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Shoreline Situation Report ISLE OF WIGHT COUNTY, VIRGINIA



Supported by the National Science Foundation, Research Applied to National Needs Program
NSF Grant Nos. GI 34869 and GI 38973 to the Wetlands/Edges Program, Chesapeake Research Consortium, Inc.
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Chesapeake Research Consortium Report Number 46

Special Report In Applied Marine Science and Ocean Engineering Number 97 of the

VIRGINIA INSTITUTE OF MARINE SCIENCE
Gloucester Point, Virginia 23062

1975

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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 some of the potential uses of the shoreline, particularly with respect to recreational use, since such information could be of considerable value in the way a particular segment of coast is perceived by potential users.

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. Peter Rosen and Mike Carron assisted with the graphics. 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 unresolved. 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 a grouping 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) Potential 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

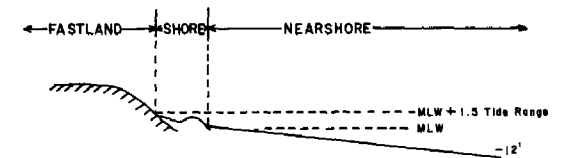


Figure 1 An illustration of the definition of the three components of the shorelands.

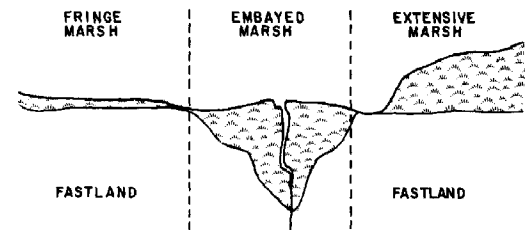


Figure 2 A generalized illustration of the three different marsh types.

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 wild-fowl sanctuaries, fish and shellfish conservation grounds, or other uses that would preclude development.

Agricultural

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

Unmanaged

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

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

The shoreland use classification applies to the general usage of the fastland area to an arbitrary distance of half mile from the shore or beach zone or to some less distant, logical barrier. In multi-usage areas one must make a subjective selection as to the primary or controlling type of usage.

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 repeti-

tive 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) Potential Shore Uses

We placed particular attention in our study on evaluating the recreational potential of the shore zone. We included this factor in the consideration of shoreline defenses for areas of high recreational potential. Furthermore, we gave consideration to the development of artificial beaches if this method were technically feasible at a particular site.

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. The material in this report is provided to indicate the physiographic types of marshes and to serve as a rough guide on acreages until detailed surveys are completed. Additional information of the wetlands characteristics may be found in Coastal Wetlands of Virginia:

Interim Report by Marvin L. Wass and Thomas D. Wright, SRAMSOE Report No. 10, Virginia Institute of Marine Science, 1969, and in other VIMS publications.

i) Flood Hazard Levels

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

j) Shellfish Leases and Public Grounds

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

k) Beach Quality

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

CHAPTER 3

PRESENT SHORELINE SITUATION

CHAPTER 3
PRESENT SHORELINE SITUATION OF
ISLE OF WIGHT COUNTY, VIRGINIA

3.1 THE SHORELANDS OF ISLE OF WIGHT COUNTY

Two water systems affect the shorelands of Isle of Wight County. The James River, which accounts for 29% of the shoreline, flows along subsegments 1B and 3A. The creek systems, which account for the remaining 71% of the shoreline, are made up of Lawnes Creek (Subsegment 1A), Chuckatuck Creek (Subsegment 3B), and the Pagan River (Segment 2), which has two tributaries, Cypress Creek and Jones Creek.

There are 129.6 miles of measured fastland in Isle of Wight County. The shoreline is much shorter, containing 79.6 miles. Though the fastlands of the county range from low shore to high shore, 94% of the county's fastland is classified as either low or moderately low shore. In the creek system, 97% of the fastland is either low or moderately low shore. The remaining 3% is moderately high shore, located along the head of the Pagan River. Along the James River, 80% of the fastlands are either low or moderately low shore, 15% high shore or high shore with bluff, and 4% moderately high shore. The shoreline of the creeks is 98% marsh. The James River shoreline is 57% beach and 35% extensive marsh. The remaining 8% is divided between artificially stabilized and fringe marsh.

Since measurements of the nearshore width loose significance in the narrower and shallower streams, the nearshore zone of the creeks is left unclassified. In the James River subsegments, 37% of the nearshore zone is classified as intermediate

and 46% as wide. The remaining 17% is unclassified.

The two systems are affected differently, or to differing degrees, by many natural forces. This, in turn, directly affects the usage of each system's fastland. The James River shorelands are exposed to direct wind and wave attacks generated by storms. This exposure to storm surges (weather tides) results in a higher flood hazard, increased erosion rates, and an overall susceptibility to storm damage. The tributary system is, for the most part, protected from such extreme activity. While the interior creeks offer most of the advantages of living on the water, they are only affected to a limited extent by the problems associated with the river.

The shorelands usage reflects the differences between the river and creek systems. The shorelands on the James River are almost equally divided between unmanaged, wooded (39%), agricultural (37%), and residential usage (24%). Over half the creek system, 55%, is classified as agricultural, with 26% unmanaged, wooded, and 13% residential. Most commercial activities, and all industrial and "formal" recreational activities are found along the creeks. The creek marshes and Ragged Island marsh are used for waterfowl hunting and for some fishing.

Ninety-nine percent of the fastland is privately owned.

3.2 SHORE EROSION PROCESSES, PATTERNS, AND DEFENSES

3.21 Shore Erosion Processes and Patterns

Shore erosion in Isle of Wight County is generally limited to portions of the James River shorelands. The creek shorelands are relatively stable, though there are evidences of some erosion in several places. Erosion in the county is linked to a combination of both natural and man-induced phenomena.

The creeks are, for the most part, protected from the high intensity storm action common on the river. Even in periods of high water levels, erosion is minimal. As stated earlier, 98% of the creek shorelands are covered by marsh grasses. Marshes, especially the extensive embayed marshes along most of the creeks, have a sponge-like ability to absorb water, thus limiting damage to the fastland. Also, if flood waters should reach the interior fastland and cause interior washing, the marsh will catch much of the runoff sediment.

Erosion along the creeks is primarily the result of man's activities along the shoreline. Wave energy from boat wakes is an ever increasing problem along the creeks. With the increased development along the creeks, there has been a tremendous increase in all types of water sports. With many marinas being located along the protected creek shores, there has been a much accelerated usage of the creek waters by small boats. In the creeks, which are naturally narrow, boat wakes press much energy against the fringing marsh causing erosion.

Another potential problem along the creek marsh areas stems from the development of the creek shoreline. Piers which cross the marshes, if not properly constructed, may lead to the destruction of the marsh, leaving the fastland unprotected. Also, increased pedestrian traffic along the shore zone can easily lead to the destruction of marsh grasses. Without the protective covering of marsh grasses, the creek shoreline would be very vulnerable to both flood and boat wake erosion.

The shorelands of Isle of Wight County along the James River are subject to the erosive forces of storm waves with tides, floods, and winds. The effects of these forces on any particular spot along the shore depend upon several factors. The primary factor is the fetch, the over water distance across which the wind blows. Other important factors include the strength of the wind and the depth of the water. The winds from the northeast and northwest are usually the most severe, generating waves and high water levels, which can cause severe shoreline damage to unprotected areas. However, man has interrupted the fetch from the northwest with the Reserve Fleet thus diminishing the effects of such storms. The area along Mogarts Beach extending to Days Point has an historical erosion rate of 3.8 feet per year. The area now appears stable. Since there are only isolated instances of shore protective structures, these could not have made such a drastic change in the area's erosion rate. But directly north-northwest of the area, offshore from Lawnes Neck, lies the James River Reserve Fleet. And as late as January, 1974, the fleet extended south as far as Rushmere Shores. The Reserve Fleet in recent times has

effectively cut off the long fetch to the north-northwest, protecting the shoreline from severe storm effects. Along Mogarts Beach, the once eroding 30-foot high bluffs are now covered with vegetation (Figure 9). However, this condition of stability probably will be short lived, for the Reserve Fleet is being constantly diminished in numbers. This was the case at Rushmere Shores. When the Fleet was offshore, the area stabilized and a beach developed. Since the Fleet has been moved from offshore, the area has again been suffering from erosion (Figure 6). When the Reserve Fleet is no longer interrupting the long north-west fetch to Mogarts Beach, the area will once again suffer from the effects of the severe north-western storms.

Elsewhere in the county, the bluffs along Lawnes Neck have been eroding at a rate of 1.9 feet per year. This erosion is still taking place, as evidenced by the falling trees (Figure 3). When the undercutting of the bluff is severe enough, the trees topple, carrying large amounts of soil with them. The erosion here is a major source of sand in the littoral drift nourishing the beaches to the south.

The Ragged Island marshes and shoreline have been eroding at a rate of from 1.2 to 2.6 feet per year. This area is vulnerable to storms from the northwest and northeast, and to a lesser extent, to those from the east and southeast. The Goodwin Point shoreline has an erosion rate of 1.2 feet per year (Figure 7).

3.22 Shore Erosion Defenses

There are few existing structures in the county serving to alleviate erosion. Most bulkheading

is concerned with holding fill rather than halting an erosion problem. In areas where erosion is prevalent and remedial action is necessary, professional advice is a necessary beginning to finding a feasible solution to the problem.

Along the creeks, where boat wakes are the major erosion cause, some type of protection in front of affected marsh areas may be necessary. In one place, logs have been staked in front of the marsh to cut down on the wave energy reaching the grasses. Such devices can sometimes achieve the desired effect in low intensity areas. Speed limits for boats traveling in the creeks should be enforced.

Along the James River shoreline, erosion is more of a problem. The shorelines of Lawson Point and Ragged Island are uninhabited and thus, protection for the shore is not necessary. In those areas where protection is economically feasible and desirable, professional advice is necessary. Several different types of action may prove suited to the county's needs. A unified area approach to erosion is recommended in any problem areas. Not only are individual costs lessened, but also such an approach protects the entire stretch of shoreline without aggravating neighboring property, as is common with individual actions.

Mogarts Beach, though stable now, cannot be expected to remain stable. One course of action here is to grade the slope of the 30-foot bluffs along the shore. A hillside with a steep slope will do little to stop erosion. By making a gentler slope, vegetation will be more able to hold the soil. Terracing the slope is another alternative. Some type of offshore structure

may prove beneficial in diminishing the strength of waves reaching the beach and thus the cliffs behind.

Along Burwell Bay, there are several existing groin fields. These have managed to capture sizeable fillets of sand. However, the groins cover only a small section of the shoreline. The slope of the 10 to 15-foot cliffs here needs to be reduced and the cliff vegetated. Since the supply of sand in the littoral drift seems good, a series of groins along the shore would probably be sufficient to protect the fastland.

In summary, the shoreline erosion problems of Isle of Wight are not severe. Erosion here is both natural and man-induced. A major change in the county's erosion patterns occurred with the anchoring of the Reserve Fleet offshore. With a diminishing Reserve Fleet offshore, erosion once again is threatening some areas.

3.3 POTENTIAL USE ENHANCEMENT OF THE ISLE OF WIGHT COUNTY SHORELINE

The potential use enhancement of the Isle of Wight County shoreline is very limited for a number of reasons. Along the James River, only two areas are not developed. Ragged Island is a valuable extensive marsh area, and as such should preclude any type of development. Upper Lawnes Neck is totally uninhabited, and has wide, sandy beaches. However, it is accessible only by boat or by a two mile long logging road. The area has high cliffs which are eroding. The cost of erosion control in this area would be quite high; this factor must be considered in any development plans. The other areas along the river have already developed into private, vacation homes and

regular home sites. Further development to any great extent might destroy much of what first attracted development here.

The creeks have been developed to a greater degree than the river. Only isolated development could proceed here, and then mostly toward the creek heads, which many would find unacceptable.

There is one development currently under construction behind the marsh at Ragged Island Creek. The development, "Carisbrooke", is currently a residential area, though plans call for the further development of a school, shopping center, and business offices as the need arises. Developments such as this, which conserve such valuable resources as the marsh areas, are well conceived. As of this writing, "Carisbrooke" has done an admirable job of building a shorelands community without destroying the shorelands.



FIGURE 3



FIGURE 4



FIGURE 5



FIGURE 6

Figure 3: Eroding bluffs at Lawnes Neck. The falling trees uproot large amounts of soil, further adding to the erosion problem.

Figure 4: Aerial view north of Baileys Beach. This picture, taken in July, 1974, shows a creek behind the two jetties on the right in the photo. Groins seem only moderately effective in trapping sand. Several appear to have been flanked.

Figure 5: Ground view, taken in July, 1975, of the area in the previous photo. The jetties have served to close off the creek, which is now dry and filled with marsh grasses and sand.

Figure 6: Eroding bluffs just north of previous photo. The beach and lower half of the bluffs are mostly clay and are not suitable for most recreational activities. When the Reserve Fleet extended south this far, the area was mostly stable. Without that offshore protection, erosion is again a problem.

Figure 7: An aerial view of Goodwin Point. Parts of the shoreline have been bulkheaded, but unprotected stretches are very vulnerable to wind and wave attacks.



FIGURE 7

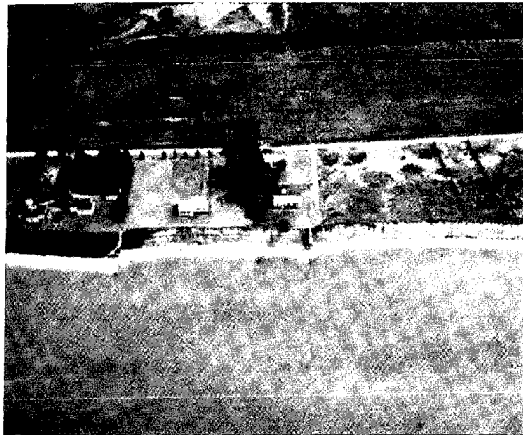


FIGURE 8

Figure 8: Aerial view of Mogarts Beach. This area had an erosion rate of 3.8 feet per year until the Reserve Fleet was anchored to the north. Although erosion is still a problem in some areas, it is not as severe.



FIGURE 9

Figure 9: Ground view of Mogarts Beach. The tree on the beach gives evidence of past erosion. The bluffs should be graded and revegetated if they are to withstand wind and wave attacks.



FIGURE 10

Figure 10: Muddy Cove ground view. This concrete bulkhead, retaining fill, would probably be illegal now, as it extends into the natural fringe barrier (The Virginia Wetlands Acts of 1972). The wooden bulkhead to the left in the photo, placed behind the fringe, has allowed the marsh to continue to grow.



