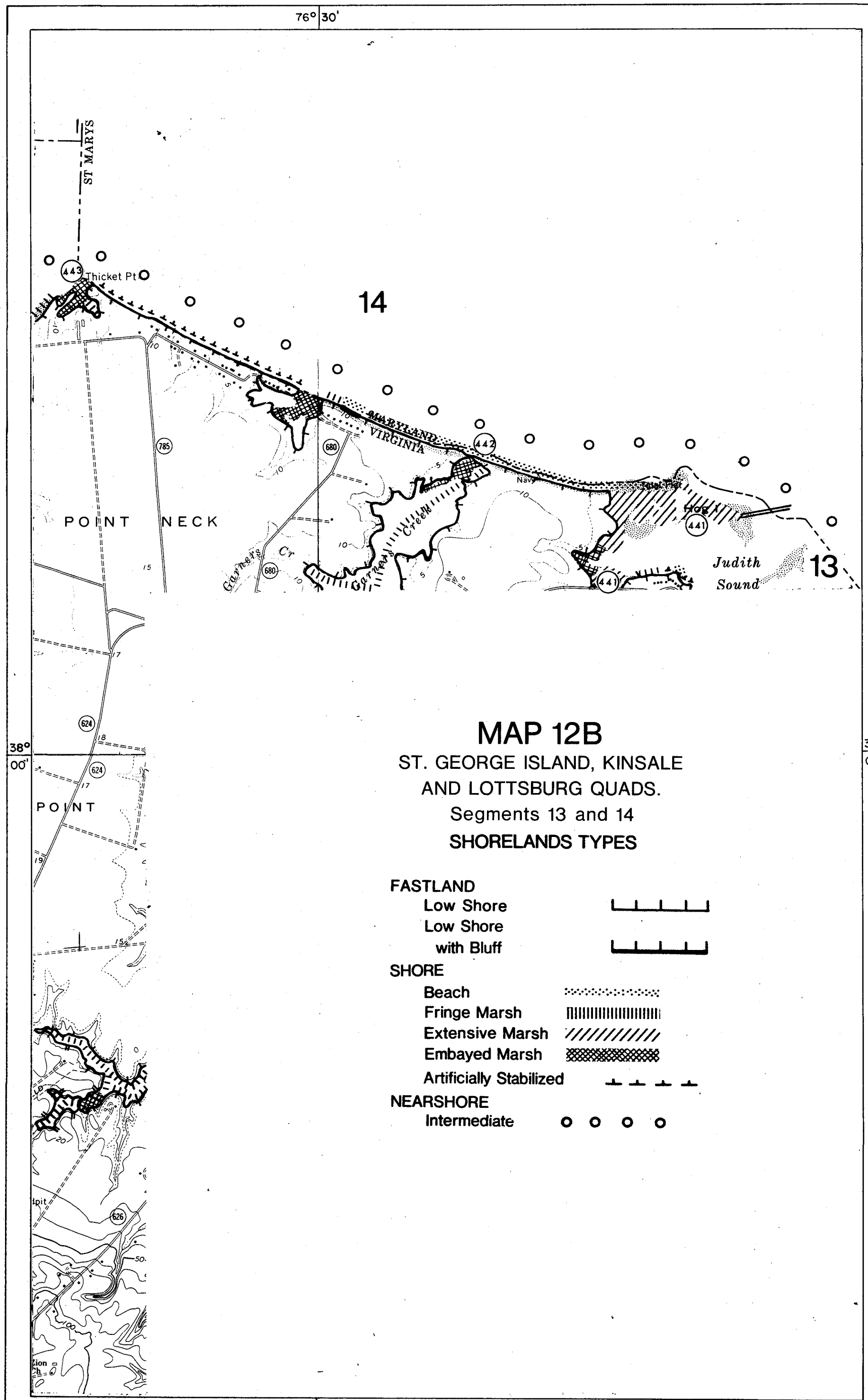
ST. GEORGE ISLAND, KINSALE AND LOTTSBURG QUADS.

Segments 13 and 14

TOPOGRAPHY AND CULTURE

// = Segment Boundary

/ = Subsegment Boundary



MAP 12B

ST. GEORGE ISLAND, KINSALE
AND LOTTSBURG QUADS.
Segments 13 and 14

SHORELANDS TYPES

FASTLAND
- Low Shore
- Low Shore with Bluff

SHORE
- Beach
- Fringe Marsh
- Extensive Marsh
- Embayed Marsh
- Artificially Stabilized

NEARSHORE
- Intermediate

76° 30'

ST MARYS

Thicket Pt

14

MARYLAND

VIRGINIA

POINT NECK

POINT

Garners Cr

Garners Creek

Navy

Tidal Flat

Hog I

Judith Sound

13

1A 1RS 1W 1A 1W 1RS 1A 1W 1RS 1A 1W 1RS

MAP 13A

KINSDALE AND LOTTSBERG QUADS.

Segments 14, 15, and 16

TOPOGRAPHY AND CULTURE

// = Segment Boundary

/ = Subsegment Boundary

76° 35'

38° 00'

Great House Pt

Oyster Shell Pt

Cedar Pt

16

Long Pt

Mundy Point

Wilkins Creek

Drum Cove

Creek

Harryhogan

Pea Neck

Lodge Creek

Dungan Pt

Dungan Cove

14

Barn Pt

Thicket Point Bay

Tom Jones Pt

Cornish Creek

SOUTH YEOCOMICO RIVER

CHERRY

Palmer Pt

Palmer Cove

15

Eagle Hill

BM 118?

