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## Shoreline Situation Report Counties of Fairfax and Arlington, City of Alexandria

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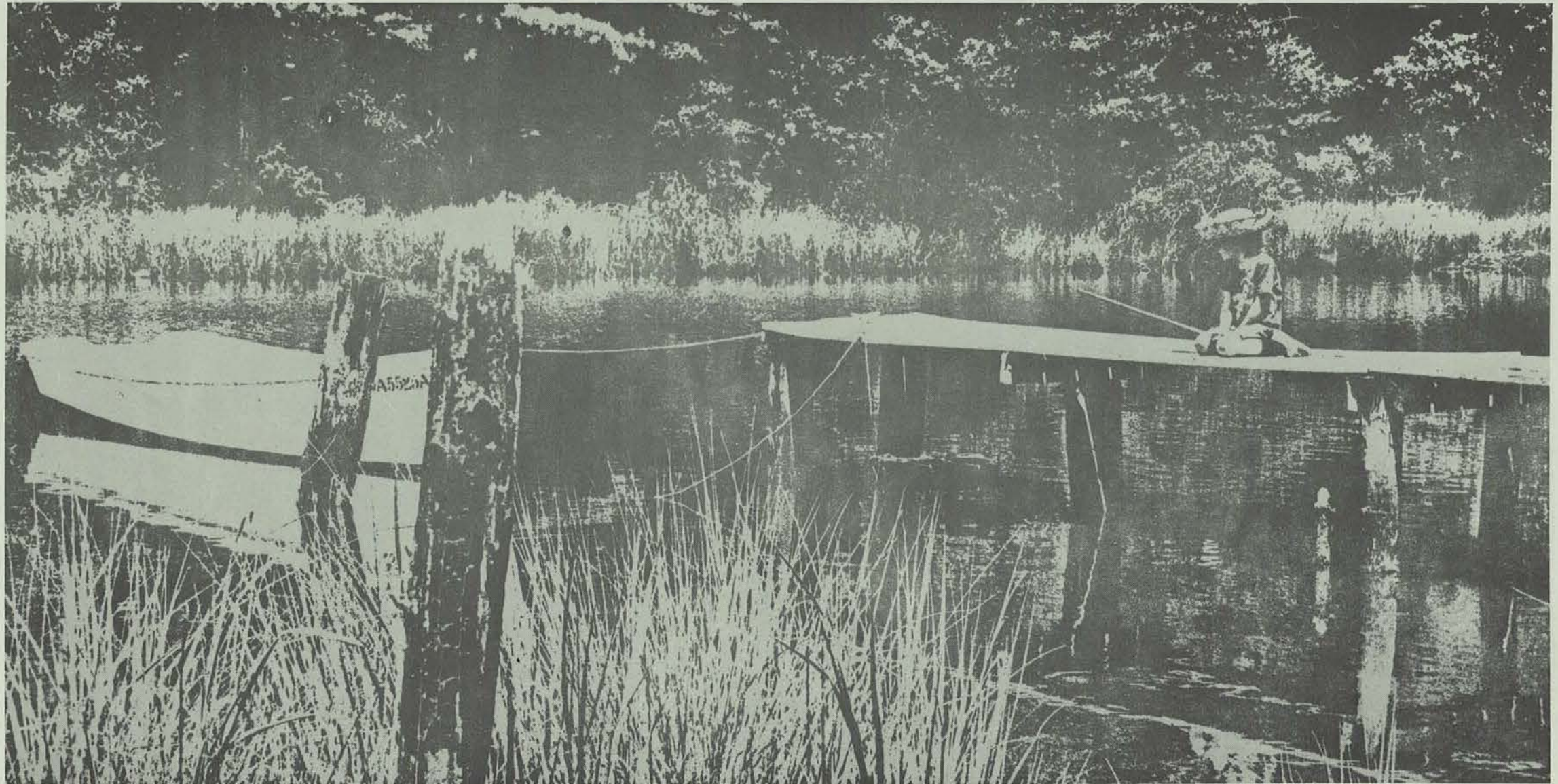
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Shoreline Situation Report  
COUNTIES OF FAIRFAX AND ARLINGTON, CITY OF ALEXANDRIA



Prepared and Published With Funds Provided to the Commonwealth by the Office of Coastal Zone Management,  
National Oceanic and Atmospheric Administration, Grant Nos. 04-7-158-44041 and 04-8-MO1-309

Special Report In Applied Marine Science and Ocean Engineering Number 166 of the

VIRGINIA INSTITUTE OF MARINE SCIENCE  
Gloucester Point, Virginia 23062

1979



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# CHAPTER 1

## Introduction

## CHAPTER 1

### INTRODUCTION

#### 1.1 PURPOSES AND GOALS

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

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

The major man-induced uses of the shorelands are:

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

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

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

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

#### 1.2 ACKNOWLEDGEMENTS

This report has been prepared and published with funds provided to the Commonwealth by the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, grant number 04-8-M01-309. The Shoreline Situation Report series was originally developed in the Wetlands/Edges Program of the Chesapeake Research Consortium, Inc., as supported by the Research Applied to National Needs (RANN) program of the National Science Foundation. The completion of this report would have been impossible without the expert services of Beth Marshall, who typed several drafts of the manuscript, Bill Jenkins and Ken Thornberry, who prepared the photographs, and Sam White, who piloted the aircraft on the many photo acquisition and reconnaissance flights. Also we thank the numerous other persons who, through their direct aid, criticisms, and suggestions, have assisted our work.

CHAPTER 2  
Approach Used and Elements Considered

## CHAPTER 2

### APPROACH USED AND ELEMENTS CONSIDERED

#### 2.1 APPROACH TO THE PROBLEM

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

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

The format of presentation in the report follows a sequence from general summary statements for the county (Chapter 3) to tabular segment summaries and finally detailed descriptions and maps for each subsegment (Chapter 4). The purpose in choosing this format was to allow selective use

of the report since some users' needs will adequately be met with the summary overview of the county while others will require the detailed discussion of particular subsegments.

#### 2.2 CHARACTERISTICS OF THE SHORELANDS INCLUDED IN THE STUDY

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

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

##### a) Shorelands Physiographic Classification

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

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

### Definitions:

#### Shore Zone

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

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

Beach

Marsh

Fringe marsh, < 400 ft. (122 m) in width  
along shores

Extensive marsh

Embayed marsh, occupying a drowned valley  
or reentrant

Artificially stabilized

#### Fastland Zone

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



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

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

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

#### Nearshore Zone

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

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

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

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

purposes:

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

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

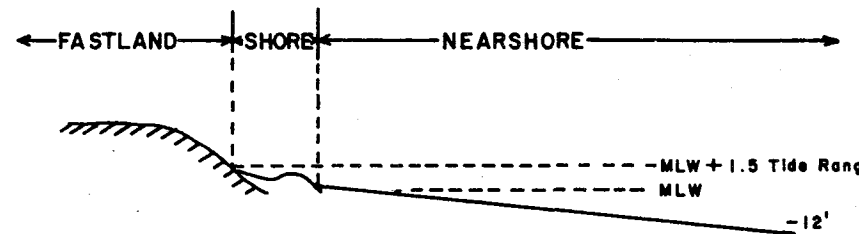


Figure 1

A profile of the three shorelands types.

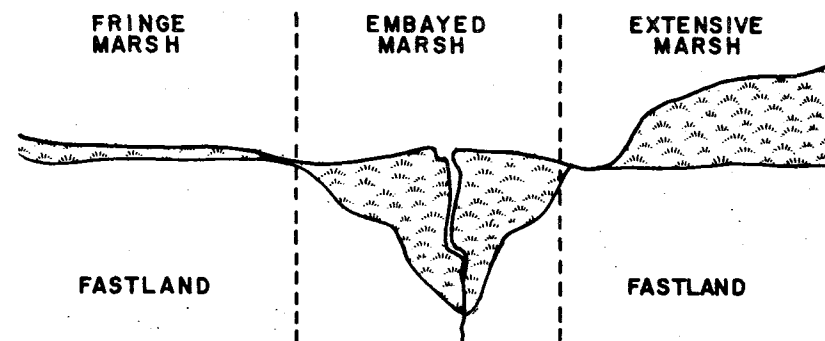


Figure 2

A plan view of the three marsh types.

#### b) Shorelands Use Classification

##### Fastland Zone

##### Residential

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

##### Commercial

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

##### Industrial

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

##### Governmental

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

##### Recreational and Other Public Open Spaces

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

##### Preserved

Includes lands preserved or regulated for

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

#### Agricultural

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

#### Unmanaged

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

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

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

#### Shore Zone

Bathing  
Boat launching  
Bird watching  
Waterfowl hunting

#### Nearshore Zone

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

#### c) Shorelands Ownership Classification

The shorelands ownership classification used has two main subdivisions, private and governmental, with the governmental further divided into

federal, state, county, and town or city. Application of the classification is restricted to fastlands alone since the Virginia fastlands ownership extends to mean low water. All bottoms below mean low water are in State ownership.

#### d) Water Quality

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

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

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

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

#### e) Zoning

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

#### f) Shore Erosion and Shoreline Defenses

The following ratings are used for shore erosion:

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

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

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

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

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

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

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

#### h) Distribution of Marshes

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

#### i) Flood Hazard Levels

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

#### j) Shellfish Leases and Public Grounds

The data in this report show the leased and public shellfish grounds as portrayed in the Virginia State Water Control Board publication "Shellfish growing areas in the Commonwealth of Virginia: Public, leased and condemned,"

November, 1971, and as periodically updated in other similar reports. Since the condemnation areas change with time they are not to be taken as definitive. However, some insight to the conditions at the date of the report are available by a comparison between the shellfish grounds maps and the water quality maps for which water quality standards for shellfish were used.

#### k) Beach Quality

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



**CHAPTER 3**  
**Present Shorelands Situation**



## CHAPTER 3

### PRESENT SHORELINE SITUATION OF THE COUNTIES OF FAIRFAX AND ARLINGTON, AND THE CITY OF ALEXANDRIA

#### 3.1 THE SHORELANDS OF THE COUNTIES OF FAIRFAX AND ARLINGTON, AND THE CITY OF ALEXANDRIA

The Counties of Fairfax and Arlington and the City of Alexandria are located at the fall line of the Potomac River and comprise the northern-most study area of the Shoreline Situation Report series. The three municipalities, although forming a contiguous shoreline, are very different in both shorelands type and use. The measured shorelands lengths for the study area are:

	<u>Shore</u>	<u>Fastland</u>
Fairfax	77.1 mi.	78.9 mi.
Alexandria	9.8 mi.	9.8 mi.
Arlington	11.1 mi.	11.1 mi.
Total	98.0 mi.	99.8 mi.

For the purposes of this discussion, where feasible, each political entity will be discussed separately.

#### 3.11 FAIRFAX COUNTY

Fairfax County comprises seventy-nine percent of the shorelands in the study area. Located along the Potomac River, its boundaries are the Occoquan River to the south and the Fairfax-Alexandria line at Hunting Creek to the north. The fastlands of Fairfax range from low shore to high shore with bluffs, with eighty-four percent being low or moderately low shore. Two percent of the fastlands are artificially filled areas. Marshes, including fringe, embayed and extensive marshes, comprise sixty-nine percent of the shoreline of Fairfax County. According to the "Fairfax County Tidal Marsh Inventory", (D. Doumlele, Virginia Institute of Marine Science March 1976), Fairfax County has a total of 920.1 acres of marshes. (Marsh areas on the "B" series maps of this report are keyed to the "Fairfax County Tidal Marsh Inventory".) Twenty-two percent of the shorelines are beach, and nine percent are artificially stabilized.

Fairfax County, being relatively close to the

Washington, D.C. metropolitan area, is continually being developed for a variety of residential and commercial purposes. However, most of the shorelands of the county are already consumed. A total of sixty-three percent of the shorelands are owned by the federal, state, or city governments. Included in the governmental lands are Fort Belvoir Military Reservation, Mason Neck State Wildlife Refuge, and the Northern Virginia Regional Park. The two historic trusts of Mount Vernon and Gunston Hall are publically owned and comprise three percent of the shoreline. The only areas of the county's shoreline owned by private concerns are along the Occoquan River, at the mouth of Gunston Cove, along the northern bank of Dogue Creek, and along the Potomac River above Fort Hunt Park. These sections have mostly been developed for residential purposes.

Flood data for the Fairfax County area was extracted from H.U.D. Federal Insurance Administration "Flood Hazard Boundary Maps". According to these maps, the 100-year flood would range from 9.3 feet above MSL at the mouth of Occoquan Bay to 9.8 feet above MSL at Hunting Creek. Most flooding in the Fairfax County area is due to heavy upstream rains causing extreme runoff to swell the river. The increased urbanization at the fall line on the Potomac River causes more runoff, as the water cannot absorb into asphalt or concrete. Increased runoff in turn causes increased flooding further downstream.

Several developed areas would be inundated during the 100-year storm, damaging or destroying property. The sections with the probability of receiving most damage are the New Alexandria and Belle View subdivisions just south of Hunting Creek. All of Belle View and most of New Alexandria would be inundated, causing a significant destruction of personal property. The flood height here could reach 9.8 feet above MSL. Other populated areas which are prone to flooding are the Mount Vernon Yacht Club on Dogue Creek, several structures in Fort Belvoir on the east bank of Accotink Creek, and a small development on the east bank of the mouth of Massey Creek on the Occoquan River. Structures at each site are endangered by the 100-year flood.

#### 3.12 ALEXANDRIA CITY

The City of Alexandria has 9.8 measured miles

of shoreline and fastland along the Potomac River and its tributaries. The city comprises ten percent of the shorelines in the study area. The fastlands of Alexandria range from low to moderately low shore, with seventy-two percent being low shore. Thirteen percent of the fastland is artificial fill. The shore zone is forty-one percent artificially stabilized, forty-five percent fringe marsh, and thirteen percent beach. The shore zone is very narrow here, having an average width of less than ten feet. The city's marshes are included in the "Fairfax County Tidal Marsh Inventory".

The waterfront of Alexandria is used for a variety of purposes. Forty-three percent is industrial, thirty-three percent is recreational, and eight percent is governmental. Other uses include commercial, residential, and unused areas. The ownership of much of Alexandria's waterfront is disputed by the city and the federal government. Present figures show twenty-two percent private, seventy percent federal, and seven percent city.

Flood data was extracted from the City of Alexandria's "Flood Plain Map, 1977" (Ordinance No. 2182, adopted May 24, 1977). According to the map, the 100-year flood would range from 12 feet above MSL at Hunting Creek to 15 feet above MSL at Four-mile Run. This level would inundate the entire waterfront area, including areas up to two blocks inland. Many structures could be damaged or destroyed during the flood.

#### 3.13 ARLINGTON COUNTY

The County of Arlington has 11.1 measured miles of shoreline and comprises eleven percent of the study area. The county's fastlands range from low shore to high shore with bluff, with the lower elevations located below the Key Bridge. The fastland statistics show forty-four percent low shore, eighteen percent moderately low shore, three percent moderately high shore, and thirty-three percent high shore, including bluffs. Two percent of the fastlands are artificial fill.

As in the City of Alexandria, the shore zone along this section of the Potomac River is very narrow. Twenty-seven percent of the shore is artificially stabilized with riprap, nineteen percent is beach, and fifty-four percent is fringe marsh. Refer to the "Fairfax County Tidal Marsh

Inventory" for more information on the marshes in Arlington.

The shorelands of Arlington County can be divided into two sections of use. The lower section is used for various governmental, industrial, and recreational purposes. Washington National Airport is located in this section. Most of the upper portion of the county's shorelands are park lands adjacent to the George Washington Memorial Parkway.

Flooding is not a problem in the upper section of Arlington's shorelands, as elevations are generally greater than 100 feet near the shore. However, some areas south of the Key Bridge are prone to flooding. According to the H.U.D. Federal Insurance Administration "Flood Hazard Boundary Maps" for Arlington County, the 100-year storm would flood areas to 21 feet above MSL near the mouth of Fourmile Run. Many houses and other structures would be damaged or destroyed in this section during the storm. Much of Washington National Airport is also located in the flood plain and would be inundated during the 100-year flood. Other sections of the shoreline are owned by the federal government and are not developed.

### 3.2 WATER QUALITY OF THE UPPER POTOMAC RIVER

The water quality of the Upper Potomac River is a point of concern for the various municipalities in the area. According to the Metropolitan Washington "208 Water Quality Plan" (Metropolitan Washington Council of Governments, March 1978), "the estuary has particular water quality problems because wastewater treatment plants discharge a majority of the region's sewage into the estuary, and the nonpoint source of runoff from the urban area and combined sewer overflows enter the estuary as well. The capacity of the estuary to absorb waste loads is limited and is heavily dependent on Potomac flows to overcome tidal action which confines wastes in the upper estuary." The Virginia water quality standard, according to the state's "305 (b) Report", states that "navigable water shall be of the quality to provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water." No area of the Upper Potomac River meets this criteria all of the time.

There are two basic tests for determining the water quality of a given area; fecal coliform bacteria and dissolved oxygen (DO). Fecal coliform bacteria are present in the intestinal tract and feces of all warm-blooded animals and are often associated with harmful microorganisms in the water. The fecal coliform level standard for the United States is 200 MPN/100 ml. The area from Sheridan Point south generally meets this standard, with the rest of the Upper Potomac River averaging fecal coliform counts in excess of the standard. Dissolved oxygen (DO) concentrations are important standards for the maintenance of aquatic life in the estuary. Most fish require DO concentrations above 4.0 ppm in order to survive and sustain spawning activity. Severe dissolved oxygen levels lower than the standard may cause fish kills. DO levels are directly related to water temperature (the lower the temperature, the higher its oxygen storage capacity and the higher the DO concentrations). In past summers, consistently high temperatures have caused low DO levels in the Upper Potomac River. This, combined with generally poor water quality, is the suspected cause of the over 17,000 pounds of fish kills observed in the area from 1972 to 1976.

Of growing concern in the Upper Potomac River are periodically high turbidity levels. Upstream

rains wash surface sediments into the stream, thus causing high turbidity levels. The sediments affect the quality of the water in the estuary, as they cover rooted aquatic vegetation which are important to young fish and other wildlife. As a result, nearly all rooted aquatics are gone from the estuarial shallows of the Potomac River, with a coincident high decrease of fish in the shallows. This loss of plant and animal life in the Upper Potomac have far-reaching effects on the overall water quality of the area.

In summary, the increased urbanization of the headwaters of the Potomac River is having a detrimental effect on the estuary's water quality. No longer is this area a prime spawning ground for many types of fish and wildlife. As a major cause of the problem is nonpoint source pollution from urban runoff and agricultural fields, more attention should be focussed on the problem in an effort to control the pollution.

### 3.3 PRESENT SHORE EROSION SITUATION

There is no historical erosion data available for the Upper Potomac River. Field investigations by the Virginia Institute of Marine Science, making use of recent VIMS low altitude oblique color photography, revealed several areas exhibiting erosional behavior in recent years; much of the area, however, appears stable. These areas are limited to the southern section of Fairfax County and are affected by both wave attacks and downhill rain runoff. For specific areas of erosion, refer to the Subsegment Descriptions, Chapter 4.

Generally, erosion is not considered to be a significant problem for this area of the Potomac River. (One house on the south bank of the mouth of Gunston Cove is endangered by continued erosion.) Populated shoreline areas have been largely artificially stabilized.

### 3.4 ALTERNATE SHORE USE

The study area of Fairfax, Alexandria and Arlington is considered part of the Washington, D.C. metropolitan area. As such, there is a great demand for land suitable for development. However, most of the shorelands of this section are already consumed. Sixty-eight percent of the shorelands are owned by the various levels of government and are unavailable for development. The remaining thirty-two percent, which are privately owned, are generally developed. There seems to be a concerted effort by all three municipalities to make the use of the shorelands in harmony with the environment. There are basically two areas which are not presently used; 4.4 miles of wooded land along the Occoquan River and 2.0 miles of wooded land along the south bank of Gunston Cove. These sections are at the extreme south of the study area and are probably subject to slightly less development pressure than other areas. No other sections have large areas of undeveloped shorelands.

The City of Alexandria has a unique problem in its shoreline redevelopment program, as the ownership of most of the waterfront area is disputed between the city and the federal government. No planned alternate shore use can occur until this dispute is settled. However, it seems that despite the outcome of the dispute, most of the waterfront area will be publically owned and used for various recreational purposes. According to city plans, industry not historically suited to the area or which is deemed unattractive to the area will be discouraged from locating on the waterfront and, if already located there, will be encouraged to relocate.

