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James City County Tidal Marsh Inventory

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JAMES CITY COUNTY

TIDAL MARSH INVENTORY

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INTRODUCTION

This publication is the seventeenth in a series of marsh inventory reports compiled by the Department of Wetlands Ecology and Environmental Impact Assessment. The sixteen previously published inventories are listed on page 13. The report is presented in much the same format as the preceeding reports.

Under Section 62.1-13.4 of the Virginia Wetlands Act, the Virginia Institute of Marine Science is obligated to inventory the tidal wetlands of the Commonwealth. The inventory program is designed to assist wetlands boards, cities, counties, planning districts and other local, state and federal agencies as well as the general public and private industry. This document, along with its companion, the Shoreline Situation Report, James City County, Va., 1975, VIMS SRAMSOE No. 81, 62 p., is essential for those participating in the Commonwealth's Coastal Resources Management Program.

A previously published study, Guidelines for Activities Affecting Virginia Wetlands, Silberhorn, Dawes and Barnard, 1974, VIMS SRAMSOE No. 46, will be helpful in the utilization of this report. Excerpts from the above document are included in the following text, explaining marsh vegetation types and their evaluation. It is our desire that these guidelines and the inventory reports will be useful to those concerned with conserving this valuable natural resource.

This report describes nearly 7040 acres of tidal wetlands which are divided into fifteen sections of shoreline. Of this total approximately 35 acres are located within the Williamsburg City limits (Sections III and XII), with the remainder located in James City County. Both James River and York River drainages are included, with the majority of the wetlands (6367 acres) situated along the James River and its main tributary, the Chickahominy (Sections I to XI). The remainder of the tidal marsh areas (673 acres) are located along the York River and its adjacent tidal creeks that fall within both the City and County limits (Sections XII to XV).

The distribution of marsh plant species in this report follows the salinity gradient of the adjacent tidal waters. Along the James River, for example, the most downstream segment (Section I) is dominated by brackish water marshes with abundant big cordgrass and saltmarsh cordgrass (Types I, V, XII). Proceeding upriver, however, these brackish water species become less and less abundant. And, by the region of the Chickahominy River (Section VII) they have been almost completely replaced by freshwater species including arrow arum, pickerelweed, wild rice, yellow pond lily, etc. (Types VII, XI, IX).

The region of the Chickahominy River (Sections VI to XI) also contains large areas of both tidal and non-tidal swamps. These swamps are generally dominated by bald cypress but include species such as black gum, red maple, pumpkin ash and tupelo gum as well as numerous shrub and occasional marsh plants. Because of the difficulty in determining which of these areas meet the elevational requirements of the Wetlands Act without an accurate elevational survey only those areas contained within or located adjacent to the large tidal marshes are included in this report.

Those sections of James City County and Williamsburg which are found along the York River consist primarily of brackish water species (Sections XII to XV). Freshwater areas do occur, but only in the most upstream areas of the several large tidal creeks.

The wetland areas included here can be described as being highly valuable in environmental terms. The brackish water areas are excellent wildlife habitats and serve as nursery areas for many species of finfish. In many sections, especially along the York River, they help to stabilize large sections of shoreline. The freshwater areas are also very valuable habitats and serve as spawning sites for many commercially important species of fish. In addition, they are utilized by many species of ducks and other waterfowl so that their values to sportsmen are year round, fishing in the summer and hunting in the winter.

METHODS

Aerial photographs and topographic maps (U.S.G.S.) were utilized to obtain wetland locations, wetland boundaries and patterns of marsh vegetation. Acreages and wetland boundaries were substantiated by observations on foot, by boat and by low level overflights. Individual plant species percentages are quantitative estimates of coverage based on visual field inspections of every marsh. In some instances, especially in tidal freshwater areas, those percentages are subject to seasonal bias.

Marshes one quarter of an acre or larger are designated by number. Many marshes smaller than one quarter acre (usually narrow fringing marshes) are designated by the same symbol (shaded) as the larger marshes on the section maps but assigned no number. Small marshes (less than one acre) are exaggerated and are not indicated to scale. Information such as individual marsh acreage, plant species percentage and acreage, marsh type, and other observations are recorded in tabular form. Plant species percentages are recorded to the nearest percent, and acreages to the nearest tenth of an acre. In marshes of less than one acre, the species are recorded to the nearest hundredth of an acre. In those instances where an individual plant species is estimated to amount to less than 0.5 percent, the symbol (-) is used to indicate a trace amount. In unusual situations where an individual marsh is estimated to contain 50 percent or more of a species that is not listed as a marsh type, the closest applicable marsh type is used. For example, a marsh which is judged to contain 60 percent wild rice would be listed as Type XI(Freshwater Mixed).

MARSH TYPES AND EVALUATION

For a better understanding of what is meant by marsh types, some background information is required. The personnel of the Department of Wetlands Ecology and Environmental Impact Assessment have classifed twelve different common marsh types in Virginia, based on vegetational composition. These marsh types have been evaluated according to certain values and are recorded in the Guidelines report. The following is a brief outline of the wetland types and their evaluation as found in that publication:

"It is recognized that most wetlands areas, with the exception of the relatively monospecific cordgrass marshes of the Eastern Shore, are not homogenously vegetated. Most marshes are, however, dominated by a major plant. By providing the manager with the primary values of each community type and the means of identification he then has a useful and convenient tool for weighing the relative importance of each marsh parcel. In Virginia, many wetlands management problems involve only a few acres or a fraction of an acre. The identification of plant communities permits the manager to evaluate both complete marshes and subareas within a marsh.

"Each marsh type may be evaluated in accordance with five general values. These are:

"1. Production and detritus availability. Previous VIMS reports have discussed the details of marsh production and the role of detritus which results when the plant material is washed into the water column. The term "detritus" refers to plant material which decays in the aquatic system and forms the basis of a major marine food web. The term "production" refers to the amount of plant material which is produced by the various types of marsh plants. Vegetative production of the major species has been measured and marshes have been rated in accordance with their average levels of productivity. If the production is readily available to the marine food web as detritus, a wetlands system is even more important than one of equal productivity where little detritus results.

Availability of detritus is generally a function of marsh elevation and total flushing, with detritus more available to the aquatic environment in the lower, well-flushed marshes.

"2. Waterfowl and wildlife utilization. Long before marshes were discovered to be detritus producers, they were known as habitats for various mammals and marsh birds and as food sources for migratory waterfowl. Some marsh types, especially mixed freshwater marshes, are more valuable because of diversity of the vegetation found there.

"3. Erosion buffer. Erosion is a common coastal problem. Marshes can be eroded, but some, particularly the more saline types, are eroded much more slowly than adjacent shores which are unprotected by marsh. This buffering quality is derived from the ability of the vegetation to absorb or dissipate wave energy by establishing a dense root system which stabilizes the substrate. Generally, freshwater species are less effective than saltwater plants in this regard.

"4. Water quality control. The dense growth of some marshes acts as a filter, trapping upland sediment before it reaches waterways and thus protecting shellfish beds and navigation channels from siltation. Marshes can also filter out sediments that are already in the water column. The ability of marshes to filter sediments and maintain water clarity is of particular importance to the maintenance of clam and oyster production. Excessive sedimentation can reduce the basic food supply of shellfish through reduction of the photic zone where algae grows. It can also kill and degrade pollutants through complex chemical processes, a discussion of which is beyond the scope of this paper..."

"5. Flood buffer. The peat substratum of some marshes acts as a giant sponge in receiving and releasing water. This characteristic is an effective buffer against coastal flooding, the effectiveness of which is a function of marsh type and size.

"Research and marsh inventory work accomplished by VIMS personnel indicate that 10 species of marsh vegetation tend to dominate many marshes, the dominant plant depending on water salinity, marsh elevation, soil type and other factors. The term "dominant" is construed to mean that at least 50% of the vegetated surface of a marsh is covered by a single species. Brackish and freshwater marshes often have no clearly dominant species of vegetation. These marshes are considered to be highly valuable in environmental terms."

Marsh Types and Their Environmental Contributions

(Edited from Guidelines for Activities Affecting Virginia Wetlands)

Type I Saltmarsh Cordgrass Community

a. Average yield 4 tons per acre per annum. (Optimum growth to 10 tons per acre.)
b. Optimum availability of detritus to the marine environment.
c. Roots and rhizomes eaten by waterfowl and stems used in muskrat lodge construction. Also serves as nesting material for various birds.
d. Deterrent to shoreline erosion.
e. Serves as sediment trap and assimilates flood waters.

Type II Saltmeadow Community

a. 1-3 tons per acre per annum.
b. Food (seeds) and nesting areas for birds.
c. Effective erosion deterrent.
d. Assimilates flood waters.
e. Filters sediments and waste material.

Type III Black Needlerush Community

a. 3-5 tons per acre per annum.
b. Highly resistant to erosion.
c. Traps suspended sediments but not as effective as Type II.
d. Somewhat effective in absorbing flood waters.

Type IV Saltbush Community

a. 2 tons per acre per annum or less.
b. Nesting area for small birds and habitat for a variety of wildlife.
c. Effective trap for flotsam.

Type V Big Cordgrass Community

a. 3-6 tons per acre per annum.
b. Detritus less available than from Type I.
c. Habitat for small animals and used for muskrat lodge.
d. Effective erosion buffer.
e. Flood water assimilation.

Type VI Cattail Community

a. 2-4 tons per acre per annum.
b. Habitat for birds and utilized by muskrats.
c. Traps upland sediments

Type VII Arrow Arum-Pickerelweed Community

a. 2-4 tons per acre per annum.
b. Detritus readily availabe to marine environment.
c. Seeds eaten by wood ducks.
d. Susceptible to erosion from wave action and boat wakes, particularly in winter months.

Type VIII Reed Grass Community

a. 4-6 tons per acre per annum.
b. Little value to wildlife except for cover.
c. Invades marshes and competes with more desirable species.
d. Deters erosion on disturbed sites.

Type XI Yellow Pond Lily Community

a. Less than 1 ton per acre per annum.
b. Cover and attachment site for aquatic animals and algae.
c. Feeding territory for fish.

Type X Saltwort Community

a. Less than 0.5 tons per acre per annum.
b. Little value to aquatic or marsh animals.

Type XI Freshwater Mixed Community

a. 3-5 tons per acre per annum.
b. High diversity of wildlife.
c. High diversity of wildlife foods.
d. Often associated with fish spawning and nursery grounds.
e. Ranks high as a sediment trap and nursery grounds.

Type XII Brackish Water Mixed Community

a. 3-4 tons per acre per annum.
b. Wide variety of wildlife foods and habitat.
c. Deterrent to shoreline erosion.
d. Serves as sediment trap and assimilates flood waters.
e. Known spawning and nursery grounds for fish.

EVALUATION OF WETLAND TYPES

(From Guidelines for Activities Affecting Virginia Wetlands)

For management purposes, the twelve types of wetlands identified above are grouped into five classifications based on the estimated total environmental value of an acre of each type.

Group One: Saltmarsh Cordgrass (Type I)
Arrow Arum-Pickerelweed (Type VII)
Freshwater Mixed (Type XI)
Brackish Water Mixed (Type XII)

Group One marshes have the highest values in productivity and wildfowl and wildlife utility and are closely associated with fish spawning and nursery areas. They also have high value as erosion inhibitors, are important to the shellfish industry and valued as natural shoreline stabilizers. Group One marshes should be preserved.

Group Two: Big Cordgrass (Type V)
Saltmeadow (Type II)
Cattail (Type VI)

Group Two marshes are of only slightly lesser value than Group One marshes. The major difference is that detritus produced in these marshes is less readily available to the marine environment due to higher elevations and consequently less tidal action to flush the detritus into adjacent waterways. Group Two marshes have very high values in protecting water quality and acting as buffers against coastal flooding. These marshes should also be preserved, but if development in wetlands is considered to be justified it would be better to alter Group Two marshes than Group One marshes.

Group Three: Yellow Pond Lily (Type IX)
Black Needlerush (Type III)

The two marshes in the Group Three category are quite dissimilar in properties. The yellow pond lily marsh is not a significant contributor to the food web but it does have high values to wildlife and waterfowl. Black needlerush has little wildlife value but it ranks high as an erosion flood buffer. Group Three marshes are important though their total values are less than Group One and Two marshes. If development in wetlands is considered necessary, it would be better to alter Group Three marshes than Groups One or Two.

Group Four: Saltbush (Type IV)

The saltbush community is valued primarily for the diversity and bird nesting area it adds to the marsh ecosystem. To a lesser extent it acts as an erosion buffer. Group Four marshes should not be unnecessarily disturbed but it would be better to concentrate necessary development in these marshes rather than disturb any of the marshes in the preceding groups.

Group Five: Saltwort (Type X)
Reedgrass (Type VIII)

Based on present information Group Five marshes have few values of any significance. While Group Five marshes should not be unreasonably disturbed, it is preferable to develop in these marshes than in any other types.

For a better understanding of Virginia's Wetlands in general, the Wetlands Act of 1972 and marsh types and their evaluation, the following publications are recommended:

Coastal Wetlands of Virginia
Interim Report No. 3
Guidelines for Activities
Affecting Virginia's Wetlands
Special Report in Applied Marine
Science and Ocean Engineering No. 46
Gene M. Silberhorn, George M. Dawes,
Thomas A. Barnard, Jr., June 1974
Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

Local Management of Wetlands
Environmental Considerations
Special Report in Applied Marine
Science and Ocean Engineering No. 35
Kenneth Marcellus, George M. Dawes
Gene Silberhorn, June 1973
Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

Coastal Wetlands of Virginia
Interim Report No. 2
Special Report in Applied Marine
Science and Ocean Engineering No. 27
Kenneth Marcellus, July 1972
Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

Coastal Wetlands of Virginia Interim Report
Special Report in Applied Marine Science
and Ocean Engineering No. 10
Marvin Wass and Thomas Wright, December 1969
Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

Laws of Virginia Relating to Wetlands
and Subaqueous Waters
Virginia Marine Resources Commission
2401 West Avenue
Newport News, Virginia 23607

Wetlands Guidelines
Virginia Marine Resources Commission
2401 West Avenue
Newport News, Virginia 23607

Tidal Wetland Plants of Virginia
Educational Series No. 19
Gene M. Silberhorn, illustrated by
Mary Warinner. August 1976
Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

Published Tidal Marsh Inventories

Lancaster County
Mathews County
York County and
Town of Poquoson
Northumberland County
Prince William County
Stafford County
King George County
City of Hampton

Fairfax County
Gloucester County
City of Virginia Beach, Vol. 1
City of Newport News and
Ft. Eustis
Accomack County
Northumberland County
Westmoreland County
Surry County

Available from: Library
Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

MARSH PLANTS

Common and Scientific Names as found in the Data Tables

American Lotus*	Nelumbo lutea Willd.
Arrowhead or Bull Tongue	Sagittaria falcata Pursh
Arrow Arum	Peltandra virginica (L.) Kunth
Bald Cypress	Taxodium distichum (L.) Richard
Beggar Ticks	Bidens spp.
Big Cordgrass	Spartina cynosuroides (L.) Roth
Black Gum	Nyssa sylvatica Marshall
Black Needlerush	Juncus roemerianus Scheele
Button Bush	Cephalanthus occidentalis L.
Cardinal Flower*	Lobelia cardinalis L.
Cattails	
Common	Typha latifolia L.
Narrow-leaved	Typha angustifolia L.
Common Threesquare	Scirpus americanus Persoon
Climbing Hempweed*	Mikania scandens (L.) Willd.
Dodder*	Cuscuta spp.
Giant Bulrush	Scirpus validus Vahl
Ironweed*	Vernonia noveboracensis (L.) Michaux

*Marsh species not included in Virginia Wetlands Act of 1972

MARSH PLANTS (cont.)

Jewelweed*	Impatiens capensis Meerb.
Marsh-Fleabane	Pluchea purpurascens (Swartz) DC.
Marsh Hibiscus	Hibiscus moscheutos L.
Marsh Mallow*	Kosteletzkya virginica (L.) Presl
Olney Threesquare	Scirpus olneyi Gray
Orach*	Atriplex patula L.
Pickerelweed	Pontederia cordata L.
Reed Grass	Phragmites australis (Cav.) Trin. ex Steud.
Saltbushes	
Groundsel Tree	Baccharis halimifolia L.
Marsh Elder	Iva frutescens L.
Saltmarsh Aster*	Aster tenufolius L.
Saltmarsh Bulrush	Scirpus robustus Pursh
Saltmarsh Cordgrass	Spartina alterniflora Loisel.
Saltmarsh Loosestrife	Lythrum lineare L.
Saltmeadow Grasses	
Saltgrass	Distichlis spicata (L.) Greene
Saltmeadow Hay	Spartina patens (Aiton) Muhl.
Sedge*	Carex stricta Lam.
Smartweed	Polygonum spp.

*Marsh species not included in Virginia's Wetlands Act of 1972

MARSH PLANTS (cont.)

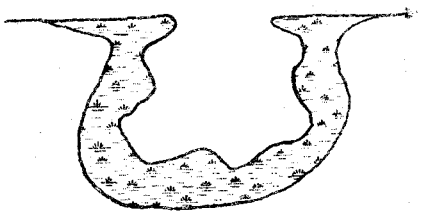
Southern Cutgrass or Rice Cutgrass	Leersia oryzoides (L.) Swartz
Swamp Rose*	Rosa palustris Marshall
Switch Grass	Panicum virgatum L.
Tear Thumb*	Polygonum arifolium L.
Walter's Millet*	Echinochloa walteri (Pursh) Nash
Water Dock	Rumex verticillatus L.
Water Hemp	Amaranthus cannabina (L.) J. D. Sauer
Water Parsnip*	Sium suave Walt.
Water Willow*	Decodon verticillatus (L.) Ell.
Wild Rice	Zizania aquatica L.
Wool Reed*	Cinna arundinacea L.
Wool Grass*	Scirpus cyperinus (L.) Kunth
Yellow Pond Lily	Nuphar luteum (L.) Sibthrop & Smith

*Marsh species not included in Virginia's Wetlands Act of 1972

Glossary of Descriptive Terms

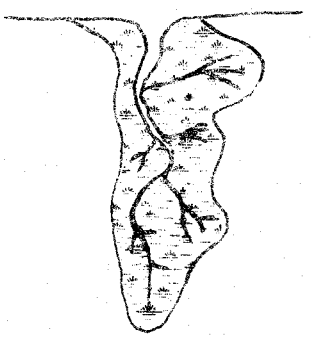
cove marsh

a marsh contained within a concavity or recessed area on a shoreline; the marsh vegetation is usually found surrounding a central, open-water pond, and tidal flushing is permitted through an inlet.



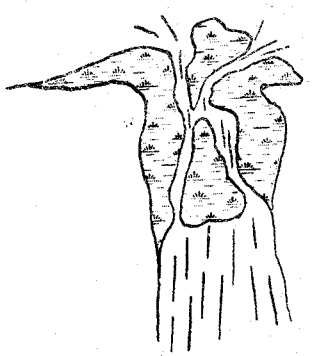
creek or embayed marsh

a marsh occupying a drowned creek valley; in many large creek marshes the salinity decreases headward; this type of marsh may be divided for inventory purposes into sections if significant changes in the plant community occur along its length.



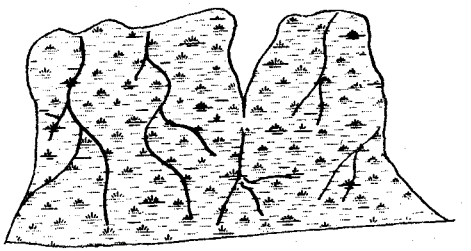
delta marsh

a marsh found growing on sediment deposited at the mouth of a tidal creek; tidal exchange through the creek mouth is usually restricted to narrow channels by the marsh.



Glossary of Descriptive Terms

extensive marsh — a large marsh where the length and depth or width are roughly comparable; most extensive marshes are drained by many tidal channels and creeks which have little freshwater input.



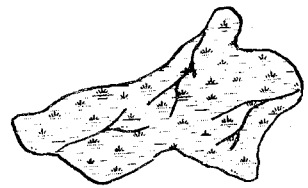
fringe marsh — a marsh which borders along a section of shoreline and generally has a much greater length than width or depth.

high marsh — the marsh surface is at an elevation of mean high water or above; it is usually inundated less than twice daily by tidal action.

low marsh — the marsh surface is at an elevation below mean high water; it is usually inundated twice daily by tidal action.

