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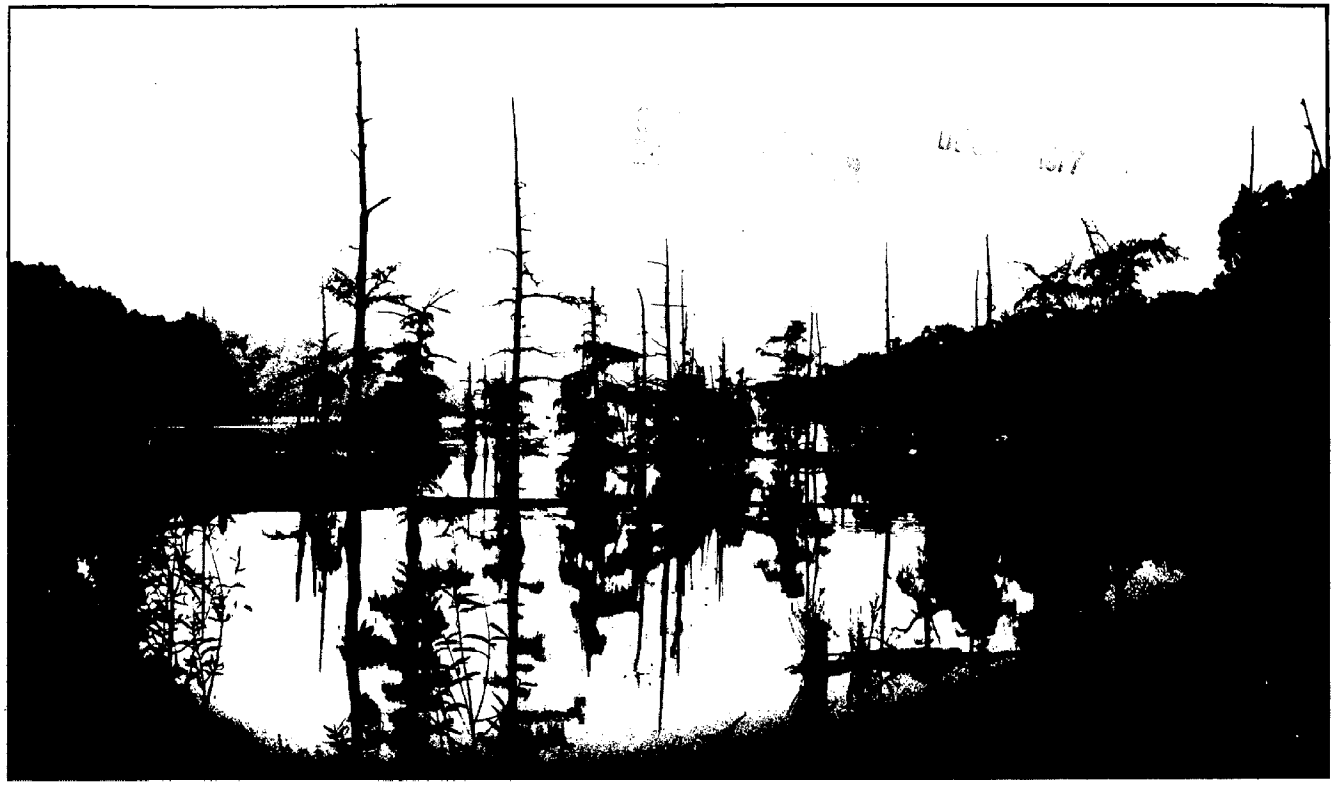
Shoreline Situation Report
SURRY COUNTY, VIRGINIA



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Chesapeake Research Consortium Report Number 50

Special Report In Applied Marine Science and Ocean Engineering Number 112 of the

VIRGINIA INSTITUTE OF MARINE SCIENCE
Gloucester Point, Virginia 23062

1976

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Shoreline Situation Report
SURRY COUNTY, VIRGINIA

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CHAPTER 1

INTRODUCTION

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INTRODUCTION

1.1 PURPOSES AND GOALS

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

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

The major man-induced uses of the shorelands are:

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

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

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

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

1.2 ACKNOWLEDGEMENTS

This report was prepared with funds provided by the Research Applied to National Needs Program (RANN) of the National Science Foundation through the Chesapeake Research Consortium, Inc. The report was 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. Beth Marshall typed the manuscript. Bill Jenkins and Ken Thornberry prepared the photographs. Lynne Rogers assisted with data reduction. We would like to thank the numerous other persons in Virginia and Maryland that have assisted our work with their suggestions and criticisms of our ideas and methods.

CHAPTER 2

APPROACH USED AND ELEMENTS CONSIDERED

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2.1 APPROACH TO THE PROBLEM

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

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

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

2.2 CHARACTERISTICS OF THE SHORELANDS INCLUDED IN THE STUDY

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

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

a) Shorelands Physiographic Classification:

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

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

Definitions:

Shore Zone

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

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

The classification used is:

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

Fastland Zone

The zone extending from the landward limit of the shore zone is termed the fastland. The fastland is relatively stable and is the site of most material development or construction. The physiographic classification of the fastland is based upon the average slope of the land within 400 feet (122 m) of the fastland - shore boundary. The general classification is:

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

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

Nearshore Zone

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

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

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

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

- Narrow, 12-ft. (3.7 m) isobath located ≤ 400 yards from shore
- Intermediate, 12-ft. (3.7 m) isobath 400-1,400 yards from shore
- Wide, 12-ft. (3.7 m) isobath ≥ 1,400 yards
  - Subclasses: with or without bars
    with or without tidal flats
    with or without submerged vegetation

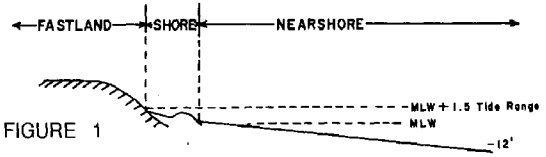


FIGURE 1

A profile of the three shorelands components.

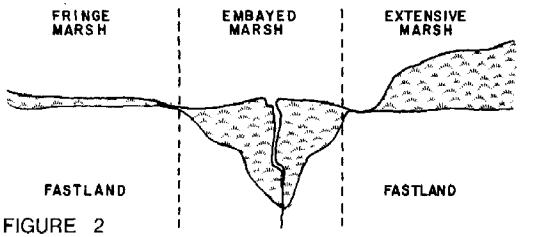


FIGURE 2

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.

Government

Includes lands whose usage is specifically controlled, restricted, or regulated by governmental organizations: e.g., Camp Peary, Fort Story.

Recreation and Other Public Open Spaces

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

Preserved

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

Agricultural

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

Unmanaged

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

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

b) Wooded: more than 40% tree cover.

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

Shore Zone

Bathing
Boat launching
Bird watching
Waterfowl hunting

Nearshore Zone

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

c) Shorelands Ownership Classification

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

d) Water Quality

The ratings of satisfactory, intermediate or unsatisfactory assigned to the various subsegments are taken from a listing at the Virginia Bureau of Shellfish Sanitation, based on information from water samples collected in the various tidewater shellfishing areas. The Bureau attempts to visit each area at least once a month.

The 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 these limits are somewhat more stringent than those used in rating recreational waters (see Virginia State Water Control Board, Water Quality Standards 1946, amended 1970), they are used here because the Bureau of Shellfish Sanitation provides the best areawide coverage available at this time. In general, any waters fitting the satisfactory or intermediate categories would be acceptable for water recreation.

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 V.I.M.S. 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 SHORELINE SITUATION

CHAPTER 3
PRESENT SHORELINE SITUATION OF SURRY COUNTY, VIRGINIA

3.1 THE SHORELANDS OF SURRY COUNTY

Surry County, located on the south side of the James River, is bounded by Lawnes Creek on the south (17.5 miles above the mouth) and by Upper Chippokes Creek on the north (38.5 miles above the mouth). The shorelands reflect the county's predominantly rural character in that they are relatively undeveloped. The only residential developments on the shore are at Scotland, Claremont, Sloop Point, and Sunken Meadow, which are for summer vacation residences. Very few areas of the shore are used extensively for most of the year.

The fastland of Surry County ranges from low shore to high shore with several areas of artificial fill (see Table 1). Artificial fill has been used to fill in behind bulkheading on the beach at Sunken Meadow. The areas at Sunken Meadow which have been filled now support buildings or trailers. Thirty-four percent of the fastlands have moderately high to high bluffs on the shore. This figure does not include those areas where bluffs occur further than 400 feet into the fastland. Most of the shoreline of the county is backed by bluffs. Fifty-two percent of the fastlands are either low shore or moderately low shore. The areas of low shore are subject to flooding during periods of abnormally high water. Most of the flooding occurs during northeast storms which affect the Chesapeake Bay area during the fall, winter, and spring months. Flooding can also be caused by severe upstream rains, as in the case of the Camille and Agnes storms of 1969 and 1972 respectively. Higher than normal water levels endanger structures which are built along the shore zone at Sunken Meadow and at Sloop Point. Tidal marshes protect the fastland in the creeks from severe flooding. Surry County's shore does not receive the full force of either type of storm, as it is located approximately 20 miles above the mouth of the James and 50 miles below the fall line in Richmond.

Only forty-two percent of Surry's shorelands border on the James River. The rest of the shore is along creeks, the larger ones being Upper and Lower Chippokes Creek, Lawnes Creek, and Grays Creek. Tidal marshes, including fringe, embayed, and extensive marshes, comprise sixty percent of the county's shoreline (a tidal marsh inventory for Surry County is forthcoming). Tidal marshes benefit the area by offering flood and erosion protection and by their many ecological assets. During floods, marshes act much like sponges, absorbing water and lessening the impact of the water on the vulnerable fastland behind. Likewise, the marshes absorb much wave energy hitting the shoreline. As stated in Chapter 2, the marshes, especially extensive marshes, act as transporters of detritus and other food chain materials, making them prime habitats for waterfowl and other animals which choose the marsh areas for their homes. The marsh areas, which are vital for the continued existence of many animals, should be preserved in their natural state.

Beaches comprise thirty-eight percent of Surry County's shoreline. Most of the beaches are fairly wide, though most have limited use and are littered with fallen trees and driftwood. There are three beaches in the county that are actively used, two of which have public admission. The beach at Scotland is privately owned residential property. The privately owned beaches at Sloop Point and Sunken Meadow charge for public admission. They are widely used during the summer months.

The fastland in Surry County is used for various activities. Agriculture plays an important part in the county's economics and controls thirteen percent of the fastland. The Hog Island State Waterfowl Refuge, Chippokes State Park, and numerous smaller sites along the shoreline are preserved areas which comprise eighteen percent of the fastland. Six percent of the shorelands are residential areas, mainly used for second or summer vacation homes. Fifty-eight percent of the fastlands are wooded areas. Development along the shoreline in Surry County is generally restricted to the areas directly bordering on the James River. Most creek areas are relatively untouched.

No data is available from the Bureau of Shellfish Sanitation since Surry County is in a transition zone between salt water and fresh water. Low salinity levels here are not conducive to shellfish propogation.

The Water Quality Inventory (305 (B) Report) by the Virginia State Water Control Board (April, 1976) indicates that while the water quality in this section is generally good, seasonal and sectional problems do exist. The only major discharger in the county is the Virginia Electric and Power Company power plant on Hog Island. However, conditions upstream probably have a greater effect on the water quality in Surry County.

There are numerous dischargers into the river in Richmond, Hopewell, and Petersburg which adversely affect the water quality. Flood waters

cause sewer overflows in Richmond, allowing oxidizable organics and bacteria to enter the James River. In late 1975, the James River below Richmond was closed to all shellfish and finfish harvesting due to chemical contamination. At the present time, the river is open to the taking of seed oysters.

3.2 SHORELINE EROSION IN SURRY COUNTY

As in all the counties in Virginia bordering major rivers or the Bay, the shorelands of Surry County are continually being eroded. This never-ending process of erosion and accretion is dependent upon many variables such as the location of the county, the physiography of its shorelands, the depth and width of the water body, and man's use of the shorelands. The many combinations of these and other factors determine whether any given area on the shoreline will erode or accrete and at what rate.

Surry County is located along the James River, its eastern boundary being 17.5 miles above the river's mouth and its western boundary 38.5 miles above the mouth. From the fall line in Richmond, the eastern boundary is 60.5 miles and the western boundary is 39.5 miles. For a point of reference, Scotland Wharf is 27 miles above the mouth and 51 miles below the fall line. The county's shore is affected by storms occurring in the Chesapeake Bay and by heavy rains occurring above the fall line.

A primary cause of erosion of the fastland is waves 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. Being so far from the mouth, the James River at Surry County is not wide enough nor straight enough to have a really significant fetch. The exception here is at Eastover, which is directly south of the mouth of the Chickahominy River (this area will be discussed later). Without a significant fetch, erosive wave action is minimized for most of the county. However, storms in the Bay do affect the county's shorelands. During severe storms, the water level rises. This storm surge may be two or more feet above the normal high tide level. This rise in water level is enough to neutralize the natural buffer provided by the beach or marsh, allowing waves to attack the higher fastland behind.

Heavy upstream rains and ensuing high water levels also are responsible for some erosion. As in the case of severe storms, the higher water levels associated with flood waters allow wave actions to erode the vulnerable cliff material behind the buffer zone.

According to an unpublished VIMS report, erosion in Surry County averages from 1.0 to 2.8 feet per year, depending upon the location of the area and the frequency and intensity of storm generated wave action. The area of greatest erosion is Eastover, encompassing an area from Sunken Meadow to the Pipsico Boy Scout Reservation. Over the last 100 years, this area has lost an average of 11.8 feet per year. As stated earlier, most of the James River at Surry County is too narrow with too many bends to allow a long fetch. At Eastover, though, the fetch from the north-northeast is 3.8 nautical miles. This long fetch comes from the mouth of the Chickahominy River located on the north bank of the James directly across from the affected area. The fetch allows winds to be significantly more powerful here, therefore causing waves hitting the shore to be more powerful and thus more erosive. The entire area has bluffs along the shoreline which are generally composed of easily erodable shell material, clay, and sand.

Eastover and other areas with wooded bluffs along the shoreline are also adversely affected by rain runoff. Rain waters erode the bluffs, undermining the trees and eventually causing them to fall. The trees carry with them large amounts of soil trapped in their root systems. This further complicates the erosion problems of a given area.

Beaches and marshes are natural barriers against the erosion of the fastland. The size and shape of any particular beach or marsh changes through time, due to storm actions, erosion patterns, and man's intervention. Beaches rely on the erosion of the fastland for a continuous supply of sand in the littoral drift. Storms which cause severe erosion in one area can help to build the beaches downdrift. However, stabilization of an eroding area can cut off the sand supply downstream and starve the beaches there. Proper design and construction of the shore protective structures can minimize any detrimental effects from the emplacement. Only 2% (0.7 miles) of Surry's 66.0 miles of shoreline have been stabilized. Most areas suffering from erosion are unmanaged, wooded. The problem is thus not critical and the areas need no protection. In cases of erosion where stabilization seems to be the answer, an area wide plan of shore protection should be adopted. Individual costs are reduced

and the chances for aggravated erosion nearby are greatly lessened with such a plan.

Shoreline erosion in most of Surry County is not a serious problem. The erosion rate in most areas is slight to moderate. Problems arising from erosion are usually the result of a lack of planning on the part of the developer or individual who buys shorefront property. Planning ahead can solve many problems before they become critical. For instance, many people want to build overlooking the water. However, building near the edge of a cliff is not advisable, as erosion will soon force relocation. Likewise, building on areas where elevations are less than 7 feet is inviting damages from flood waters. Good, common sense in building near the shoreline is imperative if one is to enjoy one's investment.

3.3 SHORE USE LIMITATIONS

Along any given stretch of shoreline, many factors can limit or restrict the area's use. Some restricting factors are:

1. The elevation of the shorelands. High bluff areas are easily eroded, low lands are subject to flooding.
2. The exposure of the shorelands. An area exposed to severe storm actions can be easily eroded and flooded.
3. The existing use of the shorelands. Many areas are preserved, which prohibits development. Adjacent industrial plants would inhibit residential usage.
4. Other factors. There are other contributing factors to an area's use or nonuse. These include access, water navigability, area geology, zoning regulations, and water quality.

Before considering the merits vs. disadvantages of any given area, one has to have an "ideal" with which to compare. This ideal land on the shore, though different to everyone, has certain qualities which most potential shore dwellers would probably agree upon. It would have elevations of from 10 to 20 feet (to protect against flooding), be stable with a nice, wide, sandy beach, and have access to deep water (at least 6-foot depths within 100 feet of shore). Ideally, the land would have good access (a paved road nearby), and would not be close to any potential contaminants (industrial plants, gravel pits, sewage outfalls, etc.). In considering the potential for development, one has to weigh each advantage and disadvantage of an area and make a decision on those factors which are most important to him. Our discussion in this section will be of those factors in a given area which we feel could limit development there.

There are approximately 27.8 miles of river-fronting shoreline in Surry County, representing forty-two percent of the total shoreline. This section of the county should have the most value for potential developers, since it has beaches and usually good access to deep water. A total of 7.3 miles of the river shoreline, including Hog Island State Waterfowl Refuge, Chippokes State Park, and four smaller areas, are preserved, either for historical or for ecological purposes. Other sections in Surry where development would be prohibited are the Surry Nuclear Power Plant (0.8 miles) and the Pipsico Boy Scout Reservation (1.3 miles).

The shorelands of Surry County also support summer - recreational communities. These areas include Sunken Meadow (0.7 miles), Sloop Point (0.6 miles), Guildford Heights (0.6 miles), Scotland (0.8 miles), and Cobham Wharf (0.6 miles). These areas total 3.3 miles and represent 12% of the river-fronting shoreline. Very little additional development can occur in these residential communities, since most river-fronting property is already used. Thus, 12.7 miles (46%) of Surry County's shoreline on the James River is not available for development.

The rest of the river shoreline in Surry County is almost totally unused, the exception being those areas used for agriculture. There are several reasons for the present undeveloped state of the shoreline. Almost the entire shoreline in Surry County bordering the river has unstable bluffs. Downhill rain runoff continually erodes these areas, often undermining trees which eventually fall and complicate the erosion problem. Most of the unused areas suffer from moderate erosion, with one section having severe erosion of 11.8 feet per year. Also, there is no good access to most unused sections of the shoreline.

As a result of these processes, development on the shoreline would be costly. Slope stabilization and manipulation of surface drainage will be necessary prior to development near the edge of higher shorelands.

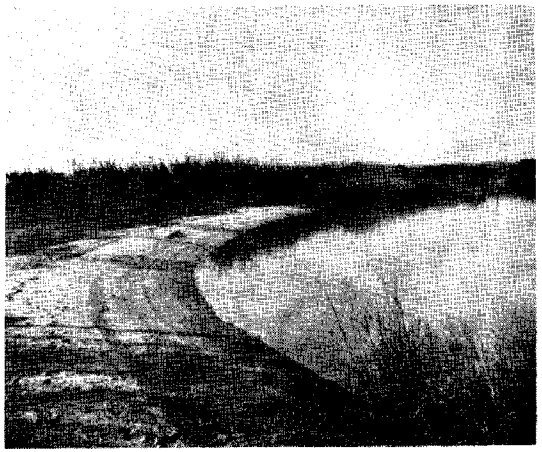


FIGURE 3

FIGURE 3: Beach and marsh at Hog Island State Waterfowl Refuge. The entire area is preserved.

FIGURE 4: Beach at Chippokes State Park. A sand bar has formed at the mouth of the creek.

FIGURE 5: Bluffs between Broad Swamp and Wakefield. The bluffs here, as in most of Surry, are continually eroding. Rain runoff, wind and wave actions all contribute to this problem.

FIGURE 6: A marina and several private residences are located at Pleasant Point at the mouth of Crouch Creek.

