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Shoreline Situation Report Prince George County, Virginia

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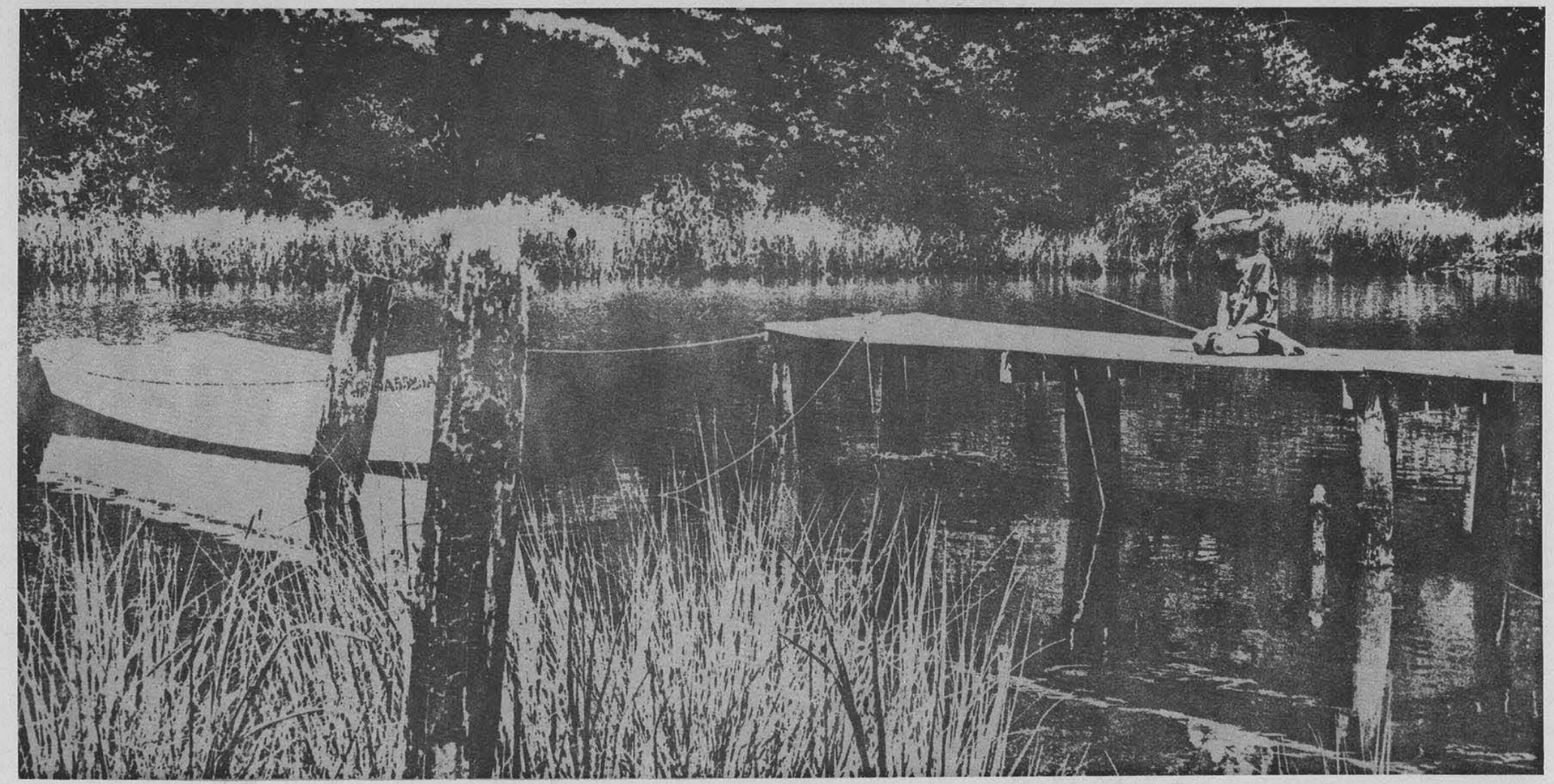
Shoreline Situation Report

PRINCE GEORGE COUNTY, VIRGINIA



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Chesapeake Research Consortium Report Number 47

Special Report In Applied Marine Science and Ocean Engineering Number 114 of the

VIRGINIA INSTITUTE OF MARINE SCIENCE
Gloucester Point, Virginia 23062

1976

Shoreline Situation Report
PRINCE GEORGE COUNTY, VIRGINIA

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CHAPTER 2
Approach Used and Elements Considered

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

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

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

Nearshore Zone

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

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

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

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

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

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

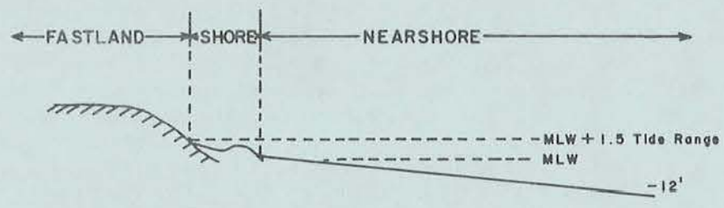


Figure 1

A profile of the three shorelands types.

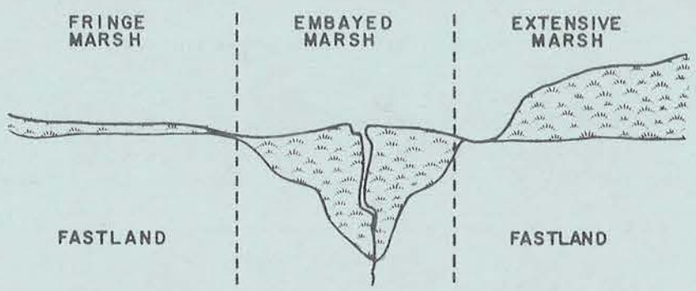


Figure 2

A plan view of the three marsh types.

b) Shorelands Use Classification

Fastland Zone

Residential

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

Commercial

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

Industrial

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

Governmental

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

Recreational and Other Public Open Spaces

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

Preserved

Includes lands preserved or regulated for

h) Distribution of Marshes

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

i) Flood Hazard Levels

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

j) Shellfish Leases and Public Grounds

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

k) Beach Quality

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

CHAPTER 3
Present Shorelands Situation

the Fort Lee Military Reservation, the Hopewell chemical plants, large urban residential areas, sand and gravel mining operations, and several marinas. Less than ten percent of the area is unused.

There are several possible alternate uses for parts of this section of shoreline. The land adjacent to the I-95 bridge in Petersburg is owned by the city. Proposed plans call for the development of a public recreational park which would include docks for ferry boats, picnic areas, a railroad museum, and tours through various historical homes. Another possible recreational site would be along the headwaters of Cabin Creek in Hopewell. This wooded area could be used for various low intensity activities such as hiking, picnicking, and camping. The site is located near a housing development and not far from the urban residential area of City Point. Such "nature parks" are much needed near areas of high density population buildup.

In contrast with the highly developed shoreline of the cities of Hopewell and Petersburg, the shorelands of the county of Prince George are largely agricultural and unused. However, alternate shore uses are very limited for this area also.

The Jordan Point section, which is near Hopewell and on the major route between Hopewell and Williamsburg, has a marina, an airport, and a country club. The present use precludes alternate development here. Most of the remaining shorelands are contained within several large estates, "Brandon", "Flowerdew Hundred", "Willow Hill", and "Upper Brandon". These estates, which have survived from the 1800's, directly control the use of much of the shorelands. These rural-agricultural sections of the county will probably remain relatively unchanged.

FIGURE 8

FIGURE 9

FIGURE 8: Aerial view of Brandon Point. This area has nice sandy beaches of fair width, though often littered with debris.

FIGURE 9: Ground view of Brandon Point. Note debris on beach.

FIGURE 10: Aerial view at Fort Powhatan. The shoreline has elevations of 50 feet in most areas here.

FIGURE 11: View from the bluffs at Fort Powhatan. The groin serves little purpose, and the retaining wall at the cliff base seems ineffective.