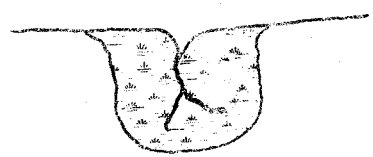
marsh island

an isolated marsh surrounded on all sides by open water; interior portions of the marsh may contain trees scattered at highest elevations



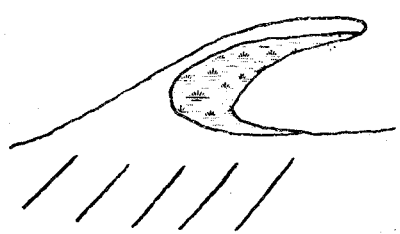
pocket marsh

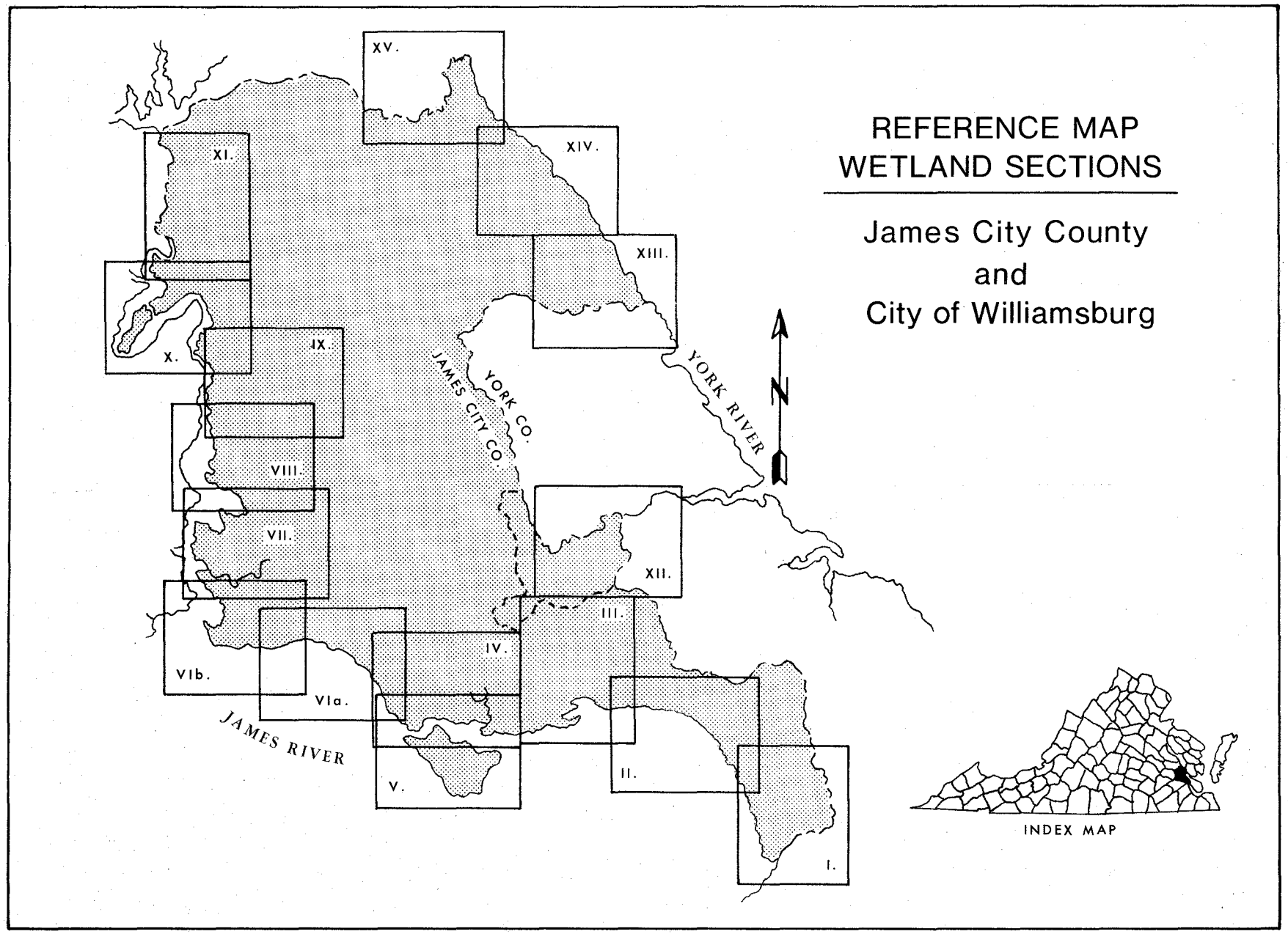
a marsh contained within a small, essentially semi-circular area on a shoreline



point or spit marsh

a marsh which extends from the uplands in the form of a point or spit; its development is usually influenced by tidal currents that form a sand berm behind which the marsh forms



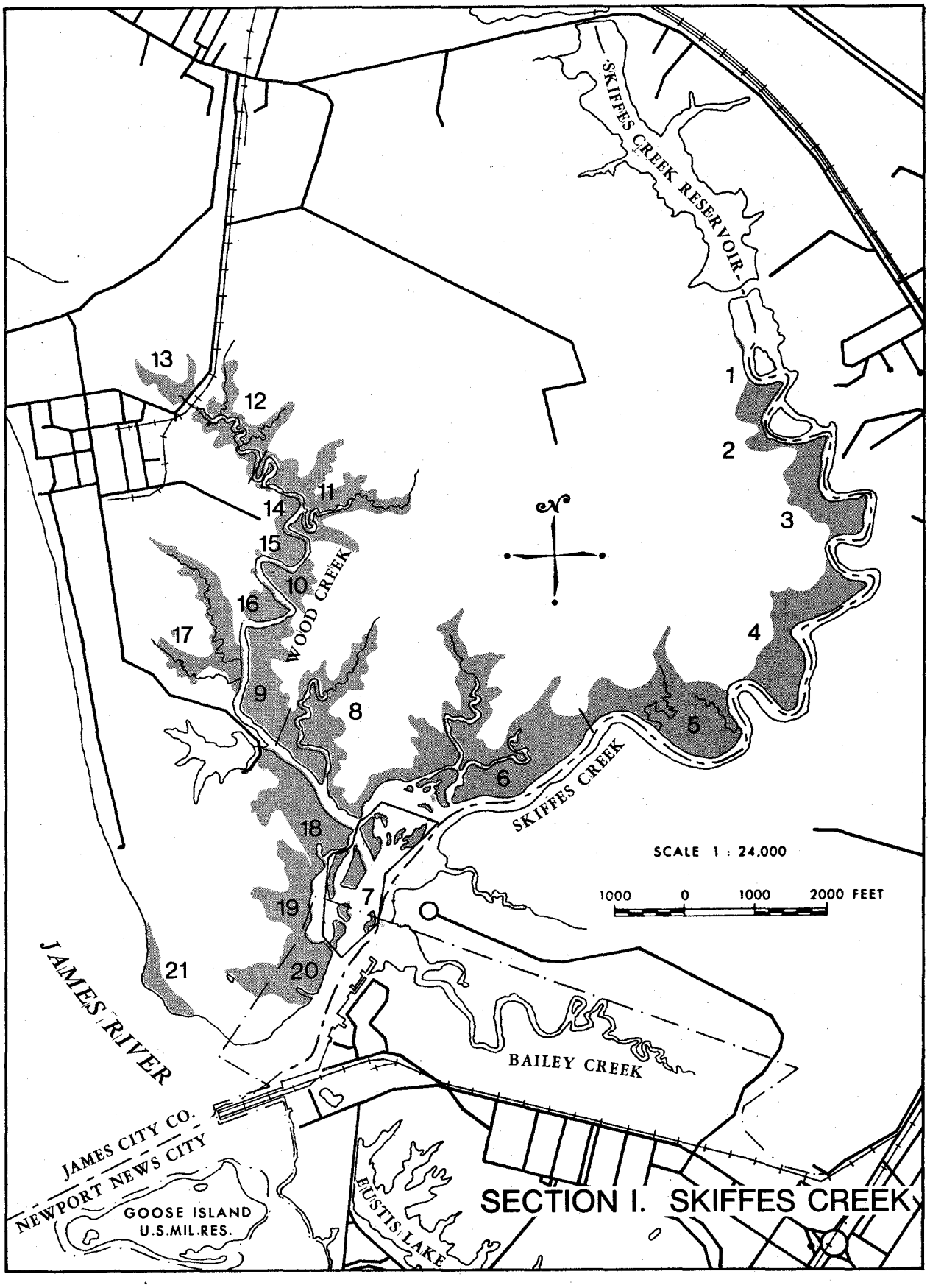

REFERENCE MAP
WETLAND SECTIONS
James City County
and
City of Williamsburg
XV.
XIV.
XIII.
XI.
X.
IX.
VIII.
VII.
VIb.
VIa.
V.
IV.
III.
II.
XII.
I.
YORK CO.
JAMES CITY CO.
YORK RIVER
JAMES RIVER
N
INDEX MAP

SECTION I

JAMES RIVER-SKIFFES CREEK

This section of James City County shoreline includes the marshes of Wood Creek and the western side of Skiffes Creek. Both creeks are dominated for the most part by brackish marshes that include species such as saltmarsh cordgrass (Type I) and big cordgrass (Type V). Proceeding upstream in both main branches, but especially in Skiffes Creek, plant species associated with more freshwater conditions increase in abundance. These include such species as arrow arum, pickerelweed, smartweeds, water dock, common threesquare (Types VII, XI).

Dredge and fill operations have altered the tidal wetlands to some extent in both these creek systems. In the lower portion of Skiffes Creek several areas of saltmarsh cordgrass (#7) have been dredged to provide deep water access to Wood Creek. Also, a large area of marsh near the mouth of Skiffes Creek has been filled with spoil and there has been some spreading onto adjacent, but as yet unaltered, marsh areas (#22). A branch of Wood Creek has also been dammed forming a non-tidal pond that is rapidly being colonized by cattails and reed grass. In addition, the head of Wood Creek has been crossed by a road but culverts allow tidal flushing to an upstream marsh area (#13).


SKIFFES CREEK RESERVOIR
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
WOOD CREEK
SKIFFES CREEK
SCALE 1 : 24,000
1000 0 1000 2000 FEET
JAMES RIVER
BAILEY CREEK
JAMES CITY CO.
NEWPORT NEWS CITY
GOOSE ISLAND
U.S.MIL.RES.
EUSTIS LAKE
SECTION I. SKIFFES CREEK

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
1	Skiffes Creek	6.0	%	40	-	-		-		35	5			-		15				-	5	-					f,-	Creek marsh section; brackish and freshwater species; saltmarsh cordgrass appears to be dying back.	XI
			acres	2.4	-	-		-		2.1	0.3			-		0.9				-	0.3	-					f,-		
2	Skiffes Creek	3.1	%	30	-	-		-		50	5			-		15				-	-	-						Pocket marsh area; some saltmarsh cordgrass but dominated by arrow arum and pickerel weed.	VII
			acres	0.9	-	-		-		1.5	0.2			-		0.5				-	-	-							
3	Skiffes Creek	18.0	%	50	10	-	-	-	-	15	10			-		5					5	-					b,5	Creek marsh; berm along channel edge formed by deposition of dredge spoil is vegetated with upland species.	I
			acres	9	1.8	-	-	-	-	2.7	1.8			-		0.9					0.9	-					b,0.9		
4	Skiffes Creek	26.7	%	55	35	-		-	-	-	5			-		5				-	-	-						Creek marsh dominated by cordgrasses; some freshwater species and cattails along upland edge.	I
			acres	14.7	9.4	-		-	-	-	1.3			-		1.3				-	-	-							
5	Skiffes Creek	35.7	%	30	60	3	-	-	2	-	-			-		-					-	-					a,5	Creek marsh dominated by cordgrasses; other species scattered, with cattails along upland.	V
			acres	10.7	21.4	1.1	-	-	0.7	-	-			-		-					-	-					a,1.8		
6	Skiffes Creek	66.6	%	40	50	-	5	-	1	-	-			2		-						-					a,2 b,-	Creek marsh dominated by cordgrasses; several patches of needlerush; cattails along uplands and at head of pocket.	I
			acres	26.7	33.3	-	3.3		0.7	-	-			1.3		-						-					a,1.3 b,-		
7	Skiffes Creek	10.4	%	100							-			-														Scattered marsh islands dominated by saltmarsh cordgrass; channel dredged through largest island; marsh erosion evident.	I
			acres	10.4							-			-															
8	Wood Creek	17.4	%	35	60	-	-	-	-		2			3							-	-					a,g,-	Creek marsh extends back to large pocket area; dominated by cordgrass with hibiscus, cattails at head.	V
			acres	6.1	10.5	-	-	-	-		0.3			0.5							-	-					a,g,-		

a - Black Needlerush
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s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

Section I. Skiffes Creek
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum-Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
9	Wood Creek	21.9	%	25	55	-		-	-		5			10								-					g,5	Creek marsh dominated by big cordgrass with abundant saltmarsh cordgrass; scattered waterhemp.	V
			acres	5.5	12.0	-		-	-		1.1			2.2								-					g,1.1		
10	Wood Creek	6.0	%	30	60	-		-	-		5			3							-	-			-		g,2	Creek marsh dominated by big cordgrass; understory of smartweeds and waterhemp.	V
			acres	1.8	3.6	-		-	-		0.3			0.2							-	-			-		g,0.1		
11	Wood Creek	21.0	%	25	50	-		-	2		15			3							2				-		g,3	Creek marsh section extends back to pocket areas; big cordgrass dominates with other species scattered.	V
			acres	5.3	10.5	-		-	0.4		3.2			0.6							0.4				-		g,0.6		
12	Wood Creek	14.4	%	25	40	-	-	5	5	5	15			-							5						b,g,-	Section of creek marsh below road; cordgrasses dominate with some freshwater species evident.	XII
			acres	3.6	5.8	-	-	0.7	0.7	0.7	2.2			-							0.7						b,g,-		
13	Wood Creek	3.9	%	55	20	-	-	5	5	-	-			15							-	-					b,k,1,-	Pocket marsh formed at head of creek above road; tidal flushing permitted via culvert under road.	I
			acres	2.1	0.8	-	-	0.2	0.2	-	-			0.6							-	-					b,k,1,-		
14	Wood Creek	1.2	%	40	50	-		-	-		10			-							-	-					g,-	Creek marsh section; big cordgrass co-dominates with saltmarsh cordgrass; other species scattered.	V
			acres	0.5	0.6	-		-	-		0.1			-							-	-					g,-		
15	Wood Creek	4.3	%	50	40	-		-	-		3			5							-				-		g,2	Creek marsh section; big cordgrass along creek edge; interior of marsh dominated by saltmarsh cordgrass.	I
			acres	2.2	1.7	-		-	-		0.1			0.2							-				-		g,0.1		
16	Wood Creek	4.3	%	35	55	-		-	2		5			1								-					a,- g,2	Creek marsh section; big cordgrass along creek; interior dominated by saltmarsh cordgrass.	V
			acres	1.5	2.4	-		-	0.1		0.2			-								-					a,- g,0.1		

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Section I. Skiffes Creek
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
17	Wood Creek	16.2	%	40	50	-		-	-	-	2			5							-	-					a,b,-g,3	Large pocket marsh with two branches; dominated by cordgrass with other species scattered.	V
			acres	6.5	8.1	-		-	-	-	0.3			0.8							-	-					a,b,-g,0.5		
18	Wood Creek	21.4	%	50	40			-	-		-			10								-					a,g,-	Creek marsh; upper portion dammed forming non-tidal pond; cordgrasses dominate with abundant hemp throughout.	I
			acres	10.7	8.6			-	-		-			2.1								-					a,g,-		
19	Skiffes Creek	13.7	%	55	35	-	-	-	-		-			10							-	-					a,g,-	Creek marsh dominated by saltmarsh cordgrass with abundant big cordgrass.	I
			acres	7.5	4.8	-	-	-	-		-			1.4							-	-					a,g,-		
20	Skiffes Creek	22.5	%	55	30	-	5	-	-		-			5								-					a,b,g,k,-e,5	Creek marsh dominated by saltmarsh cordgrass but big cordgrass, reed grass and meadow grasses border along filled areas.	I
			acres	12.4	6.8		1.1	-	-		-			1.1								-					a,b,g,k,-e,1.1		
21	James River	7.2	%	45	45	-	-	-	-		-			-		5						5					b,-	Marsh fringe; saltbush cordgrass along water grades back to big cordgrass.	XII
			acres	3.2	3.2	-	-	-	-		-			-		0.4						0.4					b,-		
	TOTAL SECTION I.	341.9	%	42	42	-	1	-	1	2	3			3		1					1	-					a,1 e,- g,1 l,- b,- f,- k,-		
			acres	143.7	145.3	1.1	4.4	0.9	2.8	7.0	11.4			11.0		4.0					2.3	0.4					a,3.1 e,1.1 g,2.5 l,- b,0.9 f,- k,-		

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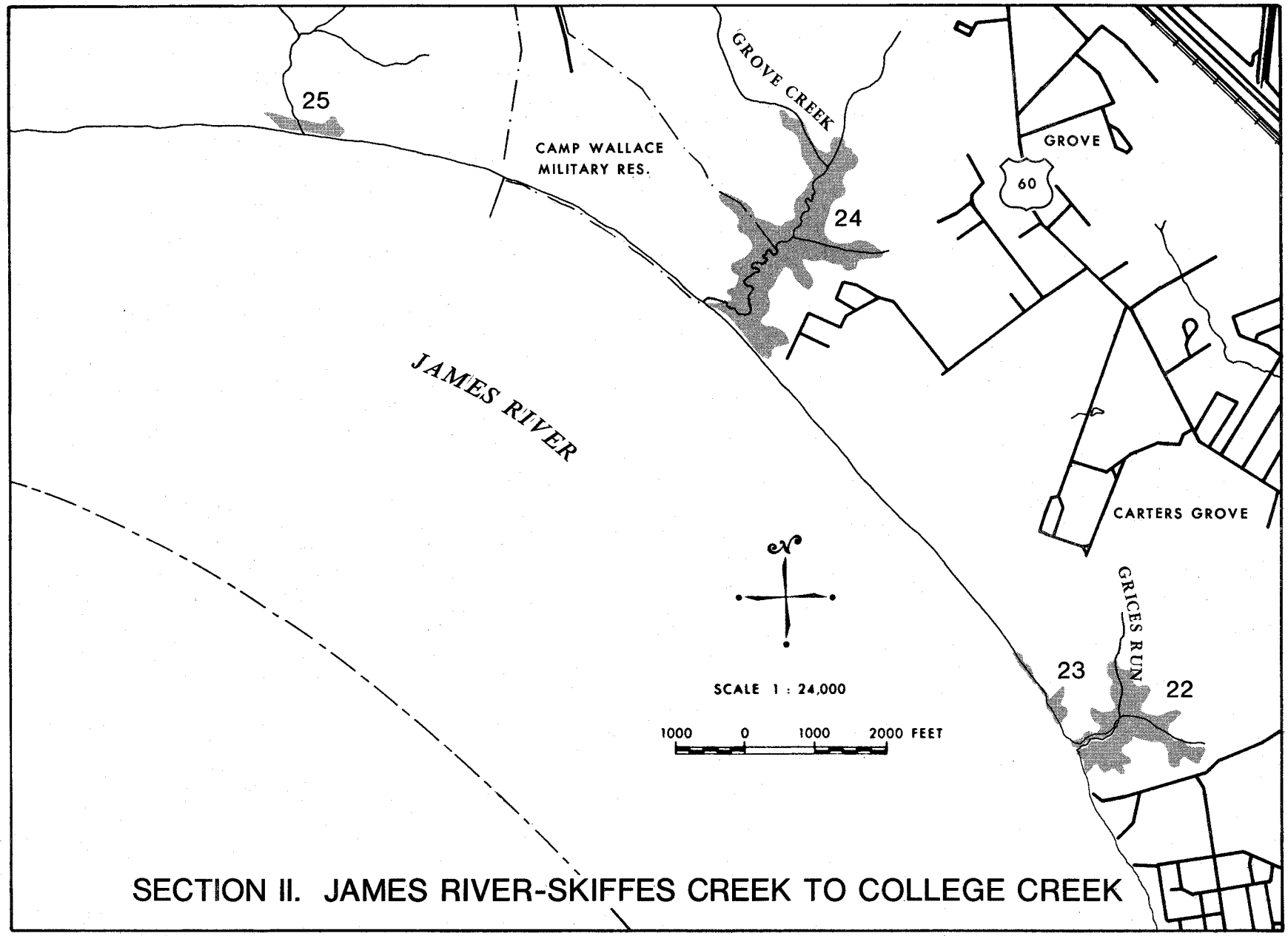
SECTION II

JAMES RIVER-SKIFFES CREEK TO COLLEGE CREEK

Much of the shoreline located along this section of James City County is devoid of marsh. This is primarily due to the erosive forces of the James River, which have resulted in a shore zone of moderately eroding bluffs and adjacent sandy beaches. However, there are several tidal creeks which contain significant areas of marsh. Grices Run (#22) forms a large pocket marsh that contains a variety of brackish water species (Type XII). Grove Creek (#24) contains over 51 acres of marsh that grade from brackish water species (Type XII) near the mouth to freshwater species (Types VII, XI) at the head. A filled roadway which is now abandoned had been build across the marsh about midway along its length, but tidal exchange occurs through a break in the causeway.

The upstream section of a tidal creek in the vicinity of Kingsmill has been recently dammed to form a non-tidal pond. At present only the most downstream section (#25) of the marsh remains.