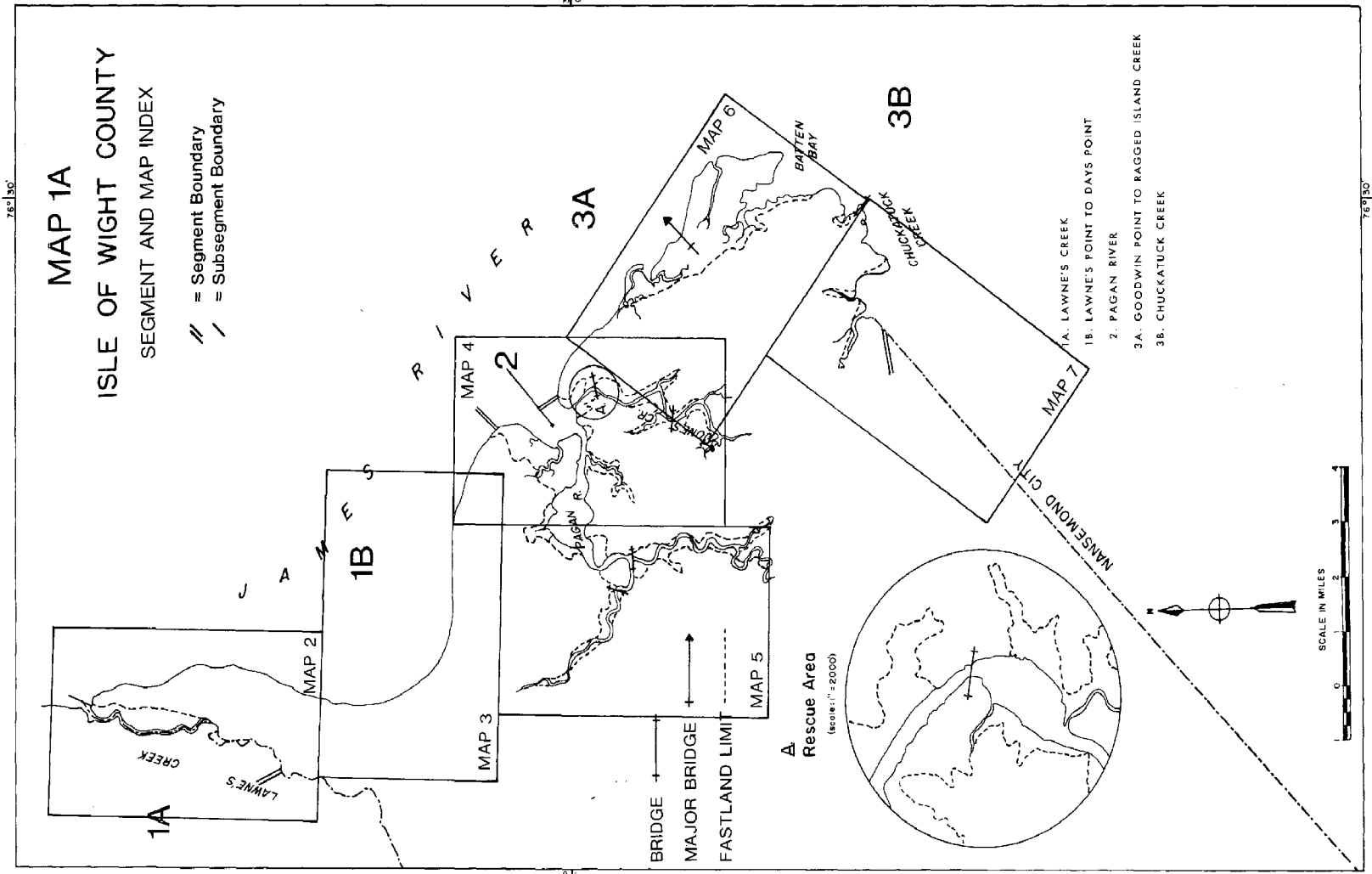
FIGURE 11

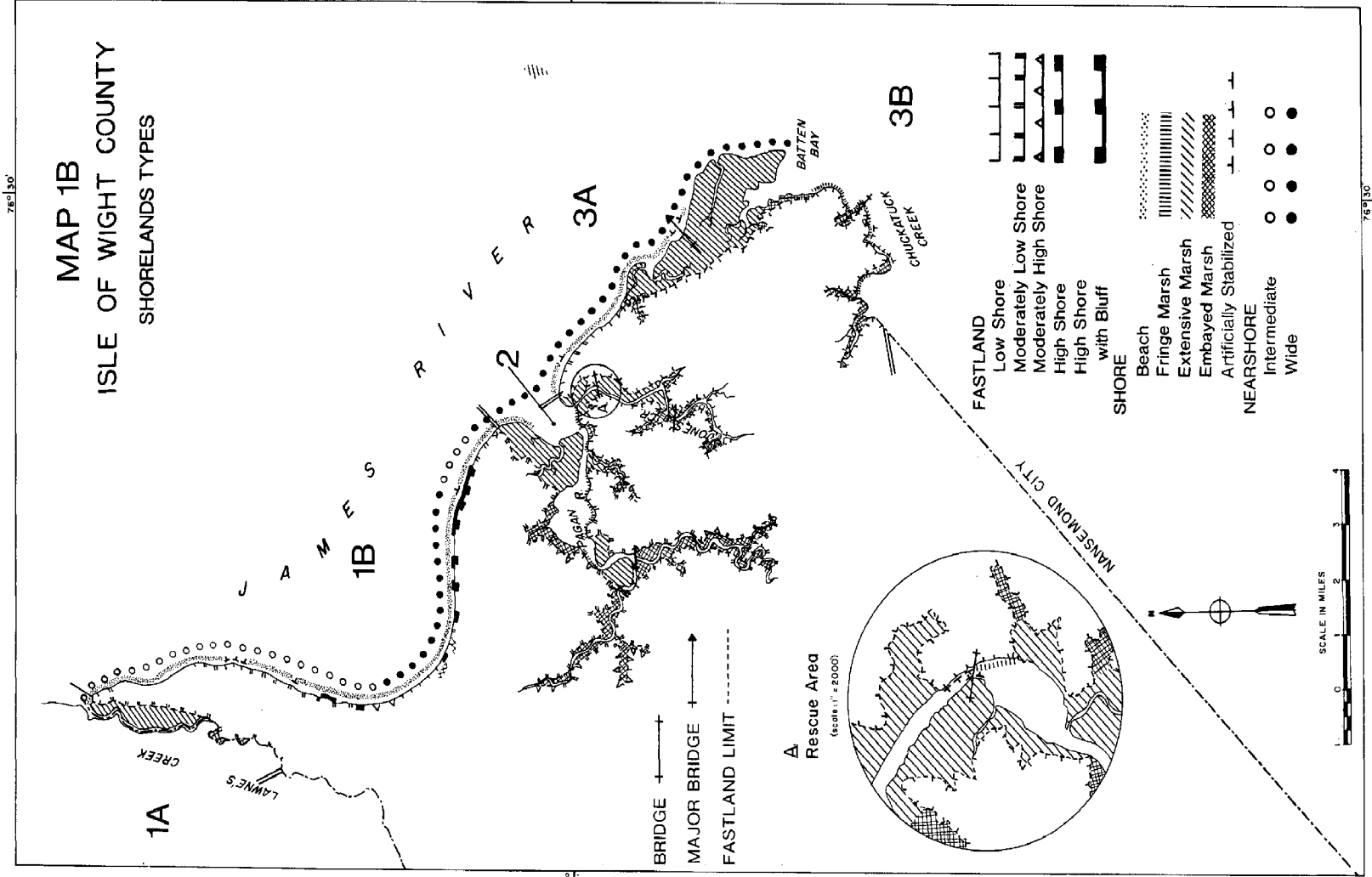
Figure 11: Wooden bulkhead near the mouth of Brewers Creek. The structure is in very good shape and is retaining fill in front of several residences.



FIGURE 12

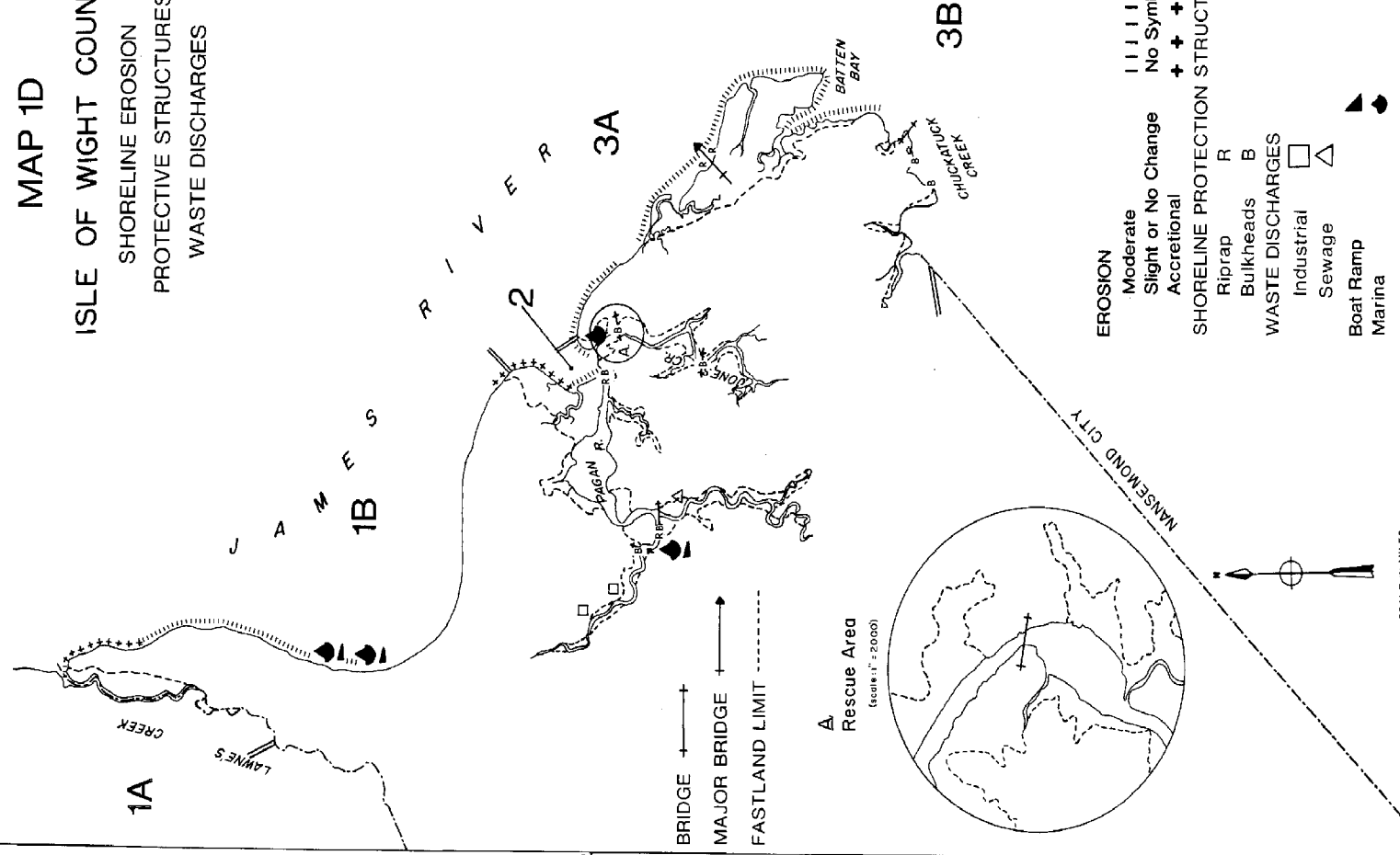
Figure 12: View at bridge along Jones Creek. The logs lying in front of the marsh act as a buffer against boat wake erosion in this low intensity area. A marina is directly across the creek.





76° 13' 00"

MAP 1D
ISLE OF WIGHT COUNTY
 SHORELINE EROSION
 PROTECTIVE STRUCTURES
 WASTE DISCHARGES



76° 13' 00"

76° 13' 00"

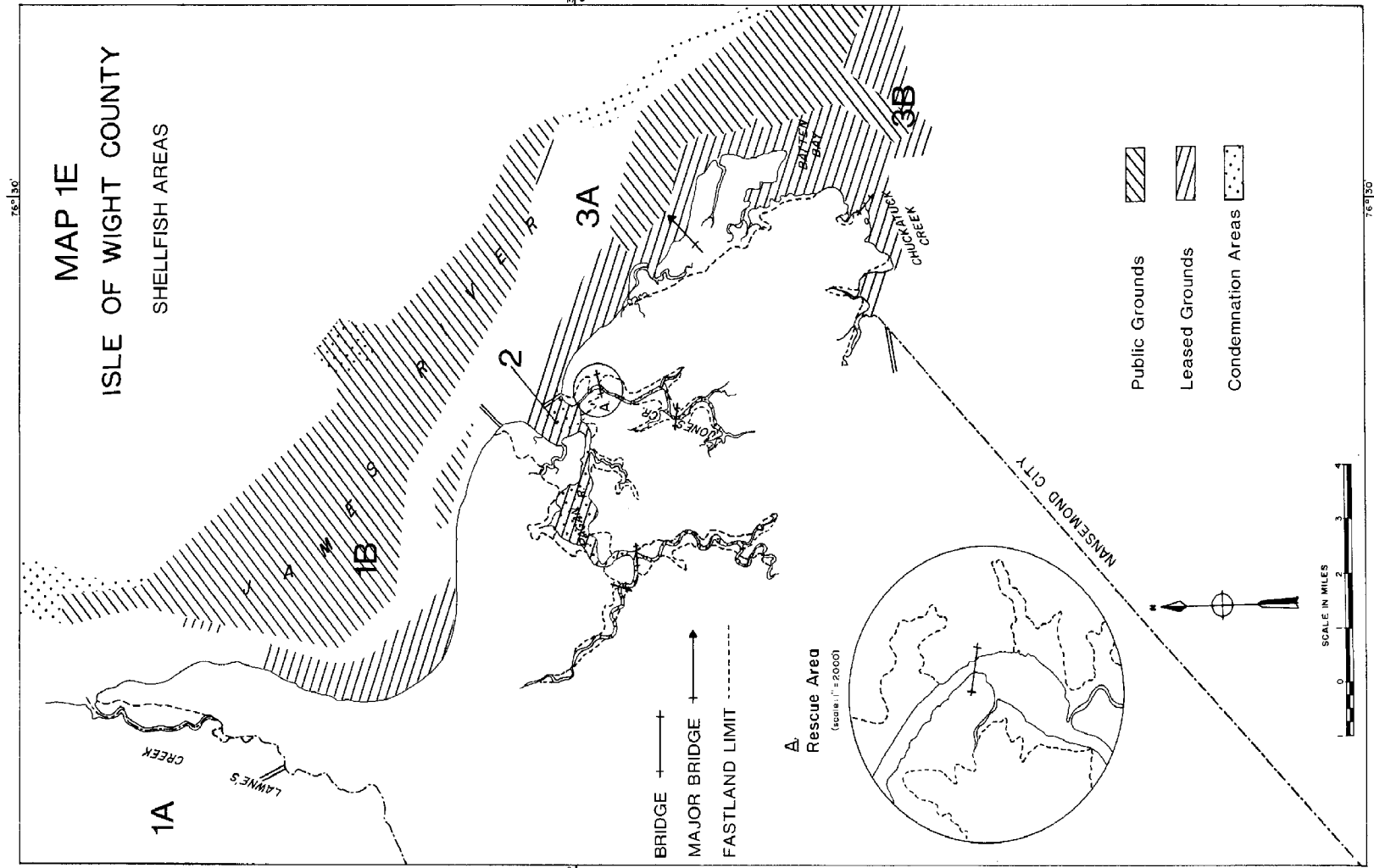


TABLE 1. ISLE OF WIGHT COUNTY SHORELANDS PHYSIOGRAPHY, FASTLAND USE, OWNERSHIP (STATUTE MILES)