FIGURE 10

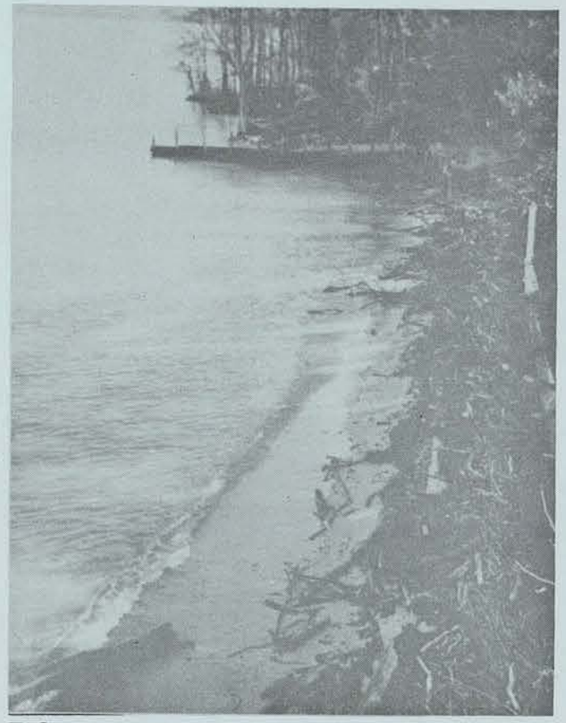


FIGURE 11

77° 15'

PRINCE GEORGE COUNTY

BRIDGE

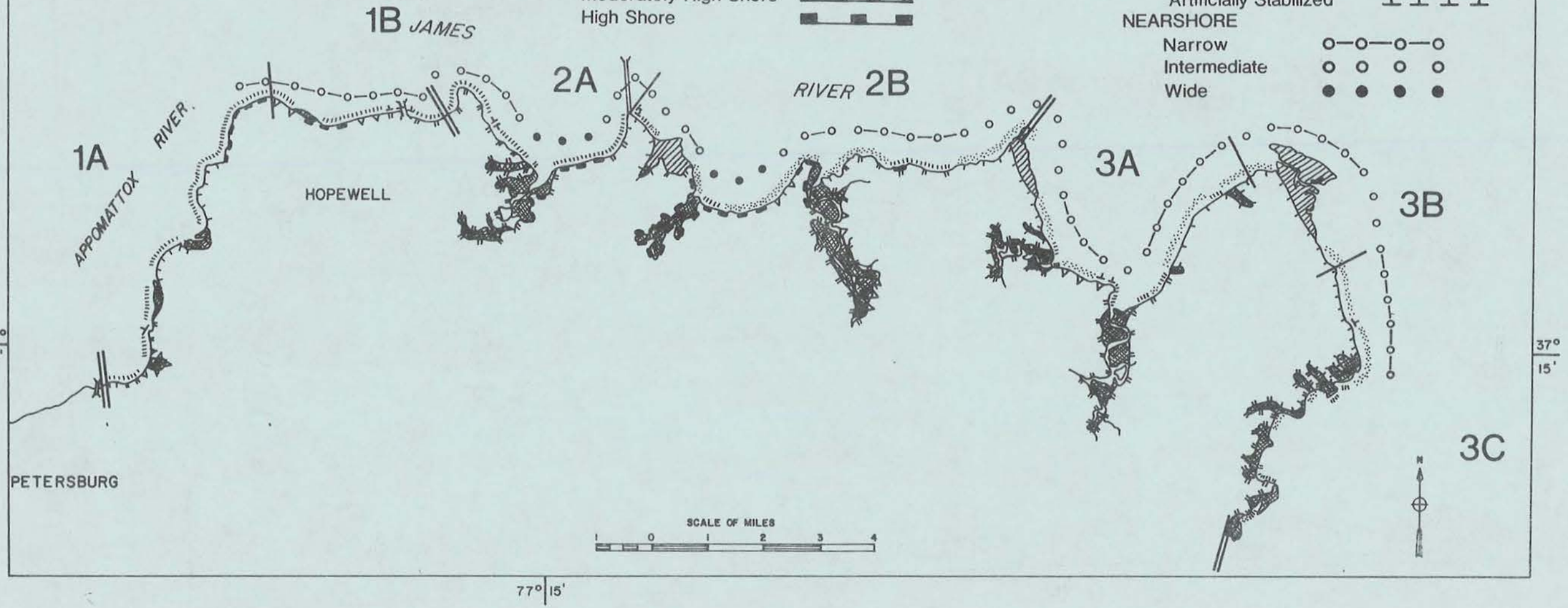
MAP 1B

SHORELANDS TYPES

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

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

NEARSHORE
- Narrow
- Intermediate
- Wide



77° 15'

77° 15'

PRINCE GEORGE COUNTY

BRIDGE

MAP 1D

SHORELINE EROSION

PROTECTIVE STRUCTURES

WASTE DISCHARGES

PROTECTIVE STRUCTURES

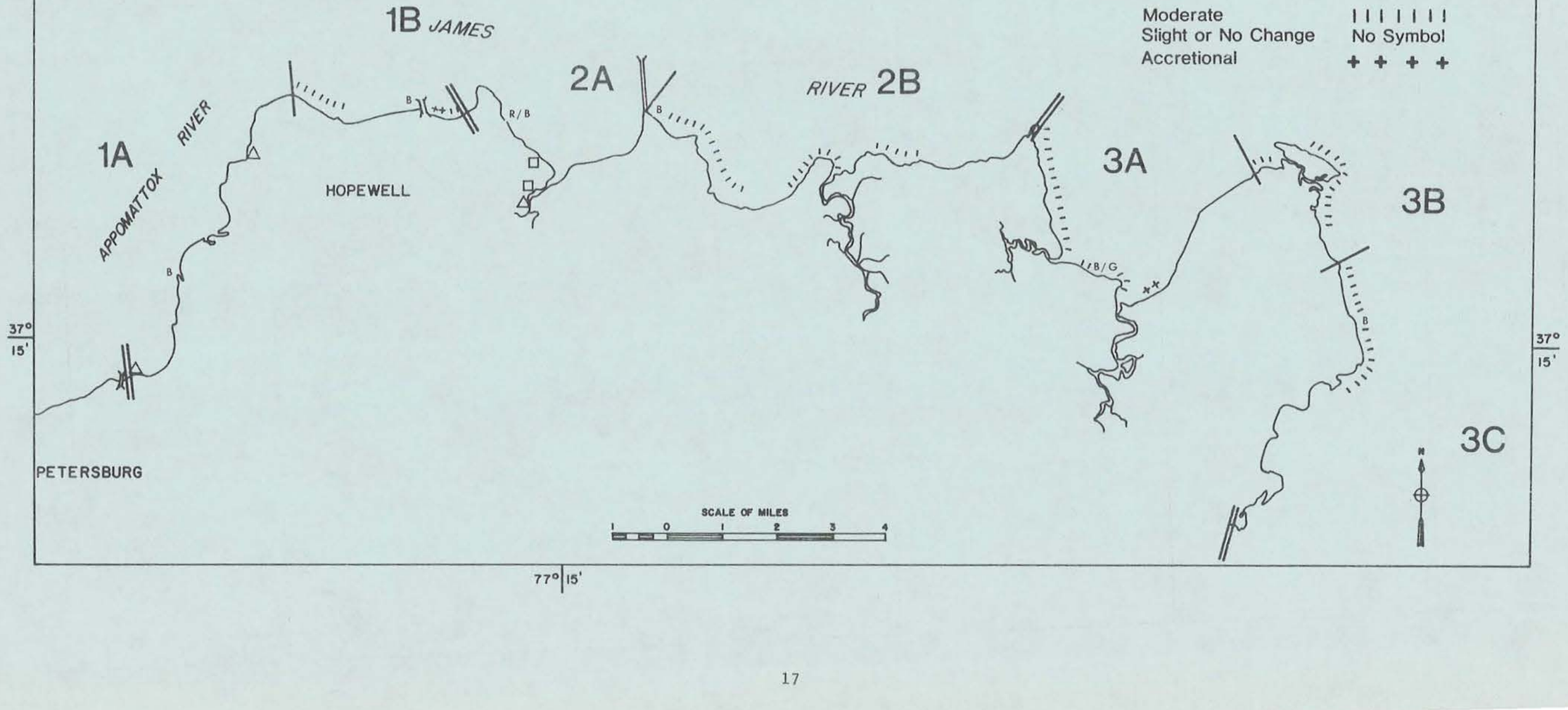
Bulkhead	B
Groin	G
Riprap	R

WASTE DISCHARGES

Industrial	□
Sewage	△

EROSION

Moderate	| | | | | | |
Slight or No Change	No Symbol
Accretional	+ + + +



77° 15'