SECTION II. JAMES RIVER-SKIFFES CREEK TO COLLEGE CREEK

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum-Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
22	Grices Run	27.2	%	25	35	10	-	10	10	-	5			5		-					-	-					g,-	Large pocket marsh; interior dominated by big cordgrass; significant mixture of other brackish species.	XII
			acres	6.8	9.5	2.7	-	2.7	2.7	-	1.4			1.4		-					-	-					g,-		
23	James River	1.8	%	20	5	20	5	20	10		-			-								-					a,10	Small pocket marsh with beach partially across front; brackish water species dominate with some high marsh areas.	XII
			acres	0.4	0.1	0.4	0.1	0.4	0.2		-			-								-					a,0.2		
24	Grove Creek	51.3	%	10	20	15	-	-	-	50	-	-		-	5	-		-				-						b,h,-	Large pocket marsh; grades from brackish water species at mouth to freshwater species at head; filled causeway crosses marsh.	VII
			acres	5.1	10.3	7.7	-	-	-	25.6	-	-		-	2.6	-		-				-						b,h,-		
25	James River	5.1	%		20	10		15	20	10	-	5		-		20		-											Pocket marsh; upstream half of marsh has been dammed forming non-tidal pond.	XI
			acres		1.0	0.5		0.8	1.0	0.5	-	0.3		-		1.0		-												
	TOTAL SECTION II	85.4	%	14	24	13	-	5	5	30	2	-		2	3	1											a,- g,- b,- h,-		
			acres	12.3	20.9	11.3	0.1	3.9	3.9	26.1	1.4	0.3		1.4	2.6	1.0											a,0.2 g,- b,- h,-		

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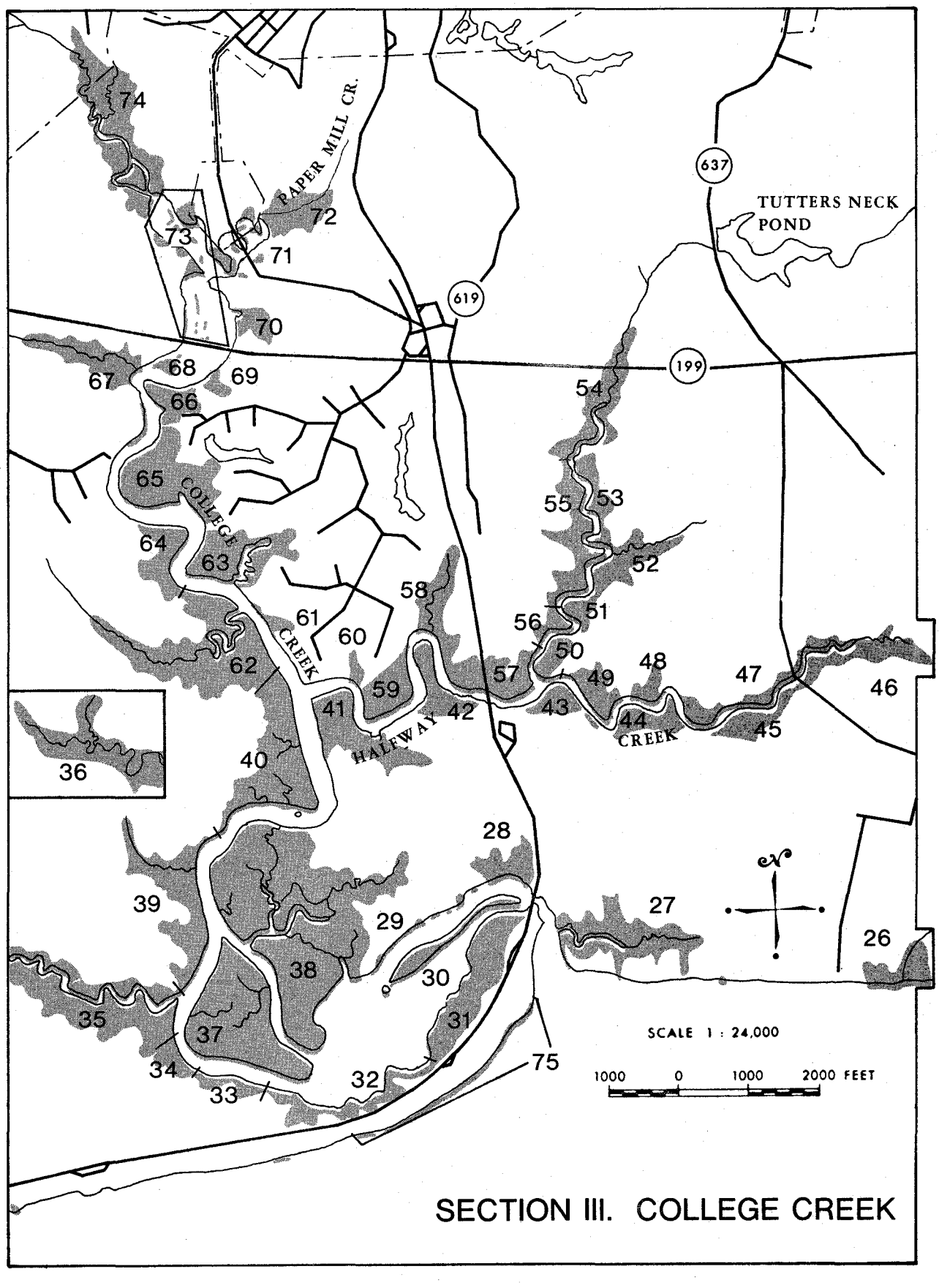
SECTION III

JAMES RIVER-COLLEGE CREEK

This section of James City County shoreline includes nearly 650 acres of tidal wetlands, most of which occur within the College Creek system. Of this total nearly 73 per cent is composed of arrow arum (Type VII), a freshwater species, while the next most abundant species, big cordgrass (Type V), account for only about 14 percent. Big cordgrass only occurs near the mouth of College Creek where its ability to withstand low salinity, brackish water becomes important.

Most of the tidal marshes within College Creek remain undisturbed, natural areas. There are exceptions however including the construction of the Colonial Parkway across the creek's mouth where spreading of fill from the roadway construction has allowed the invasion of small amounts of reed grass onto adjacent marsh areas (#31). In addition some marshes have been filled at the eastern end of the Williamsburg Airport (#62). Also, large areas of marsh in the vicinity of Paper Mill Creek (#73) have recently disappeared and these former stands are marked now only by isolated clumps of arrow arum. Review of aerial photography reveals that this disappearance occurred during a period when the Route 199 bridge was being constructed, but the cause is unknown. Another highway project which crosses Paper Mill Creek (#71) has displaced a significant area of marsh of approximately 2.5 acres. The resultant "mud wave" caused by dirt fill being placed on the marsh is slowly spreading on either side of roadway, disrupting previously unaffected marsh areas. As a consequence the roadway is slowly settling and numerous cracks are continually forming in the road surface.



SECTION III. COLLEGE CREEK

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
26	James River	7.1	%		5	40	-	20	20	10	-	-		5		-				-					-	-	i,h,-	Ber across front with cypress and big cordgrass; interior of marsh largely hibiscus, mallow and cattails.	XI
			acres		0.4	2.8	-	1.4	1.4	0.7	-	-		0.4		-				-					-	-	i,h,-		
27	College Creek	22.5	%	-	50	5		5	10	25	5	-		-	-	-			-	-	-				-	-	c,-	Pocket marsh; lower portion dominated by big cordgrass; upper portion of arrow arum, hibiscus, cattails, mallow.	V
			acres	-	11.3	1.1		1.1	2.3	5.6	1.1	-		-	-	-			-	-	-				-	-	c,-		
28	College Creek	6.4	%		-	3		1	1	90	5	-		-		-				-					-	-		Arrow arum dominated pocket marsh; cattails and hibiscus along upland edge; other species scattered.	VII
			acres		-	0.2		0.1	0.1	5.7	0.3	-		-		-				-					-	-			
29	College Creek	1.1	%	5	30	10		5	5	35	5			-		5		-		-	-					-	a,-	Marsh fringe along creek shoreline with several pocket areas; interior of pockets mostly big cordgrass, cattails & hibiscus.	XI
			acres	0.1	0.2	0.1		0.1	0.1	0.3	0.1			-		0.1		-		-	-					-	a,-		
30	College Creek	7.4	%	-	5			-	-	75	10	-		-	-	-				-	-					10		Long marsh island dominated by arrow arum; big cordgrass located in middle portion;other species scattered.	VII
			acres	-	0.4			-	-	5.6	0.7	-		-	-	-				-	-					0.7			
31	College Creek	23.3	%	10	35	-		2	3	25	20	-		-		-		-		-	-				-	-	e,5	Broad fringing marsh; arrow arum along channel grades back to smartweeds and big cordgrass; area of reed grass along upland.	XI
			acres	2.3	8.2	-		0.5	0.7	5.8	4.6	-		-		-		-		-	-				-	-	e,1.2		
32	College Creek	5.3	%	25	20	5		5	5	30	5	-		-	-	-				-	-				-	-	a,5	Fringe of saltmarsh cordgrass and needlerush; extends back to pockets with big cordgrass, arrow arum and other species.	XI
			acres	1.2	1.1	0.3		0.3	0.3	1.5	0.3	-		-	-	-				-	-				-	-	a,0.3		
33	College Creek	2.2	%		5	-		5	5	85	-	-		-		-		-		-	-				-	-		Two adjacent pocket marsh areas; dominated by arrow arum with interior sections of hibiscus and mallow.	VII
			acres		0.1	-		0.1	0.1	1.9	-	-		-		-		-		-	-				-	-			

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Section III. College Creek
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum-Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
34	College Creek	3.3	%		10	-		5	5	75	5	-		-	-	-		-		-	-				-	-		Arrow arum dominates along creek; other species including big cordgrass, hibiscus and mallow dominate interior.	VII
			acres		0.3	-		0.2	0.2	2.4	0.2	-		-	-	-		-		-	-				-	-			
35	College Creek	40.2	%		40	5		-	10	30	10	5		-		-		-			-				-	-	c,-	Creek marsh section dominated by big cordgrass and arrow arum; cattails and mallow along uplands; hemp increases upstream.	XI
			acres		16.1	2.0		-	4.0	12.1	4.0	2.0		-		-		-			-				-	-	c,-		
36	College Creek	14.2	%		15	5		5	5	45	10	5		3	-	-		2		-	5				-	-		Upstream section of creek marsh; reduction in big cordgrass while other species including pickerelweed increase over downstream area.	XI
			acres		2.2	0.7		0.7	0.7	6.4	1.4	0.7		0.4	-	-		0.3		-	0.7				-	-			
37	College Creek	40.3	%	-	20			-	-	80	-	-		-		-		-		-	-					-		Large marsh island dominated by arrow arum and pickerelweed; scattered patches of big cordgrass.	VII
			acres	-	8.1			-	-	32.2	-	-		-		-		-		-	-					-			
38	College Creek	100.5	%	-	40	-		-	-	60	-	-		-		-		-	-	-	-					-	c,-	Extensive creek marsh with mixture of arrow arum and big cordgrass; big cordgrass predominates towards uplands.	VII
			acres	-	40.2	-		-	-	60.3	-	-		-		-		-	-	-	-					-	c,-		
39	College Creek	20.7	%	-	-	5		-	-	95	-	-		-	-	-		-	-	-	-				-	-	c,-	Fringing marsh dominated arrow arum and pickerelweed; extends back to large pocket areas with cattails along uplands.	VII
			acres	-	-	1.0		-	-	19.7	-	-		-	-	-		-	-	-	-				-	-	c,-		
40	College Creek	26.4	%	-	2	-		-	1	97	-			-	-	-				-	-				-	-	c,-	Creek marsh dominated by arrow arum; other species scattered throughout.	VII
			acres	-	0.5	-		-	0.3	25.6	-			-	-	-				-	-				-	-	c,-		
41	College Creek	16.0	%			-				95	5			-	-						-					-		Creek marsh dominated by arrow arum with scattered smartweeds and other species.	VII
			acres			-				15.2	0.8			-	-						-					-			

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#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
42	Halfway Creek	7.4	%							90	5	-		-	-					-	5				-	-	c,-	Creek marsh; dominated by arrow arum with other species scattered.	VII
			acres							6.6	0.4	-		-	-					-	0.4				-	-	c,-		
43	Halfway Creek	3.5	%			-		-		97	-			-	-					-	3				-	-		Creek marsh; predominately arrow arum; other species scattered throughout.	VII
			acres			-		-		3.4	-			-	-					-	0.1				-	-			
44	Halfway Creek	4.9	%			-				100	-			-	-					-	-				-	-		Predominately arrow arum; other species only scattered.	VII
			acres			-				4.9	-			-	-					-	-				-	-			
45	Halfway Creek	5.1	%			-			-	95	2			-	-					-	3				-	-		Dominated by arrow arum with scattered water dock; other species mainly along upland edge.	VII
			acres			-			-	4.8	0.1			-	-					-	0.2				-	-			
46	Halfway Creek	17.7	%			1		-		95	2	-		-	-					-	2				-	-	j,-	Upstream section of creek branch above bridge; arrow arum grades to swamp species and cattails at head.	VII
			acres			0.2		-		16.8	0.4	-		-	-					-	0.3				-	-	j,-		
47	Halfway Creek	10.4	%					-		95	2			-	-					-	3				-	-		Creek marsh section; predominately arrow arum with scattered water dock; other species mostly along upland edge.	VII
			acres					-		9.9	0.2			-	-					-	0.3				-	-			
48	Halfway Creek	3.7	%	-		3		-		95	-			-	-					-	2				-	-	c,-	Pocket marsh; predominately arrow arum with cattails along upland; other species scattered.	VII
			acres	-		0.1		-		3.5				-	-					-	0.1				-	-	c,-		
49	Halfway Creek	7.1	%	-		-		-		95	-			-	-					-	5				-	-	c,-	Creek marsh; arrow arum with some water dock; other species scattered; cattails on pockets along upland.	VII
			acres	-		-		-		6.7	-			-	-					-	0.4				-	-	c,-		

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#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
50	Halfway Creek	4.7	%			-		2		95	-			-	-					-	3					-	c,-	Creek marsh of predominately arrow arum; scattered water dock, hibiscus and other species	VII
			acres			-		0.1		4.5	-			-	-					-	0.1					-	c,-		
51	Halfway Creek	3.2	%			-		2		95	-			-	-					-	3					-	c,-	Creek marsh of predominately arrow arum; other species scattered.	VII
			acres			-		0.1		3.0	-			-	-					-	0.1					-	c,-		
52	Halfway Creek	8.5	%			-		-		95	-			-	5					-	-					-	c,-	Creek marsh dominated by arrow arum; extends back to pocket areas with wild rice at heads.	VII
			acres			-		-		8.1	-			-	0.4					-	-					-	c,-		
53	Halfway Creek	6.3	%			-		-	-	95	2			-	1					-	2				-	-	j,-	Creek marsh section dominated by arrow arum; scattered wild rice with swamp species in pockets along uplands.	VII
			acres			-		-	-	6.0	0.1			-	0.1					-	0.1				-	-	j,-		
54	Halfway Creek	13.1	%			5		-	-	85	5			-	-		-			-	-				-	-	j,5	Head of creek branch extending above road; dominated by arrow arum but grades upstream to swamp species.	VII
			acres			0.7		-	-	11.0	0.7			-	-		-			-	-				-	-	j,0.7		
55	Halfway Creek	11.6	%			-		-	-	95	2			-	1					-	2				-	-	j,-	Creek marsh section; dominated by arrow arum with swamp species in pockets along upland.	VII
			acres			-		-	-	11.1	0.2			-	0.1					-	0.2				-	-	j,-		
56	Halfway Creek	3.5	%			-		2		95	-			-	-					-	3					-	c,-	Creek marsh dominated by arrow arum; scattered hibiscus, water dock and other species.	VII
			acres			-		0.1		3.3	-			-	-					-	0.1					-	c,-		
57	Halfway Creek	14.9	%			-		-		100	-			-	-					-	-					-	c,-	Creek marsh section dominated by arrow arum and pickerelweed; other species along upland edge.	VII
			acres			-		-		14.9	-			-	-					-	-					-	c,-		

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#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
58	Halfway Creek	10.3	%			2		-	-	95	3			-	-					-	-				-	-	c,-	Pocket marsh; mostly arrow arum and pickerelweed; cattails in pockets along upland.	VII
			acres			0.2		-	-	9.8	0.3			-	-					-	-				-	-	c,-		
59	Halfway Creek	9.6	%			-				95	-	-		-	-					-	5				-	-	c,-	Creek marsh section; predominately arrow arum, pickerel weed, waterdock; cattails along upland.	VII
			acres			-				9.1	-	-		-	-					-	0.5				-	-	c,-		
60	Halfway Creek	2.0	%			5		-		90	-	-		-	5	-			-	-	-				-	-	c,-	Small pocket marsh; mostly arrow arum and pickerelweed; wild rice and cattails at head.	VII
			acres			0.1		-		1.8	-	-		-	0.1	-			-	-	-				-	-	c,-		
61	College Creek	1.9	%	-	-	5		3	2	80	-	-		-	5	-		-	5	-					-	-	c,-	Small pocket marsh dominated by arrow arum; hibiscus at head with wildrice and cattails along upland edge.	VII
			acres	-	-	0.1		0.1	-	1.5	-	-		-	0.1	-		-	0.1	-					-	-	c,-		
62	College Creek	37.2	%	-	5	-		1	2	75	4	2		-	1	-		-	10	-	-				-	-	c,-	Large pocket marsh dominated by arrow arum; other species scattered with big cordgrass in downstream section only.	VII
			acres	-	1.9	-		0.4	0.7	27.9	1.5	0.7		-	0.4	-		-	3.7	-	-				-	-	c,-		
63	College Creek	16.0	%	-	4	1		-	1	85	1	1		-	5	-		-	2	-	-					-	c,e,-	Creek marsh dominated by arrow arum; extends back to pocket area with wildrice at head; channel dredged through marsh.	VII
			acres	-	0.6	0.2		-	0.2	13.5	0.2	0.2		-	0.8	-		-	0.3	-	-					-	c,e,-		
64	College Creek	7.5	%		-	2			-	95	1	1		-	1						-				-	-		Creek marsh that extends back to pocket areas; predominately arrow arum with other species scattered throughout.	VII
			acres		-	0.1			-	7.1	0.1	0.1		-	0.1						-				-	-			
65	College Creek	24.8	%	-	-	1		-	-	97	-	-		-	-	-				-	2					-		Creek marsh dominated by arrow arum; interior section dammed forming pond; dredged boat basin with spoil placed above upland.	VII
			acres	-	-	0.2		-	-	24.1	-	-		-	-	-				-	0.5					-			

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Section III. College Creek
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
66	College Creek	5.5	%	-	-	1		-	-	97	-	-		-	-	-				-	2					-		Creek marsh section dominated by arrow arum; adjacent to dredged basin for small marina.	VII
			acres	-	-	0.1		-	-	5.3	-	-		-	-	-				-	0.1					-			
67	College Creek	9.7	%		-	1		-	-	97	-	1		-	-	-			-	-	1				-	-		Pocket marsh dominated by arrow arum; jewel-weed and cattails at head; other species generally scattered.	VII
			acres		-	0.1		-	-	9.4	-	0.1		-	-	-			-	-	0.1				-	-			
68	College Creek	1.2	%			-		-		100	-	-		-		-				-						-		Creek marsh almost entirely of arrow arum; large section of marsh have disappeared since 1969.	VII
			acres			-		-		1.2	-	-		-		-				-						-			
69	College Creek	2.1	%			2		-	-	95	1	2		-						-					-	-		Pocket marsh of arrow arum and pickerelweed; jewel-weed and cattails at head.	VII
			acres			0.1		-	-	1.9	-	0.1		-						-					-	-			
70	College Creek	3.7	%			10		-	-	85	-	5		-						-	-				-	-		Pocket marsh area of predominately arrow arum; cattails and jewel-weed at head; extensive lower section of marsh has disappeared.	VII
			acres			0.4		-	-	3.1	-	0.2		-						-	-				-	-			
71	Paper Mill Creek	5.1	%			-		-	-	95	-	5									-							Lower section of creek branch; mostly scattered areas of arrow arum; recent road construction has resulted in extensive mudwave.	VII
			acres			-		-	-	4.8	-	0.3									-								
72	Paper Mill Creek	10.1	%			55		-	-	30	-	15		-	-					-	-				-			Upper section of creek branch; arrow arum and pickerelweed grades to jewel-weed and cattails at head & along upland border.	VI
			acres			5.6		-	-	3.0	-	1.5		-	-					-	-				-				
73	College Creek	4.0	%		-	2		-	-	90	3	5		-	-	-				-	-					-		Scattered remanant areas of arrow arum; disappearance of former large marsh areas has occurred in last 10 years.	VII
			acres		-	0.1		-	-	3.6	0.1	0.2		-	-	-				-	-					-			

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Section III. College Creek
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
74	College Creek	33.2	%		-	5		-	-	80	5	5		-	-	-			-	-	5				-	-		Creek marsh formed at head of creek; arrow arum with smartweed and water-dock; other species along upland edge.	VII
			acres		-	1.7		-	-	26.4	1.7	1.7		-	-	-			-	-	1.7				-	-			
75	James River	2.0	%		30	-	25	15	20	5	5	-		-		-		-				-					a,k,-	High marsh fringe mixed with myrtle and pine in areas; average width 30 ft.	XII
			acres		0.6	-	0.5	0.3	0.4	0.1	0.1	-		-		-		-				-					a,k,-		
	TOTAL SECTION III.	648.4	%	1	14	3	-	1	2	73	3	1		-	-	-	-	-	1		1	-			-	-	a,- e,- i,- k,- c,- h,- j,-		
			acres	3.6	92.2	18.2	0.5	5.6	11.5	473.1	19.6	7.8		0.8	2.1	0.1	-	0.3	4.1		6.0	-			-	0.7	a,0.3e,1.2 i,- k,- c,- h,- j,0.7		