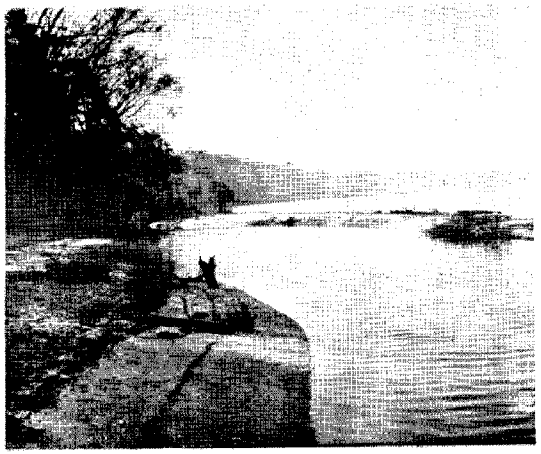


FIGURE 4

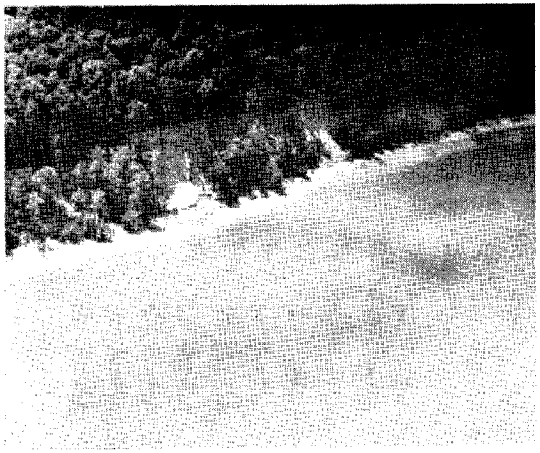


FIGURE 5

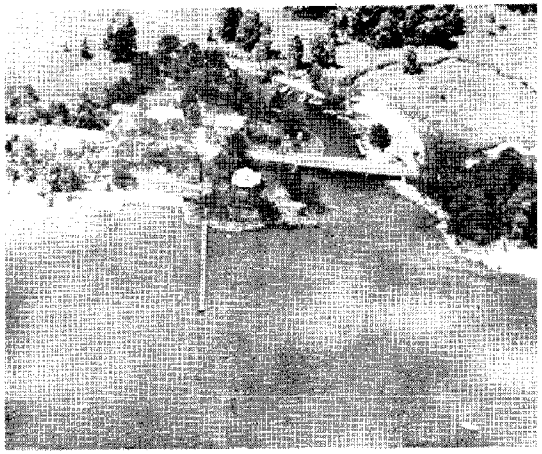


FIGURE 6

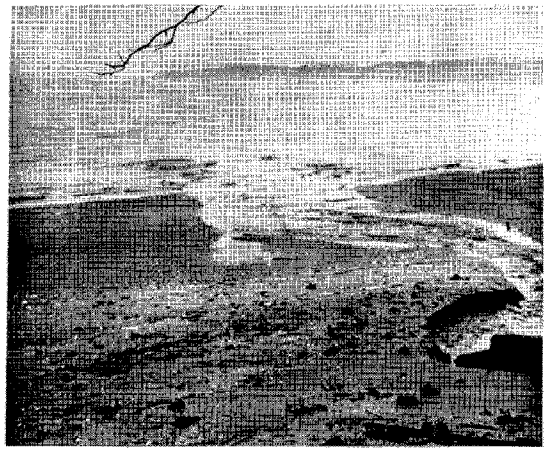


FIGURE 7

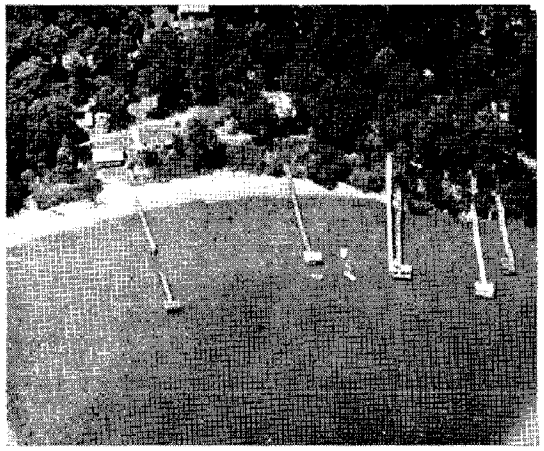


FIGURE 8

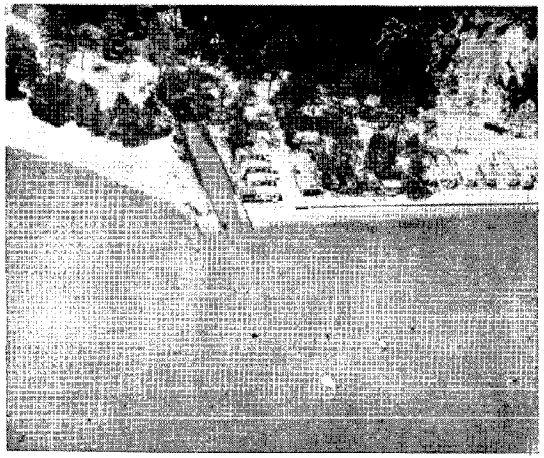


FIGURE 9

FIGURE 7: Creek on beach at Guildford Heights. The beaches here are nourished by the erosion of the bluffs behind.

FIGURE 8: The piers at Scotland reflect the heavy summer vacation residential usage of this area. Most houses are built on the bluffs along the shoreline.

FIGURE 9: Beach and stream at Sunken Meadow. The trailers are placed on artificial fill behind a wooden bulkhead. Flooding from storm induced waves poses a serious problem here.

FIGURE 10: Ground view of trailers at Sunken Meadow. The bulkhead has been repaired in several places.

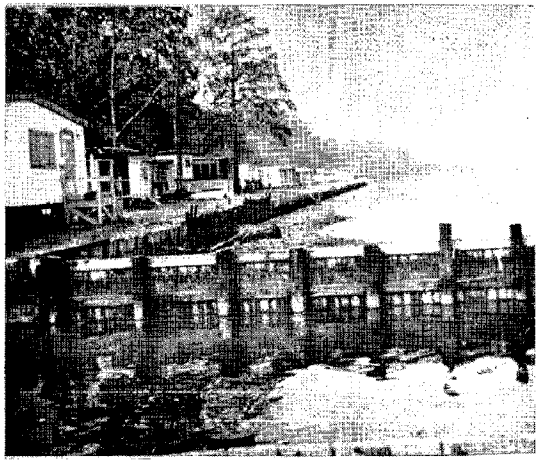
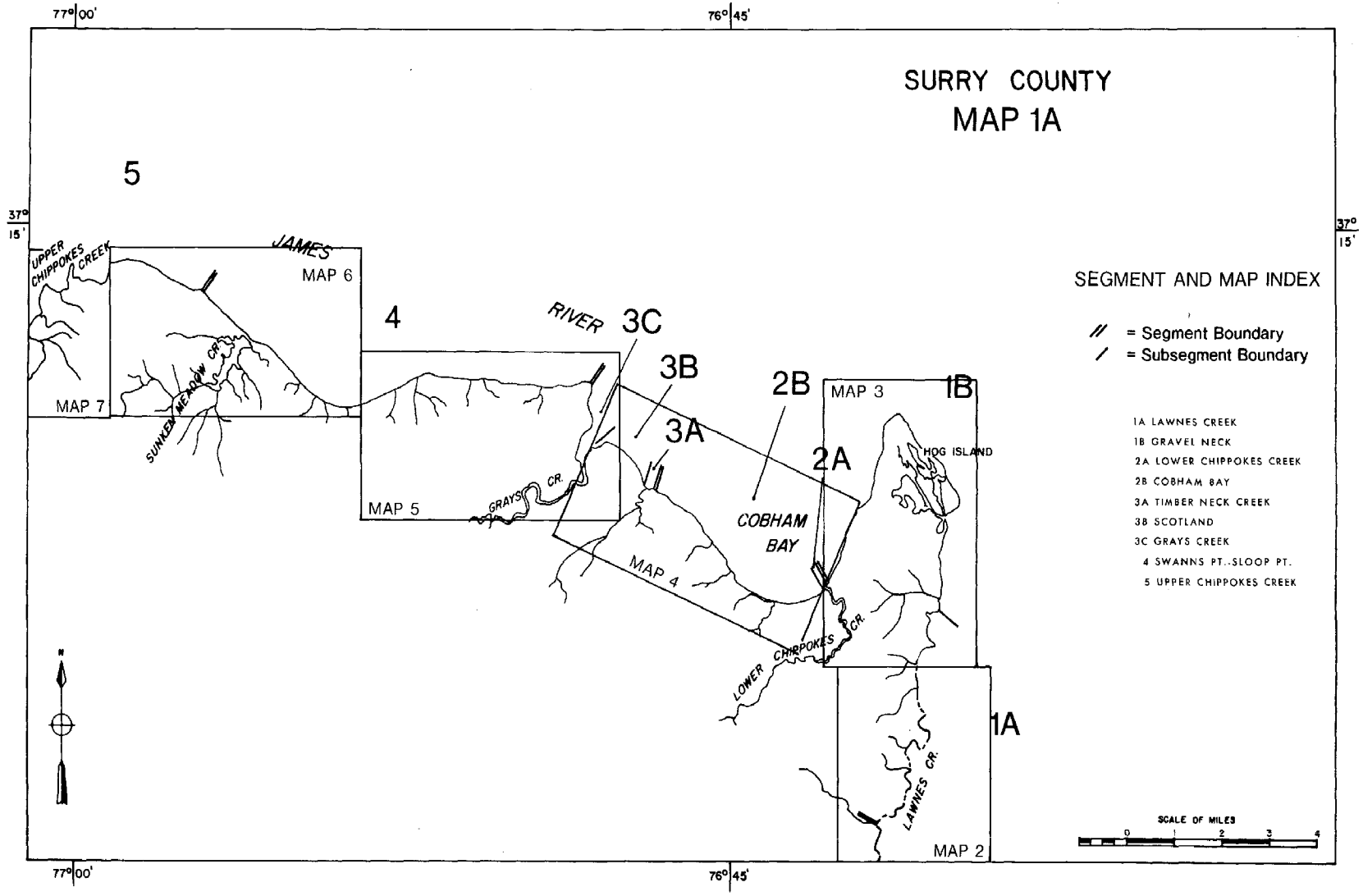
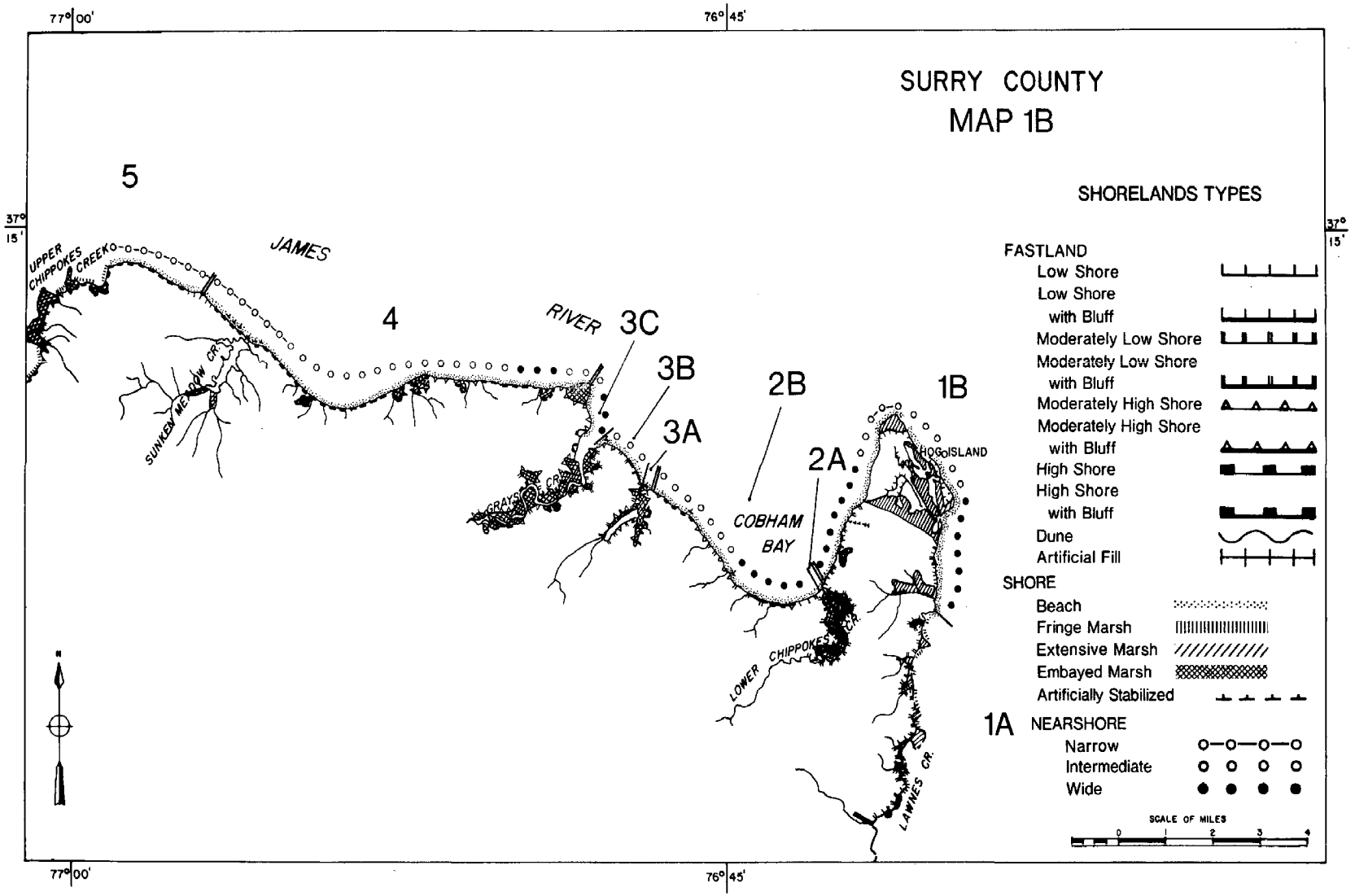
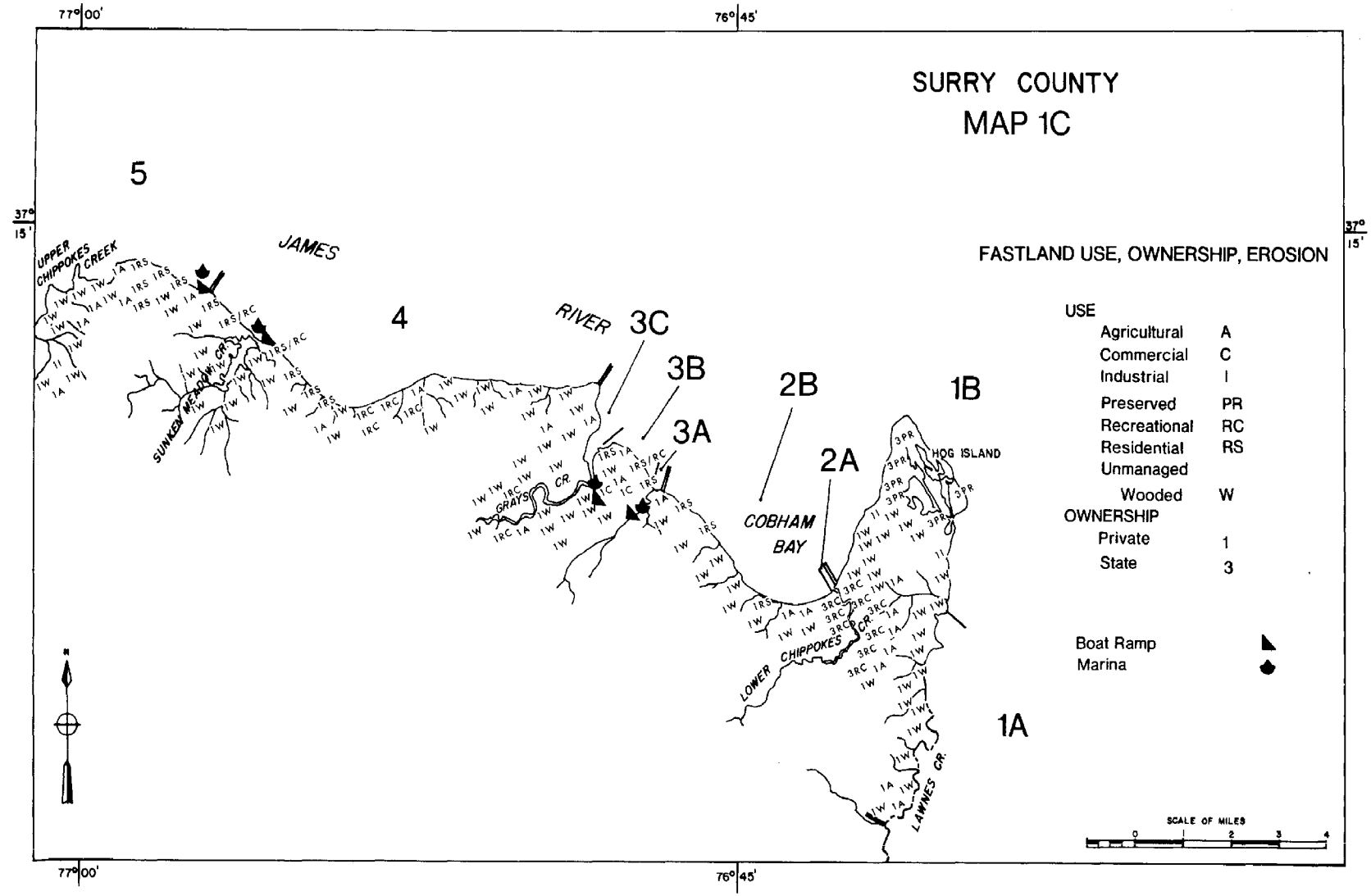


FIGURE 10


77°00'
76°45'
SURRY COUNTY
MAP 1A
5
37°15'
JAMES
RIVER
UPPER CHIPPOKES CREEK
MAP 6
4
3C
3B
2B
1B
MAP 7
SUNKEN MEADOW CR.
MAP 3
3A
2A
HOG ISLAND
MAP 5
GRAYS CR.
COBHAM BAY
MAP 4
LOWER CHIPPOKES CR.
1A
LAWNES CR.
MAP 2
SEGMENT AND MAP INDEX
// = Segment Boundary
/ = Subsegment Boundary
1A LAWNES CREEK
1B GRAVEL NECK
2A LOWER CHIPPOKES CREEK
2B COBHAM BAY
3A TIMBER NECK CREEK
3B SCOTLAND
3C GRAYS CREEK
4 SWANNS PT.-SLOOP PT.
5 UPPER CHIPPOKES CREEK
SCALE OF MILES
0 1 2 3 4


77°00'
76°45'
SURRY COUNTY
MAP 1B
5
4
3C
3B
3A
2B
2A
1B
37°
15'
JAMES
RIVER
UPPER CHIPPOKES CREEK
SUNKEN MEADOW CR.
GRAYS CREEK
COBHAM BAY
HOG ISLAND
LOWER CHIPPOKES CR.
LAWNES CR.
SHORELANDS TYPES
FASTLAND
Low Shore
Low Shore with Bluff
Moderately Low Shore
Moderately Low Shore with Bluff
Moderately High Shore
Moderately High Shore with Bluff
High Shore
High Shore with Bluff
Dune
Artificial Fill
SHORE
Beach
Fringe Marsh
Extensive Marsh
Embayed Marsh
Artificially Stabilized
1A NEARSHORE
Narrow
Intermediate
Wide
SCALE OF MILES
0 1 2 3 4


77°00'
76°45'
37°15'
SURRY COUNTY
MAP 1C
FASTLAND USE, OWNERSHIP, EROSION
5
4
3C
3B
3A
2B
2A
1B
1A
JAMES
RIVER
UPPER CHIPPOKES CREEK
SUNKEN MEADOW CR.
GRAYS CR.
COBHAM BAY
HOG ISLAND
LOWER CHIPPOKES CR.
LAWNES CR.
USE
Agricultural A
Commercial C
Industrial I
Preserved PR
Recreational RC
Residential RS
Unmanaged
Wooded W
OWNERSHIP
Private 1
State 3
Boat Ramp
Marina
SCALE OF MILES
0 2 3 4

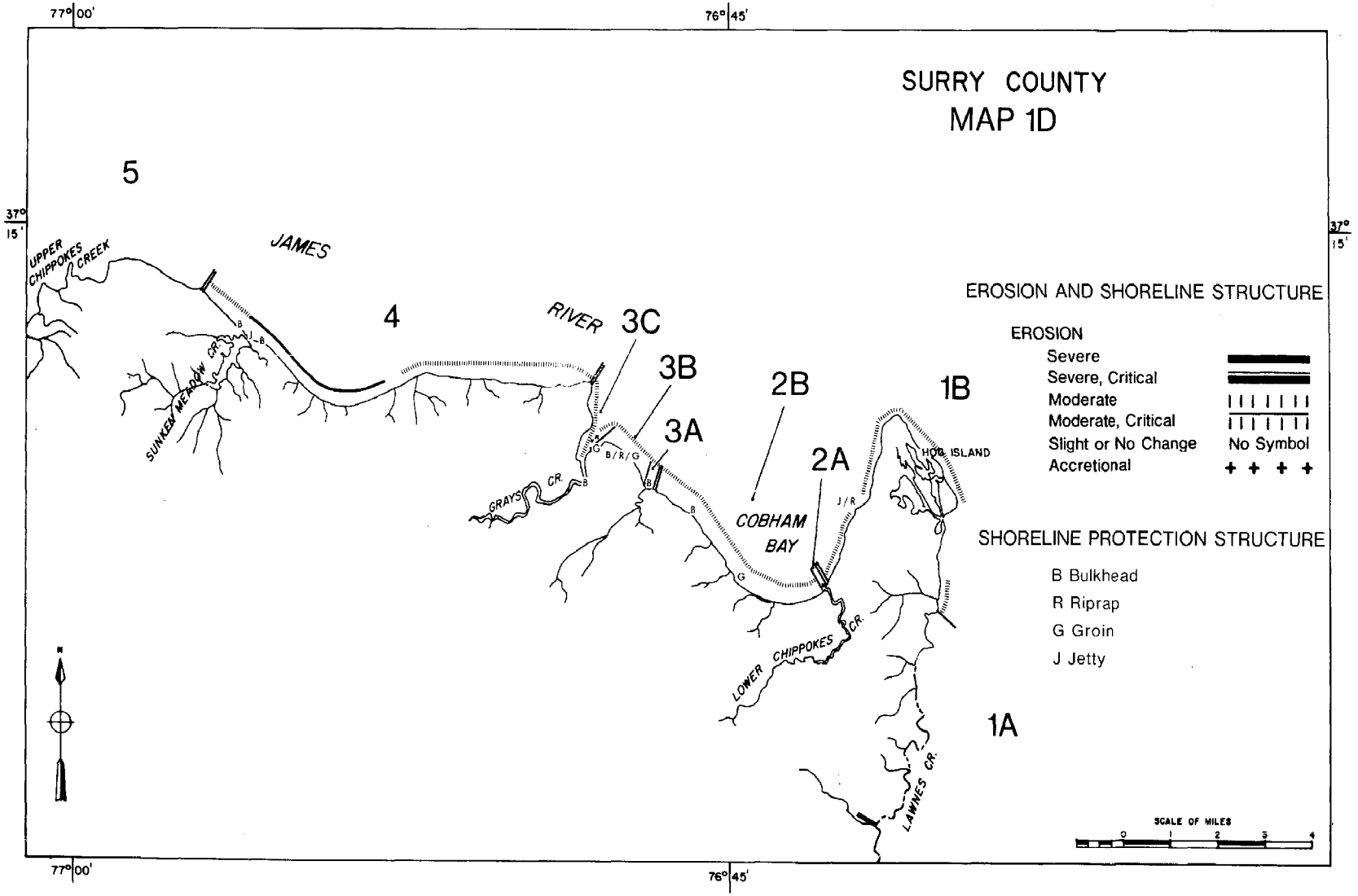

77°00'
76°45'
SURRY COUNTY
MAP 1D
5
4
3C
3B
3A
2B
2A
1B
1A
37°
15'
JAMES
RIVER
UPPER CHIPPOKES CREEK
SUNKEN MEADOW CR.
GRAYS CR.
COBHAM BAY
HOG ISLAND
LOWER CHIPPOKES CR.
LAWNES CR.
EROSION AND SHORELINE STRUCTURE
EROSION
Severe
Severe, Critical
Moderate
Moderate, Critical
Slight or No Change
No Symbol
Accretional
SHORELINE PROTECTION STRUCTURE
B Bulkhead
R Riprap
G Groin
J Jetty
SCALE OF MILES
0 1 2 3 4