Ownership, use and physiographic classification	SHORELANDS PHYSIOGRAPHY											FASTLANDS USE					OWNERSHIP		TOTAL MILES			
	FASTLANDS					SHORE					NEARSHORE		AGRICULTURAL	COMMERCIAL	INDUSTRIAL	RECREATIONAL	RESIDENTIAL	UNMANAGED, WOODED	PRIVATE	COUNTY	SHORE	FASTLAND
	LOW SHORE	MODERATELY LOW SHORE	MODERATELY HIGH SHORE	HIGH SHORE	HIGH SHORE WITH BLUFF	BEACH	ARTIFICIALLY STABILIZED	FRINGE MARSH	EMBAYED MARSH	EXTENSIVE MARSH	INTERMEDIATE	WIDE										
1A	1.9	5.5											0.3				0.2	6.9	7.4		6.2	7.4
1B	3.2	5.4	0.8	1.4	2.3	10.7	1.1	1.4	1.5	3.3	8.4	3.4	5.3				3.4	4.4	13.1		12.3	13.1
2	46.1	22.9	3.6				0.4	6.0	14.6	14.0		0.6	42.5	3.2	2.0	0.7	9.2	15.0	71.9	0.7	35.0	72.6
3A	9.3	0.6				2.3		0.9		7.5		7.2	3.2				2.1	4.6	9.9		10.7	9.9
3B	26.6						0.4	5.7	7.8	1.5			16.1				4.0	6.5	26.6		15.4	26.6
TOTAL	87.1	34.4	4.4	1.4	2.3	13.0	1.9	14.0	23.9	26.8	8.4	11.2	67.4	3.2	2.0	0.7	18.9	37.4	128.9	0.7	79.6	129.6
% of FASTLAND	67%	27%	3%	1%	2%								52%	2%	2%	1%	15%	29%	99%	1%		100%
% of SHORELINE						16%	2%	18%	30%	34%	11%	14%									100%	

CHAPTER 4

4.1 TABLE OF SUBSEGMENT SUMMARIES

4.2 SEGMENT AND SUBSEGMENT DESCRIPTION

4.3 SEGMENT AND SUBSEGMENT MAPS

TABLE 2. SHORELINE SITUATION REPORT SUBSEGMENT SUMMARIES, ISLE OF WIGHT COUNTY, VIRGINIA

SUBSEGMENT	SHORELANDS TYPE	SHORELANDS USE	OWNERSHIP	ZONING	FLOOD HAZARD	WATER QUALITY	BEACH QUALITY	SHORE EROSION SITUATION	POTENTIAL USE ENHANCEMENT
1A LAWNES CREEK 32,600 feet (6.2 mi.)	PASTLAND: Moderately low shore 74% and low shore 26%. SHORE: Extensive marsh 53%, embayed marsh 24%, and fringe marsh 23%. CREEK: Lawnes Creek is shallow. It has an average width of 200 ft.	PASTLAND: Agricultural 5%, residential 3%, and unmanaged, wooded 93%. SHORE: Sport fishing and waterfowl hunting. CREEK: Sport fishing.	Private.	Agricultural.	Low, noncritical.	No data.	No beaches.	Moderate, noncritical, 1.6 ft/yr. at the mouth of the creek. Slight or no change elsewhere. No endangered structures or shore protective structures.	Low. There is little access to the area. Marsh is best used as a wildlife habitat.
1B BURWELL BAY 64,400 feet (12.3 mi.)	PASTLAND: Low shore 24%, moderately low shore 42%, moderately high shore 5%, high shore 10%, and high shore with bluff 19%. SHORE: Beach 88%, artificially stabilized 3%, and extensive marsh 4%. NEARSHORE: Intermediate 67% and wide 28%.	PASTLAND: Agricultural 40%, residential 26%, and unmanaged, wooded 34%. SHORE: Recreational. NEARSHORE: Anchorage for Reserve Fleet in Burwell Bay. Commercial transport to Richmond through Rockland Shoal Channel. Elsewhere, water sports, sport boating, and fishing.	Private.	Agricultural and residential.	Low, noncritical except around Burwell Bay and Baileys Beach where the flood hazard is moderate, critical.	No data.	Good to poor. Most beaches are wide and sandy. Beach S of Bushmere Shore is mostly clay.	Moderate, noncritical (1.2 - 1.9 ft/yr.) from 1 mile S of Lawnes Point to just S of Holly Point. Historically, severe, noncritical (3.8 ft/yr.), from New Lawson Triangulation to Days Point. Area is stable now, due to presence of Reserve Fleet. Accretion of 1.5 ft/yr. occurs at Lawnes Point. There are no endangered structures. Shore protective structures consist of several groin fields and one area of bulkheading.	Low. Lawnes Neck has no access roads. The rest of the subsegment should remain as a low density residential and agricultural area.
2 PAGAN RIVER 185,000 feet (35.0 mi.)	PASTLAND: Low shore 63%, moderately low shore 32%, and moderately high shore 5%. SHORE: Embayed marsh 42%, extensive marsh 40%, fringe marsh 17%, and artificially stabilized 1%. NEARSHORE: Wide 2%. Pagan River has controlling depths of 6 ft.	PASTLAND: Agricultural 59%, residential 13%, commercial 4%, industrial 3%, recreational 1%, and unmanaged, wooded 21%. SHORE: Fishing and waterfowl hunting. RIVER: Sport boating and fishing.	Private, except for County owned Carrollton Nike Park on Jones Creek.	Mostly agricultural, other areas are residential, commercial or industrial.	Low, noncritical to moderate, critical.	Satisfactory.	Poor. One, thin, beach at Days Point.	No data, except for areas bordering the James River. Area from Days Point to Williams Creek has been accreting at a rate of 3.4 ft/yr. Moderate, noncritical (2.6 ft/yr.) from Williams Creek to the mouth of the Pagan River. Four areas of shore protective structures, usually wooden bulkheading, are mostly effective in retaining fill and in guarding against boat wake erosion.	Low. The marsh areas should be preserved in their natural state. Elsewhere, the creek's present use as low density residential and agricultural areas should be continued.
3A RAGGED ISLAND 56,600 feet (10.7 mi.)	PASTLAND: Low shore 94% and moderately low shore 6%. SHORE: Extensive marsh 70%, beach 22%, fringe marsh 8%, and artificially stabilized 1%. NEARSHORE: Wide 67%.	PASTLAND: Agricultural 32%, residential 21%, and unmanaged, wooded 47%. SHORE: Sport fishing and waterfowl hunting. NEARSHORE: Commercial shipping in the Channel. Elsewhere sport boating, fishing, and other water sports.	Private.	Agricultural and residential.	Moderate, noncritical and critical.	Satisfactory.	Poor.	Slight or no change to moderate, noncritical (1.2 - 2.6 ft/yr.). Several hundred feet of bulkheading on Goodwin Point and riprap at the James River abutment. These both seem to be effective.	Low. The Ragged Island Marshes should be left as they are.
3B CHUCKATUCK CREEK 81,200 feet (15.4 mi.)	PASTLAND: Entirely low shore. SHORE: Embayed marsh 51%, fringe marsh 37%, extensive marsh 10%, and artificially stabilized 2%. CREEK: Chuckatuck Creek has 4 foot depths at its mouth.	PASTLAND: Agricultural 61%, residential 15%, and unmanaged, wooded 24%. SHORE: Sport fishing and waterfowl hunting. CREEK: Sport fishing, boating, and other water sports.	Private.	Agricultural and residential.	Low, noncritical for most of the area, moderate, critical E of Muddy Cove.	Satisfactory.	No beaches.	Moderate, noncritical erosion (1.2 ft/yr.) from the mouth of Chuckatuck to Ragged Island. No data for the rest of the area. Several areas of wooden or concrete bulkhead. All seem at least moderately effective in doing their job in retaining fill.	A planned residential community is already underway at the head of Ragged Island Creek. The rest of the subsegment should remain as low density residential area.

LAWNES CREEK, ISLE OF WIGHT COUNTY, VIRGINIA
SUBSEGMENT 1A (Map 2)

EXTENT: 32,600 feet (6.2 mi.) of shoreline along Lawnes Creek. The subsegment includes 39,200 feet (7.4 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Moderately low shore 74% (29,200 ft.) and low shore 26% (10,000 ft.).
SHORE: Extensive marsh 53% (17,200 ft.), embayed marsh 24% (8,000 ft.), and fringe marsh 23% (7,400 ft.).
CREEK: Lawnes Creek is shallow. It has an average width of 200 feet.

SHORELANDS USE

FASTLAND: Agricultural 5% (1,800 ft.), residential 3% (1,000 ft.), and unmanaged, wooded 93% (36,400 ft.).
SHORE: Sport fishing and waterfowl hunting in the marsh areas.
CREEK: Sport fishing in areas of the creek.

SHORELINE TREND: The creek trends basically N - S.

OWNERSHIP: Private.

ZONING: Agricultural.

FLOOD HAZARD: Low, noncritical for the subsegment. All of the fastland is at least above the 20-foot contour.

WATER QUALITY: No data available for this area.

BEACH QUALITY: There are no beaches in this subsegment.

PRESENT SHORE EROSION SITUATION

EROSION RATE: Slight or no change to moderate, noncritical. The only area of measurable erosion is at the mouth of Lawnes Creek where the erosion rate has been 1.6 feet per year. The rest of the creek shoreline is protected from the erosive forces of direct bay waves and river fetches.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: None.

Suggested Action: No action is necessary.

OTHER SHORE STRUCTURES: None.

POTENTIAL USE ENHANCEMENT: Low. There is some residential development along Route 676 located about $\frac{1}{2}$ mile into the fastland. With no other roads into the area, further development is unlikely. This area is probably best left as it is, serving as a wildlife habitat. Nature trails are a possibility along the creek.

MAPS: USGS, 7.5 Min.Ser. (Topo.), HOG ISLAND Quadr., 1965, Pr. 1972.
USGS, 7.5 Min.Ser. (Topo.), BACONS CASTLE Quadr., 1969.
C&GS, #529, 1:40,000 scale, JAMES RIVER, Newport News to Jamestown Island, 1970.

PHOTOS: Aerial-VIMS 12July74 IW-1A/1.

BURWELL BAY, ISLE OF WIGHT COUNTY, VIRGINIA
SUBSEGMENT 1B (Maps 2, 3, and 4)

EXTENT: 64,400 feet (12.3 mi.) of shoreline from Lawnes Point to Days Point. The subsegment includes 68,800 feet (13.1 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 24% (16,800 ft.), moderately low shore 42% (28,600 ft.), moderately high shore 6% (4,000 ft.), high shore 10% (7,200 ft.), and high shore, with bluff 18% (12,200 ft.).
SHORE: Beach 88% (56,400 ft.), artificially stabilized 9% (5,600 ft.), and extensive marsh 4% (2,400 ft.).
NEARSHORE: Intermediate 67% (44,200 ft.) and wide 28% (18,200 ft.). The rest of the shoreline is located along several creeks in the subsegment and is unclassified.

SHORELANDS USE

FASTLAND: Agricultural 40% (27,800 ft.), residential 26% (17,900 ft.), and unmanaged, wooded 34% (23,100 ft.).
SHORE: Recreational usages at the different beaches found along the shore of the subsegment.
NEARSHORE: Burwell Bay is used as an anchorage for the Maritime Administration James River Reserve Fleet. No private boats are allowed within 500 feet of the anchorage. Commercial vessels use the Rocklanding Shoal Channel in their transport of goods upstream to Richmond and surrounding areas. The rest of the subsegment's nearshore is used for water sports, sport boating, and fishing.

WIND AND SEA EXPOSURE: The shoreline trends first N - S, then W - E. The fetches at Holly Point are SE - 15.2 nm and E - 7.6 nm.

OWNERSHIP: Private.

ZONING: Agricultural and Residential.

FLOOD HAZARD: Low, noncritical to moderate, critical. Most of the subsegment is sufficiently high to withstand the flood waters of the James River. However, several areas, especially around Burwell Bay and Baileys Beach, have areas with structures below the 5-foot (MSL) contour. These are endangered by flooding.

WATER QUALITY: No data available.

BEACH QUALITY: Good to poor. The subsegment has wide, sandy beaches along much of its shoreline. Notable are the beaches around Mogarts Beach and along the uninhabited areas of Lawnes Neck. However, there are also beaches in this subsegment composed of clay with rocks and little or no sand. One example is the area between Rushmere Shores and Baileys Beach. Here, the beach and half of the 15-foot bluff behind is composed of clay. These beaches are not suitable for most recreational activities.

PRESENT SHORE EROSION SITUATION

EROSION RATE: Slight or no change to moderate, noncritical. The area at Lawnes Point has been accreting at a rate of 1.5 feet per year. There is moderate, noncritical erosion occurring from one mile south of Lawnes Point to just south of Holly Point. Here, the historical erosion rate has been from 1.2 to 1.9 feet per year. The shoreline from New Lawson Triangulation to Days Point historically has experienced severe erosion at a rate of 3.8 feet per year. However, field checks reveal that most of the area is now stable. This stabilization has probably been the result of the placement of the U.S. Reserve Fleet upstream of the area. This action has severely limited the potentially long fetch from the north. If the Reserve Fleet is moved, or is severely diminished in numbers, the area would probably again suffer from severe erosion.

ENDANGERED STRUCTURES: None at present.

SHORE PROTECTIVE STRUCTURES: There are several groin fields in the subsegment. They are located at Rushmere Shores, south of Holly Point, east of New Lawson Triangulation, and at Mogarts Beach. Most of the groins are made of wood but a few are constructed of rubble. There is bulkheading at the marina at Baileys Beach which appears to be successful.