CHAPTER 4

4.1 Table of Subsegment Summaries

4.2 Segment and Subsegment Descriptions

4.3 Segment and Subsegment Maps

SUBSEGMENT 1A

PETERSBURG TO HOPEWELL

(Maps 2 and 3)

EXTENT: 39,400 feet (7.5 mi.) of shoreline from the I-95 bridge at Petersburg to the Hopewell City limits. The subsegment also includes 41,200 feet (7.8 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 44% (3.4 mi.), moderately low shore 9% (0.7 mi.), moderately high shore 19% (1.5 mi.), and high shore 28% (2.2 mi.).
SHORE: Artificially stabilized 3% (0.2 mi.), fringe marsh 94% (7.1 mi.), and embayed marsh 3% (0.2 mi.).
RIVER: The Appomattox River is too narrow and shallow for classification, having controlling depths of 5 feet in 1971.

SHORELANDS USE
FASTLAND: Agricultural 6% (0.5 mi.), commercial 1% (0.1 mi.), governmental (Fort Lee Military Reservation and the Federal Reformatory) 34% (2.6 mi.), industrial 40% (3.1 mi.), recreational 7% (0.6 mi.), and unmanaged, wooded 12% (0.9 mi.).
SHORE: Some waterfowl hunting in the marshes, but mostly unused.
RIVER: Commercial shipping and pleasure boating.

SHORELINE TREND: The shoreline trends basically NNE - SSW. Fetches are negligible due to the narrowness of the river and the numerous marsh islands.

OWNERSHIP: Private 61%, federal 34%, and city 5%.

ZONING: Mostly agricultural for the federally owned lands. There is some industrial and recreational zoning in Petersburg.

FLOOD HAZARD: Low. This area is not exposed to direct storm effects. Any flooding would be the result of heavy upstream rains.

BEACH QUALITY: There are no beaches in this subsegment.

PRESENT SHORE EROSION SITUATION
EROSION RATE: No data. The area appears stable.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There is approximately 1,000 feet of bulkheading at a marina one mile north of the Petersburg City limits.

OTHER SHORE STRUCTURES: There are several piers and a boat ramp at the Appomattox Small Boat Harbor.

SHORE USE LIMITATIONS: Approximately thirty-four percent of the shorelands in this subsegment are included in the Fort Lee Military Reservation. These lands are federally owned and controlled, which would preclude any development. An additional forty percent of the shorelands are actively mined for sand and gravel. No development seems probable here until the mining operations are complete. The remaining sections of the shorelands are used for agriculture, some industry (Petersburg Sewage Treatment Plant), and recreation. Though construction near the I-95 bridge seems probable, development elsewhere in the subsegment is unlikely.

ALTERNATE SHORE USE: Low. The area with the most growth potential is a parcel of city owned property near the I-95 bridge. The City of Petersburg is considering plans for a public park which would include a boat basin for ferry boat tours, a museum, various historic homes, and other facilities. Elsewhere, there is little alternate use potential.

MAPS: USGS, 7.5 Min.Ser. (Topo.), HOPEWELL, Va. Quadr., 1969;
USGS, 7.5 Min.Ser. (Topo.), CHESTER, Va. Quadr., 1969;
USGS, 7.5 Min.Ser. (Topo.), PETERSBURG, Va. Quadr., 1969.
C&GS, #531, 1:20,000 scale, JAMES RIVER, Jordan Point to Richmond, 1971.

PHOTOS: Aerial-VIMS 12Jul74 PG-1A/107-114.

SUBSEGMENT 1B

CITY OF HOPEWELL

(Map 3)

EXTENT: 24,000 feet (4.5 mi.) of shoreline from the westward extent of Hopewell City limits east to the end of Hopewell's water boundary (3,400 feet southwest of City Point). The subsegment also includes 24,600 feet (4.7 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Moderately low shore 34% (1.6 mi.), moderately high shore 34% (1.6 mi.), and high shore 32% (1.5 mi.).
SHORE: Artificially stabilized 13% (0.6 mi.), fringe marsh 78% (3.4 mi.), and embayed marsh 8% (0.4 mi.).
RIVER: The Appomattox River is too narrow for classification, having controlling depths of 5 feet to Petersburg in 1971.

SHORELANDS USE
FASTLAND: Commercial 8% (0.4 mi.), residential 76% (3.6 mi.), and unmanaged, wooded 16% (0.7 mi.).
SHORE: Private use and some waterfowl hunting in the marshes.
RIVER: Commercial shipping and pleasure boating.

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

OWNERSHIP: Private.

ZONING: Residential.

FLOOD HAZARD: Low, noncritical. The entire subsegment has elevations of at least 20 feet, with the exception of the mouth of Cabin Creek.

BEACH QUALITY: There are no beaches in this subsegment.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Slight or no change to moderate, noncritical. The historical erosion rate from Cabin Creek to Hopewell City limits is 2.0 feet per year.

SUBSEGMENT 2B

JORDAN POINT TO WINDMILL POINT

(Maps 4, 5 and 6)

EXTENT: 139,000 feet (26.3 mi.) of shoreline from Jordan Point to Windmill Point. The subsegment also includes 156,000 feet (29.6 mi.) of fastland.

SHORELANDS TYPE
FASTLAND: Low shore 24% (7.2 mi.), moderately low shore 40% (11.9 mi.), moderately high shore 9% (2.6 mi.), high shore 26% (7.5 mi.), and high shore with bluff 1% (0.4 mi.).
SHORE: Beach 28% (7.5 mi.), fringe marsh 8% (2.0 mi.), embayed marsh 60% (15.7 mi.), and extensive marsh 4% (1.1 mi.).
NEARSHORE: Narrow 9%, intermediate 18%, and wide 10%. The remainder of the subsegment is located along the creeks.

SHORELANDS USE
FASTLAND: Agricultural 25% (7.4 mi.), commercial 3% (0.9 mi.), industrial 4% (1.1 mi.), recreational 1% (0.3 mi.), residential 3% (1.0 mi.), and unmanaged, wooded 64% (18.9 mi.).
SHORE: Little used except for the marina at Jordan Point. Some waterfowl hunting in the marshes.
NEARSHORE: Sport boating, fishing, and other water related activities. Commercial shipping to Hopewell and Richmond.

SHORELINE TREND: The shoreline trend is basically W - E from Jordan Point to Windmill Point. The fetch at Jordan Point is WSW - 1.7 nm, and at Coggins Point W - 1.9 nm. The fetches at Windmill Point are WNW - 3.5 nm and SSE - 2.2 nm.

OWNERSHIP: Private.

ZONING: Jordan Point is zoned for business. The rest of the subsegment is zoned for agricultural, residential, and some industrial use.

FLOOD HAZARD: Low, noncritical. The majority of the shorelands have elevations of at least 20 feet.

BEACH QUALITY: Fair. Most beaches are of moderate width with some vegetation.

PRESENT SHORE EROSION SITUATION
EROSION RATE: Slight or no change to moderate, noncritical. The area experiencing most change is Flowerdew Hundred, which has an average erosion rate of 2.4 feet per year.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There is a small area of effective bulkheading at Jordan Point Marina. Several sand filled barges off Jordan Point serve as effective breakwaters.