TABLE 1. SUMMARY OF SURRY COUNTY SHORELANDS PHYSIOGRAPHY, FASTLAND USE AND OWNERSHIP (STATUTE MILES)

Ownership, use and physiographic classification / Subsegment	SHORELANDS PHYSIOGRAPHY																FASTLANDS USE								OWNERSHIP		TOTAL MILES	
	FASTLANDS								SHORE					NEARSHORE														
	ARTIFICIAL FILL	LOW SHORE	MODERATELY LOW SHORE	MODERATELY LOW SHORE WITH BLUFF	MODERATELY HIGH SHORE	MODERATELY HIGH SHORE WITH BLUFF	HIGH SHORE	HIGH SHORE WITH BLUFF	ARTIFICIALLY STABILIZED	BEACH	FRINGE MARSH	EMBAYED MARSH	EXTENSIVE MARSH	NARROW	INTERMEDIATE	WIDE	AGRICULTURAL	COMMERCIAL	INDUSTRIAL	PRESERVED	RECREATIONAL	RESIDENTIAL	UNMANAGED, WOODED	UNMANAGED, OPEN	PRIVATE	STATE	SHORE	FASTLAND
1A		1.8	5.9	0.3						0.2	1.7	1.5	2.4				0.4		0.4				7.2		8.0		5.8	8.0
1B		12.1	2.3	1.1					0.1	6.5			1.9	0.3	3.2	5.0			0.6	10.2			4.7		5.3	10.2	8.4	15.5
2A		2.4	3.6	1.9	0.2	0.2		0.2			2.5	4.1					1.6			3.0		0.5	3.4		5.5	3.0	6.6	8.5
2B		1.0	0.5	0.8		1.7		0.8		4.7				0.5	1.2	3.1	1.7			1.2		0.6	1.2		3.6	1.1	4.7	4.7
3A		0.6	2.8	0.1	1.9		1.2		0.2	0.2	1.0	7.5			0.2			0.1				0.3	6.2		6.6		8.9	6.6
3B		0.3	0.6	0.3	0.1	0.3			0.1	1.5					1.2	0.5	0.4					0.8	0.2	0.2	1.6		1.6	1.6
3C		1.1	3.9	0.5	0.7	6.0		4.7		1.3	2.2	8.2			0.2	0.9	1.8	0.1			0.1	0.2	14.4	0.3	16.9		11.7	16.9
4	0.1	2.3	0.5		0.8	0.3	0.2	8.4	0.3	8.3		0.6		2.2	6.3	0.8	2.4			0.4	2.6	2.1	5.1		12.6		9.3	12.6
5		1.3	1.1	0.3	1.7	0.8		5.0		2.2	2.7	4.1		1.6	0.6		2.5		0.3			0.8	6.6		10.2		9.0	10.2
TOTAL	0.1	22.9	21.2	5.3	5.4	9.3	1.4	19.1	0.7	24.9	10.1	26.0	4.3	4.6	12.9	10.3	10.8	0.2	1.3	14.8	2.7	5.3	49.0	0.5	70.3	14.3	66.0	84.6
% of FASTLAND	0	27%	25%	6%	6%	11%	2%	23%									13%	0	1%	18%	3%	6%	58%	1%	83%	17%		100%
% of SHORELINE									2%	38%	15%	39%	6%	7%	19%	16%											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 SURRY COUNTY, VIRGINIA

SUBSEGMENT	SHORELAND TYPE	SHORELAND USE	OWNERSHIP	ZONING	FLOOD HAZARD	BEACH QUALITY	SHORE EROSION SITUATION	ALTERNATE SHORE USES
1A LAWNES CREEK 5.2 miles (5.0 miles of fastland)	FASTLAND: Low shore 22%, moderately low shore 74%, and moderately low shore with bluff 4%. SHORE: Beach 3%, fringe marsh 30%, embayed marsh 25%, and extensive marsh 42%. CREEK: Lawnes Creek has 2-foot depths at its mouth.	FASTLAND: Unmanaged, wooded 89%, industrial 6%, and agricultural 5%. SHORE: Sport fishing and waterfowl hunting. CREEK: Sport fishing.	Private.	Agricultural - rural residential.	Low. The area has at least 20-foot elevations throughout.	Poor. The only beach in this subsegment is at the mouth of the creek where access is limited.	This area appears to be stable. There are no endangered or protective structures.	Low. The marsh areas should be preserved in their natural state. Various low intensity recreational uses are a possibility.
1B HOG ISLAND 8.4 miles (15.5 miles of fastland)	FASTLAND: Low shore 78%, moderately low shore 15%, and moderately low shore with bluff 7%. SHORE: Artificially stabilized 1%, beach 77%, and extensive marsh 22%. NEARSHORE: Narrow 5%, intermediate 39%, and wide 56%.	FASTLAND: Industrial 4%, preserved 66%, and unmanaged, wooded 30%. SHORE: Approximately 30,000 feet of shoreline is preserved (Hog Island Waterfowl Refuge) and about 2,000 feet is industrial. The remaining shoreline has limited low intensity recreational usage. NEARSHORE: Commercial shipping in the channel and some sport fishing.	State 66% and Private 34%.	Agricultural - rural residential and some industrial.	Low, noncritical, except at the Hog Island State Waterfowl Refuge where it is moderate to high, noncritical. For two structures at the Surry Nuclear Plant there is a high, critical flood hazard.	Fair. Beaches here are less than 20 feet wide with fine grained sand.	Moderate, noncritical. The historical erosion rate from Hog Island to Walnut Point is 2.8 feet per year. There is about 100 feet of ineffective bulkheading with groins along the west side of Hog Island. Two effective rubble riprap jetties and a cement bag bulkhead are located at the Surry Nuclear Power Plant.	Low. Hog Island is a preserved area. The Surry Nuclear Plant is south of Hog Island and has limited development potential. The rest of the subsegment has limited access and should be left in its natural state.
2A LOWER CHIPPOKES CREEK 6.6 miles (8.5 miles of fastland)	FASTLAND: Low shore 28%, moderately low shore 43%, moderately low shore with bluff 23%, moderately high shore 2%, moderately high shore with bluff 2%, and high shore with bluff 2%. SHORE: Fringe marsh 36% and embayed marsh 62%. CREEK: Average depths range from 2 to 5 feet.	FASTLAND: Agricultural 19%, preserved 35%, residential 6%, and unmanaged, wooded 40%. SHORE: Fishing and waterfowl hunting in the marsh areas. CREEK: Fishing.	Private 65% and State 35%.	Agricultural - rural residential.	Low, except moderate for the marsh areas.	There are no beaches along Lower Chippokes Creek.	The area at the mouth of Lower Chippokes Creek is accreting. The rest of the creek appears stable. There are no endangered or protective structures.	Low. 62% of the shoreline is embayed marsh and should be left in its natural state. The west side of the creek is Chippokes Plantation State Park where development is prohibited. Most of the remaining shoreline has limited access.
2B COBHAM BAY 4.7 miles (4.7 miles of fastland)	FASTLAND: Low shore 20%, moderately low shore 10%, moderately low shore with bluff 17%, moderately high shore with bluff 37%, and high shore with bluff 17%. SHORE: Artificially stabilized 1% and beach 99%. NEARSHORE: Narrow 10%, intermediate 25%, and wide 65%.	FASTLAND: Agricultural 38%, preserved 25%, residential 12%, and unmanaged, wooded 25%. SHORE: Some sun bathing and walking. NEARSHORE: Fishing, boating, and other water sports.	Private 75% and State 25%.	Agricultural, with some vacation residential and a small preserved historical area.	Low to moderate. Several homes to the east of Blizzards Creek have a moderate critical flood hazard.	Good to fair. Beaches are generally 15 to 25 feet wide and have fine, white sand.	Moderate, noncritical. There are two effective wooden groins just east of the mouth of Blizzards Creek. At Cobham Wharf, there are three sections of wooden bulkheading totaling 175 feet which are ineffective.	Low. The majority of the shoreline is either restricted or extensively used. The remaining portion is zoned as agricultural and rural residential.
3A TIMBERNECK CREEK AND CROUCH CREEK 8.9 miles (6.6 miles of fastland)	FASTLAND: Low shore 9%, moderately low shore 65%, moderately low shore with bluff 1%, moderately high shore 25%, and high shore 19%. SHORE: Artificially stabilized 2%, beach 3%, fringe marsh 12%, and embayed marsh 83%. NEARSHORE: Intermediate 2%. CREEK: Very narrow and shallow.	FASTLAND: Commercial 2%, residential 5%, and unmanaged, wooded 93%. SHORE: Some fishing and waterfowl hunting in the marshes. NEARSHORE: Sport boating and fishing. CREEK: Mostly waterfowl hunting.	Private.	Mostly agricultural, some vacation recreational.	Low. The creek is protected from severe storm effects.	Fair. There are fairly narrow beaches at the mouth of the creek.	Moderate, noncritical. Erosion at the mouth of the creek averages 1.1 feet per year historically. There is an 800-foot bulkhead and three groins at Pleasant Point, and a 200-foot bulkhead on the opposite side of the creek. All structures appear to be effective.	Low. The land at the creek mouth on both sides is already developed. The rest of the subsegment is unused and probably should remain so.
3B SCOTLAND 1.6 miles (1.6 miles of fastland)	FASTLAND: Low shore 16%, moderately low shore 35%, moderately low shore with bluff 21%, moderately high shore 7%, and moderately high shore with bluff 21%. SHORE: Artificially stabilized 9% and beach 91%. NEARSHORE: Intermediate 72% and wide 28%.	FASTLAND: Agricultural 25%, residential 50%, unmanaged, wooded 12%, and unmanaged, open 12%. SHORE: The Scotland Ferry Wharf is in this subsegment. The remaining shoreline is used for bathing and fishing. NEARSHORE: Sport fishing and boating.	Private.	Mostly vacation residential, some business and agricultural.	Low. Most areas have at least 10-foot elevations.	Good to fair. Beaches are 10 to 30 feet wide with fine grained sand. Beaches have some vegetation.	Moderate, noncritical. Most of the erosion in this area is caused by downhill rain runoff, which results in the slumping of exposed cliff material. There is about 300 feet of rubble riprap and 250 feet of wooden bulkheading. There are also 7 groins along the beach which appear to be effective.	None. The Scotland area is already extensively used.

TABLE 2 (con't).

SUBSEGMENT	SHORELANDS TYPE	SHORELANDS USE	OWNERSHIP	ZONING	FLOOD HAZARD	BEACH QUALITY	SHORE EROSION SITUATION	ALTERNATE SHORE USES
3C GRAYS CREEK 11.7 miles (16.9 miles of fastland)	FASTLAND: Low shore 6%, moderately low shore 23%, moderately low shore with bluff 3%, moderately high shore 4%, moderately high shore with bluff 36%, and high shore with bluff 28%. SHORE: Artificially stabilized, less than 1%, beach 11%, fringe marsh 19%, and embayed marsh 70%. NEARSHORE: Intermediate 2% and wide 7%. The rest of Grays Creek is too narrow and shallow for classification.	FASTLAND: Agricultural 11%, commercial less than 1%, recreational less than 1%, residential less than 1%, unmanaged, wooded 85%, and unmanaged, open 2%. SHORE: Bathing and recreational purposes. There is some waterfowl hunting in the marshes. NEARSHORE: Boating and fishing.	Private.	Mostly agricultural - rural residential, with some vacation residential.	Low. The entire area has elevations of at least 10 feet.	Poor. Beaches are thin and partially covered with vegetation.	Erosion from Swanns Point to the mouth of Grays Creek has averaged 1.1 feet per year. No data is available for Grays Creek. There is about 200 feet of bulkheading at Grays Creek Marina.	Low. The marsh areas along Grays Creek should be preserved and used for low intensity recreational purposes such as nature trails and bird watching.
4 SWANNS POINT TO SLOOP POINT 9.3 miles (12.6 miles of fastland)	FASTLAND: Artificial fill less than 1%, low shore 19%, moderately low shore 4%, moderately high shore 7%, moderately high shore with bluff 2%, high shore 1%, and high shore with bluff 66%. SHORE: Artificially stabilized 3%, beach 90%, and embayed marsh 7%. NEARSHORE: Narrow 23%, intermediate 68%, and wide 9%.	FASTLAND: Agricultural 19%, preserved 3%, recreational 21%, residential 17%, and unmanaged, wooded 40%. SHORE: Bathing, fishing, and walking. NEARSHORE: Boating, fishing, and other water related sports.	Private.	Mostly agricultural - rural residential. Some urban residential and vacation - residential. There are three areas that are historic preservation districts.	Low, noncritical for most of the subsegment. Sunken Meadow and Sloop Point have a moderate, critical flood hazard.	Fair to good. Sunken Meadow and Sloop Point have good wide, sandy beaches.	Slight or no change to severe, noncritical. The shoreline between Pipsico Boy Scout Reservation and Sunken Meadow has an erosion rate of 11.8 feet per year. No structures are endangered. At Sunken Meadow, about 1,500 feet of wooden bulkhead has been erected to retain artificial fill which seems effective. The stream to Sunken Meadow has wooden bulkheading extending into jetties. Some of the bulkhead is failing and the jetties are ineffective.	Low. The unused areas of this subsegment should remain in their natural state, but are well suited for low density recreational use such as nature walks, picnicking, and possibly camping.
5 UPPER CHIPPOKES CREEK 9.0 miles (10.2 miles of fastland)	FASTLAND: Low shore 13%, moderately low shore 11%, moderately low shore with bluff 3%, moderately high shore 17%, moderately high shore with bluff 8%, and high shore with bluff 48%. SHORE: Beach 25%, fringe marsh 29%, and embayed marsh 46%. NEARSHORE: Narrow 18% and intermediate 6%. The rest of the subsegment is creek, which is too shallow for classification.	FASTLAND: Agricultural 24%, industrial 4%, residential 8%, and unmanaged, wooded 64%. SHORE: Bathing, fishing, and some waterfowl hunting in the marshes. NEARSHORE: Sport boating, fishing, and other water related sports. CREEK: Sport fishing.	Private.	Agricultural - rural residential.	Low, noncritical to moderate, critical. Several structures at Sloop Point are below 10-foot elevations and have a moderate, critical flood hazard.	Good to fair. Sloop Point has a good beach. Most others are thin.	Slight or no change to moderate, noncritical. The area east of the creek mouth has an erosion rate of 1.0 to 1.2 feet per year. There are no protective structures.	Low. Upper Chippokes Creek is largely unused except for sport hunting and fishing. Any development here should be in harmony with the natural surroundings. The area is best suited for low intensity recreational usage.

SUBSEGMENT 1A

LAWNES CREEK, SURRY COUNTY, VIRGINIA

Maps 2 and 3

EXTENT: 30,800 feet (5.8 mi.) of shoreline along the west side of Lawnes Creek. The subsegment also contains 42,400 feet (8.0 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 22% (1.8 mi.), moderately low shore 74% (5.9 mi.), and moderately low shore with bluff 4% (0.3 mi.).
SHORE: Beach 3% (0.2 mi.), fringe marsh 30% (1.7 mi.), embayed marsh 25% (1.5 mi.), and extensive marsh 42% (2.4 mi.).
CREEK: Lawnes Creek is shallow at its mouth, with a depth of 2 feet. Sections of the creek have depths of 5 to 9 feet.

SHORELANDS USE
FASTLAND: Unmanaged, wooded 89% (7.2 mi.), industrial 6% (0.4 mi.), and agricultural 5% (0.4 mi.). The industrial usage is comprised of the gravel pit operations near the head of the creek.
SHORE: Some fishing and waterfowl hunting in the marshes.
NEARSHORE: Sport fishing.

SHORELINE TREND: The creek shoreline trends basically N - S in this subsegment.

OWNERSHIP: Private.

ZONING: Agricultural - rural residential.

FLOOD HAZARD: Low. The area is not subject to large waves or other direct storm effects. With elevations of at least 20 feet throughout the subsegment, this area is not susceptible to flooding.

BEACH QUALITY: The only beach in the subsegment is located at the mouth of the creek. This beach is fairly wide, but access is very poor.

SHORE EROSION SITUATION
EROSION RATE: The area appears stable.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: None.

SHORE USE LIMITATIONS: Development along Lawnes Creek is limited by several factors. Sixty-seven percent of the shoreline is either embayed or extensive marsh. These areas should not be destroyed. Also, Lawnes Creek is too shallow for most boats to use. Without good access to the river, this area loses much of its water-related residential value.

ALTERNATE USES: The Lawnes Creek shorelands in Surry are probably best left in their natural state. Possible uses for the area include hunting, fishing, and low intensity recreational activities such as hiking, canoeing, and camping.

MAPS: USGS, 7.5 Min.Ser. (Topo.), BACONS CASTLE Quadr., 1969.
USGS, 7.5 Min.Ser. (Topo.), HOG ISLAND Quadr., 1965, photorevised 1972.
C&GS, #529, 1:40,000 scale, JAMES RIVER, Newport News to Jamestown Island, 1972.

PHOTOS: No VIMS photos.

SUBSEGMENT 1B

HOG ISLAND, SURRY COUNTY, VIRGINIA

Map 3

EXTENT: 44,600 feet (8.4 mi.) of shoreline from Hunnicut Creek to Bayse Point. The subsegment also includes 81,600 feet (15.5 mi.) of fastland. (Hog Island State Waterfowl Refuge contains 54,000 feet of fastland.)

SHORELANDS TYPE
FASTLAND: Low shore 78% (12.1 mi.), moderately low shore 15% (2.3 mi.), and moderately low shore with bluff 7% (1.1 mi.).
SHORE: Artificially stabilized 1% (0.1 mi.), beach 77% (6.5 mi.), and extensive marsh 22% (1.9 mi.).
NEARSHORE: Narrow 3% (0.3 mi.), intermediate 38% (3.2 mi.), and wide 59% (5.0 mi.).

SHORELANDS USE
FASTLAND: Industrial 4% (0.6 mi.), preserved 66% (10.2 mi.), and unmanaged, wooded 30% (4.7 mi.). The 10.2 miles of fastland preserved in the Hog Island State Waterfowl Refuge is an estimated figure for the numerous islands and peninsulas.
SHORE: Approximately 30,000 feet of shoreline is included in the Hog Island State Waterfowl Refuge. This area is preserved. Of the remaining 14,600 feet, about 2,000 feet is used for industrial purposes by the Surry Nuclear Power Plant. The rest of the shoreline has limited use for bathing and other low intensity recreational purposes.
NEARSHORE: Some sport boating. The channel, which lies about 0.5 nautical miles offshore of Hog Point and about 1.8 nautical miles offshore of Bayse Point, is used by various ships headed for ports along the upper James River.

WIND AND SEA EXPOSURE: The shoreline trends first basically S - N, then NNE - SSW. The fetch at Walnut Point is ESE - 8.8 nautical miles.

OWNERSHIP: State - 66% and private 34%.

ZONING: Mostly agricultural - rural residential, some industrial (Surry Nuclear Power Plant).

FLOOD HAZARD: Low, noncritical, except for the Hog Island State Waterfowl Refuge, where it is

moderate to high, noncritical. For two structures at the intake for the Surry Nuclear Power Plant, there is a high, critical flood hazard.

BEACH QUALITY: Fair. Beaches in the subsegment characteristically are less than 20 feet in width and have a fine grain size.