Suggested Action: None for the present. In the next few years, depending upon the size and location of the Reserve Fleet, erosion will probably be a greater problem along Burwell Bay and around Mogarts Beach. The bluffs at Mogarts Beach need to be sloped more and then revegetated. Though most are now well vegetated, they are too steep to hold the soil should erosion become a problem there again.

OTHER SHORE STRUCTURES: There are numerous piers in the subsegment. A boatramp is located at Rushmere Shores.

POTENTIAL USE ENHANCEMENT: Low. The Lawnes Neck area is almost inaccessible, which makes any type of development highly unlikely. The rest of the subsegment is already developed as a second home, vacation area. Though some development here is a possibility, there is a limited amount of land available.

MAPS: USGS, 7.5 Min.Ser. (Topo.), HOG ISLAND
Quadr., 1965, Pr. 1972.
USGS, 7.5 Min.Ser. (Topo.), BACONS CASTLE
Quadr., 1969.
USGS, 7.5 Min.Ser. (Topo.), MULBERRY ISLAND
Quadr., 1965, Pr. 1970.
C&GS, #529, 1:40,000 scale, JAMES RIVER,
Newport News to Jamestown Island, 1970.

PHOTOS: Aerial-VIMS 12July74 IW-1B/2-20, 27-29;
24Jan 75 IW-1B/21-26, 30-38.

Ground - 2July75 IW-1B/67-104.

PAGAN RIVER, ISLE OF WIGHT COUNTY, VIRGINIA
SEGMENT 2 (Maps 4 and 5)

EXTENT: 185,000 feet (35.0 mi.) of shoreline from Days Point to Goodwin Point, including the Pagan River, Cypress Creek, and Jones Creek. The segment has 383,200 feet (72.6 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 63% (243,300 ft.), moderately low shore 32% (120,700 ft.), and moderately high shore 5% (19,200 ft.).

SHORE: Embayed marsh 42% (77,000 ft.), extensive marsh 40% (74,000 ft.), fringe marsh 17% (31,950 ft.), and artificially stabilized 1% (2,080 ft.).

NEARSHORE: Wide 2% (3,400 ft.). The Pagan River has a controlling depth of only six feet, which is too shallow to be classified by our system.

SHORELANDS USE

FASTLAND: Agricultural 59% (224,600 ft.), residential 13% (48,400 ft.), commercial 4% (16,600 ft.), industrial 3% (10,600 ft.), recreational 1% (3,800 ft.), and unmanaged, wooded 21% (79,200 ft.).

SHORE: Fishing in the marsh areas of Jones and Cypress Creeks, and in areas of the Pagan River. Waterfowl hunting also takes place in these areas.

RIVER: Sport boating and fishing in the river and creeks.

SHORELINE TREND: The Pagan River system contains many meanders. The river trends basically E - W. The tributary creeks trend basically N - S.

OWNERSHIP: Private, except for the County owned Carrollton Nike Park on Jones Creek.

ZONING: Mostly agricultural. Residential for most of Smithfield. Commercial at the Route 10 bridge abutment over Cypress Creek. Industrial at the Route 10 bridge abutment over the Pagan River.

FLOOD HAZARD: Low, noncritical to moderate, critical. Most of the segment's fastland is sufficiently high to withstand flood waters.

There are, however, some houses built in areas susceptible to flooding (land with less than a 5-foot elevation). In these areas, the flood hazard is moderate, critical.

WATER QUALITY: Satisfactory, as of January, 1975.

BEACH QUALITY: Poor. There is one narrow beach at Days Point.

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data except for the areas directly bordering on the James River. The area from Days Point to Williams Creek has been accreting at a rate of 3.4 feet per year historically. Moderate, noncritical erosion has been occurring from Williams Creek to the mouth of the Pagan River. Historically, that area has lost an average of 2.6 feet per year.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: There is approximately 800 feet of bulkhead in the area around the Route 704 bridge over Jones Creek. The marina here has about 600 feet of wooden bulkhead holding backfill. This is in good condition and seems effective. On the west side of the creek there is an old system of about 100 feet of logs laid on the shoreline supposedly acting as a bulkhead. This method would be ineffective in a high energy area. However, there is little or no erosion here and the logs mainly act as a buffer between the shore and the fastland. On the west side of the creek there is an eel processing plant which is encompassed with about 100 feet of wooden bulkhead, part of which is backfilled with concrete. This emplacement is fairly new, well constructed, and apparently effective. At Fulgham Bridge, a residence has several hundred feet of bulkhead constructed of horizontally placed railroad ties. This is effective in holding backfill.

At Battery Park, an oyster packing plant has an old bulkhead now mostly fronted by rubble riprap. The area is stable. On the east side of the Route 10 bridge over Cypress Creek, there is a restaurant and marina. This area has approximately 300 feet of retaining wall and riprap along its shoreline. The retaining wall is constructed of small pilings with horizontally placed boards. It is permeable but is still relatively effective in retaining fill. The packing plant on the north side of the

Route 10 bridge across the Pagan River has vertical pilings protecting its shoreline.

Suggested Action: The Pagan River is a low intensity area with little or no erosion. No action is deemed necessary.

OTHER SHORE STRUCTURES: There is a boatramp at the marina west of Cypress Creek and one at a marina between Red Point and Cypress Creek. There are numerous piers and docks throughout the segment. A marine railway is located at a marina at Rescue. Also, there are several bridges across the river and the creeks.

POTENTIAL USE ENHANCEMENT: Low. The marsh areas of the shoreline should be left in their natural state. The present usage of the rest of the shoreline as a low density residential and agricultural area should be continued.

MAPS: USGS, 7.5 Min.Ser. (Topo.), BACONS CASTLE Quadr., 1969.
USGS, 7.5 Min.Ser. (Topo.), MULBERRY ISLAND Quadr., 1965, Pr. 1970.
USGS, 7.5 Min.Ser. (Topo.), BERNES CHURCH Quadr., 1965, Pr. 1972.
USGS, 7.5 Min.Ser. (Topo.), SMITHFIELD Quadr., 1968.
C&GS, #529, 1:40,000 scale, JAMES RIVER, Newport News to Jamestown Island, 1970.

PHOTOS: Aerial-VIMS 24Jan75 IW-2/39-64.

Ground - 29May75 IW-2/48-66.

RAGGED ISLAND, ISLE OF WIGHT COUNTY, VIRGINIA
SUBSEGMENT 3A (Maps 4 and 6)

EXTENT: 56,600 feet (10.7 mi.) of shoreline from Goodwin Point to Ragged Island Creek. The subsegment includes 52,400 feet (9.9 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 94% (49,000 ft.) and moderately low shore 6% (3,400 ft.).
SHORE: Extensive marsh 70% (39,600 ft.), beach 22% (12,200 ft.), fringe marsh 8% (4,800 ft.), and artificially stabilized less than 1%.
NEARSHORE: Wide 67%, located along the James River. The rest of the shoreline measurement is from creeks or creek mouths and is unclassified.

SHORELANDS USE

FASTLAND: Agricultural 32% (17,700 ft.), residential 21% (11,000 ft.), and unmanaged, wooded 47% (24,400 ft.).
SHORE: Sport fishing and waterfowl hunting in the marshes of Ragged Island.
NEARSHORE: Commercial shipping in the channel. Sport boating, fishing, and other water sports throughout the subsegment.

WIND AND SEA EXPOSURE: The shoreline trends basically NW - SE. The fetch at Candy Island is SE - 8.5 nm and ENE - 4.0 nm.

OWNERSHIP: Private.

ZONING: Agricultural and Residential.

FLOOD HAZARD: Moderate, noncritical except critical for one house at the head of Cooper Creek.

WATER QUALITY: Satisfactory, as of January, 1975.

BEACH QUALITY: Poor to good. Most beaches found in this subsegment are narrow and interspaced with salt bush. There are some nice beaches along Ragged Island's shoreline, however they are almost totally inaccessible except by boat.

PRESENT SHORE EROSION SITUATION

EROSION RATE: Slight or no change to moderate, noncritical. Except for a stable 70-foot section southeast of Goodwin Point, the entire

subsegment has eroded at a rate of 1.2 to 2.6 feet per year historically.
ENDANGERED STRUCTURES: No structures are presently endangered.
SHORE PROTECTIVE STRUCTURES: There is several hundred feet of bulkhead in front of two houses on Goodwin Point and riprap at the James River Bridge abutment. All seems to be effective.

Suggested Action: With almost all of the shoreline experiencing moderate erosion, some type of artificial stabilization of the shoreline is in order. However, economics make it impractical to stabilize any areas of the subsegment except for the Goodwin Point shoreline. There, landowners should make a joint effort to present a unified defense to protect against erosion. Professional advice is always the first step in considering such a project.

OTHER SHORE STRUCTURES: There are several piers and the James River Bridge in this subsegment.

POTENTIAL USE ENHANCEMENT: The Ragged Island marshes should be left as an unspoiled area. It is a valuable resource to the area as a natural wildlife habitat.

MAPS: USGS, 7.5 Min.Ser. (Topo.), MULBERRY ISLAND Quadr., 1965, Pr. 1970.
USGS, 7.5 Min.Ser. (Topo.), BENNS CHURCH Quadr., 1965, Pr. 1972.
USGS, 7.5 Min.Ser. (Topo.), NEWPORT NEWS SOUTH Quadr., 1964, Pr. 1968.
C&GS, #529, 1:40,000 scale, JAMES RIVER, Newport News to Jamestown Island, 1970.

PHOTOS: Aerial-VIMS 24Jan75 IW-3A/65-66.

CHUCKATUCK CREEK, ISLE OF WIGHT COUNTY, VIRGINIA
SUBSEGMENT 3B (Maps 6 and 7)

EXTENT: 81,200 feet (15.4 mi.) of shoreline from Ragged Island Creek to the Isle of Wight County line. The shoreline measurement includes Brewers Creek and Green Swamp Creek (to the county line). The subsegment also includes 140,400 feet (26.6 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Entirely low shore.
SHORE: Embayed marsh 51% (41,400 ft.), fringe marsh 37% (30,150 ft.), extensive marsh 10% (7,800 ft.), and artificially stabilized 2% (1,850 ft.).
CREEK: Chuckatuck Creek has depths of about 4 feet at its mouth.

SHORELANDS USE

FASTLAND: Agricultural 61% (85,000 ft.), residential 15% (21,000 ft.), and unmanaged, wooded 24% (34,400 ft.).
SHORE: Sport fishing and waterfowl hunting along the marsh areas of the subsegment.
CREEK: Sport fishing, boating, and other water sports. Also, at the mouth of Brewers Creek, residents maintain oyster and clam beds in the creek nearshore.

WIND AND SEA EXPOSURE: The shoreline trends N - S from the subsegment's start to the mouth of Chuckatuck Creek. From there, the creek shoreline trends NE - SW. The fetch at the mouth of Chuckatuck Creek is E to W - 9.4 nm and ENE to WSW - unlimited across the Chesapeake Bay.

OWNERSHIP: Private.

ZONING: Agricultural and Residential.

FLOOD HAZARD: Low, noncritical for most of the subsegment. Flooding occurs in the marsh areas throughout the subsegment. The only area where flooding endangers structures is just east of Muddy Cove. Here, the flood hazard is moderate, critical.

WATER QUALITY: Satisfactory, as of January, 1975.

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

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data on Brewers Creek or Chuckatuck Creek. Moderate, noncritical erosion is occurring from the mouth of Chuckatuck Creek to Ragged Island. The shore here historically has eroded at an average rate of 1.2 feet per year.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: There is a 50-foot section of concrete block bulkhead east of Winall Point. On the east side of Muddy Cove, one residence has approximately 100 feet of concrete bulkhead backed by a wooden retaining wall 10 feet behind. Adjoining this is another 100 feet of old, wooden bulkhead, retaining fill. Just east of Brewers Creek there is 1,600 feet of wooden bulkhead with backfill. All structures appear effective in their job of retaining fill and guarding against boat wake erosion.

Suggested Action: No action is deemed necessary. The eroding section of shoreline is marsh, thus, no measures can be taken there to prevent it. Elsewhere, the segment's shoreline is stable.

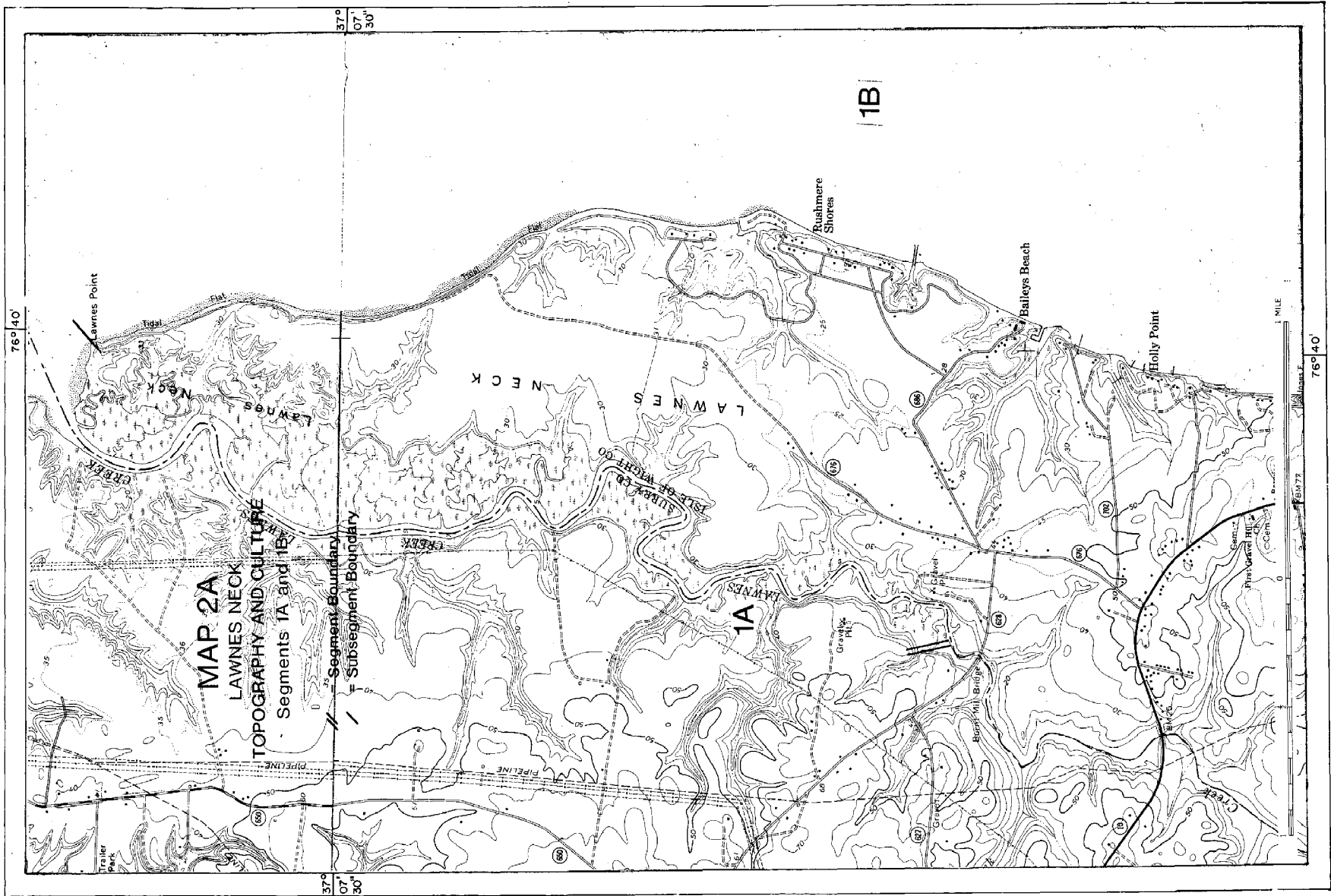
OTHER SHORE STRUCTURES: There are numerous piers found from just north of the mouth of Chuckatuck Creek to the mouth of Brewers Creek. A wooden boatramp is located on the east side of Muddy Cove.