OTHER SHORE STRUCTURES: There are several piers located in the subsegment. Structures at Jordan Point include a marine railway, concrete boat ramp, and numerous covered slips.

SHORE USE LIMITATIONS: Sixty-four percent of the shoreline in this subsegment is embayed or extensive marsh. These areas are protected by the Virginia Wetlands Act of 1972, which strictly controls any planned alteration of tidal marsh areas. Development behind marshes is possible, though access to the water would be limited and difficult. Several areas along the shoreline, mainly around Jordan Point, have already been developed. The marina and airport at Jordan Point would prohibit other building in that area. The Beechwood Manor subdivision does have room for expansion if necessary. The rest of the subsegment is characterized by high or moderately high elevations near the shoreline. The inland plains are generally used for agriculture. The Flowerdew Hundred area is one of several large parcels of land owned by individuals in the county. Development in these sections would depend directly upon the wishes of these landowners. For the present time, these lands are largely used for agriculture.

ALTERNATE SHORE USE: Low. This subsegment is largely rural - agricultural in nature. Development will probably continue to center on the well used inland motor routes through the county. Isolated residential development is possible in areas along the shore. It is expected, however, that the shorelands will remain primarily in their present rural state for the near future.

MAPS: USGS, 7.5 Min.Ser. (Topo.), WESTOVER, Va. Quadr., 1965;
USGS, 7.5 Min.Ser. (Topo.), CHARLES CITY, Va. Quadr., 1965.
C&GS, #530, 1:40,000 scale, JAMES RIVER, Jamestown Island to Jordan Point, 1971.

PHOTOS: Aerial-VIMS 12Jul74 PG-2B/38-66.

Ground-VIMS 10Dec75 PG-2B/32-44; 64-72.

behind in the fastland. The marsh should be preserved. This subsegment is actively used for agricultural purposes, being part of two large estates. Any development would be at the sacrifice of the agriculture.

ALTERNATE SHORE USE: Low. Two large estates actively control the use of this subsegment. No change in the present agricultural use is forseen for the near future.

MAPS: USGS, 7.5 Min.Ser. (Topo.), CHARLES CITY, Va. Quadr., 1965;
USGS, 7.5 Min.Ser. (Topo.), BRANDON, Va. Quadr., 1965.
C&GS, #530, 1:40,000 scale, JAMES RIVER, Jamestown Island to Jordan Point, 1971.

PHOTOS: Aerial-VIMS 12Jul74 PG-3B/5-15.

Ground-VIMS 10Dec75 PG-3B/1-10.

SUBSEGMENT 3C

UPPER CHIPPOKES CREEK

(Maps 8 and 9)

EXTENT: 76,800 feet (14.5 mi.) of shoreline from Brandon Point to the headwaters of Upper Chippokes Creek. The fastland extent is 91,000 feet (17.2 mi.).

SHORELANDS TYPE
FASTLAND: Low shore 42% (7.2 mi.), moderately low shore 50% (8.5 mi.), moderately high shore 3% (0.6 mi.), and high shore 5% (0.9 mi.).
SHORE: Artificially stabilized less than 1%, beach 21% (3.1 mi.), fringe marsh 6% (0.9 mi.), and embayed marsh 73% (10.4 mi.).
NEARSHORE: Narrow 16%. The remainder of the subsegment is located along Upper Chippokes Creek, which has controlling depths of 2 to 5 feet.

SHORELANDS USE
FASTLAND: Agricultural 42% (7.2 mi.) and unmanaged, wooded 58% (10.0 mi.).
SHORE: Some waterfowl hunting in the marshes, but mostly unused.
RIVER: Commercial shipping and pleasure boating.
CREEK: Sport fishing and other water related activities.

SHORELINE TREND: The shoreline trend is basically NE - SW in this subsegment. The fetch at Chippokes Point is SE - 5.6 nm.

OWNERSHIP: Private.

ZONING: Agricultural.

FLOOD HAZARD: Low, noncritical. The majority of the subsegment has elevations of at least 10 feet. Only the marsh areas are subject to flooding.

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

PRESENT SHORE EROSION SITUATION
EROSION RATE: Slight or no change to moderate, noncritical. While the areas near the creek head appear stable, erosion elsewhere ranges from 1.1 to 1.4 feet per year.
ENDANGERED STRUCTURES: None.
SHORE PROTECTIVE STRUCTURES: There is approximately 400 feet of effective bulkheading at Brandon.

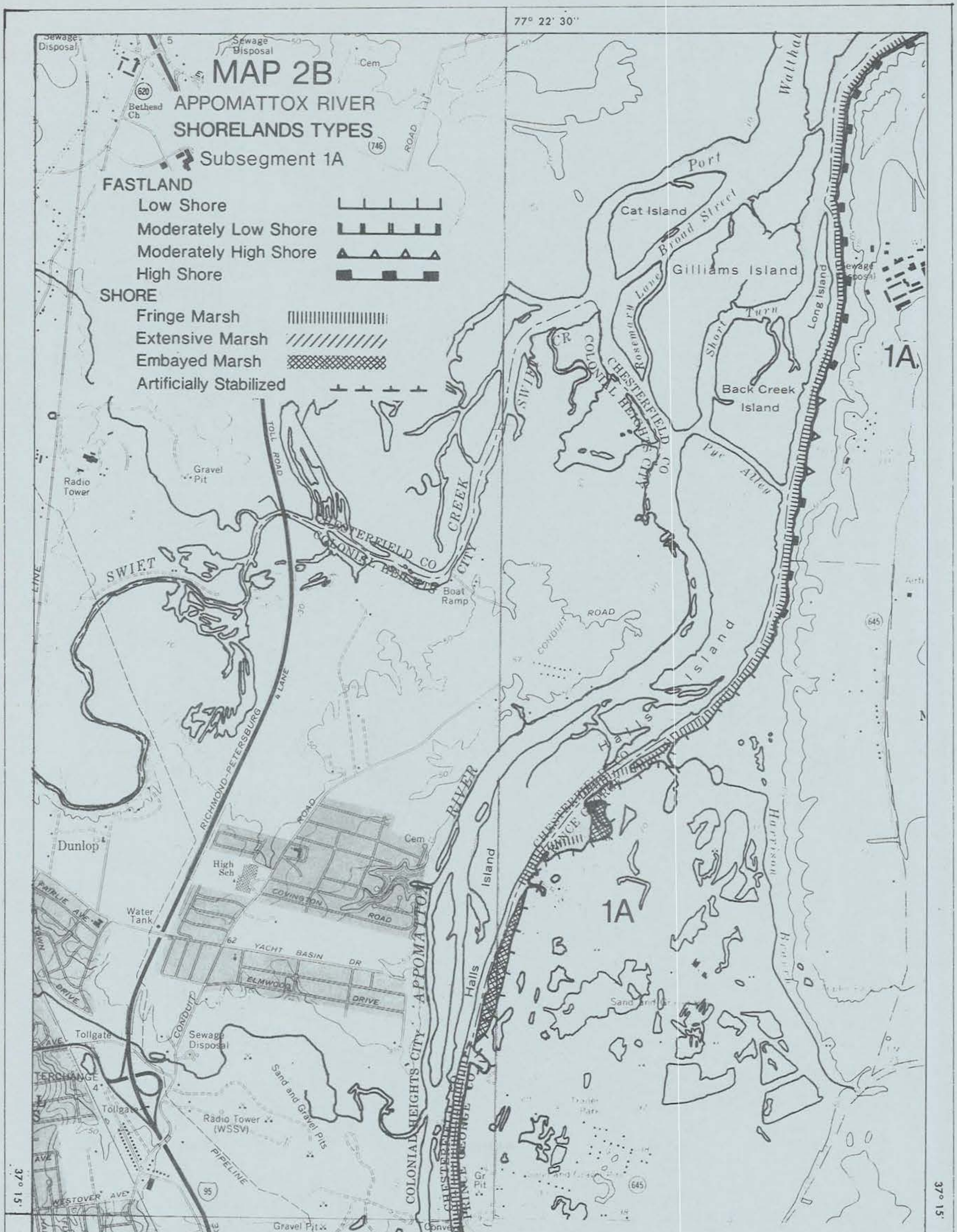
OTHER SHORE STRUCTURES: There is a pier at Brandon and a boat landing near the head waters of Upper Chippokes Creek.