SHORE EROSION SITUATION

EROSION RATE: Most of the shoreline from Walnut Point to Bayse Point is undergoing moderate, noncritical erosion. The area of greatest change is between Hog Point and Walnut Point, where the historical erosion rate is 2.8 feet per year.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: Along the west side of Hog Island, there is about 100 feet of bulkheading with groins. This structure has been flanked and is now ineffective. There are two rubble riprap jetties at the mouth of the outfall of the Surry Nuclear Power Plant further upstream. Along the sides of the outfall is a cement bag bulkhead. These structures are effective.

OTHER SHORE STRUCTURES: None.

SHORE USE LIMITATIONS: Hog Island is a preserved area, and as such, no development can take place. The Surry Nuclear Power Plant is located to the south of the Wildlife Refuge. This area also has a very limited development potential. The rest of the subsegment does not have good access. The only road is Route 650, which is from 0.5 to 1.0 miles inland. Any house or development would have to build its own road.

ALTERNATE USES: The only section of this subsegment which might be subject to development is south of the power plant. This area is best left in its natural state. Any number of low intensity recreational uses including hiking, camping, and picnicking could be employed here.

MAPS: USGS, 7.5 Min.Ser. (Topo.), HOG ISLAND Quadr., 1965, photorevised 1972.
C&GS, #529, 1:40,000 scale, JAMES RIVER, Newport News to Jamestown Island, 1972.

PHOTOS: Aerial-VIMS 23July74 SU-1B/1-32
Ground-VIMS 6Nov 75 SU-1B/64-72.

SUBSEGMENT 2A

LOWER CHIPPOKES CREEK, SURRY COUNTY, VIRGINIA

Map 3

EXTENT: 34,800 feet (6.6 mi.) of shoreline. The subsegment also contains 45,000 feet (8.5 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 28% (2.4 mi.), moderately low shore 43% (3.6 mi.), moderately low shore with bluff 23% (1.9 mi.), moderately high shore 2% (0.2 mi.), moderately high shore with bluff 2% (0.2 mi.), and high shore with bluff 2% (0.2 mi.).
SHORE: Fringe marsh 38% (2.5 mi.) and embayed marsh 62% (4.1 mi.).
CREEK: Lower Chippokes Creek is too narrow and shallow for classification. Average depths range from 2 to 5 feet.

SHORELANDS USE
FASTLAND: Agricultural 19% (1.6 mi.), preserved 35% (3.0 mi.), residential 6% (0.5 mi.), and unmanaged, wooded 40% (3.4 mi.).
SHORE: Fishing and waterfowl hunting in the marsh areas.
CREEK: Mainly fishing.

SHORELINE TREND: The creek trends mainly N - S.

OWNERSHIP: Private 65% and state 35%.

ZONING: Agricultural - rural residential.

FLOOD HAZARD: Low, except moderate for the marsh areas.

BEACH QUALITY: There are no beaches along Lower Chippokes Creek.

SHORE EROSION SITUATION
EROSION RATE: The area at the mouth of Lower Chippokes Creek is accreting. No data is available for the rest of the creek, though it appears to be stable.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: There is a boat ramp at the trailer park along the creek.

SHORE USE LIMITATIONS: The shoreline of Lower Chippokes Creek is sixty-two percent embayed marsh. Marsh areas should be preserved whenever possible, as they are an invaluable resource. The west side of the creek is Chippokes Plantation State Park where development is prohibited. Most of the other land available for development has no good access.

ALTERNATE USES: Chippokes Plantation State Park is used for low intensity recreational purposes such as nature walks. Though some development is possible for the south side of the creek, most of the areas should remain in their natural state if possible.

MAPS: USGS, 7.5 Min.Ser. (Topo.), HOG ISLAND Quadr., 1965, photorevised 1972.
C&GS, #529, 1:40,000 scale, JAMES RIVER, Newport News to Jamestown Island, 1972.

PHOTOS: Aerial-VIMS 23July74 SU-2A/33-38.

SUBSEGMENT 2B

COBHAM BAY, SURRY COUNTY, VIRGINIA

Maps 3 and 4

EXTENT: 25,000 feet (4.7 mi.) of shoreline from Lower Chippokes Creek to Pleasant Point. This subsegment also contains 25,000 feet (4.7 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 20% (1.0 mi.), moderately low shore 10% (0.5 mi.), moderately low shore with bluff 17% (0.8 mi.), moderately high shore with bluff 37% (1.7 mi.), and high shore with bluff 17% (0.8 mi.).
SHORE: Artificially stabilized 1% (less than 0.1 mi.) and beach 99% (4.7 mi.).
NEARSHORE: Narrow 10% (0.5 mi.), intermediate 25% (1.2 mi.), and wide 65% (3.1 mi.).

SHORELANDS USE
FASTLAND: Agricultural 38% (1.7 mi.), preserved 25% (1.2 mi.), residential 12% (0.6 mi.), and unmanaged, wooded 25% (1.2 mi.).
SHORE: Some sun bathing and walking.
NEARSHORE: Fishing, boating, and other water sports.

WIND AND SEA EXPOSURE: The shoreline trends basically E - W in this subsegment. The fetch is NE - 6.5 nautical miles.

OWNERSHIP: Private 75% and state 25%.

ZONING: Mostly agricultural, with some vacation residential and a small, preserved historical area.

FLOOD HAZARD: Low to moderate. Most flooding would occur in the low lands along the several creeks in the subsegment. Several houses to the east of Blizzards Creek have a moderate, critical flood hazard.

BEACH QUALITY: Good to fair. Beaches in this subsegment are generally 15 to 25 feet wide and consist of fine, white sand.

SHORE EROSION SITUATION
EROSION RATE: The entire subsegment is

undergoing moderate, noncritical erosion. The historical erosion rate here is 1.1 feet per year.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There are two effective wooden groins just east of the mouth of Blizzards Creek. At Cobham Wharf, there are three sections of wooden bulkhead totaling about 175 feet, which are mostly ineffective at stopping erosion.

OTHER SHORE STRUCTURES: There are a few piers, a boat ramp, and a marine railway in the subsegment.

SHORE USE LIMITATIONS: Except for areas around creek mouths, the entire subsegment is characterized by bluffs along the shore. These bluffs are subject to wind and wave erosion, as well as weathering from downhill rain runoff. The Pleasant Point and Cobham Wharf areas are already developed with vacation homes. The state-owned and preserved Chippokes Plantation State Park occupies the land from College Run Creek to Lower Chippokes Creek.

ALTERNATE USES: The only part of the subsegment's shoreline which is not restricted or already extensively used is located between Cobham Wharf and College Run Creek. This portion of the subsegment has elevations of 40 to 60 feet and is presently zoned and used primarily for agriculture and rural residences. This use seems best for the area.

MAPS: USGS, 7.5 Min.Ser. (Topo.), HOG ISLAND Quadr., 1965, photorevised 1972.
USGS, 7.5 Min.Ser. (Topo.), SURRY Quadr., 1965.
C&GS, #529, 1:40,000 scale, JAMES RIVER, Newport News to Jamestown Island, 1972.

PHOTOS: Aerial-VIMS 23July74 SU-2B/39-73.
Ground-VIMS 6Nov 75 SU-2B/51-63.

SUBSEGMENT 3A

TIMBER NECK CREEK AND CROUCH CREEK,

SURRY COUNTY, VIRGINIA

Map 4

EXTENT: There is 47,000 feet (8.9 mi.) of shoreline in this subsegment and 34,600 feet (6.6 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 9% (0.6 mi.), moderately low shore 43% (2.8 mi.), moderately low shore with bluff 1% (0.1 mi.), moderately high shore 29% (1.9 mi.), and high shore 18% (1.2 mi.).
SHORE: Artificially stabilized 2% (0.2 mi.), beach 3% (0.2 mi.), fringe marsh 12% (1.0 mi.), and embayed marsh 83% (7.5 mi.).
NEARSHORE: Intermediate 2% (0.2 mi.).
CREEK: Very shallow and narrow. No depths are recorded on any topographic maps or C&GS charts.

SHORELANDS USE
FASTLAND: Commercial 2% (0.1 mi.), residential 5% (0.3 mi.), and unmanaged, wooded 93% (6.2 mi.).
SHORE: Some fishing and waterfowl hunting in the marshes.
NEARSHORE: Boating and fishing.
CREEK: Mostly waterfowl hunting.

SHORELINE TREND: The shoreline trend is basically N - S in this subsegment.

OWNERSHIP: Private.

ZONING: Mostly agricultural, some vacation recreational.

FLOOD HAZARD: Low. The area is not subject to large waves or other direct storm effects. With elevations of at least 10 feet throughout the subsegment, the area is not susceptible to flooding.

BEACH QUALITY: The only areas of beach are at the mouth of the creek. The beaches are fairly narrow (15 to 20 feet wide) and nice white sand.

SHORE EROSION SITUATION
EROSION RATE: Moderate, noncritical. Erosion at the mouth of the creek averages 1.1 feet per year historically.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: At Pleasant Point, there is 800 feet of bulkhead and 3 effective groins. On the other side of the creek is 200 feet of bulkhead. All bulkheading seems to be effective.

OTHER SHORE STRUCTURES: There are 5 piers and an alongside dock at the mouth of the creek.

SHORE USE LIMITATIONS: Except for the creek mouth, the entire shoreline of the subsegment is embayed marsh. Overwhelmingly, the fastland is unused, wooded. Also, the creek is too shallow for any extensive boat usage.

ALTERNATE USES: The land at the creek mouth on both sides is already developed. The rest of the subsegment is unused and probably should remain so.

MAPS: USGS, 7.5 Min.Ser. (Topo.), SURRY Quadr., 1965.
C&GS, #530, 1:40,000 scale, JAMES RIVER, Jamestown Island to Jordon Point, 1971.

PHOTOS: Aerial-VIMS 23July74 SU-3A/74-78.

SUBSEGMENT 3B

SCOTLAND, SURRY COUNTY, VIRGINIA

Maps 4 and 5

EXTENT: There is 8,600 feet (1.6 mi.) of shoreline from Timber Neck Creek to Grays Creek. The subsegment also contains 8,600 feet (1.6 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 16% (0.3 mi.), moderately low shore 35% (0.6 mi.), moderately low shore with bluff 21% (0.3 mi.), moderately high shore 7% (0.1 mi.), and moderately high shore with bluff 21% (0.3 mi.).
SHORE: Artificially stabilized 9% (0.1 mi.) and beach 91% (1.5 mi.).
NEARSHORE: Intermediate 72% (1.2 mi.) and wide 28% (0.5 mi.).

SHORELANDS USE
FASTLAND: Agricultural 25% (0.4 mi.), residential 50% (0.8 mi.), unmanaged, wooded 12% (0.2 mi.), and unmanaged, open 12% (0.2 mi.).
SHORE: The Scotland Ferry Wharf is in this subsegment. The rest of the shoreline is used for bathing and fishing.
NEARSHORE: Sport fishing and boating.

SHORELINE TREND: The shoreline trends basically E - W in this subsegment.

OWNERSHIP: Private.

ZONING: Mostly vacation residential, some business and agricultural.

FLOOD HAZARD: Low. Most of the subsegment has elevations of at least 10 feet and is not susceptible to flooding.

BEACH QUALITY: Good to fair. Beaches in this subsegment average from 30 feet wide at the ferry dock to 10 feet at Camp Waters. The sand is fine grained. Some vegetation is found on the beaches.

SHORE EROSION SITUATION
EROSION RATE: Moderate, noncritical. The historical erosion rate for this area is 1.1 feet per year. Most erosion in this subsegment

is caused by downhill rain runoff, which results in the slumping of exposed cliff material.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There is about 300 feet of rubble riprap and 250 feet of wooden bulkhead. There are also 7 groins along the beach, which for the most part, are effective.

OTHER SHORE STRUCTURES: There is one boat ramp (cement bag), one private marine railway and alongside piers.

SHORE USE LIMITATIONS: Most of the Scotland area of Surry County is zoned for vacation - residential use. Approximately sixty-one percent of the shorelands are presently developed for such purposes. Very limited other development is possible in this area. To the east of Grays Creek, the shorelands are used for agriculture. This area suffers from moderate erosion of the 20 to 30 foot bluff on the shoreline. Further development here would be at the sacrifice of the agriculture. To the east of Scotland is Camp Chanco, a church-owned recreational facility. The development potential here is also limited.

ALTERNATE SHORE USES: None. In an area such as Scotland, where almost all available land is already actively used, there are few, if any, alternatives to the existing use. This subsegment is probably best left as it is. Minor adjustments with regard to space allocations to the various types of use, are always a possibility.

MAPS: USGS, 7.5 Min.Ser. (Topo.), SURRY Quadr., 1965.
C&GS, #530, 1:40,000 scale, JAMES RIVER, Jamestown Island to Jordon Point, 1971.

PHOTOS: Aerial-VIMS 23July74 SU-3B/79-93.
Ground-VIMS 6Nov 75 SU-3B/27-50.

SUBSEGMENT 3C

GRAYS CREEK, SURRY COUNTY, VIRGINIA

Map 5

EXTENT: There is 62,000 feet (11.7 mi.) of shoreline along Grays Creek. The subsegment contains 89,000 feet (16.9 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 6% (1.1 mi.), moderately low shore 23% (3.9 mi.), moderately low shore with bluff 3% (0.5 mi.), moderately high shore 4% (0.7 mi.), moderately high shore with bluff 36% (6.0 mi.), and high shore with bluff 28% (4.7 mi.).
SHORE: Artificially stabilized, less than 1%, beach 11% (1.3 mi.), fringe marsh 19% (2.2 mi.), and embayed marsh 70% (8.2 mi.).
NEARSHORE: Intermediate 2% (0.2 mi.) and wide 7% (0.9 mi.). The rest of Grays Creek is too narrow and shallow for classification.

SHORELANDS USE
FASTLAND: Agricultural 11% (1.8 mi.), commercial less than 1% (0.1 mi.), recreational less than 1% (0.1 mi.), residential less than 1% (0.2 mi.), unmanaged, wooded 85% (14.4 mi.), and unmanaged, open 2% (0.3 mi.).
SHORE: Bathing and recreational purposes. There is some waterfowl hunting in the marshes.
NEARSHORE: Boating and fishing.

SHORELINE TREND: The creek trends basically NE - SW in this subsegment.

OWNERSHIP: Private.

ZONING: Mostly agricultural - rural residential, some vacation residential.

FLOOD HAZARD: The majority of this subsegment is creek, therefore it is not subject to large waves or similar storm effects. With elevations of at least 10 feet throughout the subsegment, this area is not susceptible to flooding.

BEACH QUALITY: Poor. The only beaches in the subsegment are from Haystack Gut to Swanns Point. This area has thin strip beaches which are partially covered with vegetation. They are of little or no recreational use.

SHORE EROSION SITUATION
EROSION RATE: Erosion from Swanns Point to the mouth of Grays Creek has averaged 1.1 feet per year. No data is available for Grays Creek, though erosion here appears minimal.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: Grays Creek Marina has about 200 feet of bulkheading retaining fill. It seems effective.

OTHER SHORE STRUCTURES: There are several piers at the marina on Grays Creek and another pier toward the creek head.

SHORE USE LIMITATIONS: The shoreline of Grays Creek is predominantly embayed marsh (70%). These marsh areas should be left in their natural state. The remaining shorelands of Grays Creek are fringe marsh backed by 30 to 60 foot bluffs. These areas are not considered prime targets for development. The shoreline from the creek mouth to south of Swanns Point is characterized by fringe marsh and fringe beach backed by 60 to 70 foot bluffs. Though any large scale development is not considered feasible for this area, some individual residences could be built. The Swanns Point area is embayed marsh encircling several pieces of low fastland. The fastland here is below 5 feet and is not suited for development.

ALTERNATE USES: Grays Creek is a relatively unspoiled area. Because of its great value as a habitat for aquatic life and its use as a flood and erosion control agent, the marsh lands found here should remain in their natural state. This area is well suited for such low intensity recreational purposes as bird watching, hiking, and nature walks.

MAPS: USGS, 7.5 Min.Ser. (Topo.), SURRY Quadr., 1965.
C&GS, #530, 1:40,000 scale, JAMES RIVER, Jamestown Island to Jordon Point, 1971.

PHOTOS: Aerial-VIMS 23July74 SU-3C/94-101.

SEGMENT 4

SWANNS POINT TO SLOOP POINT,

SURRY COUNTY, VIRGINIA

Maps 5 and 6

EXTENT: 49,000 feet (9.3 mi.) of shoreline from Swanns Point to Sloop Point. The segment also contains 66,600 feet (12.6 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Artificial fill - less than 1% (0.1 mi.), low shore 19% (2.3 mi.), moderately low shore 4% (0.5 mi.), moderately high shore 7% (0.8 mi.), moderately high shore with bluff 2% (0.3 mi.), high shore 1% (0.2 mi.), and high shore with bluff 66% (8.4 mi.).

SHORE: Artificially stabilized 3% (0.3 mi.), beach 90% (8.3 mi.), and embayed marsh 7% (0.6 mi.).

NEARSHORE: Narrow 23% (2.2 mi.), intermediate 68% (6.3 mi.), and wide 9% (0.8 mi.).

SHORELANDS USE

FASTLAND: Agricultural 19% (2.4 mi.), preserved 3% (0.4 mi.), recreational 21% (2.6 mi.), residential 17% (2.1 mi.), and unmanaged, wooded 40% (5.1 mi.).

SHORE: Bathing, fishing, and walking. There are many recreational activities on the beaches in this segment, especially at Sunken Meadow Beach.

NEARSHORE: Sport boating and fishing, bathing, and other water related sports.

SHORELINE TREND: The shoreline trends basically E - W, then SE - NW. The fetch at Sunken Meadow Beach is NE - 3.8 nautical miles.

OWNERSHIP: Private.

ZONING: Predominantly agricultural - rural residential. Wakefield is zoned for urban residential and the Sunken Meadow area is zoned for vacation - residential. There are three areas along the shoreline that are historic preservation districts.

FLOOD HAZARD: Low, noncritical for most of the segment. There are several areas in this segment that are exposed to possible inundation by flood waters. The land at Swanns Point is all below the 10-foot contour and is susceptible to flooding. No structures are endangered here. Further west at Sunken Meadow, the flood hazard is moderate, critical. Structures and numerous trailers have been placed along the beach behind bulkheading with fill. This stabilized area averages only 2 feet in height, with the normal tide range extending to the bulkhead. Flood waters here would overtop this structure and possibly cause severe damage to the trailers and other buildings behind. To the northwest, at Sloop Point, many structures are on a beach zone below the 10 foot contour. The flood hazard for this area ranges from low to moderate, critical. Several structures here are within 5 feet of the water, with normal high tide levels extending even closer. Since the flood levels for the James River this far from the mouth are not very high, the flood hazard here would be moderate, critical. Even limited flooding could cause damage to some buildings.

BEACH QUALITY: Fair to good. The eroding cliffs throughout this segment offer a good supply of sand to nourish the beaches in the area. Though most of the beaches average from 10 to 15 feet wide, they are often vegetated or lack enough good access to be good beaches. There are two good beaches in this segment. Sunken Meadow is a popular recreational area. It has beaches from 15 to 40 feet wide with medium grained white sand. Sloop Point also has good beaches, though they are privately owned and are not for public use.

SHORE EROSION SITUATION

EROSION RATE: Slight or no change to severe, noncritical. Several areas in this segment have historical erosion rates of from 1.1 to 1.7 feet per year. No structures are endangered in these areas. The greatest change in the shoreline has occurred between the Pipsico Boy Scout Reservation and the creek at Sunken Meadow. Here, the erosion rate has averaged 11.8 feet per year. This high erosion rate is the result of three basic interrelated actions. First, the composition of the bluffs along the shoreline makes them easily eroded. The base of the bluffs is a combination of shell material and loosely packed clay. The next stratum is of clay and sand, and the top layer is sand. Second, bluffs are always exposed to erosion due to downhill rain runoff. In this area, the wooded nature of the bluffs adds to the problem. As rain waters erode the cliffs, they undermine the trees, eventually causing them to fall. When they do fall, the trees carry with them huge amounts of soil trapped in the root systems. The last factor in this area's high erosion rate is the length of the fetch and thus, the strength of the wind generated waves reaching the shoreline. The mouth of the Chickahominy River is on the north side of the James, directly northeast from this reach. Thus the fetch affecting the area is very long (3.8 nm). Storm winds and waves are able to be more powerful and damaging than is usually the case for an area this far from the mouth of a river. The wind and waves undercut the cliff base, causing slumping of the face and undermining trees. This process quickly eats away the cliff face.

ENDANGERED STRUCTURES: No houses are endangered at the present time.

SHORE PROTECTIVE STRUCTURES: All protective structures in the segment are found at Sunken Meadow. Two areas of artificial fill are bulkheaded. About 1,600 feet of wooden bulkhead has been erected to retain the fill here. Both installations seem to be effective. The stream to Sunken Meadow Pond has wooden bulkheading along its banks, extending as jetties into the river. Several areas of the structure along the creek are failing, and the jetties seem partially ineffective, as the channel is silting in.

OTHER SHORE STRUCTURES: There are many piers and 4 boat ramps in this segment.

SHORE USE LIMITATIONS: This segment has large areas of greatly used shoreline and large areas of totally unused shoreline. Basically, most of the actively used shoreline is located close to Claremont. There are three main residential areas; all used for summer vacation residences. These are Sloop Point, Sunken Meadow, and Guildford Heights, which account for 17% of the total shoreline in the segment. Various other uses of the shorelands include three historically preserved areas, the Pipsico Boy Scout Reservation, and several areas used for recreation. A total of 41% of this segment's shorelands are actively used. Here, other development is unlikely and, in several cases, prohibited. Not included in this figure are those lands used for agriculture, a total of 19% of the shorelands.