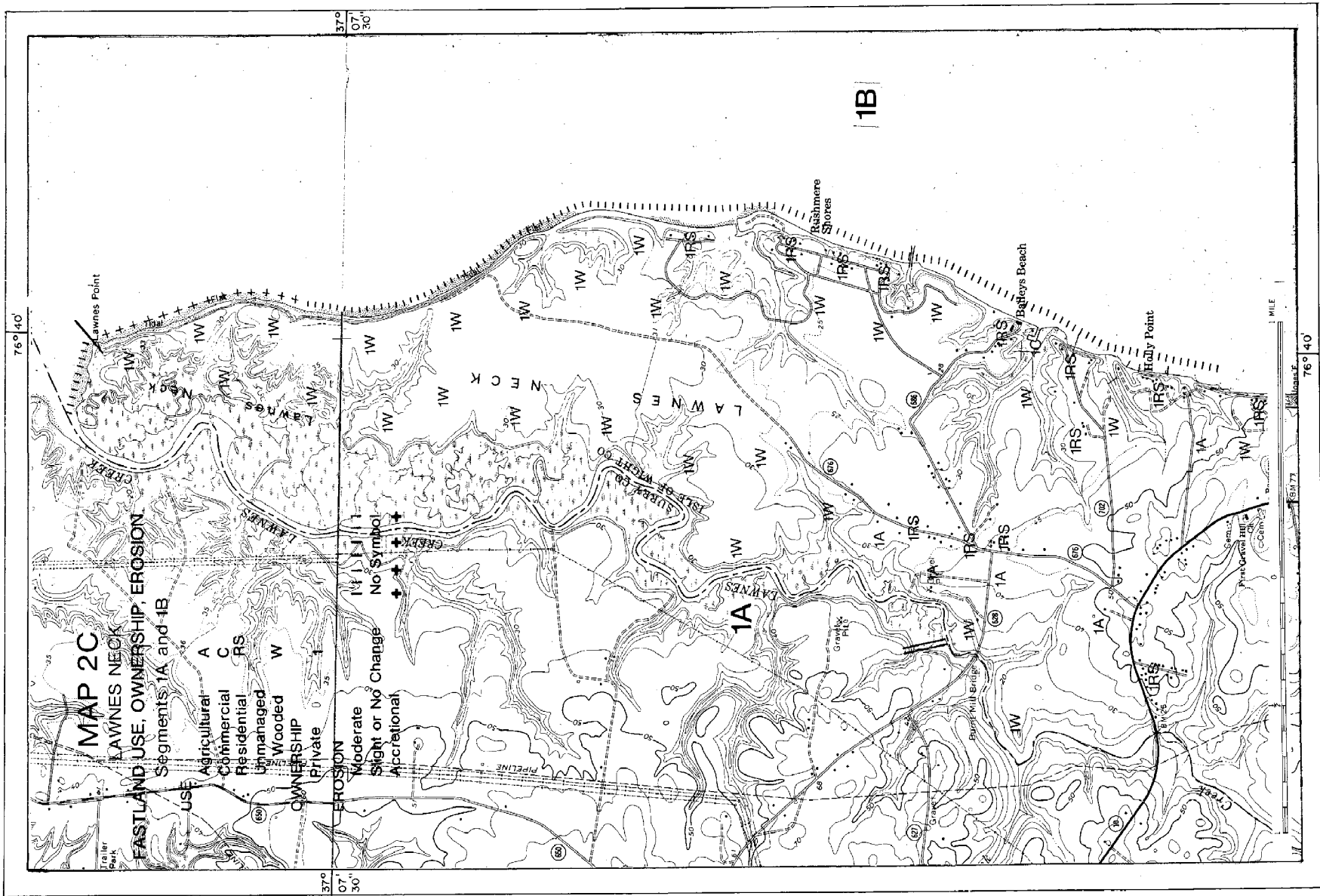
POTENTIAL USE ENHANCEMENT: Low. The present usage as a low density residential area appears most satisfactory.

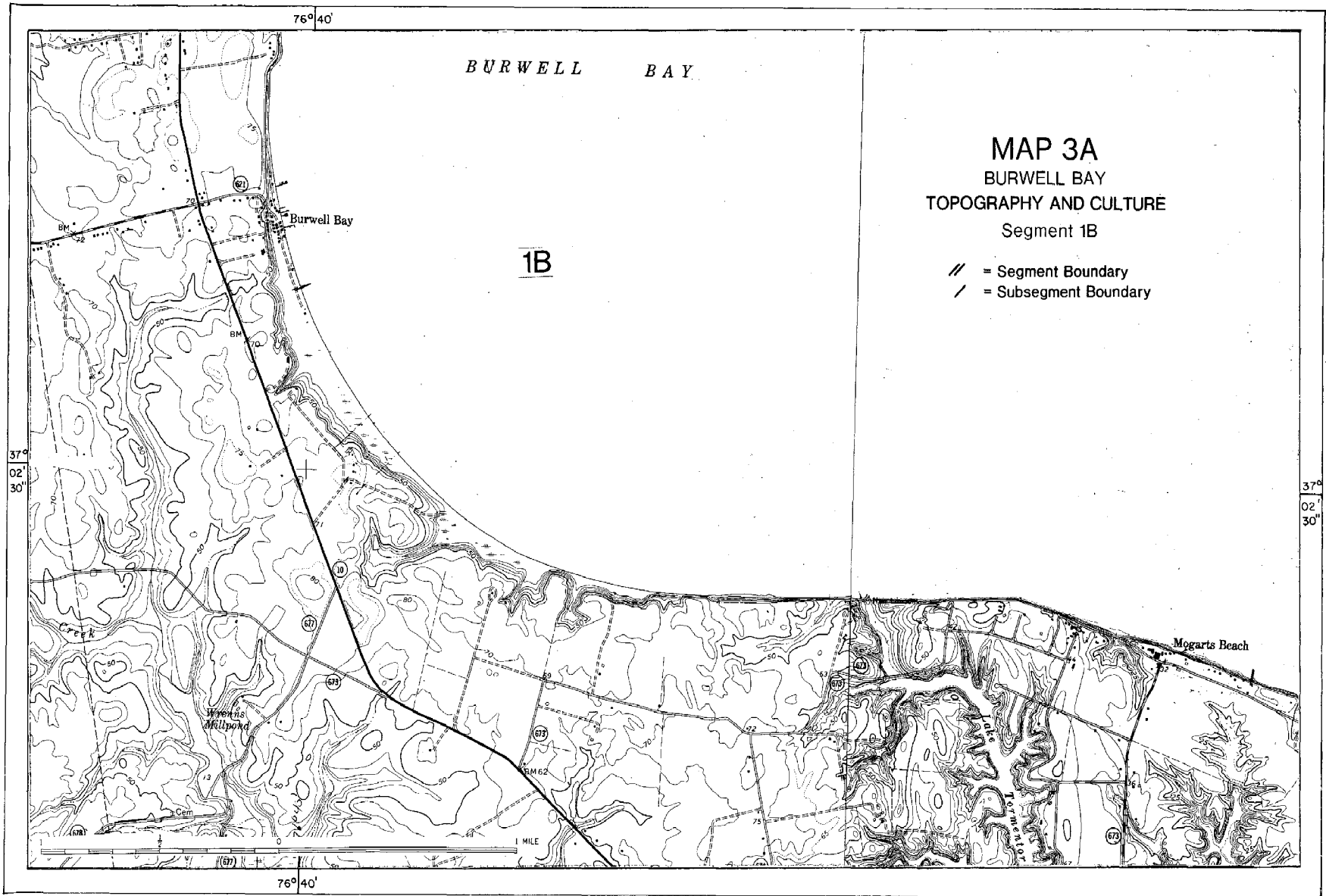
MAPS: USGS, 7.5 Min.Ser. (Topo.), BENNS CHURCH
Quadr., 1965, Pr. 1972.
USGS, 7.5 Min.Ser. (Topo.), NEWPORT NEWS
SOUTH Quadr., 1964, Pr. 1968.
C&GS, #529, 1:40,000 scale, JAMES RIVER,
Newport News to Jamestown Island, 1970.

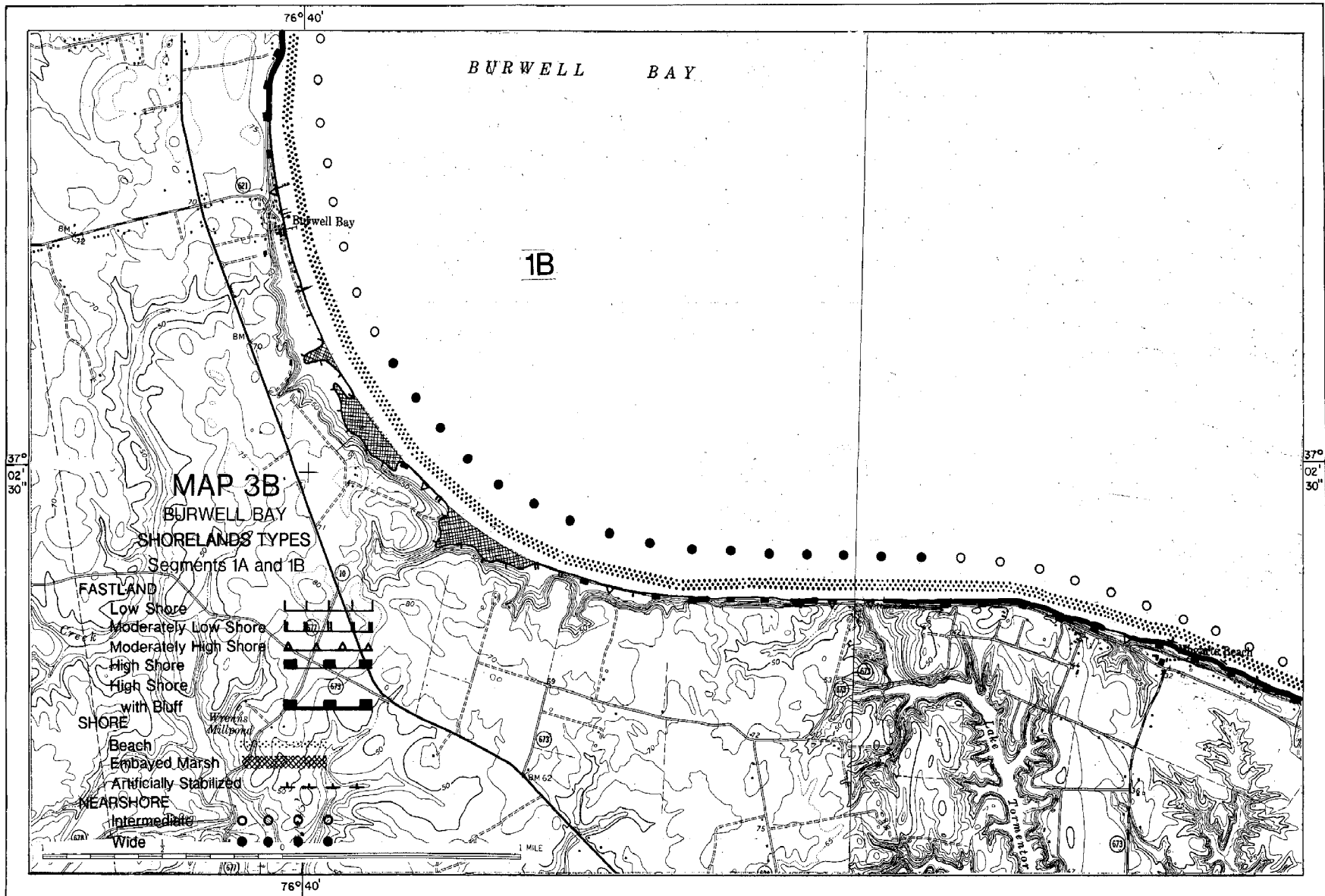
PHOTOS: Aerial-VIMS 24Jan75 IW-3B/67-70.