SHORE USE LIMITATIONS: The fastlands of this subsegment are divided between agricultural and wooded lands. Generally, the agricultural areas are located from the mouth of Upper Chippokes Creek north to Brandon. The shorelands of the creek are entirely unmanaged, wooded. As in the preceeding subsegment, the agricultural lands are part of a large estate, "Brandon", and their use is therefore controlled by the estate. The wooded lands along Upper Chippokes Creek are fronted by large areas of embayed marsh (seventy-three percent of the shoreline is embayed marsh). The shorelands along the creek have very limited access, there being only dirt roads to the area.

ALTERNATE SHORE USE: Low. Little change in the present shore use seems probable. The agricultural lands are controlled by a large estate and will most likely remain unchanged. The lack of access to the creek shorelands, plus the presence of embayed marsh along the shoreline, make development unlikely here. A low intensity recreational facility near the headwaters of Upper Chippokes Creek is a possibility. This area is near a paved road, and the wooded nature of the land plus the embayed marsh areas would be ideal for nature walks, picnicking, and other such recreational uses.

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

PHOTOS: Aerial-VIMS 12Jul74 PG-3C/1-4;
PG-3B/5-8.
Ground-VIMS 10Dec75 PG-3B/1-10.


MAP 2B
APPOMATTOX RIVER
SHORELANDS TYPES
Subsegment 1A
FASTLAND
Low Shore
Moderately Low Shore
Moderately High Shore
High Shore
SHORE
Fringe Marsh
Extensive Marsh
Embayed Marsh
Artificially Stabilized
77° 22' 30''
37° 15'
1A
Cat Island
Gilliams Island
Long Island
Back Creek Island
Port Walthall
Halls Island
APPOMATTOX RIVER
SWIFT CREEK
COLONIAL HEIGHTS CITY
CHESTERFIELD CO
PRINCE GEORGE CO
Dunlop
Radio Tower
Gravel Pit
Boat Ramp
Water Tank
High Sch
COVINGTON ROAD
YACHT BASIN DR
ELMWOOD DRIVE
Tollgate
Sewage Disposal
Sand and Gravel Pits
Radio Tower (WSSV)
PIPELINE
Gravel Pit
Sand and Gravel Pits
Jr High Sch
COLONIAL HEIGHTS
Pocahontas
RICHMOND-PETERSBURG TOLL ROAD
1 MILE

77° 20'

MAP 3A
HOPEWELL
TOPOGRAPHY AND CULTURE
Subsegments 1A, 1B, and 2A

// = Segment Boundary
/ = Subsegment Boundary

1A
1B
2A

Rivermont
Point of Rocks
Sandpit
APPOMATTOX RIVER
CHESTERFIELD
HOPEWELL CITY
Tidal Flat
Light
Randolph Hospital
Copeland Sch
Water Tank
Athletic Field
FEDERAL REFORMATORY
Malloney Jr High Sch
St James Sch
HOPEWELL
James Sch
Industrial Waste Ponds
Gravelly Run
Radio Tower (WHAP)
Highland Park
Woodson High Sch
Arlington
Kenwood
Five Forks
Fire Station
Trailer Park
Bailey Creek
Cattail Creek
Bullhill Creek
FORT LEE
MILITARY RESERVATION
PRINCE GEORGE CO
HOPEWELL CITY

37° 17' 30"