Grays Co

Jerusalem

Gravel Pits

Branch

Gravel Pit

Hall

BM 5

Gravel Pit

Hampton

WESTMORELAND CO

NORTHUMBERLAND CO

Gandy Millpond

Courtney Millpond

Mill

Hyacinth

Henderson Ch

Cem

Fruit Plain

Sandpit

Lodge

Boat Landing

Melrose Ch

617

618

620

621

622

623

202

700

MAP 13B

KINSALE AND LOTTSBERG QUADS.

Segments 14, 15, and 16

SHORELANDS TYPES

FASTLAND

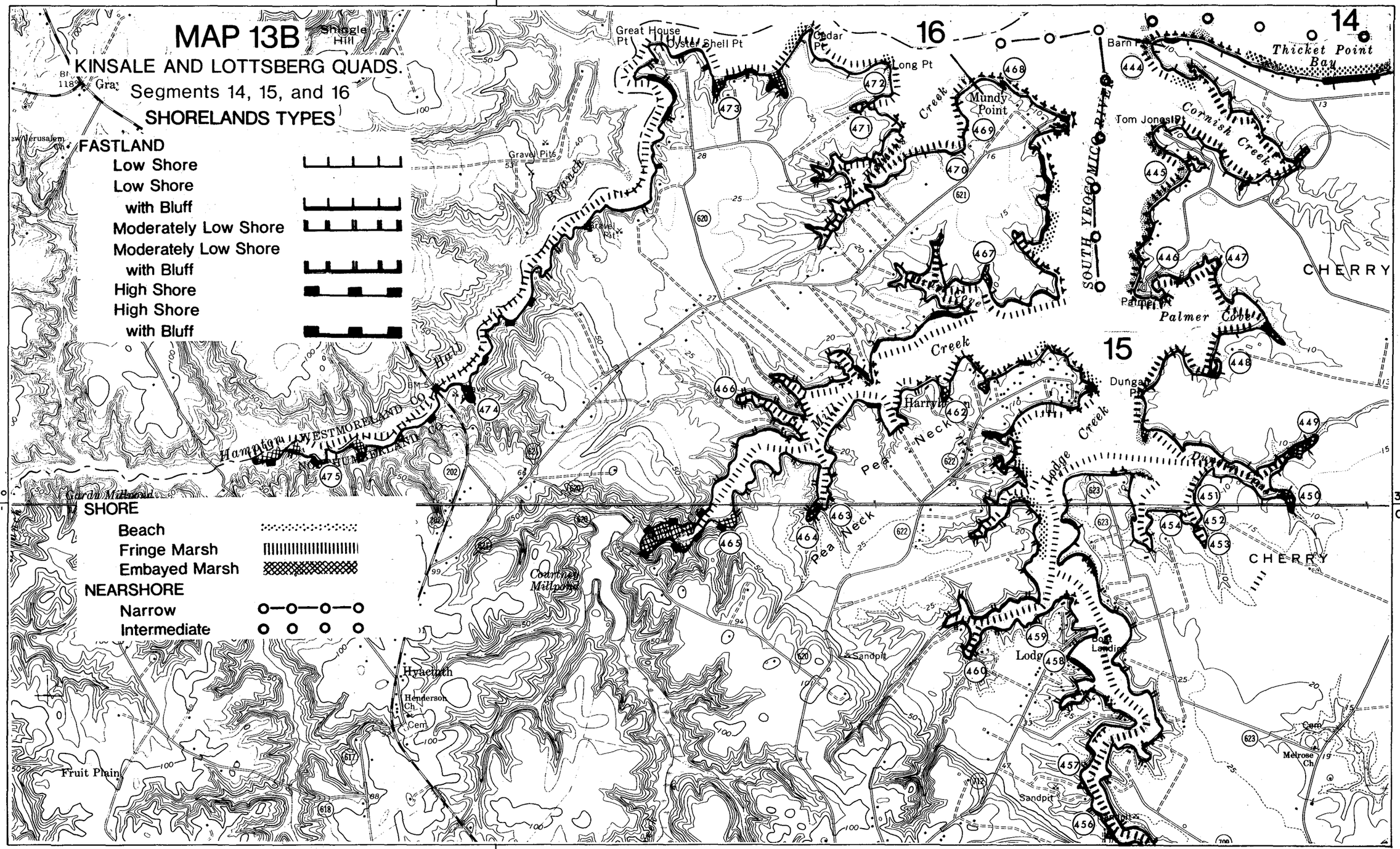
- Low Shore
- Low Shore with Bluff
- Moderately Low Shore
- Moderately Low Shore with Bluff
- High Shore
- High Shore with Bluff

SHORE

- Beach
- Fringe Marsh
- Embayed Marsh

NEARSHORE

- Narrow
- Intermediate



MAP 13C

KINSALE AND LOTTSBERG QUADS.

Segments 14, 15, and 16

FASTLAND USE, OWNERSHIP, EROSION

USE

Agricultural	A
Commercial	C
Industrial	I
Residential	RS
Unmanaged	
Unwooded	U
Wooded	W

OWNERSHIP

Private	1

EROSION

Moderate	|||||
Slight or No Change	No Symbol