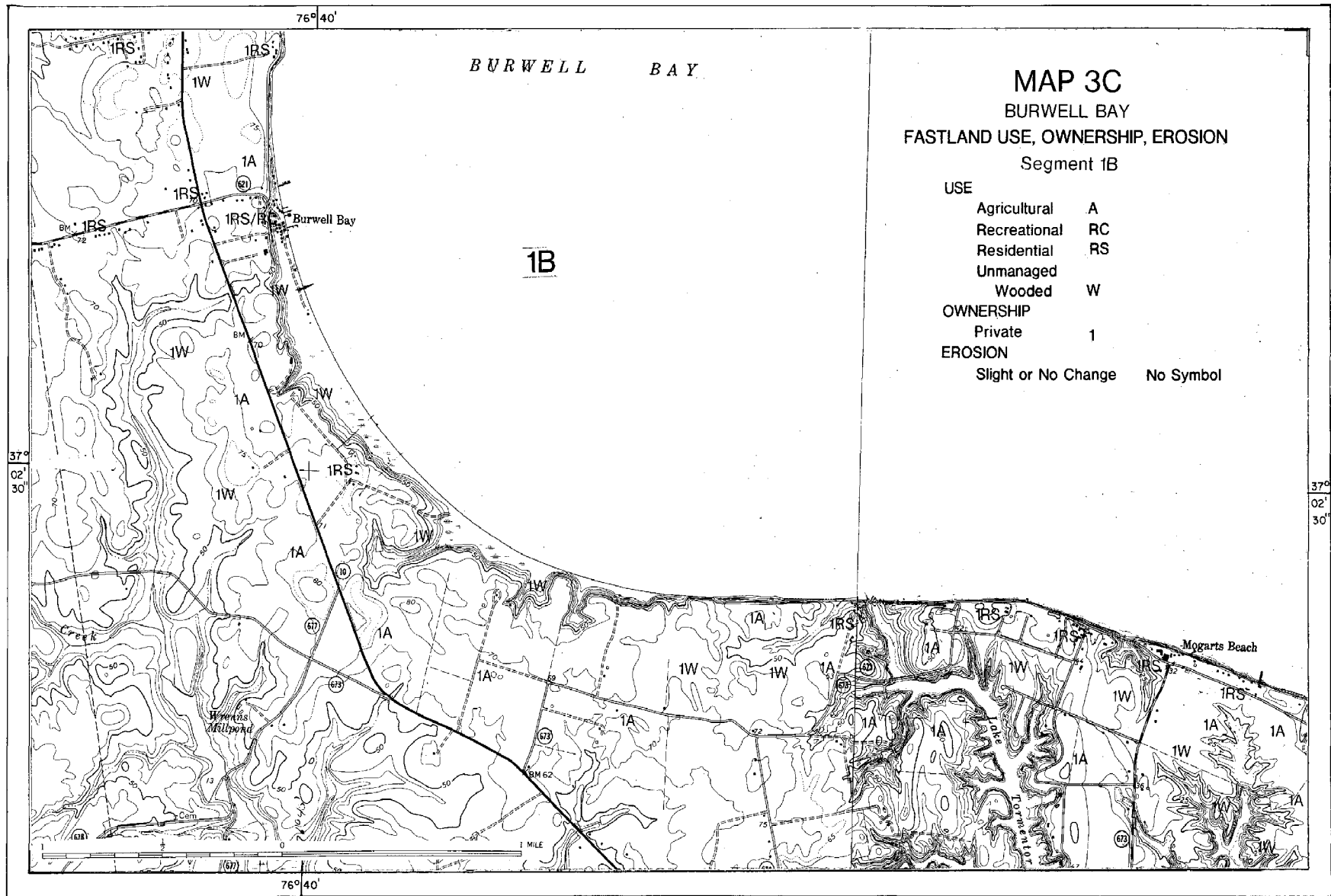
Ground - 29May75 IW-3B/1-47.



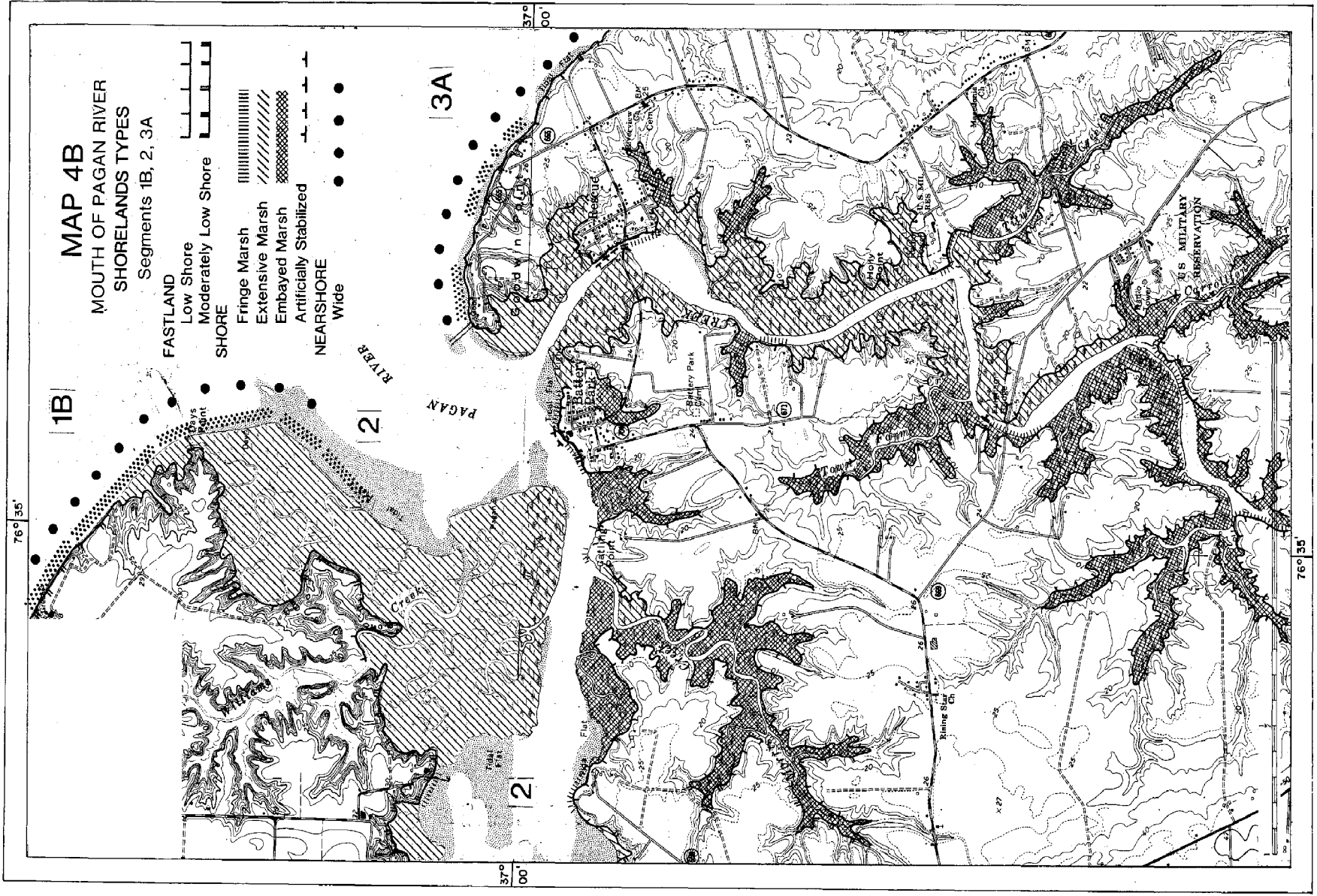










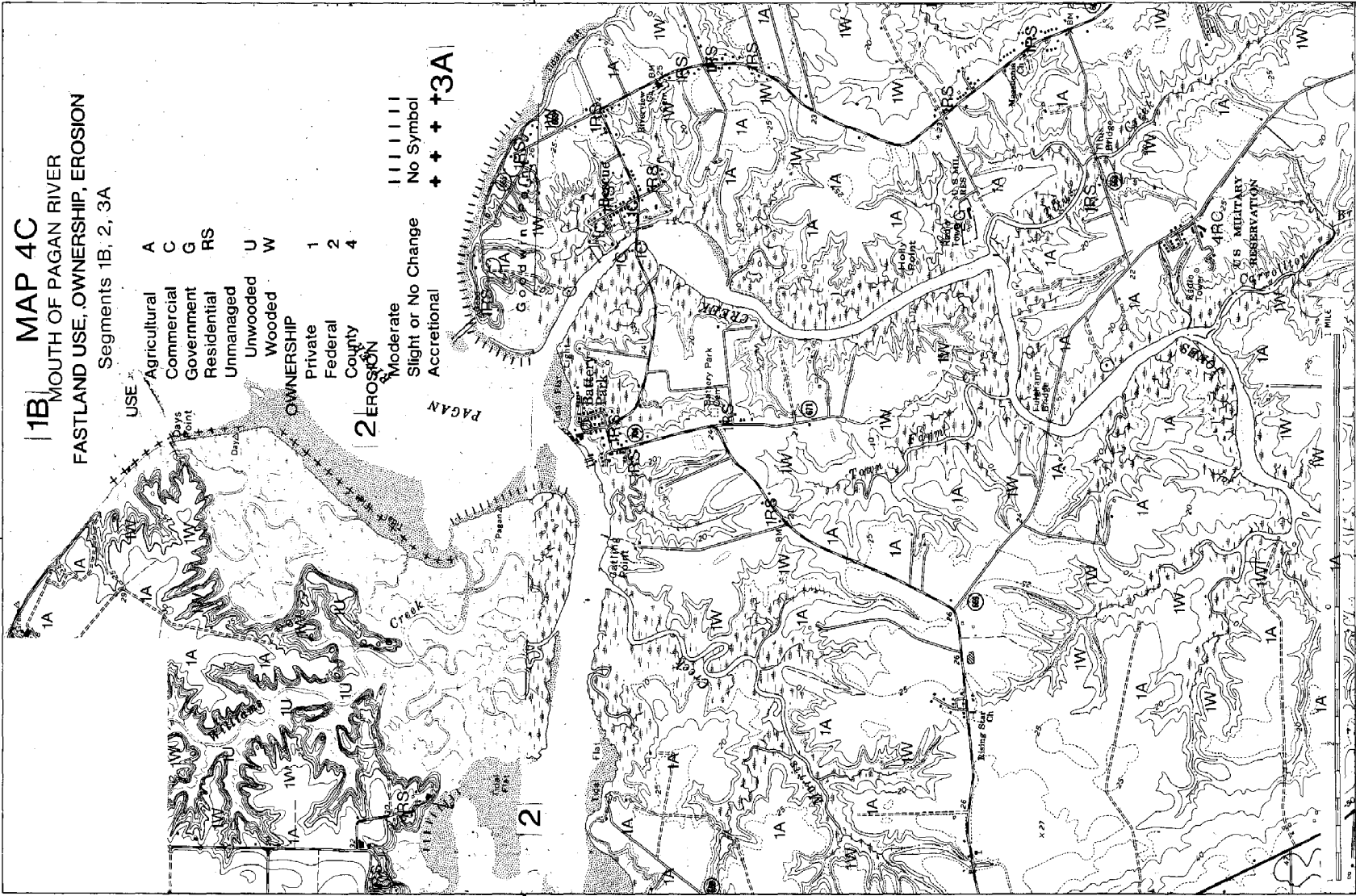


76° 35'

MAP 4C
1B MOUTH OF PAGAN RIVER
 FASTLAND USE, OWNERSHIP, EROSION
 Segments 1B, 2, 3A

- USE**
- A Agricultural
 - C Commercial
 - G Government
 - RS Residential
 - U Unmanaged
 - U Unwooded
 - W Wooded
- OWNERSHIP**
- 1 Private
 - 2 Federal
 - 4 County

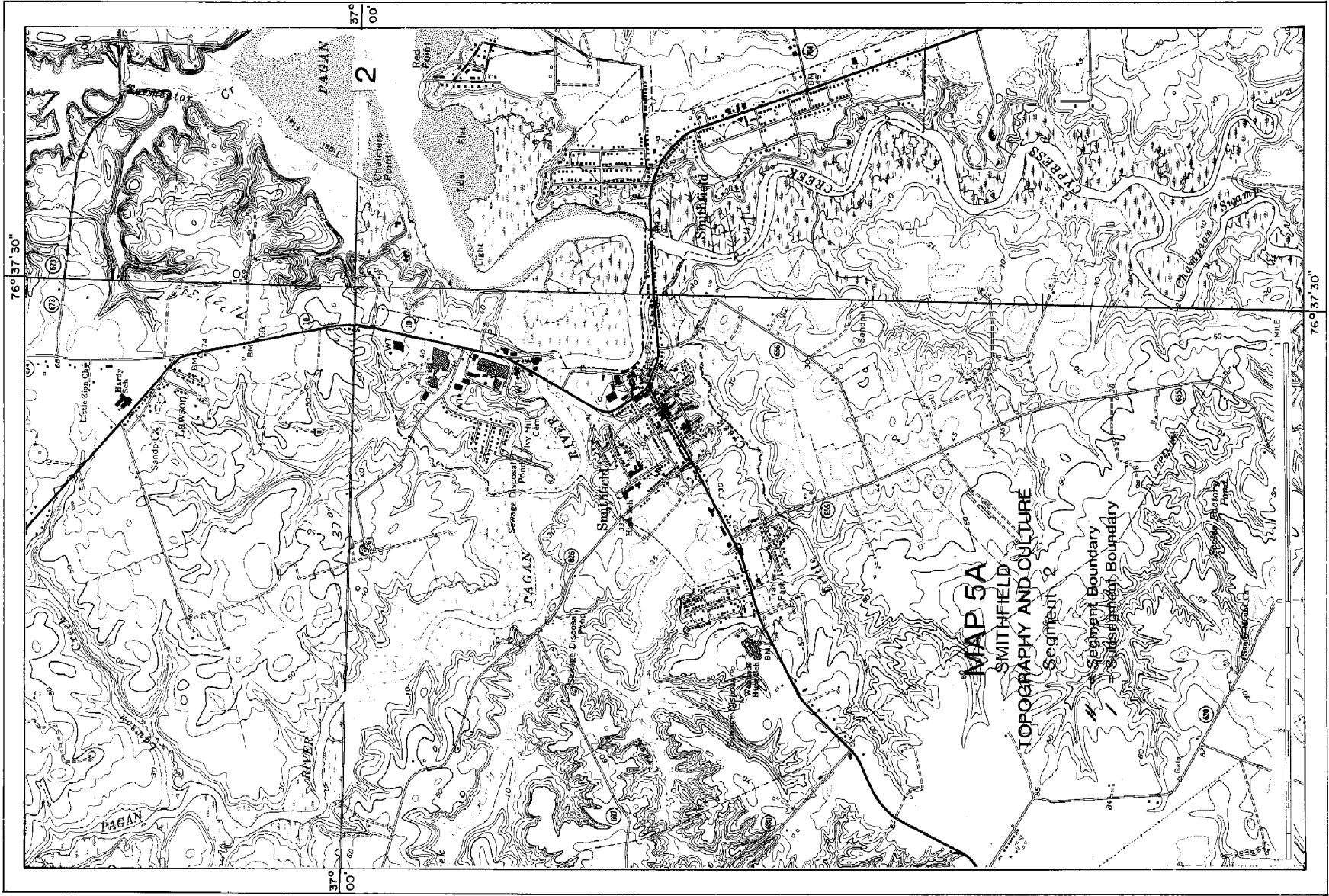
- 2 EROSION**
- ||||| Moderate
 - Slight or No Change
 - No Symbol No Symbol
 - + + + Accretional
- 3A**