77° 15'

77° 00'

# COUNTIES OF FAIRFAX AND ARLINGTON CITY OF ALEXANDRIA MAP 1A

## SEGMENT AND MAP INDEX

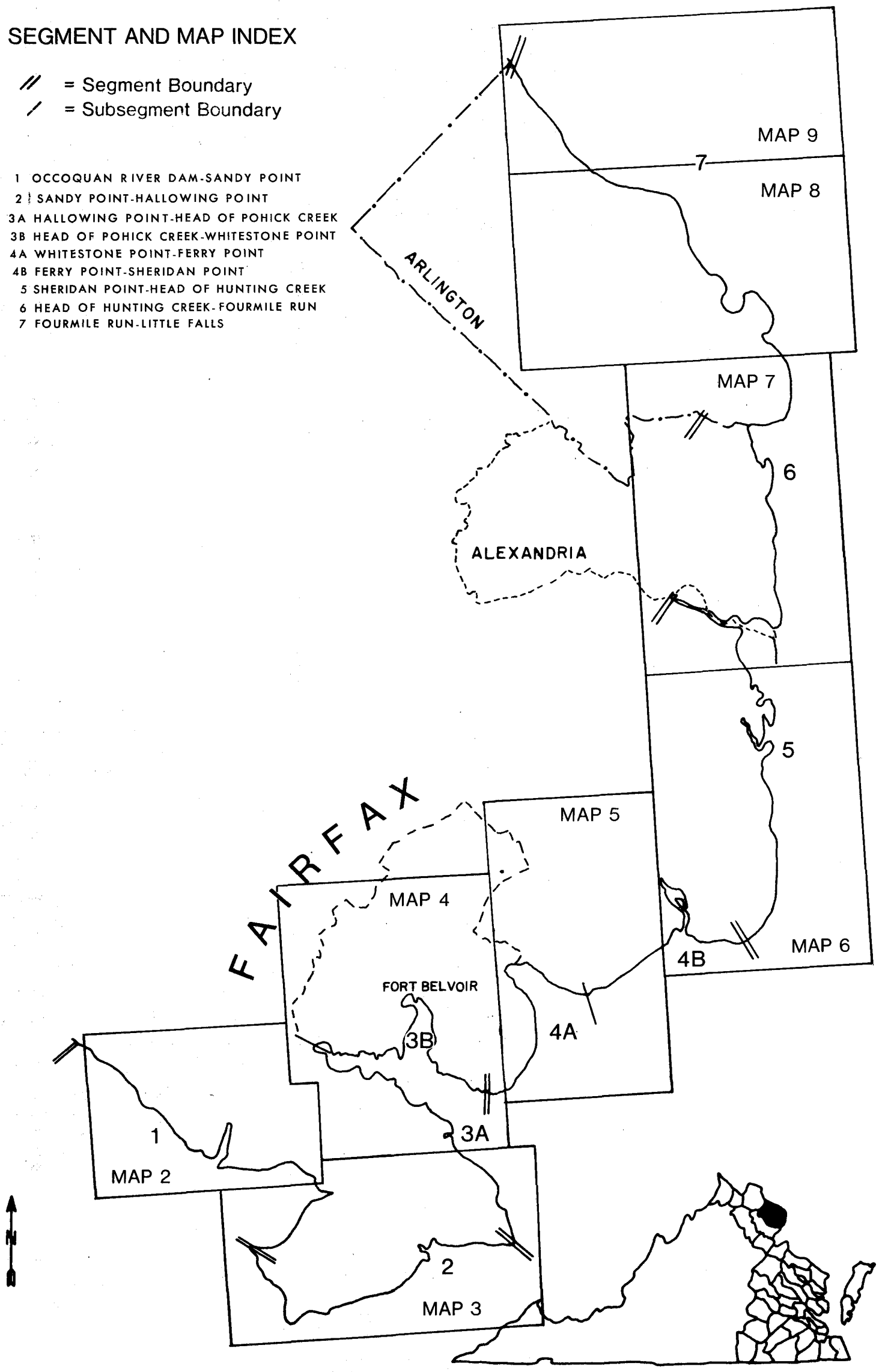
- // = Segment Boundary
- / = Subsegment Boundary

- 1 OCCOQUAN RIVER DAM-SANDY POINT
- 2 SANDY POINT-HALLOWING POINT
- 3A HALLOWING POINT-HEAD OF POHICK CREEK
- 3B HEAD OF POHICK CREEK-WHITESTONE POINT
- 4A WHITESTONE POINT-FERRY POINT
- 4B FERRY POINT-SHERIDAN POINT
- 5 SHERIDAN POINT-HEAD OF HUNTING CREEK
- 6 HEAD OF HUNTING CREEK-FOURMILE RUN
- 7 FOURMILE RUN-LITTLE FALLS

15

45° 38'

38° 45'










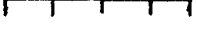
77° 15'

77° 00'

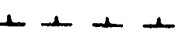
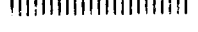
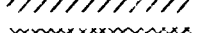
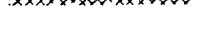
# COUNTIES OF FAIRFAX AND ARLINGTON CITY OF ALEXANDRIA MAP 1B

## SHORELANDS TYPES




### FASTLAND

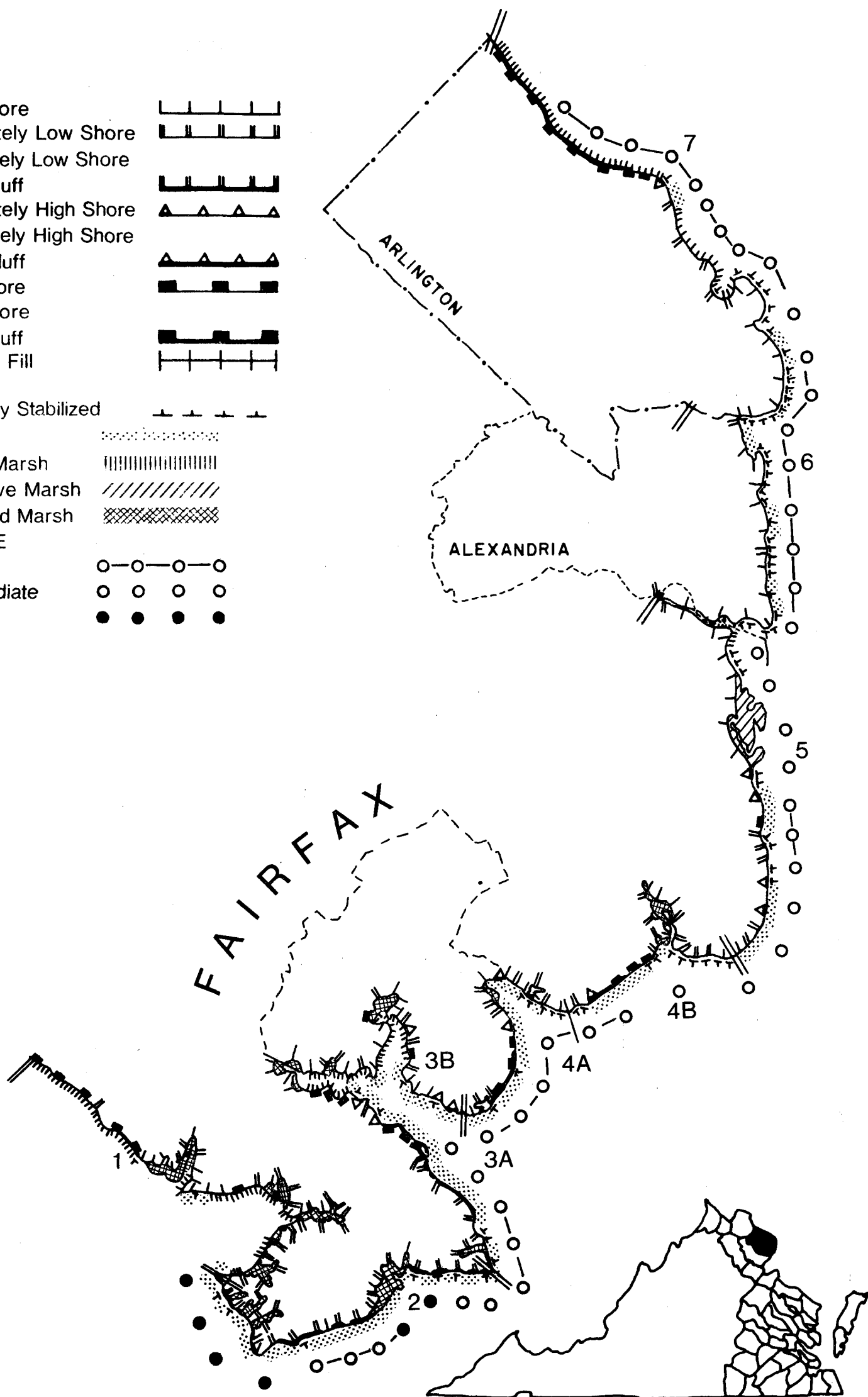
- Low Shore 
- Moderately Low Shore 
- Moderately Low Shore with Bluff 
- Moderately High Shore 
- Moderately High Shore with Bluff 
- High Shore 
- High Shore with Bluff 
- Artificial Fill 

### SHORE

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

### NEARSHORE

- Narrow 
- Intermediate 
- Wide 





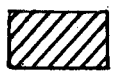


77° 15'

77° 00'

# COUNTIES OF FAIRFAX AND ARLINGTON CITY OF ALEXANDRIA MAP 1D

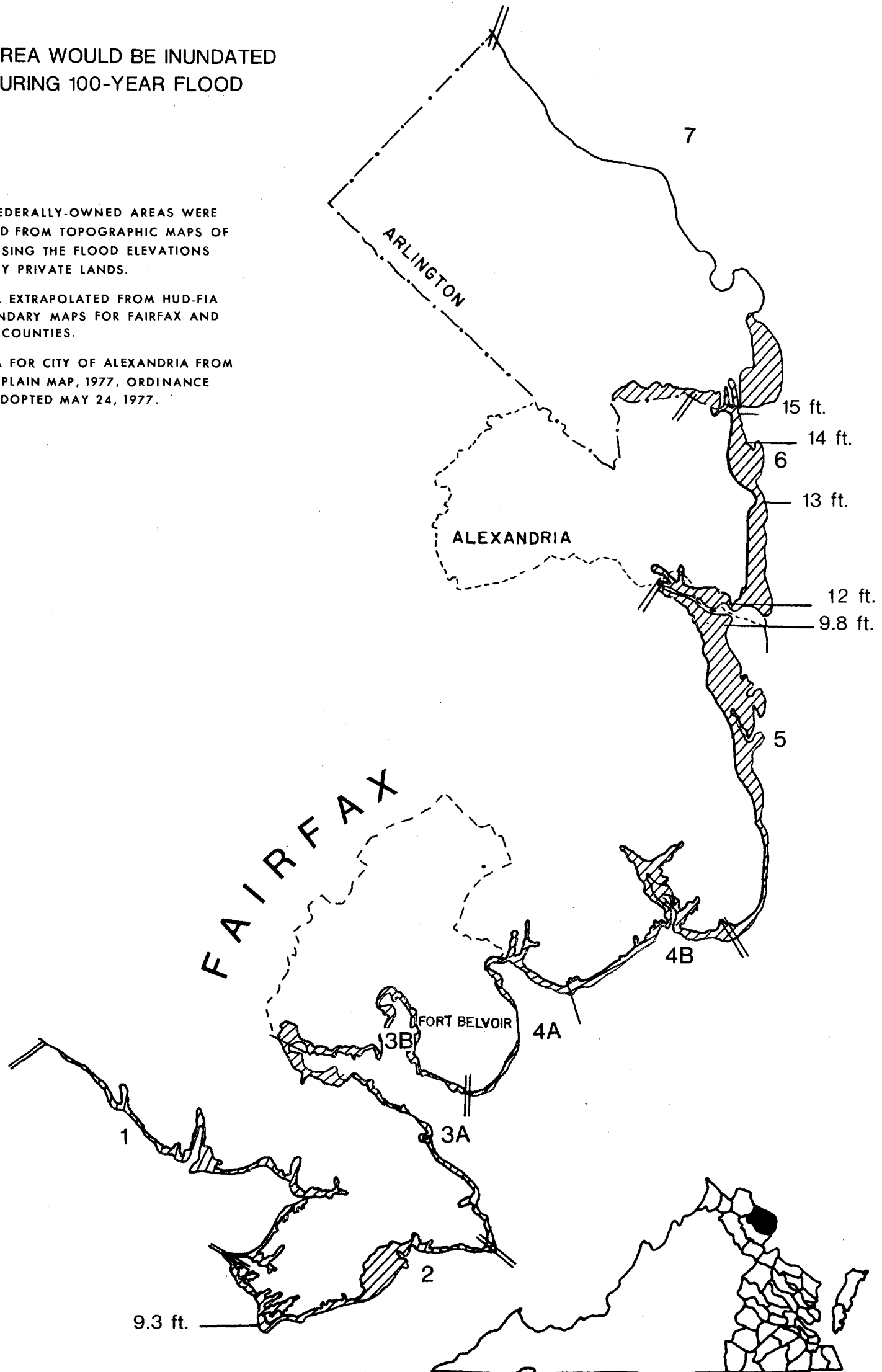
## FLOOD PLAIN AREAS

 AREA WOULD BE INUNDATED DURING 100-YEAR FLOOD

1 DATA FOR FEDERALLY-OWNED AREAS WERE INTERPOLATED FROM TOPOGRAPHIC MAPS OF THE AREA, USING THE FLOOD ELEVATIONS FROM NEARBY PRIVATE LANDS.

2 FLOOD DATA EXTRAPOLATED FROM HUD-FIA FLOOD BOUNDARY MAPS FOR FAIRFAX AND ARLINGTON COUNTIES.

3 FLOOD DATA FOR CITY OF ALEXANDRIA FROM CITY FLOOD PLAIN MAP, 1977, ORDINANCE NO. 2182, ADOPTED MAY 24, 1977.



18

38° 45'

38° 45'

77° 15'

77° 00'

TABLE 1. FAIRFAX AND ARLINGTON COUNTIES, CITY OF ALEXANDRIA SHORELANDS PHYSIOGRAPHY AND FASTLAND USE (STATUTE MILES)

Physiographic, use, and ownership classification	SHORELANDS PHYSIOGRAPHY													FASTLAND USE								OWNERSHIP				TOTAL MILES						
	FASTLAND									SHORE				NEARSHORE																		
	ARTIFICIAL FILL	LOW SHORE	MODERATELY LOW SHORE	MODERATELY LOW SHORE WITH BLUFF	MODERATELY HIGH SHORE	MODERATELY HIGH SHORE WITH BLUFF	HIGH SHORE	HIGH SHORE WITH BLUFF	ARTIFICIALLY STABILIZED	BEACH	FRINGE MARSH	EMBAYED MARSH	EXTENSIVE MARSH	NARROW	INTERMEDIATE	WIDE	AGRICULTURAL	COMMERCIAL	GOVERNMENTAL	INDUSTRIAL	PRESERVED	RECREATIONAL	RESIDENTIAL	UNMANAGED, UNWOODED	UNMANAGED, WOODED	PRIVATE	FEDERAL	STATE	CITY	FASTLAND	SHORELINE	
1		5.5	8.9	0.5	0.1		1.6	0.5	0.2	0.6	6.3	3.8				0.4			1.8	8.7		1.8	0.1	4.4		7.1		8.7	1.3	17.1	10.9	
2		0.5	8.4	3.1					0.9	3.9	0.6	7.0		1.3	0.9	4.1					1.1	8.7	1.8		0.5	2.3		1.1	8.6	12.0	12.3	
3A		2.6	2.9	1.4	0.4		1.0	1.0	0.5	3.9	2.9	1.4		1.2	1.5						1.1	3.8	2.2		2.0	5.6			3.8	9.3	8.7	
3B		9.5	2.4		0.9		0.3		0.5	1.4	9.8	1.7						13.2									13.2			13.2	13.3	
4A		4.2	2.1		0.3	0.1	0.3	1.1	1.4	2.8	2.5	1.3		1.6				5.9			0.3	1.5	0.3	0.2		2.2	5.9			8.1	8.1	
4B		3.7	4.8			0.2	0.8	0.5	1.7	1.5	3.6	3.3		0.6	2.2				0.2	1.4	2.1	5.9	0.3	0.2		7.7	2.1		0.2	10.0	10.2	
5	1.7	3.6	1.9		1.8		0.2		1.5	2.6	3.2		6.3	0.8	6.6		0.2				0.2	5.4	2.9	0.2	0.3	4.0	5.2			9.2	13.6	
6	1.3	7.1	1.4						4.0	1.3	4.4	0.1		4.7	0.8		0.4	0.8	4.2			3.2	0.6	0.5		2.2	6.9		0.7	9.8	9.8	
7	0.2	4.8	2.0		0.4		0.4	3.2	3.0	2.1	5.9			7.3	1.6			0.8	3.6			6.1	0.4			0.9	8.0	2.2		11.1	11.1	
TOTAL	3.2	41.5	34.8	5.0	3.9	0.3	4.6	6.3	13.7	20.1	39.2	18.6	6.3	17.5	13.6	4.1	0.6	0.6	20.7	9.8	12.5	29.6	17.0	1.4	7.6	32.0	41.3	12.0	14.6	99.8	98.0	
% of FASTLAND	3%	41%	35%	5%	4%	1%	5%	6%									1%	1%	21%	10%	12%	30%	17%	1%	8%	32%	41%	12%	15%	100%		
% of SHORELINE									14%	21%	40%	19%	6%	18%	14%	4%																100%
FAIRFAX	1.7	29.6	31.4	5.0	3.5	0.3	4.2	3.1	6.7	16.7	28.9	18.5	6.3	5.5	11.2	4.1	0.6	0.2	19.1	2.0	12.5	20.3	16.1	0.9	7.6	28.9	26.4	9.8	13.9	78.9	77.1	
ALEXANDRIA	1.3	7.1	1.4						4.0	1.3	4.4	0.1		4.7	0.8		0.4	0.8	4.2			3.2	0.6	0.5		2.2	6.9		0.7	9.8	9.8	
ARLINGTON	0.2	4.8	2.0		0.4		0.4	3.2	3.0	2.1	5.9			7.3	1.6				0.8	3.6			6.1	0.4		0.9	8.0	2.2		11.1	11.1	

## CHAPTER 4

4.1 Table of Subsegment Summaries

4.2 Segment and Subsegment Descriptions

4.3 Segment and Subsegment Maps

TABLE 2. SHORELINE SITUATION REPORT SUBSEGMENT SUMMARY FOR FAIRFAX AND ARLINGTON COUNTIES, CITY OF ALEXANDRIA

SUBSEGMENT	SHORELANDS TYPE	SHORELANDS USE	OWNERSHIP	FLOOD HAZARD	WATER QUALITY	BEACH QUALITY	SHORE EROSION SITUATION	ALTERNATE SHORE USE
1 FAIRFAX COUNTY OCCOQUAN DAM TO SANDY POINT 10.9 miles (17.1 miles of fastland)	FASTLAND: Low shore 32%, moderately low shore 52%, moderately high shore with bluff 3%, moderately high shore 1%, high shore 9%, and high shore with bluff 3%. SHORE: Artificially stabilized 1%, beach 5%, fringe marsh 58%, and embayed marsh 35%. NEARSHORE: The Occoquan River and Belmont Bay are too narrow and shallow for classification.	FASTLAND: Agricultural 2%, industrial 10%, preserved 51%, residential 10%, unmanaged, unwooded 1%, and unmanaged, wooded 25%. SHORE: Mostly unused; some recreational and commercial use. NEARSHORE: Some sport boating and fishing.	Private 41%, state 51%, and city 8%.	Moderate to high. The 100-year storm would flood areas to elevations of 9.3 feet. A small housing development on the east bank of Massey Creek would be flooded.	The Occoquan River generally has good water quality.	Poor. There are only narrow strips of beach in the segment.	No data. Field investigation shows some erosion along sections of the Belmont Bay shoreline, however it is not significant or critical. Three areas in the segment have a total of 700 feet of bulkhead and 100 feet of riprap, all effective.	Moderate. The forty-one percent of the shorelands which are private are being developed for residential purposes.
2 FAIRFAX COUNTY SANDY POINT TO HALLOWING POINT 12.3 miles (12.0 miles of fastland)	FASTLAND: Low shore 4%, moderately low shore 70%, and moderately low shore with bluff 26%. SHORE: Artificially stabilized 7%, beach 31%, fringe marsh 5%, and embayed marsh 57%. NEARSHORE: Narrow 11%, intermediate 8%, and wide 33%. The remainder of the nearshore zone is too narrow and shallow for classification.	FASTLAND: Preserved 9%, recreational 72%, residential 15%, and unmanaged, wooded 4%. SHORE: Mostly unused; some recreational use in front of residences. NEARSHORE: The Potomac River is used for commercial traffic, sport boating, and fishing.	Private 19%, state 9%, and city 72%.	Moderate. The 100-year flood would reach elevations of 9.3 feet. No structures would be affected.	This section of the Potomac River generally has good water quality.	Fair. The beaches are usually of moderate to narrow width and are often littered with debris.	No data. Field inspection shows moderate erosion from Sandy Point to Sycamore Point. There are 7,500 feet of bulkhead in the section, most of which is located at Hallowing Point River Estates. Riprap is located south of Sandy Point, and three groins are south of the riprap. All structures appear to be effective.	Low. Given that eighty-one percent of the shorelands are owned by the state and local governments, there are few private lands available for development.
3A FAIRFAX COUNTY HALLOWING POINT TO POHICK CREEK 8.7 miles (9.3 miles of fastland)	FASTLAND: Low shore 28%, moderately low shore 31%, moderately low shore with bluff 15%, moderately high shore 5%, high shore 10%, and high shore with bluff 11%. SHORE: Artificially stabilized 5%, beach 45%, fringe marsh 33%, and embayed marsh 16%. NEARSHORE: Narrow 14% and intermediate 17%. The remainder of the nearshore zone is too narrow and shallow for classification.	FASTLAND: Agricultural 2%, preserved 12%, recreational 41%, residential 23%, and unmanaged, wooded 22%. SHORE: Some recreational use along public shorelands and in front of residences. NEARSHORE: Unused in Gunston Cove and Pohick Bay. Commercial shipping in the Potomac River.	Private 60% and city 40%.	Moderate. The 100-year flood would affect areas to elevations of 9.5 feet, including several structures along Pohick Bay.	This section generally has good water quality.	Fair. Hallowing Point has a moderately wide beach, but is littered with debris. Other beaches in the subsegment are usually narrow.	No data. Field investigations show erosion is continuing from Hallowing Point to inside the mouth of Gunston Cove. There are 2,500 feet of artificially stabilized shoreline in the subsegment, most of which is bulkhead. A small groin field is located north of Hallowing Point.	Low. The forty percent of the shorelands which are privately owned are already largely developed. Some continued residential development is possible in some areas of the shoreline.
3B FAIRFAX COUNTY POHICK CREEK TO WHITESTONE POINT 13.3 miles (13.2 miles of fastland)	FASTLAND: Low shore 72%, moderately low shore 18%, moderately high shore 7%, and high shore 3%. SHORE: Artificially stabilized 4%, beach 10%, fringe marsh 73%, and embayed marsh 13%. NEARSHORE: Pohick Creek and Accotink Bay are too narrow and shallow for classification.	FASTLAND: Entirely governmental. SHORE: Mostly unused, except for the area from Accotink Bay to Whitestone Point, which is used for access to boats by the military. NEARSHORE: Sport boating and fishing; some use by military vessels.	Federal 100%.	Moderate. The 100-year storm would reach elevations of 9.5 feet, flooding several structures on the east bank of the mouth of Accotink Bay.	This area generally has good water quality.	Fair. The beaches from Accotink Bay to Whitestone Point are generally narrow and debris litters the area.	No data. Field investigations show no significant erosion in the subsegment. There are approximately 2,500 feet of bulkhead in the subsegment, all of which appears to be effective.	Low. No private development is possible unless the government relinquishes control of the area.
4A FAIRFAX COUNTY WHITESTONE POINT TO FERRY POINT 8.1 miles (8.1 miles of fastland)	FASTLAND: Low shore 52%, moderately low shore 26%, moderately high shore 4%, moderately high shore with bluff 1%, high shore 3%, and high shore with bluff 14%. SHORE: Artificially stabilized 18%, beach 35%, fringe marsh 31%, and embayed marsh 16%. NEARSHORE: Narrow 20%. The remainder of the nearshore zone is too narrow and shallow for classification.	FASTLAND: Governmental 72%, recreational 3%, residential 19%, unmanaged, unwooded 3%, and unmanaged, wooded 2%. SHORE: Mostly unused; some recreational use along residential areas. NEARSHORE: Commercial traffic, pleasure boating and fishing.	Private 27% and Federal 73%.	Moderate. The 100-year storm, reaching elevations of 9.5 feet, would flood many structures in a housing development in Fort Belvoir and several structures at Mount Vernon Yacht Club.	The area has good water quality.	Fair. The beaches are generally of moderate width but are often littered with fallen trees and other debris.	No data. Field investigations show erosion along the bluffs near Whitestone Point. There are 7,600 feet of artificially stabilized shoreline in the subsegment, sixty percent of which is bulkhead and the rest riprap. All appear to be effective.	Moderate. The unused areas of the subsegment are located near residential sections. These areas will probably be developed for residences also.



TABLE 2 (Cont'd.)

