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1-1-1976

## Shoreline Situation Report Essex County, Virginia

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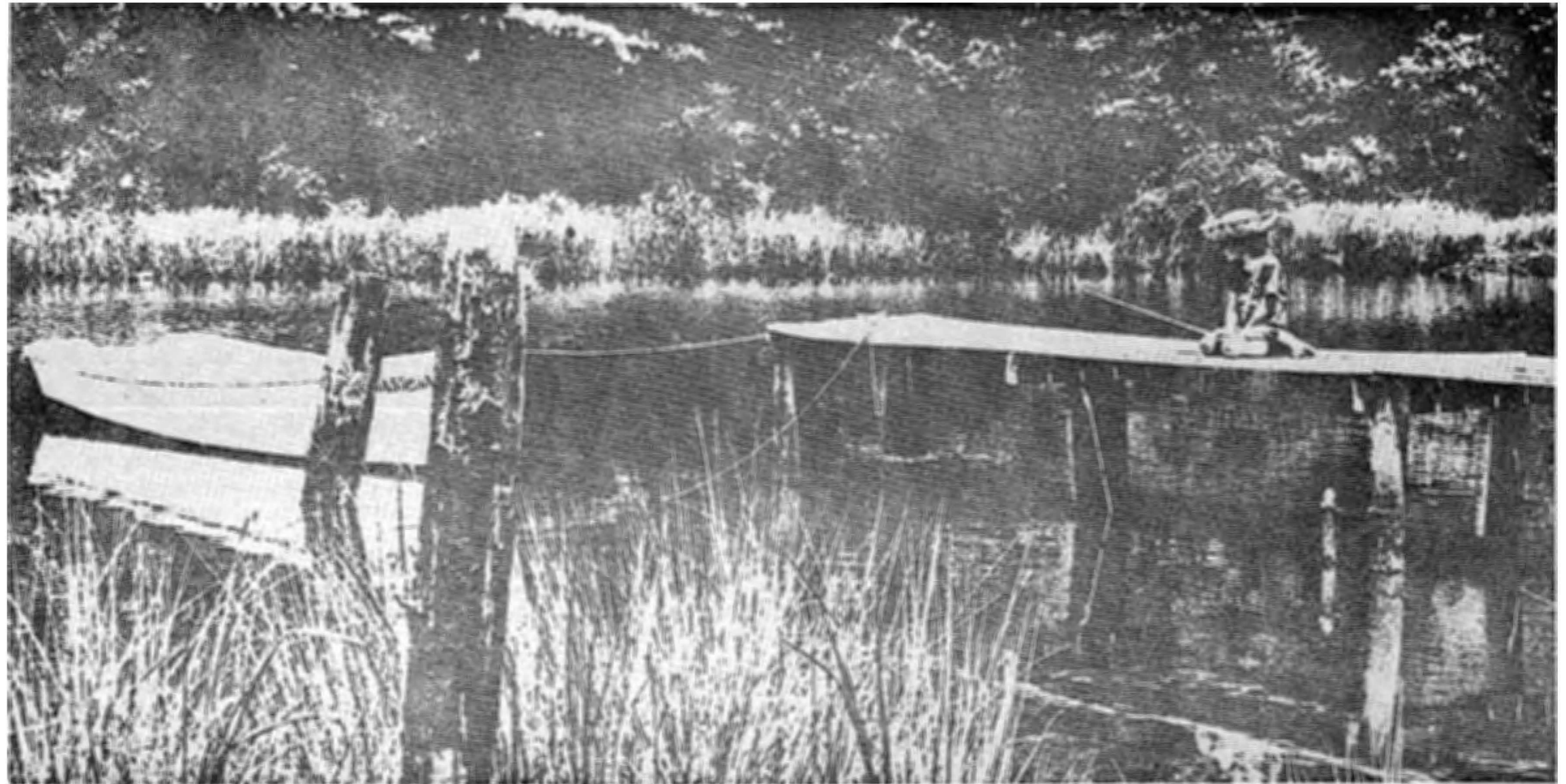
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### Recommended Citation

Rogers, L. M., Owen, D. W., & Peoples, M. H. (1976) Shoreline Situation Report Essex County, Virginia. Special Reports in Applied Marine Science and Ocean Engineering (SRAMSOE) No. 135. Virginia Institute of Marine Science, College of William and Mary. <http://dx.doi.org/doi:10.21220/m2-7s4n-ez14>

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# Shoreline Situation Report ESSEX COUNTY, VIRGINIA



Supported by the National Science Foundation, Research Applied to National Needs Program  
NSF Grant Nos. GI 34869 and GI 38973 to the Wetlands/Edges Program, Chesapeake Research Consortium, Inc.  
Published With Funds Provided to the Commonwealth by the Office of Coastal Zone Management,  
National Oceanic and Atmospheric Administration, Grant No. 04-6-158-44037

Special Report In Applied Marine Science and Oceanic Engineering Number 135 of the

VIRGINIA INSTITUTE OF MARINE SCIENCE  
Gloucester Point, Virginia 23062

1976

# Shoreline Situation Report ESSEX COUNTY, VIRGINIA

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TABLE OF CONTENTS

	PAGE
CHAPTER 1: INTRODUCTION	1
1.1 Purposes and Goals	2
1.2 Acknowledgements	2
CHAPTER 2: APPROACH USED AND ELEMENTS CONSIDERED	3
2.1 Approach to the Problem	4
2.2 Characteristics of the Shorelands Included	4
CHAPTER 3: PRESENT SHORELINE SITUATION OF ESSEX	9
3.1 The Shorelands of Essex	10
3.2 Shore Erosion Situation	10
3.3 Shore Use Limitations	11
CHAPTER 4: SUMMARIES AND MAPS OF ESSEX	21
4.1 Segment and Subsegment Summaries	22
4.2 Segment and Subsegment Descriptions	25
Segment 1	25
Segment 2	28
Segment 3	29
Segment 4	31
Segment 5	33
Segment 6	35
Segment 7	37
Segment 8	39
4.3 Segment and Subsegment Maps	41

LIST OF ILLUSTRATIONS

	PAGE
FIGURE 1: Shoreland Components	5
FIGURE 2: Marsh Types	5
FIGURE 3: Typical River Meander	11
FIGURE 4: Mark Haven Beach	12
FIGURE 5: Bowlers Wharf	12
FIGURE 6: North of Browns Point	12
FIGURE 7: South of Lowery Point	12
FIGURE 8: Lowery Point	13
FIGURE 9: Tappahannock	13
FIGURE 10: East of Mount Landing Creek	13
FIGURE 11: Daingerfield Landing	13
TABLE A: Comparison of Shorelands Use	10
TABLE 1: Essex County Shorelands Physiography	19
TABLE 2: Essex County Subsegment Summaries	22
MAPS 1A-E: Essex County Summary Maps	14
MAPS 2A-C: Mark Haven Beach	41
MAPS 3A-C: Bowlers Wharf	44
MAPS 4A-C: Piscataway Creek	47
MAPS 5A-C: Tappahannock	50
MAPS 6A-C: Mount Landing Creek	53
MAPS 7A-C: Bottoms Neck	56
MAPS 8A-C: Otterburn Marsh	59
MAPS 9A-C: Horse Head Point	62
MAPS 10A-C: Portobago Bay	65

# 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.

#### 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 04-5-158-50001. 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 the several drafts of the manuscript, Bill Jenkins, who prepared the photographs, and Glenn Carter and Sam White who piloted the aircraft through several photographic missions. 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 sub-segments. 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

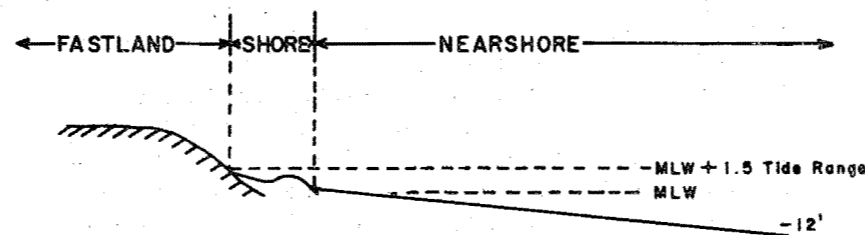


Figure 1

A profile of the three shorelands types.

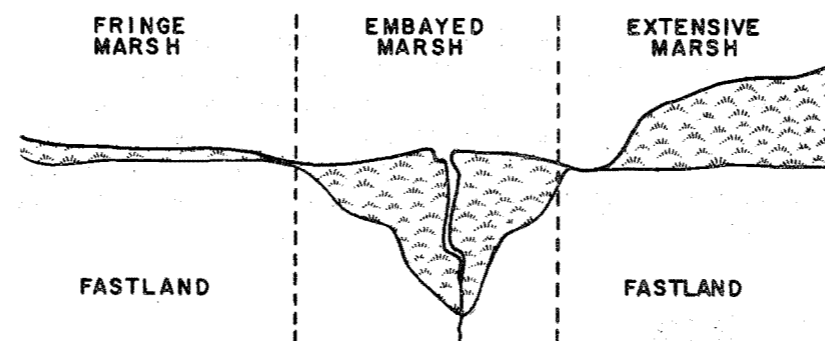


Figure 2

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 wild-fowl 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 Engineers 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

## PRESENT SHORELINE SITUATION OF ESSEX COUNTY

## 3.1 THE SHORELANDS OF ESSEX COUNTY

Essex County is located along the southern bank of the Rappahannock River and is bounded by Middlesex County to the southeast and Caroline County to the northwest. The county is predominantly rural in nature, though sections of the shorelands are developed. The only fairly large population center along the shore is the Town of Tappahannock.

The fastland of Essex County ranges from low shore to high shore with bluff, with several areas of artificial fill (see Table 1). Although eighty-nine percent of the shoreline is low or moderately low shore (sometimes with bluffs), flooding is not usually a problem.

Tidal marshes, including fringe, embayed and extensive marshes, comprise eighty-four percent of the county's shoreline (a tidal marsh inventory for Essex County is forthcoming). The Virginia Wetlands Act of 1972 controls any proposed alterations to these areas, as marshes, especially embayed and extensive marshes, serve vital ecological functions and have valuable flood and erosion protection qualities. As non-renewable resources, marshes should be preserved.

Eleven percent of the shoreline is comprised of beaches. Though there are several nice beaches fronting private residences, most areas have thin, strip beaches, often with vegetation.

Development patterns along the shoreline of Essex County vary with the location. Basically, the shoreline from Mount Landing Creek east (the Tappahannock area) is being developed for residential purposes, most of which are second or vacation homes. Table A is a comparison of land use statistics between the area east of Tappahannock (Subsegments 1A-4A) and the area west of Tappahannock (Subsegments 4B-8C).

TABLE A

## Comparison of Shorelands Use Statistics

Miles (Percent of Section)

Fastland Use	Subsegments	Subsegments
	1A - 4A	4B - 8C
Unmanaged, Wooded	33.3mi. (43%)	15.3mi. (19%)
Agricultural	27.7mi. (35%)	63.7mi. (78%)
Residential	13.9mi. (18%)	1.6mi. ( 2%)
Commercial	1.5mi. ( 2%)	0.4mi. ( 1%)
Industrial	1.5mi. ( 2%)	0.2mi. ( 1%)
	78.1mi. (100%)	81.2mi. (100%)

There are several major differences in the two sections, as the table reveals. The most important aspect is the difference in residential usage. East of Tappahannock, eighteen percent of the shorelands are developed for residential purposes, as compared with only two percent of the shorelands to the west. Overall, seventy-eight percent of the shorelands east of Tappahannock are still agricultural - wooded, while ninety-seven percent of the shorelands to the west are agricultural - wooded. Another statistic showing the greater development in the eastern section is the amount of artificial stabilization. Thirteen percent of the shoreline east of Tappahannock is artificially stabilized, as compared with only one percent west of Tappahannock.

According to the Virginia Water Quality Inventory (305(b) Report), (Virginia State Water Control Board, April, 1976), the Rappahannock River along Essex County generally has good water quality (Hoskins Creek, east of Tappahannock, has poor water quality due to natural swamp conditions and several waste treatment plants). Seasonal and sectional water problems do occur due to upstream industrial and domestic waste discharges and some agricultural rain runoff. Development along the county's shorelands should be controlled so that the water quality of the Rappahannock River is not damaged.

## 3.2 SHORE EROSION SITUATION

Shoreline retreat in Essex County is dependent upon several factors, combinations of which control the rate of erosion or accretion in a given area at a given time. There are three basic causes of erosion which can affect a river system such as the Rappahannock River. A prevalent cause of shoreline retreat is downhill rain runoff. This is a basic weathering of the shoreline due to rain waters. Rain runoff erosion mainly affects bluffs, especially wooded bluffs, as it undermines the tree system along the shore. Continued washing away of the soil causes the trees to eventually fall, carrying with them large amounts of soil suspended in the root systems. Rain runoff erosion is not dependent upon the nearshore type and can pose a problem for any area.

It was observed that several agricultural areas have been plowed perpendicularly to the shoreline (see Figure 11). Such plowing encourages rain runoff erosion and is a prime contributor to non-point source pollution. The sediments suspended in the rain runoff contain large amounts of fertilizers and pesticides which contribute to seasonal water quality problems. Most runoff erosion and the ensuing pollution from agricultural areas could be eliminated by; 1) plowing parallel to the shoreline, and 2) leaving a "green zone" along the shoreline (A "green zone" is a buffer area planted with grasses between the field and the shore. In Essex County, a buffer of fifty feet should be sufficient). Proper use of the shorelands would do much to control runoff erosion of the agricultural lands and the pollution of the river. The other two types of erosion are dependent upon the location of the area, the type of nearshore zone, and many other variables.

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. The width of the water body is also important in describing erosion patterns for a given area. Wave action is responsible for most erosion along the county's shoreline from Beverly Marsh east toward the river mouth. The longest fetches and usually the most powerful wind generated waves are from the southeast,

north, and the northwest along this section of the county's shoreline (However, winds from the southeast are generally very light. Those from the south are very powerful and thus can cause much erosion even without a large fetch.). Winds approaching from any of these directions can cause much shoreline retreat along affected areas. (The 100-year average erosion rate for much of this section of the shoreline is 1.5 to 2.5 feet per year, with several areas having rates of from 3 to 4 feet per year). Approximately 7.4 miles of the shoreline have been artificially stabilized. However, erosion is continuing in unprotected areas.

Most of the erosion and accretion found along the upper Rappahannock River (above Beverly Marsh) occurs at the bends in the river. The river current is fastest on the outside of the meanders and is much less on the inside. As a result, the outside bends erode while the inside bends accrete. The amount and rate of erosion depends upon both the composition of the land in the bends and the speed of the current there (see Figure 3).

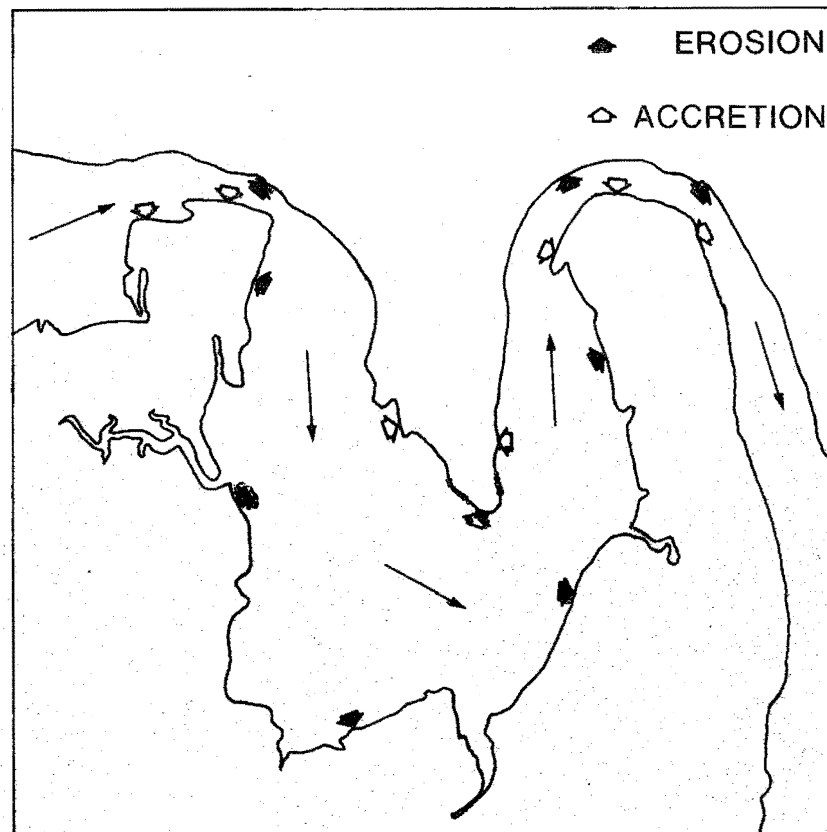


FIGURE 3. TYPICAL RIVER MEANDER

Beaches and marshes are natural barriers against erosion of the fastland. Both absorb the incident wave energy and therefore inhibit the erosion of the fastland. However, beaches are usually very thin along the shoreline of Essex County due to a limited supply of sand in the littoral drift. Many areas, especially around Tappahannock and east of the town, have been artificially stabilized. These structures have usually been constructed on an individual basis, as compared to a sectional or community basis. Attendant with these structures has been the disappearance of beaches downstream, as sediment sources have been withdrawn from the system. Many areas have attempted to reestablish beaches by employing groin systems. However, these systems have proven of little value for most areas, since they depend upon the littoral transport of sand for success. In order to reestablish or maintain existing beaches, probably the only course of action would be a program of beach nourishment coincident with site specifically designed structures to trap moving sands. Any action would be costly and should entail a detailed study of the area and a unified solution.

It should be noted that most areas still suffering from erosion in Essex County are either used for agriculture or are unused. Any program of protection for these areas would probably be too costly to be justified.

### 3.3 ALTERNATE SHORE USE

Essex County is overwhelmingly rural, with eighty-eight percent of the shorelands being used for agriculture or are unused. Approximately ten percent of the shoreline is used for residential purposes and two percent is used for commercial and industrial purposes. Most present activity along the shoreline is centered around Tappahannock and some areas further east toward the river mouth. The presently consumed shorelands can be characterized as thin strips of land along the river which are used as residential areas, most being second or vacation homes (Figures 4, 5, 7, and 8). These areas are usually backed by agricultural lands. Little new development is occurring from Mount Landing Creek west toward the head of the Rappahannock River.

It is expected that some continued development will occur around the Town of Tappahannock, mainly for residential use. However, no large scale development seems probable. Care should be taken to ensure that the water quality of the Rappahannock River is not endangered by shoreline development.

Little alternate shore use seems necessary for the present time, since organized recreational facilities are usually needed in areas serving a high density population center. The only facilities needed along the shoreline in Essex County would be public boat ramps in various areas of the county.

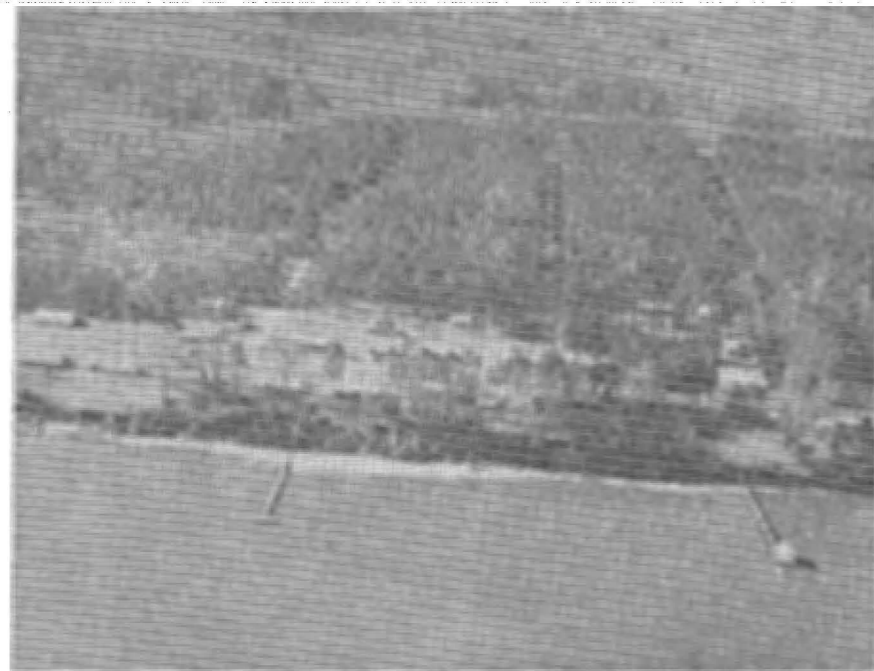


FIGURE 4

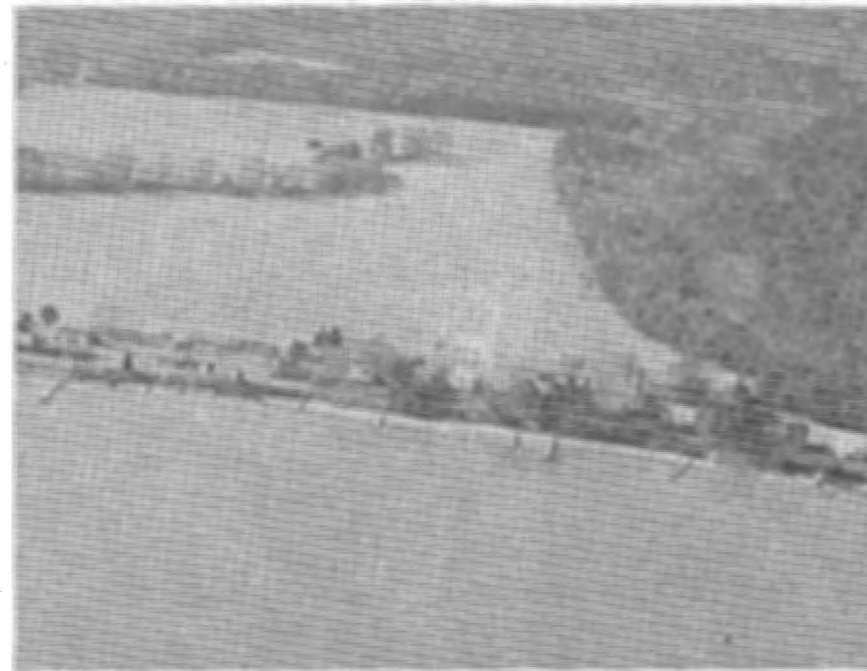


FIGURE 5

FIGURE 4: View of Mark Haven Beach, Subsegment 1A. Like much of the county's shorelands, a thin strip of land adjacent to the shore has been developed for residential use while the remaining lands are undeveloped. Notice the erosion of the bluffs in this section.

FIGURE 5: Bowlers Wharf, Subsegment 1A. A good example of strip development prevalent in Essex County. The groin fields fronting the bulkheaded shoreline have been moderately effective in trapping sand.

FIGURE 6: View between Browns Point and Wares Wharf, Subsegment 1B. Erosion of the bluffs in this area, besides causing the loss of valuable farmlands, is also a cause of non-point source pollution to the Rappahannock River. Rain runoff carries a variety of fertilizers and pesticides into the river. In order to reduce erosion of such farmlands, a "green zone" (an area that is planted in grasses, bordering the shoreline) should be established. Along the Essex County shoreline, a green zone fifty feet wide should be sufficient.

FIGURE 7: South of Lowery Point, Subsegment 1B. The numerous groins have not been successful in creating beaches in front of the bulkhead in this area.

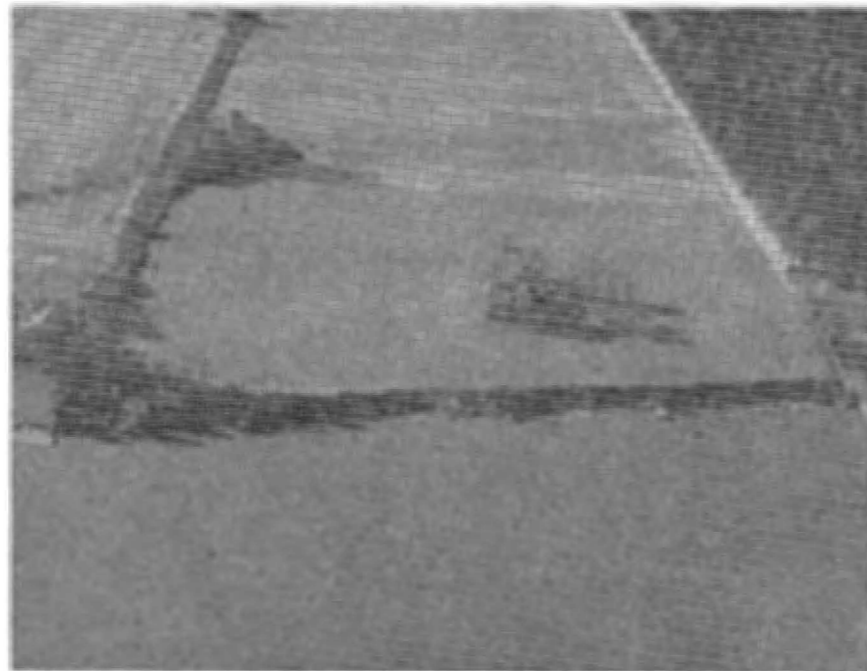


FIGURE 6



FIGURE 7



FIGURE 8: Lowery Point, Subsegment 1C. These residences were built on artificial fill dumped on the marsh. The groins of cement bags have not been effective in building up a buffer beach in front of the bulkhead.

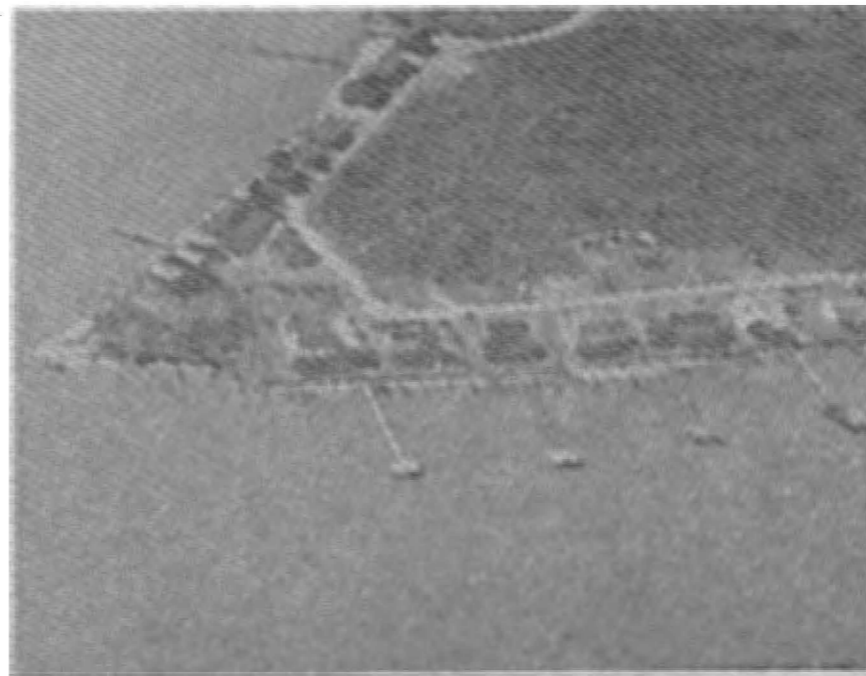


FIGURE 8

FIGURE 9: Tappahannock, Subsegment 4A. Tappahannock is the only town located along the shorelands in Essex County. The entire shoreline has been artificially stabilized in this area. Again, the groins have not been effective in trapping a buffer beach.