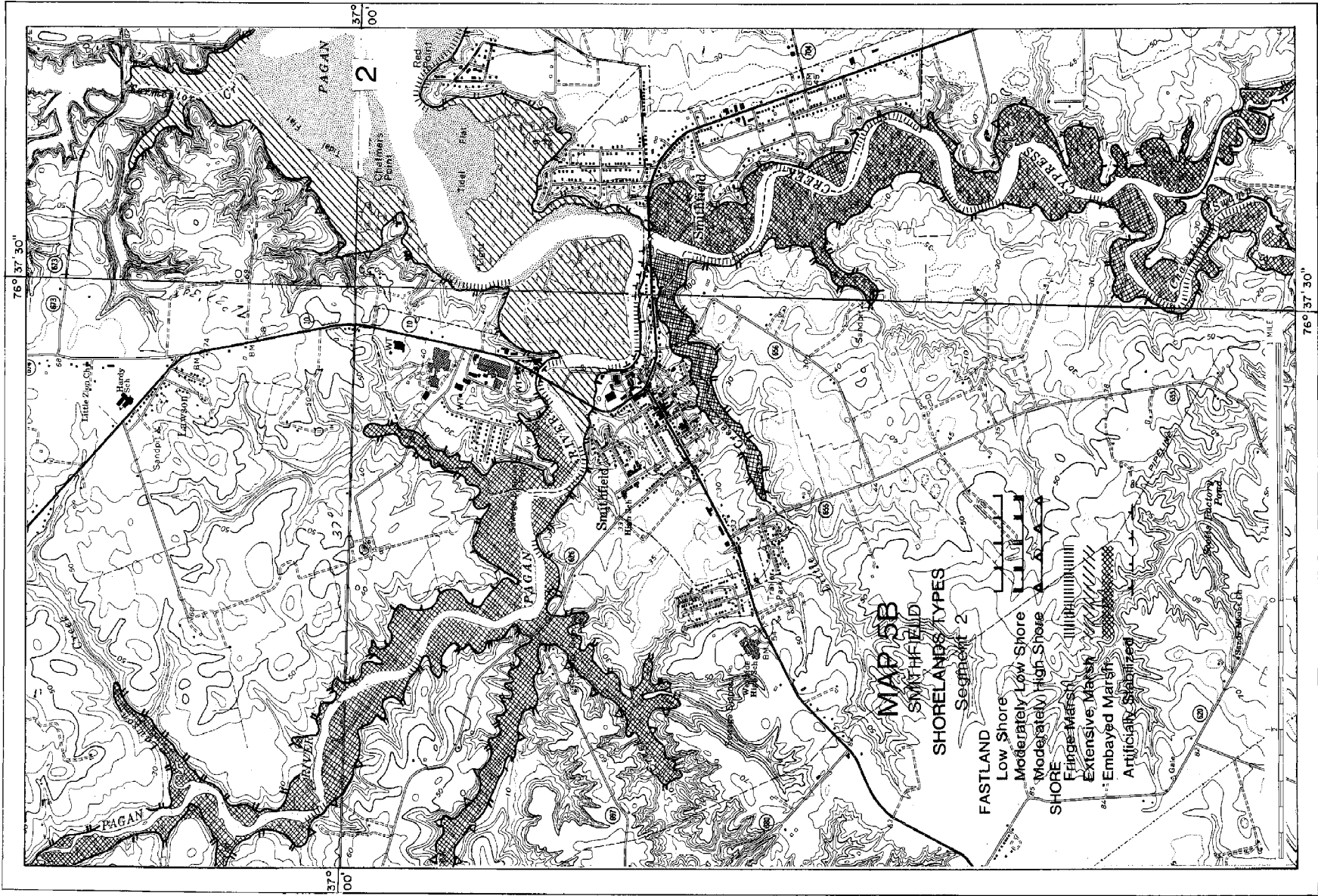


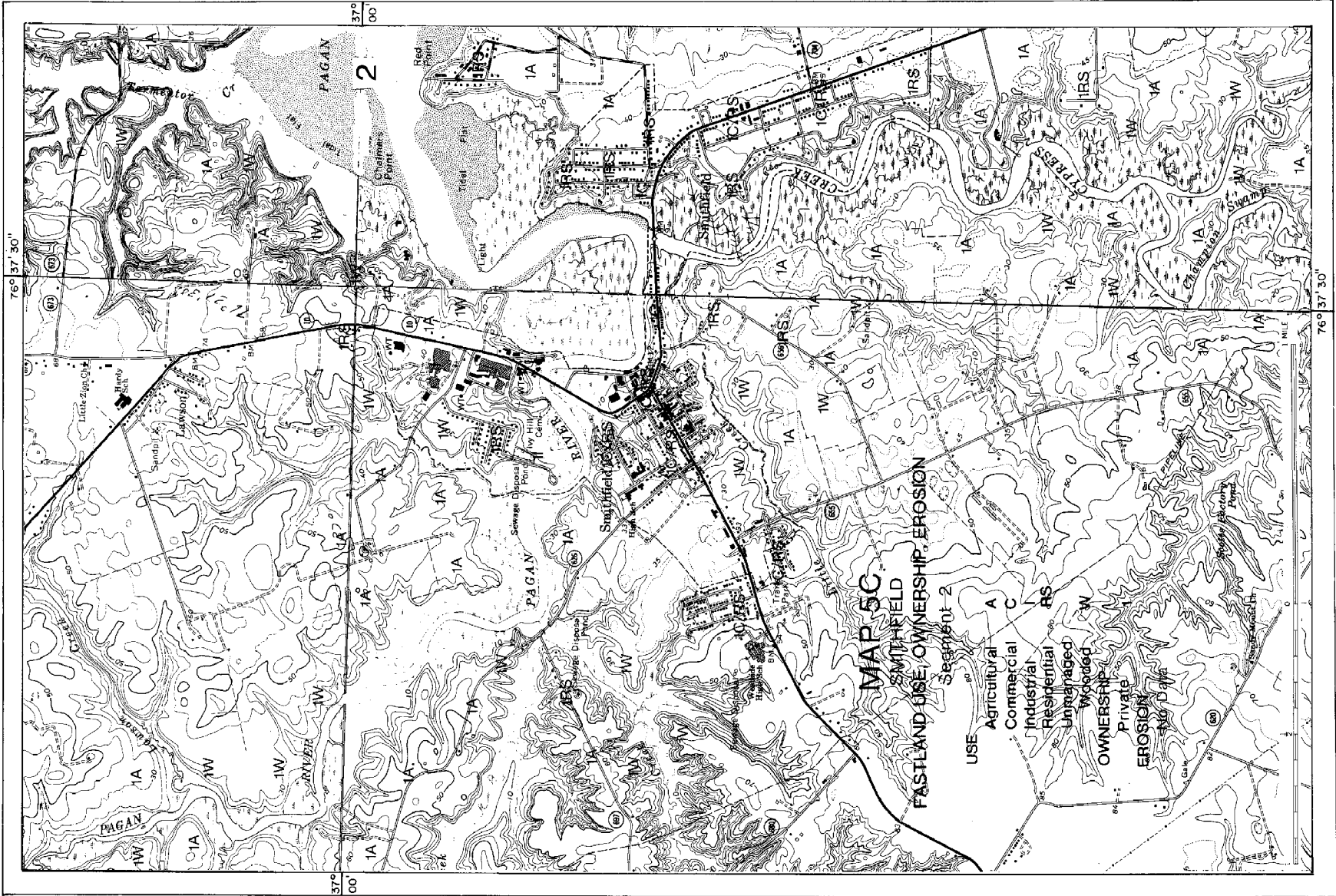
37° 00'

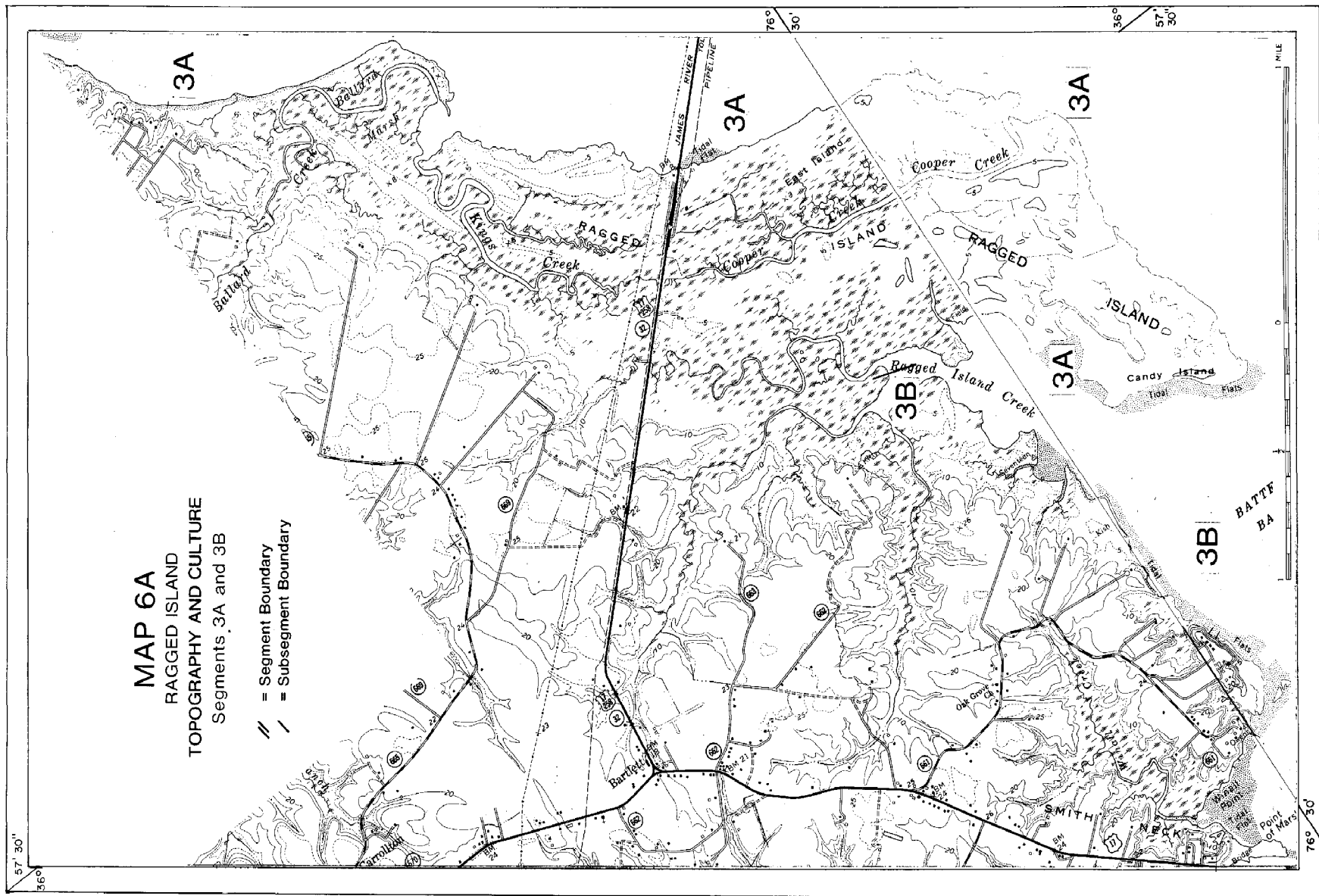
37° 00'

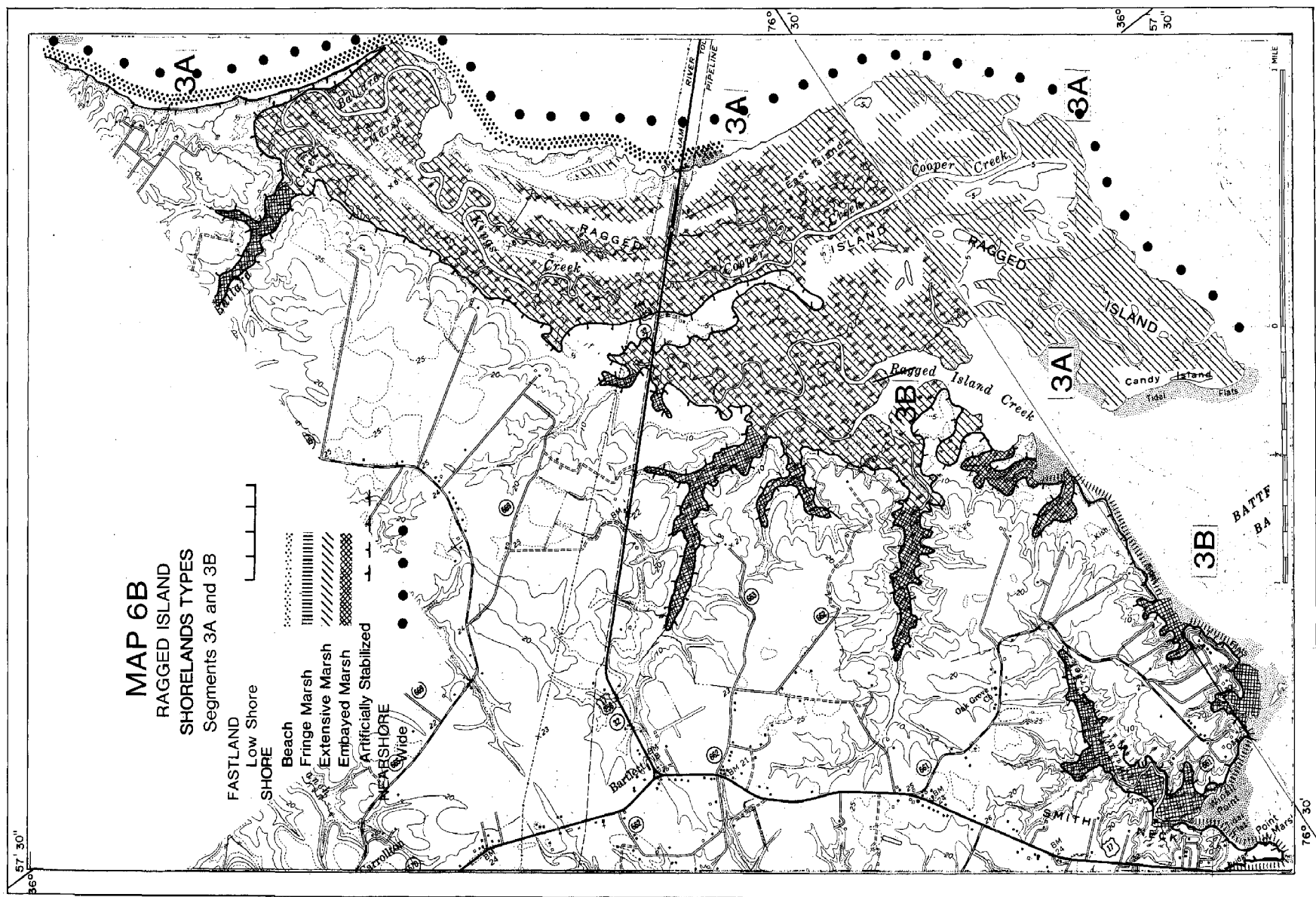
76° 35'