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

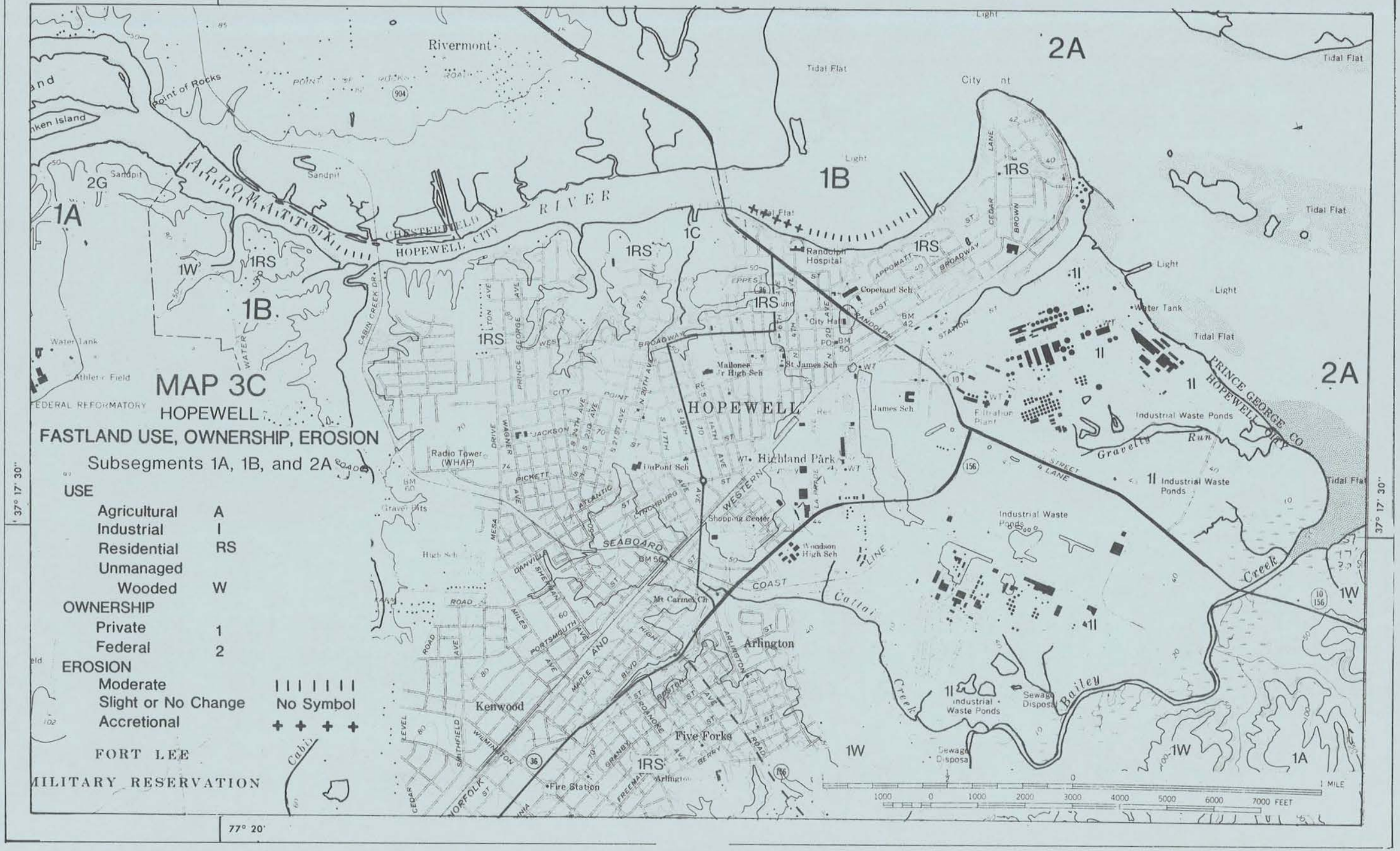
MAP 3C

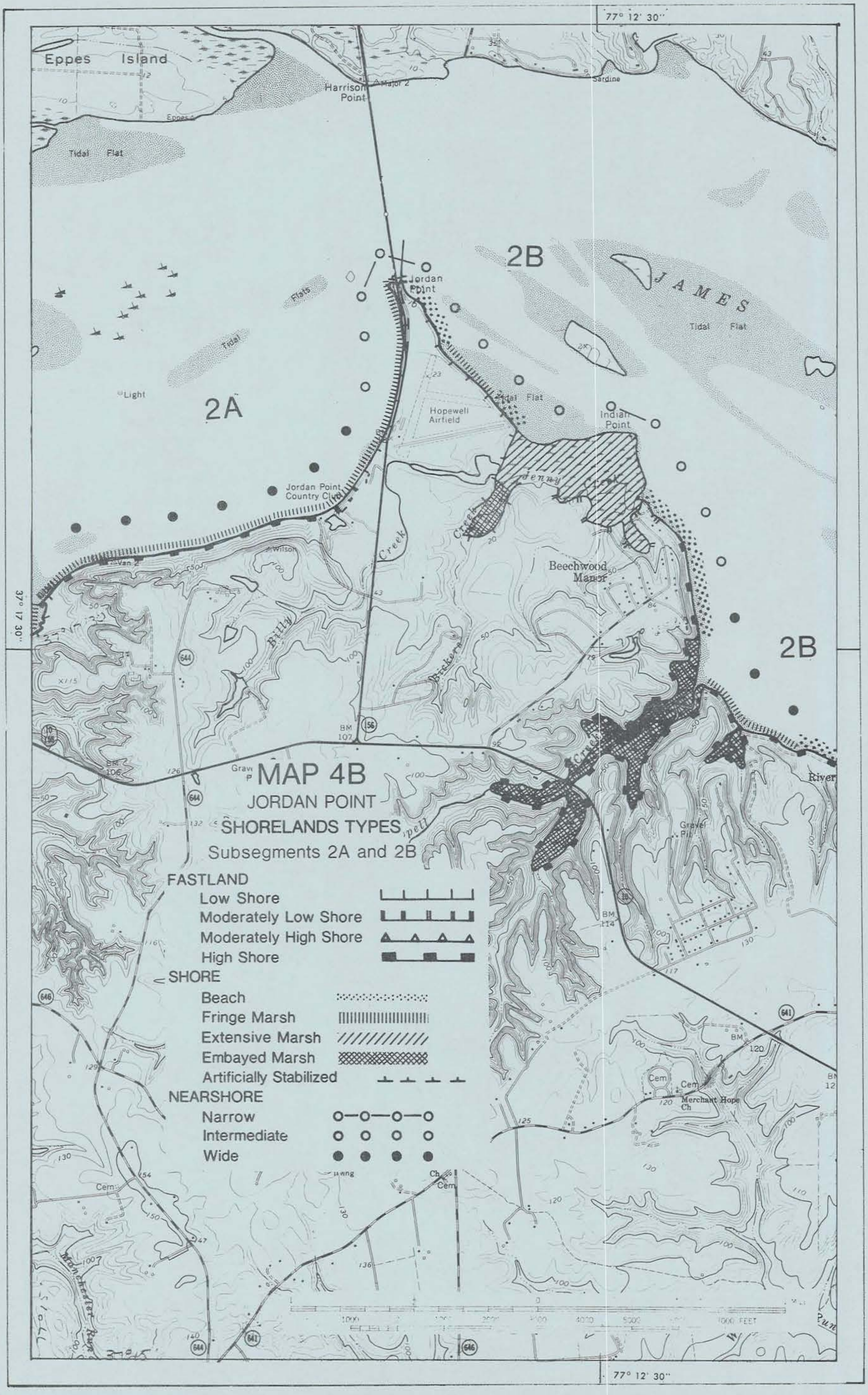
HOPEWELL

FASTLAND USE, OWNERSHIP, EROSION

Subsegments 1A, 1B, and 2A

USE		
	Agricultural	A
	Industrial	I
	Residential	RS
	Unmanaged Wooded	W
OWNERSHIP		
	Private	1
	Federal	2
EROSION		
	Moderate	| | | | | | |
	Slight or No Change	No Symbol
	Accretional	+ + + +




MAP 4B
JORDAN POINT
SHORELANDS TYPES
Subsegments 2A and 2B
FASTLAND
Low Shore
Moderately Low Shore
Moderately High Shore
High Shore
SHORE
Beach
Fringe Marsh
Extensive Marsh
Embayed Marsh
Artificially Stabilized
NEARSHORE
Narrow
Intermediate
Wide
2A
2B
2B
JAMES
River
Eppes Island
Harrison Point
Jordan Point
Indian Point
Tidal Flat
Tidal Flat
Hopewell Airfield
Jordan Point Country Club
Beechwood Manor
Sardine
Light
Merchant Hope Ch
77° 12' 30"
77° 12' 30"
37° 17' 30"

77° 10'

HERRING CREEK

Berkeley

Harrison 2

Harrisons Landing

West 2

Westover

Over 2

Buckingham Signal Pt.

Buckle Point

2B

2B

Tidal Flat

Tidal Flat

Tidal Flat

Maycocks Point

BM 39

Coggins Point

Eelbank Point

POWELL CREEK

Beechwood

Gravel Pits

MAP 5A

POWELL CREEK

TOPOGRAPHY AND CULTURE

Subsegment 2B

// = Segment Boundary

/ = Subsegment Boundary

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

Garysville

77° 10'

37° 17' 30"

37° 17' 30"

MAP 5C

POWELL CREEK

FASTLAND USE, OWNERSHIP, EROSION

Subsegment 2B

USE

Agricultural	A
Industrial	I
Residential	RS
Unmanaged Wooded	W

OWNERSHIP

Private	1

EROSION

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

77° 10'

37° 17' 30"

HERRING CREEK

Westover

Buckingham Slough Pt.

Buckle Point

2B

Tidal Flat

Maycocks Point

Coggins Point

1RS

1A

1W

1I

Eelbank Point

POWELL CREEK

Beechwood

Gravel Pits

Garysville

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

MAP 6B

FLOWERDEW HUNDRED

SHORELANDS TYPES

Subsegments 2B and 3A

FASTLAND

- Low Shore
- Moderately Low Shore
- Moderately High Shore

SHORE

- Beach
- Fringe Marsh
- Extensive Marsh
- Embayed Marsh

NEARSHORE

- Narrow
- Intermediate

77° 05'

37° 17' 30"

2B

3A

Flowerdew Hundred

Olds Pt.