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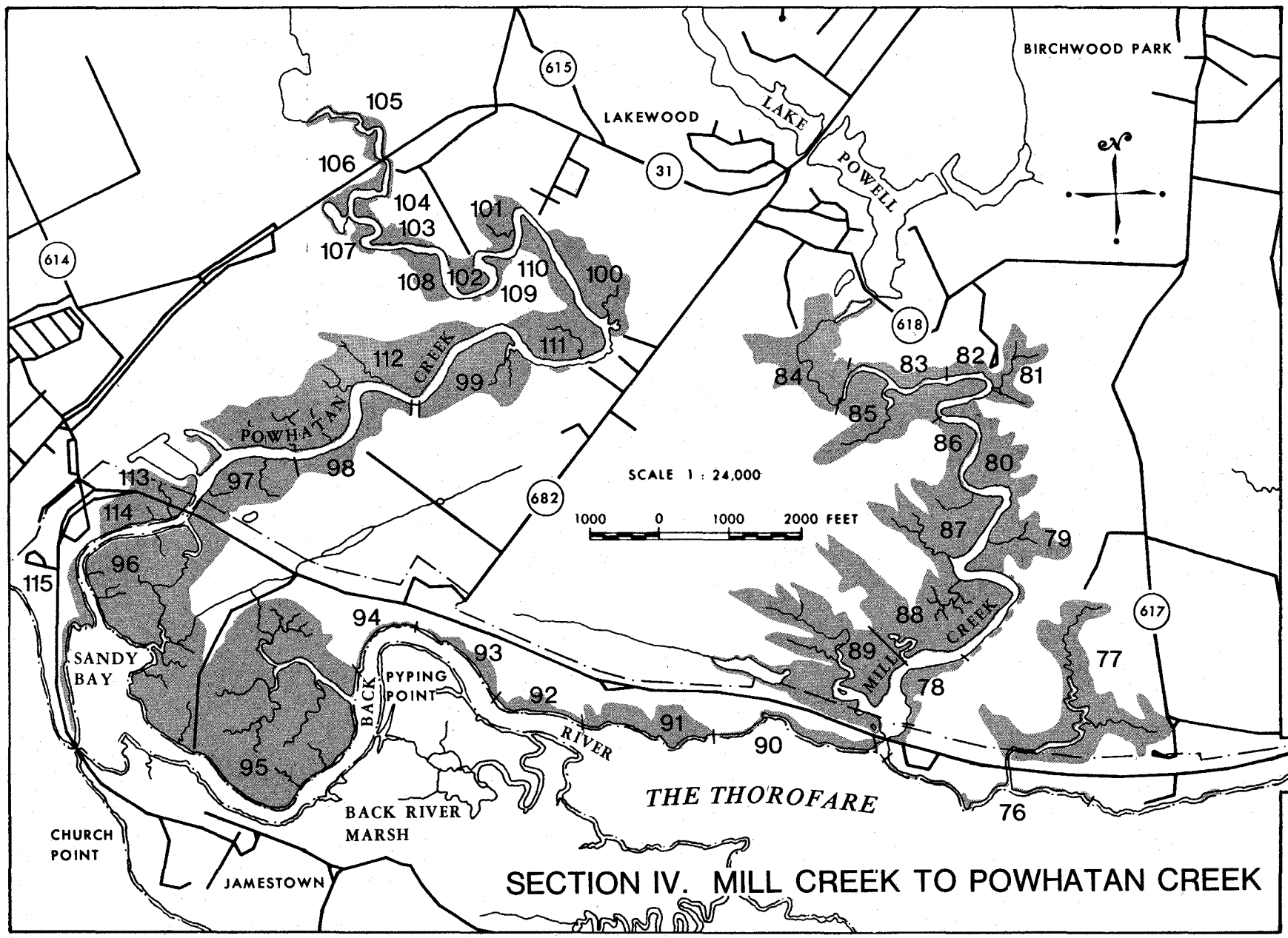
SECTION IV

JAMES RIVER-MILL CREEK TO POWHATAN CREEK

The tidal wetland areas found along this section of shoreline total over 680 acres and consist primarily of brackish and freshwater species (Types XI, VII). Big cordgrass (Type V), as well as other species that can tolerate low concentrations of salt water, are most common in the downstream sections of Mill Creek and Back River. On the other hand, species such as arrow arum, pickerelweed and wild rice (Types XI, VII) which are essentially found only in fresh water, dominate the upstream sections of these creeks.

The marsh and creek systems described here are valuable environmental areas that support abundant fish and wildlife. Both Powhatan and Mill Creeks serve as nursery and spawning areas for several species of shad and herring. The marshes themselves support animals such as deer and muskrat, and in the fall and winter supply a food source for migrating waterfowl.

The majority of the wetland areas in this section have not been disturbed irreparably by man's activities. An exception to this includes a large boat basin and marina which have been constructed adjacent to marsh #113. In addition to displacing a large area of marsh, the dredged boat basin also serves as a possible source of pollutants to the creek system. At another site located between marshes #98 and #99, is the entrance to a series of upland canals. Although it displaces few wetlands, a canal system such as this can be a source of poor water quality.


615
LAKEWOOD
LAKE
POWELL
BIRCHWOOD PARK
31
614
618
682
617
105
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CREEK
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POWHATAN
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MILL
CREEK
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SANDY
BAY
BACK
PYPING
POINT
RIVER
THE THOROFARE
76
BACK RIVER
MARSH
CHURCH
POINT
JAMESTOWN
SCALE 1 : 24,000
1000 0 1000 2000 FEET
SECTION IV. MILL CREEK TO POWHATAN CREEK

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
76	The Thorofare	1.2	%	10	45	-		5	5		-	-		-		10											a,-e,25	Marsh fringe; common threesquare and saltmarsh cordgrass along river; big cordgrass, reedgrass dominate interior sections.	XI
			acres	0.1	0.5	-		0.1	0.1		-	-		-		0.1											a,-e,0.3		
77	The Thorofare	48.5	%	-	50			3	-	40				5	-	2								-			c,k,g,-	Large creek marsh; flushes through culvert under road; big cordgrass grades to upstream areas of arrow arum.	V
			acres	-	24.2			1.5	-	19.4				2.4	-	1.0								-			c,k,g,-		
78	Mill Creek	4.6	%	-	25	-		5	5	20	15	5		15	-	5		-		-				-	-		e,5	Broad fringing marsh area with big cordgrass waterhemp and pickerelweed most abundant.	XI
			acres	-	1.3	-		0.2	0.2	0.9	0.7	0.2		0.7	-	0.2		-		-				-	-		e,0.2		
79	Mill Creek	14.1	%		20	-		5	5	30	10	10	-	20	-	-		-	-	-				-	-	-		Diverse creek marsh; cattails and wild rice in sections along upland; other species throughout.	XI
			acres		2.8	-		0.7	0.7	4.3	1.4	1.4	-	2.8	-	-		-	-	-				-	-	-			
80	Mill Creek	15.8	%		5	-		-	-	35	10	5	-	20	25	-		-	-	-	-			-	-	-		Creek marsh; abundant wild rice and water hemp in interior section; other species throughout.	XI
			acres		0.8	-		-	-	5.5	1.6	0.8	-	3.2	3.9	-		-	-	-	-			-	-	-			
81	Mill Creek	7.8	%		-	-		-	-	35	10	5	-	15	30	-		-	5	-				-	-	-		Pocket marsh; interior section dominated by arrow arum and wild rice; remainder of marsh of diverse composition.	XI
			acres		-	-		-	-	2.7	0.8	0.4	-	1.2	2.3	-		-	0.4	-				-	-	-			
82	Mill Creek	2.0	%		5	5		-		35	15	5	-	10	20	5		-	-	-	-			-	-	-		Two adjacent pocket marsh areas; narrow fringe of big cordgrass along creek; interior largely with rice and arrow arum.	XI
			acres		0.1	0.1		-		0.7	0.3	0.1	-	0.2	0.4	0.1		-	-	-	-			-	-	-			
83	Mill Creek	3.1	%			-		-	5	45	10	3	-	10	25	-		1	-	-	-			-	1			Diverse creek marsh; arrow arum, wild rice, water hemp most abundant; understory of smartweeds.	XI
			acres			-		-	0.2	1.4	0.3	0.1	-	0.3	0.8	-		-	-	-	-			-	-				

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#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
84	Mill Creek	22.8	%		5	-		5	5	40	10	10	-	20	-	-			5					-	-		h,-	Head of creek; marsh dominated by arrow arum with abundant hemp; scattered cypress; grades upstream to swamp.	XI
			acres		1.1	-		1.1	1.1	9.2	2.3	2.3	-	4.6	-	-			1.1					-	-		h,-		
85	Mill Creek	28.0	%		10	-		5	5	30	5	10	-	5	25	-		-	5	-	-			-	-	-	e,-	Creek marsh; wildrice in interior pocket area and along uplands; big cordgrass abundant in downstream section.	XI
			acres		2.8	-		1.4	1.4	8.4	1.4	2.8	-	1.4	7.0	-		-	1.4	-	-			-	-	-	e,-		
86	Mill Creek	4.5	%			5				50	10	-		-	30	-			5	-	-			-	-	-		Creek marsh section; dominated by arrow arum and wild rice.	VII
			acres			0.2				2.3	0.4	-		-	1.4	-			0.2	-	-			-	-	-			
87	Mill Creek	27.1	%		35	-		-	-	25	5	10	-	15	10	-		-	-	-	-			-	-	-	c,e,g,m-	Big cordgrass and arrow arum dominated creek marsh; wild rice abundant along uplands; other species throughout.	XI
			acres		9.5	-		-	-	6.8	1.4	2.7	-	4.0	2.7	-		-	-	-	-			-	-	-	c,e,g,m,-		
88	Mill Creek	40.1	%		55	-		2	3	20	5	10	-	5	-	-		-	-	-	-			-	-		c,m,-	Creek marsh section; big cordgrass dominate but arrow arum is abundant, especially in interior sections.	V
			acres		22.1	-		0.8	1.2	8.0	2.0	4.0	-	2.0	-	-		-	-	-	-			-	-		c,m,-		
89	Mill Creek	42.3	%		50	-		1	1	20	5	15	1	5	2	-		-	-	-	-			-	-		c,m,-	Band of reed grass along edge of Parkway; big cordgrass and wild rice dominate marsh with wild rice at heads of pockets.	V
			acres		21.2	-		0.4	0.4	8.5	2.1	6.4	0.4	2.1	0.8	-		-	-	-	-			-	-		c,m,-		
90	The Thorofare	5.5	%	5	15	5		5	5	25	20	5	-	5		5		-	-	-	-	-		-	-	-	e,5 b,k,m,-	Marsh fringe; saltmarsh cordgrass, threesquare, pickerelweed along river; other species in interior.	XI
			acres	0.3	0.8	0.3		0.3	0.3	1.3	1.0	0.3	-	0.3		0.3		-	-	-	-	-		-	-	-	e,0.3 b,k,m,-		
91	The Thorofare	13.4	%	5	10	5		5	5	20	10	5	15	15	-	5		-	-	-	-	-			-	-	m,-	Broad marsh fringe; very diverse flora throughout; mixture of brackish and freshwater species.	XI
			acres	0.7	1.3	0.7		0.7	0.7	2.6	1.3	0.7	2.0	2.0	-	0.7		-	-	-	-	-			-	-	m,-		

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q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

Section IV. Mill Creek to Powhatan Creek
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
92	Back River	4.2	%			-		5	5	35	5	-	5	-	45	-			-		-			-	-	-	m,-	Marsh fringe; wild rice very abundant with understory of arrow arum; other species scattered.	XI
			acres			-		0.2	0.2	1.5	0.2	-	0.2	-	1.9	-			-		-			-	-	-	m,-		
93	Back River	4.6	%	-	-	-	-	-	5	40	-	-	5	-	50	-		-			-			-	-	-	m,-	Marsh fringe; dominated by mixture of arrow arum and wild rice.	XI
			acres	-	-	-	-	-	0.2	1.9	-	-	0.2	-	2.3	-		-			-			-	-	-	m,-		
94	Back River	1.4	%	5	5	5		5	5	30	5	-	5	25	10	-		-	-		-			-	-	-	c,- m,-	Marsh fringe average width 30 ft; arrow arum predominates with abundant water hemp; other species scattered.	XI
			acres	0.1	0.1	0.1		0.1	0.1	0.3	0.1	-	0.1	0.3	0.1	-		-	-		-			-	-	-	c,- m,-		
95	Back River	108.3	%	-	40	-		2	3	30	5	5	3	5	5	-	-	-	1		-			-	-	-	c,1 b,m,-	Extensive creek marsh; mixture of big cordgrass and arrow arum; wild rice along uplands & in patches throughout; others scattered.	XI
			acres	-	43.4	-		2.2	3.3	32.5	5.4	5.4	3.3	5.4	5.4	-	-	-	1.0		-			-	-	-	c,1.0 b,m,-		
96	Powhatan Creek	74.5	%	-	20	-		-	-	30	5	5	20	15	5	-	-	-	-	-	-				-	-	c,m,n,-	Extensive creek marsh; big cordgrass predominately along creek; interior of marsh largely arrow arum, hemp, etc.	XI
			acres	-	14.9	-		-	-	22.4	3.7	3.7	14.9	11.2	3.7	-	-	-	-	-	-				-	-	c,m,n,-		
97	Powhatan Creek	15.5	%		10	-		-	-	25	5	5	10	20	-	-	25	-			-			-	-	-	m,-	Creek marsh; abundant tear thumb and hemp mixed with arrow arum, big cordgrass.	XI
			acres		1.5	-		-	-	3.9	0.8	0.8	1.5	3.1	-	-	3.9	-			-			-	-	-	m,-		
98	Powhatan Creek	9.7	%		5	-		5	-	30	5	5	-	25	-		25	-		-	-				-	-		Arrow arum abundant throughout but especially along creek; hemp, tearthumb, others most abundant in interior.	XI
			acres		0.5	-		0.5	-	2.9	0.5	0.5	-	2.4	-		2.4	-		-	-				-	-			
99	Powhatan Creek	21.4	%		5	-		5	-	25	5	5	5	25	-		25	-		-	-				-	-	m,-	Creek marsh section upstream from dredged channel hemp smartweed, tearthumb most abundant in interior.	XI
			acres		1.1	-		1.1	-	5.3	1.1	1.1	1.1	5.3	-		5.3	-		-	-				-	-	m,-		

a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
d - Olney Threesquare
e - Reed Grass
f - Saltmarsh Loosestrife
g - Sedge
h - Bald Cypress
i - Swamp Rose
j - Black Gum
k - Switch Grass
l - Saltmarsh Aster
m - Water Parsnip
n - Ironweed
o - Wool Grass
p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
100	Powhatan Creek	17.3	%		-	-		-	-	25	15	15	15	15	10	-	5	-		-	-				-	-	m,-	Creek marsh; diverse freshwater flora; wild rice scattered throughout.	XI
			acres		-	-		-	-	4.3	2.6	2.6	2.6	2.6	1.7	-	0.9	-		-	-				-	-	m,-		
101	Powhatan Creek	6.0	%		-	-		-	-	20	25	10	10	20	15	-	-	-		-	-				-	-	b,m,-	Creek marsh; diverse freshwater flora.	XI
			acres		-	-		-	-	1.2	1.5	0.6	0.6	1.2	0.9	-	-	-		-	-				-	-	b,m,-		
102	Powhatan Creek	4.6	%			-		-	-	30	25	-	5	5	35	-	-	-		-	-				-	-	h,m,-	Creek marsh; predominately pickerelweed and wild rice with abundant smartweed; scattered cypress.	XI
			acres			-		-	-	1.4	1.2	-	0.2	0.2	1.6	-	-	-		-	-				-	-	h,m,-		
103	Powhatan Creek	3.0	%			-		-	-	40	20	-	-	-	40	-	-	-		-	-				-	-	h,m,-	Creek marsh; predominately arrow arum, pickerelweed and wild rice; cypress scattered throughout.	XI
			acres			-		-	-	1.2	0.6	-	-	-	1.2	-	-	-		-	-				-	-	h,m,-		
104	Powhatan Creek	2.0	%			-		-	-	50	10	25	-	5	10	-	-	-		-	-				-	-	h,m,-	Fringing and creek type marsh; predominately arrow arum and pickerelweed; grades to swamp in places.	VII
			acres			-		-	-	1.0	0.2	0.5	-	0.1	0.2	-	-	-		-	-				-	-	h,m,-		
105	Powhatan Creek	4.3	%			5		-	-	45	25	25	-	-	-	-	-	-		-	-				-	-	h,m,-	Marsh at head of creek above road; arrow arum and pickerelweed dominated marsh grades to swamp with abundant cypress.	XI
			acres			0.2		-	-	1.9	1.1	1.1	-	-	-	-	-	-		-	-				-	-	h,m,-		
106	Powhatan Creek	4.1	%			-		-	-	50	10	25	-	5	10	-	-	-		-	-				-	-	h,m,-	Creek and fringing type marsh; predominately arrow arum with other species throughout.	VII
			acres			-		-	-	2.1	0.4	1.0	-	0.2	0.4	-	-	-		-	-				-	-	h,m,-		
107	Powhatan Creek	1.8	%			5		-	-	35	10	10	10	5	25		-	-	-	-	-				-	-	h,m,-	Creek marsh section; predominately a mixture of arrow arum and wild rice; other species scattered.	XI
			acres			0.1		-	-	0.6	0.2	0.2	0.2	0.1	0.4		-	-	-	-	-				-	-	h,m,-		

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l - Saltmarsh Aster
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n - Ironweed
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q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
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v - Orach

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
108	Powhatan Creek	5.7	%			-		-	-	45	20	10	5	15	5		-	-	-	-	-				-	-	h,m,-	Creek marsh of predominately arrow arum and pickerelweed; other species including cypress scattered throughout.	XI
			acres			-		-	-	2.5	1.1	0.7	0.3	0.8	0.3		-	-	-	-	-				-	-	h,m,-		
109	Powhatan Creek	1.8	%			-		-	-	40	10	5	10	5	30		-	-	-	-	-				-	-		Creek marsh section adjacent to campground; mostly arrow arum and wild rice with other species scattered.	XI
			acres			-		-	-	0.7	0.2	0.1	0.2	0.1	0.5		-	-	-	-	-				-	-			
110	Powhatan Creek	5.4	%			-		-	-	30	10	10	10	10	30		-	-	-	-	-				-	-	m,-	Creek marsh section that borders along campground; diverse flora with arrow arum and wild rice most abundant.	XI
			acres			-		-	-	1.7	0.5	0.5	0.5	0.5	1.7		-	-	-	-	-				-	-	m,-		
111	Powhatan Creek	15.5	%		-	-		-	-	30	20	10	5	20	5	5	5	-	-	-	-			-	-	-	c,m,-	Creek marsh; arrow arum with overstory of other species such as smartweed, jewelweed; abundant waterhemp.	XI
			acres		-	-		-	-	4.6	3.1	1.5	0.8	3.1	0.8	0.8	0.8	-	-	-	-			-	-	-	c,m,-		
112	Powhatan Creek	64.8	%		10	-		-	-	20	15	10	5	20	-	-	15	-	5	-	-			-	-	-	c,h,m,n,-	Broad creek marsh with diverse flora; downstream section dredged and filled for boat basin.	XI
			acres		6.5	-		-	-	13.0	9.7	6.5	3.2	13.0	-	-	9.7	-	3.2	-	-			-	-	-	c,h,m,n,-		
113	Powhatan Creek	7.8	%		30	5		5	-	40	10	5	-	5		-	-	-		-	-				-	-	b,c,m,n,-	Creek marsh section extending between dredged boat basin and Parkway; big cordgrass along creek; interior of arrow arum.	XI
			acres		2.3	0.4		0.4	-	3.1	0.8	0.4	-	0.4		-	-	-		-	-				-	-	b,c,m,n,-		
114	Powhatan Creek	9.3	%		40	-		-	-	30	5	5	-	20	-	-	-	-		-	-			-	-		b,c,m,n,-	Creek marsh section downstream of Parkway; big cordgrass predominately along creek; interior largely arrow arum & wtr. hemp.	XI
			acres		3.7	-		-	-	2.8	0.5	0.5	-	1.8	-	-	-	-		-	-				-		m,n,-		
115	Sandy Bay	6.9	%		15	5		-	-	60	15		-	5	-	-	-	-	-	-	-			-	-	-	m,h,-	Fringe marsh; dominated by arrow arum and pickerel weed; big cordgrass along upland.	VII
			acres		1.0	0.4		-	-	4.1	1.0		-	0.4	-	-	-	-	-	-	-			-	-	-	m,h,-		

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#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
	TOTAL SECTION IV.	680.7	%	-	24	-		2	1	29	8	7	5	12	6	-	3		1	-							a,- c,- g,- k,- n,- b,- e,- h,- m,-		
			acres	1.2	163.5	2.5		11.7	10.1	198.9	53.5	49.9	32.3	79.4	42.4	3.2	23.0		4.1	3.2							a,- c,1 g,- k,- n,- b,- e,0.8 h,- m,-		