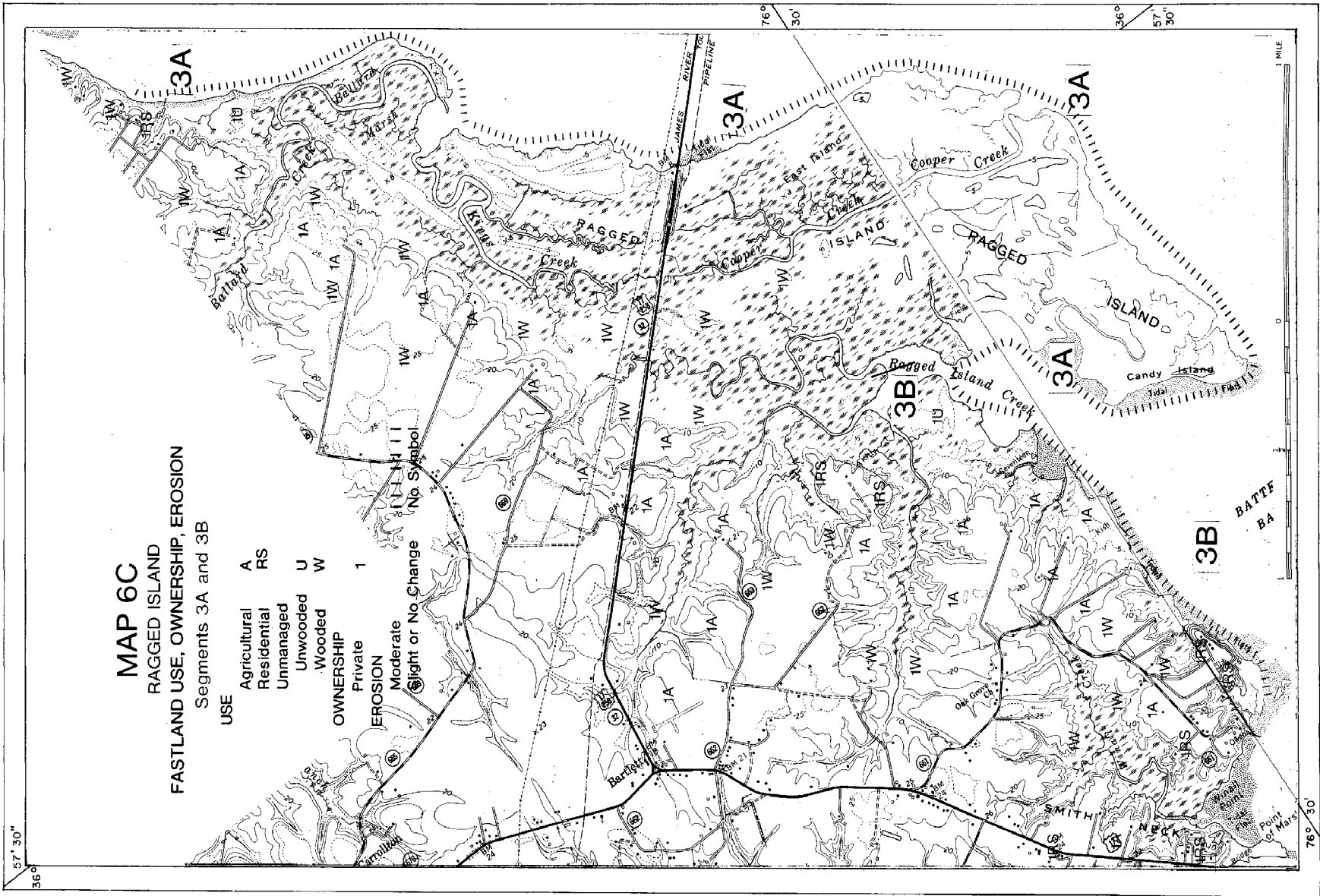


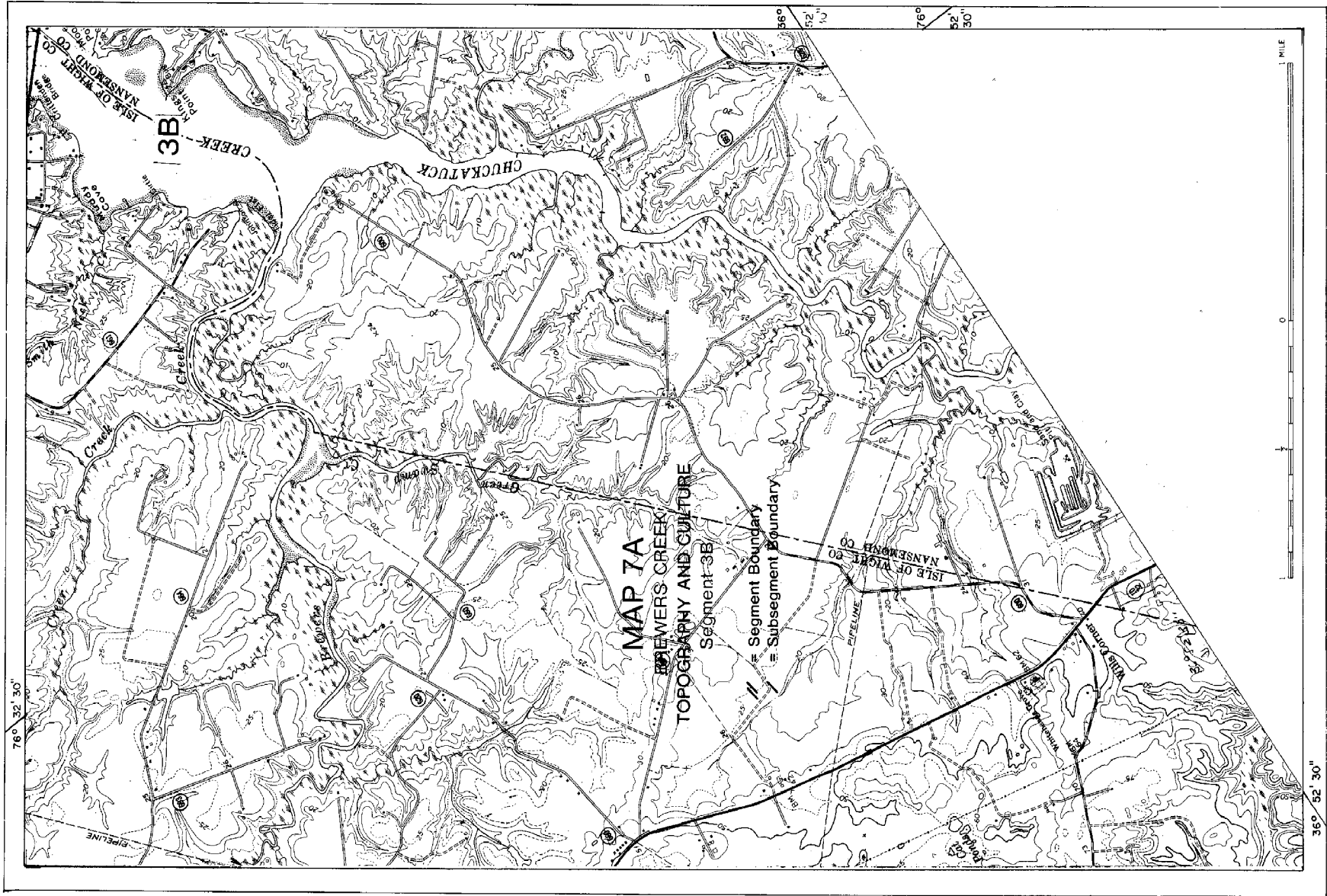


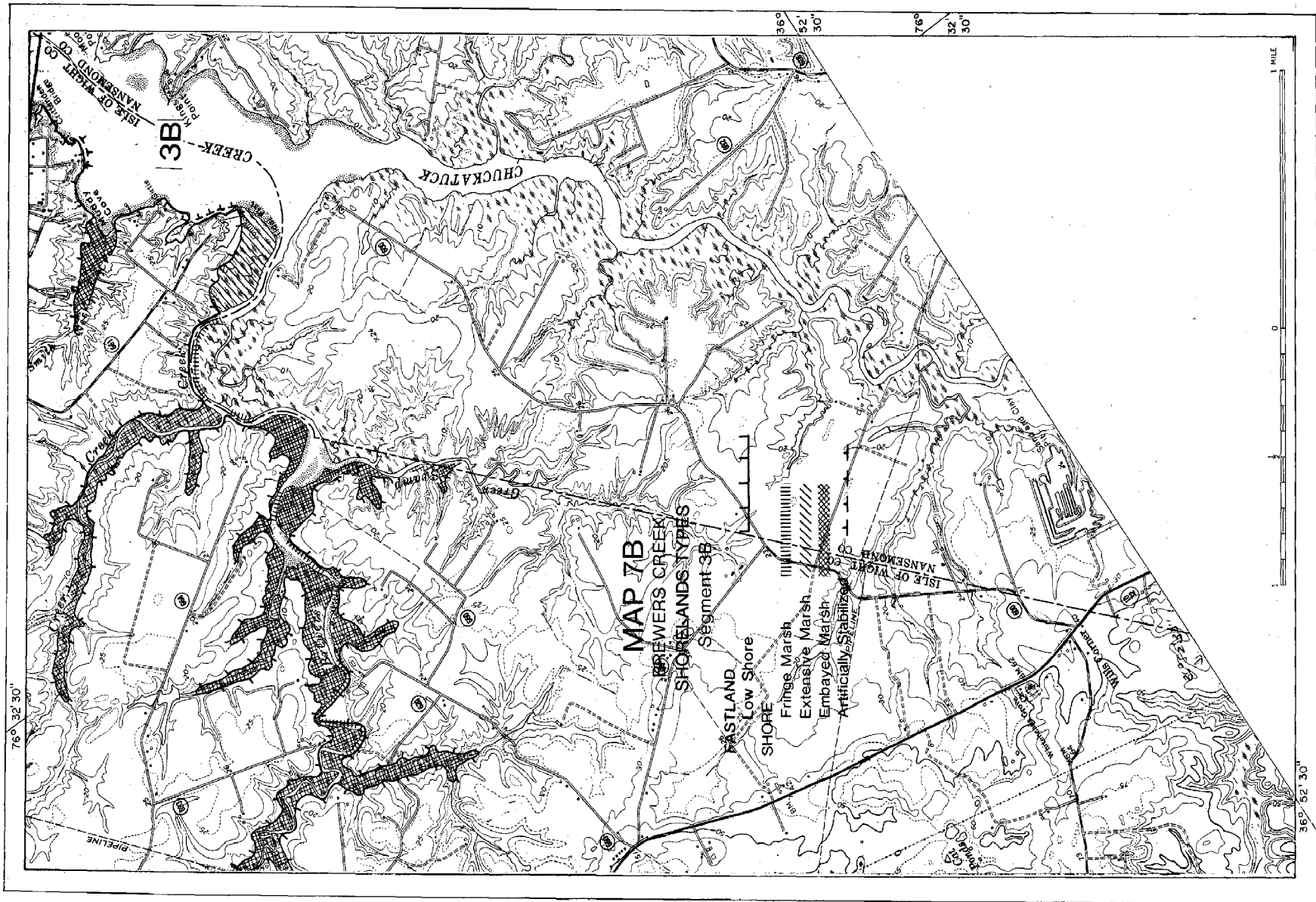


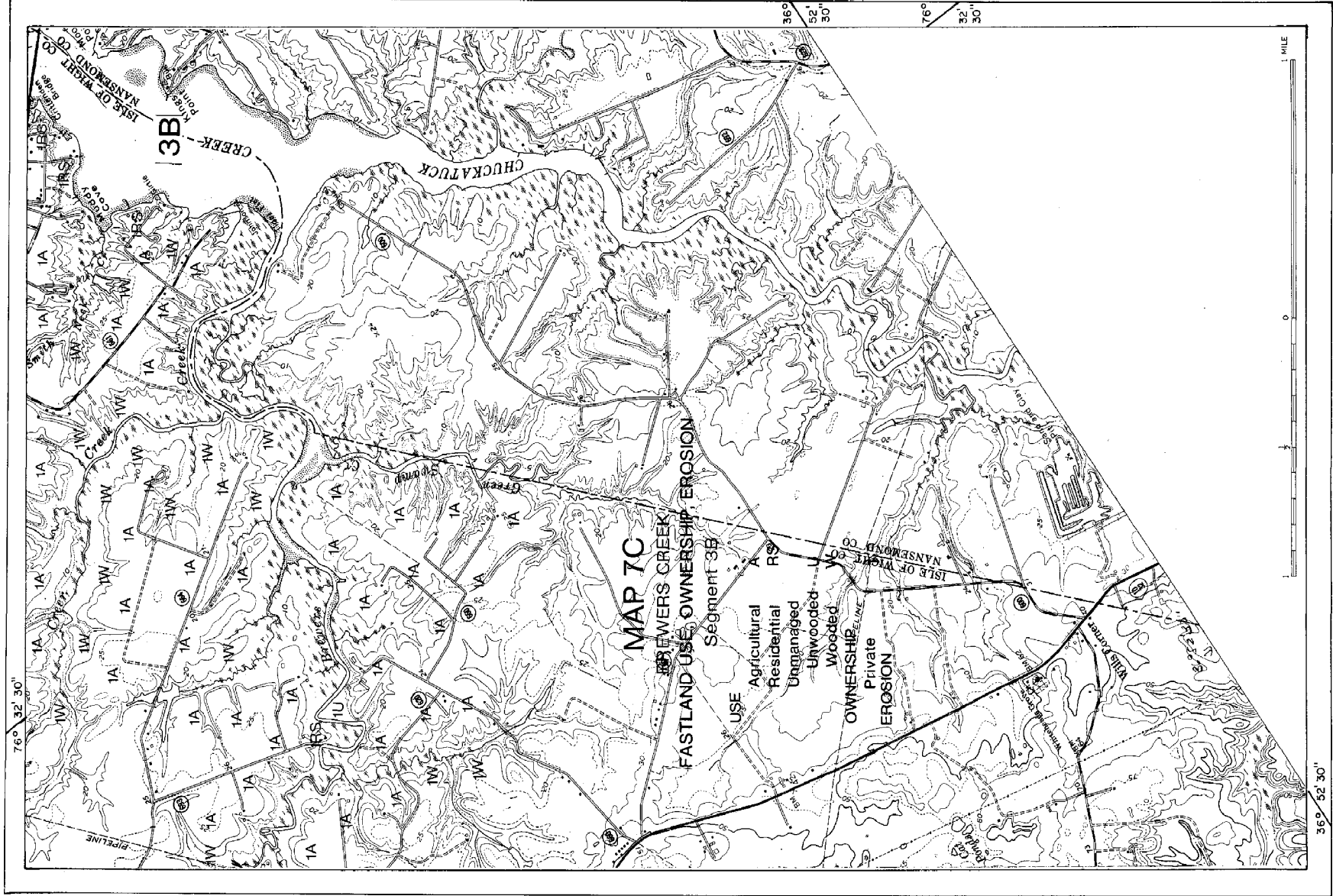












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1994