Willcox Wharf

Tidal Flat

Nathassett Camp

Hundred Creek

Flowerdew

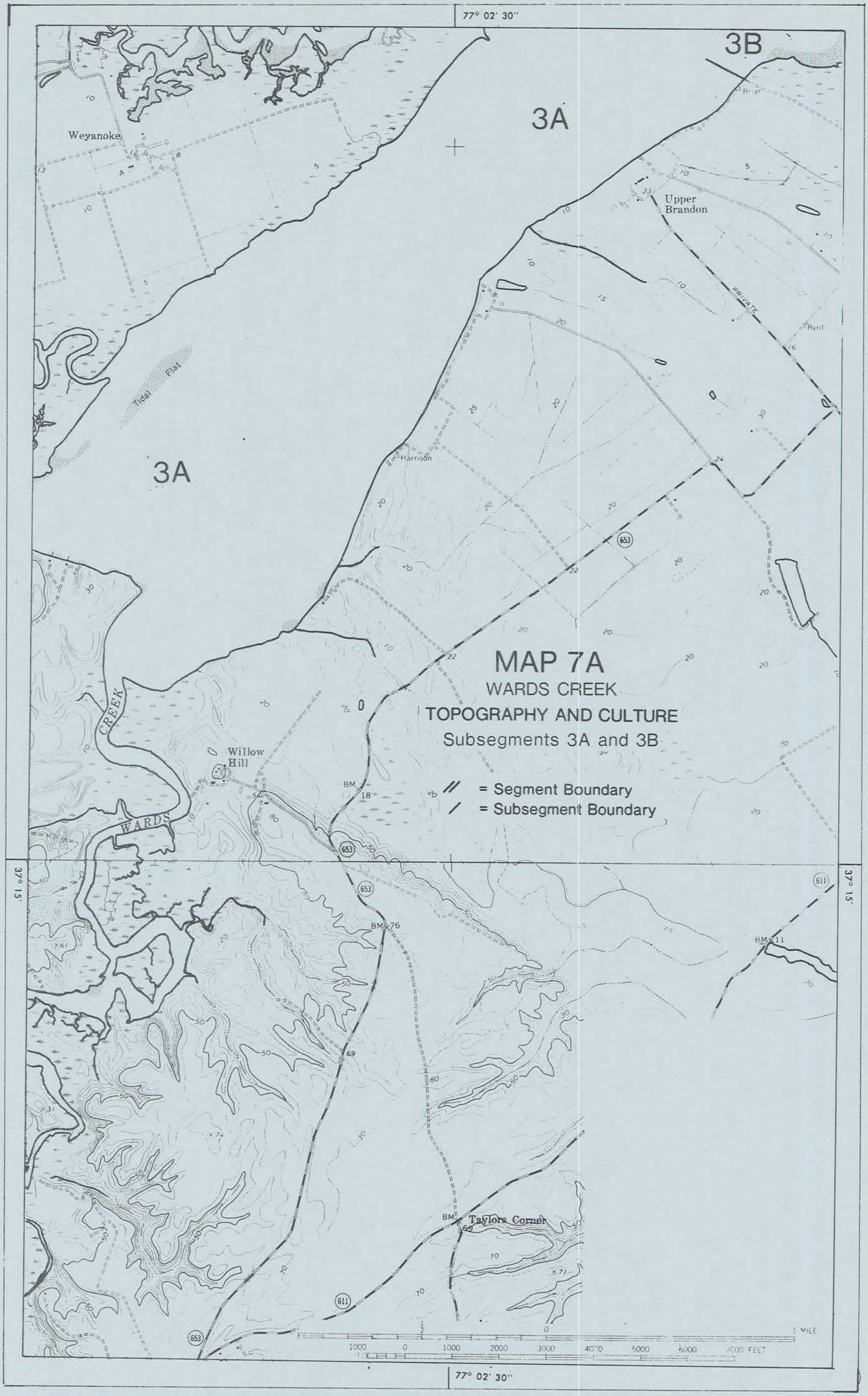
Swamp

TRAIL

JEEP

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET


77° 02' 30"
3B
3A
3A
Weyanoke
Upper Brandon
PRIVATE
Byrd
Tidal Flat
Harrison
653
Willow Hill
BM 18
WARDS CREEK
BM 76
69
611
BM 11
Taylors Corner
BM 65
37° 15'
MAP 7A
WARDS CREEK
TOPOGRAPHY AND CULTURE
Subsegments 3A and 3B
= Segment Boundary
= Subsegment Boundary
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
77° 02' 30"

77° 02' 30"

3B

3A

1A

Weyanoke

Upper Brandon

1A

1W

PRIVATE

Byrd

1A

Tidal Flat

3A

Harrison

653

1W

1W

1A

CREEK

Willow Hill

1W

1RS

BM

18

WARDS

653

1W

37° 15'

653

BM 76

1W

1W

69

1W

1W

1A

BM

Taylors Corner

65

511

653

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 FEET

77° 02' 30"

37° 15'

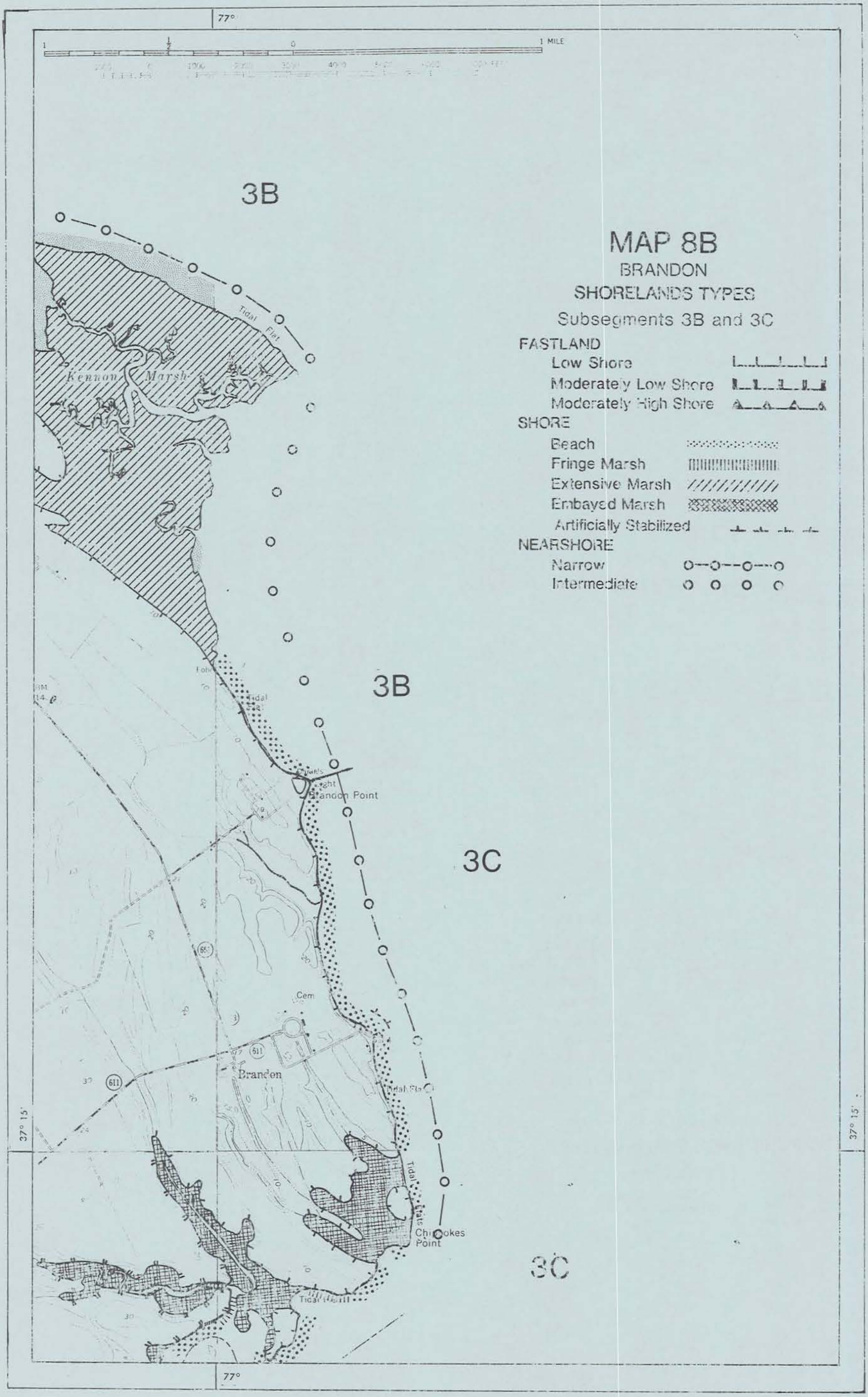
MAP 7C

WARDS CREEK

FASTLAND USE, OWNERSHIP, EROSION

Subsegments 3A and 3B

USE		
Agricultural	A	
Unmanaged Wooded	W	
OWNERSHIP		
Private	1	
EROSION		
Moderate		| | | | | | |
Slight or No Change		No Symbol
Accretional		+ + + +