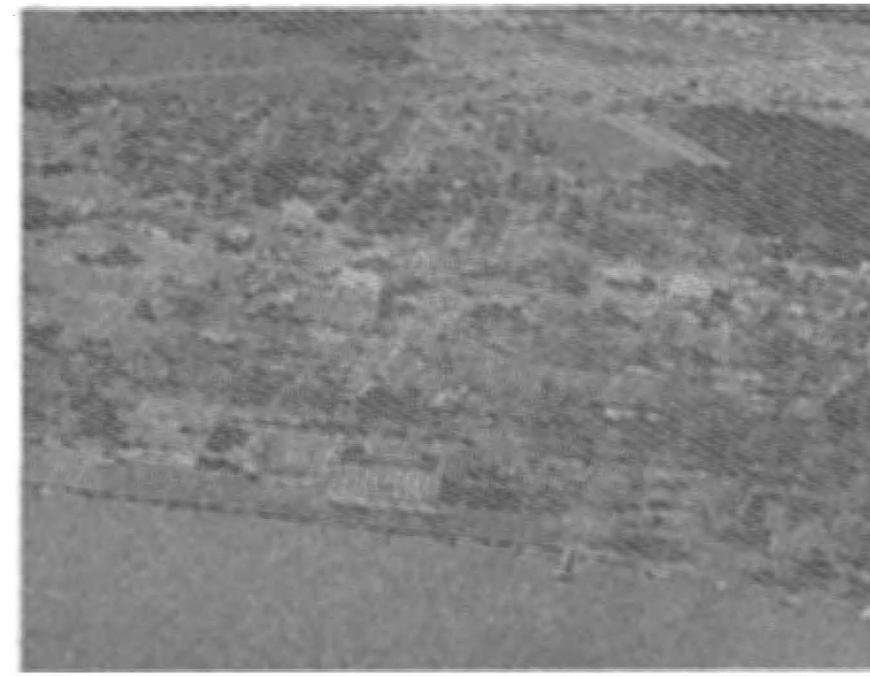


FIGURE 9

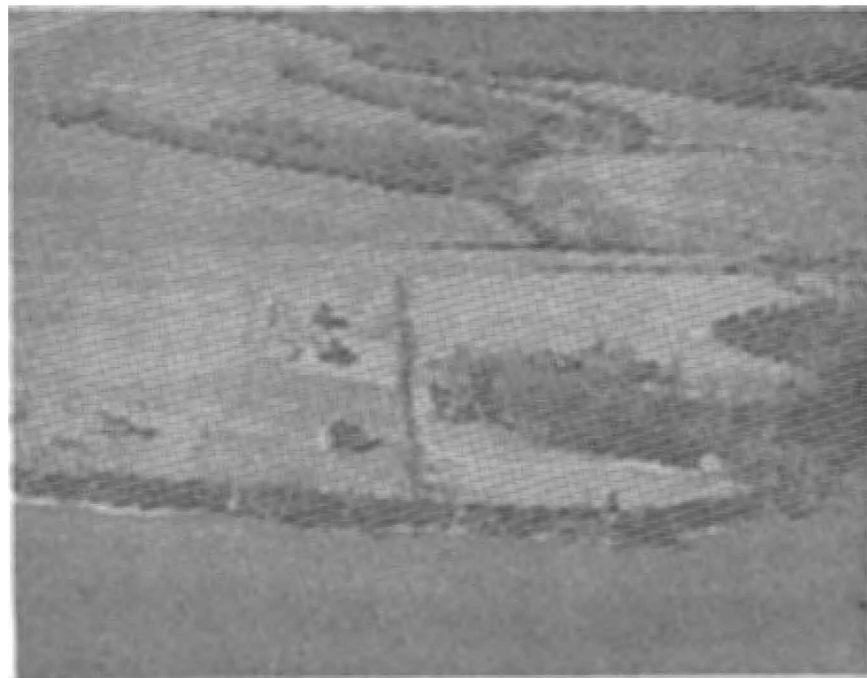


FIGURE 10

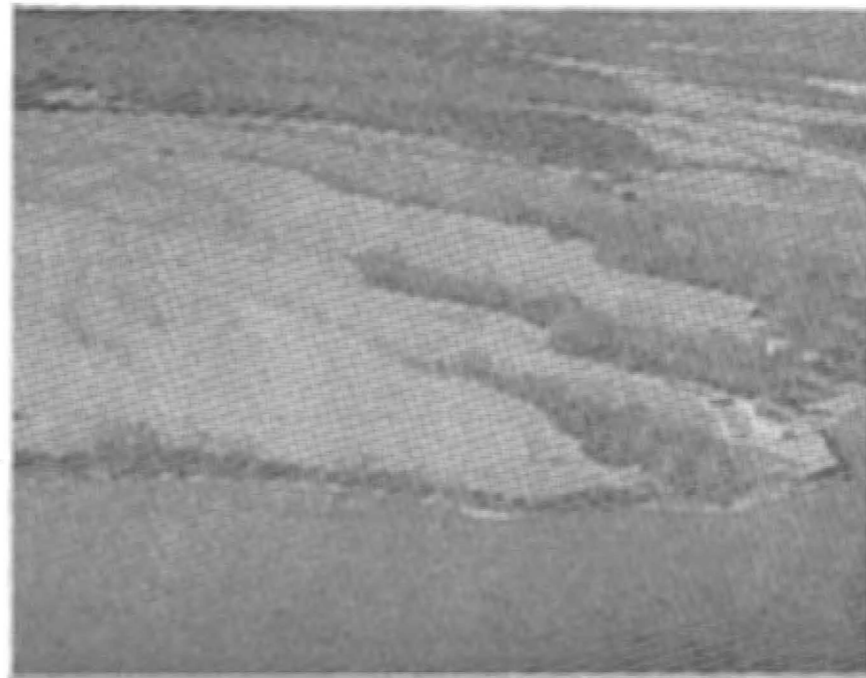
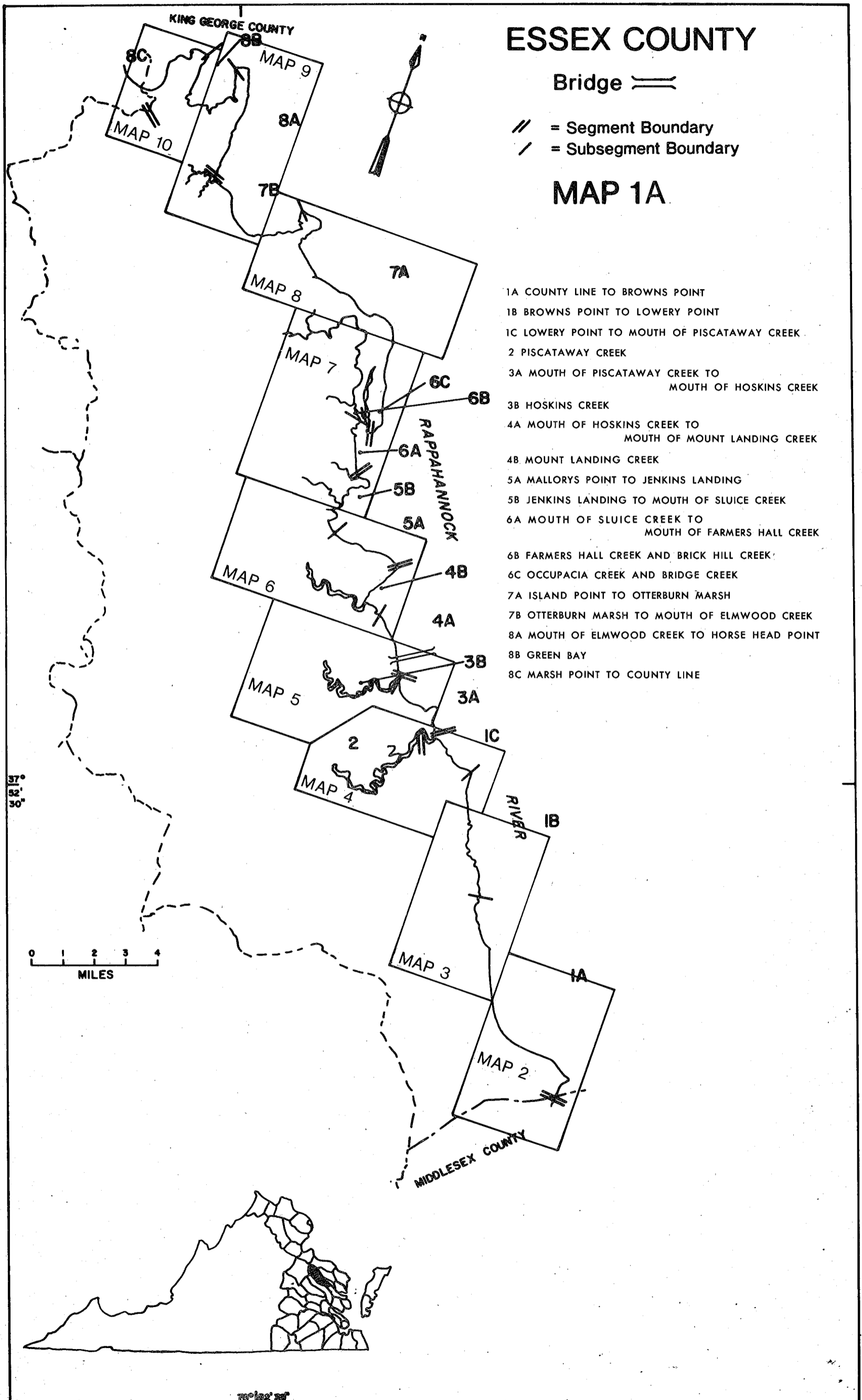


FIGURE 11

FIGURE 10: East of Mount Landing Creek, Subsegment 4A. Erosion is a problem for the shoreline in this area. As can be seen from the photo, a small housing development is being constructed in this section.

FIGURE 11: Daingerfield Landing, Subsegment 6A. The agricultural fields have been plowed perpendicular to the shoreline, which encourages rain runoff erosion. Plowing should be parallel to the shore with a fifty foot buffer zone along the shoreline.







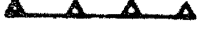



# ESSEX COUNTY

Bridge 

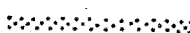


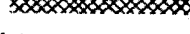

## MAP 1B

### SHORELANDS TYPES




#### FASTLAND

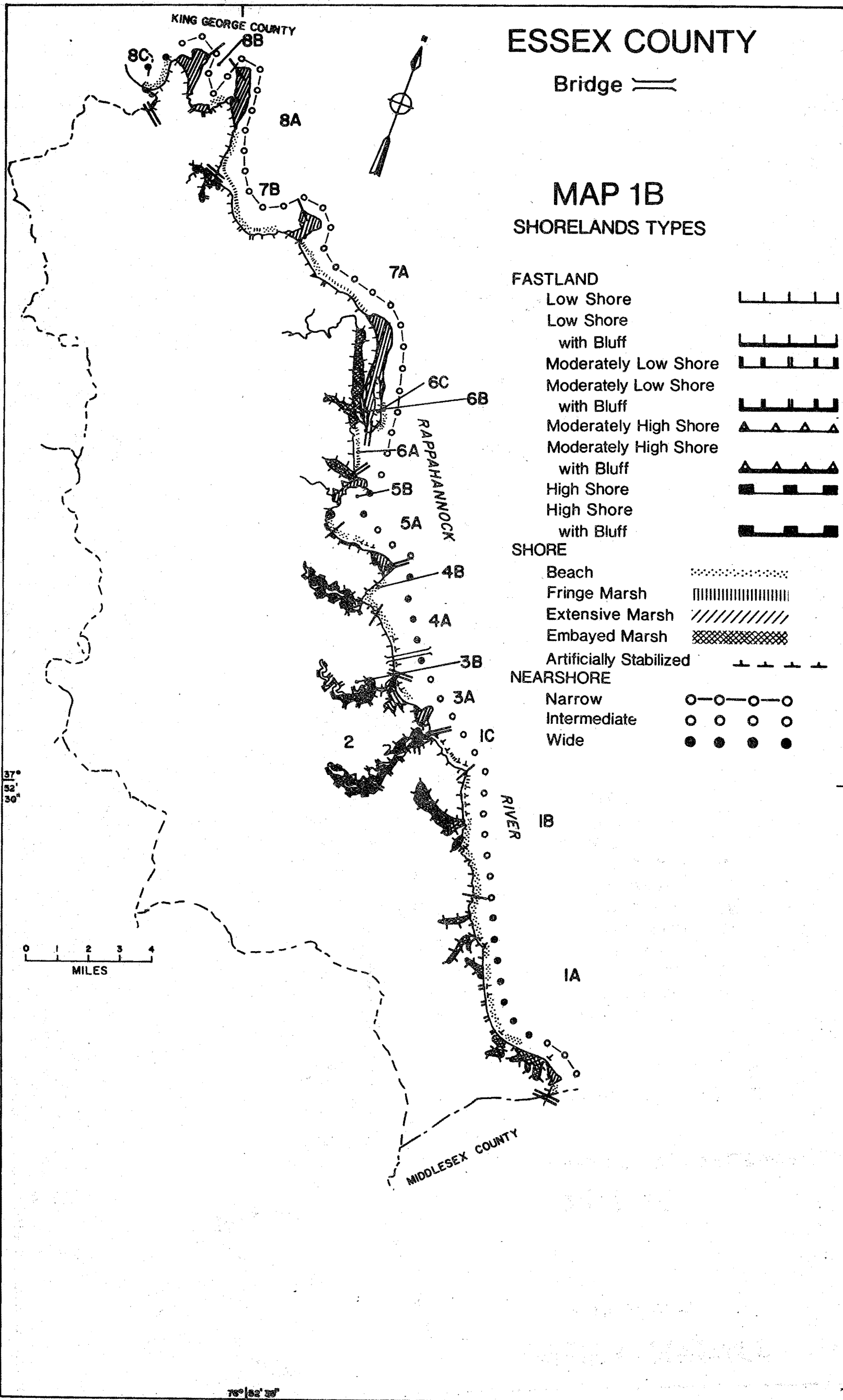
- Low Shore 
- Low Shore with Bluff 
- Moderately Low Shore 
- Moderately Low Shore with Bluff 
- Moderately High Shore 
- Moderately High Shore with Bluff 
- High Shore 
- High Shore with Bluff 

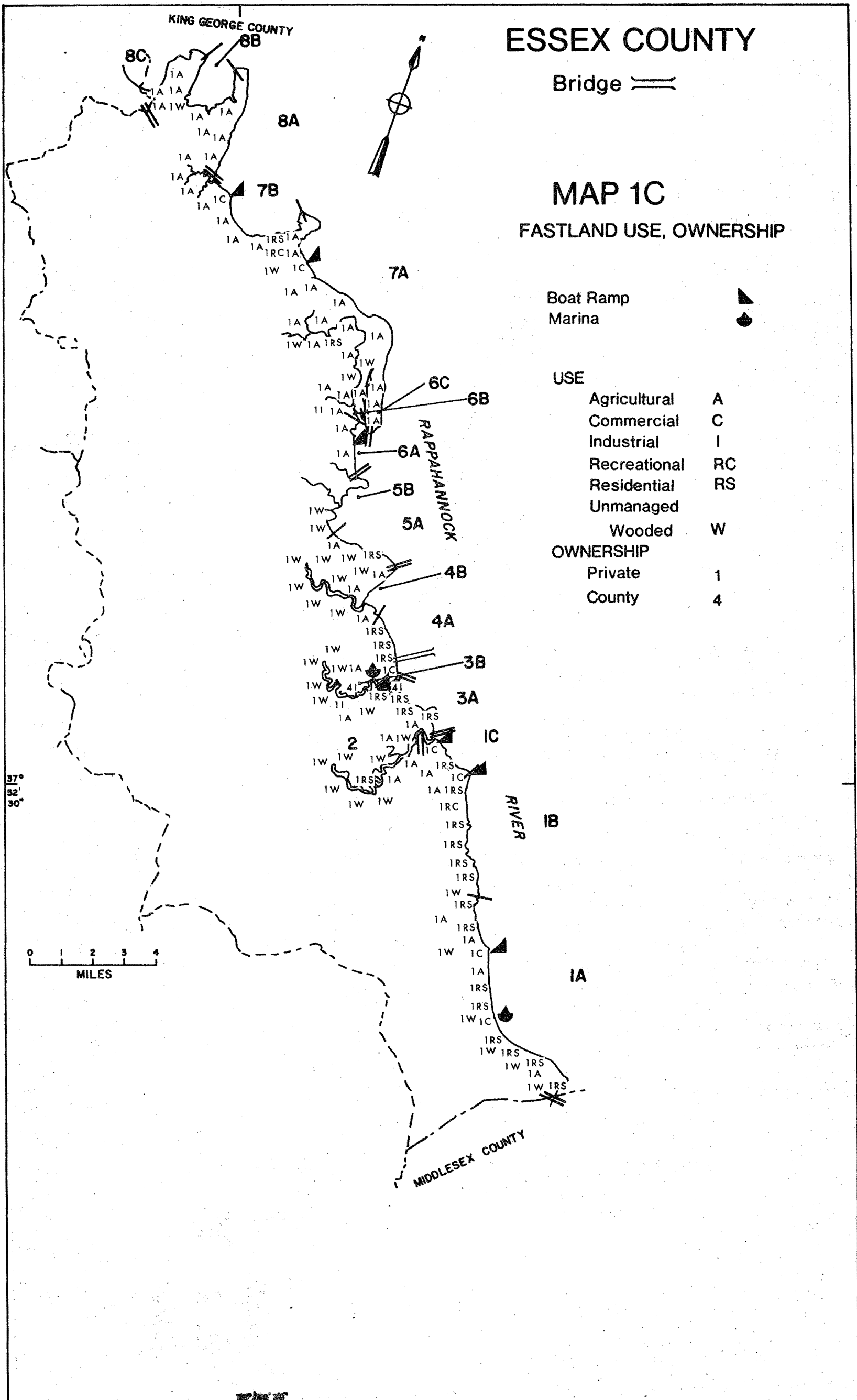
#### SHORE

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

#### NEARSHORE

- Narrow 
- Intermediate 
- Wide 





# ESSEX COUNTY

Bridge 

## MAP 1C

### FASTLAND USE, OWNERSHIP

Boat Ramp   
 Marina 

#### USE

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

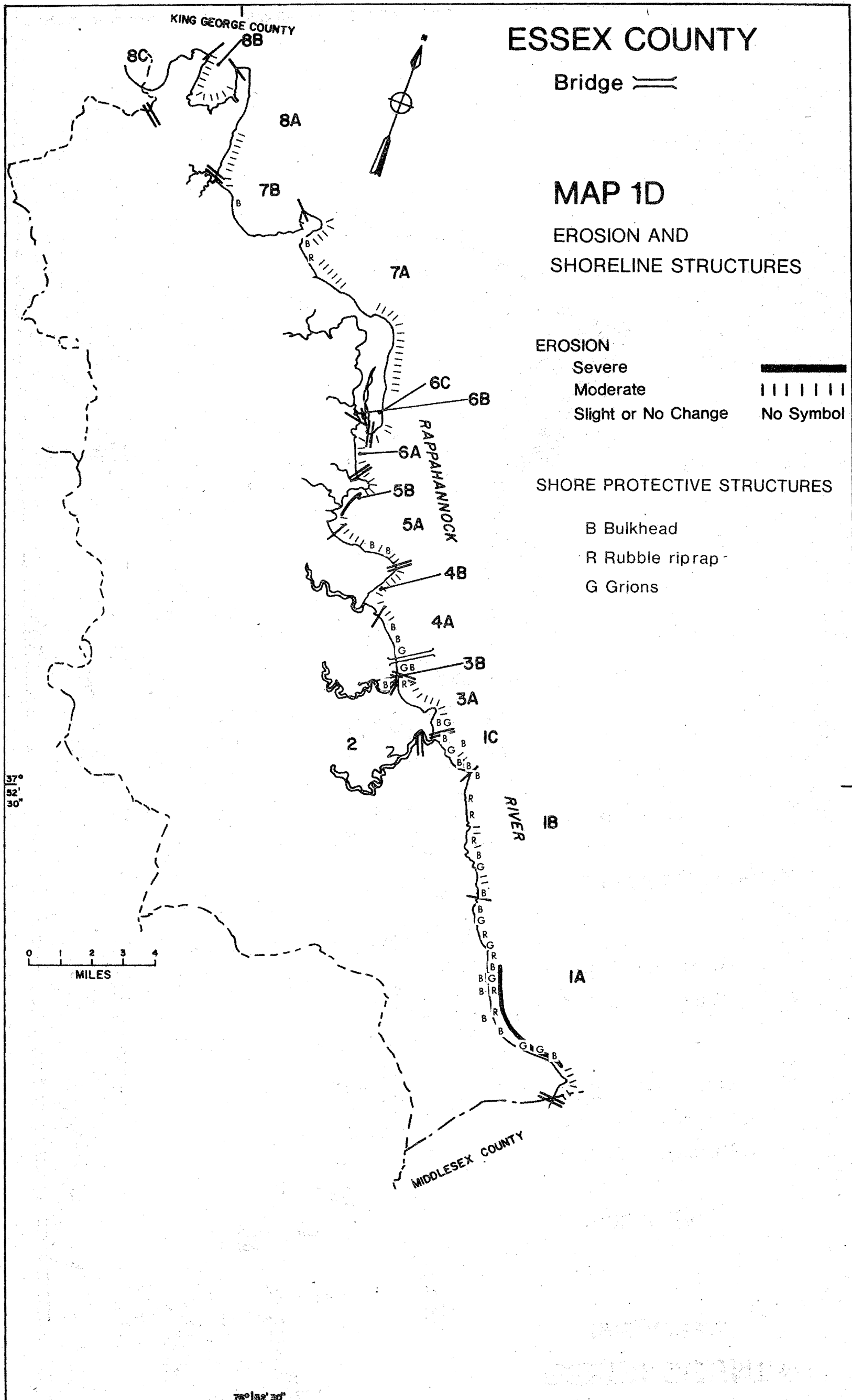
#### OWNERSHIP

- Private 1
- County 4

37°  
52'  
30"

0 1 2 3 4  
MILES

ESSEX



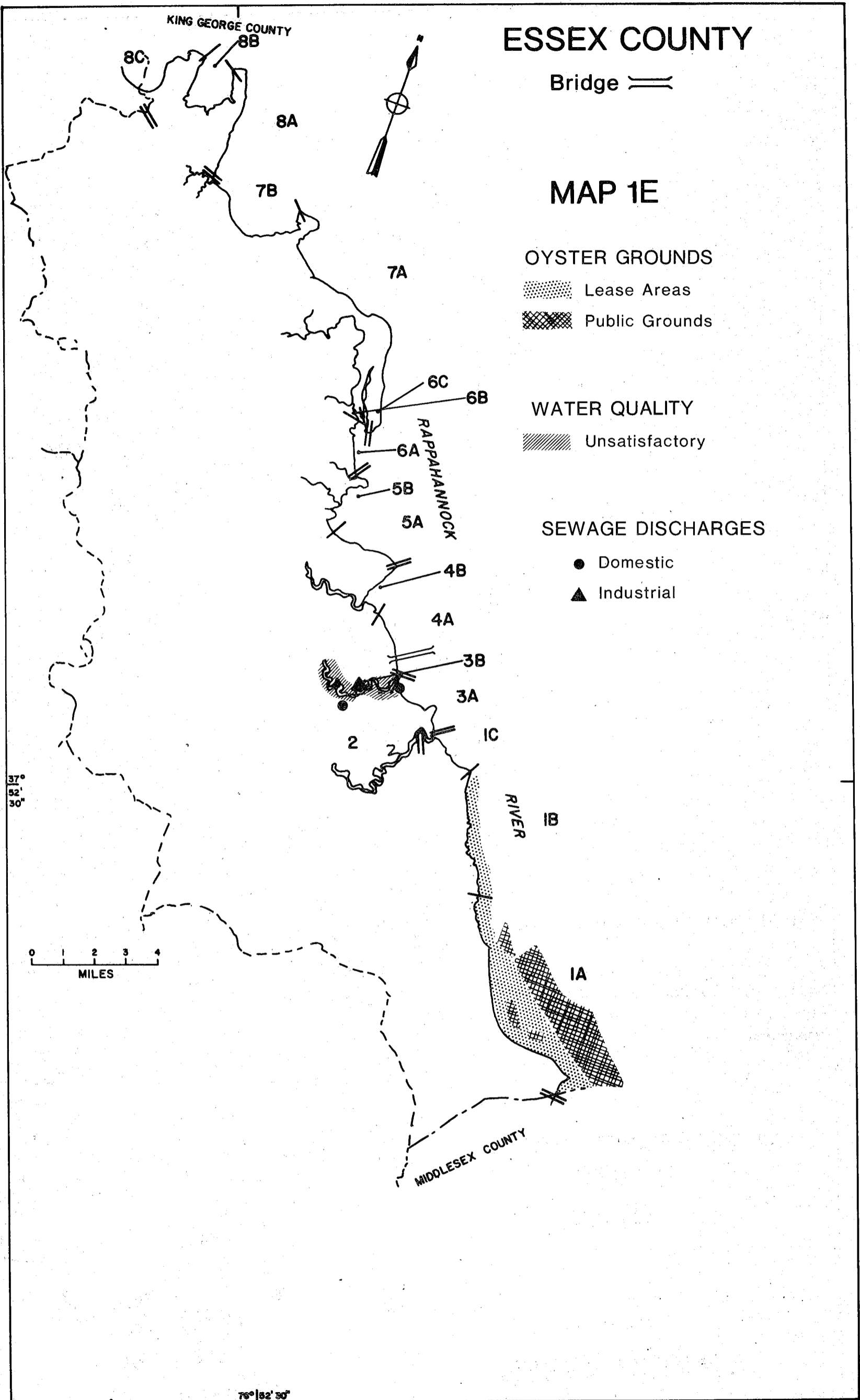


TABLE 1. ESSEX COUNTY, VIRGINIA SHORELANDS PHYSIOGRAPHY, FASTLANDS USE, OWNERSHIP (STATUTE MILES)

Physiographic, use, and ownership classifi- cation	SHORELANDS PHYSIOGRAPHY															FASTLANDS USE					OWNERSHIP		TOTAL MILES					
	FASTLAND									SHORE					NEARSHORE			AGRICULTURAL	COMMERCIAL	INDUSTRIAL	RECREATIONAL	RESIDENTIAL	UNMANAGED, WOODED	PRIVATE	COUNTY	SHORE	FASTLAND	
	ARTIFICIAL FILL	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											
1A		5.4	0.7	5.5	1.4	1.1	0.3	0.2	0.2	1.6	5.5	0.1	1.0	0.4	2.5	6.1		3.9	0.6		4.2	6.1	14.8		8.6	14.8		
1B		8.2	0.1	0.3	0.3					1.0	2.0	0.2	1.0			4.2		2.1	0.3		0.2	2.9	3.4	8.9		4.2	8.9	
1C		3.7								1.2	0.1	0.2	0.6	0.3	1.8			1.0	0.2			1.7	0.8	3.7		2.4	3.7	
2		12.5		8.7	0.7	2.6		3.3	0.4						CREEK		13.2				0.7	14.3	28.2		17.7	28.2		
3A	0.4	2.8								1.0	0.7	0.8	0.2	1.1	2.3			1.8			1.4		3.2		3.8	3.2		
3B	0.6	7.5	0.3	4.1	0.6			1.7	0.9	0.2		5.3	7.5		CREEK		4.1	0.4	1.5		0.9	8.7	14.4	1.2	13.0	15.7		
4A		2.6	1.1							1.7	1.3	0.1	0.5		2.0	0.8		1.6			2.1		3.7		3.6	3.7		
4B		10.2		0.6	0.4	1.2		2.0	0.7		0.3	1.6	9.6		CREEK		4.7					10.5	15.1		11.5	15.1		
5A		2.8	0.8	0.5	0.3					0.6	1.1	0.3	0.1	1.4		2.1	0.9				1.4	0.2	4.3		3.5	4.4		
5B		6.6		0.9		1.1	0.3	0.5	1.0			3.1	2.4	5.4			1.6					3.0	10.4		10.9	10.4		
6A		3.1									0.4	0.9		2.7		1.6						0.3	3.1		4.0	3.1		
6B		5.0										1.9	5.0	0.1	CREEK		4.8		0.2				5.0		7.0	5.0		
6C		14.2	0.1									10.6	7.0	1.8	CREEK		13.0					1.3	14.3		19.4	14.3		
7A		6.8	0.9	0.3	0.7					0.1	0.6	4.3	0.6	7.6	13.2		8.5	0.2					8.7		13.2	8.7		
7B		5.6	1.6	2.0	1.0					0.2	1.8	2.9	4.6	1.7	6.0		9.9	0.2			0.2		10.3		11.2	10.2		
8A		2.2	0.5								1.1	0.7		2.5	4.3		2.7						2.7		4.3	2.7		
8B		2.1	0.9	0.3							0.2			7.8	8.1		3.3						3.3		8.0	3.3		
8C		3.5	0.3	0.1							1.4	0.5	0.9	1.7	1.6	1.4		3.9					3.9		4.5	3.9		
TOTAL		1.0	104.8	7.3	23.3	5.4	6.0	0.6	7.7	3.2	7.6	16.5	38.2	49.3	39.2	41.8	7.9	20.2	91.4	1.9	1.7	0.2	15.5	48.6	158.0	1.2	150.8	159.3
% of FASTLAND		1%	66%	5%	15%	3%	4%	0%	5%	2%								57%	1%	1%	0%	10%	31%	99%	1%		100%	
% of SHORELINE											5%	11%	25%	33%	26%	28%	5%	13%									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 ESSEX COUNTY, VIRGINIA