SUBSEGMENT	SHORELANDS TYPE	SHORELANDS USE	OWNERSHIP	FLOOD HAZARD	WATER QUALITY	BEACH QUALITY	SHORE EROSION SITUATION	ALTERNATE SHORE USE
4B FAIRFAX COUNTY FERRY POINT TO SHERIDAN POINT 10.2 miles (10.0 miles of fastland)	FASTLAND: Low shore 37%, moderately low shore 48%, moderately low shore with bluff 2%, high shore 8%, and high shore with bluff 5%. SHORE: Artificially stabilized 17%, beach 15%, fringe marsh 35%, and embayed marsh 33%. NEARSHORE: Narrow 6% and intermediate 21%. The remainder of the nearshore zone is too narrow and shallow for classification.	FASTLAND: Industrial 2%, preserved 14%, recreational 21%, residential 59%, unmanaged, unwooded 3%, and unmanaged, wooded 2%. SHORE: Mostly unused; some recreational use along Little Hunting Creek. NEARSHORE: Commercial shipping on the Potomac River.	Private 77%, federal 21%, and city 2%.	Moderate. The 100-year storm would affect areas to elevations of 9.5 feet, flooding several structures.	The area has good water quality.	Fair. The area has beaches of moderate width, but they are often littered with debris.	No data. Field investigations show moderate erosion of the bluffs 1,500 feet north of Ferry Point. Much of the remainder of the shoreline has been artificially stabilized. There are 9,200 feet of riprap and bulkhead in the subsegment. All appear to be effective.	Low. Most of the private lands have already been developed for residential purposes.
5 FAIRFAX COUNTY SHERIDAN POINT TO HUNTING CREEK 13.6 miles (9.2 miles of fastland)	FASTLAND: Artificial fill 18%, low shore 39%, moderately low shore 20%, moderately high shore 20%, and high shore 3%. SHORE: Artificially stabilized 11%, beach 19%, fringe marsh 23%, and extensive marsh 46%. NEARSHORE: Narrow 6% and intermediate 49%. The remainder of the nearshore zone is too narrow and shallow for classification.	FASTLAND: Commercial 2%, preserved 3%, recreational 58%, residential 31%, unmanaged, unwooded 2%, and unmanaged, wooded 3%. SHORE: Recreational uses, especially at the marina. NEARSHORE: Pleasure boating and commercial traffic along the Potomac River.	Private 43% and federal 57%.	Moderate to high. The 100-year storm would flood elevations of 9.8 feet, inundating the entire Belle View development and most of New Alexandria.	Poor to fair. This section of the Potomac River usually has high fecal coliform counts.	Fair. There is a beach of moderate width from Sheridan Point to Hog Island.	No data. Field investigation shows no significant erosion along this section of the Potomac River. There are 8,100 feet of bulkhead and riprap in the segment, all of which appear to be effective.	Low. Most of the segment is either preserved or is already consumed. There are few privately owned and unused lands.
6 ALEXANDRIA CITY HUNTING CREEK TO FOURMILE RUN 9.8 miles (9.8 miles of fastland)	FASTLAND: Artificial fill 13%, low shore 72%, and moderately low shore 14%. SHORE: Artificially stabilized 41%, beach 13%, fringe marsh 45%, and embayed marsh 1%. NEARSHORE: Narrow 48% and intermediate 8%. The remainder of the nearshore zone is too narrow and shallow for classification.	FASTLAND: Commercial 4%, governmental 8%, industrial 43%, recreational 33%, residential 6%, and unmanaged, unwooded 6%. SHORE: Recreational and commercial uses along Alexandria's waterfront. NEARSHORE: Commercial shipping, pleasure boating, and tour boat traffic.	Private 22%, federal 70%, and city 7%. Much ownership is in dispute.	High. The 100-year storm would flood areas ranging from 12 feet at Hunting Creek to 15 feet at Fourmile Run, inundating the entire waterfront area.	Poor to fair. This section of the Potomac River usually has high fecal coliform counts.	Poor. There are only thin strip beaches along this section of shoreline.	No data. Field investigation showed little or no erosion in this segment. Approximately 21,000 feet of bulkhead has been constructed in this area. Though all appear to be effective, some structures are old and should be strengthened or replaced in the next decade.	High. The City of Alexandria plans to revitalize its waterfront for recreational open space, small businesses, and commercial shipping. However, any development of the Alexandria waterfront depends upon the outcome of the shore ownership dispute between the city and federal government.
7 ARLINGTON COUNTY FOURMILE RUN TO LITTLE FALLS 11.1 miles (11.1 miles of fastland)	FASTLAND: Artificial fill 2%, low shore 44%, moderately low shore 18%, moderately high shore 3%, high shore 4%, and high shore with bluff 29%. SHORE: Artificially stabilized 27%, beach 19%, and fringe marsh 54%. NEARSHORE: Narrow 66% and intermediate 15%. The remainder of the nearshore zone is too narrow and shallow for classification.	FASTLAND: Governmental 8%, industrial 33%, recreational 55%, and residential 4%. SHORE: Recreational use along George Washington Memorial Parkway. NEARSHORE: Commercial traffic along the southern section; pleasure boating along the entire nearshore.	Private 8%, federal 72%, and state 20%.	Low to moderate. The upper section of the segment has high shoreline. South of the Key Bridge, some areas would be flooded, including much of Washington National Airport.	Poor. The Potomac River has high fecal coliform counts in the segment.	Poor. There are only very narrow strip beaches in the segment.	No data. Field inspection showed little or no erosion in the area. There are 15,900 feet of effective riprap along the shoreline.	Low. All shorelands are being used. Any new use would be via redevelopment of existing areas.

SEGMENT 1

FAIRFAX COUNTY

OCCOQUAN RIVER DAM TO SANDY POINT

Maps 2 and 3

EXTENT: 57,300 feet (10.9 mi.) of shoreline along the Occoquan River and Belmont Bay. The segment includes 90,300 feet (17.1 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 32% (5.5 mi.), moderately low shore 52% (8.9 mi.), moderately low shore with bluff 3% (0.5 mi.), moderately high shore 1% (0.1 mi.), high shore 9% (1.6 mi.), and high shore with bluff 3% (0.5 mi.).

SHORE: Artificially stabilized 1% (0.2 mi.), beach 5% (0.6 mi.), fringe marsh 58% (6.3 mi.), and embayed marsh 35% (3.8 mi.).

NEARSHORE: This segment is located along the Occoquan River and Belmont Bay, which are too narrow and shallow for classification.

SHORELANDS USE

FASTLAND: Agricultural 2% (0.4 mi.), industrial 10% (1.8 mi.), preserved 51% (8.7 mi.), residential 10% (1.8 mi.), unmanaged, unwooded 1% (0.1 mi.), and unmanaged, wooded 25% (4.4 mi.).

SHORE: Mostly unused, except for some recreational use in front of residential areas (Harbor View) and some commercial use east of the railroad bridge spanning the Occoquan River.

NEARSHORE: Some sport boating and fishing.

WIND AND SEA EXPOSURE: The Occoquan River trends basically SE - NW from its mouth to its head. No significant fetches affect this area of the county.

OWNERSHIP: Private 41%, state 51%, and city 8%.

FLOOD HAZARD: Moderate to high. According to the Federal Insurance Administration, the 100-year flood would affect areas 9.3 feet above MSL. Several sections would be flooded, including a small housing development on the eastern bank of the mouth of Massey Creek.

WATER QUALITY: The Occoquan River generally has good water quality. Problems occur during

storms, as rain runoff washes pollutants and nutrients into the stream.

BEACH QUALITY: There are only thin strips of beach in the segment.

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data. VIMS field investigations show some erosion due to downhill rain runoff along sections of the Belmont Bay shoreline. However, erosion is not considered a significant problem along the Occoquan River or in Belmont Bay.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: There are approximately 650 feet of bulkhead just east of the Richmond, Fredericksburg and Potomac railroad span across the Occoquan River. Approximately 50 feet of bulkhead is located near the mouth of Massey Creek. The shoreline fronting a residence east of Massey Creek is protected by 100 feet of riprap. All structures appear effective, though they are more for cosmetic or commercial purposes than for shore protection.

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

SHORE USE LIMITATIONS: Fifty-nine percent of the shorelands in this segment are owned by the state and local governments, including the Lorton Youth Correctional Center owned by the District of Columbia. Public ownership restricts other alternate uses. Much of the privately owned lands have bluffs along the shoreline.

ALTERNATE SHORE USE: Moderate. Many of the privately held lands are being developed for residential purposes. This development will probably continue along the Massey Creek section of the segment. The area from just north of Kanes Creek to the segment end at Sandy Point is part of a state owned wildlife refuge.

MAPS: USGS, 7.5 Min.Ser. (Topo.), OCCOQUAN Quadr., 1966, pr. 1971;  
USGS, 7.5 Min.Ser. (Topo.), FORT BELVOIR Quadr., 1965, pr. 1971.  
NOS# 12289 (560), 1:40,000 scale, POTOMAC RIVER, Mattawoman Creek to Georgetown, 31st ed., 1971.

PHOTOS: Aerial-VIMS 2Mar78 FX-1/1-14.

SEGMENT 2

FAIRFAX COUNTY

SANDY POINT TO HALLOWING POINT

Map 3

EXTENT: 64,800 feet (12.3 mi.) of shoreline along Belmont Bay and the Potomac River. The segment includes 63,500 feet (12.0 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 4% (0.5 mi.), moderately low shore 70% (8.4 mi.), and moderately low shore with bluff 26% (3.1 mi.).

SHORE: Artificially stabilized 7% (0.9 mi.), beach 31% (3.9 mi.), fringe marsh 5% (0.6 mi.), and embayed marsh 57% (7.0 mi.).

NEARSHORE: Narrow 11%, intermediate 8%, and wide 33%. The remainder of the nearshore zone is located along marsh creeks, which are too narrow and shallow for classification.

SHORELANDS USE

FASTLAND: Preserved 9% (1.1 mi.), recreational 72% (8.7 mi.), residential 15% (1.8 mi.), and unmanaged, wooded 4% (0.5 mi.).

SHORE: Mostly unused; some recreational use in front of residences.

NEARSHORE: The Potomac River is used by various vessels for shipping to Alexandria and Washington, D.C.

WIND AND SEA EXPOSURE: The shoreline trends NNW - SSE from Sandy Point to High Point, then SW - NE from High Point to the segment's end at Hallowing Point. The fetch at Sandy Point is SSW - 4.8 nautical miles; at High Point SW - 11.5 nautical miles; and at Hallowing Point WSW - 6.3 nautical miles.

OWNERSHIP: Private 19%, state 9%, and county 72%.

FLOOD HAZARD: Moderate. Flooding during the 100-year storm would reach 9.3 feet above MSL, but no structures would be affected by the waters.

WATER QUALITY: This section of the Potomac River generally has good water quality. Problems arise from rain runoff carrying pollutants and heavy suspended sediments into the water.

BEACH QUALITY: Fair. The beaches near High Point are usually of moderate width, being nourished by the nearby eroding bluffs. Fallen trees and other debris are strewn along much of the shoreline. Along the shoreline at Hallowing Point River Estates, the stabilization of large areas has reduced the amount of material eroding from the bluffs. This has caused the remaining beaches to be very narrow.

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data. VIMS field inspection of the area shows moderate erosion is occurring from Sandy Point to Sycamore Point. This area is susceptible to both rain runoff erosion and wave attacks.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: There are approximately 4,500 feet of bulkhead in this segment, most of which is located along the Hallowing Point River Estates shoreline. For the most part, there has been no attempt at a collective stabilization program; rather, individual landowners have bulkheaded their property. This ununified approach at shoreline stabilization often causes the loss of beaches in neighboring areas. Several areas south of Sandy Point have riprap along the shoreline. There are three effective groins south of the riprapped areas.

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

SHORE USE LIMITATIONS: Eighty-one percent of the shorelands are owned by the state and local governments and are public parks. Fifteen percent of the shorelands are residential areas. The remaining four percent are wooded.

ALTERNATE SHORE USE: Low. There is little available unused land in the segment. The presence of the Northern Virginia Regional Park alleviates the need for other recreational lands.

MAPS: USGS, 7.5 Min.Ser. (Topo.), FORT BELVOIR Quadr., 1965, pr. 1971;  
USGS, 7.5 Min.Ser. (Topo.), INDIAN HEAD Quadr., 1966.  
NOS# 12289 (560), 1:40,000 scale,  
POTOMAC RIVER, Mattawoman Creek to Georgetown, 31<sup>st</sup> ed., 1971.

PHOTOS: Aerial-VIMS 2Mar78 FX-2/15-54.

SUBSEGMENT 3A

FAIRFAX COUNTY

HALLOWING POINT TO HEAD OF POHICK CREEK

Maps 3 and 4

EXTENT: 46,000 feet (8.7 mi.) of shoreline along Gunston Cove and Pohick Bay. The subsegment includes 49,800 feet (9.3 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 28% (2.6 mi.), moderately low shore 31% (2.9 mi.), moderately high shore with bluff 15% (1.4 mi.), moderately high shore 5% (0.4 mi.), high shore 10% (1.0 mi.), and high shore with bluff 11% (1.0 mi.).

SHORE: Artificially stabilized 5% (0.5 mi.), beach 45% (3.9 mi.), fringe marsh 33% (2.9 mi.), and embayed marsh 16% (1.4 mi.).

NEARSHORE: Narrow 14% and intermediate 17%. The remainder of the nearshore zone is located along Gunston Cove and Pohick Creek, which are too narrow and shallow for classification.

SHORELANDS USE

FASTLAND: Agricultural 2% (0.2 mi.), preserved 12% (1.1 mi.), recreational 41% (3.8 mi.), residential 23% (2.2 mi.), and unmanaged, wooded 22% (2.0 mi.).

SHORE: Some recreational use along the public shorelands and in front of residences.

NEARSHORE: Mostly unused in Gunston Cove and Pohick Bay. The Potomac River is used for commercial shipping to Alexandria and Washington, D.C.

WIND AND SEA EXPOSURE: The shoreline trends basically SE - NW in the subsegment. The fetch at the southern bank of the mouth of Gunston Cove is NW - 8 nautical miles.

OWNERSHIP: Private 60% and county 40%.

FLOOD HAZARD: Moderate. The 100-year storm would flood areas to approximately 9.5 feet above MSL. Several structures along Pohick Bay could be damaged during the flood.

WATER QUALITY: This section generally has good water quality.

BEACH QUALITY: Fair. Hallowing Point has a beach of moderate width but it is littered with debris. Beaches along other sections of the subsegment are usually narrow. As in other sections of the county, the beaches depend upon the erosion of bluff areas for nourishment. Stabilization of some areas of shoreline has diminished the sand supply of the beaches.

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data. Field investigations indicate that erosion is continuing from Hallowing Point to inside the mouth of Gunston Cove. Most erosion here is due to downhill rain runoff rather than to waves impinging upon the shore.

ENDANGERED STRUCTURES: One house at the mouth of Gunston Cove is endangered by continued erosion.

SHORE PROTECTIVE STRUCTURES: There are 2,500 feet of artificially stabilized shoreline in the subsegment, most of which is bulkhead and the remainder riprap. There is one small groin field north of Hallowing Point.

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

SHORE USE LIMITATIONS: The local governments own forty percent of the shoreline (part of the Northern Virginia Regional Park). Gunston Hall, owned by a public trust, is an historic site and is open to visitors. These sites, which account for over fifty percent of the shoreline, are not available for private development. Most of the privately owned lands are susceptible to erosion.

ALTERNATE SHORE USE: Low. There seems to be little need for alternate shorelands use in the subsegment, given the presence of both a regional park and an historic site. The privately held section of the area will probably continue to be developed for residential purposes.

MAPS: USGS, 7.5 Min.Ser. (Topo.), FORT BELVOIR Quadr., 1965, pr. 1971.  
NOS# 12289 (560), 1:40,000 scale,  
POTOMAC RIVER, Mattawoman Creek to Georgetown, 31st ed., 1971.

PHOTOS: Aerial-VIMS 2Mar78 FX-3A/55-89.

SUBSEGMENT 3B

FAIRFAX COUNTY

HEAD OF POHICK CREEK TO WHITESTONE POINT

Map 4

EXTENT: 70,200 feet (13.3 mi.) of shoreline along Pohick Bay, Accotink Bay and Gunston Cove. The subsegment includes 69,500 feet (13.2 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Low shore 72% (9.5 mi.), moderately low shore 18% (2.4 mi.), moderately high shore 7% (0.9 mi.), and high shore 3% (0.3 mi.).

SHORE: Artificially stabilized 4% (0.5 mi.), beach 10% (1.4 mi.), fringe marsh 73% (9.8 mi.), and embayed marsh 13% (1.7 mi.).

NEARSHORE: This subsegment is located along Pohick Creek and Accotink Bay, which are too narrow and shallow for classification.

SHORELANDS USE

FASTLAND: Entirely governmental.

SHORE: Mostly unused except for the area from Accotink Bay to Whitestone Point. This section is used for access to boats by the military.

NEARSHORE: Pleasure boating and fishing and use by military vessels.

WIND AND SEA EXPOSURE: The shoreline trends basically WNW - ESE in the subsegment; Accotink Bay trends N - S. The fetch at Whitestone Point is SSE - 3.0 nautical miles.

OWNERSHIP: Federal.

FLOOD HAZARD: Moderate. The 100-year flood would affect areas to approximately 9.5 feet above MSL. Several structures in Fort Belvoir, located on the east bank of the mouth of Accotink Bay, could be damaged by the flood.

WATER QUALITY: Good. Fecal coliform bacteria counts are generally low, allowing water contact recreation.

BEACH QUALITY: Fair. The beaches are located from Accotink Bay to Whitestone Point. They are generally narrow with some debris littering the shoreline.

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data. Recent field investigations indicate that there is no significant erosion in the subsegment.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: There are approximately 2,500 feet of bulkhead and riprap in the subsegment. These structures appear to be more for cosmetic or convenience purposes rather than for shore protection.

OTHER SHORE STRUCTURES: There are numerous docks and several boat ramps at the mouth of Gunston Cove.

SHORE USE LIMITATIONS: The federal ownership of the subsegment limits other alternate uses.

ALTERNATE SHORE USE: Low. No private development can occur along the shoreline unless the federal government relinquishes control over part of its holdings.

MAPS: USGS, 7.5 Min.Ser. (Topo.), FORT BELVOIR  
Quadr., 1965, pr. 1971.  
NOS# 12289 (560), 1:40,000 scale,  
POTOMAC RIVER, Mattawoman Creek to  
Georgetown, 31st ed., 1971.

PHOTOS: Aerial-VIMS 2Mar78 FX-3B/90-96.



SUBSEGMENT 4A

FAIRFAX COUNTY

WHITESTONE POINT TO FERRY POINT

Map 5

EXTENT: 42,800 feet (8.1 mi.) of shoreline along the Potomac River, including Dogue Creek. The subsegment has a fastland measurement of 42,700 feet (8.1 mi.).

SHORELANDS TYPE

FASTLAND: Low shore 52% (4.2 mi.), moderately low shore 26% (2.1 mi.), moderately high shore 4% (0.3 mi.), moderately high shore with bluff 1% (0.1 mi.), high shore 3% (0.3 mi.), and high shore with bluff 14% (1.1 mi.).

SHORE: Artificially stabilized 18% (1.4 mi.), beach 35% (2.8 mi.), fringe marsh 31% (2.5 mi.), and embayed marsh 16% (1.3 mi.).

NEARSHORE: Narrow 20%. The nearshore zone located along Dogue Creek is too narrow and shallow for classification.

SHORELANDS USE

FASTLAND: Governmental 72% (5.9 mi.), recreational 3% (0.3 mi.), residential 19% (1.5 mi.), unmanaged, unwooded 3% (0.3 mi.), and unmanaged, wooded 2% (0.2 mi.).

SHORE: Little used along the section owned by the government; some recreational use along the north bank of Dogue Creek, especially at the Mount Vernon Yacht Club.

NEARSHORE: Commercial traffic along the Potomac River; pleasure boating and fishing in Dogue Creek and on the Potomac River.

WIND AND SEA EXPOSURE: The shoreline trends basically SW - NE along the Potomac River. Dogue Creek trends SE - NW from mouth to head. The fetch at Ferry Point is SW - 3.0 nautical miles, and at the south bank of the mouth of Dogue Creek ENE - 4.1 nautical miles.

OWNERSHIP: Private 27% and federal 73%.

FLOOD HAZARD: Moderate. The 100-year storm would affect areas to 9.5 feet above MSL, endangering many structures at the Mount Vernon Yacht Club.

WATER QUALITY: The subsegment generally has good water quality.

BEACH QUALITY: Fair. The beaches from Whitestone Point to the mouth of Dogue Creek are generally of moderate width, though they are often littered with fallen trees and other debris.

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data. Recent field investigations by VIMS show that the bluffs near Whitestone Point have been eroding due to downhill rain runoff and wave actions at the base of the cliffs. Elsewhere in the subsegment, no significant erosion was noticed.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: There are approximately 7,600 feet of artificially stabilized shoreline in the subsegment, sixty percent of which is bulkhead and the rest riprap. All structures appear to be effective.

OTHER SHORE STRUCTURES: There are numerous piers and docks in the privately owned section of the subsegment, most of which are located from the Mount Vernon Yacht Club to Ferry Point.

SHORE USE LIMITATIONS: Seventy-three percent of the shorelands are controlled by the Federal government and no other use is possible. Residential use accounts for nineteen percent of the total, and recreational use makes up three percent. The remaining five percent of the shorelands are located near the residential sections of Dogue Creek.

ALTERNATE SHORE USE: Moderate. The unused lands which are now either wooded or open will probably be developed for residential purposes. Though some further development is possible in residential areas, little change in the present use statistics is foreseen.

MAPS: USGS, 7.5 Min.Ser. (Topo.), FORT BELVOIR Quadr., 1965, pr. 1971;  
USGS, 7.5 Min.Ser. (Topo.), MOUNT VERNON Quadr., 1966, pr. 1971.  
NOS# 12289 (560), 1:40,000 scale, POTOMAC RIVER, Mattawoman Creek to Georgetown, 31st ed., 1971.

PHOTOS: Aerial-VIMS 2Mar78 FX-4A/97-107.

SUBSEGMENT 4B

FAIRFAX COUNTY

FERRY POINT TO SHERIDAN POINT

Maps 5 and 6

EXTENT: 53,700 feet (10.2 mi.) of shoreline along the Potomac River, including Little Hunting Creek. The subsegment has a fastland measurement of 53,000 feet (10.0 mi.).

SHORELANDS TYPE

FASTLAND: Low shore 37% (3.7 mi.), moderately low shore 48% (4.8 mi.), moderately low shore with bluff 2% (0.2 mi.), high shore 8% (0.8 mi.), and high shore with bluff 5% (0.5 mi.).  
SHORE: Artificially stabilized 17% (1.7 mi.), beach 15% (1.5 mi.), fringe marsh 35% (3.6 mi.), and embayed marsh 33% (3.3 mi.).

NEARSHORE: Narrow 6% and intermediate 21%. The nearshore zone located along Little Hunting Creek is too narrow and shallow for classification.

SHORELANDS USE

FASTLAND: Industrial 2% (0.2 mi.), preserved 14% (1.4 mi.), recreational 21% (2.1 mi.), residential 59% (5.9 mi.), unmanaged, unwooded 3% (0.3 mi.), and unmanaged, wooded 2% (0.2 mi.).

SHORE: Some recreational use along Little Hunting Creek, but mostly unused.

NEARSHORE: Commercial shipping on the Potomac River. Little Hunting Creek is too narrow and shallow for navigation.

WIND AND SEA EXPOSURE: The shoreline trends basically WNW - ESE. Little Hunting Creek trends NNW - SSE from head to mouth. The fetch at Sheridan Point is WSW - 3.8 nautical miles.