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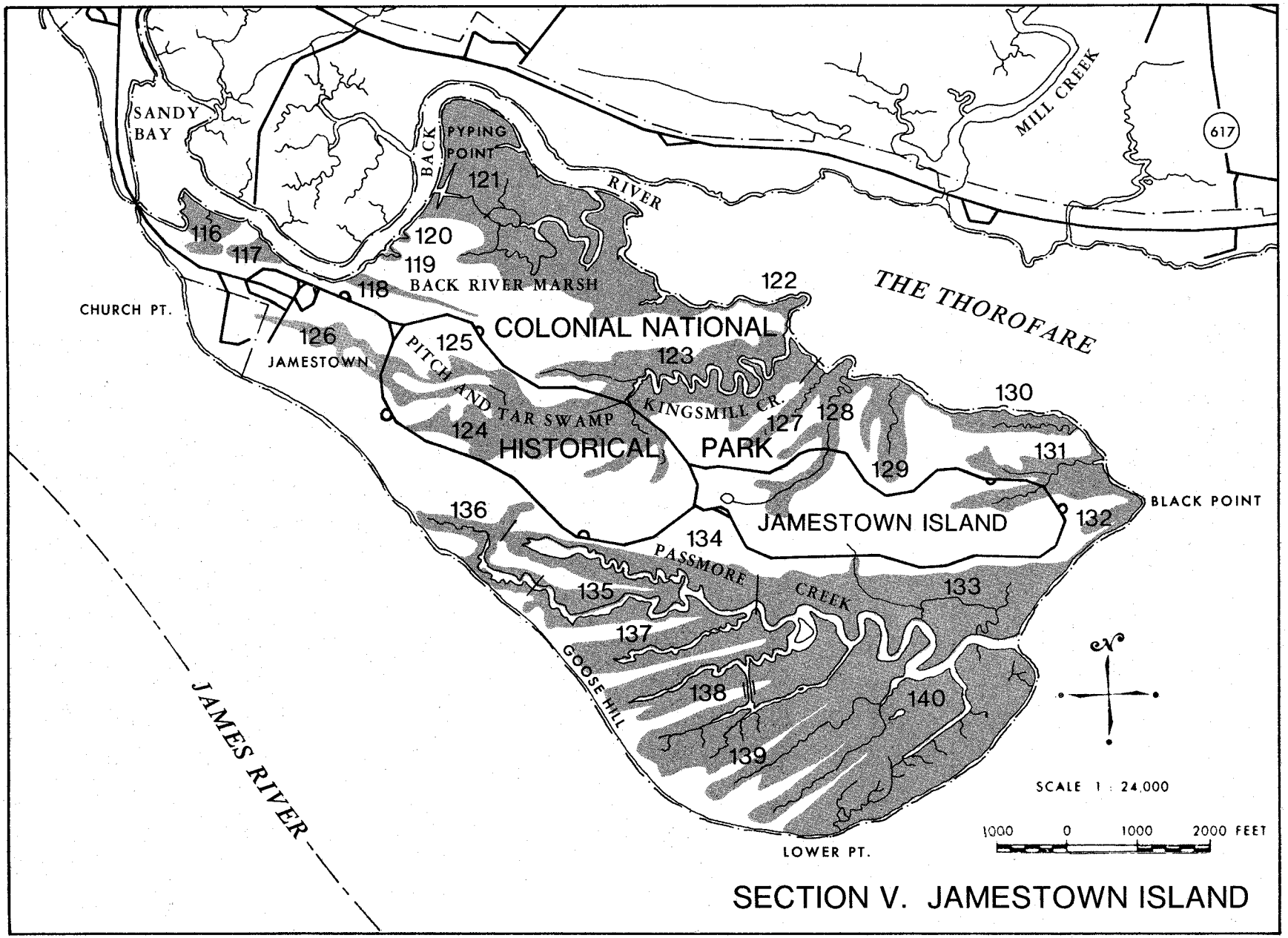
SECTION V

JAMES RIVER-JAMESTOWN ISLAND

Historic Jamestown Island, which contains over 706 acres of tidal wetlands, is located in a zone of the James River which marks the upper limits of saltwater. As such, one generally finds the waters surrounding the island to be quite fresh during the spring but somewhat brackish during the fall. This upper limit of saltwater intrusion is evident within the vegetative patterns of the various tidal creeks. In most of these areas freshwater species such as arrow arum (Type VII) dominate the upstream areas, while brackish water species such as big cordgrass (Type V) and saltmarsh cordgrass (Type I) are found near the mouths.

Back River Marsh (#121) is one of the largest wetland areas on the island and it consists of extensive stands of wild rice and arrow arum as well as large areas of big cordgrass. Kingsmill Creek (#123, 124) is dominated for most of its length by big cordgrass but grades to an upstream portion of reduced salinity known as Pitch and Tar Swamp, where such species as cattails (Type VI) and arrow arum are most abundant. At the most upstream section of this creek these marsh species are being replaced by pioneer swamp species including red maple and black gum.

Passmore Creek contains the most extensive wetlands acreage on Jamestown Island. The lower sections of the creek system (#133, 140) are for the most part again dominated by big cordgrass. At the heads of the numerous branches, which are located between a series ancient beach ridges, arrow arum and wild rice dominate. Active erosion along the western face of the island is slowly truncating these ridge and marsh areas. But because the waves also maintain a shallow sand beach along this retreating shoreline, drainage continues east to Passmore Creek rather than directly into the James River.



SECTION V. JAMESTOWN ISLAND

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
116	Sandy Bay	6.7	%	-	40	-		-	-	30	5	-	15	-	-	-	10	-	-	-	-			-	-	-	c,h,l,m,-	Big cordgrass abundant along creek; interior of marsh largely arrow arum and pickerelweed.	XI
			acres	-	2.7	-		-	-	2.0	0.3	-	1.0	-	-	-	0.7	-	-	-	-			-	-	-	c,h,l,m,-		
117	Back River	3.3	%	2	40	3		2	3	30	15	5	-	-	-	-	-	-	-	-	-			-	-	-	c,h,m,-	Pocket marsh with mixture of brackish and freshwater species; saltmarsh cordgrass along creek edge.	XI
			acres	0.1	1.3	0.1		0.1	0.1	0.9	0.5	0.2	-	-	-	-	-	-	-	-	-			-	-	-	c,h,m,-		
118	Back River	4.2	%	-	70	5		-	-	15	5	5	-	-	-	-	-	-		-	-				-	-	c,h,l,-	Pocket marsh dominated by big cordgrass and arrow arum; cattails at head; other species scattered.	V
			acres	-	3.0	0.2		-	-	0.6	0.2	0.2	-	-	-	-	-	-		-	-				-	-	c,h,l,-		
119	Back River	0.60	%	-	45	5		-	-	35	5	-	-	-	10	-	-	-		-	-				-	-	c,l,-	Small pocket marsh; arrow arum, pickerelweed, wild rice at mouth; big cordgrass cattails at head.	XI
			acres	-	0.27	0.03		-	-	0.21	0.03	-	-	-	0.06	-	-	-		-	-				-	-	c,l,-		
120	Back River	0.30	%	5	-	5				25	-		-	-	65	-				-					-	-	h,-	Small pocket marsh; dominated by wild rice with arrow arum; salt marsh cordgrass along creek.	XI
			acres	0.02	-	0.02				0.08	-		-	-	0.20	-				-					-	-	h,-		
121	Back River	114.1	%	-	35	1		1	-	35	1	-	-	2	25	-	-	-	-	-	-			-	-	-	c,m,n,-	Eastern and large western sections of marsh dominated by wild rice and arrow arum; middle section abundant big cordgrass.	XI
			acres	-	40.0	1.1		1.1	-	40.0	1.1	-	-	2.3	28.5	-	-	-	-	-	-			-	-	-	c,m,n,-		
122	The Thorofare	1.9	%	5	70	-		5	-	20	-	-	-			-		-	-	-	-	-			-	-	a,b,c,-	Spit marsh with some trees along upland berm; predominately big cordgrass with arrow arum	V
			acres	0.1	1.3	-		0.1	-	0.4	-	-	-			-		-	-		-	-			-	-	a,b,c,-		
123	Kingsmill Creek	54.9	%		88	-		1	-	10	1			-		-		-			-		-		-	-	a,b,g, m,n,-	Creek marsh comprising lower section of creek; predominately big cordgrass with scattered arrow arum.	V
			acres		48.4	-		0.5	-	5.5	0.5			-		-		-			-		-		-	-	a,b,g, m,n,-		

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#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
124	Kingsmill Creek	44.4	%		60	20		-	-	15	-			-		5		-	-	-	-	-			-	-	b,c,m,n,-	Creek marsh area above causeway; predominately big cordgrass with arrow arum; cattails in upstream sections.	V
			acres		26.6	8.9		-	-	6.7	-			-		2.2		-	-	-	-	-			-	-	b,c,m,n,-		
125	Pitch and Tar Swamp	14.6	%		-	45	-	-	-	15	5					30				-	-				-	-	g,-k,5	Creek marsh branch; partially obstructed by old dike; cattails and three-square dominate with some open water areas.	XI
			acres		-	6.6	-	-	-	2.2	0.7					4.4				-	-				-	-	g,-k,0.7		
126	Pitch and Tar Swamp	7.4	%			50		-		20	15					-			5	-				5			b,f,k,-g,5	Head of creek branch above roadway; marsh fringe around open water; grades upstream to wooded swamp.	VI
			acres			3.6		-		1.5	1.1					-			0.4	-				0.4			b,c,k,-g,0.4		
127	The Thorofare	6.5	%	1	80	3		-	-	10	5	-		-	-	-		-		-	-	-		-	-	-	a,b,m,n,-c,1	Pocket marsh dominated by big cordgrass; arrow arum along channels; cattails at head.	V
			acres	0.1	5.2	0.2		-	-	0.6	0.3	-		-	-	-		-		-	-	-		-	-	-	a,b,m,n,-c,0.1		
128	The Thorofare	17.1	%	-	80	-	-	-	-	15	5	-		-	-	-		-		-	-	-		-	-	-	a,b,c,m,n,-	Pocket marsh with two branches; dominated by big cordgrass with arrow arum; scattered smartweed; cattails upper portion	V
			acres	-	13.7	-	-	-	-	2.6	0.8	-		-	-	-		-		-	-	-		-	-	-	a,b,c,m,n,-		
129	The Thorofare	14.6	%	-	85	-	-	-	-	15	-			-		-	-	-		-	-	-		-	-	-	a,b,c,k,-	Pocket marsh; some saltmarsh cordgrass and needlerush at mouth; interior mostly big cordgrass with arrow arum.	V
			acres	-	12.4	-	-	-	-	2.2	-			-		-	-	-		-	-	-		-	-	-	a,b,c,k,-		
130	The Thorofare	10.4	%	-	90	-	-	-	-	5	5			-		-	-				-	-			-		a,b,c,k,-	Broad fringing marsh; berm across front with trees and saltbushes; interior predominately big cordgrass.	V
			acres	-	9.4	-	-	-	-	0.5	0.5			-		-	-				-	-			-		a,b,c,k,-		
131	Black Point	22.0	%	-	90	-	-	-	-	3	2			-		-		-			-	-			-	-	a,c,k,h,m,-b,5	Pocket marsh with two branches; dense stands of big cordgrass with arrow arum along creek channels.	V
			acres	-	19.8	-	-	-	-	0.7	0.4			-		-		-			-	-			-	-	a,c,k,h,m,-b,1.1		

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c - Marsh Fleabane
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e - Reed Grass
f - Saltmarsh Loosestrife
g - Sedge
h - Bald Cypress
i - Swamp Rose
j - Black Gum
k - Switch Grass
l - Saltmarsh Aster
m - Water Parsnip
n - Ironweed
o - Wool Grass
p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
132	Black Point	4.8	%	-	30	60		-	-		10			-		-					-	-			-	-	a,b,c,-	Lower 1/3 of pocket area predominately big cordgrass; upper 2/3 of cattails; saltmarsh cordgrass and threesquare along front.	VI
			acres	-	1.4	2.9		-	-		0.5			-		-					-	-			-	-	a,b,c,-		
133	Passmore Creek	70.9	%	-	90	-		-	-	10	-	-		-		-	-	-		-	-	-				-	a,c,h,n,-	Large creek marsh section; predominately big cordgrass with arrow arum & pickerelweed along channel edges & in areas of low elevation.	V
			acres	-	63.8	-		-	-	7.1	-	-		-		-	-	-		-	-	-				-	a,c,h,n,-		
134	Passmore Creek	30.3	%	1	35	-		-	-	55	5	-	-	-	-	-	-	-	3	-	-	-		1	-	-	a,b,c, g,m,-	Creek marsh section; big cordgrass dominates lower portion; arrow arum increases in abundance upstream.	VII
			acres	0.3	10.6	-		-	-	16.7	1.5	-	-	-	-	-	-	-	0.9	-	-	-		0.3	-	-	a,b,c, g,m,-		
135	Passmore Creek	19.4	%		30			-	-	60	3	-	-	-	3	-	-	-	2	-	-	-		2	-	-	c,m,-	Creek marsh section; big cordgrass & arrow arum dominate lower portion; arrow arum, other freshwater species upstream.	VII
			acres		5.8			-	-	11.6	0.6	-	-	-	0.6	-	-	-	0.4	-	-	-		0.4	-	-	c,m,-		
136	Passmore Creek	13.4	%		10	5	5	-	-	65			-	-	5	-	-	-	5	-	-	-		5	-	-	g,-	Upper section of creek marsh branch; dominated by arrow arum; extends to James River.	VII
			acres		1.3	0.7	0.7	-	-	8.6			-	-	0.7	-	-	-	0.7	-	-	-		0.7	-	-	g,-		
137	Passmore Creek	23.4	%		45	-		-	-	40	5		-	-	5	-	-		3	-	-	-		2	-	-	g,-	Creek marsh section; lower portion dominated by big cordgrass; arrow arum and other freshwater species dominate upper portion.	XI
			acres		10.5	-		-	-	9.3	1.2		-	-	1.2	-	-		0.7	-	-	-		0.5	-	-	g,-		
138	Passmore Creek	28.8	%		40	-		-	-	35	2		-	-	20	-		-	1	-	-			2	-	-	c,g,-	Creek marsh branch; big cordgrass dominates lower portion; arrow arum, wild rice dominate upper section.	XI
			acres		11.5	-		-	-	10.1	0.6		-	-	5.7	-		-	0.3	-	-			0.6	-	-	c,g,-		
139	Passmore Creek	61.6	%		80			2	1	15	2	-	-	-	-	-	-	-	-		-	-		-	-	-	b,c,m,-	Creek marsh section; dominated by big cordgrass arrow arum more abundant in upper portion.	V
			acres		49.4			1.2	0.6	9.2	1.2	-	-	-	-	-	-	-	-		-	-		-	-	-	b,c,m,-		

a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
d - Olney Threesquare
e - Reed Grass
f - Saltmarsh Loosestrife
g - Sedge
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i - Swamp Rose
j - Black Gum
k - Switch Grass
l - Saltmarsh Aster
m - Water Parsnip
n - Ironweed
o - Wool Grass
p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

Section V. Jamestown Island
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
140	Passmore Creek	130.9	%		80	-		2	1	15	2	-	-	-	-	-	-	-	-		-				-	-	b,c,-	Extensive creek marsh; extends to several branches separated by upland ridges; big cordgrass with scattered arrow arum throughout.	V
			acres		104.7	-		2.6	1.3	19.7	2.6	-	-	-	-	-	-	-	-		-				-	-	b,c,-		
	TOTAL SECTION V.	706.5	%	-	63	3	-	1	-	22	2	-	-	-	5	1	-		-						-			a,- c,- h,- l,- n,- b,- g,- k,- m,-	
			acres	0.6	443.1	24.3	0.7	5.6	2.0	159.0	14.6	0.4	1.0	2.3	37.0	6.6	0.7		3.4					2.9			a,- c,0.1 h,- l,- n,- b,1.1 g,0.4 k,0.7 m,-	

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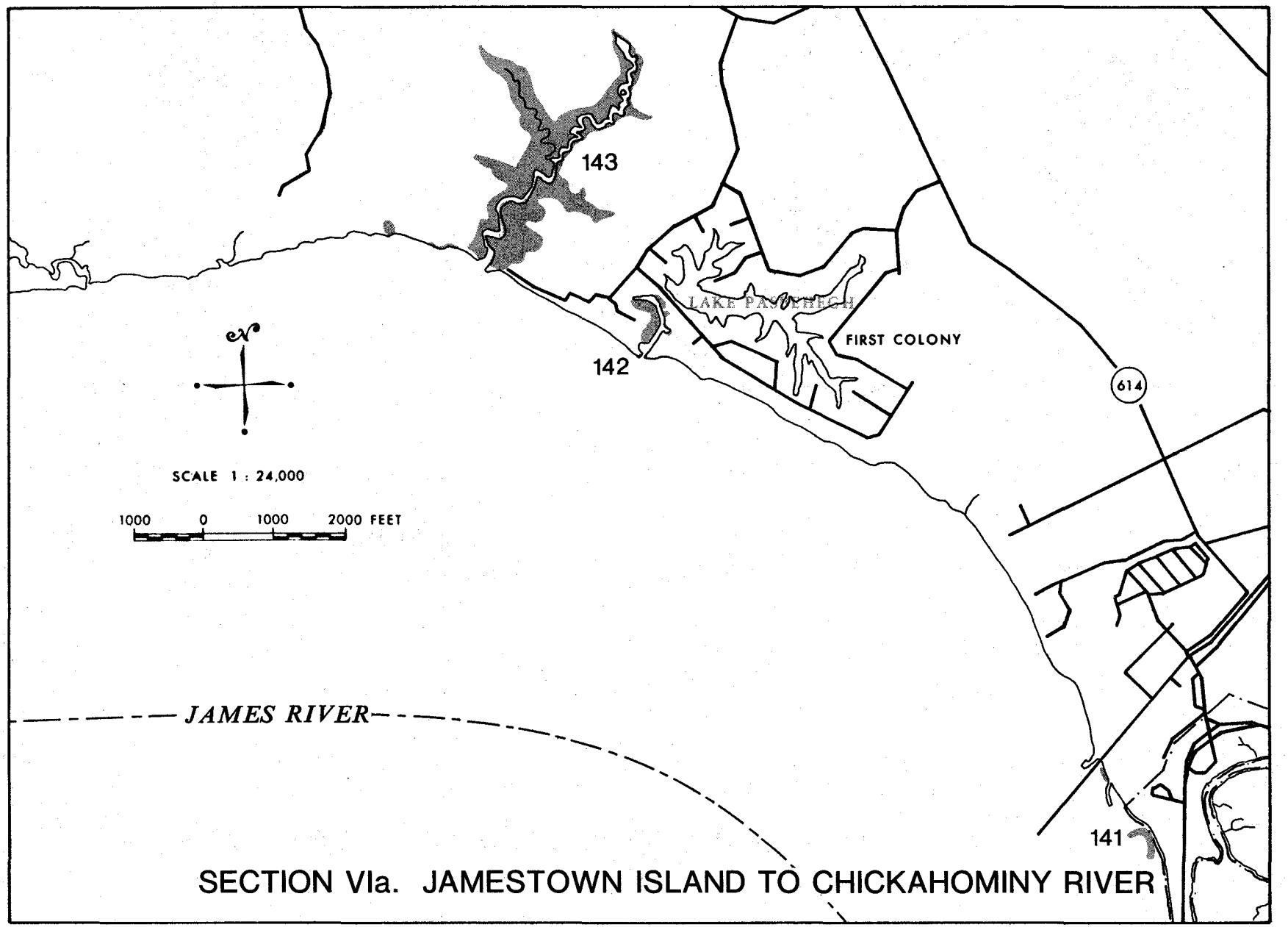
SECTION VI

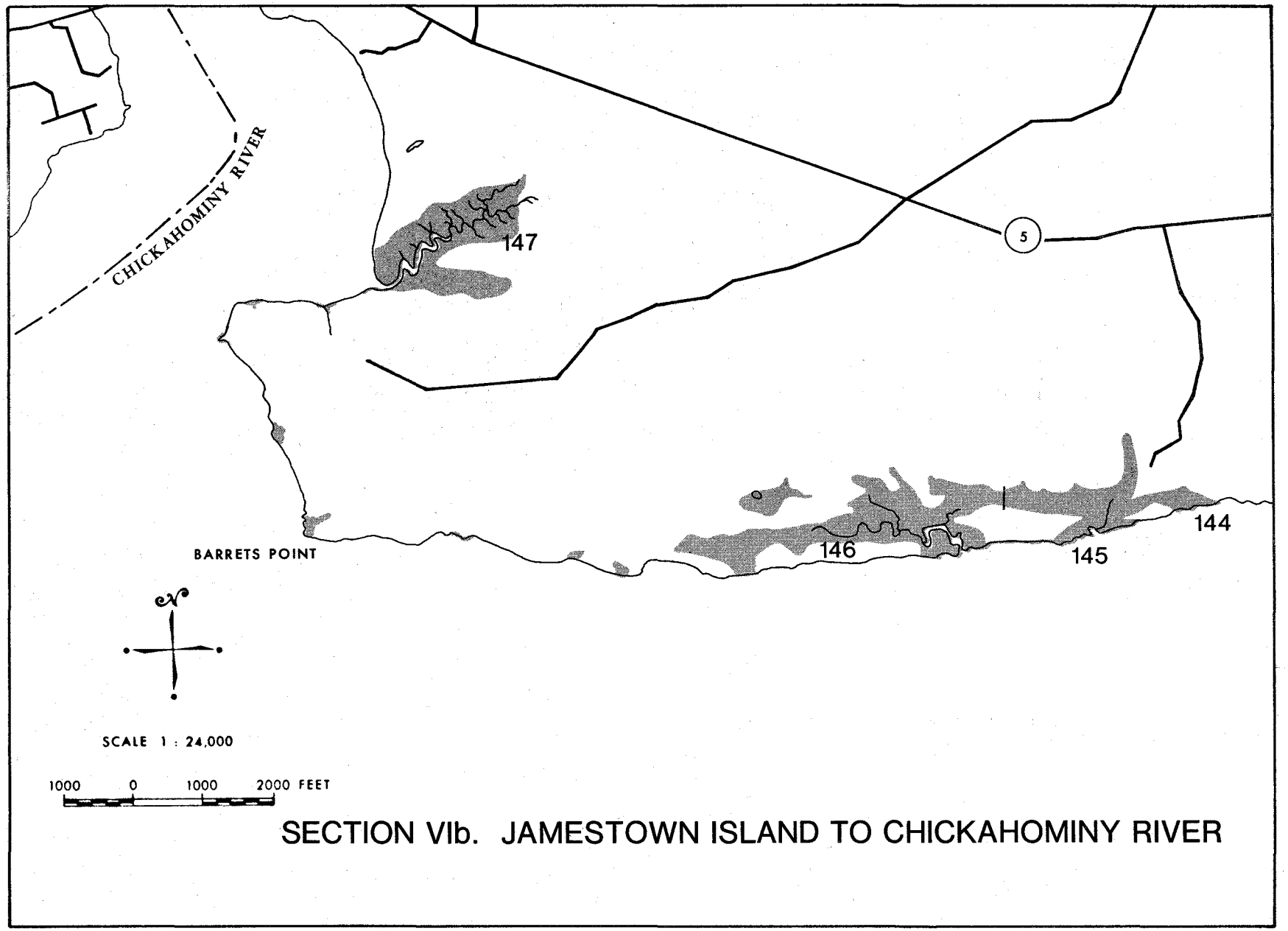
JAMES RIVER-JAMESTOWN ISLAND TO CHICKAHOMINY RIVER

This section of James City County describes a long stretch of James River shoreline extending between Jamestown Island and the Chickahominy River and it is illustrated with two map plates (VIA, VIB). Much of the shoreline along this section is devoid of marsh and is characterized by a narrow beach with adjacent low to moderate bluffs. In the vicinity of Lake Pasebehegh erosion is a particularly severe problem, with unprotected bluffs retreating at a rate of ten feet per year (James City County, Shoreline Situation Report, VIMS SRAMSOE No. 81).