SUBSEGMENT	SHORELANDS TYPE	SHORELANDS USE	OWNERSHIP	FLOOD HAZARD	WATER QUALITY	BEACH QUALITY	SHORE EROSION SITUATION	ALTERNATE SHORE USE
1A COUNTY LINE TO BROWNS POINT 8.6 miles (14.8 miles of fastland)	FASTLAND: Low shore 37%, low shore with bluff 5%, moderately low shore 37%, moderately low shore with bluff 9%, moderately high shore 7%, moderately high shore with bluff 2%, high shore 2%, and high shore with bluff 1%. SHORE: Artificially stabilized 19%, beach 63%, fringe marsh 1%, embayed marsh 12%, and extensive marsh 4%. NEARSHORE: Narrow 29% and wide 71%.	FASTLAND: Agricultural 26%, commercial 4%, residential 29%, and unmanaged, wooded 41%. SHORE: Private and commercial (marina) use. NEARSHORE: Sport boating and fishing.	Private.	Low to moderate, noncritical. The majority of the subsegment has elevations of at least 10 feet and is not subject to flooding.	Fair to good. This subsegment usually has good water quality, although at times it is degraded by upstream industrial waste.	Poor. The majority of the subsegment has narrow, strip beaches.	Slight or no change, to severe, noncritical. The Jones Point area is experiencing a moderate erosion rate, while the area just west of Jones Point to Bowlers Wharf has a severe erosion rate of 3.3 feet per year. There are areas of effective bulkheading and rubble riprap in this subsegment. The several groin fields are moderately effective.	Low. This subsegment will probably remain basically rural, with very little residential development.
1B BROWNS POINT TO LOWERY POINT 4.2 miles (8.9 miles of fastland)	FASTLAND: Low shore 93%, low shore with bluff 1%, moderately low shore 3%, and moderately low shore with bluff 3%. SHORE: Artificially stabilized 24%, beach 49%, fringe marsh 5%, and embayed marsh 22%. NEARSHORE: Intermediate.	FASTLAND: Agricultural 24%, commercial 3%, recreational 2%, residential 33%, and unmanaged, wooded 38%. SHORE: Some private and commercial use (marinas) but mostly unused. NEARSHORE: Sport boating and fishing.	Private.	Low to moderate, critical. Although the majority of the subsegment has elevations of at least 10 feet, some structures are below 5-foot elevations. These structures are susceptible to flooding during abnormally high water.	Fair to good. This subsegment usually has good water quality. Seasonal quality problems stem from upstream sewage waste and agricultural runoff.	Poor. The majority of this subsegment has narrow, strip beaches.	Slight or no change to moderate, noncritical. The area from Browns Point to Wares Wharf is experiencing a moderate erosion rate of approximately 2.1 feet per year. There is a combined total of 5,000 feet of bulkheading and rubble riprap in this subsegment. Several areas have groin systems fronting the seawalls, although these are only partially effective in trapping sand.	Low. Some residential development will probably continue in this subsegment, but care should be taken not to destroy the rural nature of the area.
1C LOWERY POINT TO MOUTH OF PISCATAWAY CREEK 2.4 miles (3.7 miles of fastland)	FASTLAND: Entirely low shore. SHORE: Artificially stabilized 48%, beach 4%, fringe marsh 9%, embayed marsh 25%, and extensive marsh 14%. NEARSHORE: Narrow 74%. The remainder of the subsegment is located in the mouth of Piscataway Creek.	FASTLAND: Agricultural 27%, commercial 4%, residential 47%, and unmanaged, wooded 22%. SHORE: Private use in the residential sections and some commercial use (marinas). NEARSHORE: Sport boating and fishing.	Private.	Moderate, critical. The entire subsegment has a low shore, most of which is subject to flooding during abnormally high waters. Many dwellings are below 5-foot elevations, some of which could be inundated during floods.	Fair to good. The Rappahannock River usually has good water quality. Seasonal water quality problems stem from upstream pollution.	Poor. There are only narrow, strip beaches in this subsegment.	Slight or no change to moderate, noncritical. The area from Lowery Point to the mouth of Piscataway Creek had an historical rate of 1.5 feet per year. However, this area has been artificially stabilized, thus stopping the shoreline retreat.	Low. There is very little shoreline property available for development in this subsegment.
2 PISCATAWAY CREEK 17.7 miles (28.2 miles of fastland)	FASTLAND: Low shore 44%, moderately low shore 31%, moderately low shore with bluff 3%, moderately high shore 9%, high shore 12%, and high shore with bluff 1%. SHORE: Fringe marsh 26%, embayed marsh 47%, and extensive marsh 27%. CREEK: Piscataway Creek has depths of 4 feet at the mouth, with greater depths for 5 miles upstream.	FASTLAND: Agricultural 46%, residential 3%, and unmanaged, wooded 51%. SHORE: Some waterfowl hunting in the marshes, though mostly unused. CREEK: Some sport boating and fishing.	Private.	Low. The majority of the segment has elevations of at least 5 feet and is not exposed to direct wind or wave actions. There are no endangered structures.	Satisfactory. The only probable causes of pollution in Piscataway Creek would be from boating activities and agricultural runoff.	There are no beaches in this segment.	No data. The area appears stable. There are no endangered or shore protective structures.	Low. The wooded area near the Route 17 bridge could be developed as a campground with nature trails and fishing amenities.
3A PISCATAWAY CREEK TO HOSKINS CREEK 3.8 miles (3.2 miles of fastland)	FASTLAND: Artificial fill 13% and low shore 87%. SHORE: Artificially stabilized 25%, beach 19%, fringe marsh 21%, embayed marsh 6%, and extensive marsh 29%. NEARSHORE: Narrow.	FASTLAND: Agricultural 56% and residential 44%. SHORE: Private use along the residential sections. NEARSHORE: Sport boating and fishing.	Private.	Moderate, critical. Most of the subsegment has elevations of 5 feet and would probably be flooded during abnormally high waters. Most dwellings are built along the 5-foot contour line and could be damaged during a flood.	Poor. The area of water just south of Hoskins Creek is polluted due to effluents from several sewage treatment plants and industrial discharges which flow into Hoskins Creek.	Poor. The only beaches in this subsegment have been trapped by the groin fields.	Moderate, noncritical. While most of the area has a moderate historical erosion rate of 2.4 to 2.5 feet per year, most residential areas have been artificially stabilized, thus slowing down the shoreline retreat.	Low. The present development of the shoreline prohibits any further or alternate use. The area will probably remain basically agricultural with a residential shoreline fringe.

TABLE 2 (cont'd.)

SUBSEGMENT	SHORELANDS TYPE	SHORELANDS USE	OWNERSHIP	FLOOD HAZARD	WATER QUALITY	BEACH QUALITY	SHORE EROSION SITUATION	ALTERNATE SHORE USE
3B HOSKINS CREEK 13.0 miles (15.7 miles of fastland)	FASTLAND: Artificial fill 4%, low shore 48%, low shore with bluff 2%, moderately low shore 26%, moderately low shore with bluff 4%, high shore 11%, and high shore with bluff 5%. SHORE: Artificially stabilized 2%, fringe marsh 41%, and embayed marsh 57%. CREEK: The entrance channel to Hoskins Creek had controlling depths of 10 feet in 1972.	FASTLAND: Agricultural 26%, commercial 3%, industrial 10%, residential 6%, and unmanaged, wooded 55%. SHORE: Some waterfowl hunting in the marshes. There are two sewage outfalls and one industrial waste outfall emptying into Hoskins Creek. CREEK: Some sport fishing but very little other use.	Private 92% and county 8%.	Low. The majority of the shoreline has elevations of at least 20 feet. Only the marsh areas are subject to flooding. There are no endangered dwellings.	Poor. Hoskins Creek has been degraded by natural swamp conditions as well as industrial and domestic waste discharges.	There are no beaches in this subsegment.	No data. The area appears stable. There is approximately 1,200 feet of effective bulkhead at the mouth of Hoskins Creek.	Low. The wooded bluff areas along the creek head and limited access to the shoreline hinder development along the creek.
4A HOSKINS CREEK TO MOUNT LANDING CREEK 3.6 miles (3.7 miles of fastland)	FASTLAND: Low shore 69% and low shore with bluff 31%. SHORE: Artificially stabilized 48%, beach 36%, fringe marsh 3%, and embayed marsh 12%. NEARSHORE: Narrow 56% and wide 21%.	FASTLAND: Agricultural 43% and residential 57%. SHORE: Some waterfowl hunting in the marshes and access to the water along Tappahannock's shoreline. NEARSHORE: Sport boating, fishing, and other water-related activities.	Private.	Low. The majority of the shoreline has elevations of at least 10 feet. Only the marshes are subject to flooding.	Fair to good. Although boating activities tend to lower the water quality this portion of the Rappahannock River usually has good water quality.	Poor. There are only narrow, strip beaches in this subsegment.	Slight or no change to moderate, noncritical. The bluffs along the shoreline just south of Mount Landing Creek are experiencing an historical erosion rate of 2.7 feet per year. There is a total figure of approximately 9,200 feet of effective bulkhead and rubble riprap along the shoreline of the Town of Tappahannock. Several other areas have partially effective groin systems.	Low. There is little available land left in the Tappahannock area for development. The remainder of the shoreline is being developed for residential purposes and no alternative use is expected.
4B MOUNT LANDING CREEK 11.5 miles (15.1 miles of fastland)	FASTLAND: Low shore 67%, moderately low shore 4%, moderately low shore with bluff 3%, moderately high shore 8%, high shore 13%, and high shore with bluff 5%. SHORE: Beach 2%, fringe marsh 14%, and embayed marsh 84%. CREEK: Mount Landing Creek has depths of 3 feet at the entrance, with deeper water inside for 3.5 miles.	FASTLAND: Agricultural 31% and unmanaged, wooded 69%. SHORE: Some waterfowl hunting in the marshes but mostly unused. CREEK: Some fishing but little other use.	Private.	Low. The lack of direct wind and wave actions on the shore and relative height of the fastland makes flooding unlikely.	Good. There are no pollution sources along Mount Landing Creek.	Poor. There is only a small section of narrow, strip beach in this subsegment.	No data. The area appears stable. There are no endangered or shore protective structures.	Low. The subsegment will probably remain basically rural in nature.
5A MALLORYS POINT TO JENKINS LANDING 3.5 miles (4.4 miles of fastland)	FASTLAND: Low shore 65%, low shore with bluff 18%, moderately low shore 11%, and moderately low shore with bluff 6%. SHORE: Artificially stabilized 16%, beach 33%, fringe marsh 9%, embayed marsh 1%, and extensive marsh 41%. NEARSHORE: Intermediate 59% and wide 26%. The remainder of the subsegment is located along the marsh creek.	FASTLAND: Agricultural 63%, residential 32%, and unmanaged, wooded 5%. SHORE: Some waterfowl hunting in the marshes and private use. NEARSHORE: Sport boating, fishing, and other water-related activities.	Private.	Low. The fastland elevations range from 5 to 20 feet and only the marshes are subject to flooding. There are no dwellings below the 5-foot contour.	Fair to good. Although the Rappahannock River usually has good water quality, seasonal problems occur due to upstream waste discharges and agricultural runoff.	Poor. The majority of the beaches in this subsegment are located in the groin fields.	Slight or no change to moderate, noncritical. Though the entire subsegment has an historical erosion rate of 2.3 feet per year, most of the shoreline near Mallorys Point has been artificially stabilized. The bluffs along the shoreline fronting the agricultural lands and some residences near Jenkins Landing are still retreating at a moderate rate.	Low. Although some residential development is probable, little significant change is expected in the shorelands use.
5B JENKINS LANDING TO SLUICE CREEK 10.9 miles (10.4 miles of fastland)	FASTLAND: Low shore 64%, moderately low shore 9%, moderately high shore 10%, moderately high shore with bluff 3%, high shore 5%, and high shore with bluff 9%. SHORE: Fringe marsh 28%, embayed marsh 22%, and extensive marsh 50%. NEARSHORE: Wide 15%. The remainder of the subsegment is located along the marsh creeks.	FASTLAND: Agricultural 71% and unmanaged, wooded 29%. SHORE: Some waterfowl hunting in the marshes but mostly unused. NEARSHORE: Sport boating and fishing.	Private.	Low. The fastland is fronted by an extensive marsh system, which acts as a flood control agent.	Fair to good. The Rappahannock River usually has good water quality. Seasonal pollution is caused by upstream waste discharges and agricultural runoff.	There are no beaches in this subsegment.	Severe, noncritical. This subsegment has an historical erosion rate of 3.9 to 4.4 feet per year. There are no endangered or shore protective structures.	Low. It is expected that this area will remain basically rural in nature.
6A SLUICE CREEK TO FARMERS HALL CREEK 4.0 miles (3.1 miles of fastland)	FASTLAND: Entirely low shore. SHORE: Beach 10%, fringe marsh 24%, and extensive marsh 66%. NEARSHORE: Intermediate 41%. The remainder of the nearshore is located in the entrance of Farmers Hall Creek.	FASTLAND: Agricultural 90% and unmanaged, wooded 10%. SHORE: Mostly unused. NEARSHORE: Sport boating and fishing.	Private.	Low. The majority of the shoreline has elevations of at least 10 feet. There are no endangered structures.	Fair to good. The subsegment usually has good water quality. Some problems occur from upstream pollution and agricultural runoff.	Poor. There are only narrow, strip beaches in this subsegment.	Moderate, noncritical. This subsegment has an historical erosion rate of 1.9 feet per year. There are no endangered or shore protective structures.	Low. This subsegment will probably remain an agricultural area.
6B FARMERS HALL CREEK AND BRICK HILL CREEK 7.0 miles (5.0 miles of fastland)	FASTLAND: Entirely low shore. SHORE: Fringe marsh 26%, embayed marsh 72%, and extensive marsh 2%. CREEKS: The creeks in this subsegment are too narrow and shallow for classification.	FASTLAND: Agricultural 97% and industrial 3%. SHORE: Some waterfowl hunting in the marshes. The industrial section is a gravel pit. CREEKS: Some fishing but mostly unused.	Private.	Low. This subsegment is not exposed to wind and wave actions, and the majority of the fastland has elevations of at least 10 feet.	Good. Any pollution in this subsegment would be from agricultural runoff and the gravel pit.	There are no beaches in this subsegment.	No data. The area appears stable. There are no endangered or shore protective structures.	Low. Little alternate use seems probable. The area is expected to remain primarily agricultural.

TABLE 2 (cont'd.)

SUBSEGMENT	SHORELANDS TYPE	SHORELANDS USE	OWNERSHIP	FLOOD HAZARD	WATER QUALITY	BEACH QUALITY	SHORE EROSION SITUATION	ALTERNATE SHORE USE
6C OCCUPACIA CREEK AND BRIDGE CREEK 19.4 miles (14.3 miles of fastland)	FASTLAND: Low shore 99% and low shore with bluff 1%. SHORE: Fringe marsh 55%, embayed marsh 36%, and extensive marsh 9%. CREEKS: The creeks in this subsegment are too narrow and shallow for classification.	FASTLAND: Agricultural 91% and unmanaged, wooded 9%. SHORE: Some waterfowl hunting in the marshes but mostly unused. CREEKS: Some fishing but mostly unused.	Private.	Low. The fastland is fronted by marshes which act as natural flood control agents. There are no dwellings below the 10-foot contour.	Good. It appears the creeks are experiencing no water quality problems.	There are no beaches in this subsegment.	No data. The area appears stable. There are no endangered or shore protective structures.	Low. Without good access to the river the area has limited development potential. This subsegment will probably remain rural, with agriculture being the prime user.
7A ISLAND POINT TO OTTERBURN MARSH 13.2 miles (8.7 miles of fastland)	FASTLAND: Low shore 78%, low shore with bluff 10%, moderately low shore 4%, and moderately low shore with bluff 8%. SHORE: Artificially stabilized 1%, beach 4%, fringe marsh 33%, embayed marsh 4%, and extensive marsh 58%. NEARSHORE: Entirely narrow.	FASTLAND: Agricultural 97% and commercial 3%. SHORE: Some commercial use (marina) but mostly unused. NEARSHORE: Sport boating, fishing, and other water-related activities.	Private.	Low. The fastland has elevations of at least 10 feet and only the marshes are subject to flooding.	Good. The Rappahannock River generally has good water quality although some pollution does occur from industrial and domestic waste upstream.	Poor. There are only narrow, strip beaches in this subsegment.	Slight or no change to moderate, noncritical. The marshes at Island Point and Beverly Marsh are experiencing a moderate erosion rate of 1.7 to 1.9 feet per year. Otterburn Marsh and south to Layton has an erosion rate of 1.3 feet per year. There is approximately 400 feet total of bulkhead and rubble riprap near Layton. These structures appear to be effective.	Low. The rural nature of the subsegment will probably remain unchanged. There appears to be no need for any alternate type of development.
7B OTTERBURN MARSH TO ELMWOOD CREEK 11.2 miles (10.2 miles of fastland)	FASTLAND: Low shore 55%, low shore with bluff 16%, moderately low shore 20%, and moderately low shore with bluff 9%. SHORE: Artificially stabilized 2%, beach 16%, fringe marsh 26%, embayed marsh 41%, and extensive marsh 15%. NEARSHORE: Narrow 54%. The remainder of the subsegment is located along the creeks.	FASTLAND: Agricultural 96%, commercial 2%, and residential 2%. SHORE: Private use and some commercial use (marina). NEARSHORE: Sport boating, fishing, and other water-related activities.	Private.	Low. The fastland has elevations of at least 10 feet and is not subject to flooding.	Fair to good. The water quality of the Rappahannock River is sometimes affected by point source discharge upstream and boating activities. However, the river usually has good water quality.	Poor. There are only narrow, strip beaches in this subsegment.	Slight or no change to moderate, noncritical. The shoreline in the meander is suffering from minor erosion due to normal river currents. There are three areas with a combined total of 1,000 feet of effective bulkheading.	Low. This area lacks good beaches and shore access, which limits its desirability for residential or recreational use.
8A ELMWOOD CREEK TO HORSE HEAD POINT 4.3 miles (2.7 miles of fastland)	FASTLAND: Low shore 81% and low shore with bluff 19%. SHORE: Beach 25%, fringe marsh 17%, and extensive marsh 58%. NEARSHORE: Entirely narrow.	FASTLAND: Entirely agricultural. SHORE: Some waterfowl hunting in the marshes but mostly unused. NEARSHORE: Sport boating and fishing.	Private.	Low. This area is not subject to wind and wave actions. There are no endangered structures.	Fair to good. The Rappahannock River generally has good water quality. Some seasonal problems result from upstream industrial and domestic discharge.	Poor. This subsegment has narrow, strip beaches.	Slight or no change to moderate, noncritical. The area to the north of Elmwood Creek is experiencing an historical erosion rate of 1.5 feet per year. There are no endangered or shore protective structures.	Low. There seems to be little need for any alternate shore use. The subsegment will probably continue to be a rural - agricultural area.
8B GREEN BAY 8.0 miles (3.3 miles of fastland)	FASTLAND: Low shore 65%, low shore with bluff 27%, and moderately low shore 8%. SHORE: Beach 2% and extensive marsh 97%. NEARSHORE: Entirely narrow.	FASTLAND: Entirely agricultural. SHORE: Some waterfowl hunting in the marshes but mostly unused. NEARSHORE: Sport boating and fishing.	Private.	Low. The majority of the fastland is fronted by marsh, which acts as a natural flood control agent.	Fair to good. The Rappahannock River generally has good water quality.	Poor. There are only thin, strip beaches in this subsegment.	Moderate, noncritical. The marshes in Green Bay are experiencing an historical erosion rate of 2.1 to 2.5 feet per year. There are no endangered or shore protective structures.	Low. There seems to be no need for alternate shore use in the subsegment. The area will probably remain basically rural in nature.
8C MARSH POINT TO COUNTY LINE 4.5 miles (3.9 miles of fastland)	FASTLAND: Low shore 89%, low shore with bluff 7%, and moderately low shore 4%. SHORE: Beach 31%, fringe marsh 11%, embayed marsh 20%, and extensive marsh 38%. NEARSHORE: Narrow 35% and wide 30%. The remainder of the subsegment is located along Portabago Creek.	FASTLAND: Entirely agricultural. SHORE: Some waterfowl hunting in the marshes but mostly unused. NEARSHORE: Sport boating and fishing.	Private.	Low. The majority of the fastland has elevations of at least 20 feet and is not subject to flooding. There are no endangered structures.	Fair to good. The Rappahannock River generally has good water quality. Some problems arise from industrial and domestic waste, agricultural runoff and boating activities.	Poor. There are only narrow, strip beaches in this subsegment.	Slight or no change. There are no endangered or shore protective structures.	Low. Like most of the county's shorelands, this area is used for agriculture. There seems to be little need for development in the subsegment.

SUBSEGMENT 1A

COUNTY LINE TO BROWNS POINT

Maps 2 and 3

EXTENT: 45,800 feet (8.6 mi.) of shoreline on the Rappahannock River from the Essex/Middlesex county line to Browns Point. The subsegment also includes 78,200 feet (14.8 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 37% (5.4 mi.), low shore with bluff 5% (0.7 mi.), moderately low shore 37% (5.5 mi.), moderately low shore with bluff 9% (1.4 mi.), moderately high shore 7% (1.1 mi.), moderately high shore with bluff 2% (0.3 mi.), high shore 2% (0.2 mi.), and high shore with bluff 1% (0.2 mi.).

SHORE: Artificially stabilized 19% (1.6 mi.), beach 63% (5.5 mi.), fringe marsh 1% (0.1 mi.), embayed marsh 12% (1.0 mi.), and extensive marsh 4% (0.4 mi.).

NEARSHORE: Narrow 29% and wide 71%.

SHORELANDS USE

FASTLAND: Agricultural 26% (3.9 mi.), commercial 4% (0.6 mi.), residential 29% (4.2 mi.), and unmanaged, wooded 41% (6.1 mi.).

SHORE: Private use along the residential sections, and some commercial use (marinas). The remainder of the shoreline in this subsegment appears to be unused.

NEARSHORE: Boating and other water-related activities.

WIND AND SEA EXPOSURE: The shoreline trends basically SE - NW in this subsegment. Fetches at Jones Point are ESE - 5.8 nm and NW - 10.0 nm. At Browns Point, fetches are SE - 11.5 nm and NNW - 4.1 nm.

OWNERSHIP: Entirely private.

FLOOD HAZARD: Low to moderate, noncritical. The majority of the subsegment has elevations of at least 10 feet with the exception of the marsh areas. There are no dwellings below 5-foot elevations.

WATER QUALITY: Fair to good. According to the

Water Quality Inventory (305(b)Report) (Virginia State Water Control Board, April, 1976), this section of the Rappahannock River usually meets the state water quality standards. However this section sometimes has lessened water quality due to upstream industrial pollution and agricultural runoff.

BEACH QUALITY: Poor to good. The majority of the subsegment has narrow, strip beaches. The area just north of the Middlesex county line has a long, wide beach of fine-grained sand.

PRESENT SHORE EROSION SITUATION

EROSION RATE: Slight or no change to severe, noncritical. The Jones Point area is experiencing a moderate erosion rate, while the area just west of Jones Point to Bowlers Wharf has a severe erosion rate of approximately 3.3 feet per year. Erosion is compounded along the bluff areas in the subsegment. The bluffs are affected by wave actions attacking the unprotected cliff base and by downhill rain runoff.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: Most artificial stabilization is effective bulkhead. There are some areas of effective riprap and also several groin fields of moderate effectiveness.

OTHER SHORE STRUCTURES: There are numerous boat ramps and piers in this subsegment. Garretts Marina at Bowlers Wharf has berths for approximately 60 vessels.

SHORE USE LIMITATIONS:

This subsegment is basically rural in nature, sixty-seven percent of the shorelands being either agricultural lands or unmanaged woods. The residential - commercial usage is generally confined to a thin strip of land along the shore. The residences are usually found in clusters of fewer than ten houses, some of which are used as primary dwellings and others as vacation homes. Much of the shoreline is experiencing erosion due to wind and wave attacks and downhill rain runoff. The many bluff areas are very susceptible to these forces.

ALTERNATE SHORE USE:

Low. The subsegment will probably remain basically rural in nature. Though some continued residential development along the shorelands is to be expected, little change in the

makeup of shorelands' use is foreseen.

MAPS: USGS, 7.5 Min.Ser. (Topo.), MORATTICO Quadr., 1968;  
USGS, 7.5 Min.Ser. (Topo.), DUNNSVILLE Quadr., 1968.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

PHOTOS: Aerial-VIMS 11May76 ES-1A/1-54.

SUBSEGMENT 1B

BROWNS POINT TO LOWERY POINT

Maps 3 and 4

**EXTENT:** 22,000 feet (4.2 mi.) of shoreline from Browns Point to Lowery Point along the Rappahannock River. The subsegment also includes 46,600 feet (8.9 mi.) of fastland.

**SHORELANDS TYPE**

**FASTLAND:** Low shore 93% (8.2 mi.), low shore with bluff 1% (0.1 mi.), moderately low shore 3% (0.3 mi.), and moderately low shore with bluff 3% (0.3 mi.).

**SHORE:** Artificially stabilized 24% (1.0 mi.), beach 49% (2.0 mi.), fringe marsh 5% (0.2 mi.), and embayed marsh 22% (1.0 mi.).

**NEARSHORE:** Intermediate.

**SHORELANDS USE**

**FASTLAND:** Agricultural 24% (2.1 mi.), commercial 3% (0.3 mi.), recreational 2% (0.2 mi.), residential 33% (2.9 mi.), and unmanaged, wooded 38% (3.4 mi.).

**SHORE:** Some private and commercial use (marinas), but mostly unused.

**NEARSHORE:** Sport boating and fishing.

**WIND AND SEA EXPOSURE:** The shoreline trends basically SE - NW. Fetches at Lowery Point are NW - 5.8 nm and SE - 11 nm. The fetch at Wares Wharf is SE - 15.7 nm.

**OWNERSHIP:** Private.

**FLOOD HAZARD:** Low to moderate, critical. Though the majority of the subsegment has elevations of at least 10 feet, some structures along the shoreline are below elevations of 5 feet. These structures are susceptible to flooding during periods of abnormally high water.

**WATER QUALITY:** Fair to good. According to the State Water Control Board's 305(b)Report, the Rappahannock River usually has good water quality. Seasonal water quality problems stem from upstream industrial and domestic discharges as well as agricultural runoff.