OWNERSHIP: Private 77%, federal 21%, and county 2%.

FLOOD HAZARD: Moderate. The 100-year flood would affect areas to 9.5 feet above MSL. Several structures could be damaged during the flood.

WATER QUALITY: The area generally has good water quality.

BEACH QUALITY: Fair. Like other sections along Fairfax County's Potomac River shoreline, this area has beaches of moderate width, though they often are littered with fallen trees or other debris.

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data. Recent VIMS field investigations show that the bluffs 1,500 feet north of Ferry Point are eroding at a moderate rate. Elsewhere in the subsegment, much of the shoreline on the Potomac River has been artificially stabilized.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: There are approximately 9,200 feet of artificially stabilized shoreline in the subsegment, several sections of which are bulkhead and the rest is riprap. All appear to be effective.

OTHER SHORE STRUCTURES: There is a pier and landing at Mount Vernon.

SHORE USE LIMITATIONS: Twenty-one percent of the shorelands are federally owned lands fronting the George Washington Memorial Parkway. Approximately twenty-five percent of the shorelands are part of the historic Mount Vernon estate owned by a public trust. The marshes and wooded lands along Little Hunting Creek are designated to remain as open space areas by the County of Fairfax.

ALTERNATE SHORE USE: Low. The lands which are privately held, excepting Mount Vernon, are already mostly developed for residential purposes. No other alternate use is foreseen for these lands.

MAPS: USGS, 7.5 Min.Ser. (Topo.), MOUNT VERNON  
Quadr., 1966, pr. 1971.  
NOS# 12289 (560), 1:40,000 scale,  
POTOMAC RIVER, Mattawoman Creek to  
Georgetown, 31st ed., 1971.

PHOTOS: Aerial-VIMS 2Mar78 FX-4B/108-120.

SEGMENT 5

FAIRFAX COUNTY

SHERIDAN POINT TO HEAD OF HUNTING CREEK

Maps 6 and 7

EXTENT: 71,500 feet (13.6 mi.) of shoreline along the Potomac River and Hunting Creek. The segment includes 48,500 feet (9.2 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Artificial fill 18% (1.7 mi.), low shore 39% (3.6 mi.), moderately low shore 20% (1.9 mi.), moderately high shore 20% (1.8 mi.), and high shore 3% (0.2 mi.).

SHORE: Artificially stabilized 11% (1.5 mi.), beach 19% (2.6 mi.), fringe marsh 23% (3.2 mi.), and extensive marsh 46% (6.3 mi.).

NEARSHORE: Narrow 6% and intermediate 49%. The remainder of the nearshore zone is located along Hunting Creek and several marsh creeks, which are too narrow and shallow for classification.

SHORELANDS USE

FASTLAND: Commercial 2% (0.2 mi.), preserved 3% (0.2 mi.), recreational 58% (5.4 mi.), residential 31% (2.9 mi.), unmanaged, unwooded 2% (0.2 mi.), and unmanaged, wooded 3% (0.3 mi.).

SHORE: Recreational use, especially at the marina south of Hunting Creek.

NEARSHORE: Pleasure boating and commercial traffic along the Potomac River.

WIND AND SEA EXPOSURE: The shoreline trends basically S - N in the segment. Hunting Creek trends WNW - ESE from head to mouth. No significant fetches affect this shoreline.

OWNERSHIP: Private 43% and federal 57%.

FLOOD HAZARD: Moderate to high. The 100-year storm would flood areas to 9.8 feet above MSL at the mouth of Hunting Creek. The flood would inundate the entire Belle View development and most of New Alexandria, damaging and possibly destroying many structures in the developments.

WATER QUALITY: Poor to fair. This section of the Potomac River usually has high fecal coliform

counts in excess of the 200 MPN/100 ml contact recreation standard.

BEACH QUALITY: Fair. This segment has beaches of moderate width from Sheridan Point to Hog Island.

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data. VIMS field investigations showed no significant erosion along this section of the Potomac River.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: There are approximately 8,100 feet of artificially stabilized shoreline in the segment, sixty percent of which is riprap and the remainder bulkhead. All structures appear to be effective.

OTHER SHORE STRUCTURES: There are several piers and docks at the marina.

SHORE USE LIMITATIONS: Fifty-seven percent of the shorelands are federally owned. Only two areas of private ownership are located along the Potomac River. The rest of the privately owned lands are located along Hunting Creek. Only five percent of the segment is not actively used.

ALTERNATE SHORE USE: Low. Most of the segment is either preserved or consumed. There are few privately owned and unused lands.

MAPS: USGS, 7.5 Min.Ser. (Topo.), MOUNT VERNON Quadr., 1966, pr. 1971;  
USGS, 7.5 Min.Ser. (Topo.), ALEXANDRIA Quadr., 1965, pr. 1971.  
NOS# 12289 (560), 1:40,000 scale,  
POTOMAC RIVER, Mattawoman Creek to Georgetown, 31<sup>st</sup> ed., 1971.

PHOTOS: Aerial-VIMS 2Mar78 FX-5/121-147.

SEGMENT 6

CITY OF ALEXANDRIA

HEAD OF HUNTING CREEK TO FOURMILE RUN

Map 7

EXTENT: 51,600 feet (9.8 mi.) of shoreline along the Potomac River and Hunting Creek. The segment includes 51,600 feet (9.8 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Artificial fill 13% (1.3 mi.), low shore 72% (7.1 mi.), and moderately low shore 14% (1.4 mi.).

SHORE: Artificially stabilized 41% (4.0 mi.), beach 13% (1.3 mi.), fringe marsh 45% (4.4 mi.), and embayed marsh 1% (0.1 mi.).

NEARSHORE: Narrow 48% and intermediate 8%. The remainder of the nearshore zone is too narrow and shallow for classification.

SHORELANDS USE

FASTLAND: Commercial 4% (0.4 mi.), governmental 8% (0.8 mi.), industrial 43% (4.2 mi.), recreational 33% (3.2 mi.), residential 6% (0.6 mi.), and unmanaged, unwooded 6% (0.5 mi.).

SHORE: Recreational use along several areas of Alexandria's waterfront; also some commercial use.

NEARSHORE: Commercial shipping, pleasure boating and tour boat traffic.

WIND AND SEA EXPOSURE: The shoreline trends basically S - N in the segment. The fetch at Jones Point is S - 4.6 nautical miles.

OWNERSHIP: Private 22%, federal 70%, and city 7%. The ownership of much of Alexandria's waterfront is disputed between the city and the federal government.

FLOOD HAZARD: High. According to the City of Alexandria's "Flood Plain Map, 1977" (Ordinance No. 2182), the 100-year flood would range from 12 feet above MSL at Hunting Creek to 15 feet above MSL at Fourmile Run. According to this data, the entire waterfront area would be inundated, flooding numerous structures up to two blocks inland. Many structures could be damaged or destroyed during the flood.

WATER QUALITY: Poor to fair. The Potomac River in this section usually has high fecal coliform counts in excess of the 200 MPN/100 ml contact recreation standard. The waters have experienced low dissolved oxygen levels in past summers.

BEACH QUALITY: Poor. There are generally only thin strip beaches along the shoreline in this segment.

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data. VIMS field investigation showed little or no erosion in the segment.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: There are approximately 21,000 feet of artificially stabilized shoreline in the segment, most of which is bulkhead. Though all structures appear to be effective, some are old and will probably have to be strengthened or replaced in the next ten years.

OTHER SHORE STRUCTURES: There are numerous piers and docks along the Alexandria waterfront.

SHORE USE LIMITATIONS: The historic waterfront of Alexandria, long a local shipping and commercial center, in recent years has been the center of the city's renewal efforts. The major factor limiting the implementation of any plans is the disputed ownership of much of the shoreline. At the present time, the City of Alexandria and the Federal government both claim ownership of these lands. Until undisputed ownership is determined, no renewal of the area can be begun. According to city plans, the shoreline is to be used for recreational purposes, with the historical commercial shipping industry to be continued. All industry not in keeping with this plan will be discouraged from locating in the area, with existing incompatible industries being encouraged to relocate elsewhere.

ALTERNATE SHORE USE: The future use of Alexandria's shoreline is contingent upon the outcome of the current ownership dispute. At present, two major alternatives exist: 1) Give undisputed ownership to the federal government and encourage them to preserve the area as a park or 2) give ownership to the City of Alexandria and allow them to develop a series of open space parks and redevelop existing structures for commercial/recreational use.

MAPS: USGS, 7.5 Min.Ser. (Topo.), ALEXANDRIA Quadr., 1965, pr. 1971.  
NOS# 12289 (560), 1:40,000 scale,  
POTOMAC RIVER, Mattawoman Creek to  
Georgetown, 31st ed., 1971.

PHOTOS: Aerial-VIMS 2Mar78 AL-6/148-163.

SEGMENT 7

ARLINGTON COUNTY

FOURMILE RUN TO LITTLE FALLS

Maps 7, 8, and 9

EXTENT: 58,500 feet (11.1 mi.) of shoreline along the Potomac River. The segment includes 58,500 feet (11.1 mi.) of fastland.

SHORELANDS TYPE

FASTLAND: Artificial fill 2% (0.2 mi.), low shore 44% (4.8 mi.), moderately low shore 18% (2.0 mi.), moderately high shore 3% (0.4 mi.), high shore 4% (0.4 mi.), and high shore with bluff 29% (3.2 mi.).

SHORE: Artificially stabilized 27% (3.0 mi.), beach 19% (2.1 mi.), and fringe marsh 54% (5.9 mi.).

NEARSHORE: Narrow 66% and intermediate 15%. The remainder of the nearshore zone is too narrow and shallow for classification.

SHORELANDS USE

FASTLAND: Governmental 8% (0.8 mi.), industrial 33% (3.6 mi.), recreational 55% (6.1 mi.), and residential 4% (0.4 mi.).

SHORE: Some recreational use along the George Washington Memorial Parkway.

NEARSHORE: Commercial shipping in the southern section of the segment; pleasure boating along the entire nearshore area.

WIND AND SEA EXPOSURE: The shoreline trends first SE - NW, then ESE - WNW. No significant fetches affect this section of the Potomac River shoreline.

OWNERSHIP: Private 8%, federal 72%, and state 20%.

FLOOD HAZARD: Low to high. The upper section of the segment has elevations greater than 100 feet near the shoreline and is not susceptible to flooding. Some areas south of the Key Bridge are prone to flooding, including much of Washington National Airport. However, most of the flood plains are owned by the federal government and are not developed. The 100-year storm would flood areas to 21 feet above MSL near the mouth of Fourmile Run. Many houses and other struc-

tures could be damaged or destroyed during the flood.

WATER QUALITY: Poor. This section of the Potomac River usually has high fecal coliform counts in excess of the 200 MPN/100 ml contact recreation standard. Also, the river has experienced low dissolved oxygen levels in past summers.

PRESENT SHORE EROSION SITUATION

EROSION RATE: No data. VIMS field investigation showed little or no erosion in this area.

ENDANGERED STRUCTURES: None.

SHORE PROTECTIVE STRUCTURES: There are approximately 15,900 feet of artificially stabilized shoreline in the segment, most of which is riprap. All structures appear to be effective.

OTHER SHORE STRUCTURES: There are several boat ramps and piers in this section.

SHORE USE LIMITATIONS: The entire shoreline is actively used for a variety of purposes. Much of the area is federally owned park land adjacent to the George Washington Memorial Parkway.

ALTERNATE SHORE USE: Low. As all shorelands are currently being used, the only change in the use of the shorelands would be via redevelopment of existing areas.

MAPS: USGS, 7.5 Min.Ser. (Topo.), ALEXANDRIA Quadr., 1965, pr. 1971;  
USGS, 7.5 Min.Ser. (Topo.), WASHINGTON WEST D.C. Quadr., 1965, pr. 1971.  
NOS# 12289 (560), 1:40,000 scale,  
POTOMAC RIVER, Mattawoman Creek to Georgetown, 31st ed., 1971.



PHOTOS: Aerial-VIMS 2Mar78 AR-7/164-176;  
186-190.

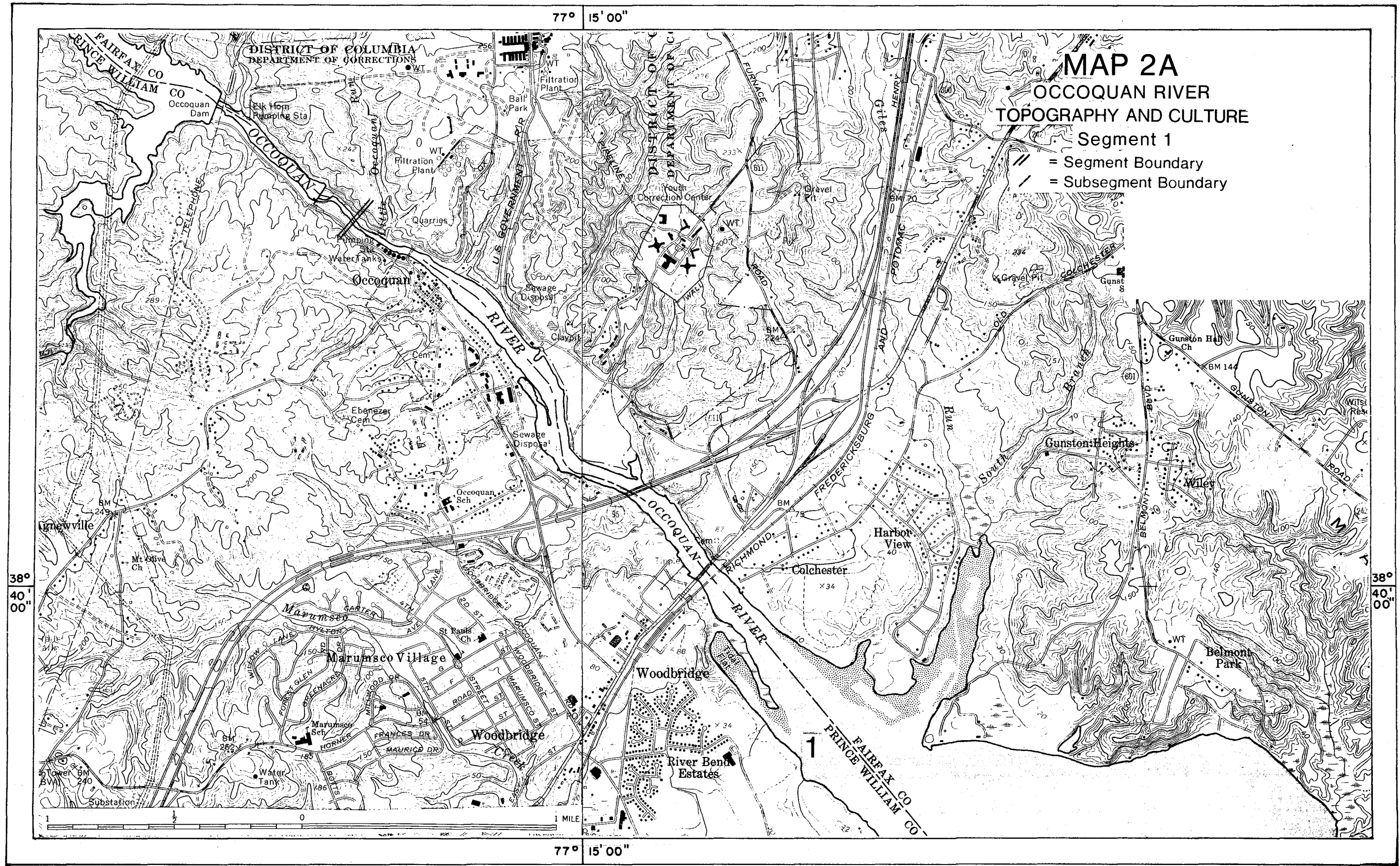
77° 15' 00"

# MAP 2A

## OCOQUAN RIVER TOPOGRAPHY AND CULTURE

Segment 1

-  = Segment Boundary
-  = Subsegment Boundary



77° 15' 00"

38° 40' 00"

38° 40' 00"






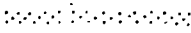





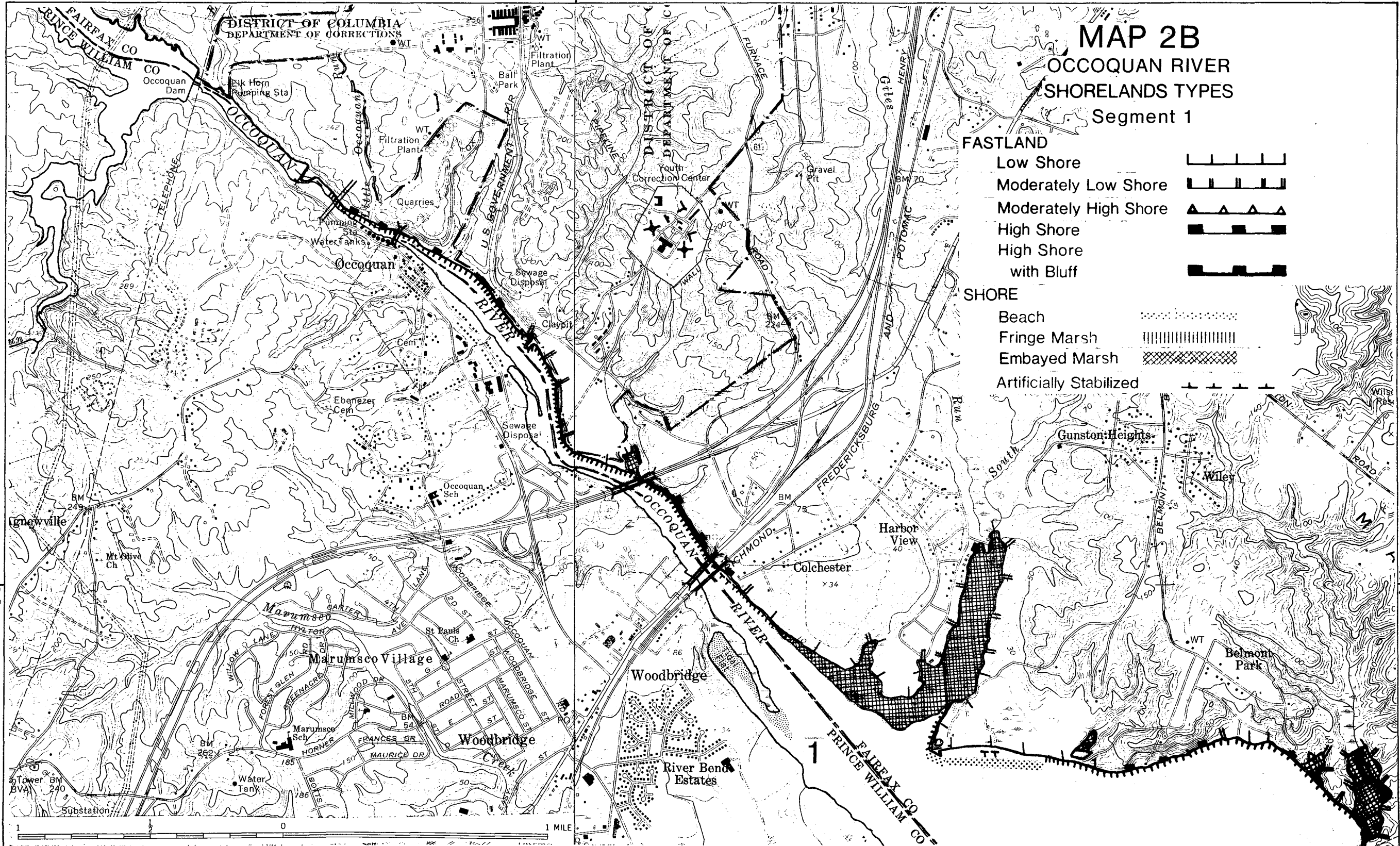
77° 15' 00"

# MAP 2B

## OCCOQUAN RIVER SHORELANDS TYPES

### Segment 1

- FASTLAND**
- Low Shore 
  - Moderately Low Shore 
  - Moderately High Shore 
  - High Shore 
  - High Shore with Bluff 
- SHORE**
- Beach 
  - Fringe Marsh 
  - Embayed Marsh 
  - Artificially Stabilized 



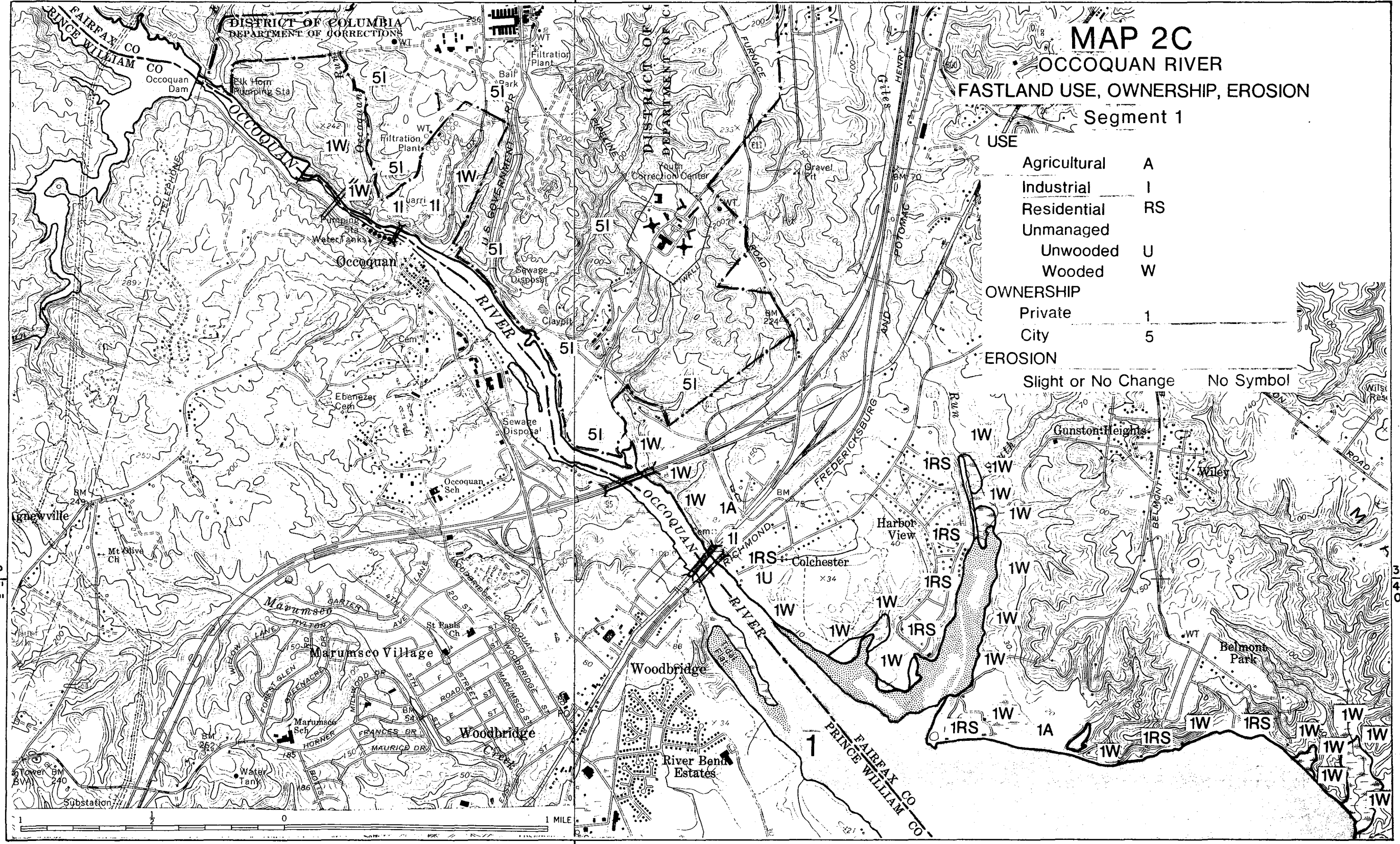
77° 15' 00"