A combined total of 60% of the shorelands are basically unavailable for development. The remaining 40% of the fastlands are unused, wooded areas. These areas are characterized by high, erodable bluffs on the shoreline, several miles of which have severe erosion (-11.8 feet per year). These wooded areas do not seem suited for continued vacation-residential development. Besides being unstable areas, they do not offer good access to the water. Also, the beaches here are only fair.

ALTERNATE USES: The unused areas of this segment should remain in their natural undisturbed state where possible. These lands, especially those bordering the three historically preserved areas, are well suited for low density recreational use. Activities appropriate here would include nature walks, hiking, picnicking, and possibly camping.

MAPS: USGS, 7.5 Min.Ser. (Topo.), SURRY Quadr., 1965.
USGS, 7.5 Min.Ser. (Topo.), CLAREMONT Quadr., 1966.
C&GS, #530, 1:40,000 scale, JAMES RIVER, Jamestown Island to Jordon Point, 1971.

PHOTOS: Aerial-VIMS 23July74 SU-4/102-148.
Ground-VIMS 6Nov 75 SU-4/08-26.

SEGMENT 5

UPPER CHIPPOKES CREEK, SURRY COUNTY, VIRGINIA

Maps 6 and 7

EXTENT: 47,600 feet (9.0 mi.) of shoreline from Sloop Point to the head of Upper Chippokes Creek. The segment has 53,600 feet (10.2 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 13% (1.3 mi.), moderately low shore 11% (1.1 mi.), moderately low shore with bluff 3% (0.3 mi.), moderately high shore 17% (1.7 mi.), moderately high shore with bluff 8% (0.8 mi.), and high shore with bluff 48% (5.0 mi.).
SHORE: Beach 25% (2.2 mi.), fringe marsh 29% (2.7 mi.), and embayed marsh 46% (4.1 mi.).
NEARSHORE: Narrow 18% (1.6 mi.) and intermediate 6% (0.6 mi.). The rest of the segment's shoreline is on Upper Chippokes Creek, which is too narrow and shallow for classification. The creek has 6 foot depths near its mouth, but is generally much more shallow toward the head.

SHORELANDS USE
FASTLAND: Agricultural 24% (2.5 mi.), industrial 4% (0.3 mi.), residential 8% (0.8 mi.), and unmanaged, wooded 64% (6.6 mi.).
SHORE: Bathing and fishing. Some waterfowl hunting in the marsh areas of Upper Chippokes Creek.
NEARSHORE: Some sport boating, fishing, and other water sports.
CREEK: Mainly sport fishing.

SHORELINE TREND: The shoreline trends basically E - W in the segment. The creek trends NE - SW.

OWNERSHIP: Private.

ZONING: Agricultural - rural residential.

FLOOD HAZARD: Low, noncritical to moderate, critical. Most of this segment's shoreline that is exposed to the river has high bluffs. Only marshes along the creek would be flooded. Two structures west of Sloop Point and several structures at Sloop Point have a moderate, critical flood hazard. These structures are all well below the 1 foot contour and are subject to flood damage. However, the James River here is a relatively low energy water body, which greatly decreases the chances for flooding.

BEACH QUALITY: Good to fair. The beaches around Sloop Point are wide and sandy. They are much used for recreational purposes. Generally, the closer the beaches are to Upper Chippokes Creek, the thinner they are and the less attractive they become for recreational use.

SHORE EROSION SITUATION
EROSION RATE: Slight or no change to moderate, noncritical. The creek shoreline and most of the river-fronting shoreline are generally stable. The only areas of noticeable erosion are just east of the creek mouth. Here, the historical erosion rates average from 1.0 to 1.2 feet per year. No structures are endangered by this shoreline retreat.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: None.

OTHER SHORE STRUCTURES: There are numerous piers throughout the segment.

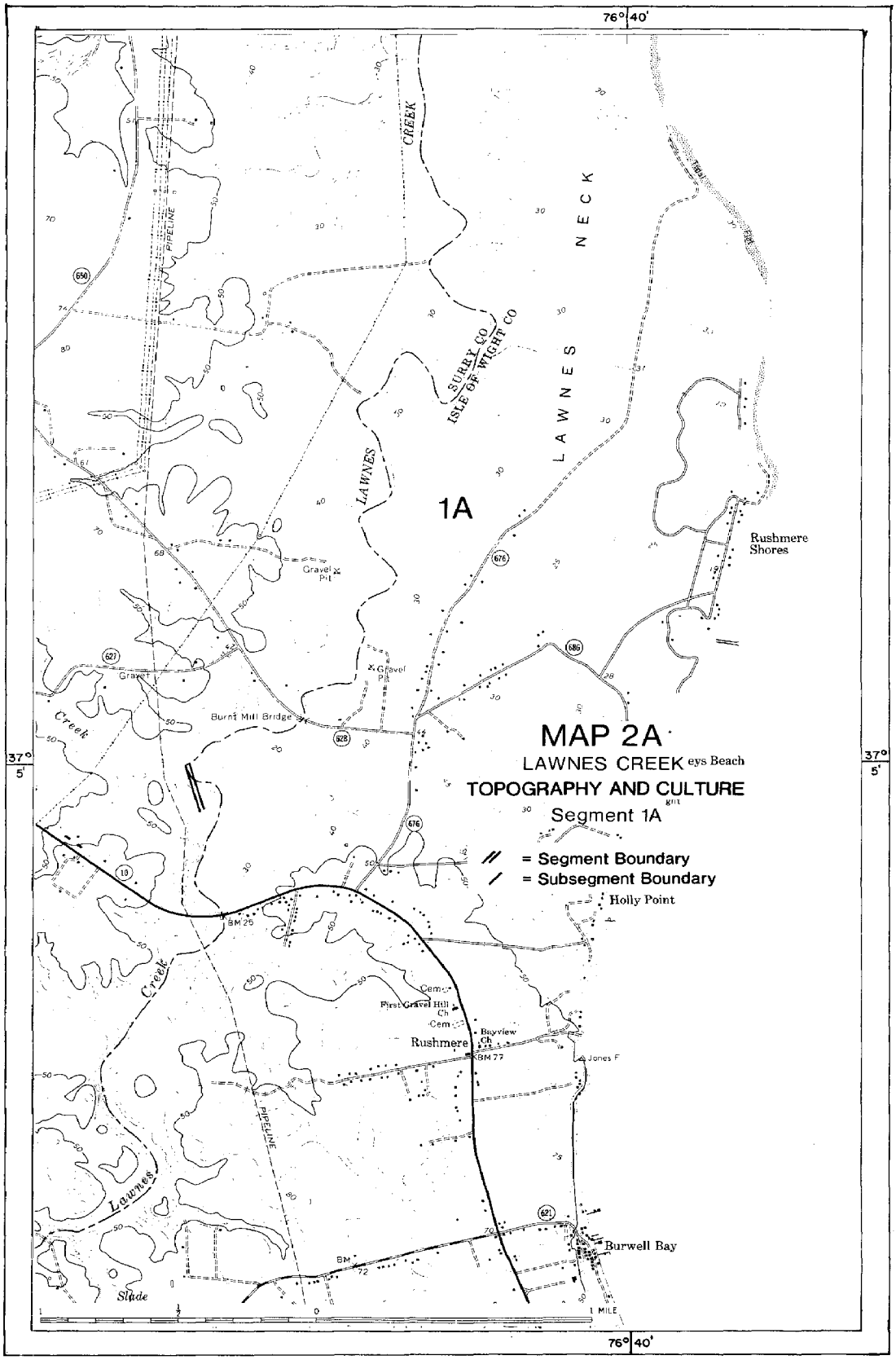
SHORE USE LIMITATIONS: Seventy-six percent of this segment's shoreline is located in Upper Chippokes Creek. The vast majority of the shoreline here is embayed marsh, which should be preserved. The shorelands of this segment can be characterized as having bluffs on the shoreline. Seventy-three percent of the fastland is either moderately high or high shore. The major exception is the Sloop Point area, which is already developed for vacation-residences. These bluff areas have development limitations due to the height, rain runoff erosion vulnerability, and lack of good access. Also, the land fronting the James just east of the creek mouth is undergoing moderate erosion of from 1.0 to 1.2 feet per year. Any housing here would have to be set back from the bluffs. There would be no easy access to the water along this stretch of shoreline.

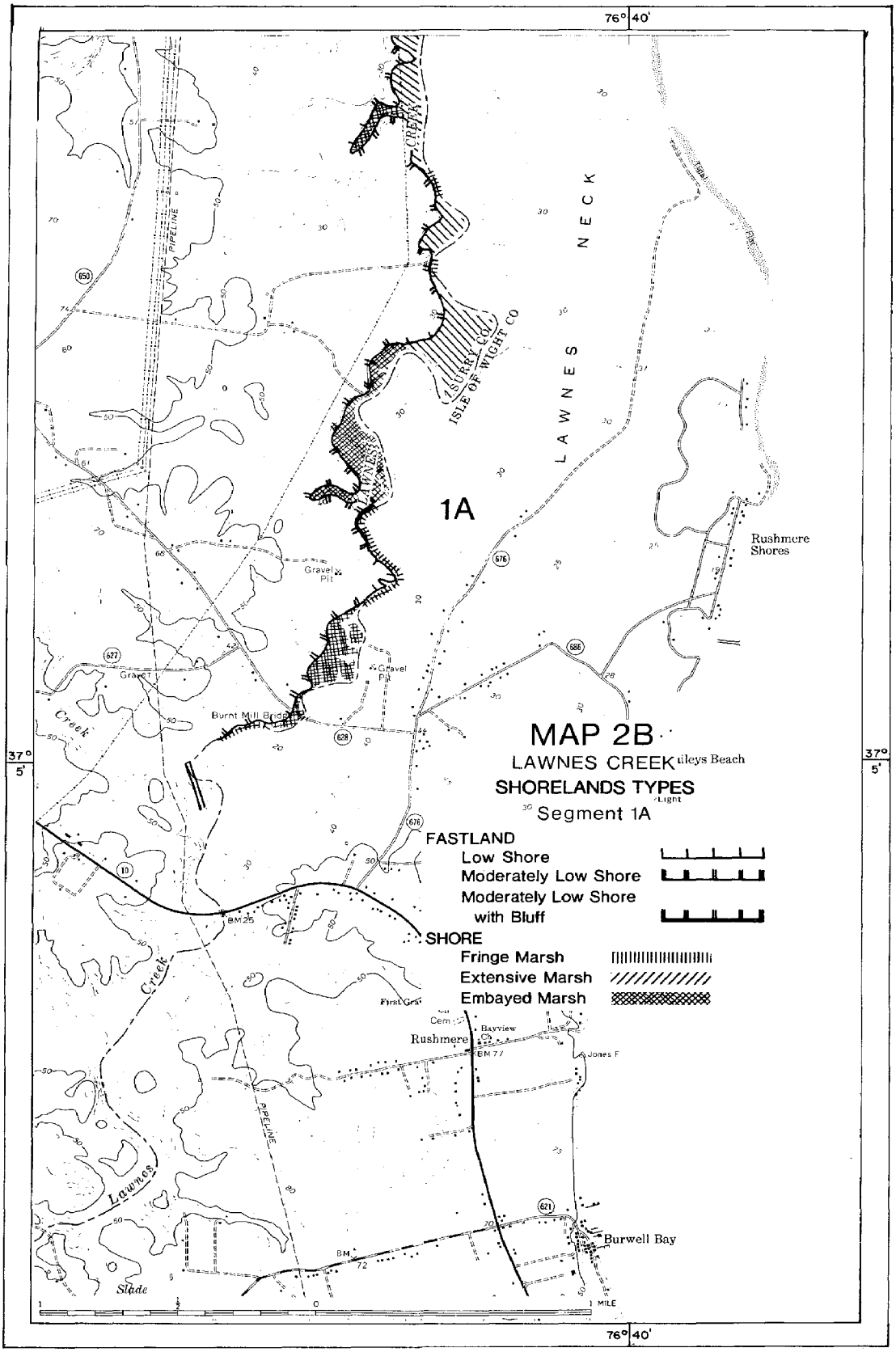
In conclusion, the undeveloped lands in this segment are not considered prime targets for development. Some single-family housing is possible, though larger scale development is considered not feasible at the present time.

ALTERNATE SHORE USES: Upper Chippokes Creek is largely unused except for sport hunting and fishing. This area is good for any low density usage such as a campground, nature walks, or picnicking. Any development should be in harmony with the natural surroundings.

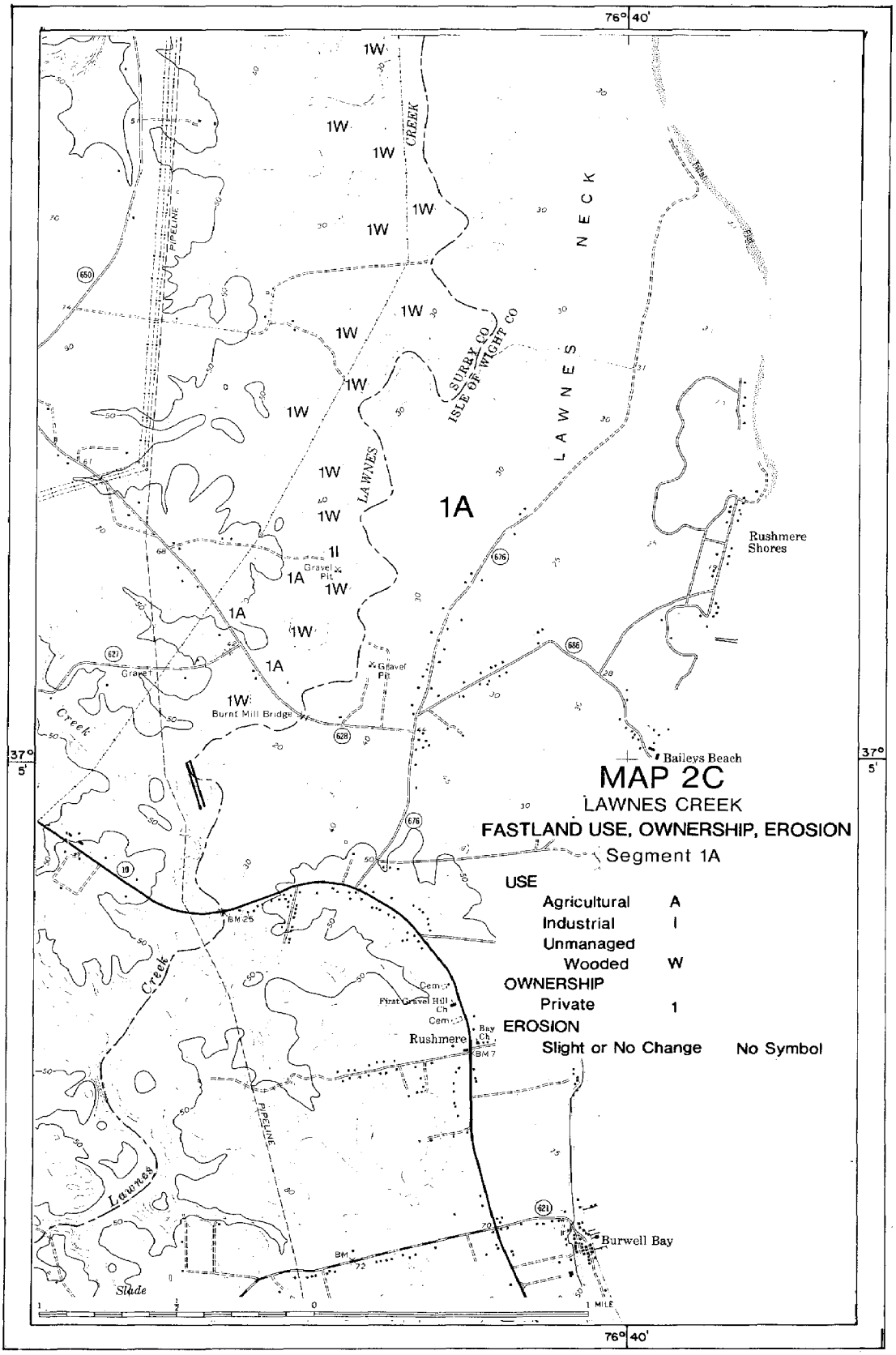
MAPS: USGS, 7.5 Min.Ser. (Topo.), CLAREMONT Quadr., 1966.
USGS, 7.5 Min.Ser. (Topo.), SAVEDGE Quadr., 1966.
C&GS, #530, 1:40,000 scale, JAMES RIVER, Jamestown Island to Jordon Point, 1971.

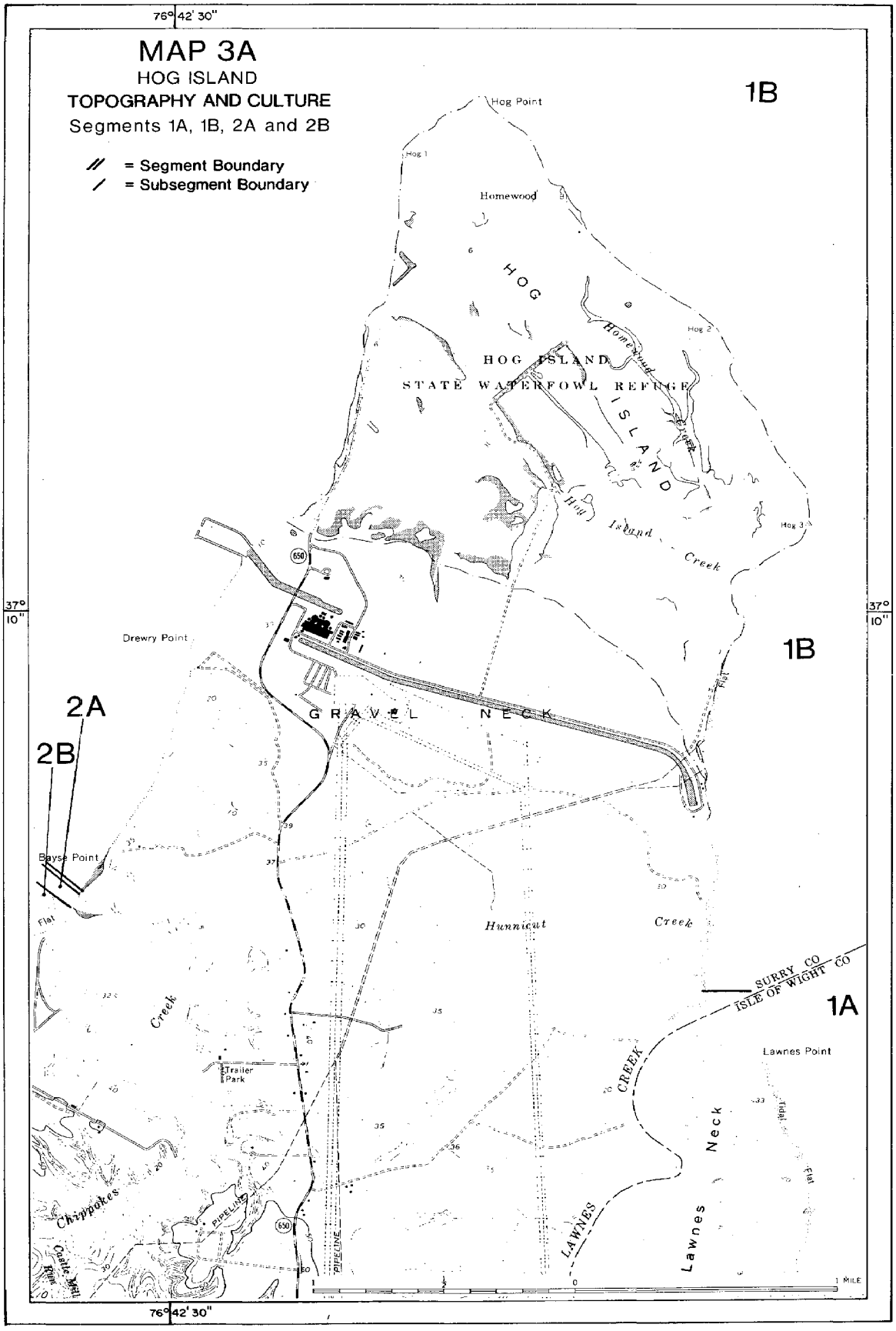
PHOTOS: Aerial-VIMS 23July74 SU-5/149-156.
Ground-VIMS 6Nov 75 SU-5/01-07.