**BEACH QUALITY:** Poor. The majority of this subsegment has narrow, strip beaches.

**PRESENT SHORE EROSION SITUATION**

**EROSION RATE:** Slight or no change to moderate, noncritical. The area from Browns Point to Wares Wharf has a moderate historical erosion rate of approximately 2.1 feet per year. However, much of the shoreline has been artificially stabilized. Erosion here is caused by storm induced wave actions and by downhill rain runoff, both of which attack the exposed cliff face.

**ENDANGERED STRUCTURES:** None.

**SHORE PROTECTIVE STRUCTURES:** There is approximately 3,000 feet of bulkhead and 2,000 feet of rubble riprap in the subsegment. Several areas have groin systems fronting the bulkhead or riprap. Though the bulkheads and riprap appear to be effective, most of the groins have been only partially effective in creating buffer beaches.

**OTHER SHORE STRUCTURES:** There are numerous piers and several privately owned boat ramps in this subsegment.

**SHORE USE LIMITATIONS:**

As in Subsegment 1A, the shoreline is extensively used for residential purposes, many houses being vacation homes. Behind the shoreline, the subsegment is used for agriculture or is unused. Twenty-two percent of the shoreline is embayed marsh, which is protected by the Virginia Wetlands Act of 1972. The bluff areas are susceptible to erosion and should be developed with caution.

**ALTERNATE SHORE USE:**

Low. The residential/recreational shoreline development will probably continue in some areas of the subsegment. The rural nature of the subsegment should not be changed because of this development. Care should be taken to ensure that the shoreline does not become congested by residential build-up. This would not only despoil the rural atmosphere of the subsegment but would probably cause pollution of this section of the Rappahannock River.

**MAPS:** USGS, 7.5 Min.Ser. (Topo.), DUNNSVILLE Quadr., 1968;  
USGS, 7.5 Min.Ser. (Topo.), TAPPAHANNOCK Quadr., 1968.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

PHOTOS: Aerial-VIMS 11May76 ES-1B/55-85.

SUBSEGMENT 1C

LOWERY POINT TO MOUTH OF PISCATAWAY CREEK

Map 4

**EXTENT:** 13,000 feet (2.4 mi.) of shoreline from Lowery Point to the mouth of Piscataway Creek. The subsegment also includes 19,400 feet (3.7 mi.) of fastland.

**SHORELANDS TYPE**

**FASTLAND:** Entirely low shore.

**SHORE:** Artificially stabilized 48% (1.2 mi.), beach 4% (0.1 mi.), fringe marsh 9% (0.2 mi.), embayed marsh 25% (0.6 mi.), and extensive marsh 14% (0.3 mi.).

**NEARSHORE:** Narrow 74%. The remainder of the subsegment is located in the mouth of Piscataway Creek.

**SHORELANDS USE**

**FASTLAND:** Agricultural 27% (1.0 mi.), commercial 4% (0.2 mi.), residential 47% (1.7 mi.), and unmanaged, wooded 22% (0.8 mi.).

**SHORE:** Private use in the residential sections and some commercial use (marinas). The remainder appears to be unused.

**NEARSHORE:** Sport boating, fishing, and other water-related activities.

**WIND AND SEA EXPOSURE:** The shoreline trends basically ESE - WNW in this subsegment. The fetch at Fairview is NNW - 2.2 nm.

**OWNERSHIP:** Private.

**FLOOD HAZARD:** Moderate, critical. The entire subsegment has low shore, most of which is subject to flooding during periods of abnormally high water. Many dwellings are below the 5-foot contour, some of which could be inundated during floods.

**WATER QUALITY:** Fair to good. The Rappahannock River usually has good water quality. Seasonal water quality problems stem from upstream pollution.

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

**PRESENT SHORE EROSION SITUATION**

**EROSION RATE:** Slight or no change to moderate, noncritical. The area from Lowery Point to the mouth of Piscataway Creek had an historical erosion rate of 1.5 feet per year. Field investigations show little or no recent erosion except for the tip of Lowery Point, which is experiencing a slight shoreline retreat.

**ENDANGERED STRUCTURES:** None.

**SHORE PROTECTIVE STRUCTURES:** This subsegment has a total of 6,200 feet of bulkhead, much of which is fronted by groin systems. Lowery Point has cement bag groins fronting the bulkheading and one residence has cement bags protecting the bulkhead toe. All bulkhead and some of the groins appear to be effective.

**OTHER SHORE STRUCTURES:** There are numerous piers in this subsegment.

**SHORE USE LIMITATIONS:**

Fifty-one percent of the shorelands are presently used for residential and commercial purposes. Many of the residences are used as second or vacation homes. Most remaining shoreline is comprised of embayed and extensive marshes which are protected by the Virginia Wetlands Act of 1972. The interior fastland is used for agriculture.

**ALTERNATE SHORE USE:**

Low. There is little available shoreline property in this subsegment which can be developed. Since residences are mainly for vacation recreation, interior fastland behind marshes would hold little appeal for developers. It is expected that the subsegment will remain basically rural in nature.

**MAPS:** USGS, 7.5 Min.Ser. (Topo.), TAPPAHANNOCK Quadr., 1968.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

**PHOTOS:** Aerial-VIMS 11May76 ES-1C/86-100.

SEGMENT 2

PISCATAWAY CREEK

Map 4

EXTENT: 93,600 feet (17.7 mi.) of shoreline along Piscataway Creek and Taylors Creek. The segment also includes 149,000 feet (28.2 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 44% (12.5 mi.), moderately low shore 31% (8.7 mi.), moderately low shore with bluff 3% (0.7 mi.), moderately high shore 9% (2.6 mi.), high shore 12% (3.3 mi.), and high shore with bluff 1% (0.4 mi.).

SHORE: Fringe marsh 26% (4.7 mi.), embayed marsh 47% (8.3 mi.), and extensive marsh 27% (4.7 mi.).

CREEK: Piscataway Creek has depths of 4 feet at the entrance, with greater depths for 5 miles upstream.

SHORELANDS USE

FASTLAND: Agricultural 46% (13.2 mi.), residential 3% (0.7 mi.), and unmanaged, wooded 51% (14.3 mi.).

SHORE: Some waterfowl hunting in the marsh areas, though mostly unused.

CREEK: Some sport boating and fishing.

WIND AND SEA EXPOSURE: The shoreline trends first NNE - SSW, then SE - NW. There are no significant fetches affecting the creek.

OWNERSHIP: Private.

FLOOD HAZARD: Low. The majority of the segment has elevations of at least 5 feet and is not exposed to direct wind and wave actions. The marsh areas are subject to flooding during periods of high rainfall upstream. There are no endangered structures.

WATER QUALITY: Satisfactory. The only possible sources of pollution in Piscataway Creek would be from boating activities and agricultural runoff.

BEACH QUALITY: There are no beaches in this segment.

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data. The area appears stable.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: None.

SHORE USE LIMITATIONS:

Seventy-four percent of the shoreline in this segment is either embayed or extensive marsh. These areas should remain in their natural state, as they are important flood and erosion control agents. Little or no new development is expected in these areas. There is little access to Piscataway Creek except at the Route 17 bridge.

ALTERNATE SHORE USE:

Low. The wooded area near the Route 17 bridge could be developed as a campground with nature trails and a boat ramp for fishing access. Other areas will probably remain mostly unchanged.

MAPS: USGS, 7.5 Min.Ser. (Topo.), TAPPAHANNOCK Quadr., 1968;  
USGS, 7.5 Min.Ser. (Topo.), DUNNSVILLE Quadr., 1968;  
USGS, 7.5 Min.Ser. (Topo.), MOUNT LANDING Quadr., 1968.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

PHOTOS: Aerial-VIMS 11May76 ES-2/101 and 102.



SUBSEGMENT 3A

PISCATAWAY CREEK TO HOSKINS CREEK

Maps 4 and 5

EXTENT: 20,000 feet (3.8 mi.) of shoreline from the mouth of Piscataway Creek to the mouth of Hoskins Creek. The subsegment also includes 17,000 feet (3.2 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Artificial fill 13% (0.4 mi.) and low shore 87% (2.8 mi.).

SHORE: Artificially stabilized 25% (1.0 mi.), beach 19% (0.7 mi.), fringe marsh 21% (0.8 mi.), embayed marsh 6% (0.2 mi.), and extensive marsh 29% (1.1 mi.).

NEARSHORE: Narrow.

SHORELANDS USE

FASTLAND: Agricultural 56% (1.8 mi.) and residential 44% (1.4 mi.).

SHORE: Private use along the residential sections, such as strolling and bathing.

NEARSHORE: Sport boating, fishing, and other water-related activities.

WIND AND SEA EXPOSURE: The subsegment trends basically SE - NW. Fetches at Jones Point are ESE - 3.2 nm and NW - 4 nm.

OWNERSHIP: Private.

FLOOD HAZARD: Moderate, critical. Most of the segment has elevations of 5 feet and would probably be subject to flooding during abnormally high water. Most dwellings are placed along the 5-foot contour line, some on artificial fill. These structures could be damaged due to flooding during severe storm surges.

WATER QUALITY: Poor. The water just south of Hoskins Creek is polluted due to effluents from several sewage treatment plants and industrial discharges which flow into Hoskins Creek.

BEACH QUALITY: Poor. The only beaches have been trapped by the groin fields.

PRESENT SHORE EROSION SITUATION

EROSION RATE: Slight or no change to moderate, noncritical. While most of the subsegment has a moderate historical erosion rate of from 2.4 to 2.5 feet per year, most residential areas have been artificially stabilized.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: The subsegment has approximately 5,000 feet of effective bulkhead, located mainly at Island Farm and near Hoskins Creek. A marina on a creek near Jones Point has some bulkhead and two riprap jetties at its entrance. The bulkheads at Island Farm and near Hoskins Creek are fronted by groin fields, some of which are effective.

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

SHORE USE LIMITATIONS:

Nearly all the fastland with direct river access has been developed for residential purposes. Marshes, which comprise the remaining shoreline, are protected by state law.

ALTERNATE SHORE USE:

Low. The present development of available shoreline prohibits further or alternate development in this subsegment. The area will probably remain basically agricultural with a residential shoreline fringe.

MAPS: USGS, 7.5 Min.Ser. (Topo.), TAPPAHANNOCK Quadr., 1968.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

PHOTOS: Aerial-VIMS 11May76 ES-3A/103-117.

SUBSEGMENT 3B

HOSKINS CREEK

Map 5

EXTENT: 68,800 feet (13.0 mi.) of shoreline along Hoskins Creek. The subsegment also includes 82,600 feet (15.7 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Artificial fill 4% (0.6 mi.), low shore 48% (7.5 mi.), low shore with bluff 2% (0.3 mi.), moderately low shore 26% (4.1 mi.), moderately low shore with bluff 4% (0.6 mi.), high shore 11% (1.7 mi.), and high shore with bluff 5% (0.9 mi.).

SHORE: Artificially stabilized 2% (0.2 mi.), fringe marsh 41% (5.3 mi.), and embayed marsh 57% (7.5 mi.).

CREEK: The entrance channel to Hoskins Creek had controlling depths of 10 feet in 1972. The remainder of the creek is too narrow and shallow for classification.

SHORELANDS USE

FASTLAND: Agricultural 26% (4.1 mi.), commercial 3% (0.4 mi.), industrial 10% (1.5 mi.), residential 6% (0.9 mi.), and unmanaged, wooded 55% (8.7 mi.).

SHORE: Some waterfowl hunting in the marshes. There are two sewage outfalls and one industrial waste outfall emptying into Hoskins Creek.

CREEK: Some fishing but very little other use.

WIND AND SEA EXPOSURE: Hoskins Creek trends basically NE - SW. The creek is protected from winds and waves.

OWNERSHIP: Private 92% and county 8%.

FLOOD HAZARD: Low. The majority of the shoreline has elevations of at least 20 feet. Only the marsh areas are subject to flooding.

WATER QUALITY: Poor. Hoskins Creek has been degraded by point source sewage disposal. The creek does not meet applicable water quality standards or the State Water Control Board's 305(b)(1)(B) criteria.

BEACH QUALITY: There are no beaches in this sub-segment.

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data. The area appears stable.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: There is approximately 1,200 feet of effective bulkhead at the mouth of Hoskins Creek in Tappahannock.

OTHER SHORE STRUCTURES: There are several piers at the marinas and at the industrial site near the mouth of Hoskins Creek.

SHORE USE LIMITATIONS:

Fifty-seven percent of the shoreline is embayed marsh, which is protected by the Virginia Wetlands Act of 1972. Nineteen percent of the fastland is already actively used. Little access to the creek fastland limits inland development.

ALTERNATE SHORE USE:

Low. The wooded bluff areas along the creek head and limited access to the shoreline hinder any development along the creek. Little alternate use is seen for Hoskins Creek.

MAPS: USGS, 7.5 Min.Ser. (Topo.), TAPPAHANNOCK  
Quadr., 1968;  
USGS, 7.5 Min.Ser. (Topo.), MOUNT LANDING  
Quadr., 1968.  
C&GS, #12237 (605-SC), 1:40,000 scale,  
RAPPAHANNOCK RIVER, CORROTOMAN RIVER to  
Fredericksburg, VA, 12th ed., 1975.

PHOTOS: Aerial-VIMS 11May76 ES-3B/117-120.

SUBSEGMENT 4A

HOSKINS CREEK TO MOUNT LANDING CREEK

Maps 5 and 6

EXTENT: 19,200 feet (3.6 mi.) of shoreline along the Rappahannock River from the mouth of Hoskins Creek to the mouth of Mount Landing Creek. The subsegment also includes 19,400 feet (3.7 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 69% (2.6 mi.) and low shore with bluff 31% (1.1 mi.).

SHORE: Artificially stabilized 48% (1.7 mi.), beach 36% (1.3 mi.), fringe marsh 3% (0.1 mi.), and embayed marsh 12% (0.5 mi.).

NEARSHORE: Narrow 56% and wide 21%. The remainder of the shoreline is found on a creek north of Tappahannock and is too narrow and shallow for classification.

SHORELANDS USE

FASTLAND: Agricultural 43% (1.6 mi.) and residential 57% (2.1 mi.). The Town of Tappahannock has some commercial use along the shoreline near the Downing Bridge, but is too small to be included in the fastland use figures.

SHORE: Waterfowl hunting in the marshes and access to the water along Tappahannock's shoreline.

NEARSHORE: Sport boating, fishing, and other water-related activities.

WIND AND SEA EXPOSURE: The shoreline trends basically SE - NW in this subsegment. Fetches at the Downing Bridge are ESE - 4.7 nm and NNW - 3.3 nm.

OWNERSHIP: Private.

FLOOD HAZARD: Low. The majority of the shoreline has average elevations of 10 feet, and only the marshes are subject to flooding. There are no dwellings below the 10-foot contour.

WATER QUALITY: Fair to good. Though boating activities tend to lower water quality, the State Water Control Board has determined that the Rappahannock River along this subsegment usually has good water quality.

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

PRESENT SHORE EROSION SITUATION

EROSION RATE: Slight or no change to moderate, noncritical. The bluffs along the shoreline south of Mount Landing Creek are experiencing moderate erosion at an historical rate of 2.7 feet per year.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: There is approximately 9,000 feet of bulkhead and 200 feet of riprap in this subsegment, most of which is located along the shoreline of the Town of Tappahannock. These structures all appear to be effective. Several areas have groin systems fronting the shoreline, some of which are partially effective.

OTHER SHORE STRUCTURES: There are numerous piers and several boat ramps in the subsegment. The Tappahannock Marina, northwest of the bridge, has a boat ramp and berths for approximately 40 boats.

SHORE USE LIMITATIONS:

Approximately one-half of the shoreline in this subsegment is included in the Town of Tappahannock. This shoreline is already "consumed" by residential and some commercial development. The rest of the subsegment, located northeast of Tappahannock, is basically rural in nature. However, the strip of land bordering the shoreline in this section is used for residential purposes. The eroding bluffs along the shoreline could endanger any structure built too close to the shore.

ALTERNATE SHORE USE:

Low. There is little available land in Tappahannock for development. The rest of the shoreline is either being used or is being developed for residential purposes. No alternate shore use is expected for this subsegment.

MAPS: USGS, 7.5 Min.Ser. (Topo.), TAPPAHANNOCK Quadr., 1968;  
USGS, 7.5 Min.Ser. (Topo.), MOUNT LANDING Quadr., 1968.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

PHOTOS: Aerial-VIMS 11May76 ES-4A/118-137.

Ground-VIMS 25Feb73 ES-4A/ 1-33.

SUBSEGMENT 4B

MOUNT LANDING CREEK

Map 6

EXTENT: 61,000 feet (11.5 mi.) of shoreline, including Mount Landing Creek and the Rappahannock River to Mallorys Point. The subsegment also includes 80,000 feet (15.5 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 67% (10.2 mi.), moderately low shore 4% (0.6 mi.), moderately low shore with bluff 3% (0.4 mi.), moderately high shore 8% (1.2 mi.), high shore 13% (2.0 mi.), and high shore with bluff 5% (0.7 mi.).

SHORE: Beach 2% (0.3 mi.), fringe marsh 14% (1.6 mi.), and embayed marsh 84% (9.6 mi.).

NEARSHORE: Wide 11%. The remainder of the subsegment is located along Mount Landing Creek.

CREEK: Mount Landing Creek has depths of 3 feet at the entrance with deeper water inside for 3.5 miles.

SHORELANDS USE

FASTLAND: Agricultural 31% (4.7 mi.) and unmanaged, wooded 69% (10.5 mi.).

SHORE: Some waterfowl hunting in the marshes, but mostly unused.

CREEK: Some fishing, but little other use.

WIND AND SEA EXPOSURE: Mount Landing Creek trends basically W - E; the shoreline from the creek to Mallorys Point trends basically SW - NE. Fetches at Mallorys Point are NW - 2.5 nm and SE - 3.9 nm. Mount Landing Creek is protected from any significant fetches.

OWNERSHIP: Private.

FLOOD HAZARD: Low. The fastland is usually fronted by large marsh areas which help control flood waters. The lack of direct wind and wave actions on the shore and relative height of the fastland makes flooding unlikely along the creek. Some flooding is possible southwest of Mallorys Point, where the fastland has average elevations of 5 feet. No structures are endangered.

WATER QUALITY: Good. There are no pollution sources along Mount Landing Creek.

BEACH QUALITY: Poor. There is only a small section of narrow, strip beach in this subsegment.

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data. The area appears stable.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: None.

SHORE USE LIMITATIONS:

The present agricultural use of the shoreline along the river, combined with its low elevation, would limit development of this area. The Mount Landing Creek shorelands are almost entirely fronted by embayed marshes. The fastland is generally wooded and many areas have bluffs. These factors would tend to limit development along the creek.

ALTERNATE SHORE USE:

Low. The subsegment will probably remain basically rural in nature. Little alternate development seems probable for the near future.

MAPS: USGS, 7.5 Min.Ser. (Topo.), MOUNT LANDING Quadr., 1968.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

PHOTOS: Aerial-VIMS 11May76 ES-4B/138-143.

SUBSEGMENT 5A

MALLORYS POINT TO JENKINS LANDING

Map 6

**EXTENT:** 18,600 feet (3.5 mi.) of shoreline along the Rappahannock River from Mallorys Point to Jenkins Landing. The subsegment also includes 23,000 feet (4.4 mi.) of fastland.

**SHORELANDS TYPE**

**FASTLAND:** Low shore 65% (2.8 mi.), low shore with bluff 18% (0.8 mi.), moderately low shore 11% (0.5 mi.), and moderately low shore with bluff 6% (0.3 mi.).

**SHORE:** Artificially stabilized 16% (0.6 mi.), beach 33% (1.1 mi.), fringe marsh 9% (0.3 mi.), embayed marsh 1% (0.1 mi.), and extensive marsh 41% (1.4 mi.).

**NEARSHORE:** Intermediate 59% and wide 26%. The remainder of the subsegment is located along the marsh creek.

**SHORELANDS USE**

**FASTLAND:** Agricultural 63% (2.7 mi.), residential 32% (1.4 mi.), and unmanaged, wooded 5% (0.2 mi.).

**SHORE:** Some waterfowl hunting in the marshes and private use.

**NEARSHORE:** Sport boating, fishing and other water-related activities.

**WIND AND SEA EXPOSURE:** The shoreline trends basically E - W in this subsegment. Fetches at the middle of the subsegment are N - 2.7 nm and ENE - 2.2 nm.

**OWNERSHIP:** Private.

**FLOOD HAZARD:** Low. The fastland elevations range from 5 to 20 feet, with no structures located below the 5-foot contour. Only marsh areas are subject to flooding.

**WATER QUALITY:** Fair to good. Although the Rappahannock River in this subsegment usually has good water quality, seasonal problems arise due to upstream industrial and domestic waste pollution and agricultural runoff.

**BEACH QUALITY:** Poor. The majority of the beaches

in this subsegment are located in the groin fields.

**PRESENT SHORE EROSION SITUATION**

**EROSION RATE:** Slight or no change to moderate, noncritical. Though the entire subsegment has an historical erosion rate of 2.3 feet per year, most of the shoreline near Mallorys Point has been artificially stabilized. The bluffs along the shoreline fronting the agricultural lands and residences near Jenkins Landing are still retreating at a moderate rate.

**ENDANGERED STRUCTURES:** No structures are endangered at the present time.

**SHORE PROTECTIVE STRUCTURES:** There is 3,000 feet of effective bulkhead in the subsegment. Groins fronting some areas seem to be at least partially effective.

**OTHER SHORE STRUCTURES:** There are numerous piers and one boat ramp in the subsegment.

**SHORE USE LIMITATIONS:**

One-third of the fastland is already developed for residential use. The bluffs along the shoreline fronting some residences are eroding, which could become a problem in future years. Undeveloped shoreline areas are rural, being either wooded or used for agriculture. Many of these areas are also eroding, which limit shoreline development.

**ALTERNATE SHORE USE:**

Low. Though some continued residential development is probable, little significant change is expected in the shoreline use. The rural nature of the subsegment will probably remain unchanged.

**MAPS:** USGS, 7.5 Min.Ser. (Topo.), MOUNT LANDING Quadr., 1968.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

**PHOTOS:** Aerial-VIMS 11May76 ES-5A/143-160.

SUBSEGMENT 5B

JENKINS LANDING TO SLUICE CREEK

Maps 6 and 7

**EXTENT:** 58,000 feet (10.9 mi.) of shoreline from Jenkins Landing to the mouth of Sluice Creek, including Broad Creek. The subsegment also includes 55,200 feet (10.4 mi.) of fastland.

**SHORELANDS TYPE**

**FASTLAND:** Low shore 64% (6.6 mi.), moderately low shore 9% (0.9 mi.), moderately high shore 10% (1.1 mi.), moderately high shore with bluff 3% (0.3 mi.), high shore 5% (0.5 mi.), and high shore with bluff 9% (1.0 mi.).

**SHORE:** Fringe marsh 28% (3.1 mi.), embayed marsh 22% (2.4 mi.), and extensive marsh 50% (5.4 mi.).

**NEARSHORE:** Wide 15%. The remainder of the subsegment is located along the marsh creeks.

**SHORELANDS USE**

**FASTLAND:** Agricultural 71% (7.4 mi.) and unmanaged, wooded 29% (3.0 mi.).

**SHORE:** Some waterfowl hunting in the marshes but mostly unused.

**NEARSHORE:** Sport boating, fishing, and other water-related activities.

**WIND AND SEA EXPOSURE:** The shoreline trends basically S - N in the subsegment. Fetches at Blandfield Point are N - 2.2 nm and SE - 2.0 nm.

**OWNERSHIP:** Private.

**FLOOD HAZARD:** Low. The fastland is fronted by an extensive marsh system, which acts as a flood control agent.

**WATER QUALITY:** Fair to good. The water quality of the Rappahannock River is usually good. Some pollution is caused by upstream industrial and domestic discharges, agricultural runoff and by boating activities.

**BEACH QUALITY:** There are no beaches in this subsegment.

**PRESENT SHORE EROSION SITUATION**

**EROSION RATE:** Severe, noncritical. The marshes

in this subsegment have an historical erosion rate of 3.9 to 4.4 feet per year.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: There is one pier with a boat house attached in Sluice Creek.

SHORE USE LIMITATIONS:

The fastland in this subsegment is fronted by an extensive marsh system, which would limit access to the shoreline. These marshes are protected by the Virginia Wetlands Act of 1972. Also, this area has no viable inland access to the fastland. The lack of roads also would limit the desirability of this area for development.

ALTERNATE SHORE USE:

Low. It is expected that the subsegment will remain basically rural in nature. No new development is probable for this area.

MAPS: USGS, 7.5 Min.Ser. (Topo.), MOUNT LANDING  
Quadr., 1968;  
USGS, 7.5 Min.Ser. (Topo.), CHAMPLAIN  
Quadr., 1968, pr. 1973.  
C&GS, #12237 (605-SC), 1:40,000 scale,  
RAPPAHANNOCK RIVER, CORROTOMAN RIVER to  
Fredericksburg, VA, 12th ed., 1975.

PHOTOS: Aerial-VIMS 11May76 ES-5B/161-171.

## SUBSEGMENT 6A

## SLUICE CREEK TO FARMERS HALL CREEK

Map 7

EXTENT: 21,000 feet (4.0 mi.) of shoreline from the mouth of Sluice Creek to the mouth of Farmers Hall Creek. The subsegment also includes 16,200 feet (3.1 mi.) of fastland.

## SHORELANDS TYPE

FASTLAND: Entirely low shore.  
SHORE: Beach 10% (0.4 mi.), fringe marsh 24% (0.9 mi.), and extensive marsh 66% (2.7 mi.).  
NEARSHORE: Intermediate 41%. The remainder of the nearshore is in the entrance to Farmers Hall Creek.

## SHORELANDS USE

FASTLAND: Agricultural 90% (2.8 mi.) and unmanaged, wooded 10% (0.3 mi.).  
SHORE: Mostly unused.  
NEARSHORE: Sport boating, fishing and other water-related activities.

WIND AND SEA EXPOSURE: The shoreline trends basically SE - NW in the subsegment. The fetch at Daingerfield Landing is SE - 2.0 nm.

OWNERSHIP: Private.

FLOOD HAZARD: Low. The majority of the shoreline has elevations of 10 feet. There are no endangered structures.

WATER QUALITY: Fair to good. Although the Rappahannock River usually has good water quality, some problems arise from upstream pollution and from agricultural runoff.

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

## PRESENT SHORE EROSION SITUATION

EROSION RATE: Moderate, noncritical. This subsegment has an historical erosion rate of 1.9 feet per year. Erosion mainly affects the low bluffs southeast of Daingerfield Landing, where wind and waves undercut the toe and rain runoff causes slumping of the cliff face.  
ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: None.

## SHORE USE LIMITATIONS:

This area is used extensively for agricultural purposes. Any development would be at the sacrifice of the agriculture. The shoreline, however, is eroding at a moderate rate of 1.9 feet per year. Any building along the shoreline would have to cope with this problem.

## ALTERNATE SHORE USE:

Low. The subsegment will probably remain as an agricultural area. With little good access, the area would not be a prime target for any alternate type of development.

MAPS: USGS, 7.5 Min.Ser. (Topo.), CHAMPLAIN Quadr., 1968, pr. 1973.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

PHOTOS: Aerial-VIMS 11May76 ES-6A/168-179.

## SUBSEGMENT 6B

## FARMERS HALL CREEK AND BRICK HILL CREEK

Map 7

EXTENT: 37,000 feet (7.0 mi.) of shoreline along Farmers Hall Creek and Brick Hill Creek. The subsegment also includes 26,200 feet (5.0 mi.) of fastland.

## SHORELANDS TYPE

FASTLAND: Entirely low shore.  
SHORE: Fringe marsh 26% (1.9 mi.), embayed marsh 72% (5.0 mi.), and extensive marsh 2% (0.1 mi.).  
CREEK: The creeks in this subsegment are too narrow and shallow for classification.

## SHORELANDS USE

FASTLAND: Agricultural 97% (4.8 mi.) and industrial 3% (0.2 mi.).  
SHORE: Some waterfowl hunting in the marshes. The industrial section is a gravel pit along Farmers Hall Creek.  
CREEK: Some fishing, but mostly unused.