77° 15' 00"

# MAP 2C

## OCOQUAN RIVER FASTLAND USE, OWNERSHIP, EROSION Segment 1

USE	
Agricultural	A
Industrial	I
Residential	RS
Unmanaged	
Unwooded	U
Wooded	W
OWNERSHIP	
Private	1
City	5
EROSION	
Slight or No Change	No Symbol

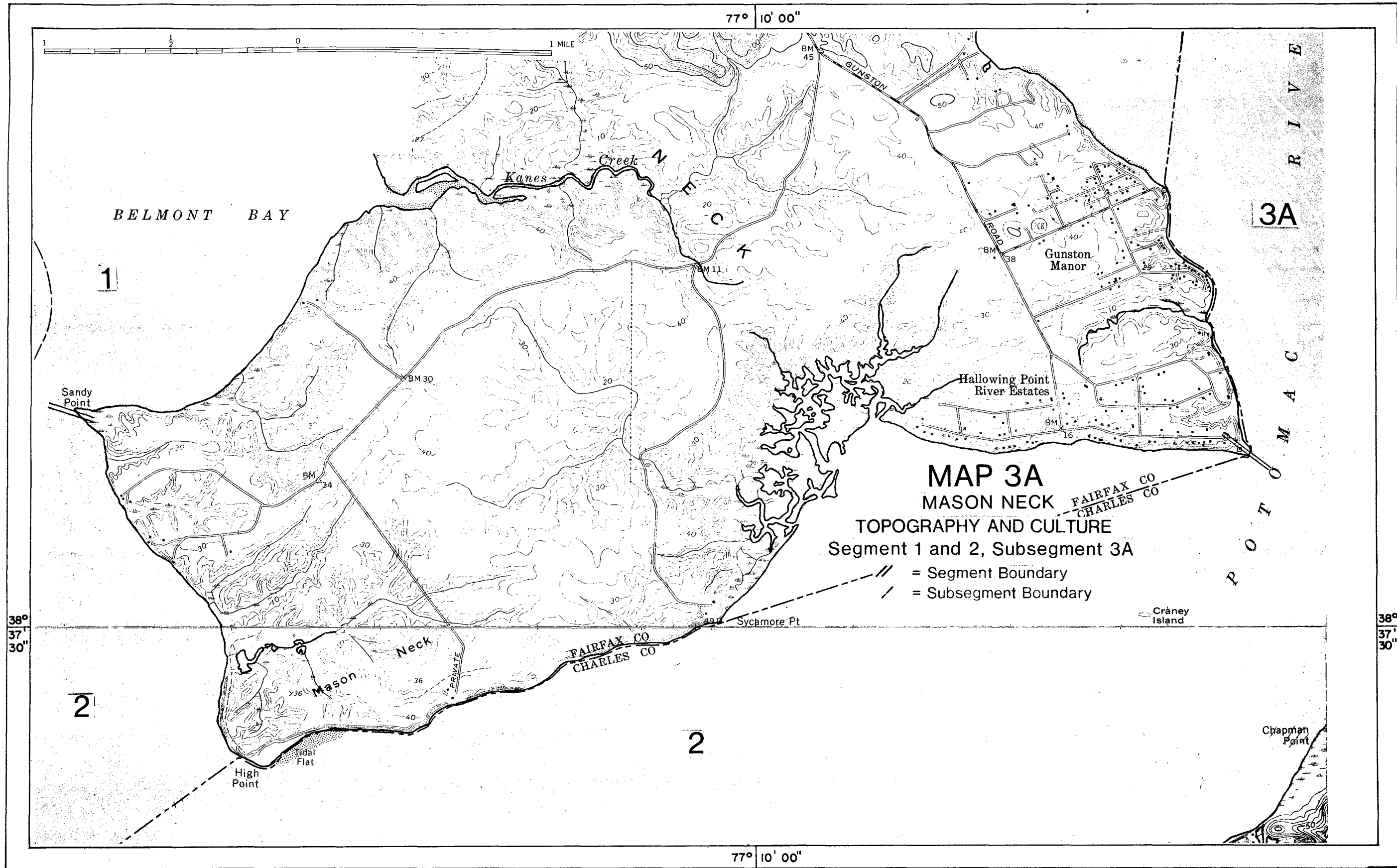


38° 40' 00"

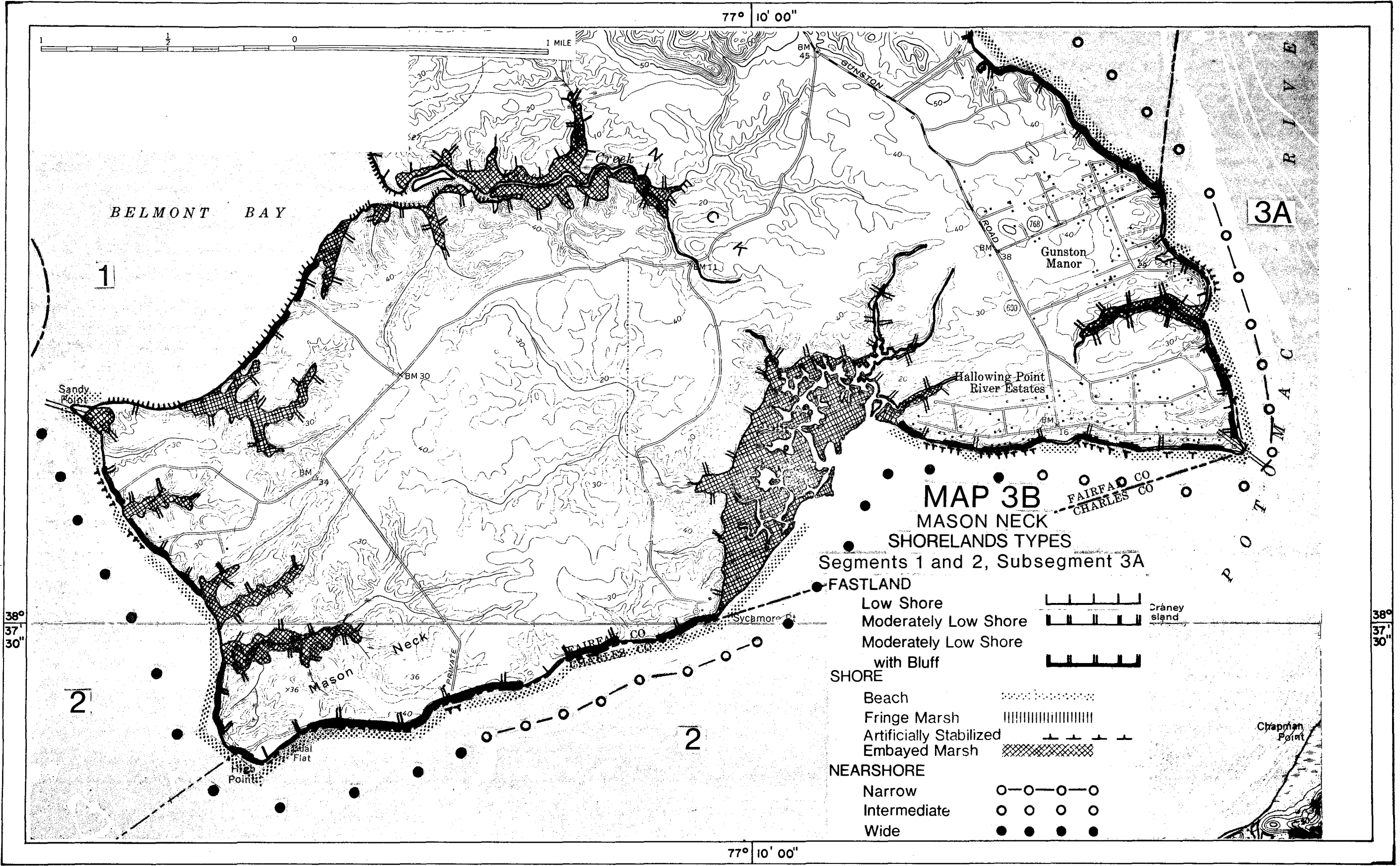
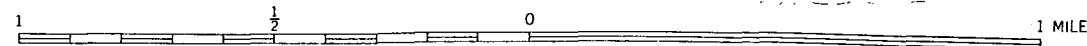
38° 40' 00"

77° 15' 00"





77° 10' 00"



BELMONT BAY

1

3A

POTOMAC RIVER

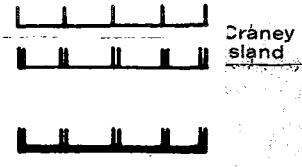
### MAP 3B

#### MASON NECK SHORELANDS TYPES

Segments 1 and 2, Subsegment 3A

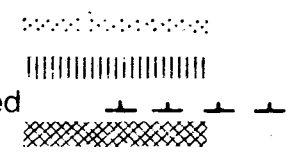
#### FASTLAND

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



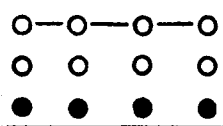
#### SHORE

- Beach
- Fringe Marsh
- Artificially Stabilized
- Embayed Marsh



#### NEARSHORE

- Narrow
- Intermediate
- Wide



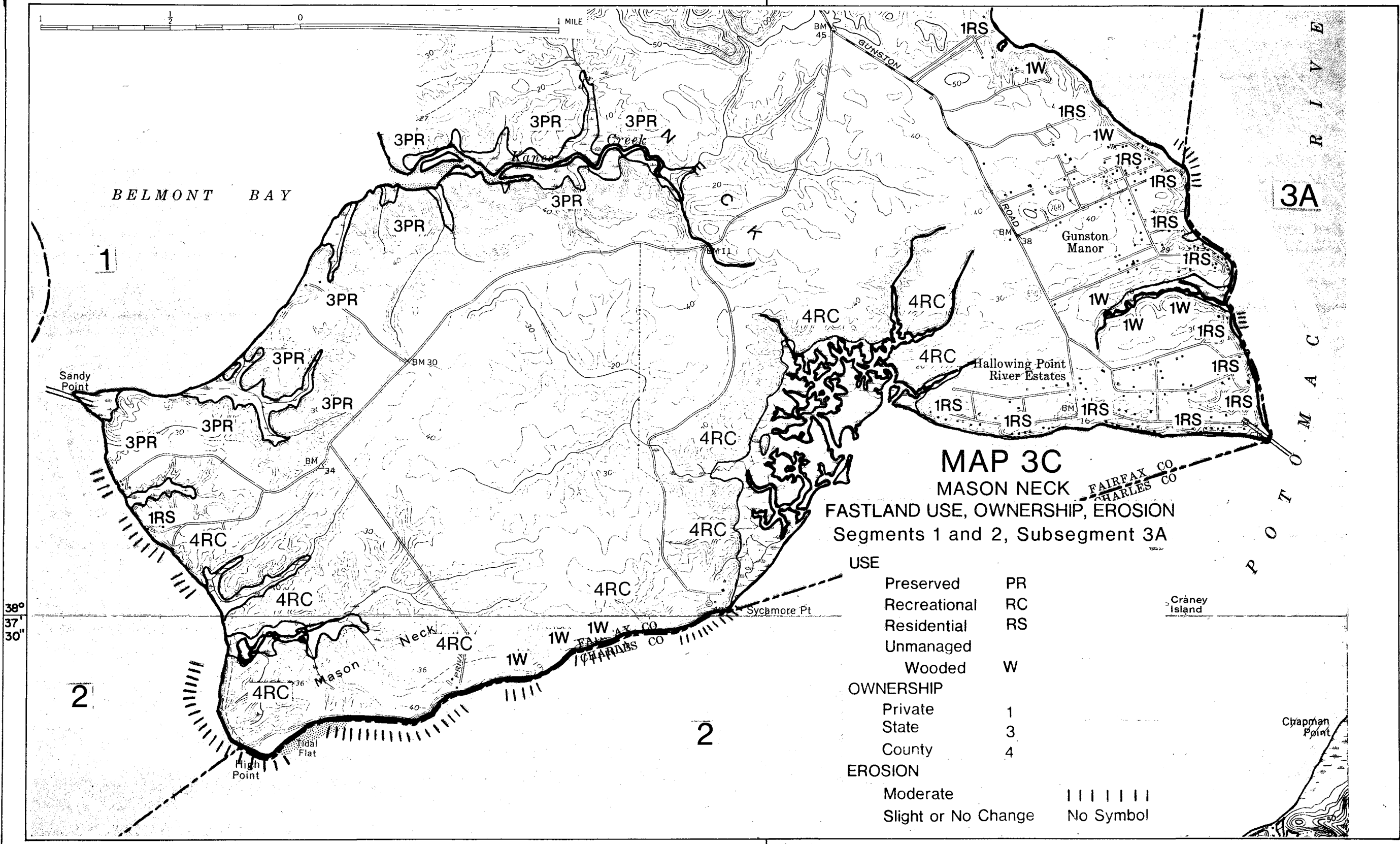
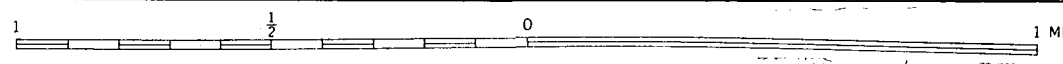
38° 37' 30"

2

38° 37' 30"

77° 10' 00"

77° 10' 00"



### MAP 3C

MASON NECK  
FASTLAND USE, OWNERSHIP, EROSION  
Segments 1 and 2, Subsegment 3A

USE	
Preserved	PR
Recreational	RC
Residential	RS
Unmanaged	
Wooded	W
OWNERSHIP	
Private	1
State	3
County	4
EROSION	
Moderate	
Slight or No Change	No Symbol

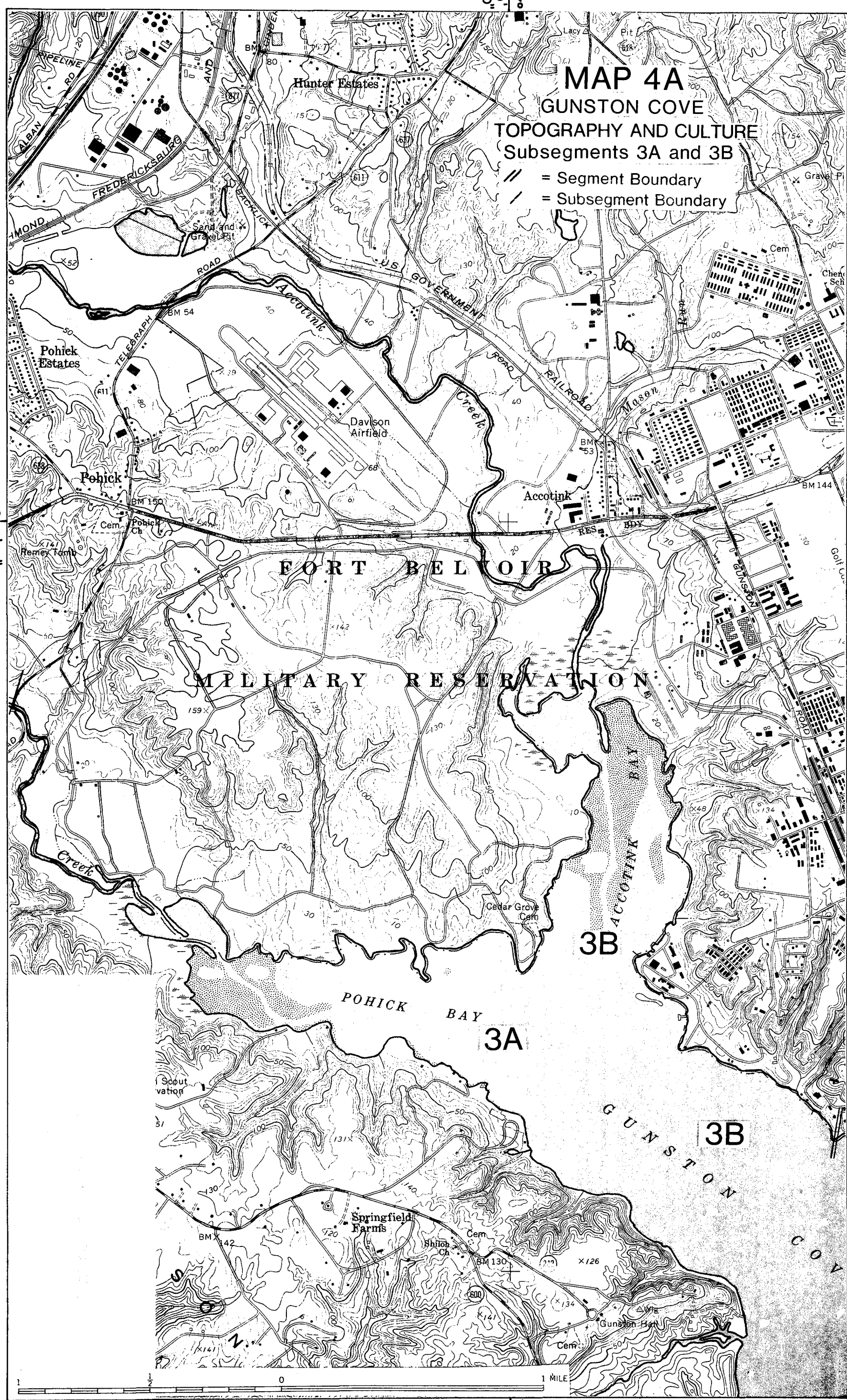
38°  
37'  
30"

38°  
37'  
30"

77° 10' 00"

**MAP 4A**  
**GUNSTON COVE**  
**TOPOGRAPHY AND CULTURE**  
 Subsegments 3A and 3B

// = Segment Boundary  
 / = Subsegment Boundary

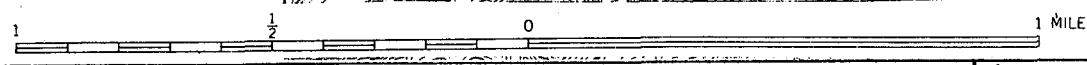


38° 42' 30"

38° 42' 30"

77° 10' 00"

77° 10' 00"



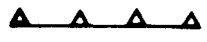






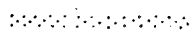


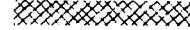
# MAP 4B

## GUNSTON COVE SHORELANDS TYPES Subsegments 3A and 3B

### FASTLAND

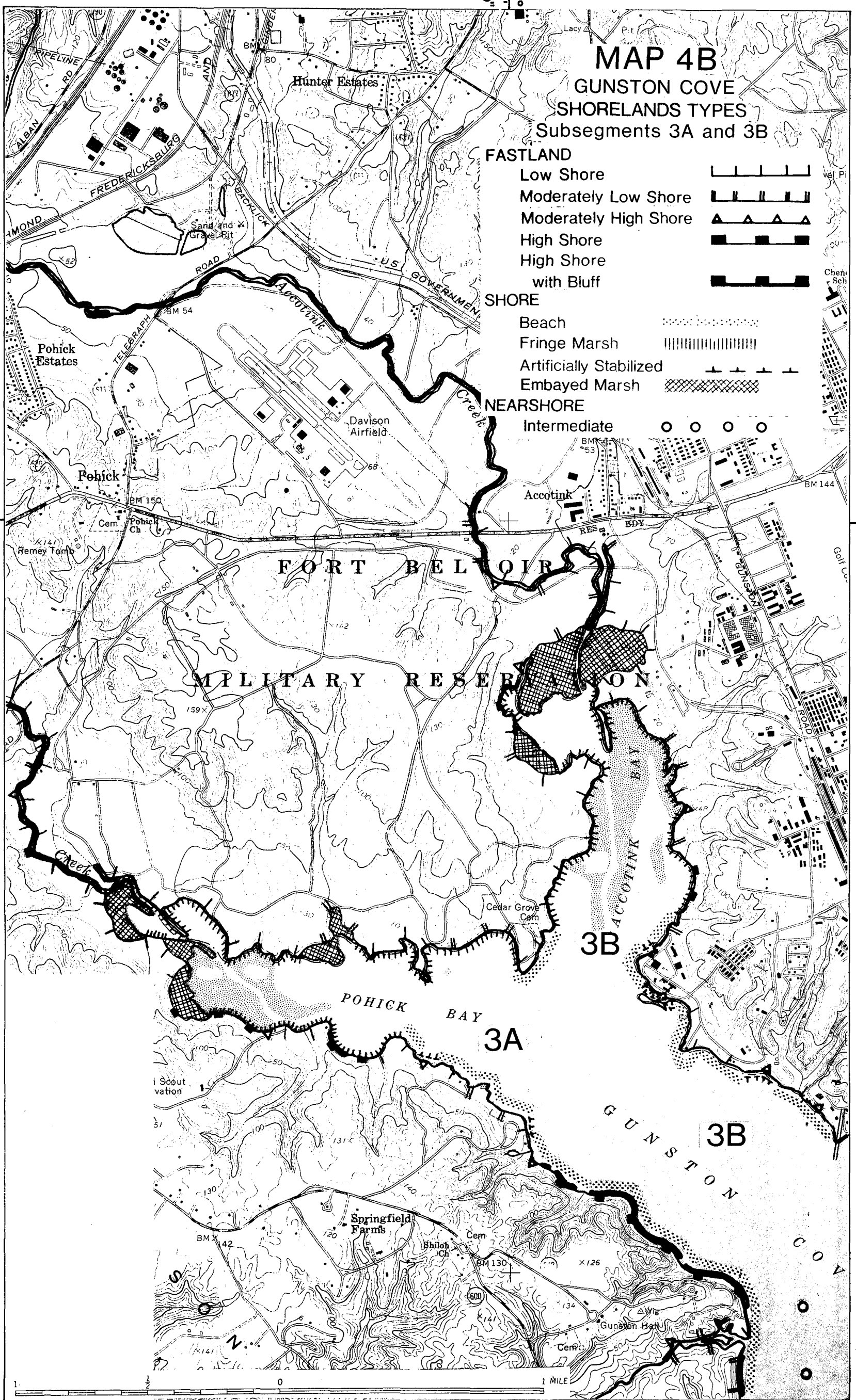
- Low Shore 
- Moderately Low Shore 
- Moderately High Shore 
- High Shore 
- High Shore with Bluff 