A large area of tidal marsh does exist in one protected tidal creek (#143). Here freshwater species predominately with arrow arum and pickerelweed (Type VII) most abundant. Additional freshwater marsh areas (#144, 147) occur up-river from this creek system, and these are for the most part surrounded by large areas of wooded swamp with abundant cypress and red maple. Although moderate in size they do support many species of resident finfish as well as provide nursery and spawning sites for herring and shad.



SECTION VIa. JAMESTOWN ISLAND TO CHICKAHOMINY RIVER



SECTION VIb. JAMESTOWN ISLAND TO CHICKAHOMINY RIVER

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
141	Glass House Point	0.50	%		5	-		-		65	-			-		30				-	-							Sand spit surrounded by fringe marsh; arrow arum at lowest elevations grades to common three-square and other species.	VII
			acres		0.02	-		-		0.32	-			-		0.15				-	-								
142	Lake Pasbehegh	2.8	%	-	10	-		10	-	35	5		25	-		-	10	-		-	-			-	-	-	h,j,n, o,p,- b,5	Creek marsh located below dam; channel dredged and partially bulkheaded, some trees on spoiled areas.	XI
			acres	-	0.3	-		0.3	-	0.9	0.3		0.6	-		-	0.3	-		-	-			-	-	-	h,j,n, o,p,- b,0.1		
143	James River	58.0	%	-	5	-		-	-	50	-	-	15	10	10	-	10			-	-			-	-	-	b,h,i,j, m,o,-	Creek marsh dominated by arrow arum; other species scattered with wild rice in pockets along upland.	VII
			acres	-	2.9	-		-	-	29.0	-	-	8.7	5.8	5.8	-	5.8			-	-			-	-	-	b,h,i,j, m,o,-		
144	James River	5.5	%	-	60	-		5	5	20	-	-	5	-	-	-	-		-	-	-			-	-	-	b,j,- h,5	Pocket marsh area; dominated by big cordgrass with arrow arum; some cypress along river.	V
			acres	-	3.2	-		0.3	0.3	1.1	-	-	0.3	-	-	-	-		-	-	-			-	-	-	b,j,- h,0.3		
145	James River	17.9	%	-	15	5		-	-	40	-	-	20	5	-	-	15	-		-	-			-	-	-	b,h,j, m,n,o,-	Pocket marsh; interior connects with adjacent marsh; predominately arrow arum surrounded by cypress.	XI
			acres	-	2.7	0.9		-	-	7.1	-	-	3.6	0.9	-	-	2.7	-		-	-			-	-	-	b,h,j, m,n,o,-		
146	James River	53.5	%		20	-		15	-	40	5	-	10	-	5	-	5	-	-	-	-			-	-	-	h,j,m, n,o,p,-	Marsh areas of arrow arum with overstory of other species; cypress surrounds marsh as well as scattered throughout.	XI
			acres		10.7	-		8.0	-	21.4	2.7	-	5.3	-	2.7	-	2.7	-	-	-	-			-	-	-	h,j,m, n,o,p,-		
147	Chickahominy River	41.3	%	-		-		10	-	30	-	-	30	5	5	-	20	-		-	-			-	-	-	c,h,m, n,o,q,-	Large pocket marsh surrounded by swamp; arrow arum with overstory of tear thumb and beggar ticks.	XI
			acres	-		-		4.1	-	12.4	-	-	12.4	2.1	2.1	-	8.2	-		-	-			-	-	-	c,h,m, n,o,q,-		
	TOTAL SECTION VI.	179.5	%	-	11	-		7	-	40	2	-	17	5	6	-	11	-	-	-	-			-	-	-	b,- h,- j,- n,- p,- c,- i,- m,- o,- q,-		
			acres	-	19.8	0.9		12.7	0.3	72.2	3.0	-	30.9	8.8	10.6	0.2	19.7	-	-	-	-			-	-	-	b,0.1 h,0.3 j,- n,- p,- c,- i,- m,- o,- q,-		

a - Black Needlerush
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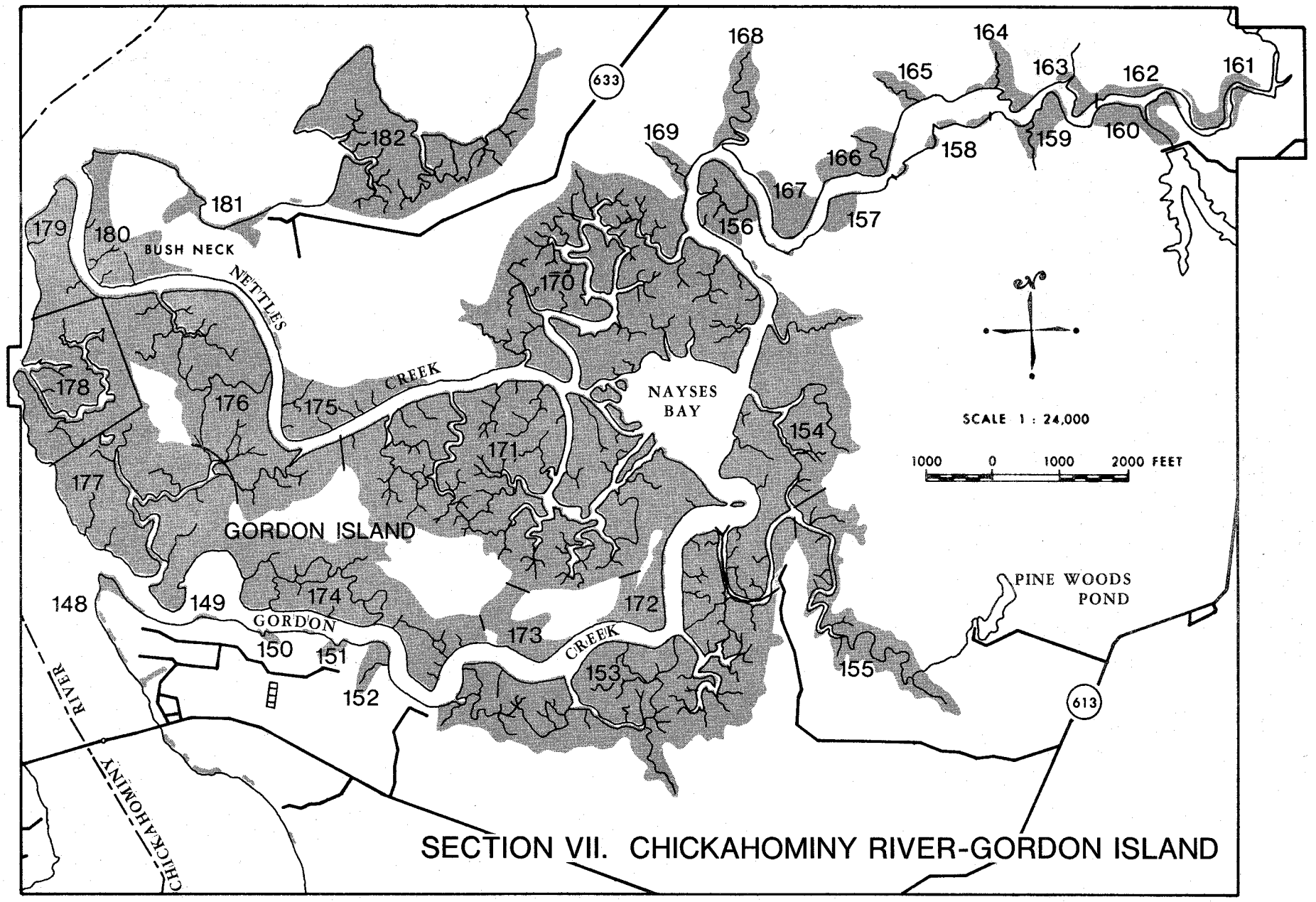
SECTION VII

CHICKAHOMINY RIVER-GORDON ISLAND

This section of James City County describes over 1400 acres of freshwater tidal marsh found along the Chickahominy River in the vicinity of Gordon Island. The marsh areas are for the most part dominated by vast stands of arrow arum in the spring which by late summer and early fall are mixed with an overstory of wild rice, beggar ticks, tear thumb, smartweeds and jewelweed. Scattered throughout these marshes are also numerous areas of tidal swamp. Most of these sections of swamp are dominated by an overstory of bald cypress but contain many other species such as black gum, red maple as well as many species of shrubs.

The beautiful wetlands areas found in much of this section of the Chickahominy River and its various tributary creeks are some of the most valuable natural areas found anywhere along the James River drainage. In the spring they serve as important nursery and spawning areas for many species of commercially important shad and herring as well as the highly desirable striped bass. They also support many species of resident fishes desired by the sports fisherman including: pickerel, largemouth bass, carp, catfish and white perch. Unfortunately, contamination by the pesticide Kepone currently makes many of these species unsuitable for consumption. In the fall and winter the marshes and creeks are alive with an abundance of ducks and other waterfowl. And the large number of duck blinds throughout the many tidal creeks testifies to the wide utilization of this valuable natural resource.



SECTION VII. CHICKAHOMINY RIVER-GORDON ISLAND

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum-Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
148	Gordon Creek	1.3	%			-		10	-	30	10	-	30	5	-	-	10			-	-			-	-	-	j,q,-h,5	Broad marsh fringe at mouth of creek; arrow arum with overstory of other species; cypress along upland.	XI
			acres			-		0.1	-	0.4	0.1	-	0.4	0.1	-	-	0.1			-	-			-	-	-	j,q,-h,0.1		
149	Gordon Creek	0.60	%			5		10	-	40	10	5	-	-	10	5	5	-		-	-				-	-	q,-h,10	Small marsh fringe; arrow arum with overstory of other marsh species; abundant cypress.	XI
			acres			0.03		0.06	-	0.24	0.06	0.03	-	-	0.06	0.03	0.03	-		-	-				-	-	q,-h,0.06		
150	Gordon Creek	0.80	%			-		5	-	35	-	-	35	5	20		-			-	-			-	-	-	h,c,-	Small pocket marsh; arrow arum with overstory of beggar ticks; scattered wild rice.	XI
			acres			-		0.04	-	0.28	-	-	0.28	0.04	0.16		-			-	-			-	-	-	h,c,-		
151	Gordon Creek	1.6	%					10	-	35		5	5	5			15			-			25					Pocket marsh with interior of hibiscus, tear thumb, smartweed; pond lily and arrow arum in downstream section.	XI
			acres					0.2	-	0.5		0.1	0.1	0.1			0.2			-			0.4						
152	Gordon Creek	4.7	%			-		-	-	40	-	-	40	5	10	-	-	-		-	-		5	-	-	-	h,-	Pocket marsh; arrow arum with overstory of beggar ticks; pond lily at lowest elevations.	XI
			acres			-		-	-	1.9	-	-	1.9	0.2	0.5	-	-	-		-	-		0.2	-	-	-	h,-		
153	Gordon Creek	150.2	%			-		-	-	40	-	-	20	-	40	-	-			-	-			-	-	-	h,i,m,-	Broad creek marsh dominated by a mixture of wild rice, arrow arum and beggar ticks; other species scattered throughout.	XI
			acres			-		-	-	60.1	-	-	30.0	-	60.1	-	-			-	-			-	-	-	h,i,m,-		
154	Gordon Creek	99.1	%			-				30	-		20	-	50	-				-	-			-		-		Broad creek marsh dominated by wild rice with understory of arrow arum; abundant beggar ticks throughout.	XI
			acres			-				29.7	-		19.8	-	49.6	-				-	-			-		-			
155	Gordon Creek	37.2	%			5		5	-	35	5	-	30	-	5	-	10		-	-	-			5	-	-	h,i,r,-	Large pocket marsh formed by creek branch; arrow arum with overstory of beggar ticks; other species throughout.	XI
			acres			1.9		1.9	-	12.9	1.9	-	11.1	-	1.9	-	3.7		-	-	-			1.9	-	-	h,i,r,-		

a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
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#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum-Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
156	Gordon Creek	16.2	%			-		-	-	50	-	-	20	-	20	-	10	-	-	-	-			-	-	-	h,j,-	Creek marsh of arrow arum with overstory of beggar ticks, tearthumb; large stands of wild rice.	VII
			acres			-		-	-	8.2	-	-	3.2	-	3.2	-	1.6	-	-	-	-			-	-	-	h,j,-		
157	Gordon Creek	5.0	%			-		-	-	20	-	-	-	-	80	-	-			-	-			-	-	-	h,-	Creek marsh dominated by wild rice with understory of arrow arum; other species scattered.	XI
			acres			-		-	-	1.0	-	-	-	-	4.0	-	-			-	-			-	-	-	h,-		
158	Gordon Creek	1.1	%			-		-		20	-		-	-	80		-			-	-			-	-			Four small fringe marshes; average width 50ft; wild rice with understory of arrow arum.	XI
			acres			-		-		0.2	-		-	-	0.9		-			-	-			-	-				
159	Gordon Creek	6.9	%			-		-	-	30	-	-	10	-	60	-	-			-	-			-	-	-	h,j,r,-	Creek marsh of wild rice with understory of arrow arum; scattered swamp species.	XI
			acres			-		-	-	2.1	-	-	0.7	-	4.1	-	-			-	-			-	-	-	h,j,r,-		
160	Gordon Creek	10.5	%			-		-	-	35	-	-	5	5	55	-	-	-		-	-			-	-	-	h,j,r,-	Marsh dominated by wild rice and arrow arum grades back to swamp of cypress, gum, ash.	XI
			acres			-		-	-	3.7	-	-	0.5	0.5	5.8	-	-	-		-	-			-	-	-	h,j,r,-		
161	Gordon Creek	6.3	%			-		-	-	35	-	-	20	5	35	-	-	-		-	-			-	-	-	j,r,n,-h,5	Marsh at head of creek; mostly arrow arum and wild rice; several areas with overstory of cypress, gum, ash.	XI
			acres			-		-	-	2.2	-	-	1.3	0.3	2.2	-	-	-		-	-			-	-	-	j,r,n,-h,0.3		
162	Gordon Creek	1.2	%							30	-		10	-	60	-				-	-			-	-	-	h,-	Fringing marsh area; dominated by wild rice with arrow arum.	XI
			acres							0.4	-		0.1	-	0.7	-				-	-			-	-	-	h,-		
163	Gordon Creek	3.0	%			-		-	-	30	-	5	25	-	40	-	-			-	-			-	-	-	c,h,n,-	Creek marsh; arrow arum with overstory of wild rice and beggar ticks; grades to swamp.	XI
			acres			-		-	-	0.9	-	0.1	0.8	-	1.2	-	-			-	-			-	-	-	c,h,n,-		

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Section VII. Chickahominy River-Gordon Island
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum-Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
164	Gordon Creek	5.5	%			-		-	-	25	-	-	5	-	70	-	-			-	-			-	-	-	c,h,-	Creek and pocket marsh; dominated by wild rice with abundant arrow arum especially in lower portion.	XI
			acres			-		-	-	1.4	-	-	0.3	-	3.8	-	-			-	-			-	-	-	c,h,-		
165	Gordon Creek	3.2	%			-		-		15	-	-	5	-	80	-	-			-	-			-		-	h,-	Wild rice dominated pocket marsh; understory of arrow arum and scattered patches of beggar ticks.	XI
			acres			-		-		0.5	-	-	0.2	-	2.5	-	-			-	-			-		-	h,-		
166	Gordon Creek	10.3	%			-		-	-	30	-	-	5	5	60	-	-			-	-			-	-	-	c,h,-	Creek marsh dominated by wild rice; understory of arrow arum throughout; scattered hemp, beggar ticks.	XI
			acres			-		-	-	3.1	-	-	0.5	0.5	6.2	-	-			-	-			-	-	-	c,h,-		
167	Gordon Creek	8.7	%			-		-	-	60	5	10	10	-	10	-	5		-	-	-			-	-	-	c,-	Creek marsh dominated by arrow arum with overstory of other species; wild rice along upland.	XI
			acres			-		-	-	5.2	0.4	0.9	0.9	-	0.9	-	0.4		-	-	-			-	-	-	c,-		
168	Gordon Creek	10.4	%			-		5	-	35	5	5	20	-	20	-	10	-	-	-	-			-	-	-	c,h,n,p,-	Large pocket marsh; diverse flora with arrow arum, beggar ticks, wild rice throughout.	XI
			acres			-		0.5	-	3.7	0.5	0.5	2.1	-	2.1	-	1.0	-	-	-	-			-	-	-	c,h,n,p,-		
169	Gordon Creek	3.0	%			-		5	-	25	-	-	5	-	65	-	-			-	-			-	-	-	c,h,-	Pocket marsh dominated by wild rice; scattered arrow arum, hibiscus, beggar ticks throughout.	XI
			acres			-		0.1	-	0.9	-	-	0.1	-	1.9	-	-			-	-			-	-	-	c,h,-		
170	Nettles Creek	180.8	%			-		-	-	40	-	-	20	-	40	-	-		-	-	-			-	-	-	i,-	Extensive creek marsh; dominated by arrow arum and wild rice with overstory of beggar ticks.	XI
			acres			-		-	-	72.3	-	-	36.2	-	72.3	-	-		-	-	-			-	-	-	i,-		
171	Gordon Island	228.8	%	-		-		2	-	25	2	-	35	1	30	-	5		-	-	-			-	-	-	c,h,i, p,r,-	Extensive creek marsh dominated by wild rice arrow arum and beggar ticks; cypress in interior section.	XI
			acres	-		-		4.6	-	57.2	4.6	-	80.1	2.3	68.6	-	11.4		-	-	-			-	-	-	c,h,i, p,r,-		

a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
d - Olney Threesquare
e - Reed Grass
f - Saltmarsh Loosestrife
g - Sedge
h - Bald Cypress
i - Swamp Rose
j - Black Gum
k - Switch Grass
l - Saltmarsh Aster
m - Water Parsnip
n - Ironweed
o - Wool Grass
p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum-Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
172	Gordon Island	9.6	%			-		-	-	30	-	-	40	-	30	-	-		-	-	-			-	-	-	h,i,r,-	Creek marsh area; includes small adjoining pocket marsh which grades back to cattails.	XI
			acres			-		-	-	2.9	-	-	3.8	-	2.9	-	-		-	-	-			-	-	-	h,i,r,-		
173	Gordon Island	9.9	%		-	-		5	-	30	5	-	50	-	5	-	5	-	-	-	-			-	-	-	h,i,m,n, p,r,-	Pocket marsh area of arrow arum with overstory of beggar ticks; grades back to pockets with swamp species.	XI
			acres		-	-		0.5	-	3.0	0.5	-	4.9	-	0.5	-	0.5	-	-	-	-			-	-	-	h,i,m,n, p,r,-		
174	Gordon Island	73.7	%		-	-		5	-	45	5	-	30	-	10	5			-	-	-			-	-	-	c,h,i,-	Large creek marsh dominated by arrow arum with overstory of beggar ticks; other species scattered throughout.	XI
			acres		-	-		3.7	-	33.1	3.7	-	22.1	-	7.4	-	3.7		-	-	-			-	-	-	c,h,i,-		
175	Nettles Creek	22.7	%			-		-	-	15	-	5	50	5	-	-	15	-	10	-	-	-		-	-	-	c,h,i, n,s,-	Creek marsh dominated by overstory of beggar ticks; other species scattered throughout.	XI
			acres			-		-	-	3.4	-	1.1	11.4	1.1	-	-	3.4	-	2.3	-	-	-		-	-	-	c,h,i, n,s,-		
176	Gordon Island	119.1	%	-		-		10	-	20	5	-	35	-	15	-	10	-	5	-	-			-	-	-	h,i,m,n, o,r,-	Berm with cypress & shrubs along creek channel interior of arrow arum & wild rice with extensive overstory of beggar ticks, others.	XI
			acres	-		-		11.9	-	23.8	6.0	-	41.7	-	17.8	-	11.9	-	6.0	-	-			-	-	-	h,i,m,n, o,r,-		
177	Gordon Island	178.1	%			-		10	-	50	1	-	20	1	5	-	10		-	-	-			1	-	2	c,h,i,p,-	Arrow arum dominates with hibiscus abundant in lower section; wild rice, beggar ticks more abundant in interior.	VII
			acres			-		17.8	-	89.0	1.8	-	35.6	1.8	8.9	-	17.8		-	-	-			1.8	-	3.6	c,h,i,p,-		
178	Gordon Island	70.0	%		-	-		5	-	45	5	-	30	-	10	-	5		-	-	-	-		-	-	-	c,h,i,-	Extensive marsh section; arrow arum dominates with overstory of beggar ticks; other species scattered.	XI
			acres		-	-		3.5	-	31.5	3.5	-	21.0	-	7.0	-	3.5		-	-	-	-		-	-	-	c,h,i,-		
179	Gordon Island	25.3	%	-	-	-		10	-	30	10	-	35	-	-	-	10	-	-	-	-	-		-	-	-	i,m,n,r,- h,5	Marsh section at mouth of creek; predominately arrow arum with overstory of beggar ticks; stand of reed grass.	XI
			acres	-	-	-		2.5	-	7.6	2.5	-	8.9	-	-	-	2.5	-	-	-	-	-		-	-	-	i,m,n,r,- h,1.3		