WIND AND SEA EXPOSURE: Farmers Hall Creek trends basically SW - NE; Brick Hill Creek trends basically NW - SE. There are no significant fetches affecting the subsegment.

OWNERSHIP: Private.

FLOOD HAZARD: Low. This subsegment is not exposed to wind and wave actions, and the majority of the fastland has elevations of 10 feet.

WATER QUALITY: Good. Any pollution in this subsegment would be from agricultural runoff and the gravel pit.

BEACH QUALITY: There are no beaches in this subsegment.

## PRESENT SHORE EROSION SITUATION

EROSION RATE: No data. The area appears stable.  
ENDANGERED STRUCTURES: None.  
SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: None.

SHORE USE LIMITATIONS:

Seventy-four percent of the shoreline is either embayed or extensive marsh, which should be preserved. The creeks in this subsegment are too shallow to allow good boat access to the creek heads. Also, there is no good inland access to the area, and without water fronted fastland, limited development for this area seems probable.

ALTERNATE SHORE USE:

Low. Little alternate use for the shorelands seems probable. The area will probably continue to be used primarily for agriculture.

MAPS: USGS, 7.5 Min.Ser. (Topo.), CHAMPLAIN Quadr., 1968, pr. 1973.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

PHOTOS: None.

SUBSEGMENT 6C

OCCUPACIA CREEK AND BRIDGE CREEK

Maps 7 and 8

EXTENT: 102,800 feet (19.4 mi.) of shoreline along Occupacia and Bridge Creeks. The subsegment also includes 75,800 feet (14.3 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 99% (14.2 mi.) and low shore with bluff 1% (0.1 mi.).  
SHORE: Fringe marsh 55% (10.6 mi.), embayed marsh 36% (7.0 mi.), and extensive marsh 9% (1.8 mi.).  
CREEKS: The creeks included in this subsegment are too narrow and shallow for classification.

SHORELANDS USE

FASTLAND: Agricultural 91% (13.0 mi.) and unmanaged, wooded 9% (1.3 mi.).  
SHORE: Some waterfowl hunting in the marshes, but mostly unused.  
CREEKS: Some fishing but mostly unused.

WIND AND SEA EXPOSURE: The creeks trend basically N - S. No fetches affect the subsegment.

OWNERSHIP: Private.

FLOOD HAZARD: Low. The fastland is fronted by marshes which act as natural flood control agents. There are no dwellings below the 10-foot contour line.

WATER QUALITY: Good. It appears the creeks are experiencing no water quality problems. Any agricultural runoff is filtered by the marshes fronting the fastland.

BEACH QUALITY: There are no beaches in this subsegment.

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data. The area appears stable.  
ENDANGERED STRUCTURES: None.  
SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: None.

SHORE USE LIMITATIONS:

The embayed and extensive marshes, which comprise forty-five percent of the shoreline, should be preserved. The creeks are too narrow and shallow for good boat access to most areas.

ALTERNATE SHORE USE:

Low. Without access to the water and without boat access to the river, the area has very limited development possibilities. The subsegment will probably remain rural in nature, with agriculture continuing to be the prime user of the fastland.

MAPS: USGS, 7.5 Min.Ser. (Topo.), CHAMPLAIN Quadr., 1968, pr. 1973.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

PHOTOS: None.



SUBSEGMENT 7A

ISLAND POINT TO OTTERBURN MARSH

Maps 7 and 8

EXTENT: 69,600 feet (13.2 mi.) of shoreline along the Rappahannock River from Island Point to Otterburn Marsh. The subsegment also includes 46,200 feet (8.7 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 78% (6.8 mi.), low shore with bluff 10% (0.9 mi.), moderately low shore 4% (0.3 mi.), and moderately low shore with bluff 8% (0.7 mi.).

SHORE: Artificially stabilized 1% (0.1 mi.), beach 4% (0.6 mi.), fringe marsh 33% (4.3 mi.), embayed marsh 4% (0.6 mi.), and extensive marsh 58% (7.6 mi.).

NEARSHORE: Narrow for the entire subsegment.

SHORELANDS USE

FASTLAND: Agricultural 97% (8.5 mi.) and commercial 3% (0.2 mi.).

SHORE: Some commercial use (marina), but mostly unused.

NEARSHORE: Sport boating, fishing and other water-related activities.

WIND AND SEA EXPOSURE: The shoreline trends first SSE - NNW. The fetch at Island Point is SSE - 3.3 nm. The fetch at Layton is ESE - 3.1 nm.

OWNERSHIP: Private.

FLOOD HAZARD: Low. With the fastland having elevations of 10 feet, only the marshes are subject to flooding. There are no endangered structures.

WATER QUALITY: Fair to good. The Rappahannock River generally has good water quality. Some pollution may occur due to upstream industrial and domestic waste discharge and by agricultural runoff.

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

PRESENT SHORE EROSION SITUATION

EROSION RATE: Slight or no change to moderate,

noncritical. The marshes at Island Point and Beverly Marsh are experiencing moderate erosion at an historical rate of 1.7 to 1.9 feet per year. The area from Otterburn Marsh to south of Layton has an historical erosion rate of 1.3 feet per year. The bluffs along the Layton shoreline are susceptible to both wind and wave attacks and downhill rain runoff.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: There is approximately 200 feet of rubble riprap and 200 feet of bulkhead near Layton. Both structures appear to be effective.

OTHER SHORE STRUCTURES: There are several piers in the subsegment and a boat ramp at Layton.

SHORE USE LIMITATIONS:

Sixty-two percent of the shoreline is either embayed or extensive marsh, which limits any development in the fastland behind. This subsegment is used extensively for agricultural purposes. Any construction would be at the sacrifice of these lands. Also, the eroding bluffs along the shoreline near Layton would limit residential construction.

ALTERNATE SHORE USE:

Low. The rural nature of the subsegment will probably remain unchanged. There appears to be no need for any alternate type of development.

MAPS: USGS, 7.5 Min.Ser. (Topo.), CHAMPLAIN Quadr., 1968, pr. 1973;  
USGS, 7.5 Min.Ser. (Topo.), LORETTO Quadr., 1968, pr. 1972.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

PHOTOS: Aerial-VIMS 11May76 ES-7A/179-233.

SUBSEGMENT 7B

OTTERBURN MARSH TO ELMWOOD CREEK

Maps 8 and 9

EXTENT: 59,000 feet (11.2 mi.) of shoreline from Otterburn Marsh to the mouth of Elmwood Creek, including Elmwood and Stillwater Creeks. The subsegment also includes 54,400 feet (10.2 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 55% (5.6 mi.), low shore with bluff 16% (1.6 mi.), moderately low shore 20% (2.0 mi.), and moderately low shore with bluff 9% (1.0 mi.).

SHORE: Artificially stabilized 2% (0.2 mi.), beach 16% (1.8 mi.), fringe marsh 26% (2.9 mi.), embayed marsh 41% (4.6 mi.), and extensive marsh 15% (1.7 mi.).

NEARSHORE: Narrow 54%. The remainder of the subsegment is located along the creeks, which are too narrow and shallow for classification.

SHORELANDS USE

FASTLAND: Agricultural 96% (9.9 mi.), commercial 2% (0.2 mi.), and residential 2% (0.2 mi.).

SHORE: Private use and commercial use (marinas).

NEARSHORE: Sport boating, fishing and other water-related activities.

WIND AND SEA EXPOSURE: The subsegment trends basically E - W through a meander in the river. The fetch northwest of Ketch Point is N - 2.4 nm. However, the fetch is probably not a significant factor since the river is less than ½ mile wide north of the subsegment.

OWNERSHIP: Private.

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

WATER QUALITY: Fair to good. The water quality of the Rappahannock River is sometimes affected by point source discharge upstream, agricultural runoff and boating activities. However, the river usually has good water quality.

BEACH QUALITY: Poor. This subsegment has only

thin, strip beaches.

**PRESENT SHORE EROSION SITUATION**

**EROSION RATE:** Slight or no change to moderate, noncritical. The shoreline in the meander is suffering from minor erosion due to normal river currents, which locate to the outside of a bend.

**ENDANGERED STRUCTURES:** None.

**SHORE PROTECTIVE STRUCTURES:** There are three areas which have a combined total of approximately 1,000 feet of bulkhead. All structures appear to be effective.

**OTHER SHORE STRUCTURES:** There are several piers in the subsegment. A boat house is located west of Saunders Wharf.

**SHORE USE LIMITATIONS:**

Though some houses are located along the shoreline, the subsegment is used predominantly for agriculture. Any construction would be at the sacrifice of these lands. Though there is only minor erosion in the subsegment, this would limit development of the shoreline.

**ALTERNATE SHORE USE:**

Low. The subsegment will probably remain a rural area. The section lacks good beaches and shore access, which limits its desirability as a residential or recreational area.

**MAPS:** USGS, 7.5 Min.Ser. (Topo.), LORETTO  
Quadr., 1968, pr. 1972.  
C&GS, #12237 (605-SC), 1:40,000 scale,  
RAPPAHANNOCK RIVER, CORROTOMAN RIVER to  
Fredericksburg, VA, 12th ed., 1975.

**PHOTOS:** Aerial-VIMS 11May76 ES-7B/234-257.

SUBSEGMENT 8A

ELMWOOD CREEK TO HORSE HEAD POINT

Map 9

EXTENT: 22,600 feet (4.3 mi.) of shoreline on the Rappahannock River, from the mouth of Elmwood Creek to Horse Head Point. The subsegment also includes 14,400 feet (2.7 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 81% (2.2 mi.) and low shore with bluff 19% (0.5 mi.).  
SHORE: Beach 25% (1.1 mi.), fringe marsh 17% (0.7 mi.), and extensive marsh 58% (2.5 mi.).  
NEARSHORE: Narrow for the entire length of the subsegment.

SHORELANDS USE

FASTLAND: Entirely agricultural.  
SHORE: Some waterfowl hunting in the marshes but mostly unused.  
NEARSHORE: Sport boating and fishing.

WIND AND SEA EXPOSURE: The shoreline trends basically S - N in the subsegment. No significant fetches affect the subsegment.

OWNERSHIP: Private.

FLOOD HAZARD: Low. This area is not subject to wind and wave actions. There are no endangered structures.

WATER QUALITY: Fair to good. The Rappahannock River generally has good water quality. Some seasonal problems result from agricultural runoff and from upstream industrial and domestic waste discharges.

BEACH QUALITY: Poor. This subsegment has thin, strip beaches.

PRESENT SHORE EROSION SITUATION

EROSION RATE: Slight or no change to moderate, noncritical. The bluff area to the north of Elmwood Creek is experiencing a moderate erosion rate of 1.5 feet per year.  
ENDANGERED STRUCTURES: None.  
SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: None.

SHORE USE LIMITATIONS:

This subsegment is used exclusively for agricultural purposes, which limits other use. Also, the area is isolated from any existing residential-industrial-commercial center, thus limiting the need for development. Lastly, the shoreline is located at least one mile from any existing state-maintained road.

ALTERNATE SHORE USE:

Low. There seems to be little need for any alternate shore use. The subsegment will probably continue to be a rural-agricultural area.

MAPS: USGS, 7.5 Min.Ser. (Topo.), ROLLINS FORK Quadr., 1968;  
USGS, 7.5 Min.Ser. (Topo.), LORETTO Quadr., 1968, pr. 1972.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

PHOTOS: Aerial-VIMS 11May76 ES-8A/257-279.

SUBSEGMENT 8B

GREEN BAY

Maps 9 and 10

EXTENT: 42,600 feet (8.0 mi.) of shoreline on the Rappahannock River from Horse Head Point to Marsh Point. The subsegment also includes 17,600 feet (3.3 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 65% (2.1 mi.), low shore with bluff 27% (0.9 mi.), and moderately low shore 8% (0.3 mi.).  
SHORE: Beach 2% (0.2 mi.) and extensive marsh 97% (7.8 mi.).  
NEARSHORE: Narrow for the entire subsegment.

SHORELANDS USE

FASTLAND: Entirely agricultural.  
SHORE: Some waterfowl hunting in the marshes but mostly unused.  
NEARSHORE: Sport boating and fishing.

WIND AND SEA EXPOSURE: The shoreline trends first N - S, then S - N through a meander. There are no significant fetches affecting the subsegment.

OWNERSHIP: Private.

FLOOD HAZARD: Low. The majority of the fastland is fronted by marsh, which acts as a natural flood control agent. There are no endangered structures.

WATER QUALITY: Fair to good. The Rappahannock River generally has good water quality.

BEACH QUALITY: Poor. The subsegment has one section of thin, strip beach.

PRESENT SHORE EROSION SITUATION

EROSION RATE: Moderate, noncritical. The marshes in Green Bay are experiencing an erosion rate of approximately 2.1 to 2.5 feet per year. One section of bluffs is also eroding.  
ENDANGERED STRUCTURES: None.  
SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: None.

**SHORE USE LIMITATIONS:**

The fastland, which is used for agricultural purposes, is fronted by an extensive marsh system. These marshes severely limit any access to the water. Also, this area is removed from any residential-industrial-commercial center, thus limiting the need for development.

**ALTERNATE SHORE USE:**

Low. There seems to be no need for alternate shore use in the subsegment. The area will probably remain basically rural in nature.

**MAPS:** USGS, 7.5 Min.Ser. (Topo.), ROLLINS FORK Quadr., 1968.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

**PHOTOS:** Aerial-VIMS 11May76 ES-8B/280-303.

**SUBSEGMENT 8C**

**MARSH POINT TO COUNTY LINE**

Map 10

**EXTENT:** 24,200 feet (4.5 mi.) of shoreline from Marsh Point to the Essex-Caroline county line along Portobago Creek. The subsegment also includes 20,800 feet (3.9 mi.) of fastland.

**SHORELANDS TYPE**

**FASTLAND:** Low shore 89% (3.5 mi.), low shore with bluff 7% (0.3 mi.), and moderately low shore 4% (0.1 mi.).  
**SHORE:** Beach 31% (1.4 mi.), fringe marsh 11% (0.5 mi.), embayed marsh 20% (0.9 mi.), and extensive marsh 38% (1.7 mi.).  
**NEARSHORE:** Narrow 35% and wide 30%. The remainder of the subsegment is located along Portobago Creek.

**SHORELANDS USE**

**FASTLAND:** Entirely agricultural.  
**SHORE:** Some waterfowl hunting in the marshes but mostly unused.  
**NEARSHORE:** Sport fishing and boating.

**WIND AND SEA EXPOSURE:** The shoreline trends basically NE - SW. The fetch at Portobago Creek is NW - 2.3 nm. However, the shallowness of Portobago Bay makes the fetch mostly insignificant.

**OWNERSHIP:** Private.

**FLOOD HAZARD:** Low. The majority of the fastland has elevations of 20 feet and is not subject to flooding. There are no endangered structures.

**WATER QUALITY:** Fair to good. The Rappahannock River usually has good water quality. Occasional problems are caused by upstream industrial and domestic waste discharges, agricultural runoff, and by boating activities.

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

**PRESENT SHORE EROSION SITUATION**

**EROSION RATE:** Slight or no change. The bluff areas just south of the extensive marsh is suffering from some minor erosion.

**ENDANGERED STRUCTURES:** None.  
**SHORE PROTECTIVE STRUCTURES:** None.

**OTHER SHORE STRUCTURES:** None.

**SHORE USE LIMITATIONS:**

As with subsegments 8A and 8B, this area is used for agriculture. The area's lack of access and its distance from any residential-industrial-commercial center severely limits any development.

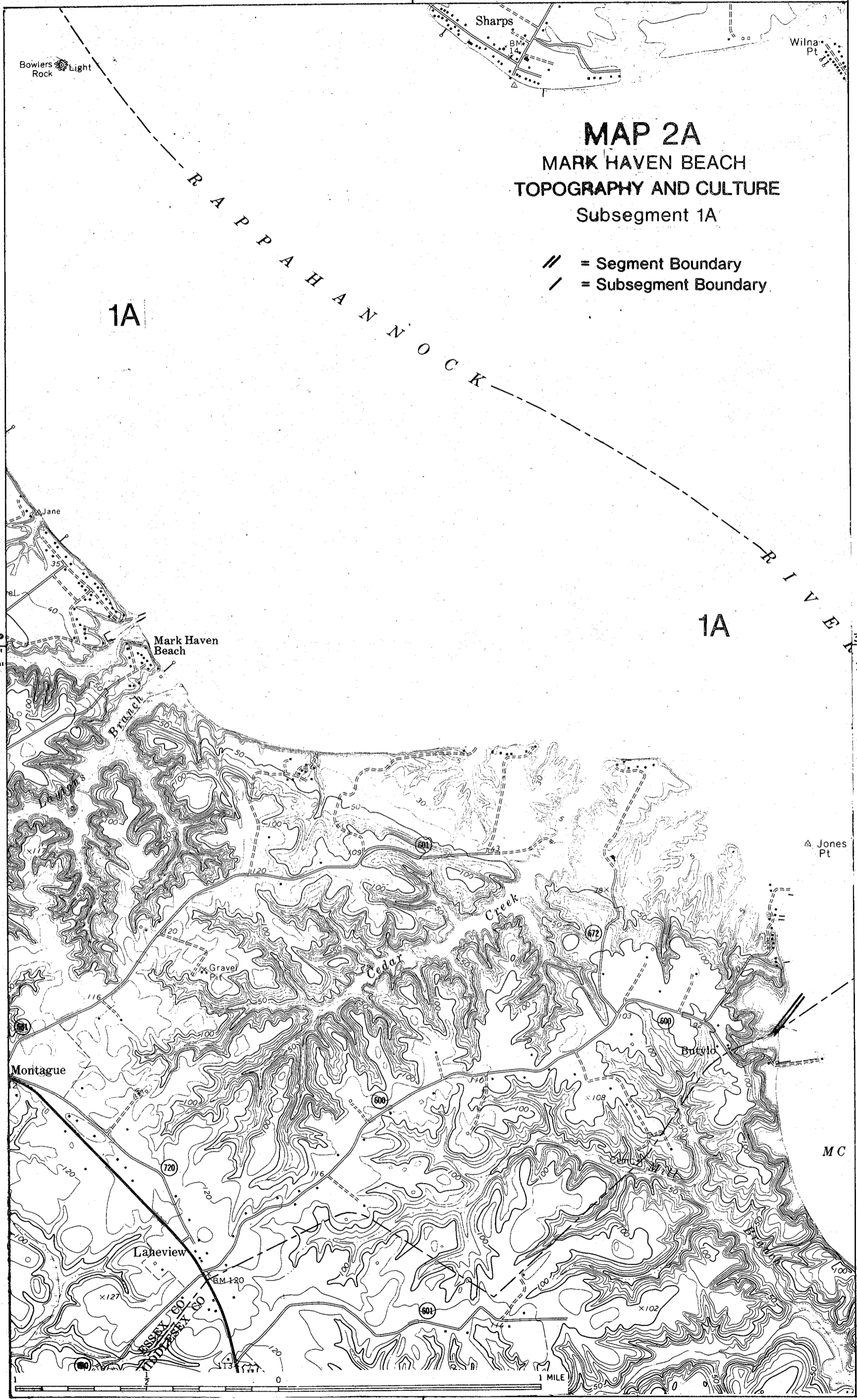
**ALTERNATE SHORE USE:**

Low. Like most of the county's shorelands, this area is used for agriculture. There seems to be little need for development in the subsegment.

**MAPS:** USGS, 7.5 Min.Ser. (Topo.), ROLLINS FORK Quadr., 1968.  
C&GS, #12237 (605-SC), 1:40,000 scale, RAPPAHANNOCK RIVER, CORROTOMAN RIVER to Fredericksburg, VA, 12th ed., 1975.

**PHOTOS:** Aerial-VIMS 11May76 ES-8C/304-319.

76° 42' 30"



**MAP 2A**  
**MARK HAVEN BEACH**  
**TOPOGRAPHY AND CULTURE**  
 Subsegment 1A

- // = Segment Boundary
- / = Subsegment Boundary

1A

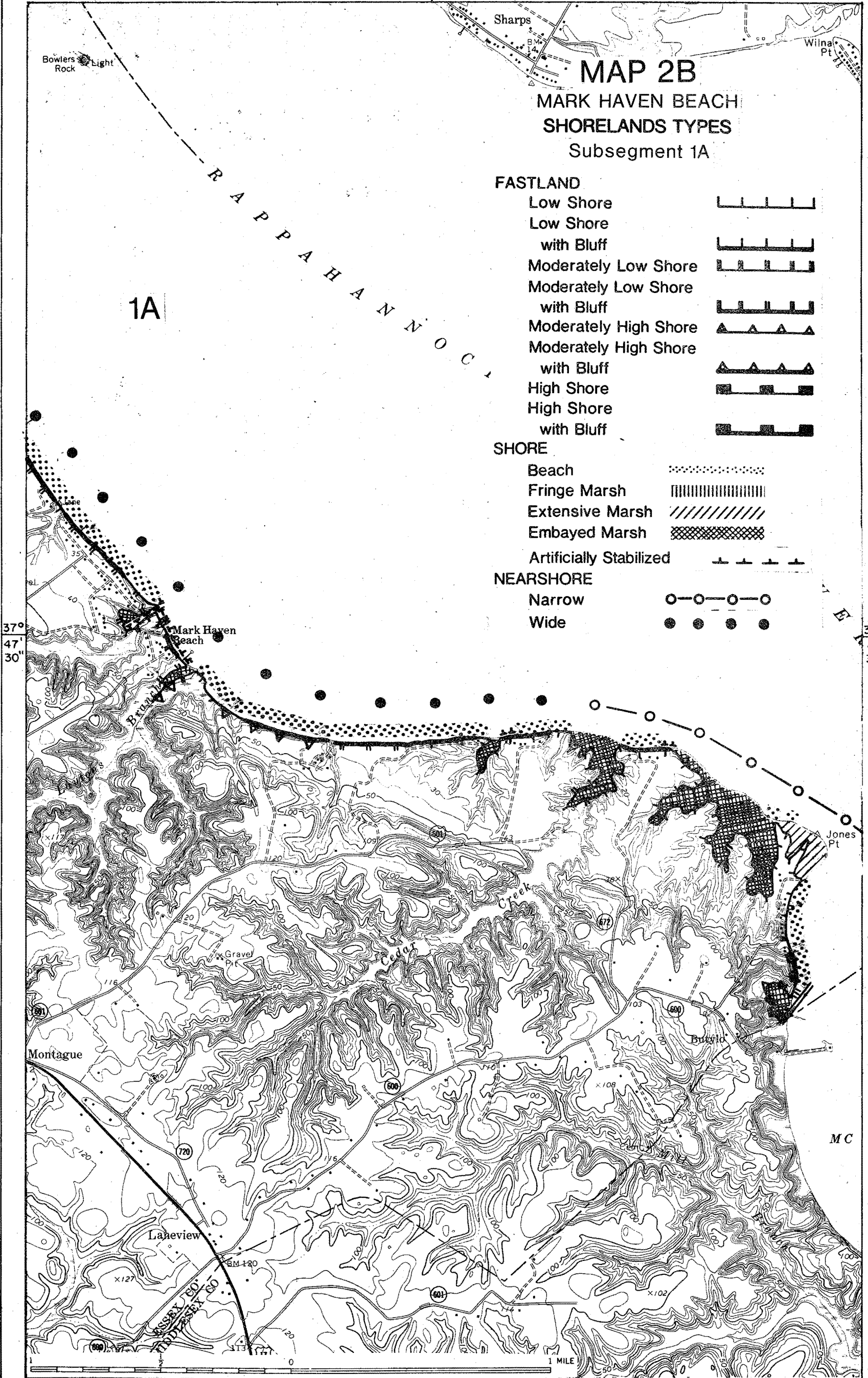
1A

37° 47' 30"

37° 47' 30"

76° 42' 30"

76° 42' 30"



# MAP 2B

## MARK HAVEN BEACH SHORELANDS TYPES Subsegment 1A

- 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
- SHORE**
- Beach
  - Fringe Marsh
  - Extensive Marsh
  - Embayed Marsh
  - Artificially Stabilized
- NEARSHORE**
- Narrow
  - Wide

1A

37° 47' 30"

37° 47' 30"

42

76° 42' 30"

76° 42' 30"

# MAP 2C

## MARK HAVEN BEACH FASTLAND USE, OWNERSHIP, EROSION Subsegment 1A



### USE

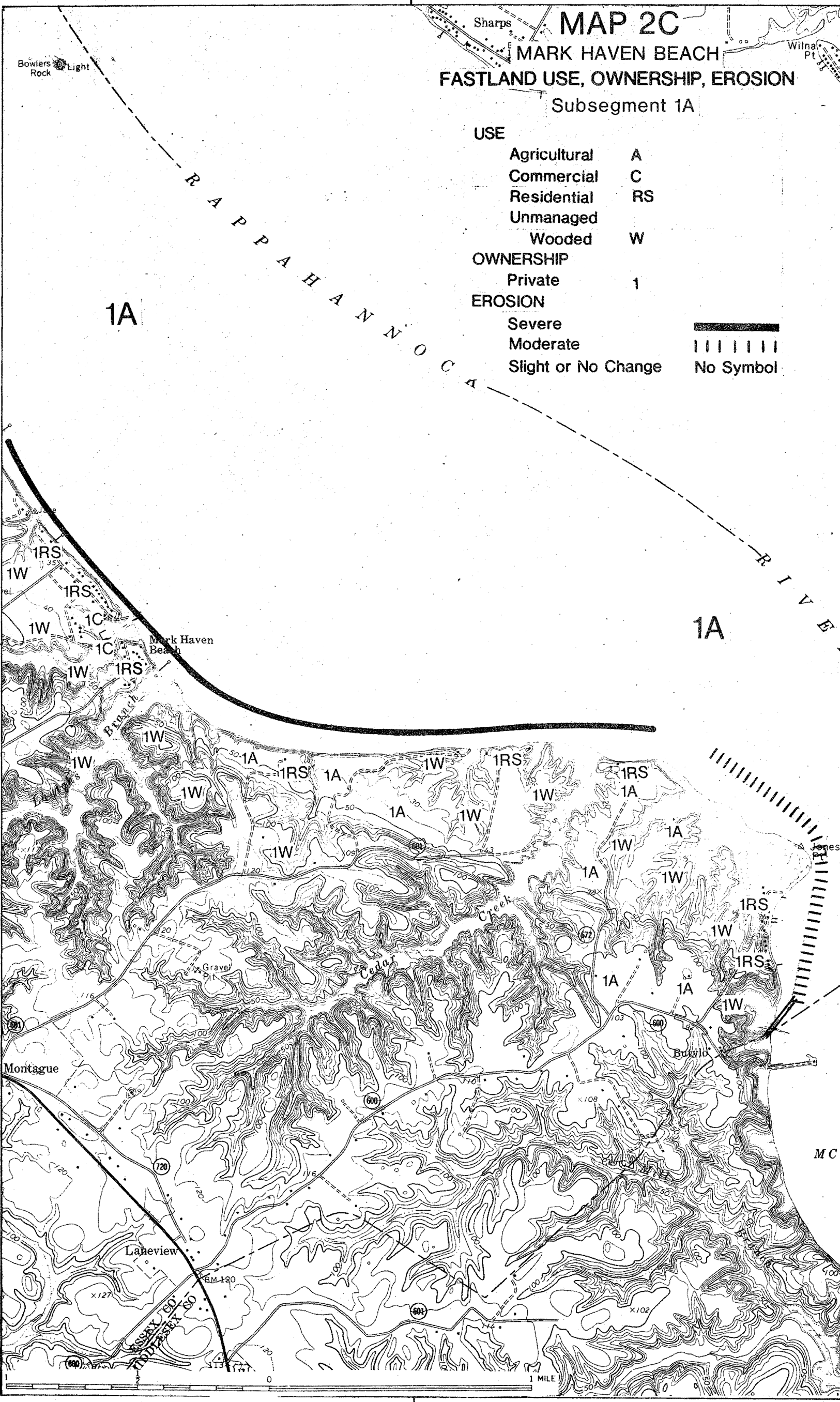
- Agricultural A
- Commercial C
- Residential RS
- Unmanaged
- Wooded W