### SHORE

- Beach 
- Fringe Marsh 
- Artificially Stabilized 
- Embayed Marsh 

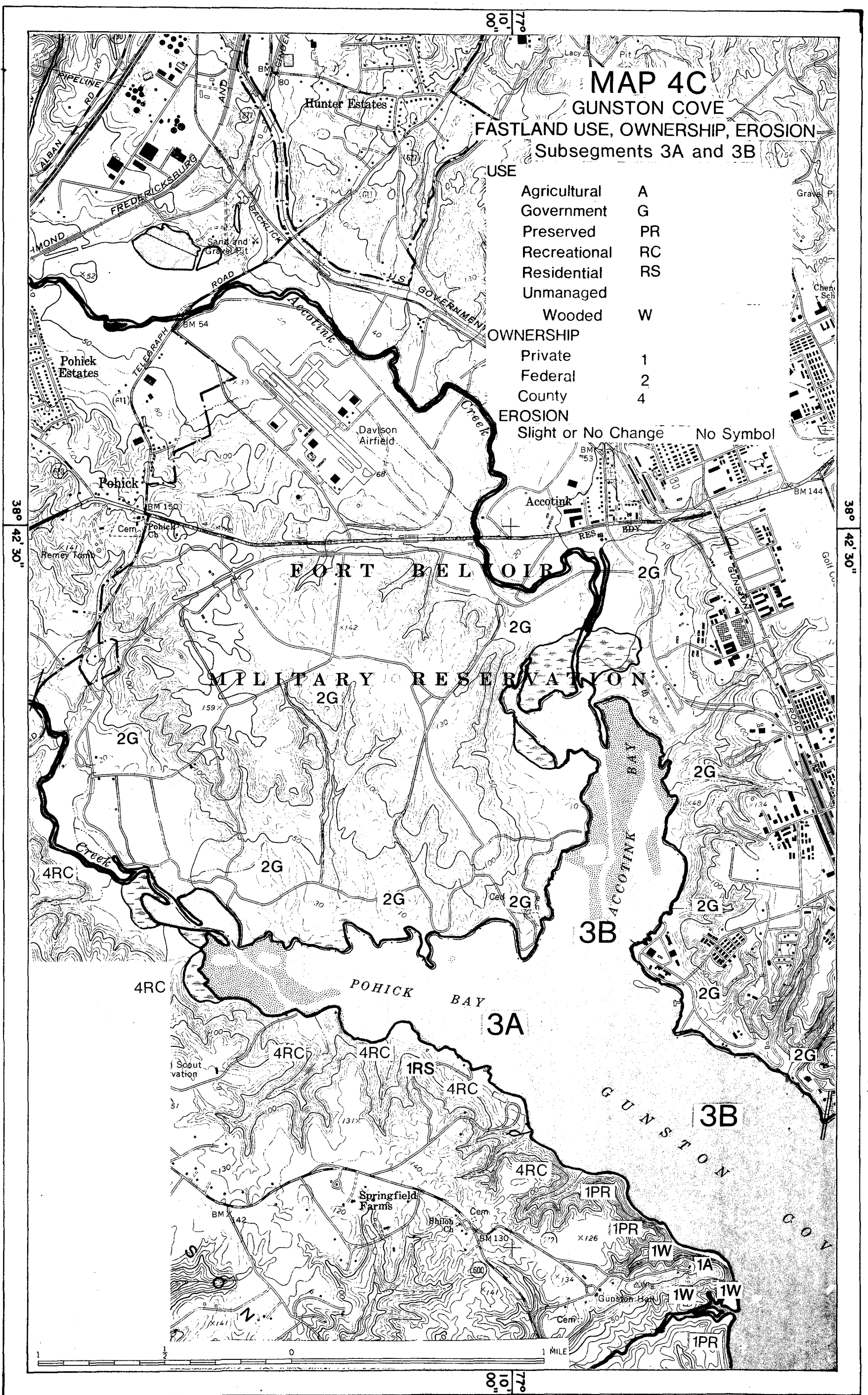
### NEARSHORE

- Intermediate 

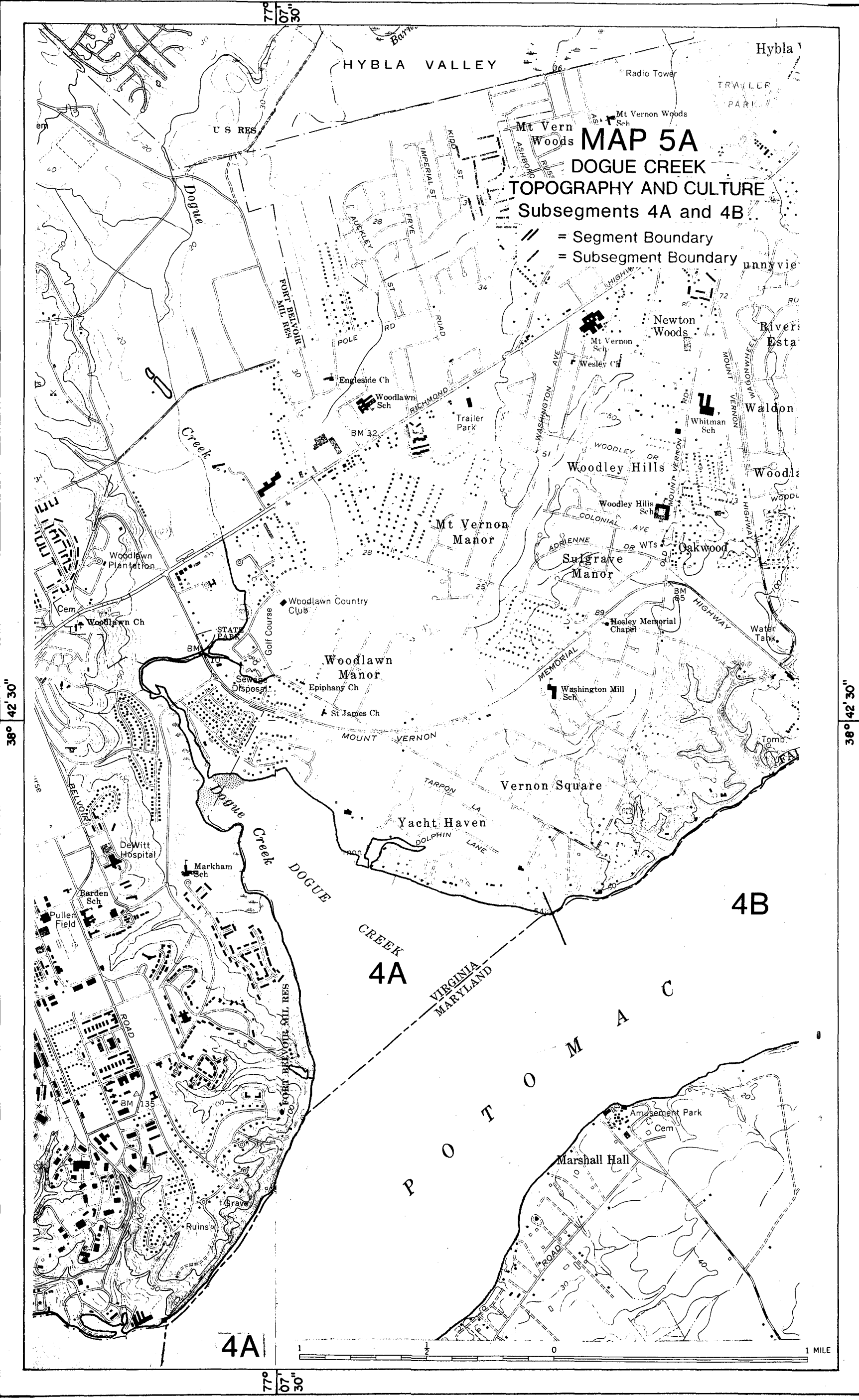


**MAP 4C**  
**GUNSTON COVE**  
**FASTLAND USE, OWNERSHIP, EROSION**  
 Subsegments 3A and 3B

<b>USE</b>	
Agricultural	A
Government	G
Preserved	PR
Recreational	RC
Residential	RS
Unmanaged	
Wooded	W
<b>OWNERSHIP</b>	
Private	1
Federal	2
County	4
<b>EROSION</b>	
Slight or No Change	No Symbol



77° 07' 30"



HYBLA VALLEY

**MAP 5A**  
**DOGUE CREEK**  
**TOPOGRAPHY AND CULTURE**  
**Subsegments 4A and 4B**

== Segment Boundary  
 == Subsegment Boundary

38° 42' 30"

38° 42' 30"

4A

4B

VIRGINIA  
MARYLAND

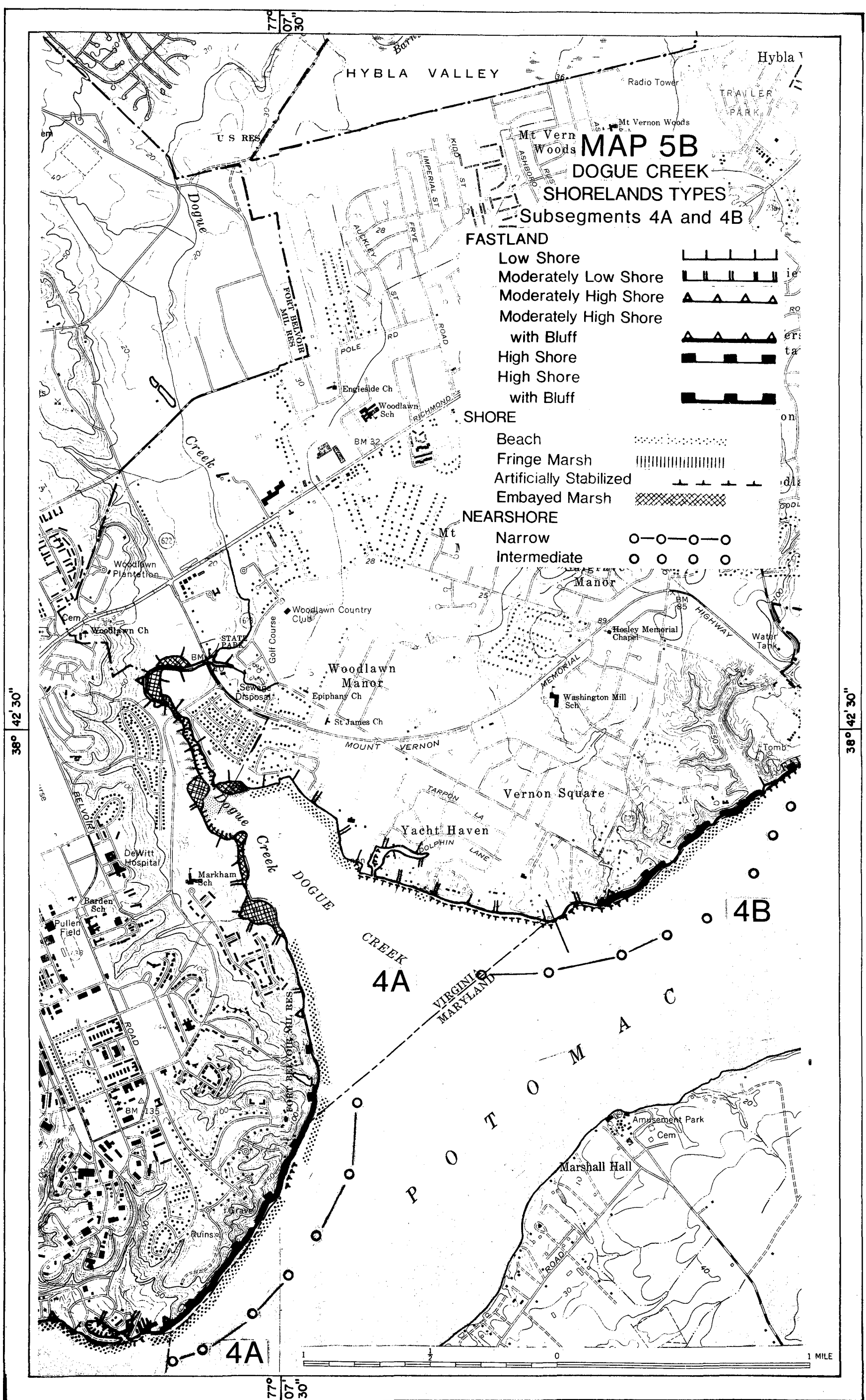
P O T O M A C

4A

77° 07' 30"

1 MILE





**MAP 5B**  
**DOGUE CREEK**  
**SHORELANDS TYPES**  
 Subsegments 4A and 4B

- FASTLAND**
- Low Shore
  - Moderately Low Shore
  - Moderately High Shore
  - Moderately High Shore with Bluff
  - High Shore
  - High Shore with Bluff
- SHORE**
- Beach
  - Fringe Marsh
  - Artificially Stabilized
  - Embayed Marsh
- NEARSHORE**
- Narrow
  - Intermediate

38° 42' 30"

38° 42' 30"

77° 07' 30"

77° 07' 30"

4A

4B

1 MILE



HYBLA VALLEY

Hybla

**MAP 5C**

**DOGUE CREEK  
FASTLAND USE, OWNERSHIP, EROSION**  
Subsegments 4A and 4B

**USE**

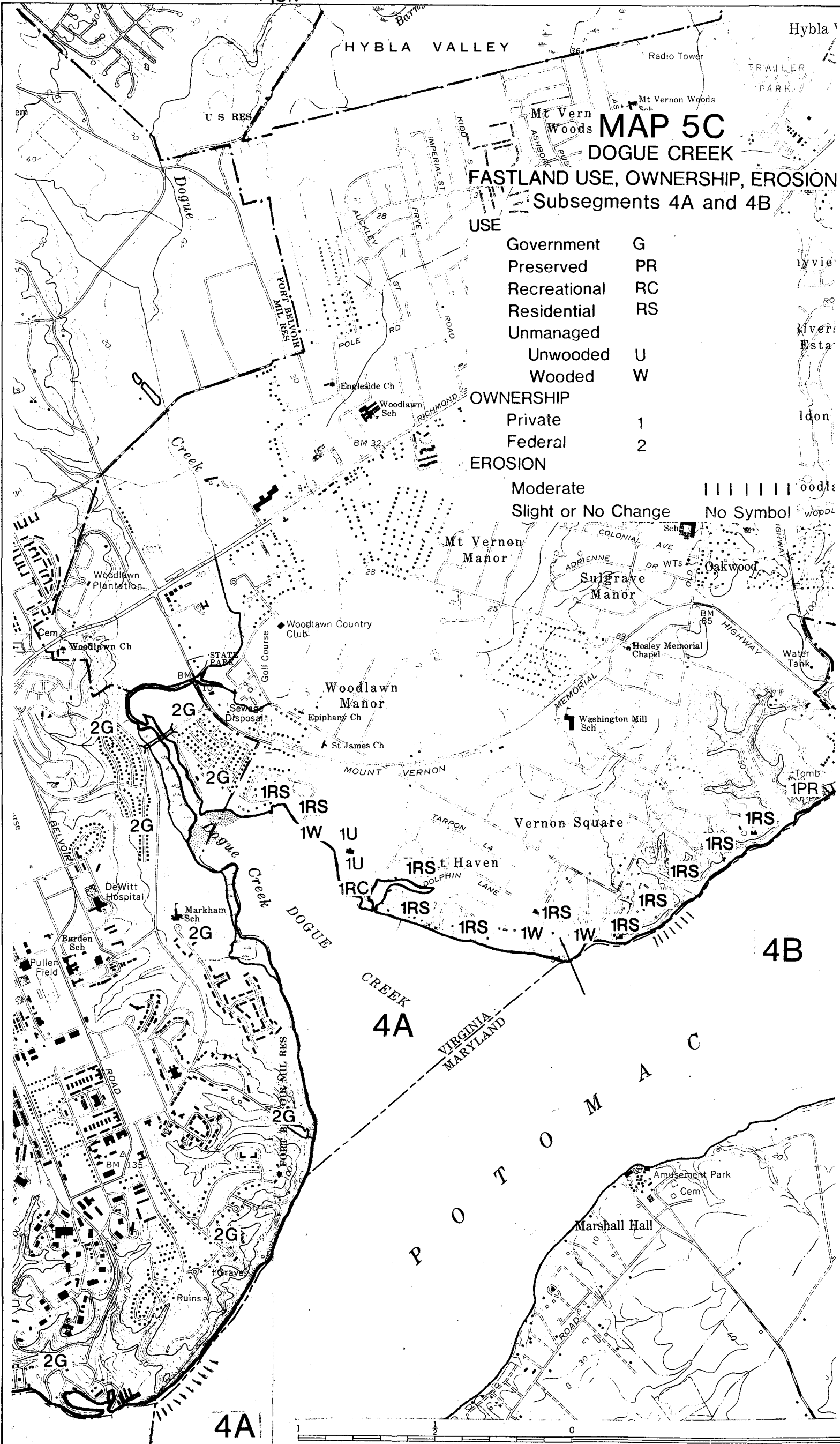
Government	G
Preserved	PR
Recreational	RC
Residential	RS
Unmanaged	
Unwooded	U
Wooded	W

**OWNERSHIP**

Private	1
Federal	2

**EROSION**

Moderate		woodla
Slight or No Change		woodl
No Symbol		



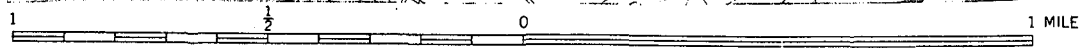
38° 42' 30"

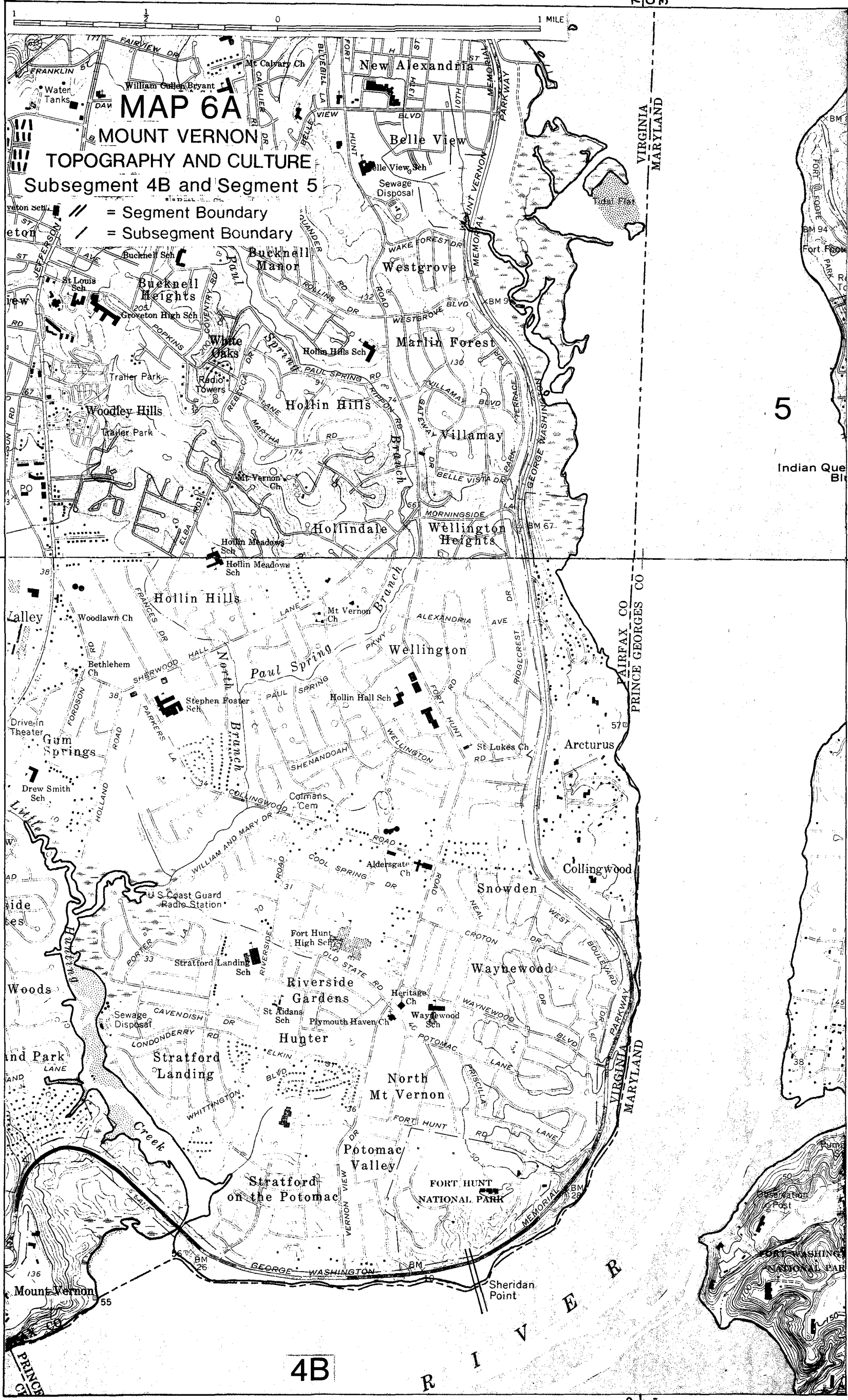
38° 42' 30"

77° 07' 30"

4A

4B





# MAP 6A

## MOUNT VERNON

### TOPOGRAPHY AND CULTURE

#### Subsegment 4B and Segment 5

- = Segment Boundary
- = Subsegment Boundary

47

77° 02' 30"

38° 45' 00"

38° 45' 00"

VIRGINIA  
MARYLAND

FAIRFAX CO  
PRINCE GEORGES CO

VIRGINIA  
MARYLAND

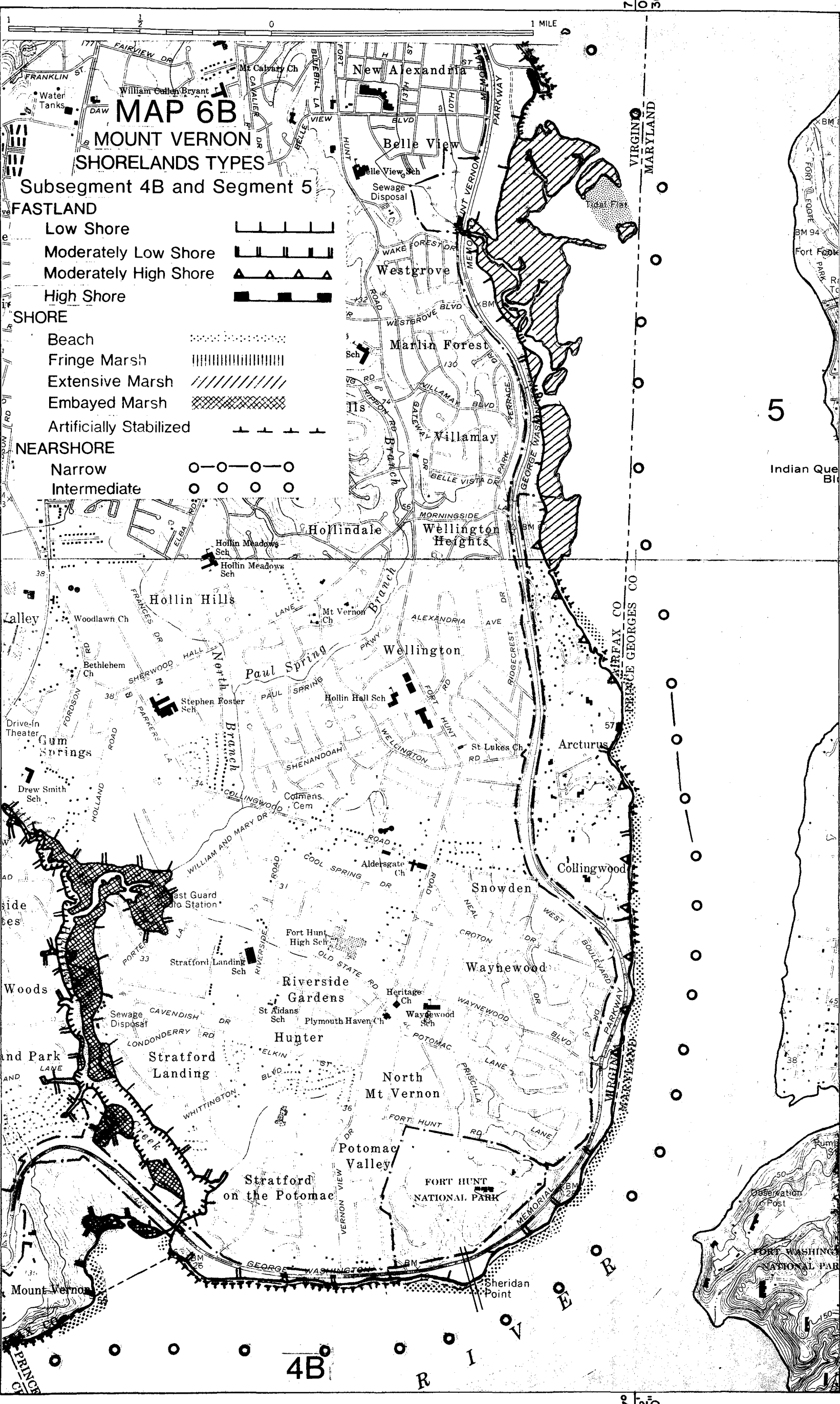
77° 02' 30"