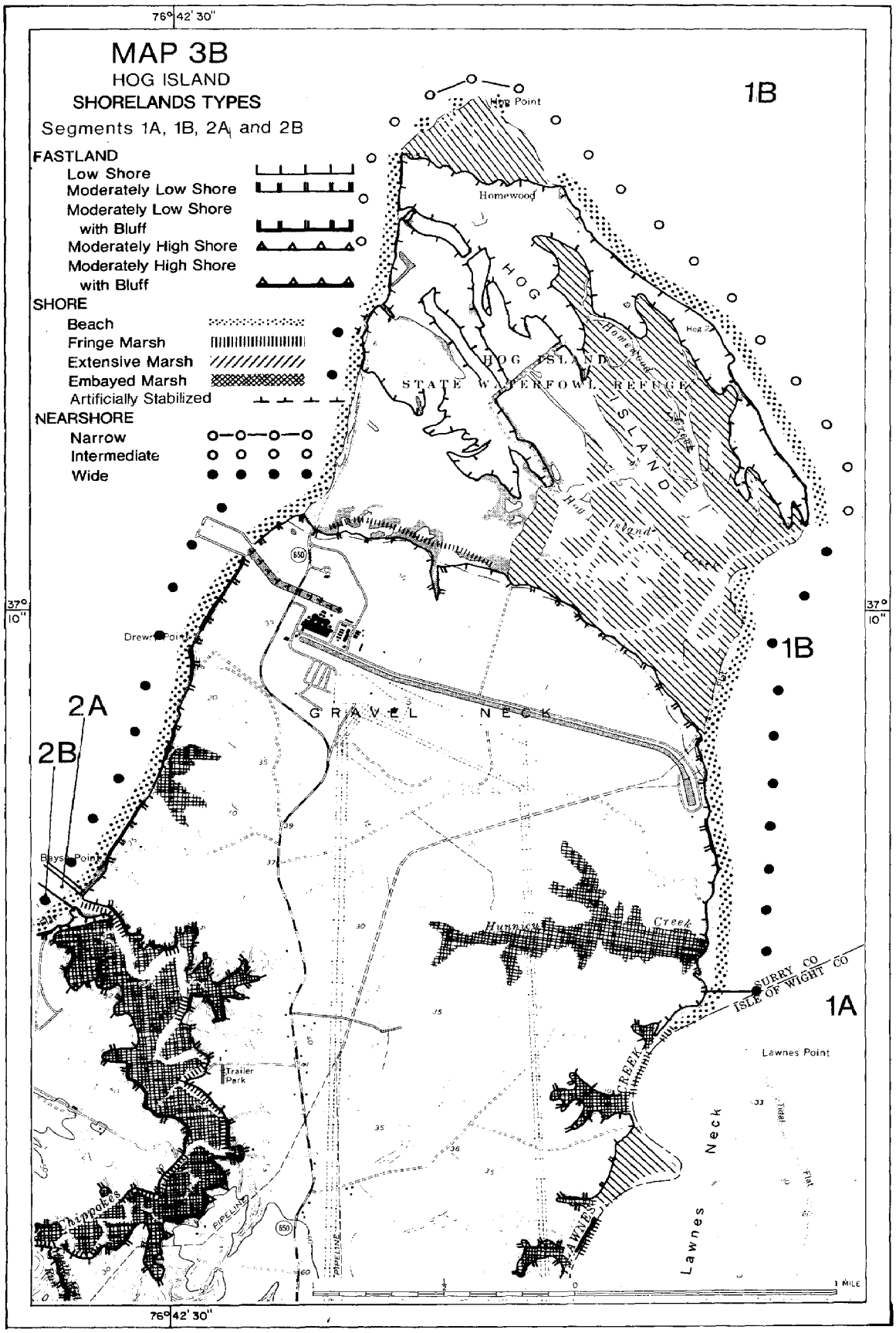

76° 40'
37° 5'
CREEK
LAWNES NECK
SURRY CO
ISLE OF WIGHT CO
LAWNES
1A
PIPELINE
Rushmere Shores
Gravel Pit
Burnt Mill Bridge
Creek
MAP 2A
LAWNES CREEK eys Beach
TOPOGRAPHY AND CULTURE
Segment 1A
= Segment Boundary
= Subsegment Boundary
Holly Point
BM 26
Cem
First Gravel Hill Ch
Cem
Bayview Ch
Rushmere
BM 77
Jones F
Lawnes Creek
Burwell Bay
BM 72
Slade
1 MILE

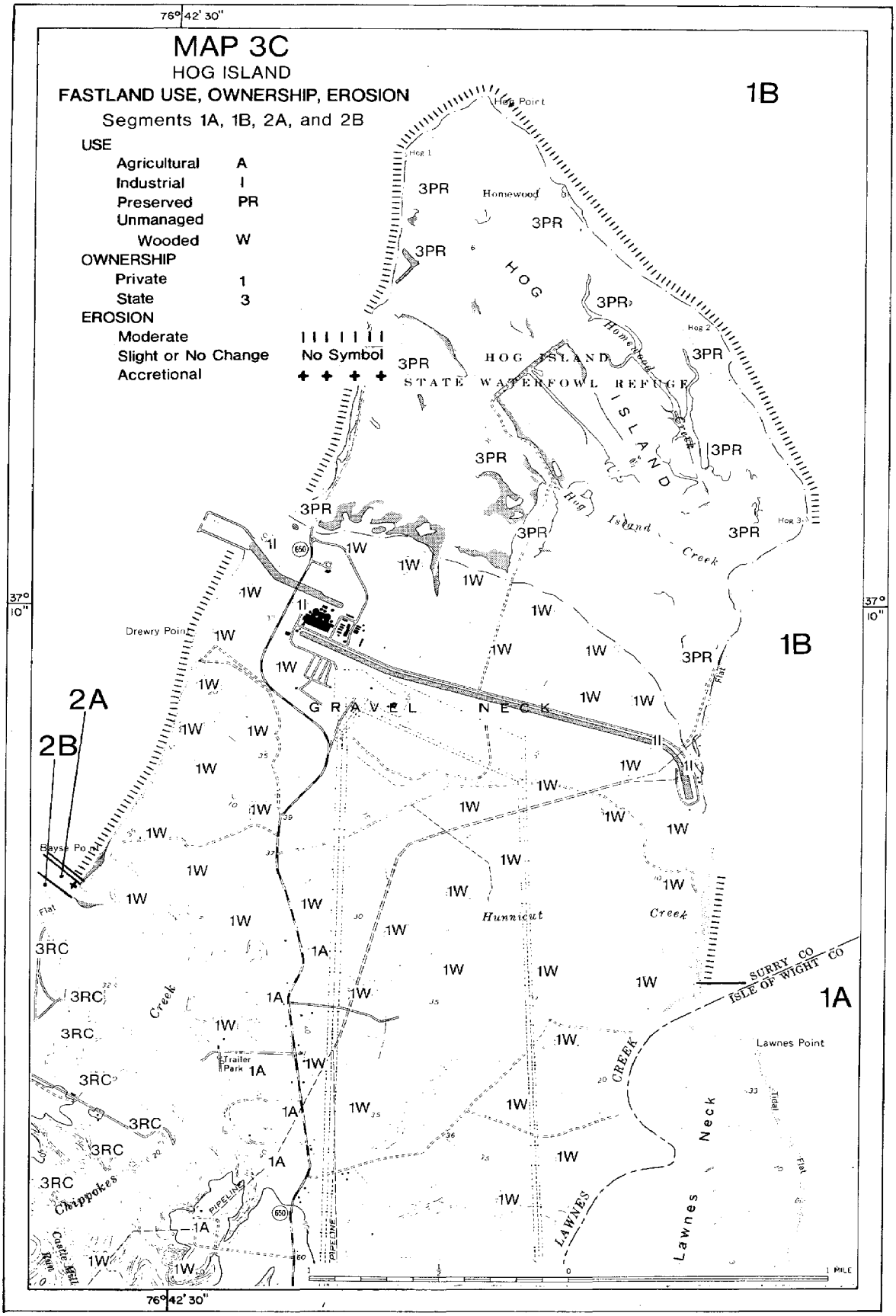


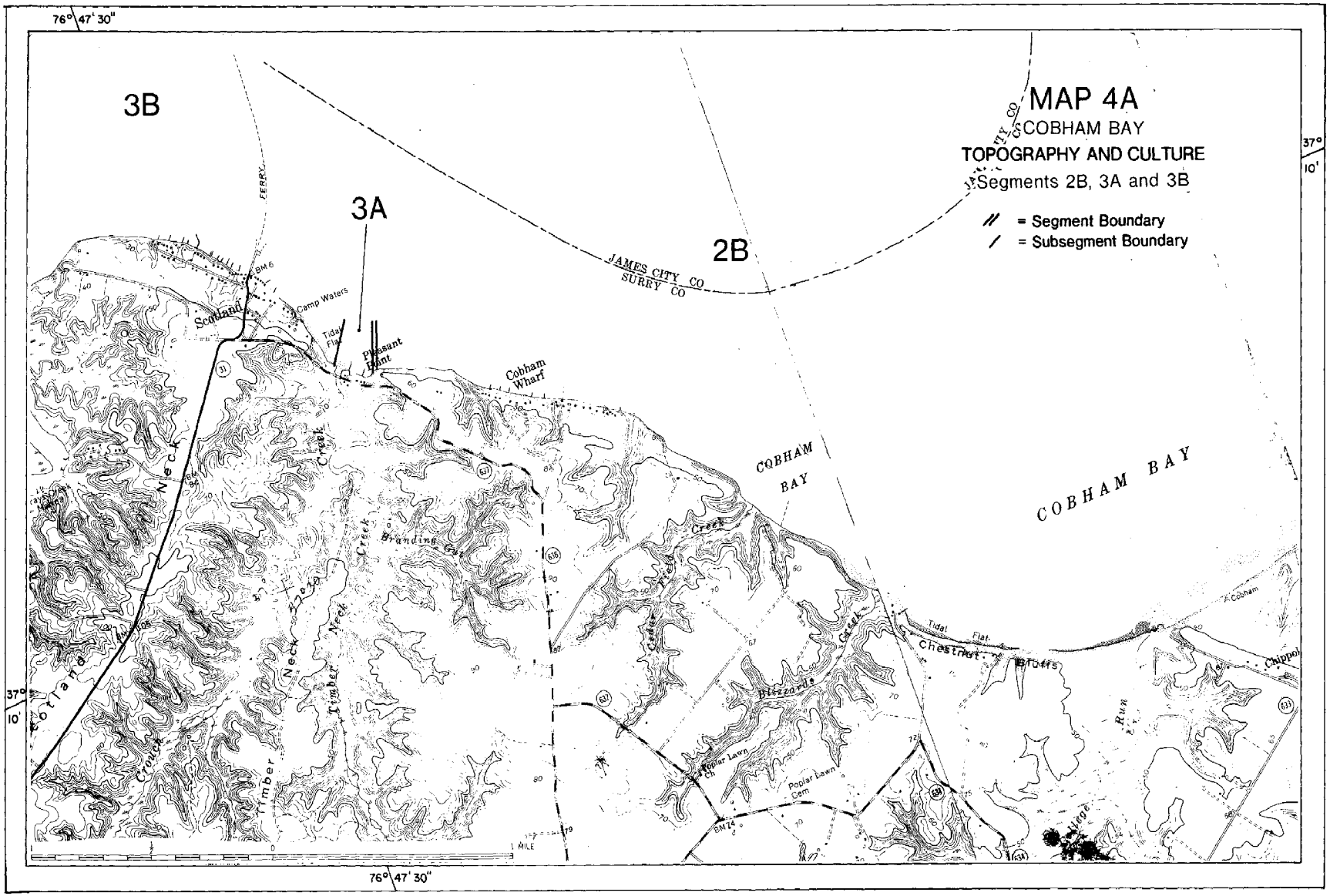
76° 40'
37° 5'
LAWNES NECK
SURRY CO
ISLE OF WIGHT CO
1A
Rushmere Shores
Gravel Pit
Burnt Mill Bridge
Creek
Lawnes
Rushmere
Bayview Ch
Jones F
Burwell Bay
Slade
PIPELINE
MAP 2B
LAWNES CREEK
SHORELANDS TYPES
Segment 1A
FASTLAND
Low Shore
Moderately Low Shore
Moderately Low Shore with Bluff
SHORE
Fringe Marsh
Extensive Marsh
Embayed Marsh
1 MILE

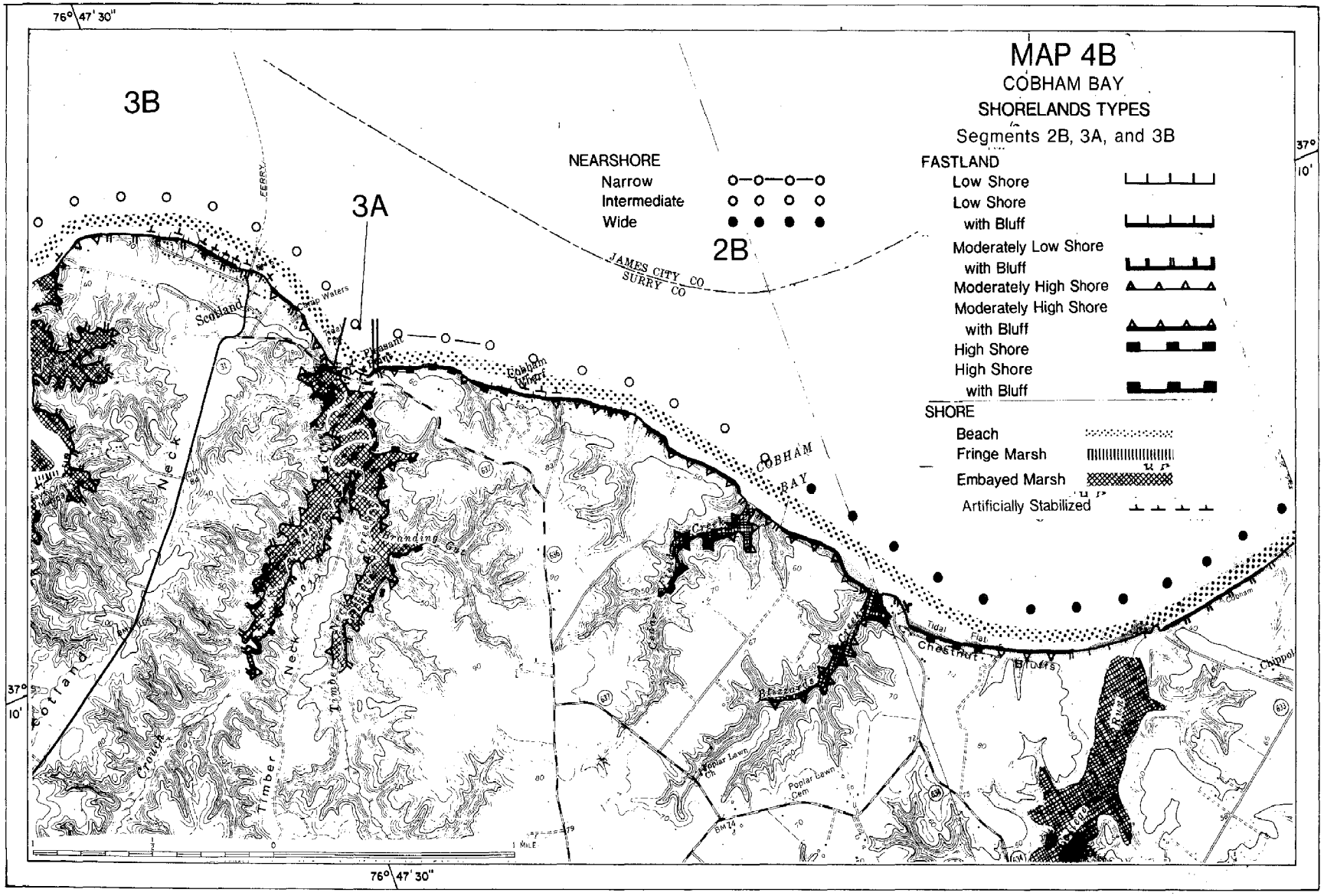

76° 40'
37° 5'
1W
1A
1I
LAWNES CREEK
LAWNES NECK
SURRY CO
ISLE OF WIGHT CO
PIPELINE
Gravel Pit
Burnt Mill Bridge
Rushmere Shores
Baileys Beach
Rushmere
First Gravel Hill Ch
Bay Ch
BM 25
BM 7
BM 72
Burwell Bay
Slade
Lawnes Creek
1 0 1 MILE
MAP 2C
LAWNES CREEK
FASTLAND USE, OWNERSHIP, EROSION
Segment 1A
USE
Agricultural A
Industrial I
Unmanaged
Wooded W
OWNERSHIP
Private 1
EROSION
Slight or No Change No Symbol

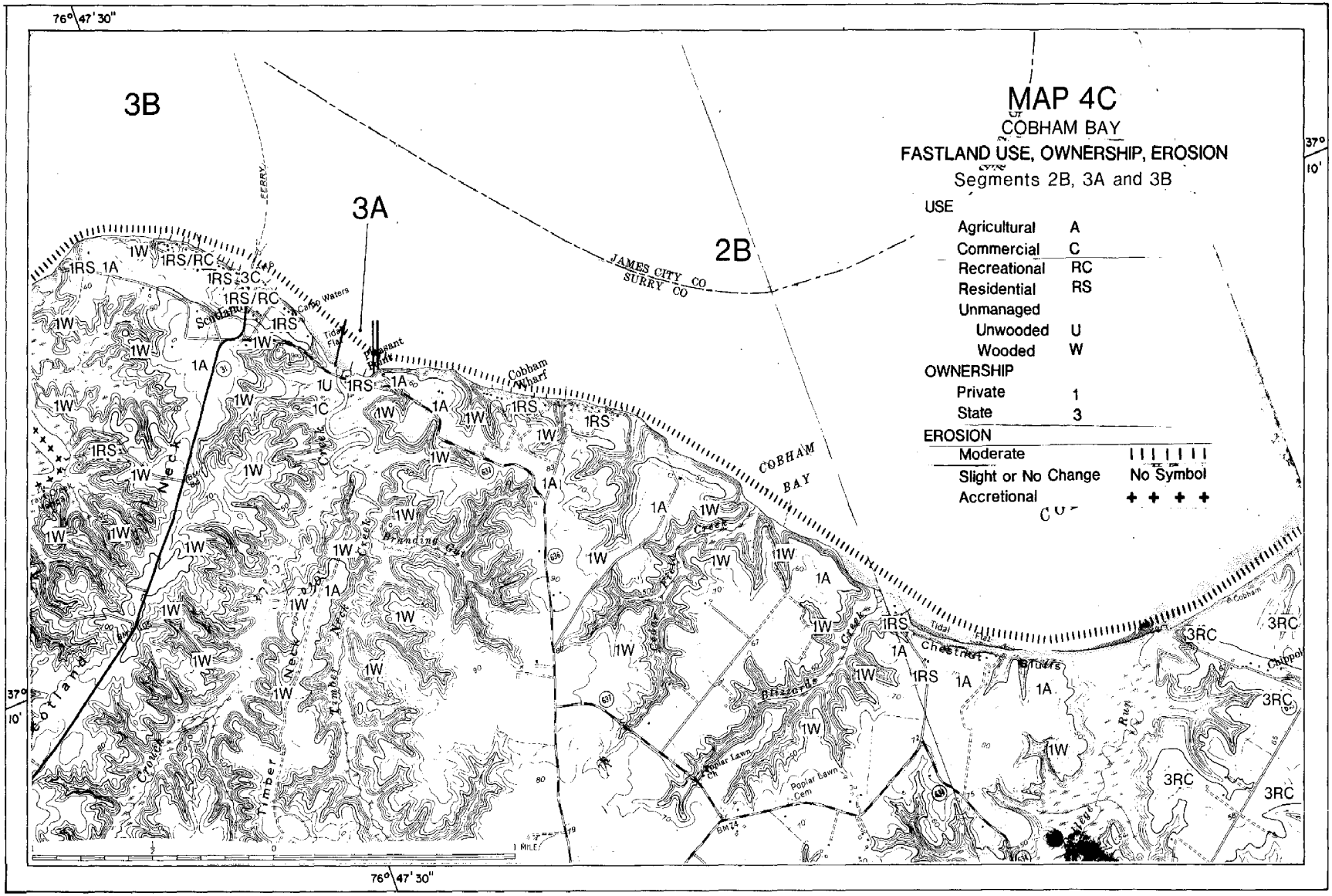

MAP 3A
HOG ISLAND
TOPOGRAPHY AND CULTURE
Segments 1A, 1B, 2A and 2B
= Segment Boundary
= Subsegment Boundary
76° 42' 30"
37° 10"
1B
1A
2A
2B
Hog Point
Hog 1
Homewood
HOG ISLAND
STATE WATERFOWL REFUGE
Homewood Creek
Hog 2
Hog 3
Hog Island Creek
Drewry Point
GRAVEL NECK
Bayse Point
Flat
Hunnicut Creek
SURRY CO
ISLE OF WIGHT CO
Lawnes Point
Trailer Park
Chippokes Creek
Castle Mill Run
PIPELINE
LAWNES CREEK
Lawnes Neck
Tidal Flat
650
1 MILE