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m - Water Parsnip
n - Ironweed
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p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

Section VII. Chickahominy River-Gordon Island
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum-Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
180	Nettles Creek	26.2	%		-	-		20	-	30	5	-	30	-	-	-	10	-	5	-	-	-		-	-	-	c,i,-	Creek marsh; arrow arum with overstory of beggar ticks and tear thumb; abundant hibiscus throughout.	XI
			acres		-	-		5.2	-	7.9	1.3	-	7.9	-	-	-	2.6	-	1.3	-	-	-		-	-	-	c,i,-		
181	Bush Neck	8.5	%		-	-		20	-	20	-	-	5	15	20	-	-			-	-			-	-	-	i,o,q,r,-h,20	Fringing marsh extends back to overstory of cypress.	XI
			acres		-	-		1.7	-	1.7	-	-	0.4	1.3	1.7	-	-			-	-			-	-	-	i,o,q,r,-h,1.7		
182	Chickahominy River	88.0	%	-		-		10	-	25	-	5	5	-	35	5	5	-	-	-	-			-	-	-	i,j,m,n,-r,-h,10	Extensive marsh area; predominately arrow arum and wild rice; large stand of cypress at western end with some swamp species.	XI
			acres	-		-		8.8	-	22.0	-	4.4	4.4	-	30.8	4.4	4.4	-	-	-	-			-	-	-	i,j,m,n,-r,-h,8.8		
	TOTAL SECTION VII.	142.5	%	-	-	-		4	-	35	2	-	25	1	26	-	5	-	1	-	-	-	-	-	-	-	c,- i,- m,- o,- q,- s,- h,1 j,- n,- p,- r,-		
			acres	-	-	1.9		63.1	-	49.4.9	26.9	7.1	352.7	8.2	369.8	4.4	68.7	-	9.6	-	-	-	0.6	3.7	-	3.6	c,- i,- m,- o,- q,- s,- h,12.3 j,- n,- p,- r,-		
			%																										
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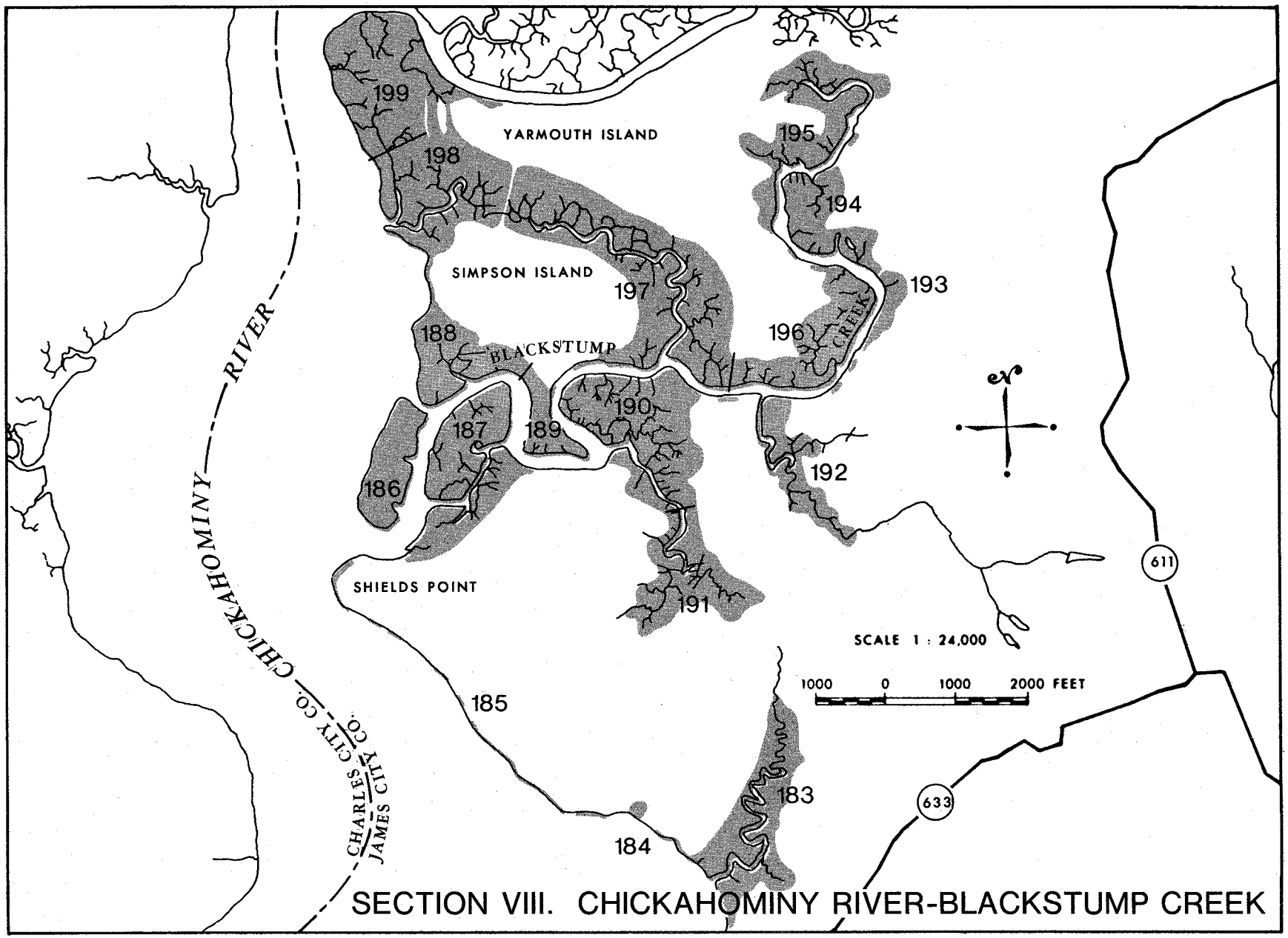
SECTION VIII

CHICKAHOMINY RIVER-BLACKSTUMP CREEK

The marsh areas found along this section of James City County are similar in species composition to those found elsewhere along the Chickahominy River. Each year spring is marked by the emergence of large stands of arrow arum and pickerelweed (Type VII). However by late summer these species are joined by a host of others such as wild rice, beggar ticks, tear thumb, and smartweed. Therefore, most of the marsh areas described here are listed as Type XI (Freshwater Mixed). There are also numerous areas of tidal and non-tidal swamp found throughout this and other sections of the Chickahominy River. Many of these areas are dominated by bald cypress but include many other species such as red maple, water ash, black gum as well as numerous shrub species.

The importance of the many species of marsh plants as valuable food for waterfowl is evident during the fall and winter when many areas of the Chickahominy River are inhabited by large populations of ducks and other waterfowl. In the spring the marshes and creeks are important spawning and nursery areas for many species of finfish such as American and hickory shad, river herring and striped bass. They support, as well, many species of resident freshwater fish, ranging from the bluegill and carp to the large-mouth bass and pickerel.



SECTION VIII. CHICKAHOMINY RIVER-BLACKSTUMP CREEK

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
183	Chickahominy River	42.7	%	-		-		25	-	25	5	-	-	-	15	5	20	-	-	-	-			5	-	-	h,i,m, n,q,r,-	Large pocket marsh; diverse flora with abundant wild rice, arrow arum, hibiscus; tidal swamp with cypress at mouth.	XI
			acres	-		-		10.7	-	10.7	2.1	-	-	-	6.4	2.1	8.6	-	-	-	-			2.1	-	-	h,i,m, n,q,r,-		
184	Chickahominy River	0.80	%			5		25	-	20	5		5	5	15	-	-	-		-	-			-	-	-	i,q,- h,20	Small fringe and pocket marsh area; extends back to overstory of cypress.	XI
			acres			0.04		0.20	-	0.16	0.04		0.04	0.04	0.12	-	-	-		-	-			-	-	-	i,q,- h,0.16		
185	Chickahominy River	0.50	%	5		-		5	-	50	5	-	15	-	5	15	-	-		-	-				-	-	h,n,q,-	Intermittent marsh fringe 2-10 ft. wide; predominately arrow arum with other species throughout.	VII
			acres	0.02		-		0.02	-	0.25	0.02	-	0.08	-	0.02	0.08	-	-		-	-				-	-	h,n,q,-		
186	Blackstump Creek	21.7	%							90	-			-	10					-	-			-	-	-		Low marsh island of arrow arum and pickerelweed; abundant wild rice at north end.	VII
			acres							19.5	-			-	2.2					-	-			-	-	-			
187	Blackstump Creek	43.1	%			-		-		70	-	-	10	-	20	-	-			-	-			-	-	-	h,-	Wild rice and beggar ticks in zones along main creek channel and uplands; remainder of marsh is arrow arum.	VII
			acres			-		-		30.2	-	-	4.3	-	8.6	-	-			-	-			-	-	-	h,-		
188	Simpson Island	26.7	%			-		-	-	45	-	-	25	-	30	-	-			-	-		-	-	-	-	h,i,m,-	Creek marsh with arrow a arum and pickerelweed along water; wild rice and beggar ticks in interior	XI
			acres			-		-	-	12.0	-	-	6.7	-	8.0	-	-			-	-		-	-	-	-	h,i,m,-		
189	Blackstump Creek	12.1	%		-	-		5	-	20	5	5	45	-	10	-	10	-	-	-	-			-	-	-	h,i,j, n,m,r,-	Creek marsh with three-square & arrow arum along channels; wild rice, hibiscus, etc. in interior; beggar ticks throughout.	XI
			acres		-	-		0.6	-	2.4	0.6	0.6	5.5	-	1.2	-	1.2	-	-	-	-			-	-	-	h,i,j, n,m,r,-		
190	Blackstump Creek	52.9	%			-		-	-	20	-	-	35	-	35	-	10			-	-			-	-	-	c,h,i,m,-	Creek marsh section; arrow arum with overstory of wild rice and beggar ticks.	XI
			acres			-		-	-	10.6	-	-	18.5	-	18.5	-	5.3			-	-			-	-	-	c,h,i,m,-		

a - Black Needlerush
b - Saltbushes
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e - Reed Grass
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g - Sedge
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i - Swamp Rose
j - Black Gum
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l - Saltmarsh Aster
m - Water Parsnip
n - Ironweed
o - Wool Grass
p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

Section VIII. Chickahominy River-Blackstump Creek
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum-Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
191	Blackstump Creek	30.5	%		-	-		-	-	20	-	-	50	-	20	-	10	-		-	-			-	-	-	c,h,m, n,p,r,-	Upstream section of creek branch; arrow arum with overstory of wild rice and beggar ticks; other species scattered.	XI
			acres		-	-		-	-	6.1	-	-	15.2	-	6.1	-	3.1	-		-	-			-	-	-	c,h,m, n,p,r,-		
192	Blackstump Creek	21.6	%			-		-	-	20	5	5	55	-	10	-	5	-		-	-			-	-	-	c,h,i, n,m,r,-	Large pocket marsh; arrow arum with overstory of beggar ticks; other species scattered.	XI
			acres			-		-	-	4.3	1.1	1.1	11.8	-	2.2	-	1.1	-		-	-			-	-	-	c,h,i, n,m,r,-		
193	Blackstump Creek	10.6	%			-		5	-	25	-	-	10	-	60	-	-			-	-			-	-	-	c,h,i,-	Fringing creek marsh dominated by arrow arum and wild rice; scattered hibiscus and beggar ticks throughout.	XI
			acres			-		0.5	-	2.6	-	-	1.1	-	6.4	-	-			-	-			-	-	-	c,h,i,-		
194	Blackstump Creek	17.2	%			-		-	-	30	-	-	20	10	35	-	5			-	-			-	-	-	c,h,i, m,p,-	Creek marsh section; arrow arum along creek, interior mostly wild rice; other species scattered.	XI
			acres			-		-	-	5.2	-	-	3.4	1.7	6.0	-	0.9			-	-			-	-	-	c,h,i, m,p,-		
195	Blackstump Creek	38.0	%			-		-	-	30	5	-	15	-	45	-	5			-	-		-	-	-	-	c,h,m,p,-	Creek marsh at head of creek; arrow arum and wild rice dominate; other species throughout.	XI
			acres			-		-	-	11.4	1.9	-	5.7	-	17.1	-	1.9			-	-		-	-	-	-	c,h,m,p,-		
196	Blackstump Creek	31.6	%		-	-		5	-	25	5	10	25	5	15	-	10	-		-	-			-	-	-	c,h,i, m,n,-	Creek marsh section; arrow arum and wild rice with overstory of beggar ticks, jewel-weed, tearthumb; hemp in upstream section.	XI
			acres		-	-		1.6	-	7.9	1.6	3.1	7.9	1.6	4.8	-	3.1	-		-	-			-	-	-	c,h,i, m,n,-		
197	Blackstump Creek	90.8	%		-	-		-	-	25	-	10	50	-	5	-	10	-		-	-			-	-	-	h,i,m, n,p,r,-	Creek marsh branch; arrow arum with overstory of beggar ticks, smartweeds etc. solid fill berm across head of marsh.	XI
			acres		-	-		-	-	22.7	-	9.1	45.4	-	4.5	-	9.1	-		-	-			-	-	-	h,i,m, n,p,r,-		
198	Yarmouth Island	49.0	%			-		-	-	15	5		60	-	-	5	15			-	-			-	-	-	c,n,o,-	Creek marsh section dominated by overstory of beggar ticks; other species scattered.	XI
			acres			-		-	-	7.4	2.4		29.4	-	-	2.4	7.4			-	-			-	-	-	c,n,o,-		

a - Black Needlerush
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u - American Lotus
v - Orach

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
199	Yarmouth Island	54.7	%			-		10	-	25	-	-	45	5	5	-	10			-	-			-	-	-	c,h,i, n,m,r,-	Creek marsh section; arrow arum with overstory of beggar ticks, tearthumb, jewelweed, etc.; other species scattered.	XI
			acres			-		5.5	-	13.7	-	-	24.6	2.7	2.7	-	5.5			-	-			-	-	-	c,h,i, n,m,r,-		
	TOTAL SECTION VIII.	544.5	%	-		-		3	-	31	2	3	33	1	17	1	9			-	-			-	-	-	c,- i,- n,- p,- r,- h,- m,- o,- q,-		
			acres	-		-		19.1	-	167.2	9.7	13.9	179.6	6.0	94.8	4.6	47.2			-	-			2.1	-	-	c,- i,- n,- p,- r,- h,0.2 m,- o,- q,-		

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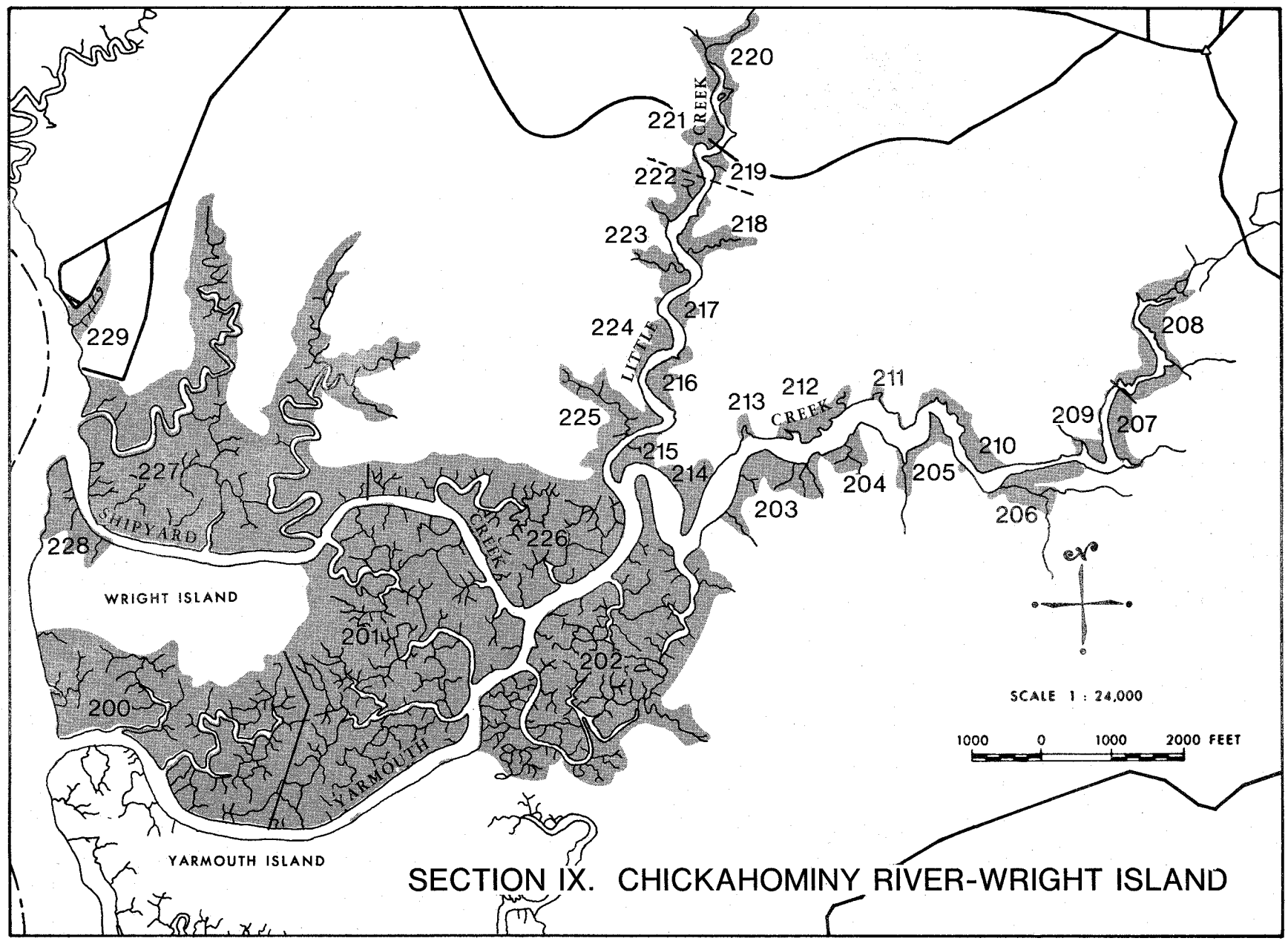
SECTION IX

CHICKAHOMINY RIVER-WRIGHT ISLAND

The marsh areas found along Yarmouth, Shipyard and Little Creeks are included in this, the third of five sections describing the wetlands of James City County found along the Chickahominy River and its tributaries. As with the other sections (VII, VIII, XI, X) arrow arum and pickerelweed (Type VII) emerge early in the season and dominate the wetlands in vast stands until mid-summer when other species such as wild rice and beggar ticks (Type XI) are evident. There are also found scattered throughout these marshes and along the upland borders numerous stands of bald cypress and other swamp species.

As with the other areas of tidal marsh located along the Chickahominy River, the wetlands described in this section are important nursery and spawning areas for several commercially important species of herring and shad as well as the striped bass. They are, in addition, excellent habitats for many species of freshwater game fish. Their waterfowl and wildlife utilization is also high since many of the species of marsh plants found here, provide an important food source for the seasonal populations of geese and ducks which arrive each fall.

During the summer of 1978 construction began on a dam that crosses the northern section of Little Creek. The purpose of the resultant reservoir is to store water that will be used to meet future needs of the Newport News water system. Aerial reconnaissance in 1980 reveals that marshes #219, 220 and 221 which totaled 12.1 acres have been destroyed. Although they have been left in this report for comparative purposes they are marked with an asterisk (*) and are not included in the section or county grand totals.