MAP 8B

BRANDON

SHORELANDS TYPES

Subsegments 3B and 3C

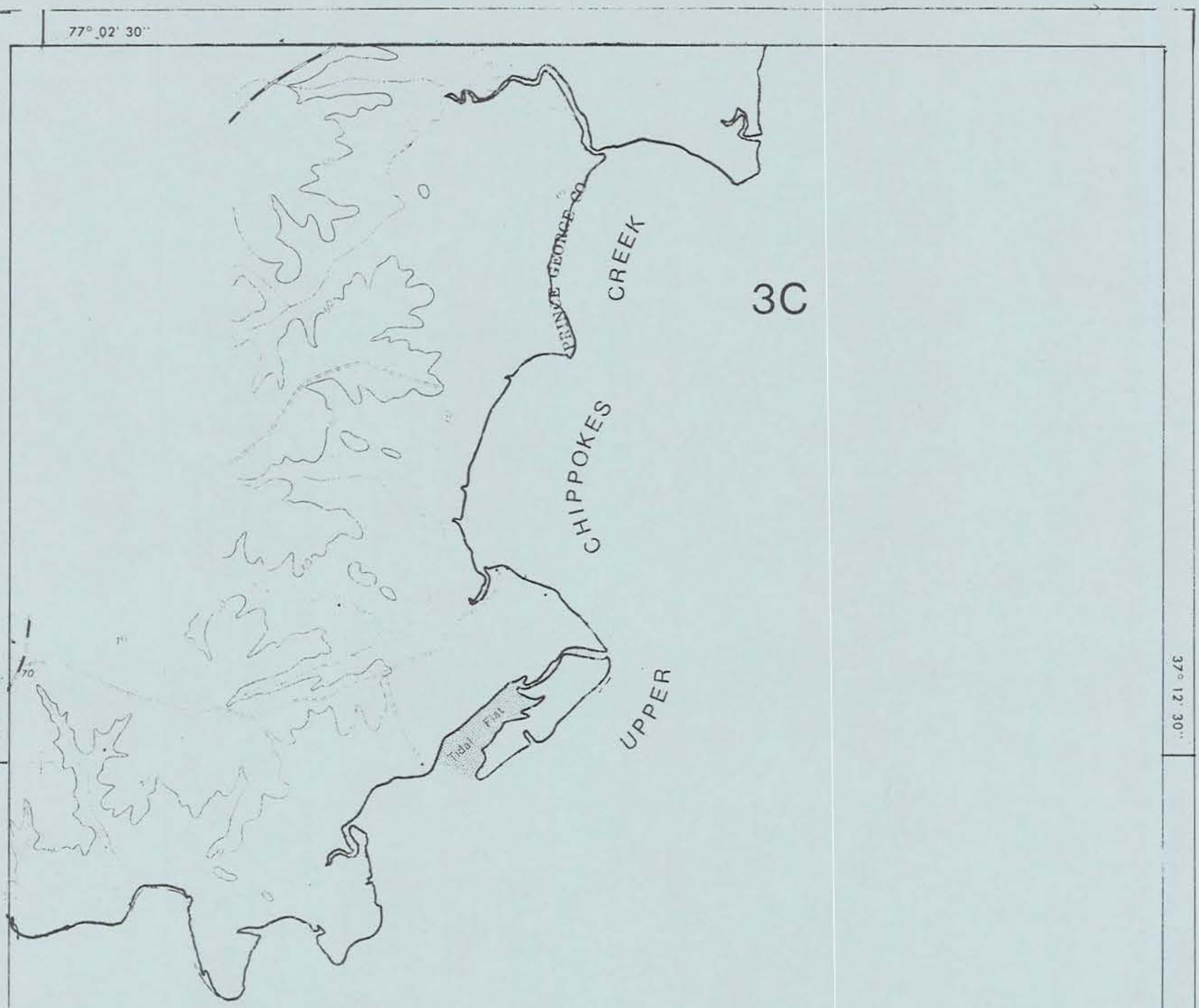
FASTLAND
- Low Shore
- Moderately Low Shore
- Moderately High Shore

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

NEARSHORE
- Narrow
- Intermediate

77° 02' 30"

37° 12' 30"



3C

MAP 9A

UPPER CHIPPOKES CREEK

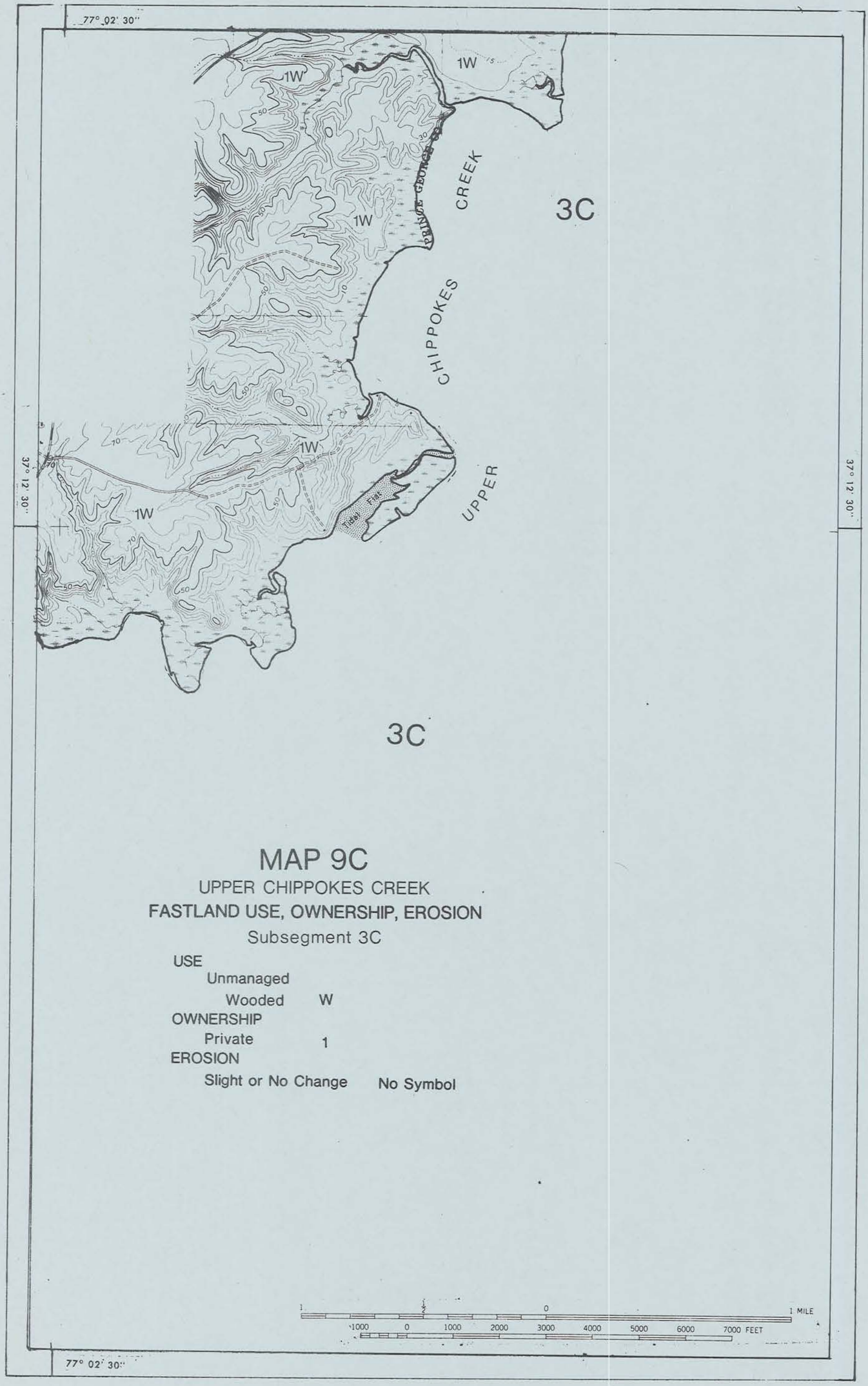
TOPOGRAPHY AND CULTURE

Subsegment 3C

// = Segment Boundary
/ = Subsegment Boundary

0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

77° 02' 30"



3C

MAP 9C

UPPER CHIPPOKES CREEK

FASTLAND USE, OWNERSHIP, EROSION

Subsegment 3C

USE	
Unmanaged	
Wooded	W
OWNERSHIP	
Private	1
EROSION	
Slight or No Change	No Symbol