### OWNERSHIP

- Private 1

### EROSION

- Severe 
- Moderate 
- Slight or No Change No Symbol



1A

1A

37° 47' 30"

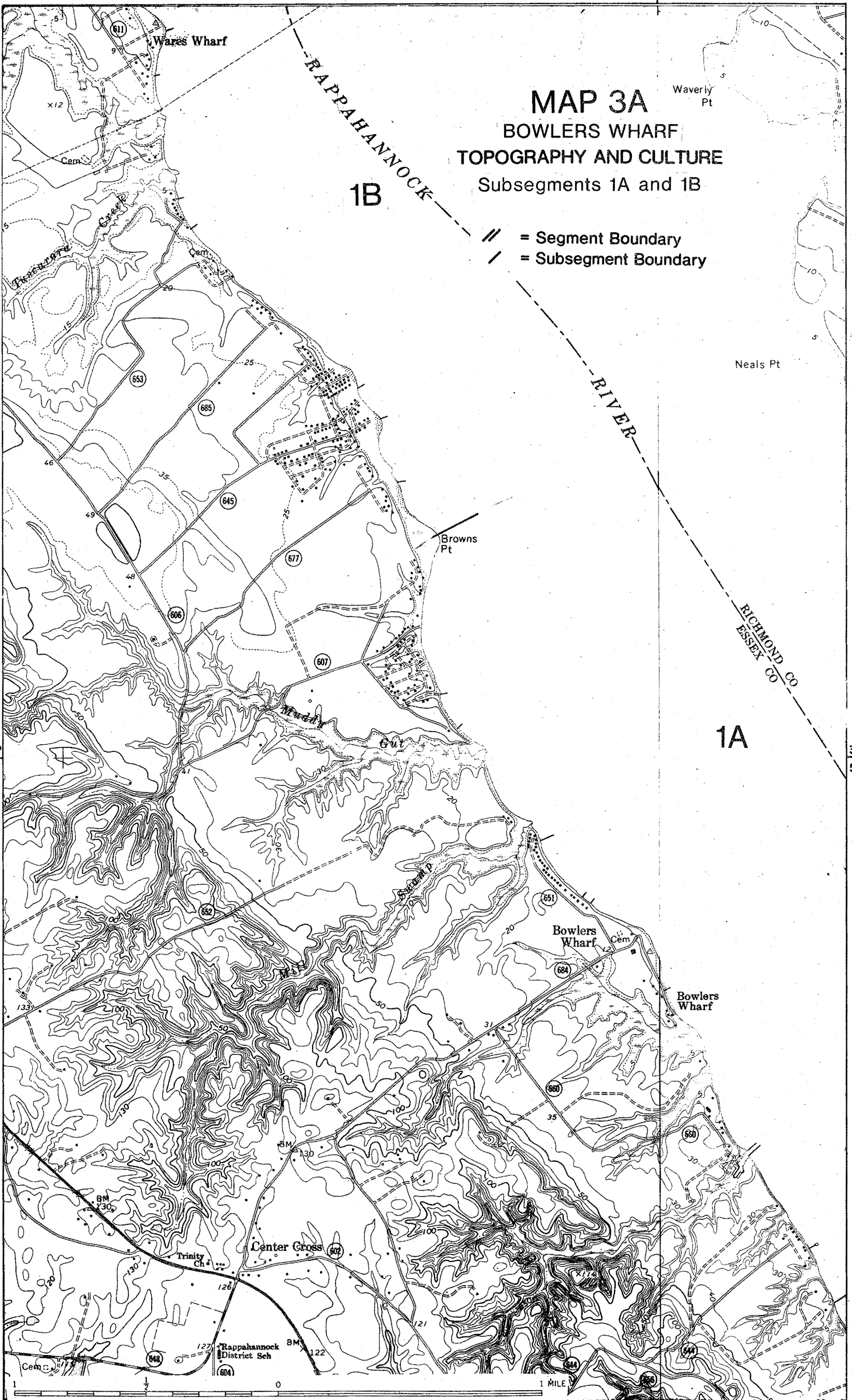
37° 47' 30"

43

76° 42' 30"

1 MILE

76° 45'



**MAP 3A**  
**BOWLERS WHARF**  
**TOPOGRAPHY AND CULTURE**  
 Subsegments 1A and 1B

1B

1A

- // = Segment Boundary
- - - = Subsegment Boundary

37° 50'

37° 50'

76° 45'

44





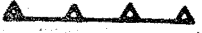


76° 45'

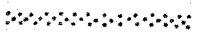



# MAP 3B BOWLERS WHARF SHORELANDS TYPES

Subsegments 1A and 1B 1A

## FASTLAND

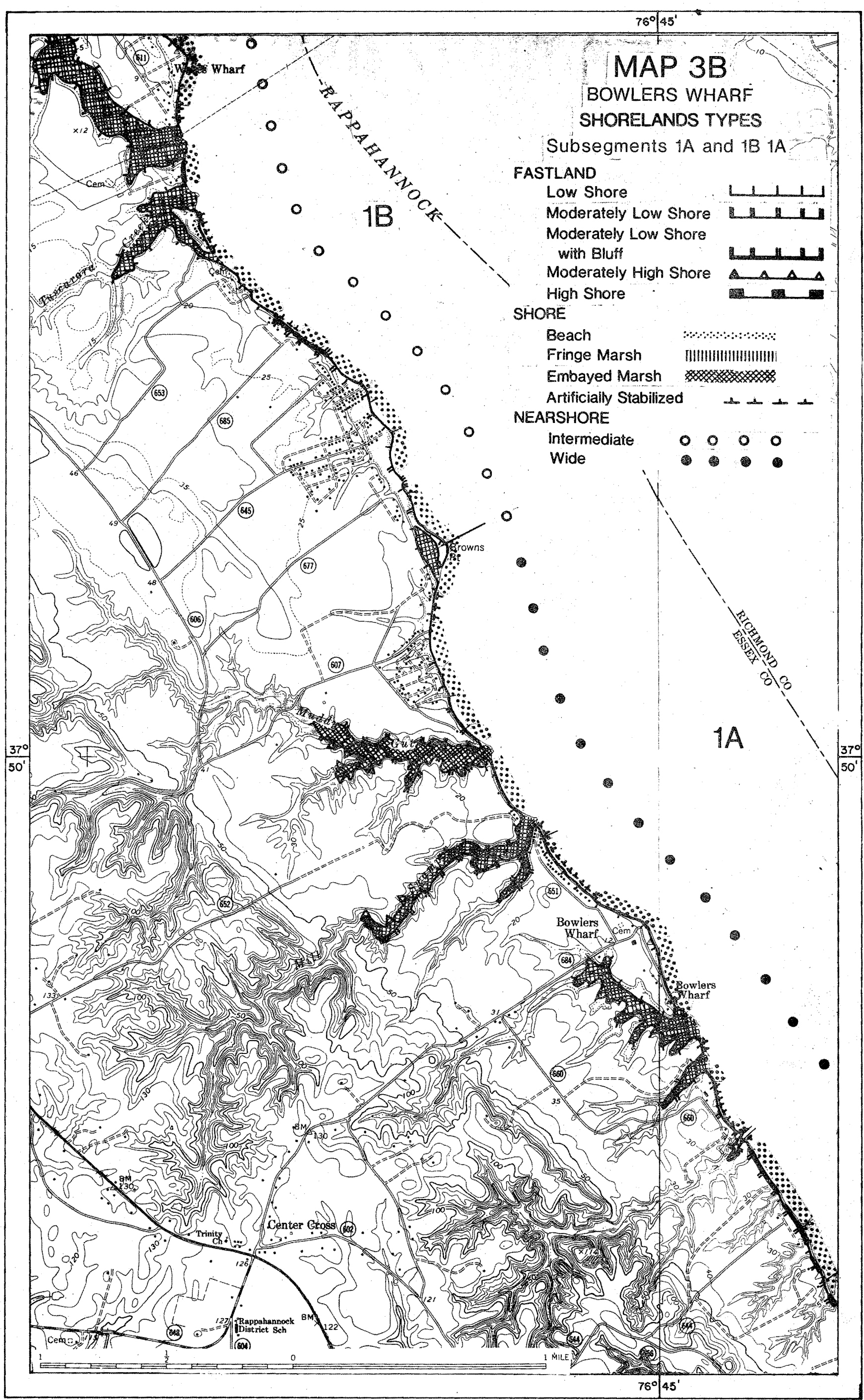
- Low Shore 
- Moderately Low Shore 
- Moderately Low Shore with Bluff 
- Moderately High Shore 
- High Shore 

## SHORE

- Beach 
- Fringe Marsh 
- Embayed Marsh 
- Artificially Stabilized 

## NEARSHORE

- Intermediate 
- Wide 



45

37° 50'

37° 50'

76° 45'

76° 45'

**MAP 3C**  
**BOWLERS WHARF**  
**FASTLAND USE, OWNERSHIP, EROSION**  
 Subsegments 1A and 1B




**USE**

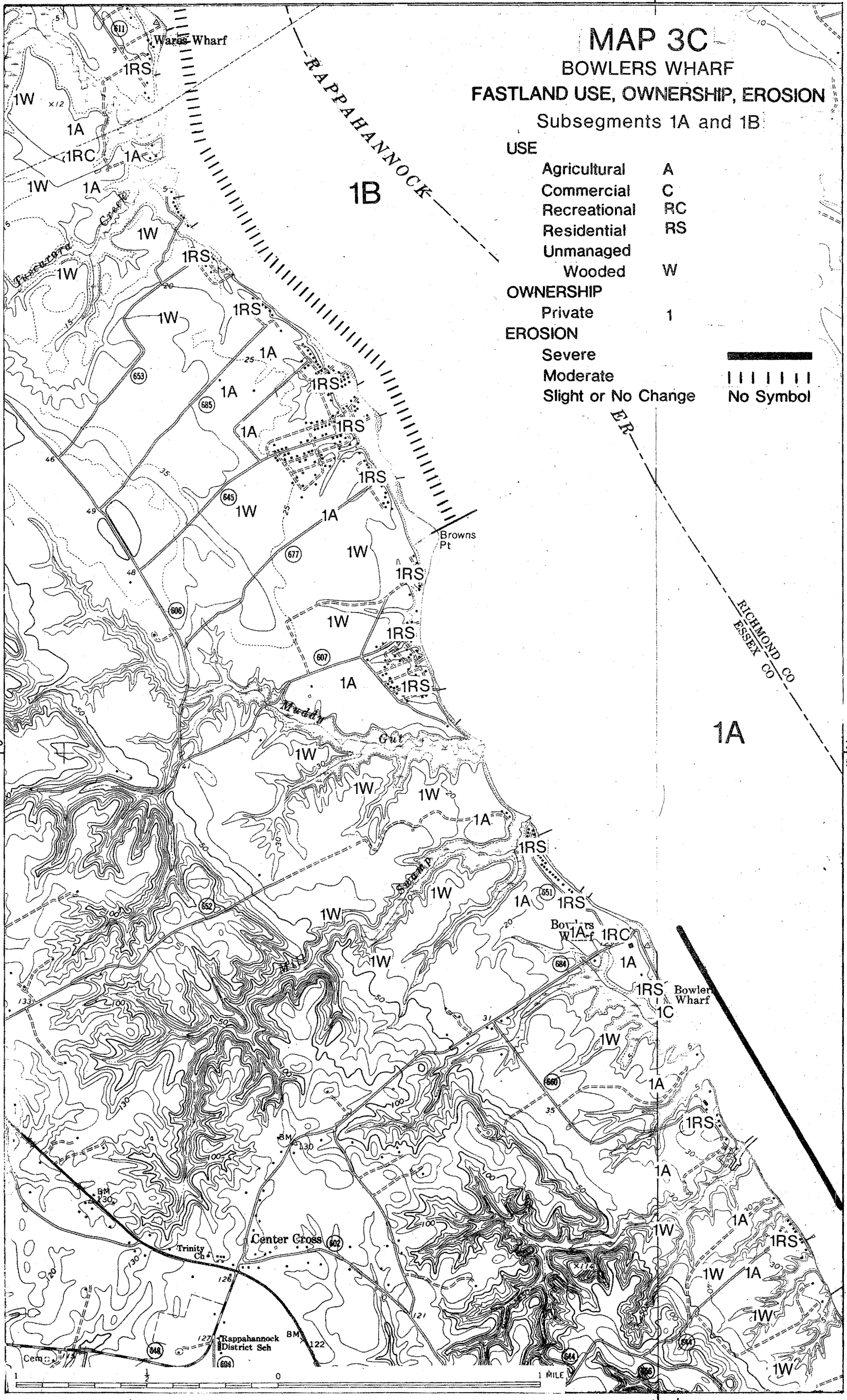
- Agricultural A
- Commercial C
- Recreational RC
- Residential RS
- Unmanaged
- Wooded W

**OWNERSHIP**

- Private 1

**EROSION**

- Severe 
- Moderate 
- Slight or No Change 

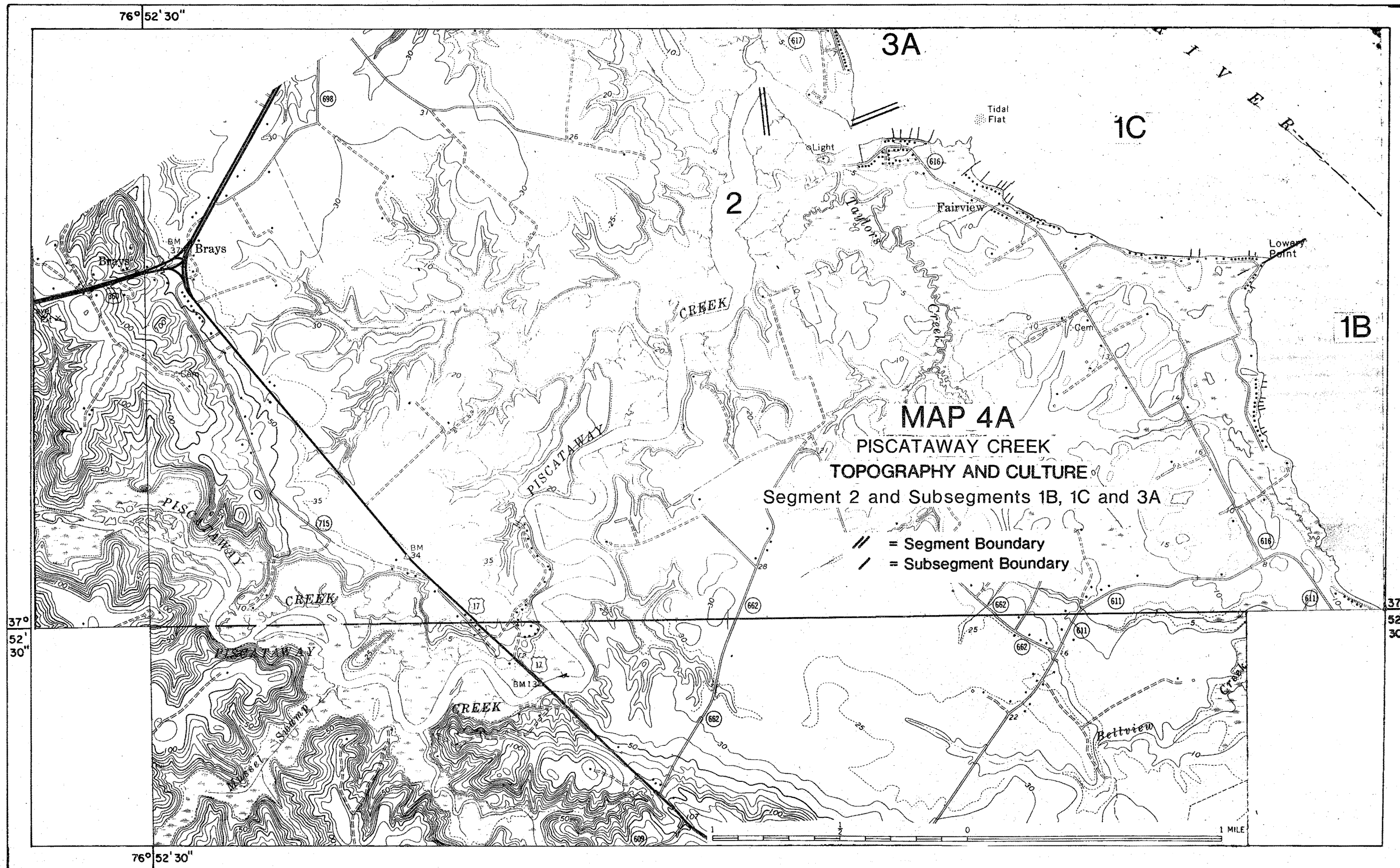


97

37° 50'

37° 50'

76° 45'







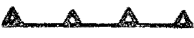

76° 52' 30"

# MAP 4B

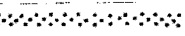

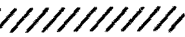

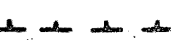
## PISCATAWAY CREEK SHORELANDS TYPES

Segment 2 and Subsegments 1B, 1C and 3A

### FASTLAND

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

### SHORE

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

### NEARSHORE

- Narrow 

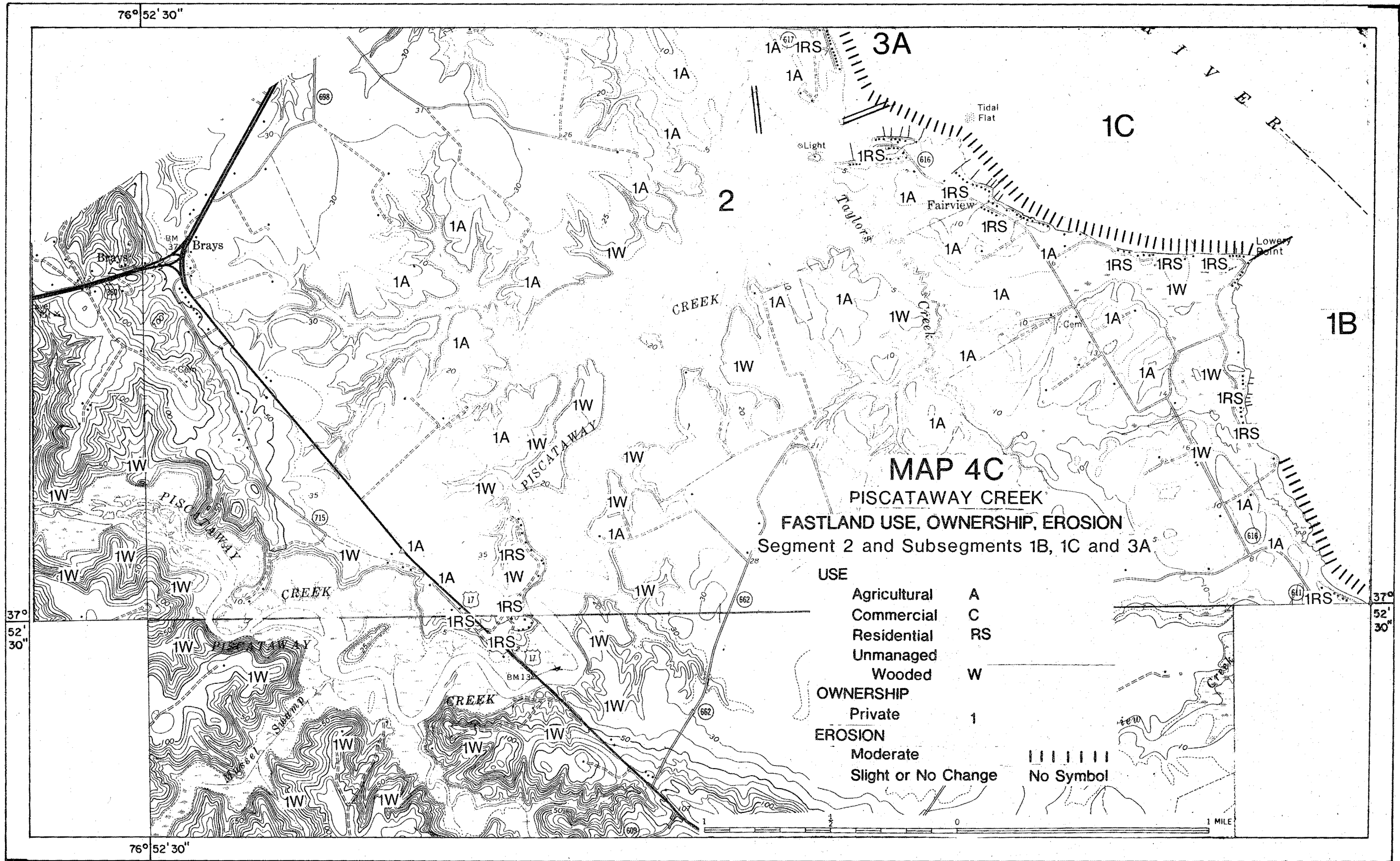
76° 52' 30"

37° 52' 30"

37° 52' 30"

1 MILE

76° 52' 30"



**MAP 4C**  
**PISCATAWAY CREEK**  
**FASTLAND USE, OWNERSHIP, EROSION**  
**Segment 2 and Subsegments 1B, 1C and 3A**

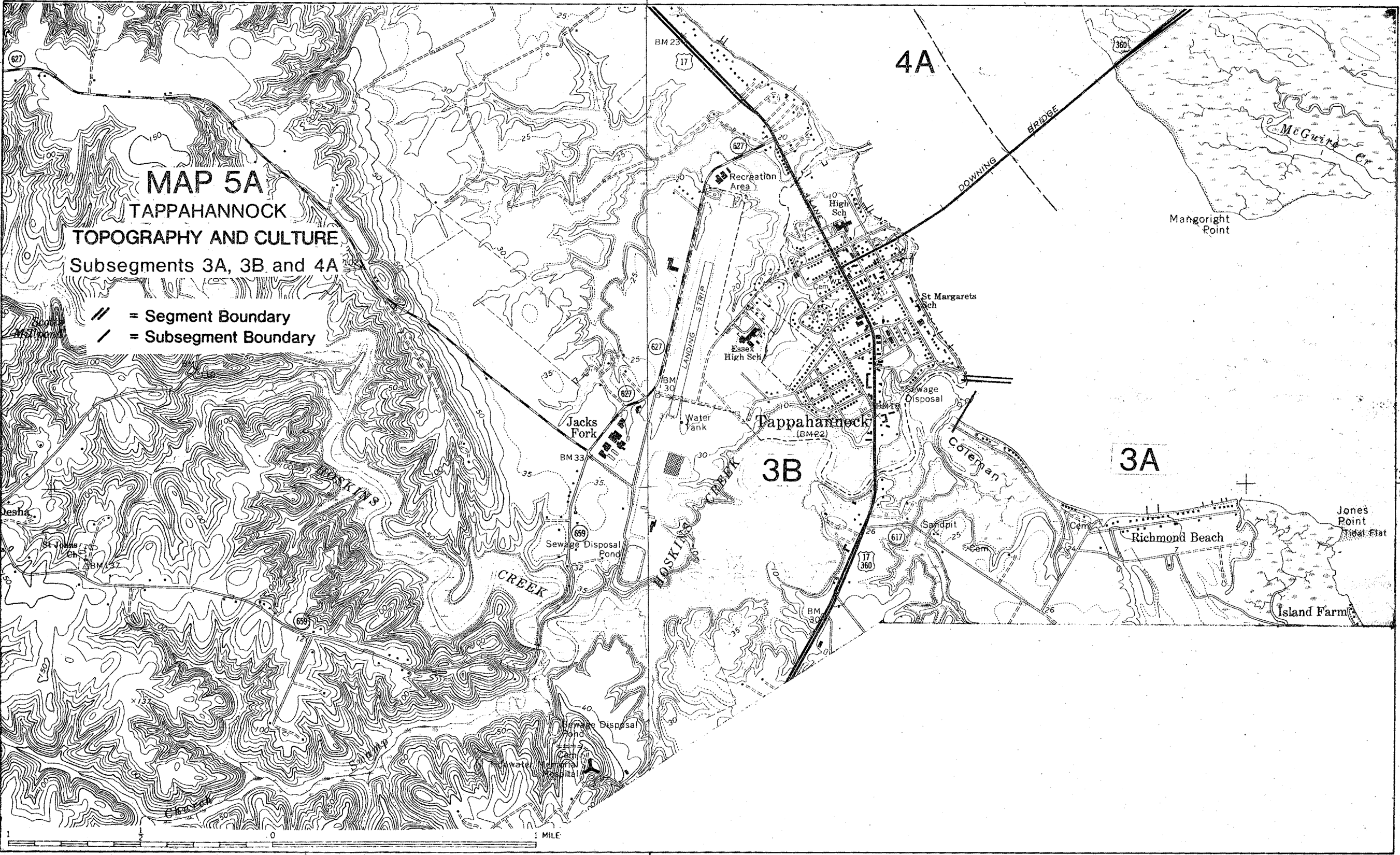
<b>USE</b>	
Agricultural	A
Commercial	C
Residential	RS
Unmanaged	
Wooded	W
<b>OWNERSHIP</b>	
Private	1
<b>EROSION</b>	
Moderate	
Slight or No Change	No Symbol

37° 52' 30"

37° 52' 30"

76° 52' 30"

76° 52' 30"



76° 52' 30"

# MAP 5B

## TAPPAHANNOCK

### SHORELANDS TYPES

Subsegments 3A, 3B and 4A

#### FASTLAND

- Low Shore
- Low Shore with Bluff
- Moderately Low Shore
- Moderately Low Shore with Bluff
- Moderately High Shore
- High Shore
- High Shore with Bluff
- Artificial Fill

#### SHORE

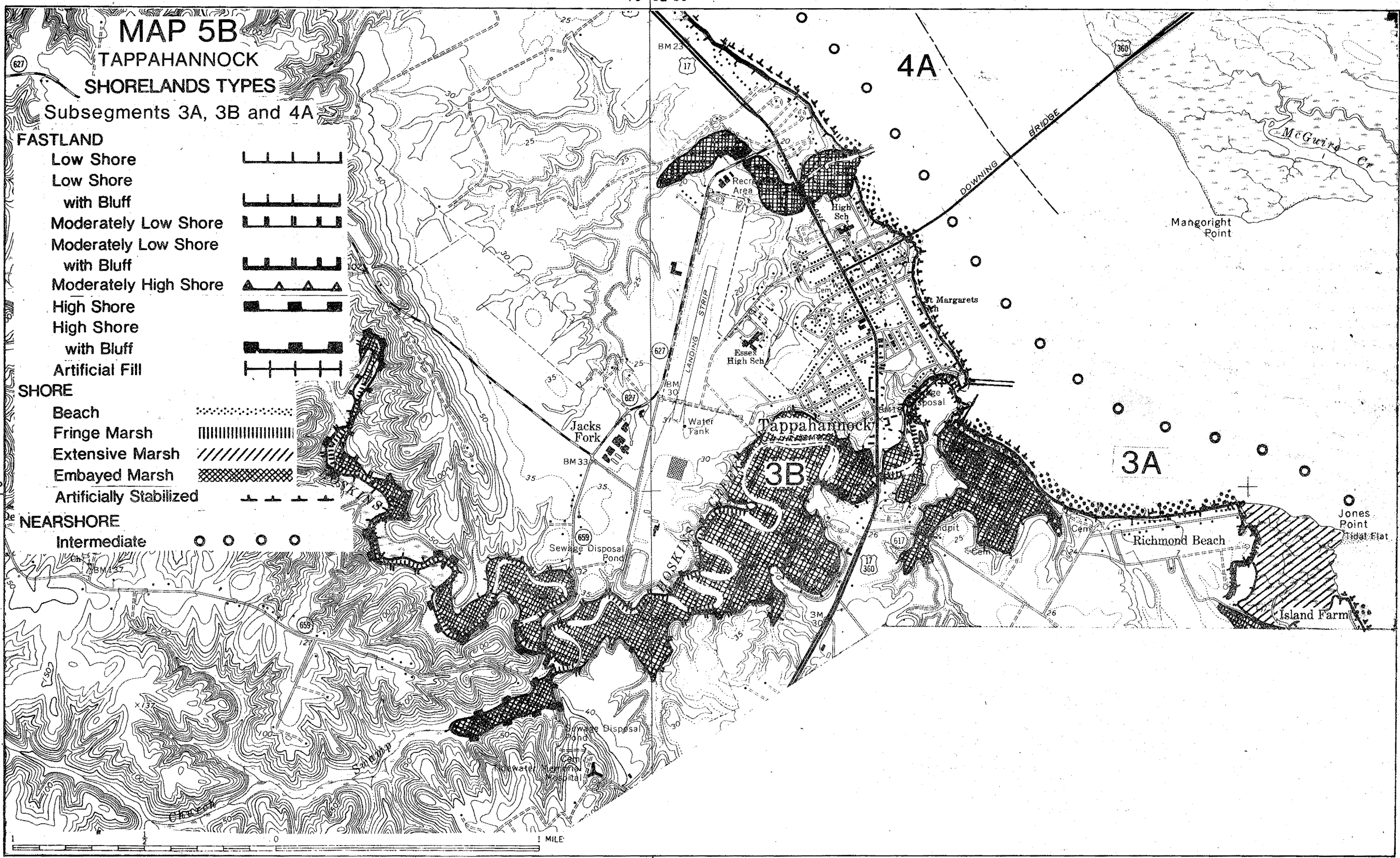
- Beach
- Fringe Marsh
- Extensive Marsh
- Embayed Marsh
- Artificially Stabilized