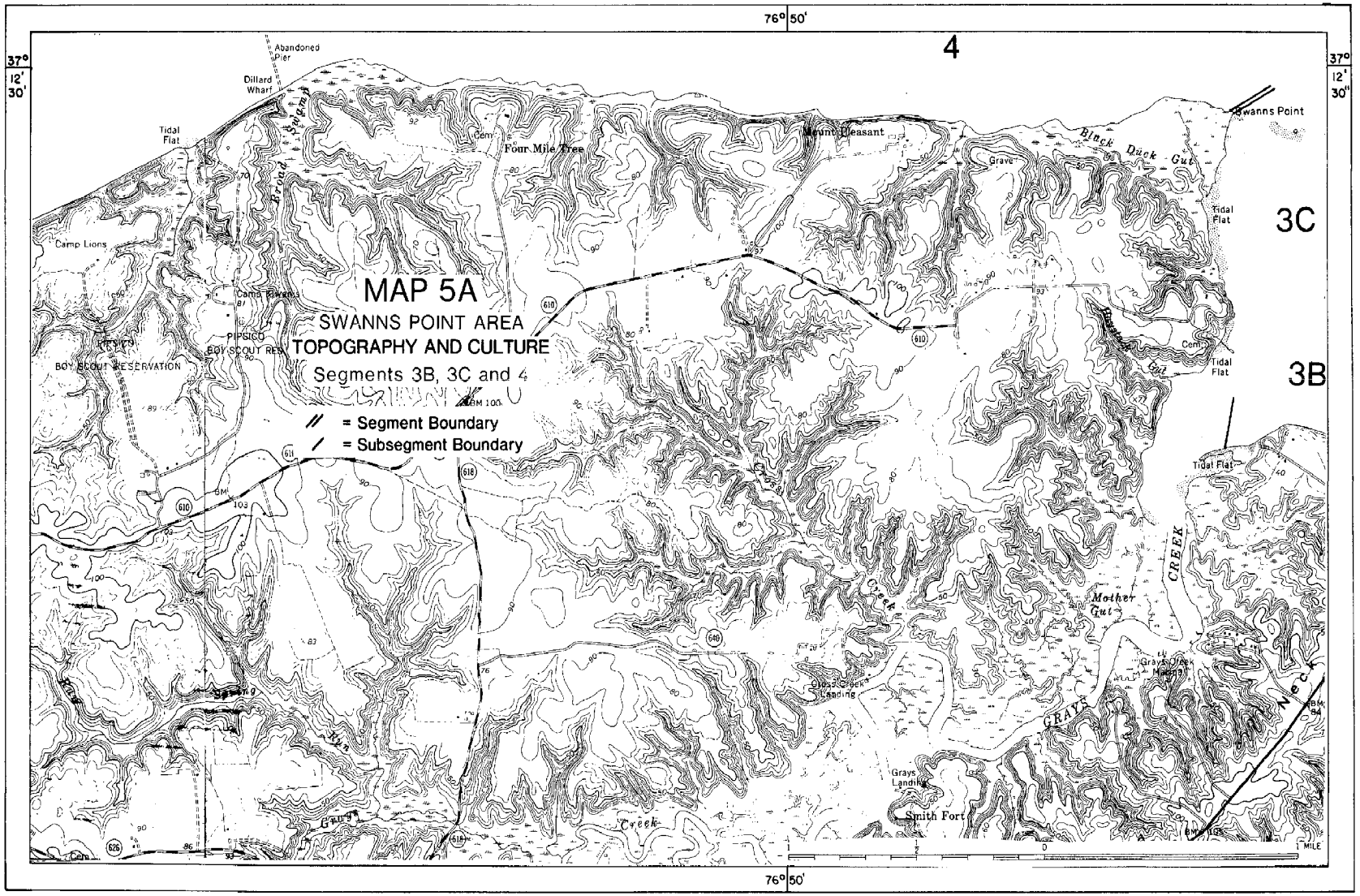

MAP 3B
HOG ISLAND
SHORELANDS TYPES
Segments 1A, 1B, 2A and 2B
FASTLAND
Low Shore
Moderately Low Shore
Moderately Low Shore with Bluff
Moderately High Shore
Moderately High Shore with Bluff
SHORE
Beach
Fringe Marsh
Extensive Marsh
Embayed Marsh
Artificially Stabilized
NEARSHORE
Narrow
Intermediate
Wide
76°42' 30"
37° 10"
1B
2A
2B
1A
Hog Point
Homewood
HOG ISLAND
STATE WATERFOWL REFUGE
Hog Island Creek
Drewry Point
GRAVEL NECK
Bays Point
Hunnicutt Creek
SURRY CO
ISLE OF WIGHT CO
Lawnes Point
Trailer Park
Chippokes
PIPELINE
Lawnes Neck
1 MILE

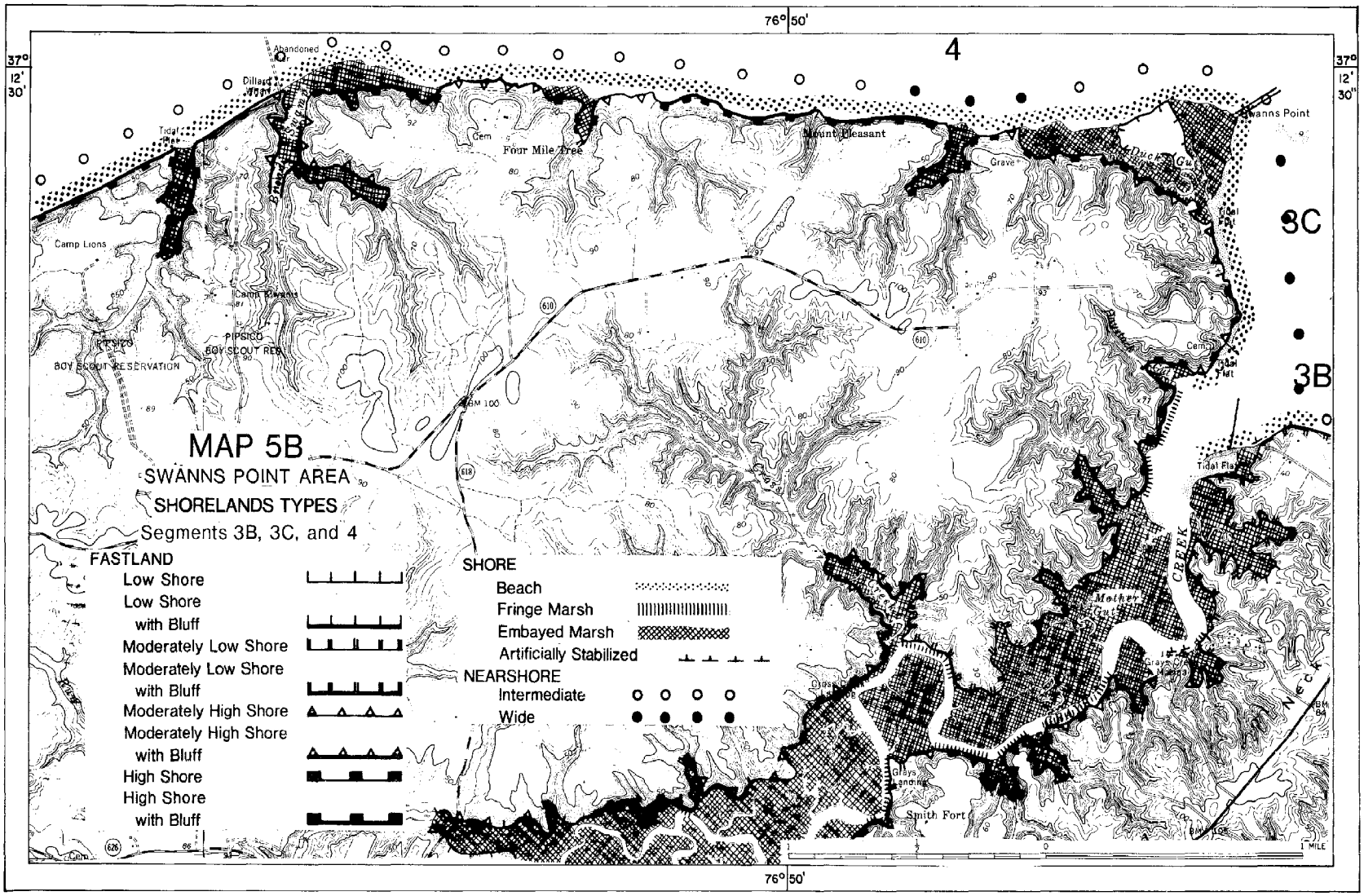

MAP 3C
HOG ISLAND
FASTLAND USE, OWNERSHIP, EROSION
Segments 1A, 1B, 2A, and 2B
USE
Agricultural A
Industrial I
Preserved PR
Unmanaged
Wooded W
OWNERSHIP
Private 1
State 3
EROSION
Moderate
Slight or No Change No Symbol
Accretional
76° 42' 30"
37° 10"
HOG ISLAND
STATE WATERFOWL REFUGE
GRAVEL NECK
Drewry Point
Bayse Point
Hog Point
Homewood
Hog Island Creek
Hunnicut Creek
Lawnes Point
Lawnes Neck
LAWNES CREEK
Chippokes Creek
Trailer Park
PIPELINE
SURRY CO
ISLE OF WIGHT CO
1B
2A
2B
1A
3PR
1W
1I
3RC
MILE

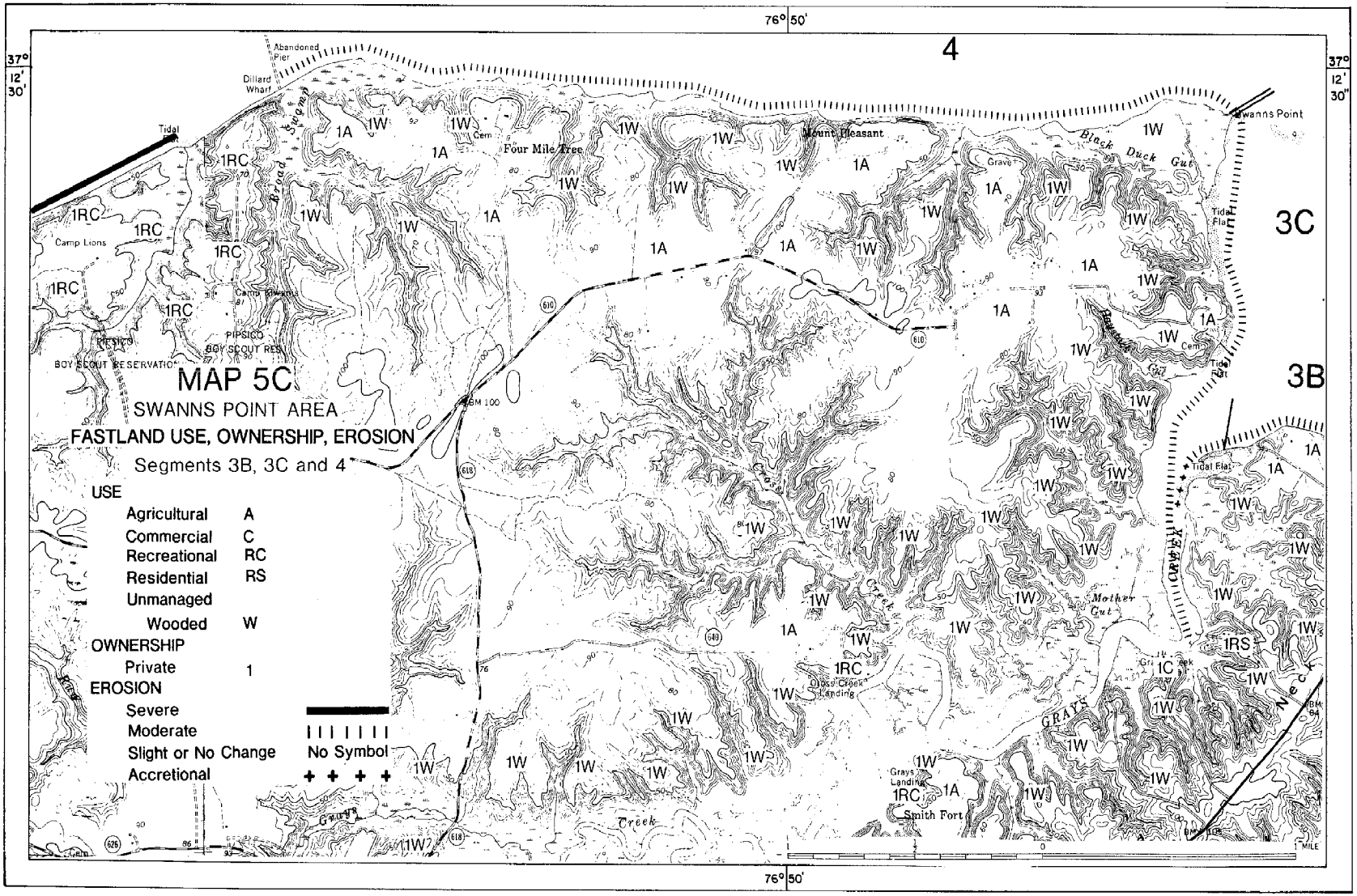

MAP 4A
COBHAM BAY
TOPOGRAPHY AND CULTURE
Segments 2B, 3A and 3B
// = Segment Boundary
/ = Subsegment Boundary
3B
3A
2B
JAMES CITY CO
SURRY CO
COBHAM BAY
COBHAM BAY
Scotland
Camp Waters
Pleasant Point
Cobham Wharf
Branding Gut
Timber Neck Creek
Blizzards Creek
Chestnut Bluffs
Poplar Lawn Cem
Tidal Flat
Chippol
Run
Neck
Crouch
Creek
Cedar Field
FERRY
76° 47' 30"
37° 10'
1 MILE

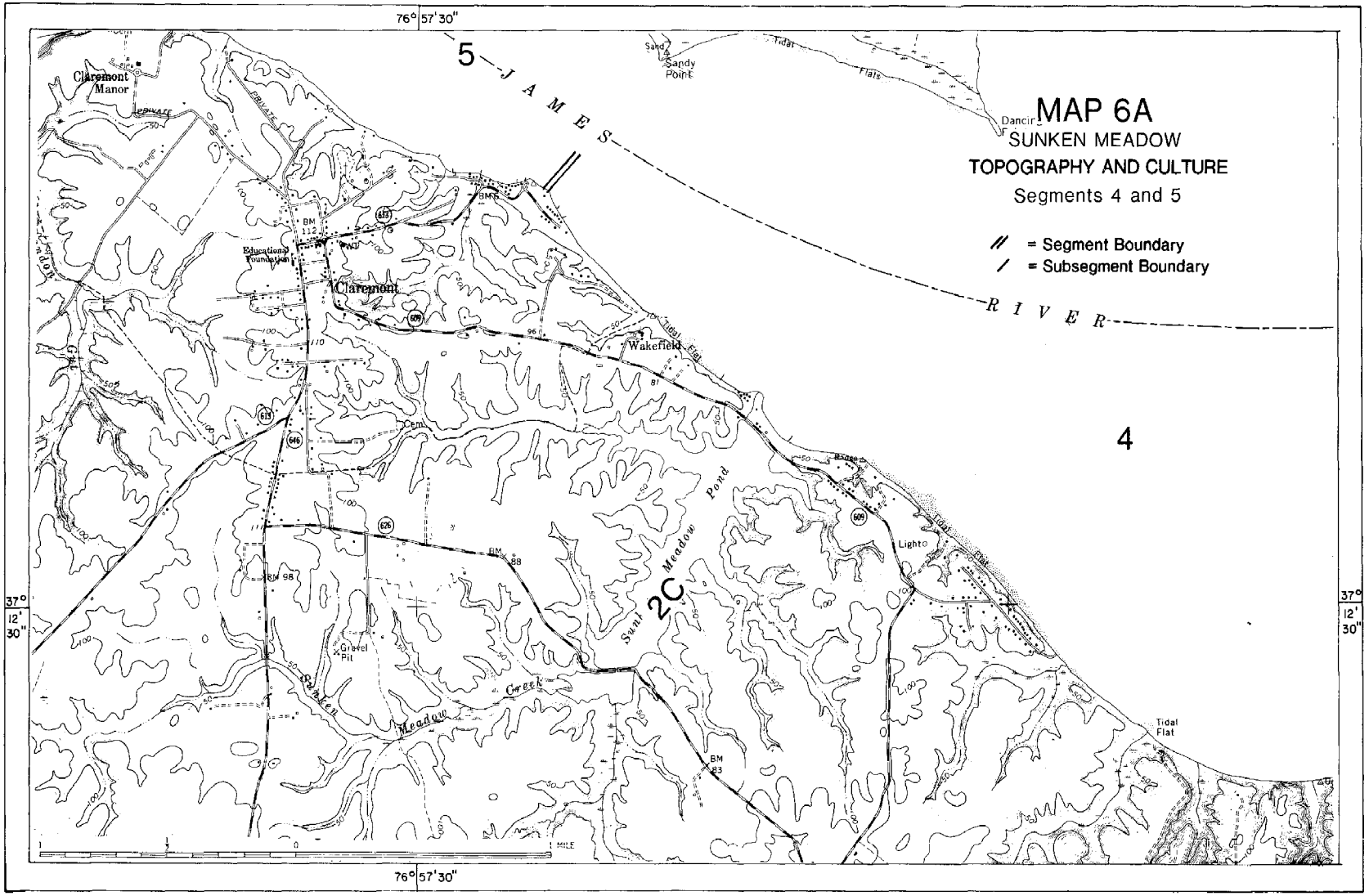

MAP 4B
COBHAM BAY
SHORELANDS TYPES
Segments 2B, 3A, and 3B
NEARSHORE
Narrow
Intermediate
Wide
FASTLAND
Low Shore
Low Shore with Bluff
Moderately Low Shore with Bluff
Moderately High Shore
Moderately High Shore with Bluff
High Shore
High Shore with Bluff
SHORE
Beach
Fringe Marsh
Embayed Marsh
Artificially Stabilized
3B
3A
2B
JAMES CITY CO
SURRY CO
COBHAM BAY
Scotland
Neck
Timber
Neck
Branding Gut
Chestnut Bluffs
Tidal Flat
Poplar Lawn Cem
Chippok
76° 47' 30"
37° 10'
1 MILE

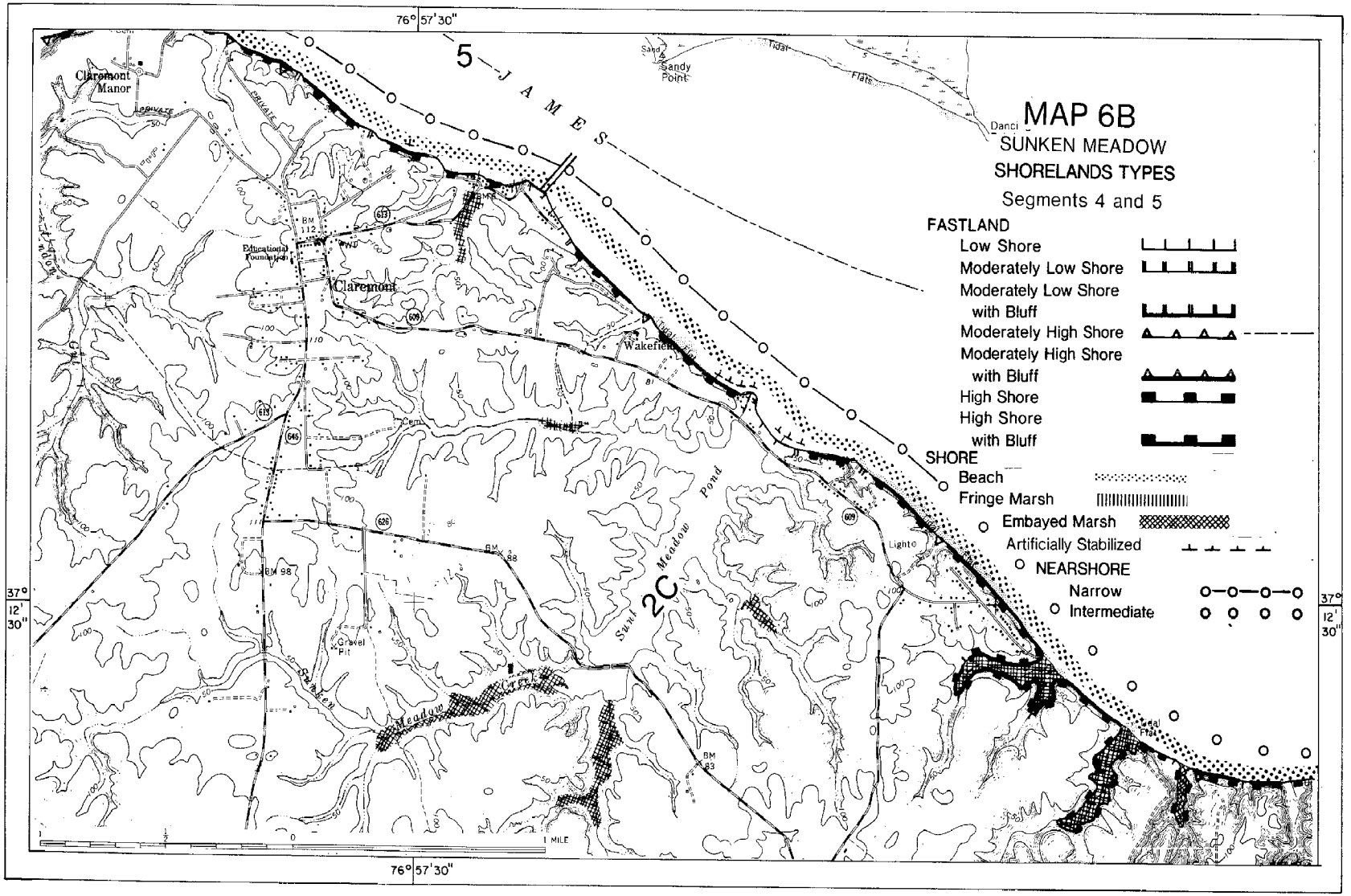

MAP 4C
COBHAM BAY
FASTLAND USE, OWNERSHIP, EROSION
Segments 2B, 3A and 3B
USE
Agricultural A
Commercial C
Recreational RC
Residential RS
Unmanaged
Unwooded U
Wooded W
OWNERSHIP
Private 1
State 3
EROSION
Moderate
Slight or No Change No Symbol
Accretional + + + +
3B
3A
2B
JAMES CITY CO
SURRY CO
COBHAM BAY
76° 47' 30"
37° 10'
1 MILE