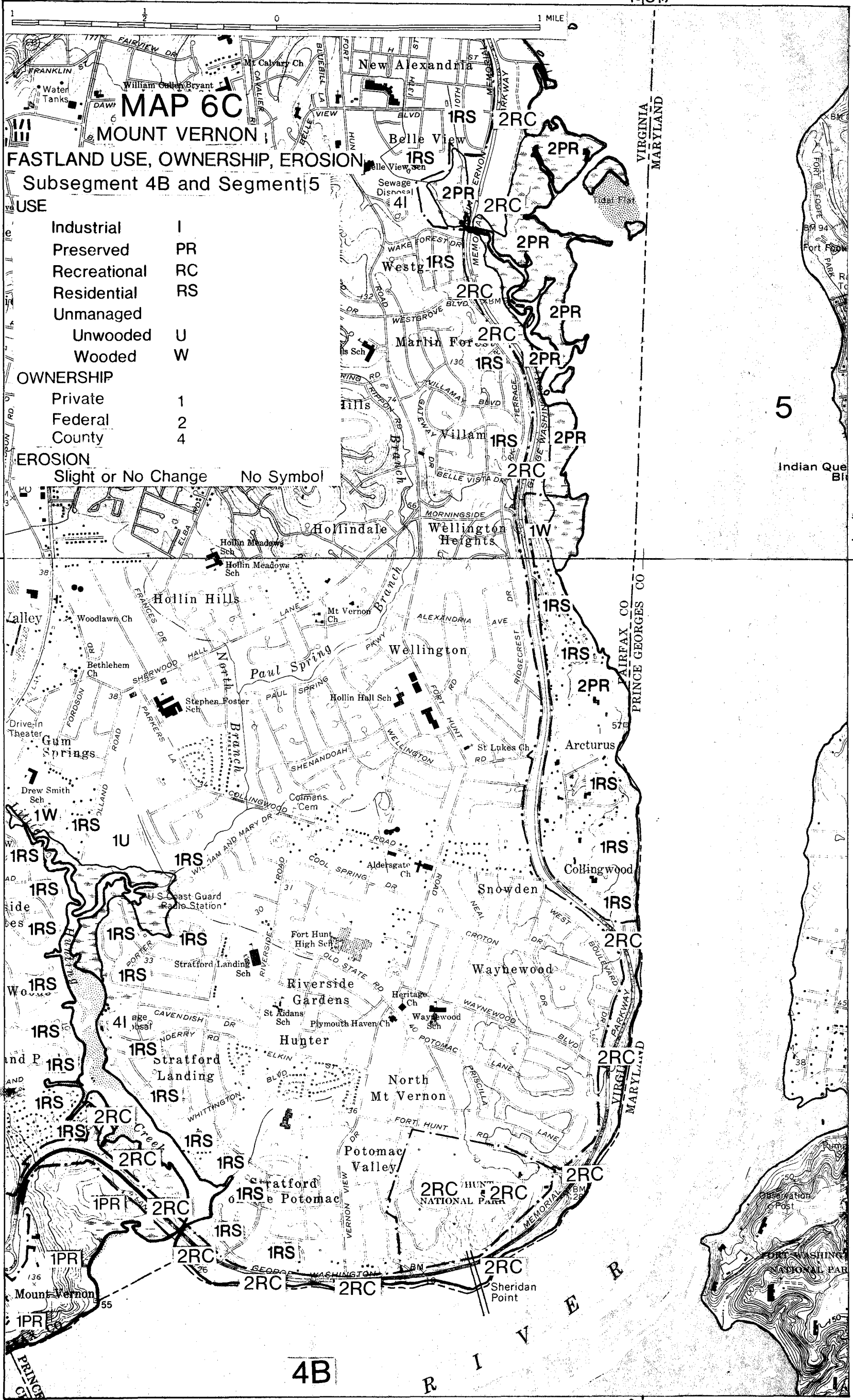
4B

R I V E R

5

Indian Que  
Bl





**MAP 6C**  
**MOUNT VERNON**  
**FASTLAND USE, OWNERSHIP, EROSION**  
**Subsegment 4B and Segment 5**

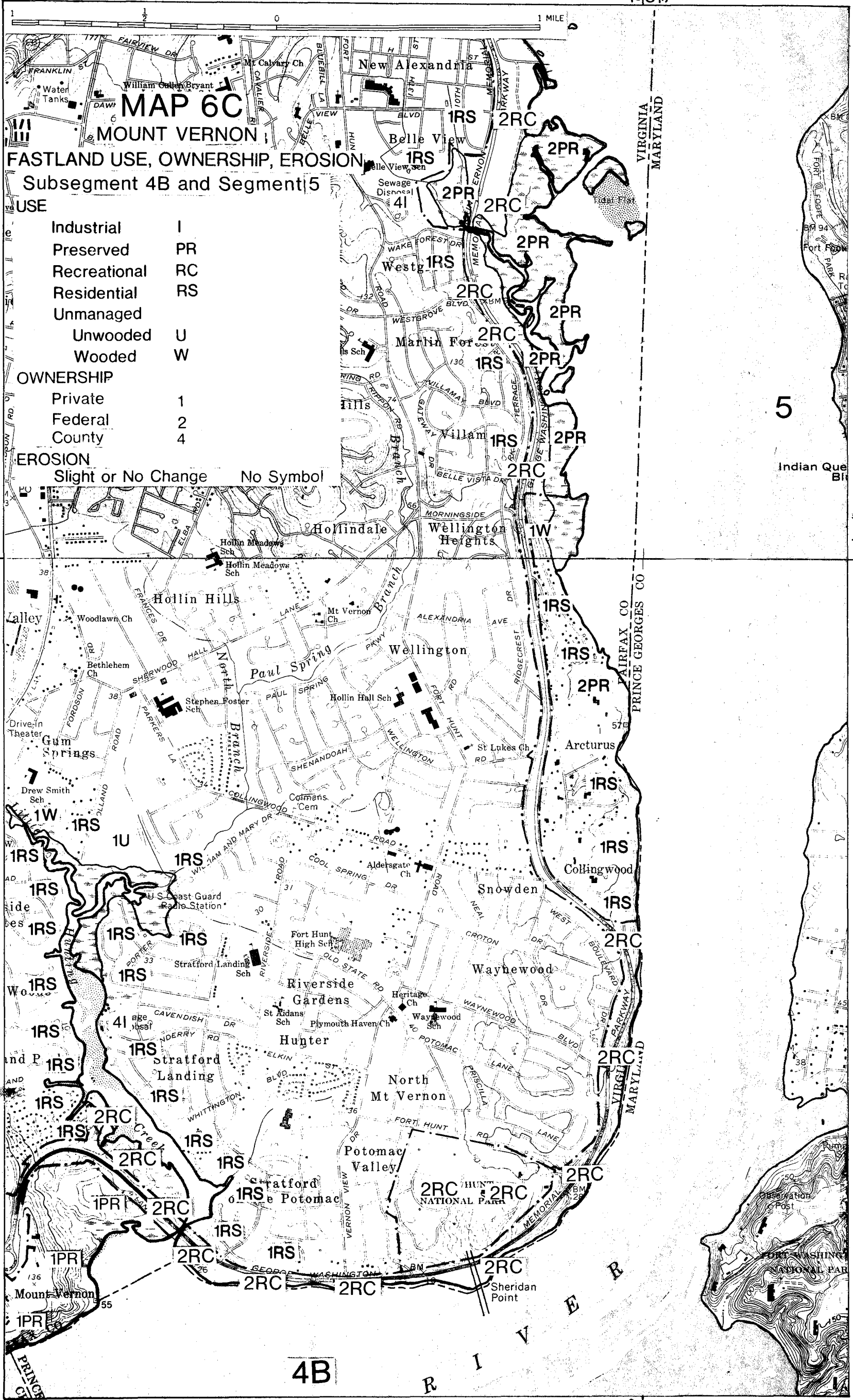
**USE**

Industrial	I
Preserved	PR
Recreational	RC
Residential	RS
Unmanaged	
Unwooded	U
Wooded	W

**OWNERSHIP**

Private	1
Federal	2
County	4

**EROSION**  
 Slight or No Change    No Symbol



**4B**

**R I V E R**



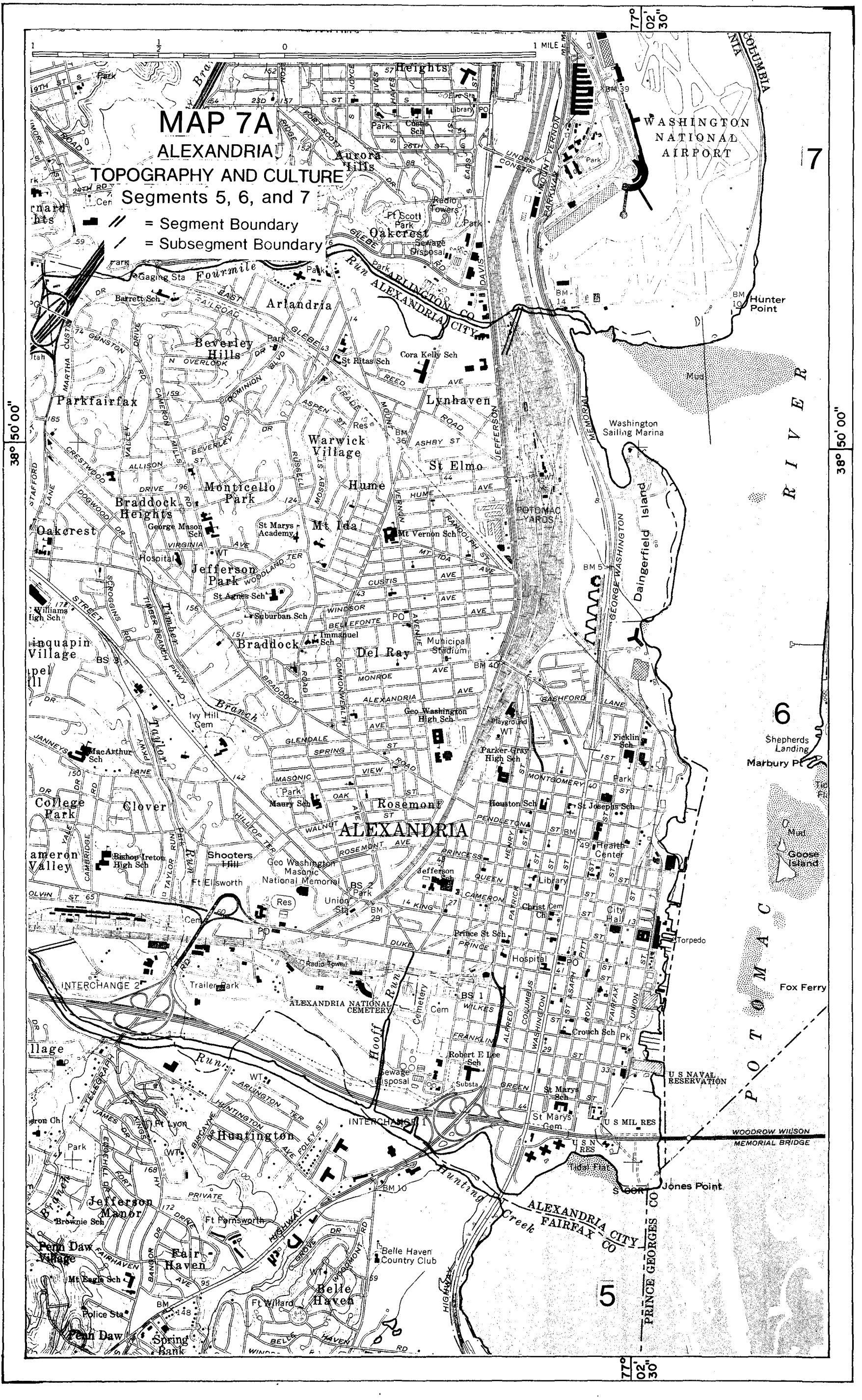
# MAP 7A

## ALEXANDRIA

### TOPOGRAPHY AND CULTURE

Segments 5, 6, and 7

- = Segment Boundary
- - - = Subsegment Boundary



17

6

5

50

# MAP 7B

## ALEXANDRIA

### SHORELANDS TYPES

Segments 5, 6, and 7

#### FASTLAND

Low Shore

Moderately Low Shore

Artificial Fill

#### SHORE

Beach

Fringe Marsh

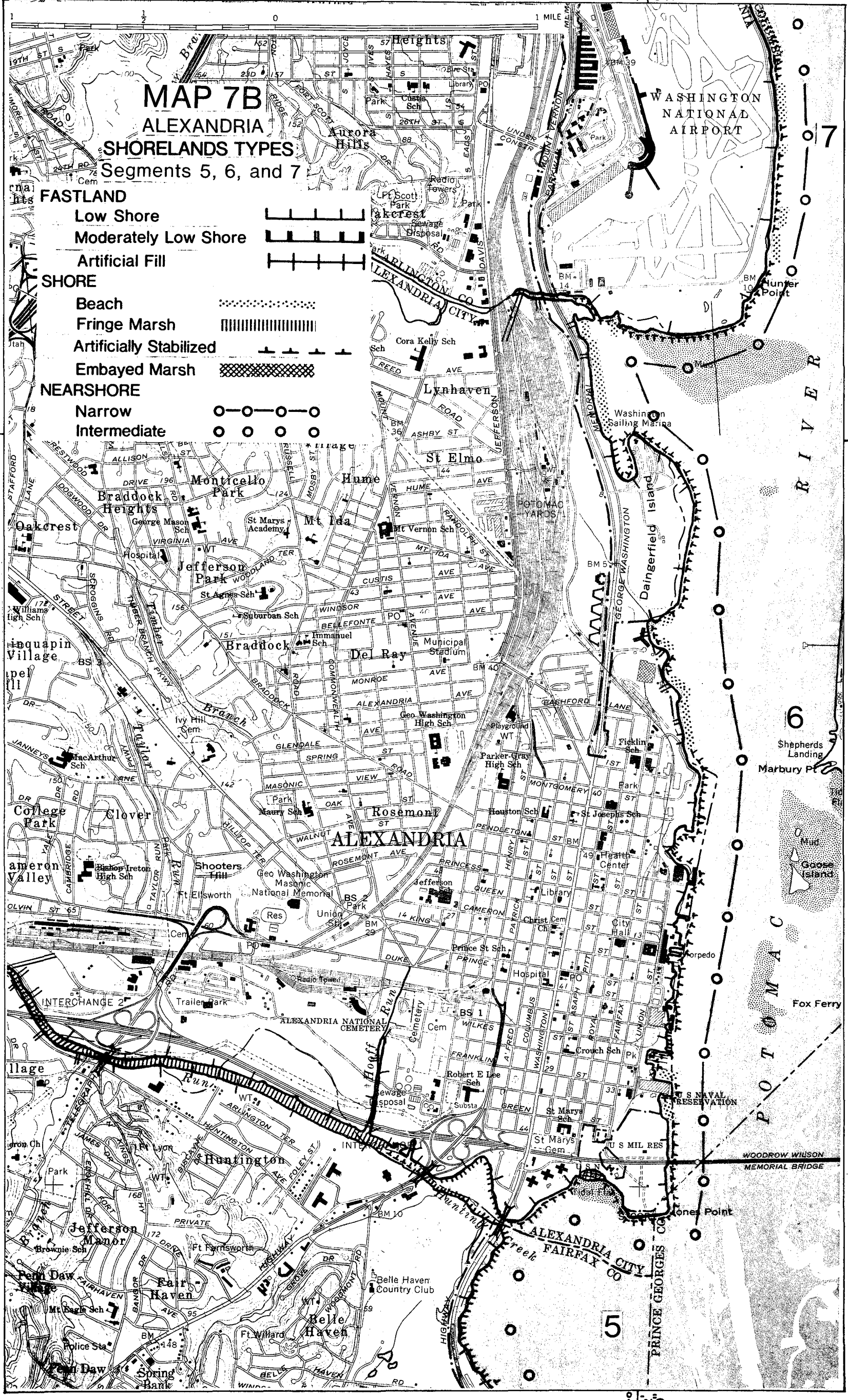
Artificially Stabilized

Embayed Marsh

#### NEARSHORE

Narrow

Intermediate



38° 50' 00"

6

POTOMAC

5

77° 02' 30"



# MAP 7C

ALEXANDRIA

FASTLAND USE, OWNERSHIP, EROSION

Segments 5, 6, and 7

## USE

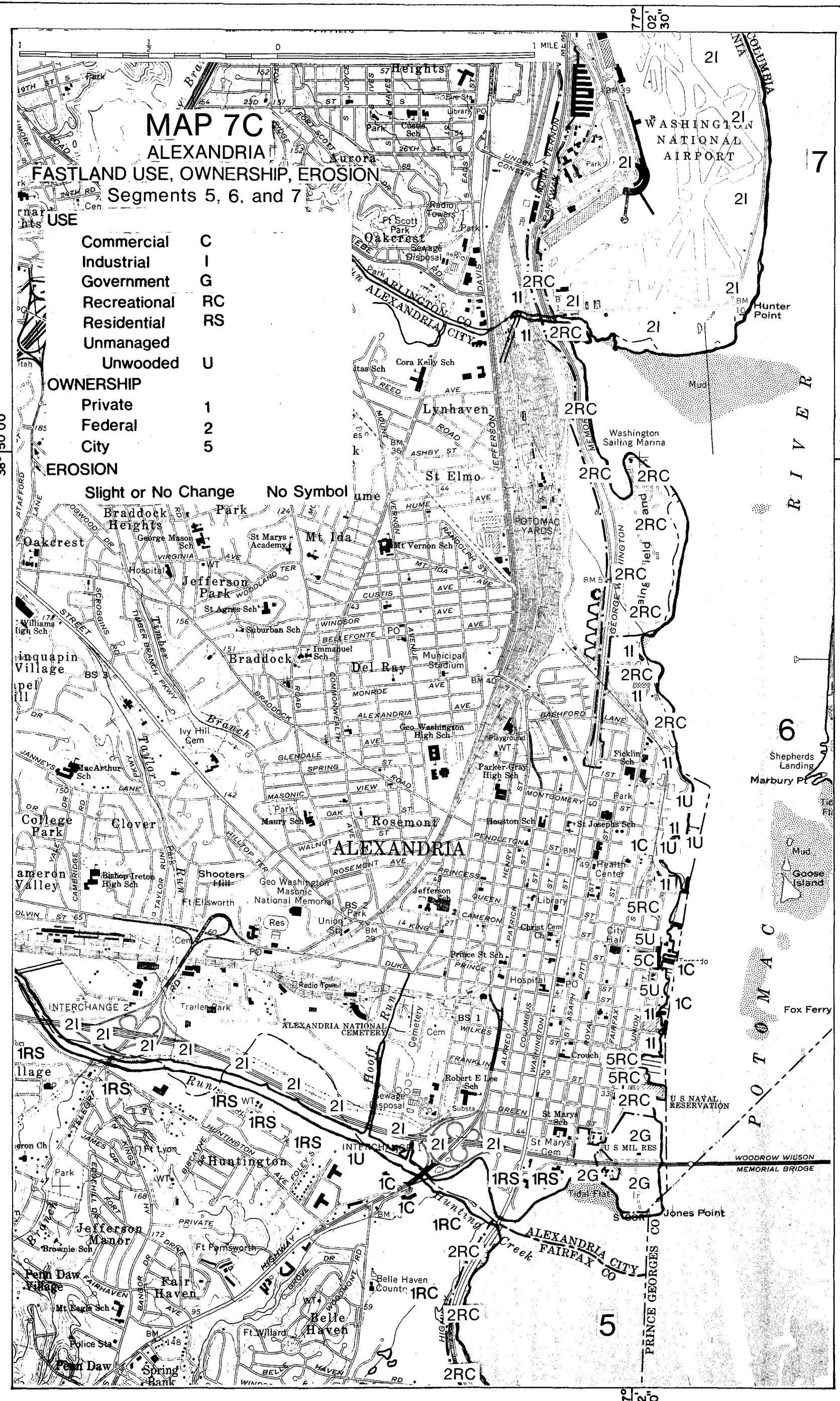
- Commercial C
- Industrial I
- Government G
- Recreational RC
- Residential RS
- Unmanaged Unwooded U