#### NEARSHORE

- Intermediate

37° 55'

37° 55'



76° 52' 30"

# MAP 5C

## TAPPAHANNOCK

### FASTLAND USE, OWNERSHIP, EROSION

Subsegments 3A, 3B and 4A

#### USE

Agricultural	A
Commercial	C
Industrial	I
Residential	RS
Unmanaged	

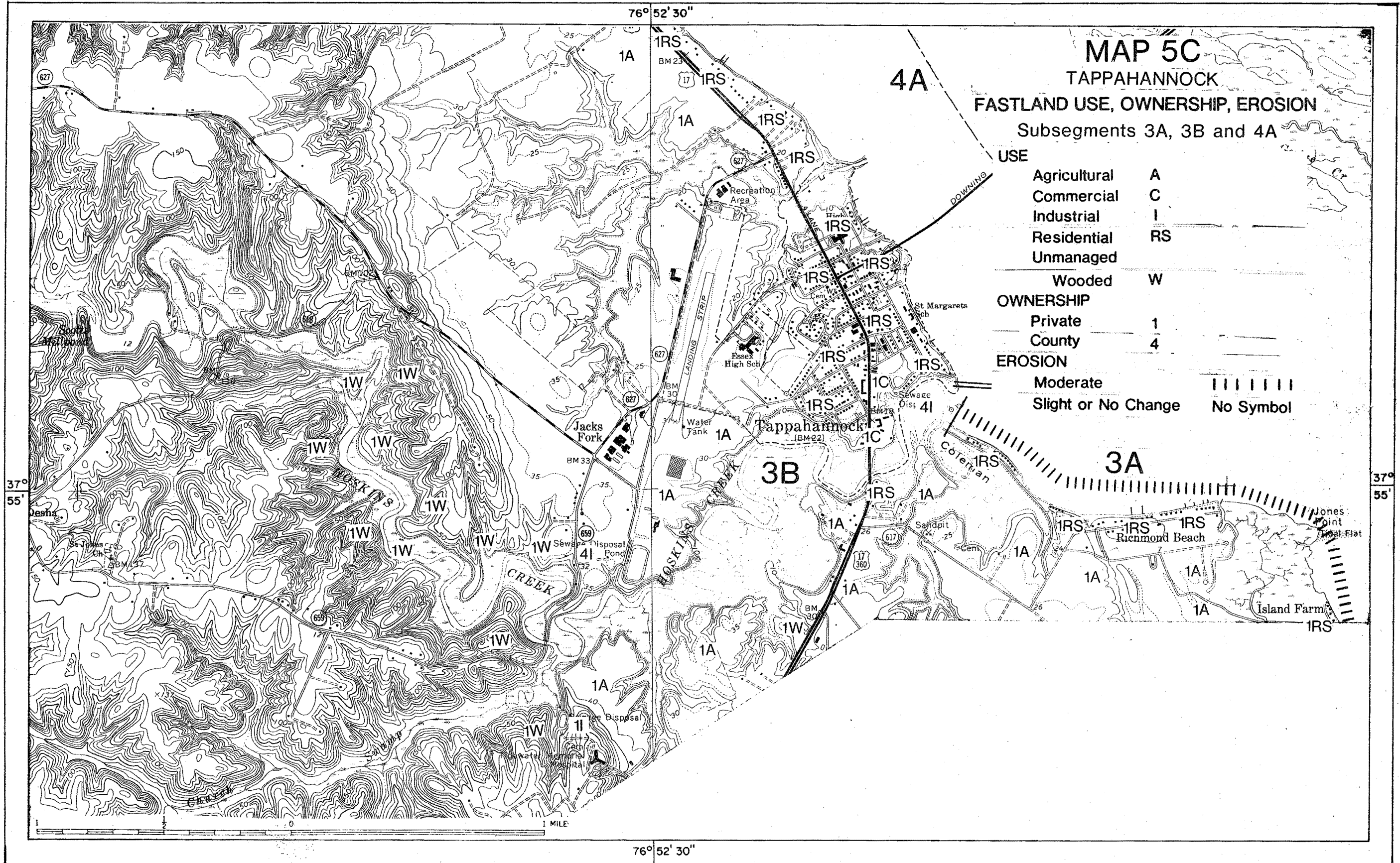
Wooded	W
--------	---

#### OWNERSHIP

Private	1
County	4

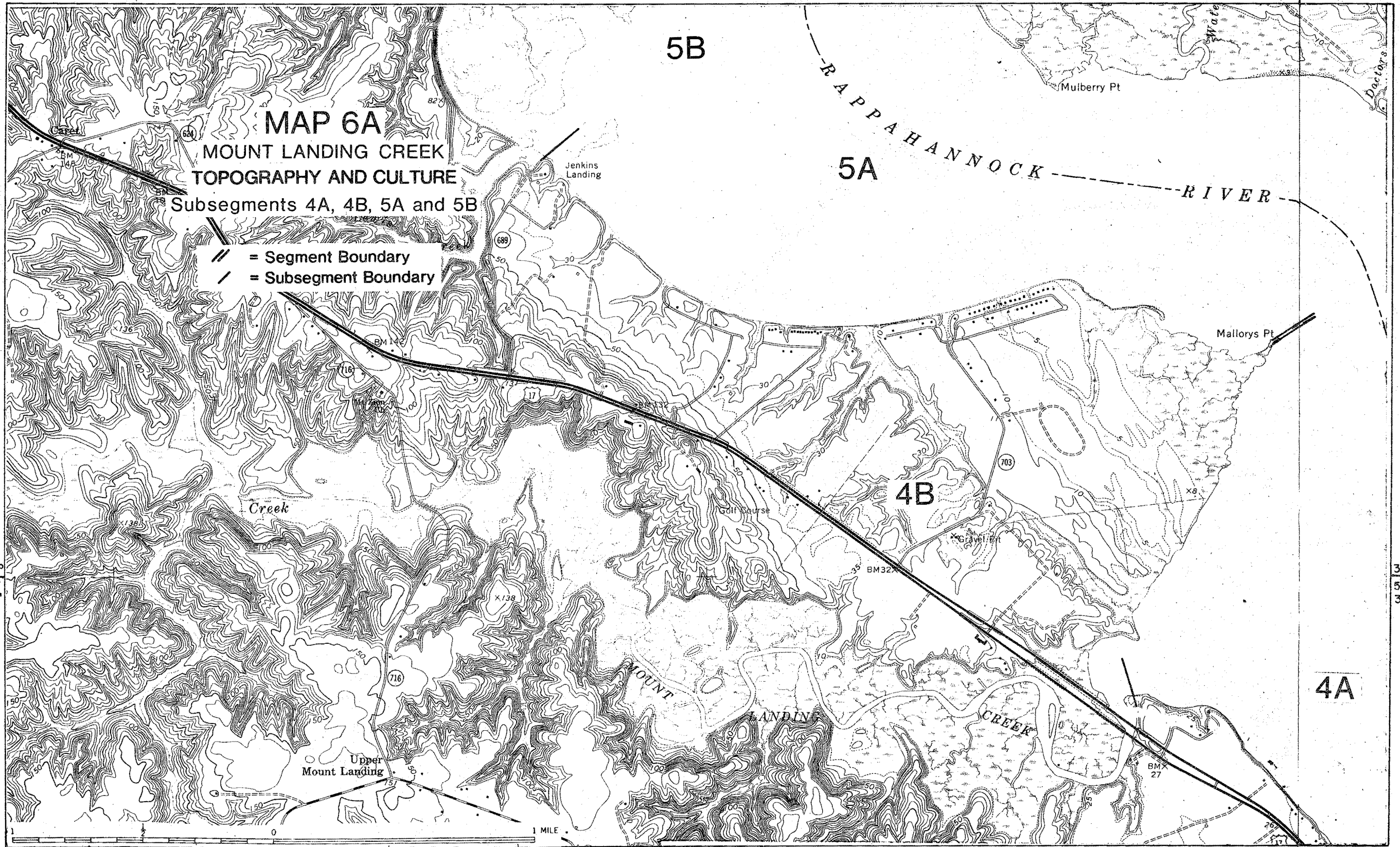
#### EROSION

Moderate	
Slight or No Change	No Symbol





76° 52' 30"



37° 57' 30"

37° 57' 30"

76° 52' 30"








76° 52' 30"

# MAP 6B






## MOUNT LANDING CREEK SHORELANDS TYPES

Subsegments 4A, 4B, 5A and 5B




### FASTLAND

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

### SHORE

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

### NEARSHORE

- Narrow 
- Intermediate 
- Wide 

5B

5A

4B

4A

RAPPAHANNOCK RIVER

MOUNT LANDING CREEK

Mulberry Pt

Mallorys Pt

Upper Mount Landing

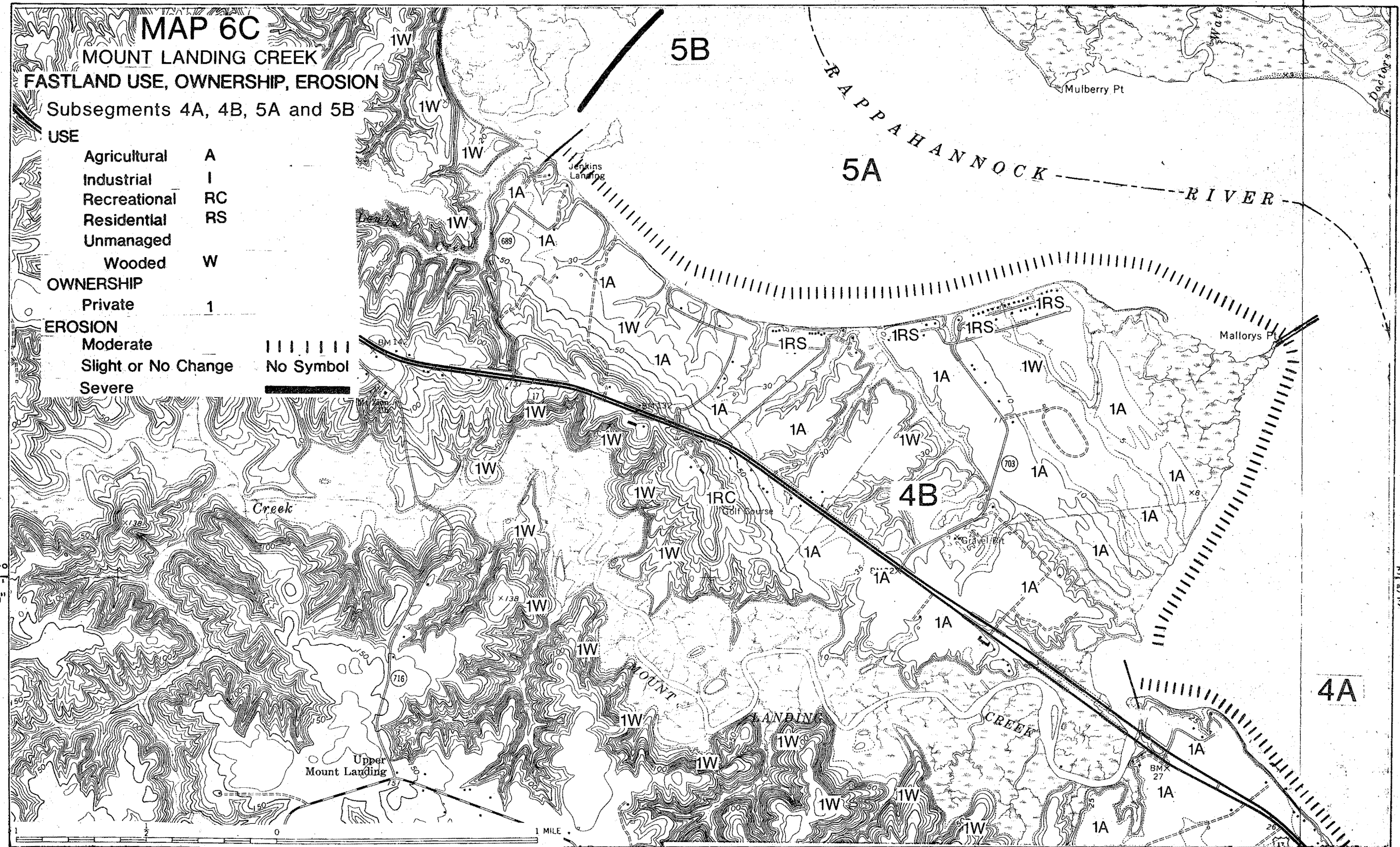
1 MILE

37° 57' 30"

37° 57' 30"

76° 52' 30"

76° 52' 30"

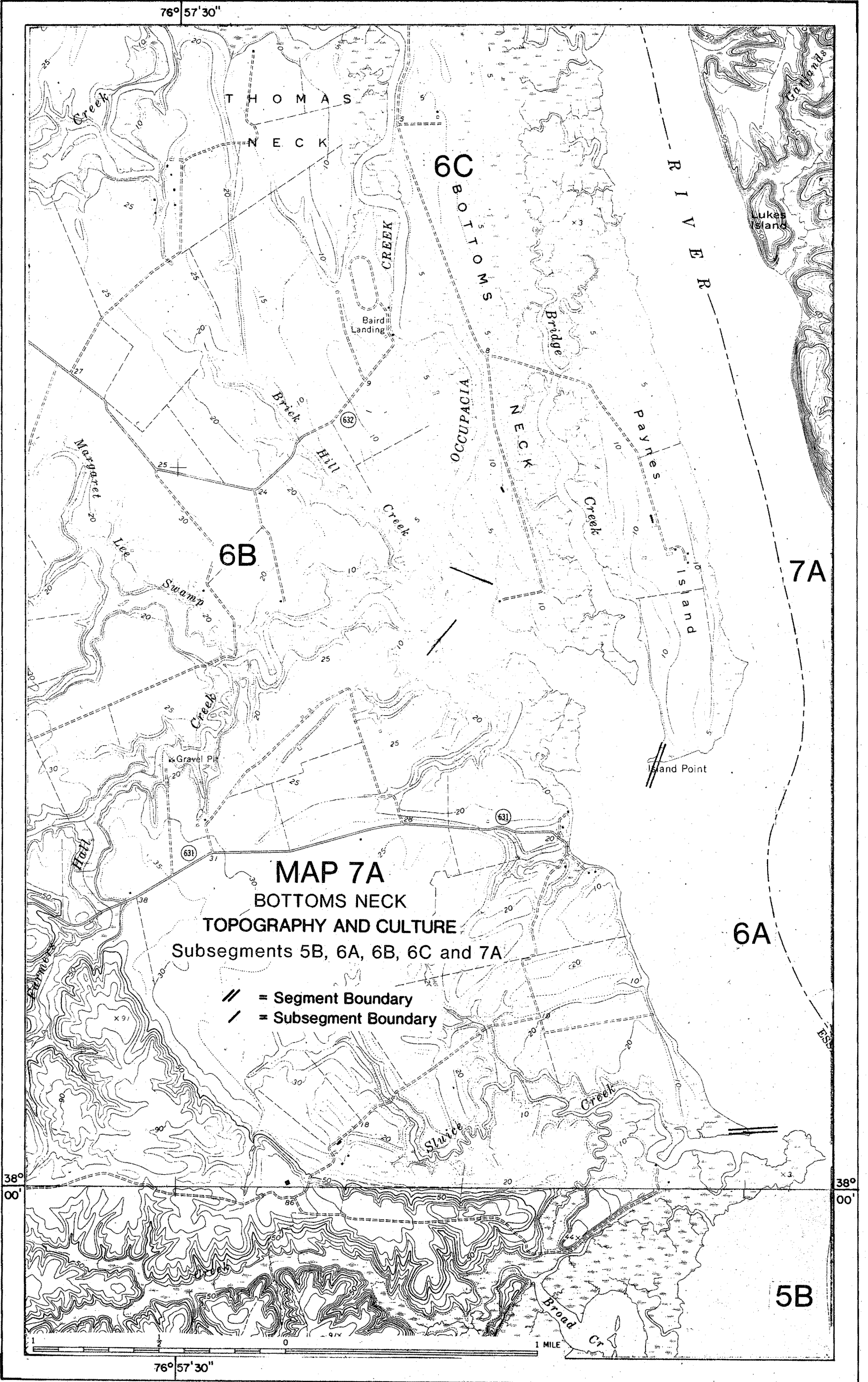


37° 57' 30"

37° 57' 30"

76° 52' 30"

76° 57' 30"



6B

6C

7A

### MAP 7A

BOTTOMS NECK

TOPOGRAPHY AND CULTURE

Subsegments 5B, 6A, 6B, 6C and 7A

- // = Segment Boundary
- / = Subsegment Boundary

6A

5B

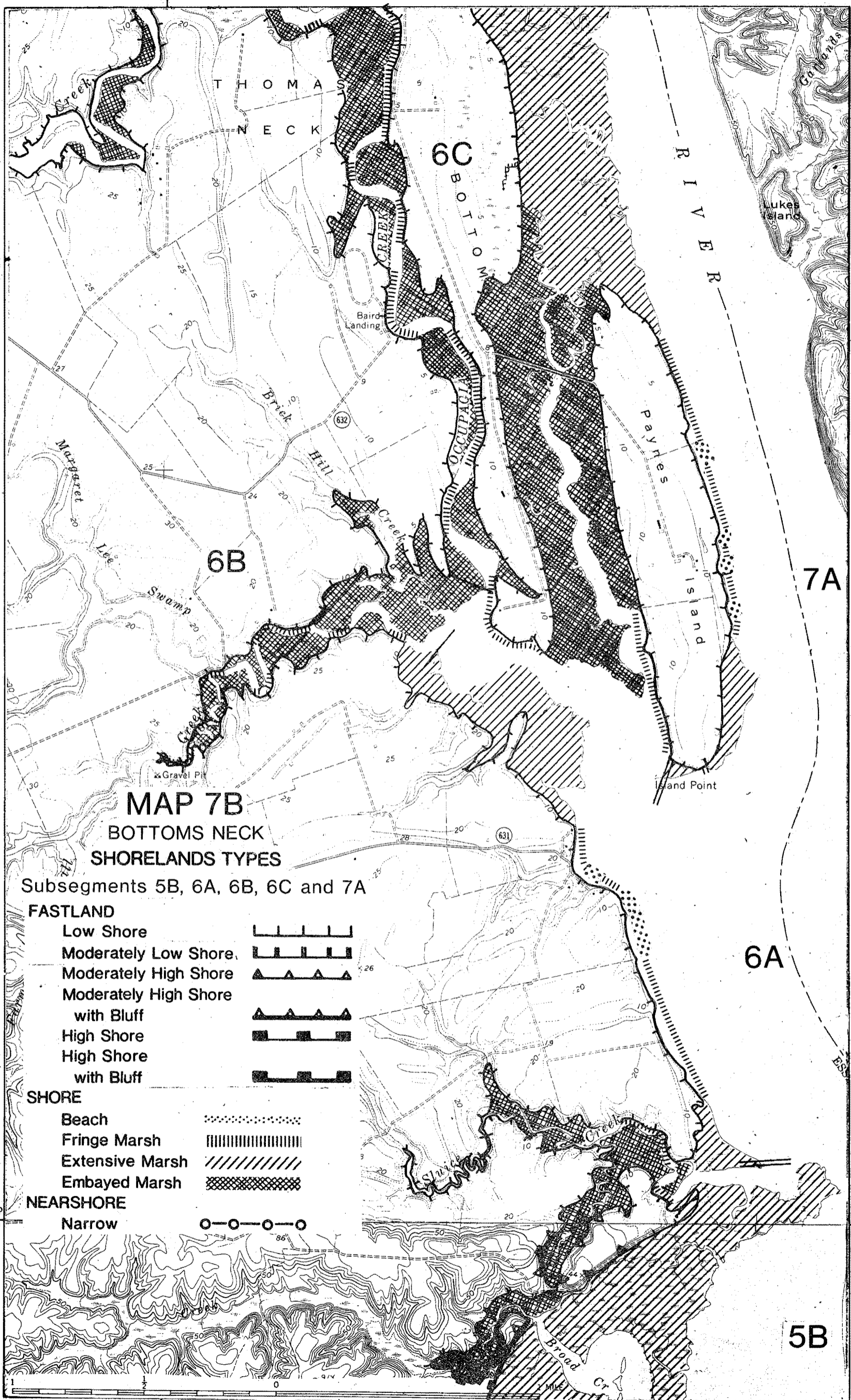
76° 57' 30"

38° 00'

38° 00'

1 MILE




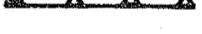


76° 57' 30"



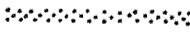

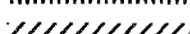

**MAP 7B**  
**BOTTOMS NECK**  
**SHORELANDS TYPES**

Subsegments 5B, 6A, 6B, 6C and 7A

**FASTLAND**

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

**SHORE**

- Beach 
- Fringe Marsh 
- Extensive Marsh 
- Embayed Marsh 

**NEARSHORE**

- Narrow 

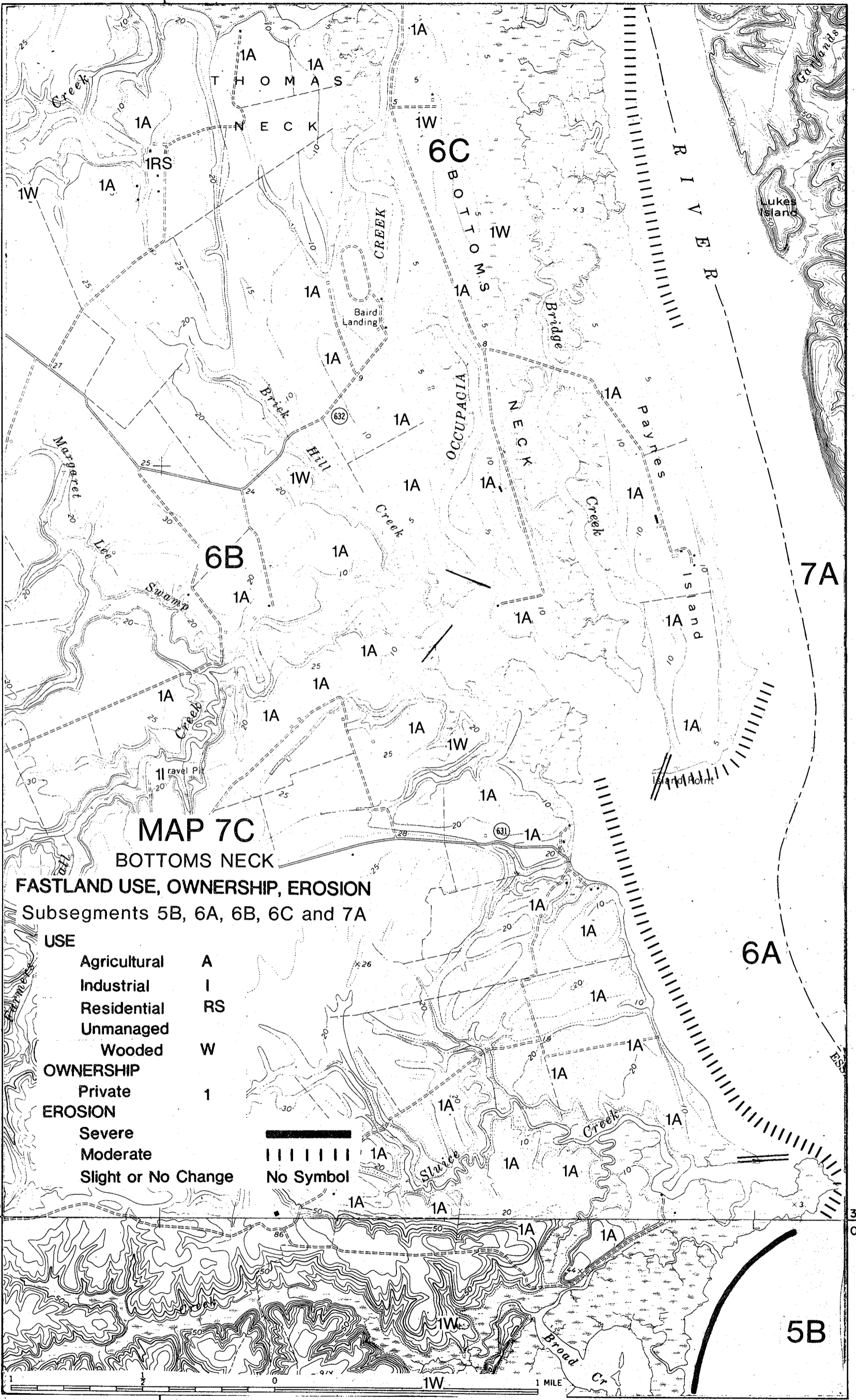
38° 00'

38° 00'

76° 57' 30"

57

76° 57' 30"



### MAP 7C

BOTTOMS NECK

FASTLAND USE, OWNERSHIP, EROSION

Subsegments 5B, 6A, 6B, 6C and 7A



#### USE

- Agricultural A
- Industrial I
- Residential RS
- Unmanaged
- Wooded W

#### OWNERSHIP

- Private 1

#### EROSION

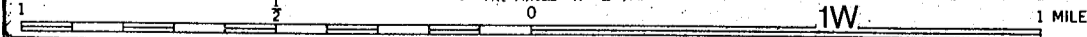
- Severe 
- Moderate 
- Slight or No Change No Symbol