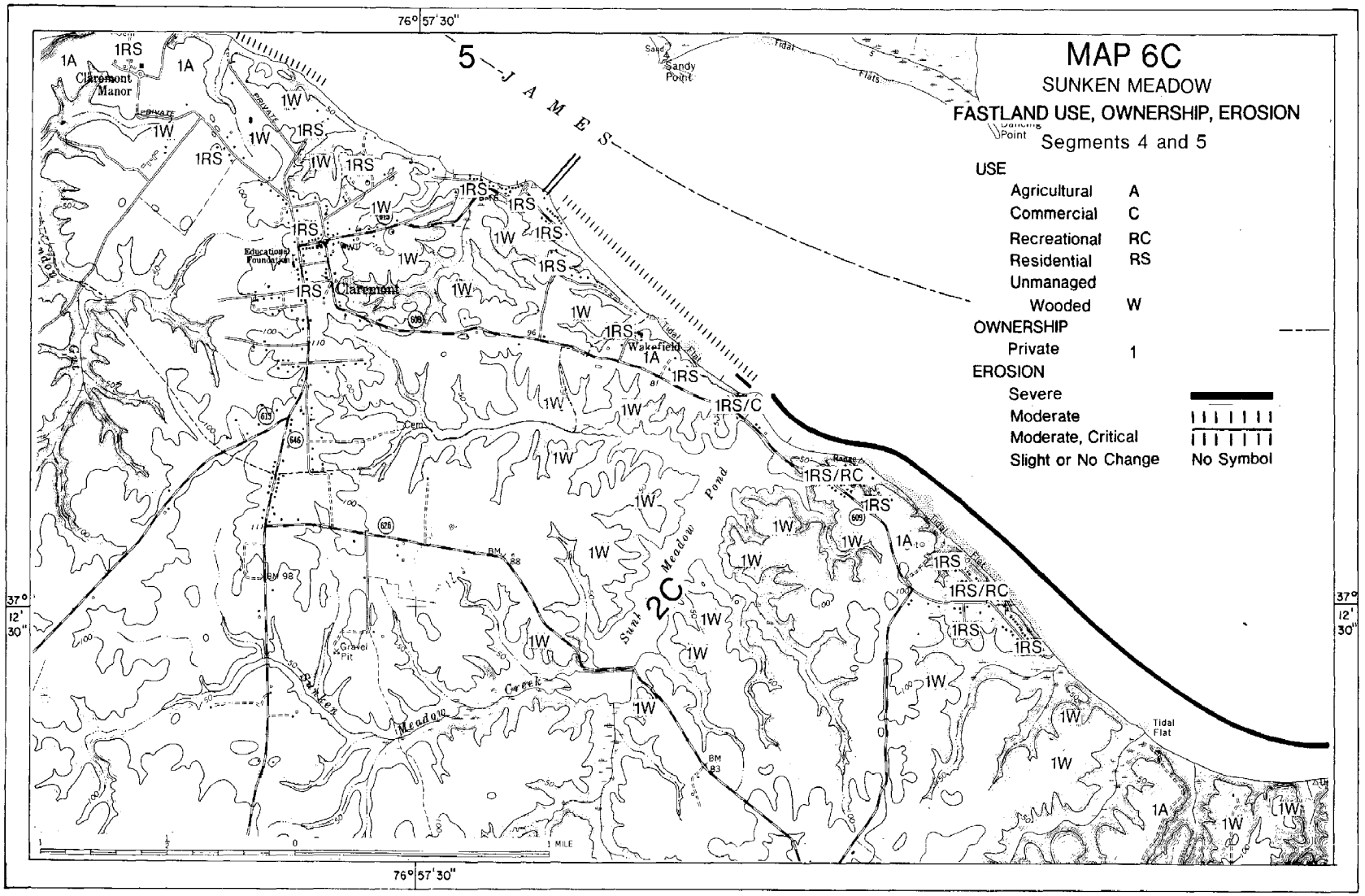

MAP 5A
SWANNS POINT AREA
TOPOGRAPHY AND CULTURE
Segments 3B, 3C and 4
// = Segment Boundary
/ = Subsegment Boundary
4
3C
3B
76° 50'
37° 12' 30"
Abandoned Pier
Dillard Wharf
Tidal Flat
Camp Lions
Camp Rivers
PIPSICO BOY SCOUT RES
BOY SCOUT RESERVATION
Four Mile Tree
Mount Pleasant
Swanns Point
Black Duck Gut
Grave
Tidal Flat
Cem
Mother Gut
GRAYS CREEK
Grays Creek Marina
Grays Landing
Smith Fort
Cross Creek Landing
Creek
Run
Spring
Gravy
Neck
1 MILE

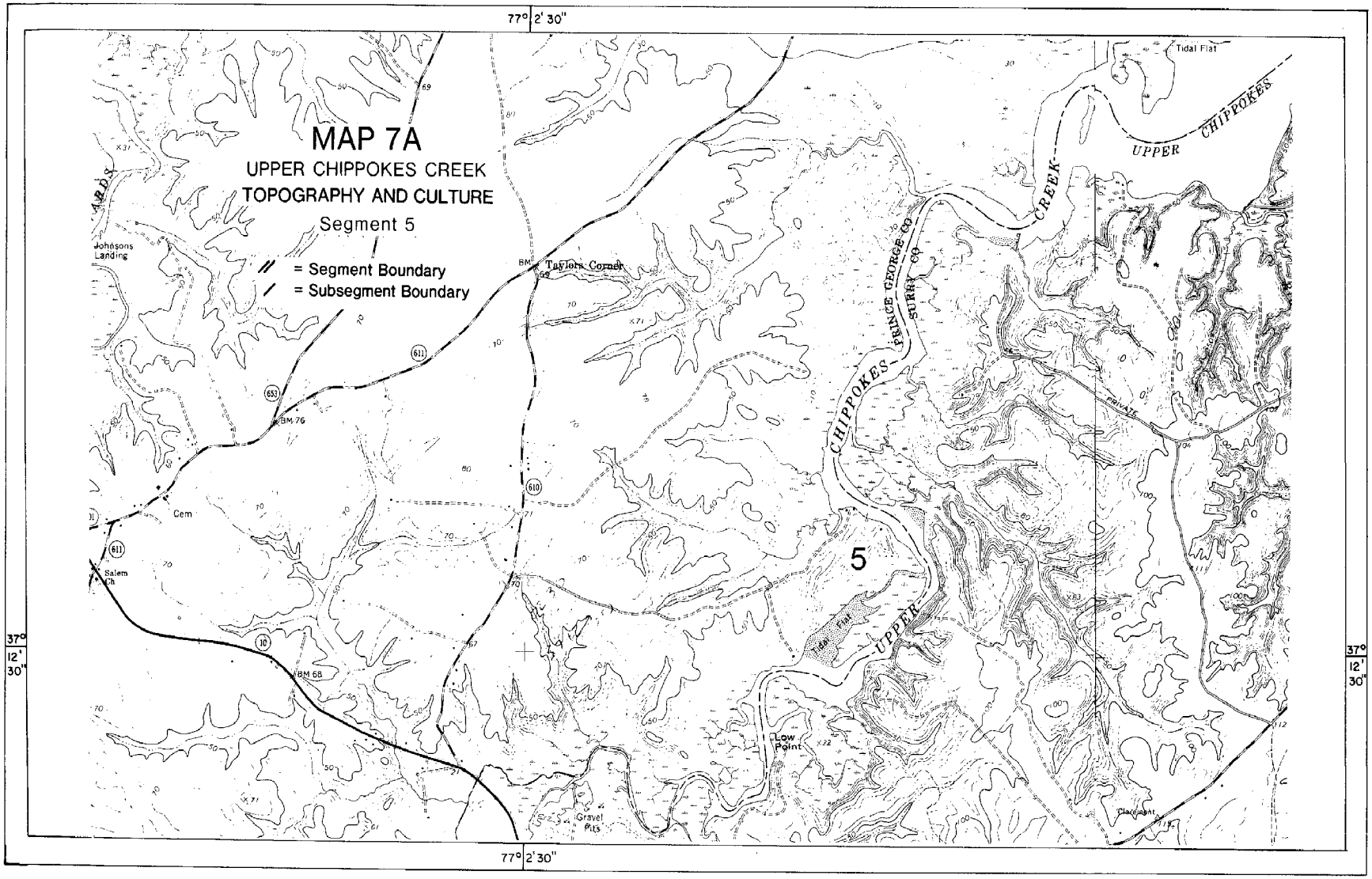

MAP 5B
SWANNS POINT AREA
SHORELANDS TYPES
Segments 3B, 3C, and 4
FASTLAND
Low Shore
Low Shore with Bluff
Moderately Low Shore
Moderately Low Shore with Bluff
Moderately High Shore
Moderately High Shore with Bluff
High Shore
High Shore with Bluff
SHORE
Beach
Fringe Marsh
Embayed Marsh
Artificially Stabilized
NEARSHORE
Intermediate
Wide
4
3C
3B
76° 50'
37° 12' 30"
Four Mile Tree
Mount Pleasant
Swanns Point
Camp Lions
PIPSICO BOY SCOUT RESERVATION
Smith Fort
Grays Landing
Tidal Flat
Cem
Grave
1 MILE

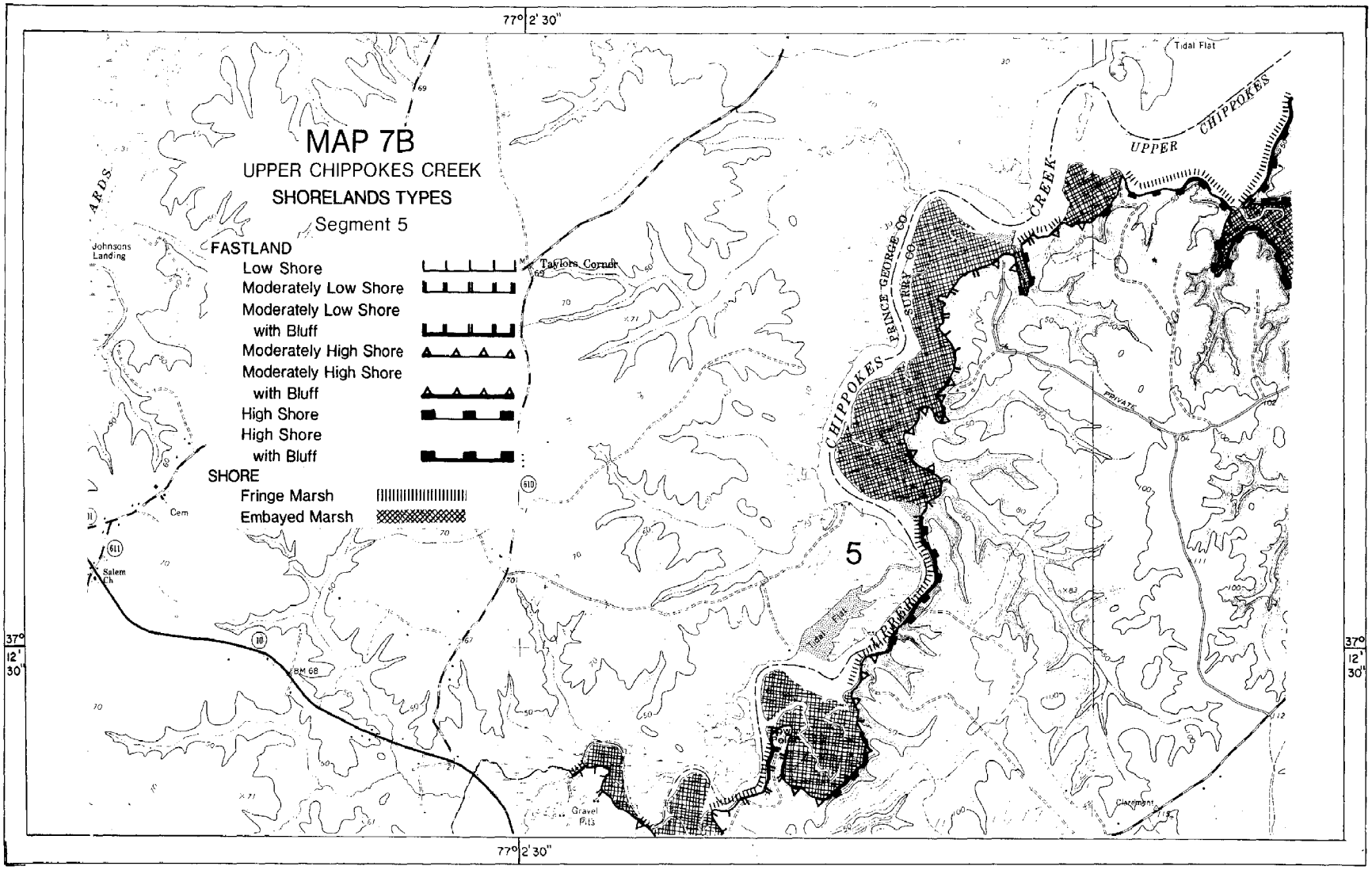

MAP 5C
SWANNS POINT AREA
FASTLAND USE, OWNERSHIP, EROSION
Segments 3B, 3C and 4
USE
Agricultural A
Commercial C
Recreational RC
Residential RS
Unmanaged
Wooded W
OWNERSHIP
Private 1
EROSION
Severe
Moderate
Slight or No Change No Symbol
Accretional
4
3C
3B
76° 50'
37° 12' 30'
Abandoned Pier
Dillard Wharf
Tidal
Camp Lions
Camp Kiwanis
PIPSICO BOY SCOUT RES
BOY SCOUT RESERVATION
Broad Swamp
Four Mile Tree
Mount Pleasant
Black Duck Gut
Swanns Point
Tidal Flat
Mother Gut
Cross Creek
Grays Creek
Grays Landing
Smith Fort
Neck
1 MILE

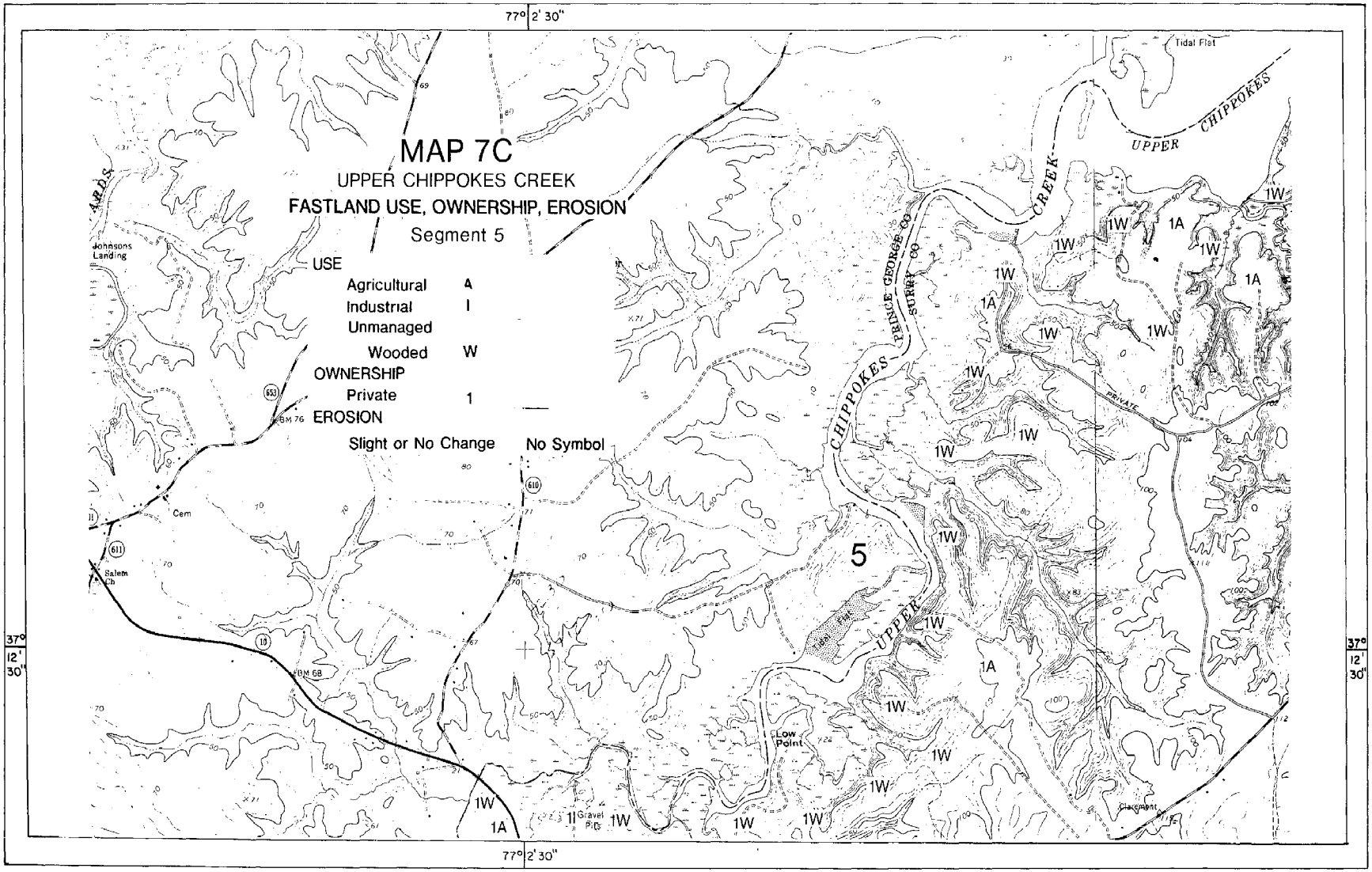

76° 57' 30"
5
J A M E S
R I V E R
4
MAP 6A
SUNKEN MEADOW
TOPOGRAPHY AND CULTURE
Segments 4 and 5
// = Segment Boundary
/ = Subsegment Boundary
Claremont Manor
Sandy Point
Tidal Flats
Education Foundation
Claremont
Wakefield
Tidal Flat
Sunken Meadow Pond
Lighto
Tidal Flat
Gravel Pit
Sunken Meadow Creek
Tidal Flat
BM 112
BM 98
BM 88
BM 83
37° 12' 30"
76° 57' 30"
MILE


MAP 6B
SUNKEN MEADOW
SHORELANDS TYPES
Segments 4 and 5
FASTLAND
Low Shore
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
Embayed Marsh
Artificially Stabilized
NEARSHORE
Narrow
Intermediate
5
2C
JAMES
Claremont Manor
Claremont
Educational Foundation
Wakefield
Sandy Point
Sunken Meadow Pond
Sunken Meadow Creek
Gravel Pit
Lighto
Danci
Tidal Flats
76° 57'30"
37° 12' 30"
1 MILE


MAP 6C
SUNKEN MEADOW
FASTLAND USE, OWNERSHIP, EROSION
Segments 4 and 5
USE
Agricultural A
Commercial C
Recreational RC
Residential RS
Unmanaged
Wooded W
OWNERSHIP
Private 1
EROSION
Severe
Moderate
Moderate, Critical
Slight or No Change No Symbol
76° 57' 30"
37° 12' 30"
5
2C
J A M E S
Claremont Manor
Claremont
Educational Foundation
Wakefield
Sandy Point
Tidal Flats
Sunken Meadow Creek
Sunken Meadow Pond
Gravel Pit
Tidal Flat
1 MILE


77° 2' 30"
MAP 7A
UPPER CHIPPOKES CREEK
TOPOGRAPHY AND CULTURE
Segment 5
= Segment Boundary
= Subsegment Boundary
Johnsons Landing
Taylors Corner
BM 76
BM 68
Cem
Salem Ch
Tidal Flat
UPPER CHIPPOKES CREEK
CHIPPOKES
PRINCE GEORGE CO
SURRY CO
PRIVATE
5
UPPER
Low Point
Gravel Pits
Claremont
37° 12' 30"
77° 2' 30"


MAP 7B
UPPER CHIPPOKES CREEK
SHORELANDS TYPES
Segment 5
FASTLAND
Low Shore
Moderately Low Shore
Moderately Low Shore with Bluff
Moderately High Shore
Moderately High Shore with Bluff
High Shore
High Shore with Bluff
SHORE
Fringe Marsh
Embayed Marsh
77° 2' 30"
37° 12' 30"
Tidal Flat
UPPER CHIPPOKES CREEK
CHIPPOKES
PRINCE GEORGE CO
SURREY CO
Taylors Corner
Johnsons Landing
Salem Ch
Cem
BM 68
Gravel Pits
Claremont
PRIVATE
5


77° 2' 30"
MAP 7C
UPPER CHIPPOKES CREEK
FASTLAND USE, OWNERSHIP, EROSION
Segment 5
USE
Agricultural A
Industrial I
Unmanaged
Wooded W
OWNERSHIP
Private 1
EROSION
Slight or No Change No Symbol
5
Tidal Flat
UPPER CHIPPOKES CREEK
CHIPPOKES
PRINCE GEORGE CO
SURRY CO
PRIVATE
Johnsons Landing
Cem
Salem Ch
BM 76
BM 68
Low Point
Gravel Pits
Claremont
37° 12' 30"
77° 2' 30"

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