## OWNERSHIP

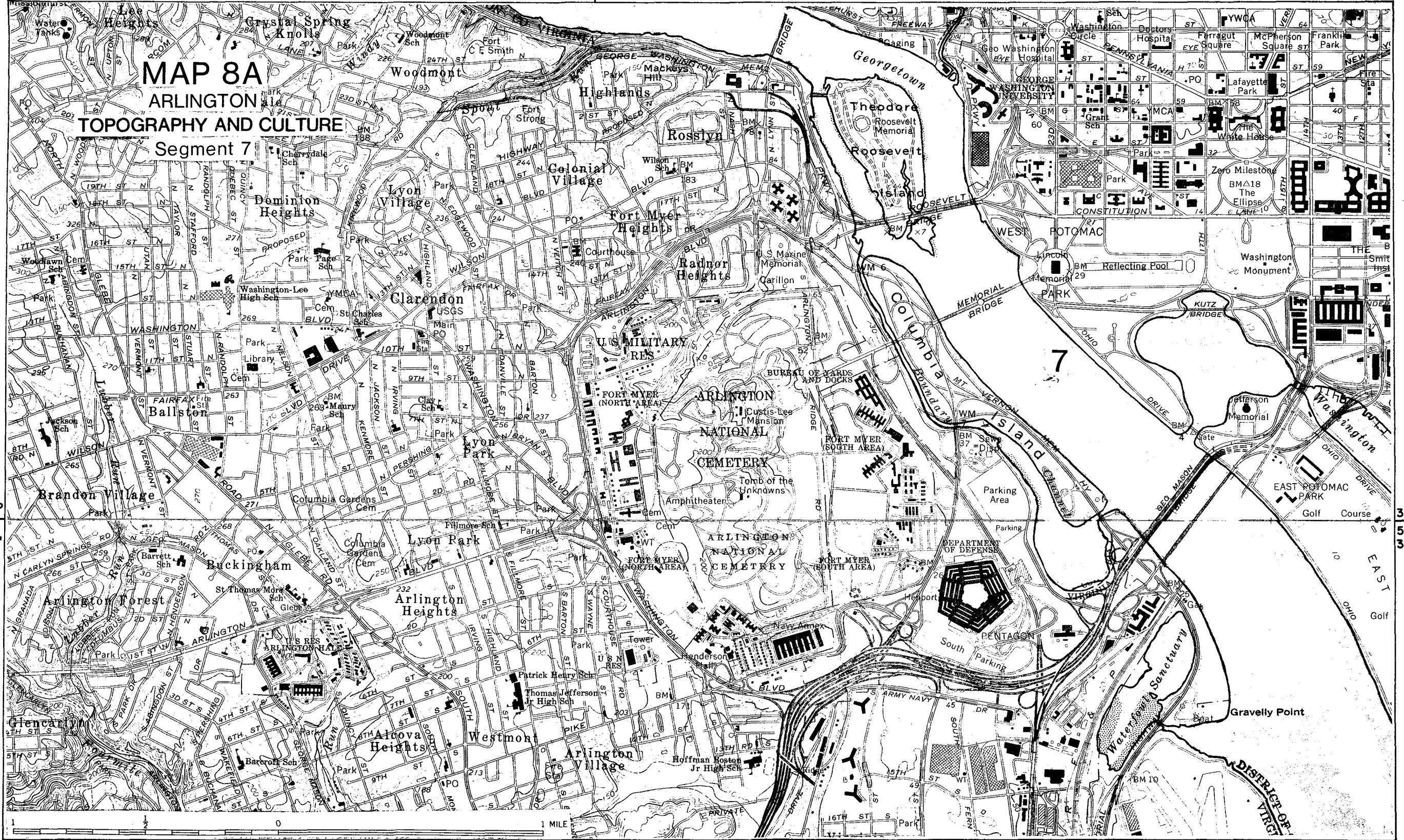
- Private 1
- Federal 2
- City 5

## EROSION

- Slight or No Change No Symbol



77° 05' 00"



77° 05' 00"


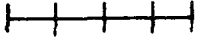

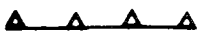




77° 05' 00"

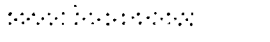


# MAP 8B

## ARLINGTON SHORELANDS TYPES Segment 7

### FASTLAND

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

### SHORE

- Beach 
- Fringe Marsh 
- Artificially Stabilized 

### NEARSHORE

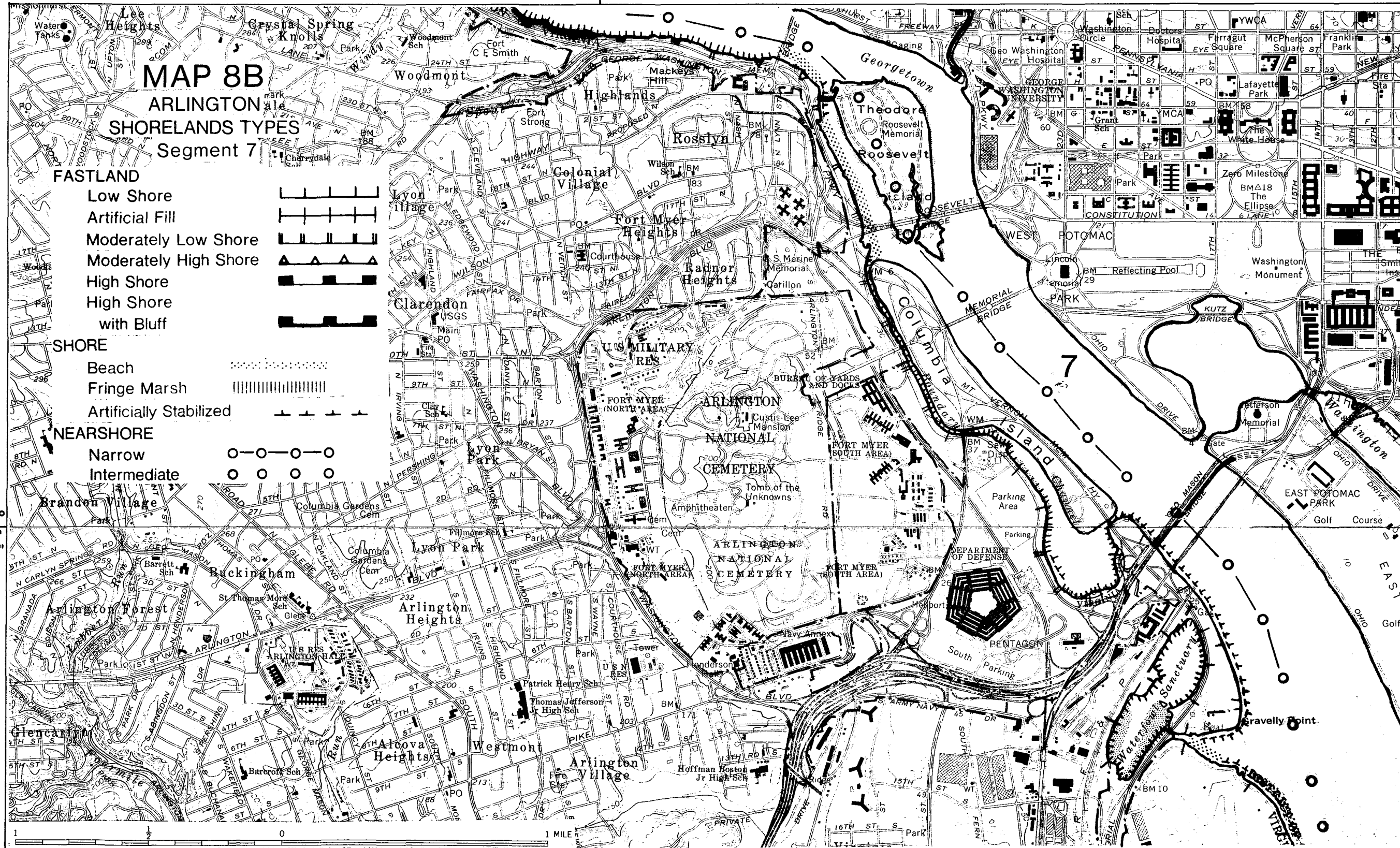
- Narrow 
- Intermediate 

38°

52' 30"

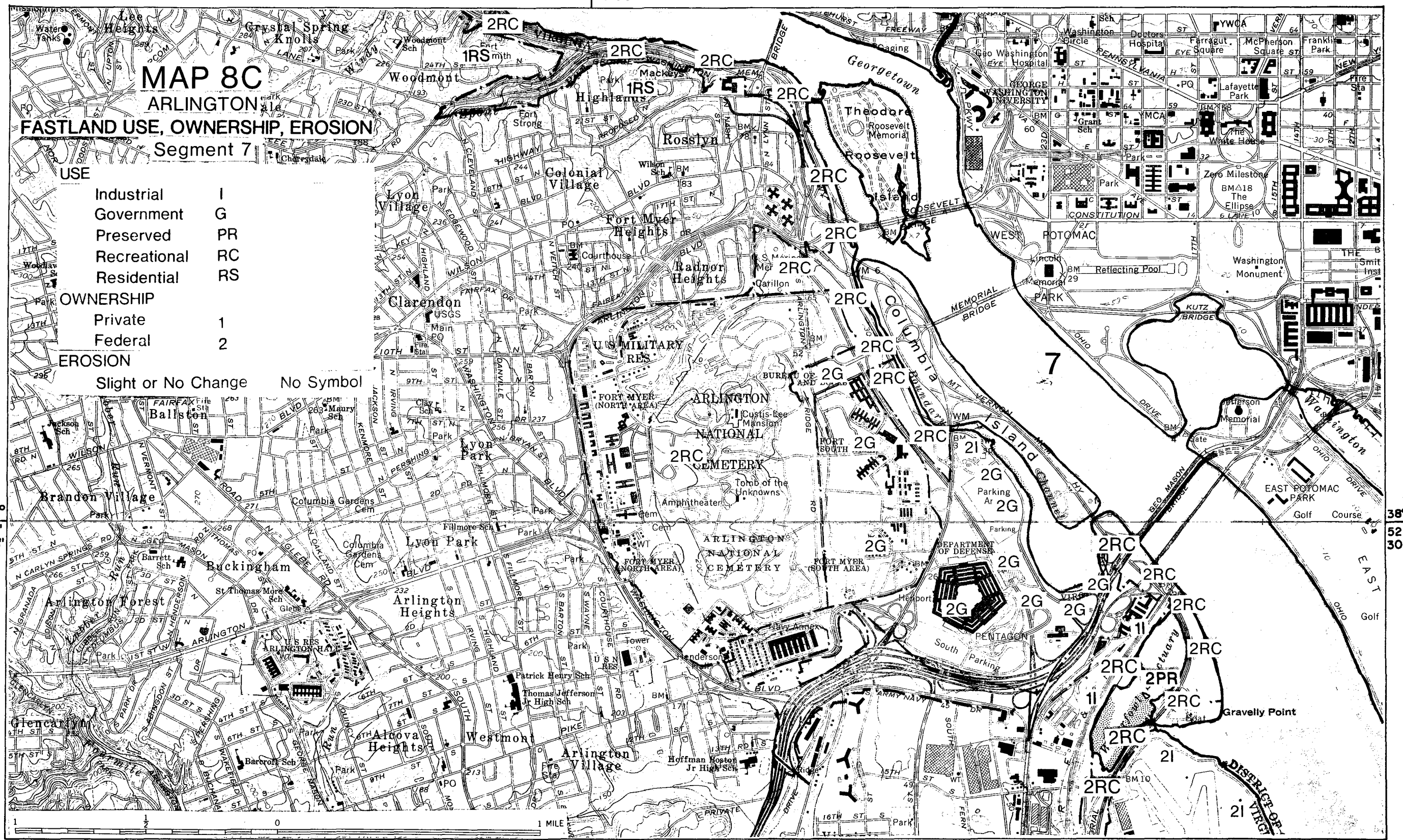
38°

52' 30"



77° 05' 00"

77° 05' 00"



38° 52' 30"

38° 52' 30"

77° 05' 00"



77° 05' 00"

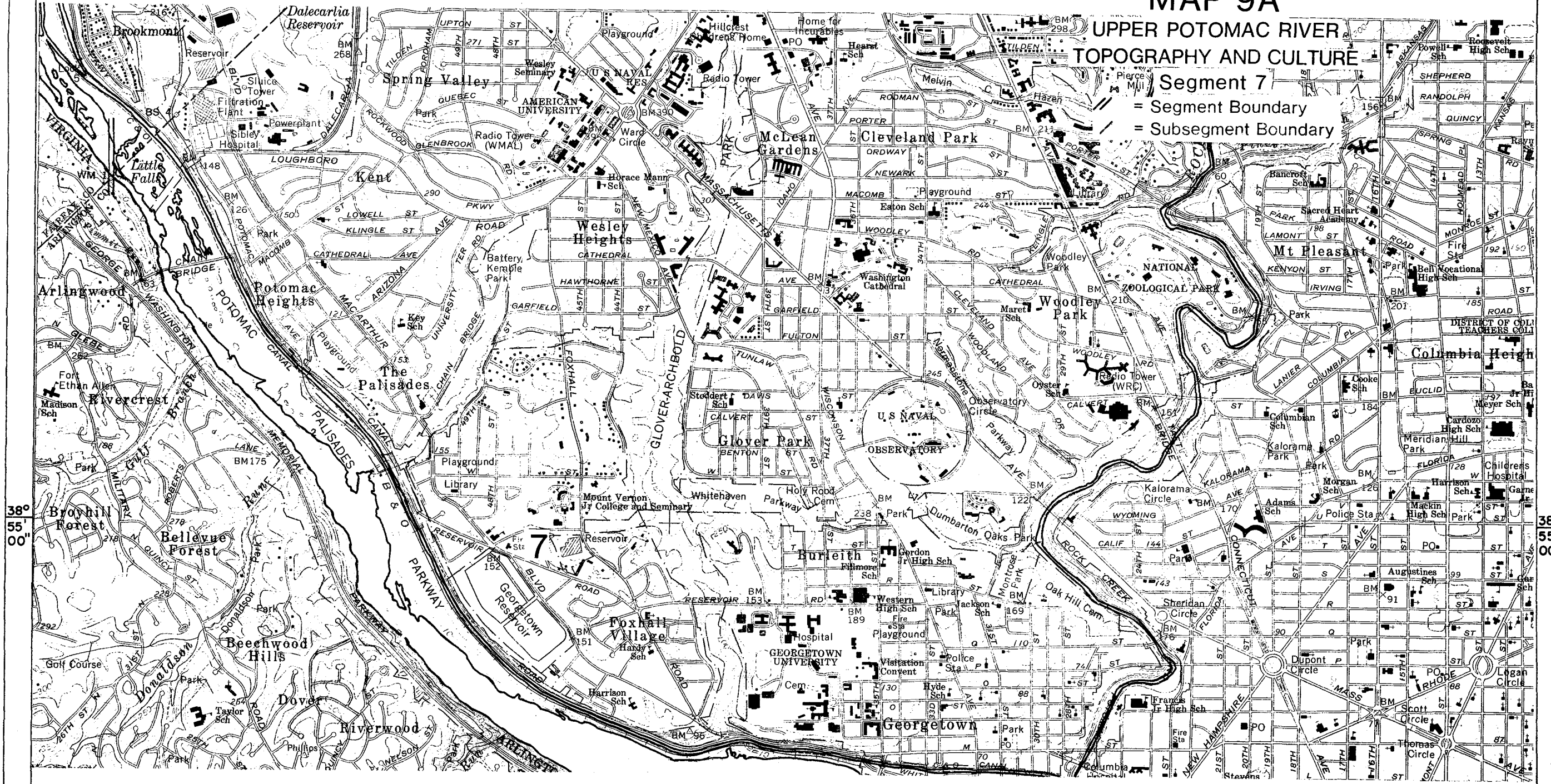
# MAP 9A

## UPPER POTOMAC RIVER TOPOGRAPHY AND CULTURE

### Segment 7

= Segment Boundary

= Subsegment Boundary



38° 55' 00"

38° 55' 00"

77° 05' 00"

77° 05' 00"

# MAP 9B

UPPER POTOMAC RIVER

SHORELANDS TYPES 1900

Segment 7

FASTLAND

High Shore

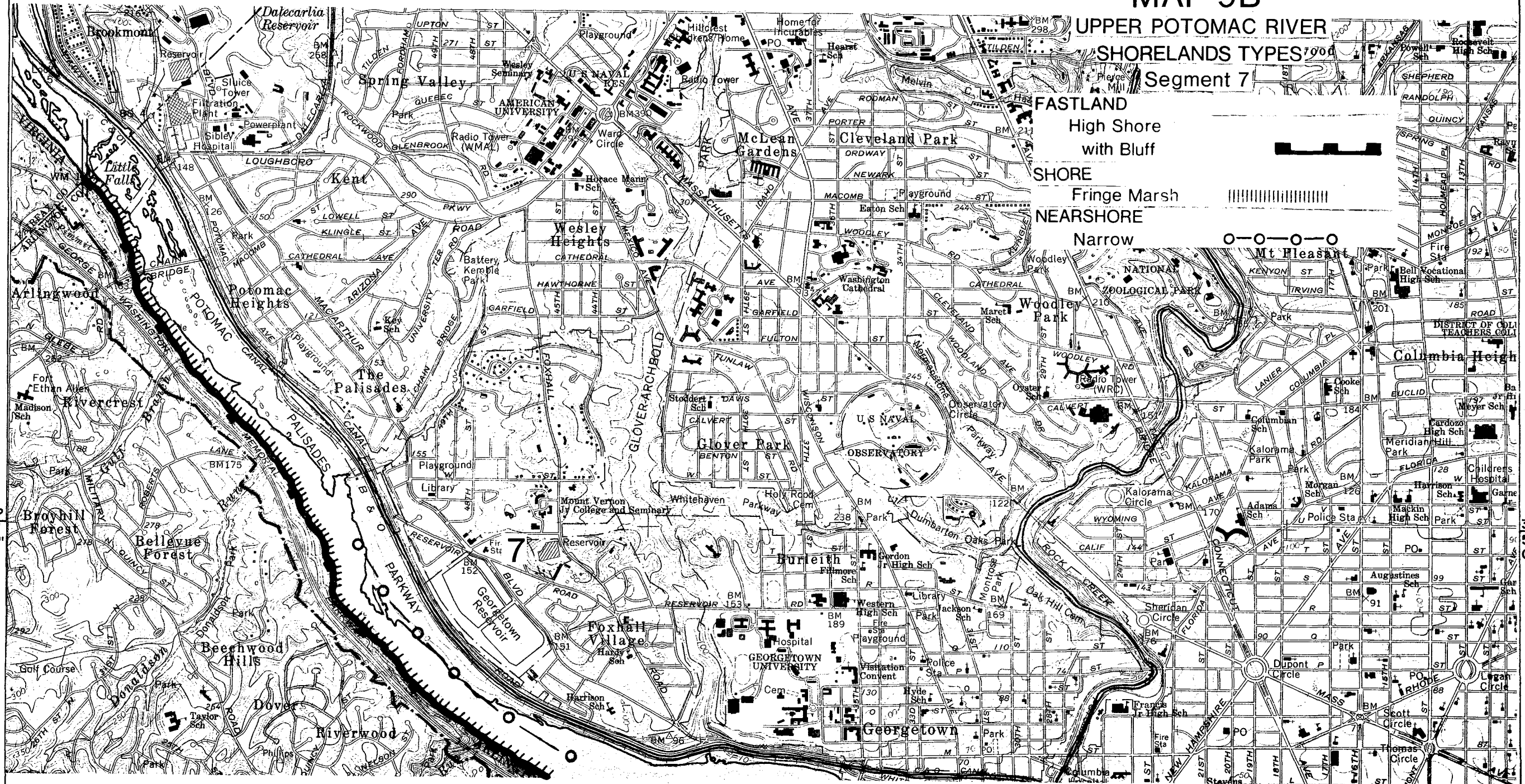
with Bluff

SHORE

Fringe Marsh

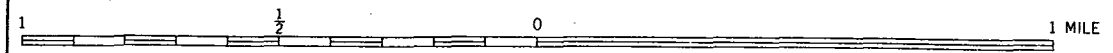
NEARSHORE

Narrow



38° 55' 00"

38° 55' 00"



77° 05' 00"

77° 05' 00"

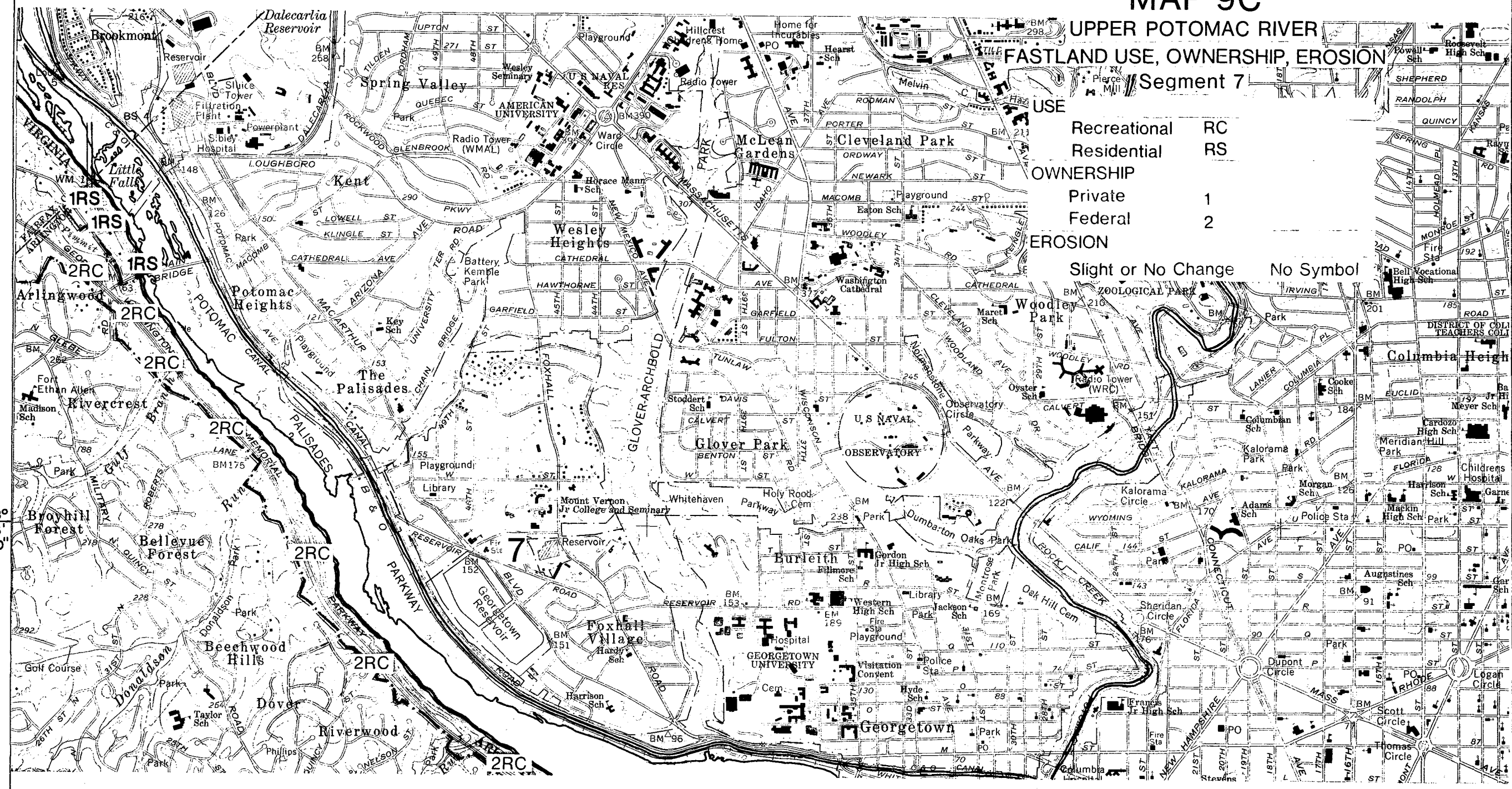
# MAP 9C

UPPER POTOMAC RIVER

FASTLAND USE, OWNERSHIP, EROSION

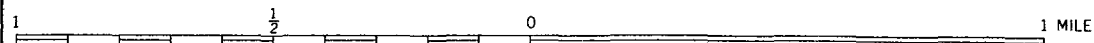
Segment 7

Recreational	RC
Residential	RS
OWNERSHIP	
Private	1
Federal	2
EROSION	
Slight or No Change	No Symbol



38° 55' 00"

38° 55' 00"



77° 05' 00"