58

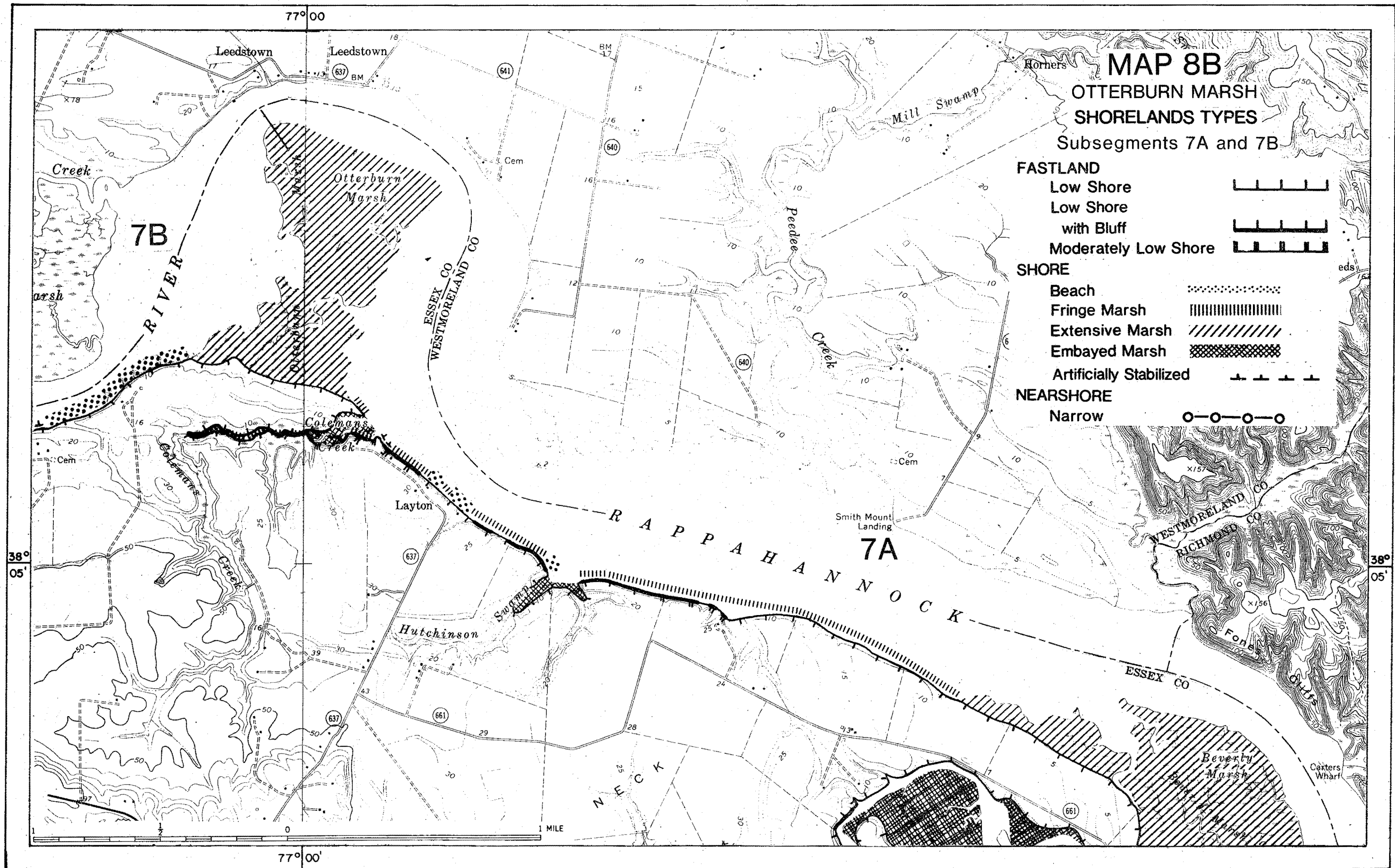
38° 00'

38° 00'

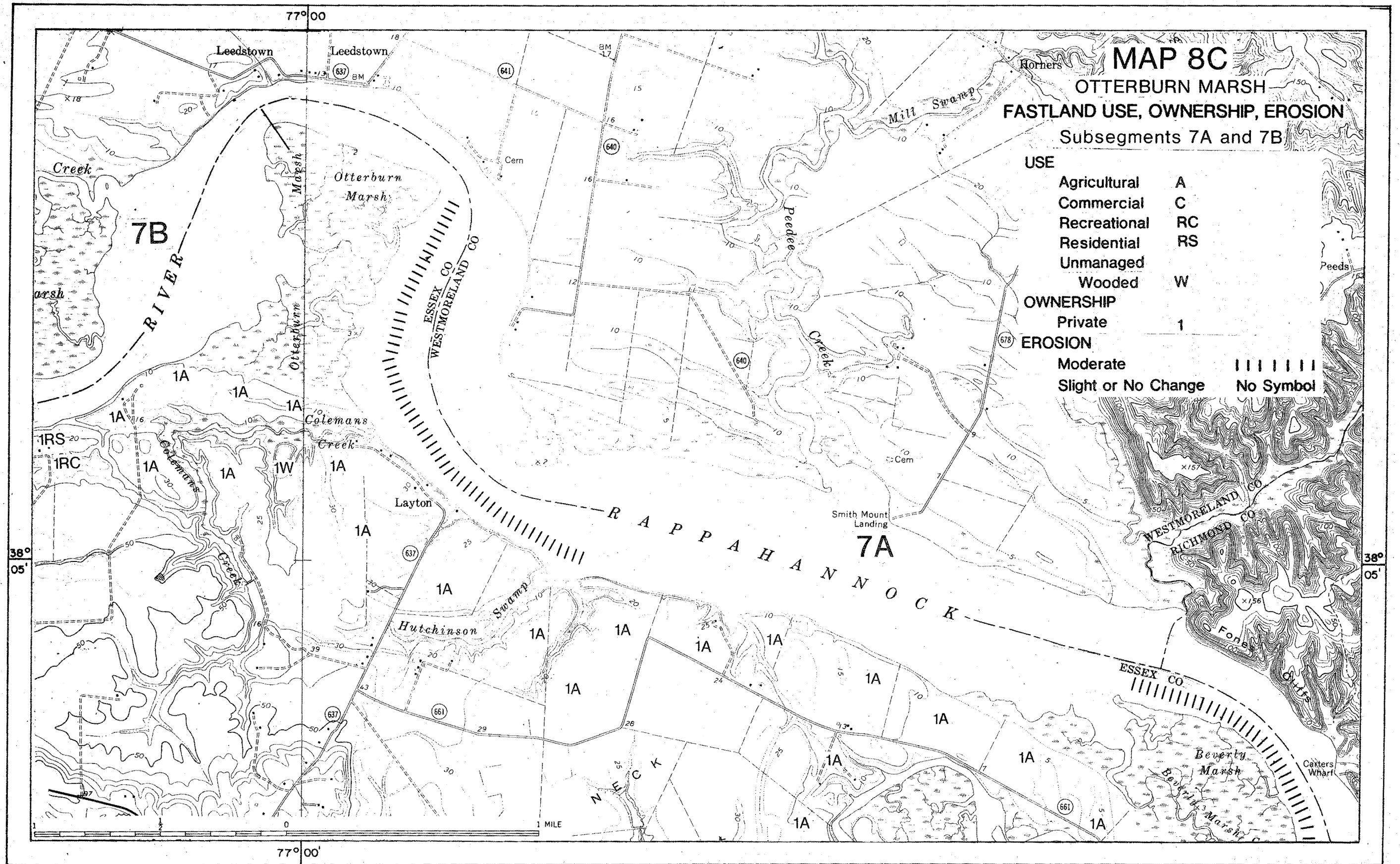
76° 57' 30"



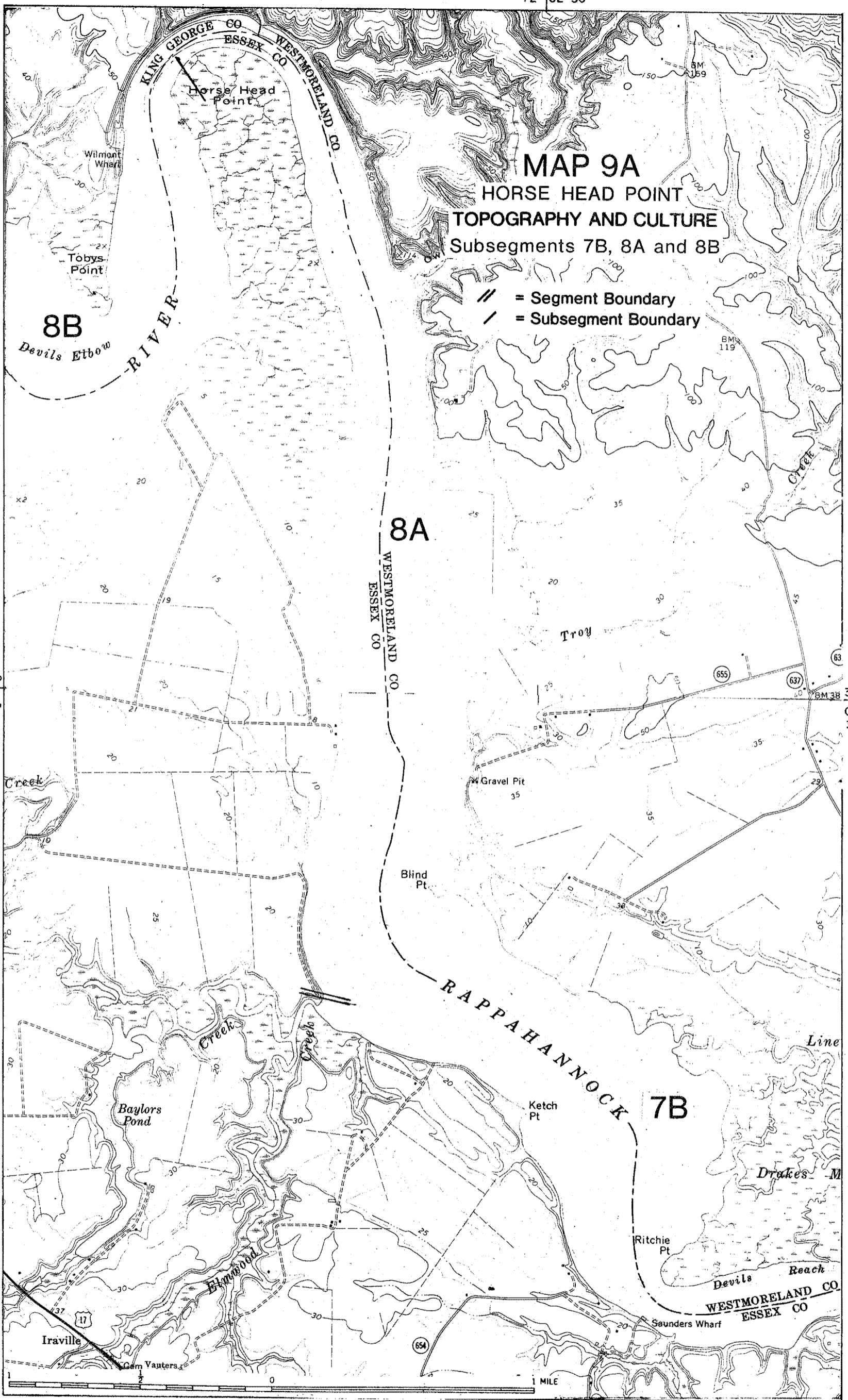








72° 02' 30"



**MAP 9A**  
**HORSE HEAD POINT**  
**TOPOGRAPHY AND CULTURE**  
 Subsegments 7B, 8A and 8B

// = Segment Boundary  
 / = Subsegment Boundary

**8B**

**8A**

**7B**

38°  
07'  
30"

38°  
07'  
30"

62

72° 02' 30"

1 MILE

72° 02' 30"

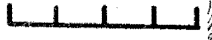
# MAP 9B

## HORSE HEAD POINT SHORELANDS TYPES

Subsegments 7B, 8A, and 8B

### FASTLAND

Low Shore



Low Shore

with Bluff



Moderately Low Shore



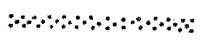
Moderately Low Shore

with Bluff



### SHORE

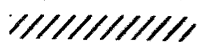
Beach



Fringe Marsh



Extensive Marsh



Embayed Marsh

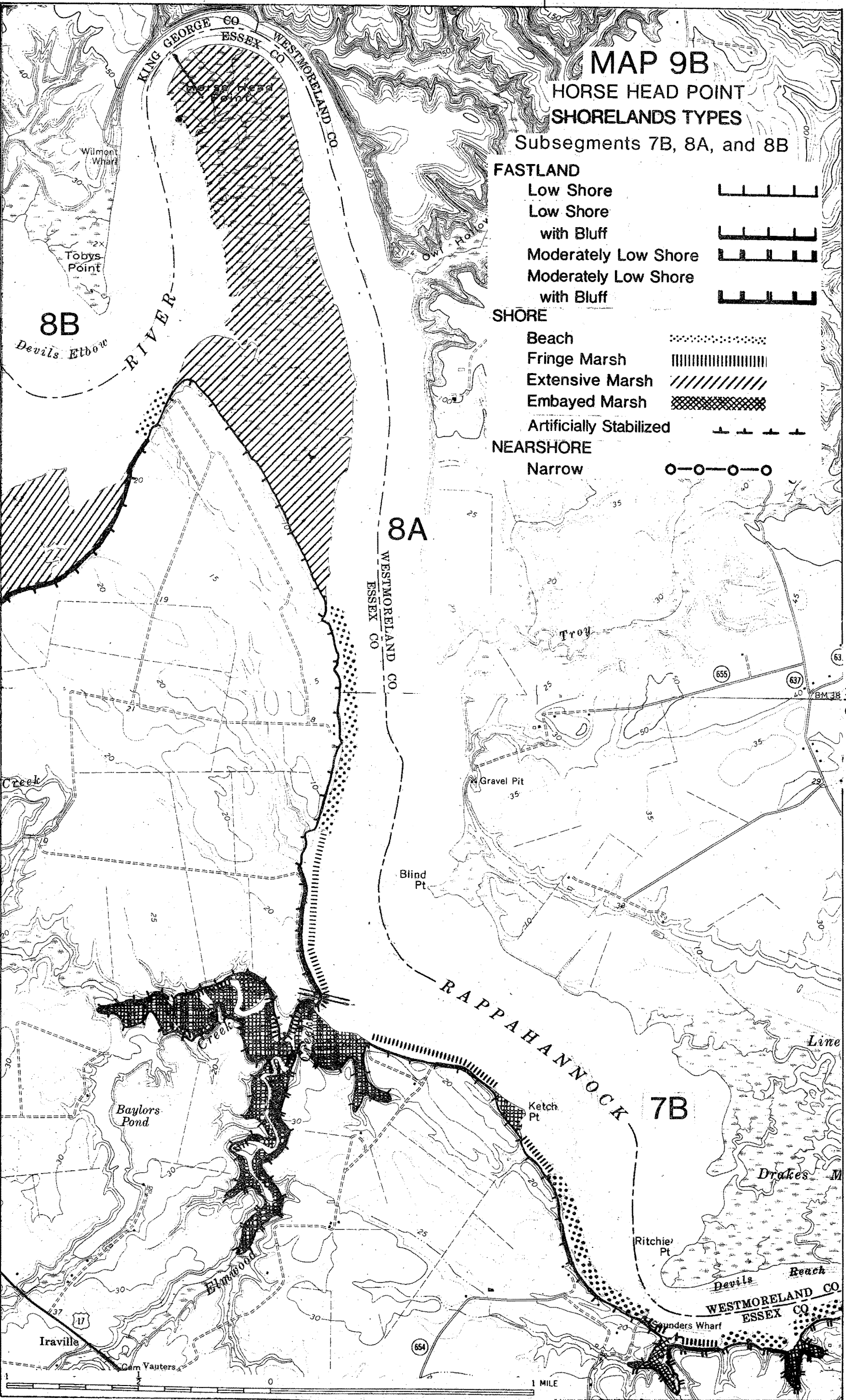
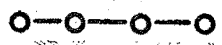


Artificially Stabilized



### NEARSHORE

Narrow



38° 07' 30"

38° 07' 30"

72° 02' 30"

72° 02' 30"

# MAP 9C

## HORSE HEAD POINT

### FASTLAND USE, OWNERSHIP, EROSION

Subsegments 7B, 8A and 8B

#### USE

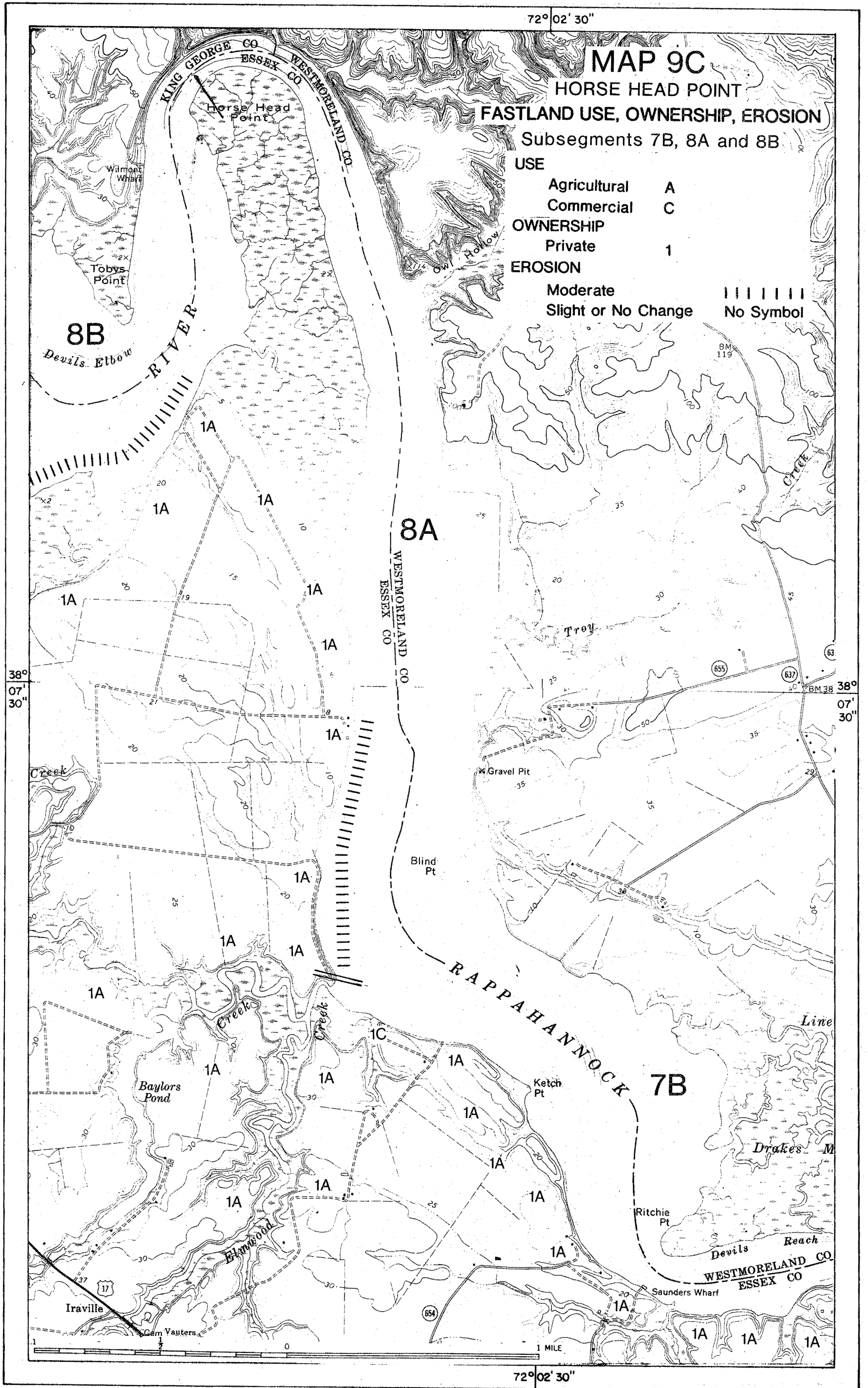
Agricultural	A
Commercial	C

#### OWNERSHIP

Private	1
---------	---

#### EROSION

Moderate	
Slight or No Change	No Symbol



72° 02' 30"

76

38° 07' 30"

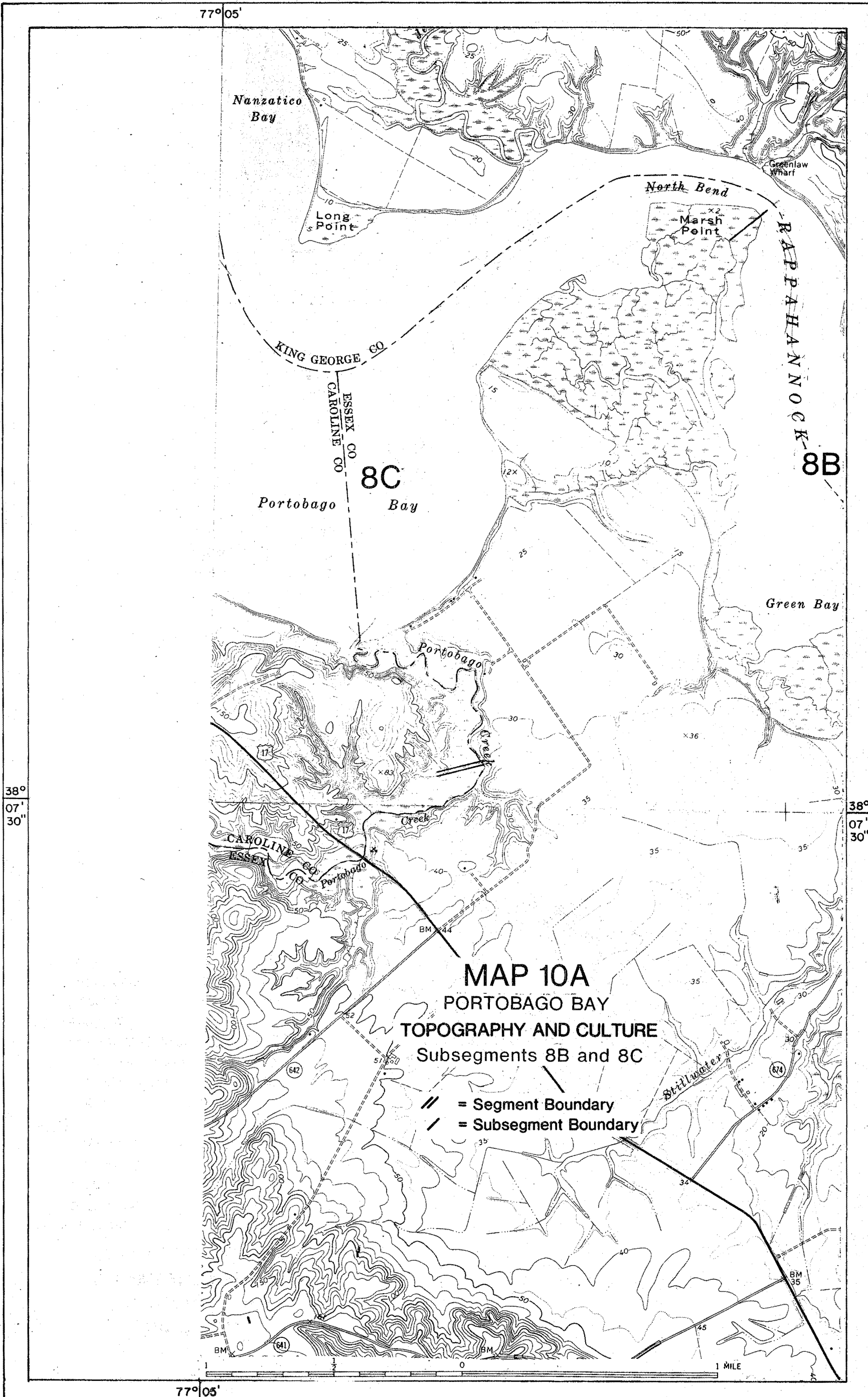
38° 07' 30"

77° 05'

38° 07' 30"

38° 07' 30"

77° 05'



# MAP 10B

PORTOBAGO BAY  
SHORELANDS TYPES  
Subsegments 8B and 8C

## FASTLAND

Low Shore

Low Shore

with Bluff

Moderately Low Shore

## SHORE

Beach

Fringe Marsh

Extensive Marsh

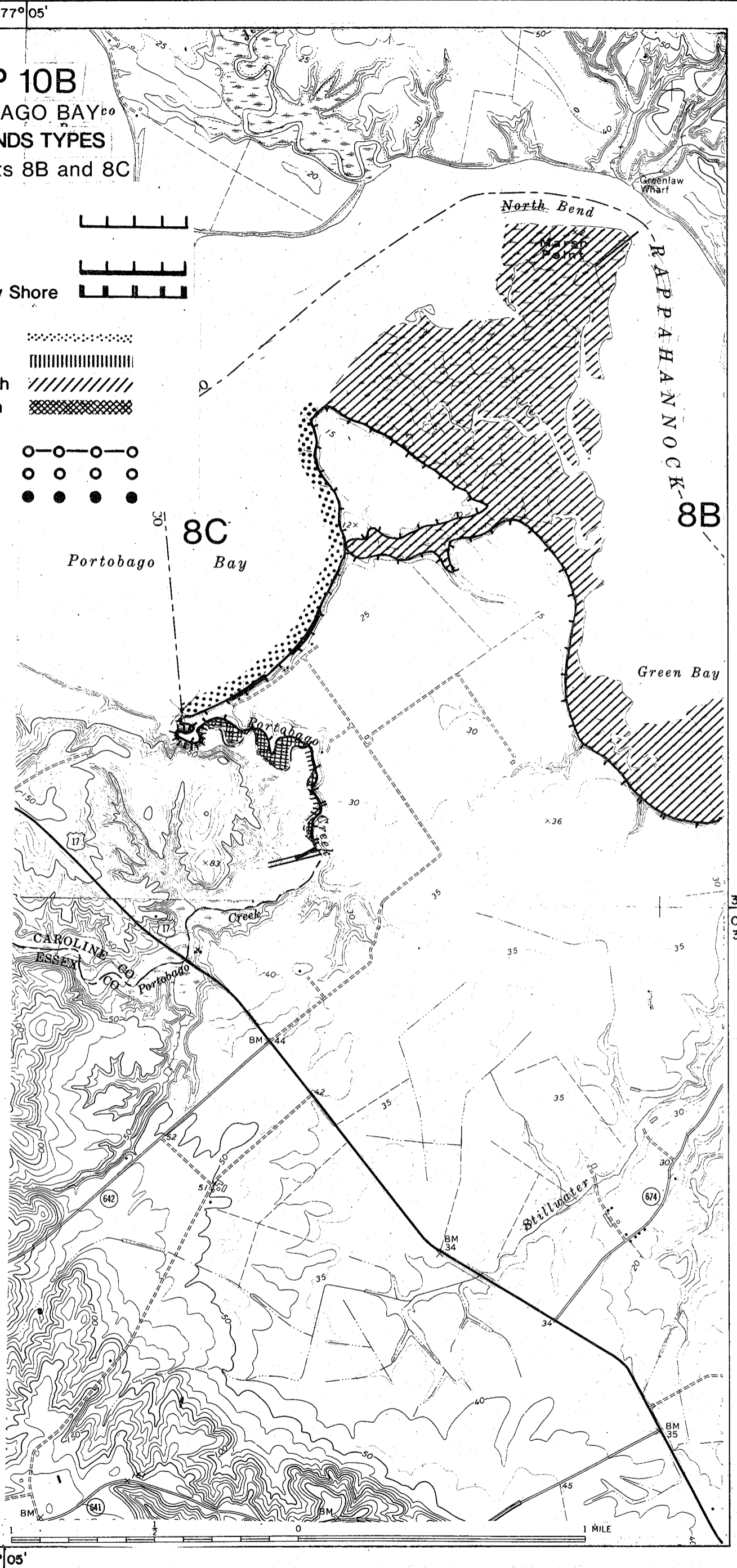
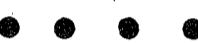
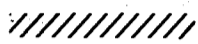
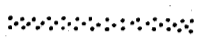
Embayed Marsh

## NEARSHORE

Narrow

Intermediate

Wide



77° 05'

Nanzatico Bay

Long Point

North Bend

Marsh Point

Greenlaw Wharf

KING GEORGE CO

ESSEX CO  
CAROLINE CO

8C

Portobago Bay

8B

Green Bay

1A

1A

1A

1A

1A

1A

1A

1A

1A

1A

1A

1A

1A

1A

1W

1A

1W

38°  
07'  
30"

38°  
07'  
30"

### MAP 10C

#### PORTOBAGO BAY

#### FASTLAND USE, OWNERSHIP, EROSION

Subsegments 8B and 8C

##### USE

- Agricultural A
- Unmanaged
- Wooded W

##### OWNERSHIP

- Private 1

##### EROSION

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

BM 641

BM 34

Stillwater Rd

674

BM 34

BM 35

1 MILE

77° 05'