SECTION IX. CHICKAHOMINY RIVER-WRIGHT ISLAND

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
200	Wright Island	132.8	%		-	-		10	-	20	-	5	40	5	5	-	15			-	-		-	-	-	-	i,h,m, n,r,-	Extensive marsh section; arrow arum with overstory of beggar ticks, tearthumb, jewel-weed; other species scattered.	XI
			acres		-	-		13.3	-	26.6	-	6.6	53.2	6.6	6.6	-	19.9			-	-		-	-	-	-	i,h,m, n,r,-		
201	Wright Island	223.8	%		-	-		-	-	30	-	-	30	-	40	-	-	-		-	-		-	-	-	-	i,h,m, n,r,o,-	Extensive creek marsh; arrow arum and wild rice with overstory of beggar ticks.	XI
			acres		-	-		-	-	67.1	-	-	67.1	-	89.6	-	-	-		-	-		-	-	-	-	i,h,m, n,r,o,-		
202	Yarmouth Creek	154.5	%			-		-	-	30	-		20	-	50	-	-	-		-	-		-	-	-	-	i,h,m,p,-	Extensive creek marsh; arrow arum and wild rice with overstory of beggar ticks; other species scattered.	XI
			acres			-		-	-	46.4	-		30.9	-	77.2	-	-	-		-	-		-	-	-	-	i,h,m,p,-		
203	Yarmouth Creek	15.4	%			-		-	-	30	-	-		-	40		-			-	-		30	-	-	-	i,h,m, p,r,-	Creek marsh; yellow pond lily along creek channel; interior of marsh mostly arrow arum and wild rice.	XI
			acres			-		-	-	4.6	-	-		-	6.2		-			-	-		4.6	-	-	-	i,h,m, p,r,-		
204	Yarmouth Creek	4.6	%			-				30	-	-	-	-	60					-			10	-	-		h,-	Pocket marsh; yellow pond lily and pickerelweed along creek grade to interior of wild rice.	XI
			acres			-				1.4	-	-	-	-	2.7					-			0.5	-	-		h,-		
205	Yarmouth Creek	4.5	%			-				10	5		-	-	20		5			-	-		60	-	-	-	h,-	Creek marsh that extends back to pocket area; yellow pond lily predominates with wild rice and other species in interior.	IX
			acres			-				0.5	0.2		-	-	0.9		0.2			-	-		2.7	-	-	-	h,-		
206	Yarmouth Creek	8.6	%			5				20	-	-	-	-	10		-			-	-		65	-	-	-	h,p,-	Creek marsh extending back to pocket area; yellow pond lily predominates with other species along upland.	IX
			acres			0.4				1.7	-	-	-	-	0.8		-			-	-		5.7	-	-		h,p,-		
207	Yarmouth Creek	6.2	%			-		-	-	25	5	-	5	-	15		5			-	-		40	5	-	-	i,h,m,-	Creek marsh section with yellow pond lily along channel; interior of arrow arum, wild rice, others.	XI
			acres			-		-	-	1.5	0.3	-	0.3	-	0.9		0.3			-	-		2.6	0.3	-	-	i,h,m,-		

a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
d - Olney Threesquare
e - Reed Grass
f - Saltmarsh Loosestrife
g - Sedge
h - Bald Cypress
i - Swamp Rose
j - Black Gum
k - Switch Grass
l - Saltmarsh Aster
m - Water Parsnip
n - Ironweed
o - Wool Grass
p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
208	Yarmouth Creek	20.7	%			-		-	-	25	5	-	5	-	25		5	-		-	-		35	-	-	-	i,h,p,-	Creek marshes at head of creek; yellow pond lily along channels; wild rice arrow arum, pickerelweed in interior sections.	XI
			acres			-		-	-	5.2	1.0	-	1.0	-	5.2		1.0	-		-	-		7.3	-	-	-	i,h,p,-		
209	Yarmouth Creek	2.0	%			-		-	-	30	-		20	-	15		5			-	-		30				h,-	Creek marsh with yellow pond lily, pickerelweed along channel; beggar ticks other species in interior.	XI
			acres			-		-	-	0.6	-		0.4	-	0.3		0.1			-	-		0.6				h,-		
210	Yarmouth Creek	8.2	%			-		-	-	30	-	-	5	-	25	-	-			-	-		40	-	-	-	h,-	Creek marsh section; zone of yellow pond lily along channel; interior of wild rice, pickerelweed etc.	XI
			acres			-		-	-	2.5	-	-	0.4	-	2.0	-	-			-	-		3.3	-	-	-	h,-		
211	Yarmouth Creek	0.50	%			-		-	-	45	5	-	10	-	30	-				-	-		10		-	-	h,-	Small fringe and pocket marsh; predominately arrow arum, pickerelweed and wild rice.	XI
			acres			-		-	-	0.22	0.02	-	0.05	-	0.15	-				-	-		0.05		-	-	h,-		
212	Yarmouth Creek	5.8	%			-		-	-	50	10	-	10	-	25	-	-			-	-		5	-	-	-	h,i,j, n,m,-	Fringing creek marsh dominated by arrow arum with wild rice; other species scattered.	VII
			acres			-		-	-	2.9	0.6	-	0.6	-	1.4	-	-			-	-		0.3	-	-	-	h,i,j, n,m,-		
213	Yarmouth Creek	0.70	%			-		-	-	30	15	-	30	-	20	-	5				-			-	-	-	h,i,p,-	Small pocket marsh; pickerelweed along channel; wild rice other species in interior.	XI
			acres			-		-	-	0.21	0.10	-	0.21	-	0.14	-	0.04				-			-	-	-	h,i,p,-		
214	Yarmouth Creek	7.4	%			-		-	-	35	-	-	20	-	40	-	-				-		5	-	-	-	h,i,m,-	Creek marsh with arrow arum, wild rice on point; beggar ticks along upland; some pond lily along channel.	XI
			acres			-		-	-	2.6	-	-	1.5	-	2.9	-	-				-		0.4	-	-	-	h,i,m,-		
215	Little Creek	5.0	%			-		-	-	30	5	5	-	25	15	-	-			-	-		15	5	-	-	c,h,i, k,m,n,-	Creek marsh section; yellow pond lily along channel; interior of arrow arum and wild rice with overstory of beggar ticks.	XI
			acres			-		-	-	1.5	0.3	0.3	-	1.2	0.7	-	-			-	-		0.7	0.3	-	-	c,h,i k,m,n,-		

a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
d - Olney Threesquare
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f - Saltmarsh Loosestrife
g - Sedge
h - Bald Cypress
i - Swamp Rose
j - Black Gum
k - Switch Grass
l - Saltmarsh Aster
m - Water Parsnip
n - Ironweed
o - Wool Grass
p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
216	Little Creek	5.2	%			-		-	-	40	5	5	30	-	15		-			-	-		5	-	-	-	h,i,m,o,-	Creek marsh of arrow arum and wild rice; overstory of beggar ticks, smartweed etc.	XI
			acres			-		-	-	2.0	0.3	0.3	1.5	-	0.8		-			-	-		0.3	-	-	-	h,i,m,o,-		
217	Little Creek	2.0	%			-		-	-	40	5	-	30	-	25		-			-	-			-	-		h,i,n, o,p,t,-	Creek marsh of arrow arum and wild rice; overstory of beggar ticks smartweeds.	XI
			acres			-		-	-	0.8	0.1	-	0.6	-	0.5		-			-	-			-	-		h,i,n, o,p,t,-		
218	Little Creek	6.8	%			-		-	-	20	10	-	35	5	20	-	5	-			-		5	-	-	-	c,h,i, m,o,r,-	Fringe and pocket marsh with some fill along upland; arrow arum and wild rice with overstory of beggar ticks.	XI
			acres			-		-	-	1.4	0.7	-	2.4	0.3	1.4	-	0.3	-			-		0.3	-	-	-	c,h,i, m,o,r,-		
219	Little Creek	* 1.6	%			-		-	-	20	10	-	50	10	-	-	-	-	-	-			10	-	-	-	h,i,p,-	Small creek marsh; overstory of beggar ticks with some cypress; yellow pond lily along channel.	XI
			acres			-		-	-	0.3	0.2	-	0.7	0.2	-	-	-	-	-	-			0.2	-	-	-	h,i,p,-		
220	Little Creek	* 8.2	%			-		-	-	20	5	-	35	5	30	-	-		-				5	-	-	-	h,i,j,-	Creek marsh at head of creek; yellow pond lily and pickerelweed grade into other species; scattered swamp trees.	XI
			acres			-		-	-	1.6	0.4	-	2.9	0.4	2.5	-	-		-				0.4	-	-	-	h,i,j,-		
221	Little Creek	* 2.3	%			-		-	-	30	5	-	40	5	20	-	-				-		-	-	-	-	h,-	Creek marsh of arrow arum and wild rice with overstory of beggar ticks; scattered swamp trees.	XI
			acres			-		-	-	0.7	0.1	-	0.9	0.1	0.5	-	-				-		-	-	-	-	h,-		
222	Little Creek	6.2	%			-		-	-	20	5	-	45	-	15	-	-			-	-		15	-	-	-	h,i,n,o,-	Creek marsh with pickerelweed and yellow pond lily along channel; wild rice, beggar ticks dominate interior.	XI
			acres			-		-	-	1.3	0.3	-	2.8	-	0.9	-	-			-	-		0.9	-	-	-	h,i,n,o,-		
223	Little Creek	5.9	%			-		-	-	20	-	-	35	5	35	-	-			-	-		5	-	-	-	e,h,i, n,o,-	Creek marsh with interior pocket area; mostly wild rice and beggar ticks; scattered hemp.	XI
			acres			-		-	-	1.1	-	-	2.1	0.3	2.1	-	-			-	-		0.3	-	-	-	e,h,i, n,o,-		

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n - Ironweed
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p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

Section IX. Chickahominy River-Wright Island
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
224	Little Creek	4.5	%			-		-	-	15	-	-	40	-	40	-	-	-		-	-		5	-	-	-	h,i,n, o,r,-	Creek marsh with pickerelweed, yellow pond lily along channel; interior of wild rice, beggar ticks, others.	XI
			acres			-		-	-	0.7	-	-	1.8	-	1.8	-	-	-		-	-		0.2	-	-	-	h,i,n, o,r,-		
225	Little Creek	11.5	%			-		-	-	35	5	-	20	-	35	-	-	-	-	-	-		-	5	-	-	h,i,n, m,o,r,-	Arrow arum, pickerelweed, beggar ticks along creek grade to interior, pocket area of wild rice.	XI
			acres			-		-	-	4.0	0.6	-	2.3	-	4.0	-	-	-	-	-	-		-	0.6	-	-	h,i,n, m,o,r,-		
226	Shipyard Creek	84.5	%			-		-	-	20	-	-	20	-	60	-	-	-	-	-	-		-	-	-	-	h,m,n,r,-	Extensive creek marsh; pickerelweed, wild rice along creek channels; wild rice dominates interior.	XI
			acres			-		-	-	16.9	-	-	16.9	-	50.7	-	-	-	-	-	-		-	-	-	-	h,m,n,r,-		
227	Shipyard Creek	218.3	%		25	-		5	-	20	5	15	20	-	5	-	5	-	-	-	-			-	-	-	b,c,n, m,o,r,-	Extensive creek marsh; big cordgrass dominates lower section; wild rice and arrow arum dominate two creek heads.	XI
			acres		54.6	-		10.9	-	43.7	10.9	32.7	43.7	-	10.9	-	10.9	-	-	-	-			-	-	-	b,c,n, m,o,r,-		
228	Wright Island	14.2	%			-		-	-	35	-	-	5	-	55	-	-	-		-	-		5	-	-	-	h,-	Creek marsh dominated by wild rice with arrow arum; yellow pond lily along channels.	XI
			acres			-		-	-	5.0	-	-	0.7	-	7.8	-	-	-		-	-		0.7	-	-	-	h,-		
229	Shipyard Landing	4.2	%		-	-		3	-	25	5	10	30	4	10	-	10	-	-	-	-		-	3	-	-	h,i,k, m,o,r,-	Dike across front of marsh culvert allows tidal flushing; pickerelweed, wild rice with overstory of beggar ticks, tearthumb, etc.	XI
			acres		-	-		0.1	-	1.1	0.2	0.4	1.3	0.2	0.4	-	0.4	-	-	-	-		-	0.1	-	-	h,i,k, m,o,r,-		
	TOTAL SECTION IX.	964.0	%		6	-		3	-	25	2	4	24	1	29	-	3	-	-	-	-		3	-	-	-	b,- e,- i,- k,- n,- t,- c,- h,- j,- m,- r,-		
			acres		54.6	0.4		24.3	-	243.5	15.6	40.3	231.8	8.6	278.9	-	33.2	-	-	-	-		31.5	1.3	-	-	b,- e,- i,- k,- n,- t,- c,- h,- j,- m,- r,-		
	*Acreage not included in total																												

a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
d - Olney Threesquare
e - Reed Grass
f - Saltmarsh Loosestrife
g - Sedge
h - Bald Cypress
i - Swamp Rose
j - Black Gum
k - Switch Grass
l - Saltmarsh Aster
m - Water Parsnip
n - Ironweed
o - Wool Grass
p - Wool Reed
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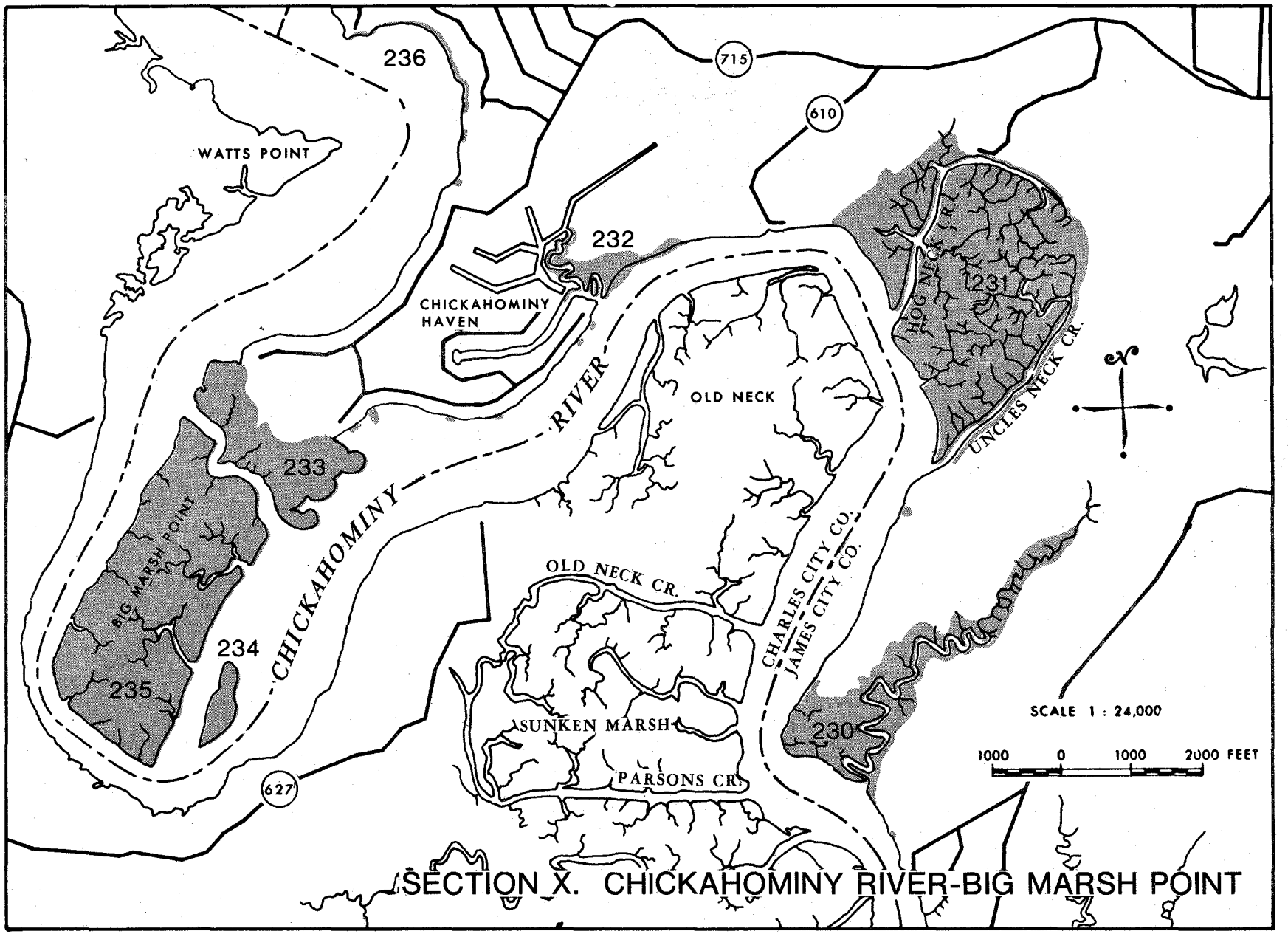
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

SECTION X

CHICKAHOMINY RIVER-BIG MARSH POINT

The portion of the Chickahominy River described and illustrated in this section, consists of approximately 490 acres of tidal wetlands, most of which occur in several large marsh areas. Like the majority of the other tidal wetland areas located along the Chickahominy River, arrow arum (Type VII) predominates early in the growing season while other species such as wild rice and beggar ticks (Type XI) are not evident until later in the summer. Bald cypress is common along most of the marsh-upland boundaries and several of the creek marshes (#230, 232) grade to cypress dominated swamp in their most upstream areas.

This section marks one of the wetland areas found along the Chickahominy River that have been impacted by man's activities. Chickahominy Haven, a year round residential community includes a number of dead-end, dredged canals that are located along marsh #232. Generally, dredged waterways such as these are a source of poor water quality, especially after residences have been established on most of the lots. Poor tidal flushing within the canals combined with runoff of fertilizers from the lawns and gardens, drainage from septic tanks and fecal matter from household pets can at times produce water that is of low oxygen content but high coliform count.



SECTION X. CHICKAHOMINY RIVER-BIG MARSH POINT

Section X. Chickahominy River-Big Marsh Point

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum-Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
230	Chickahominy River	35.1	%		-	-		3	-	25	5	10	30	5	10	-	10	-	-	-	-		-	2	-	-	h,i,k, m,n,r,-	Large pocket marsh with diverse flora; some high marsh areas with shrubs, especially towards head, but mostly arrow arum with beggar ticks.	XI
			acres		-	-		1.0	-	8.8	1.8	3.5	10.5	1.8	3.5	-	3.5	-	-	-	-		-	0.7	-	-	h,i,k, m,n,r,-		
231	Hog Neck	218.9	%			-		-	-	30	1	-	4	-	65	-	-		-				-	-	-	-	h,m,-	Extensive marsh area; arrow arrow arum, pickerelweed with overstory of beggar ticks, wild rice.	XI
			acres			-		-	-	65.7	2.2	-	8.7	-	142.3	-	-		-				-	-	-	-	h,m,-		
232	Chickahominy Haven	12.3	%			-		5	-	25	30	5	5	-	20	-	-	-	-				5	5	-	-	h,m,n,r,-	Creek marsh with dredged canal along western edge; grades upstream to swamp also disturbed by dredging.	XI
			acres			-		0.6	-	3.1	3.7	0.6	0.6	-	2.5	-	-	-	-				0.6	0.6	-	-	h,m,n,r,-		
233	Big Marsh Point	45.9	%			-		-	-	35	15	5	10	-	5	-	-	-	5	-			20	-	-	-	m,n,r,- h,5	Extensive marsh area; arrow arum dominates but large zone of yellow pond lily extends along channels;	XI
			acres			-		-	-	16.1	6.9	2.3	4.6	-	2.3	-	-	-	2.3	-			9.1	-	-	-	m,n,r,- h,2.3		
234	Big Marsh Point	7.7	%							5	5		-	-	5	-	-						85	-				Marsh island; large areas of yellow pond lily only; pickerelweed, wild rice, etc. in one section.	IX
			acres							0.4	0.4		-	-	0.4	-	-						6.5	-					
235	Big Marsh Point	169.0	%			-		2	-	30	15	5	25	2	5	1	-	-	5	-			10	-	-	-	h,k,m, n,r,-	Extensive marsh area; abundant arrow arum with overstory of beggar ticks; yellow pond lily along channels; others scattered.	XI
			acres			-		3.4	-	50.7	25.4	8.4	42.3	3.4	8.4	1.7	-	-	8.4	-			16.9	-	-	-	h,k,m, n,r,-		
236	Chickahominy River	0.50	%							5	-	5	-		20					-					-		h,70	Narrow marsh fringe of cypress trees; scattered wild rice and other species.	XI
			acres							0.02	-	0.02	-		0.10					-					-		h,0.35		
	TOTAL SECTION X.	489.4	%		-	-		1	-	30	8	3	14	1	33	-	1	-	2	-	-	-	7	-	-	-	h,- j,- m,- r,- i,- k,- n,-		
			acres		-	-		5.0	-	144.8	40.4	14.8	66.7	5.2	159.5	1.7	3.5	-	10.7	-	-	-	33.1	1.3	-	-	h,2.7 j,- m,- r,- i,- k,- n,-		

a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
d - Olney Threesquare
e - Reed Grass
f - Saltmarsh Loosestrife
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m - Water Parsnip
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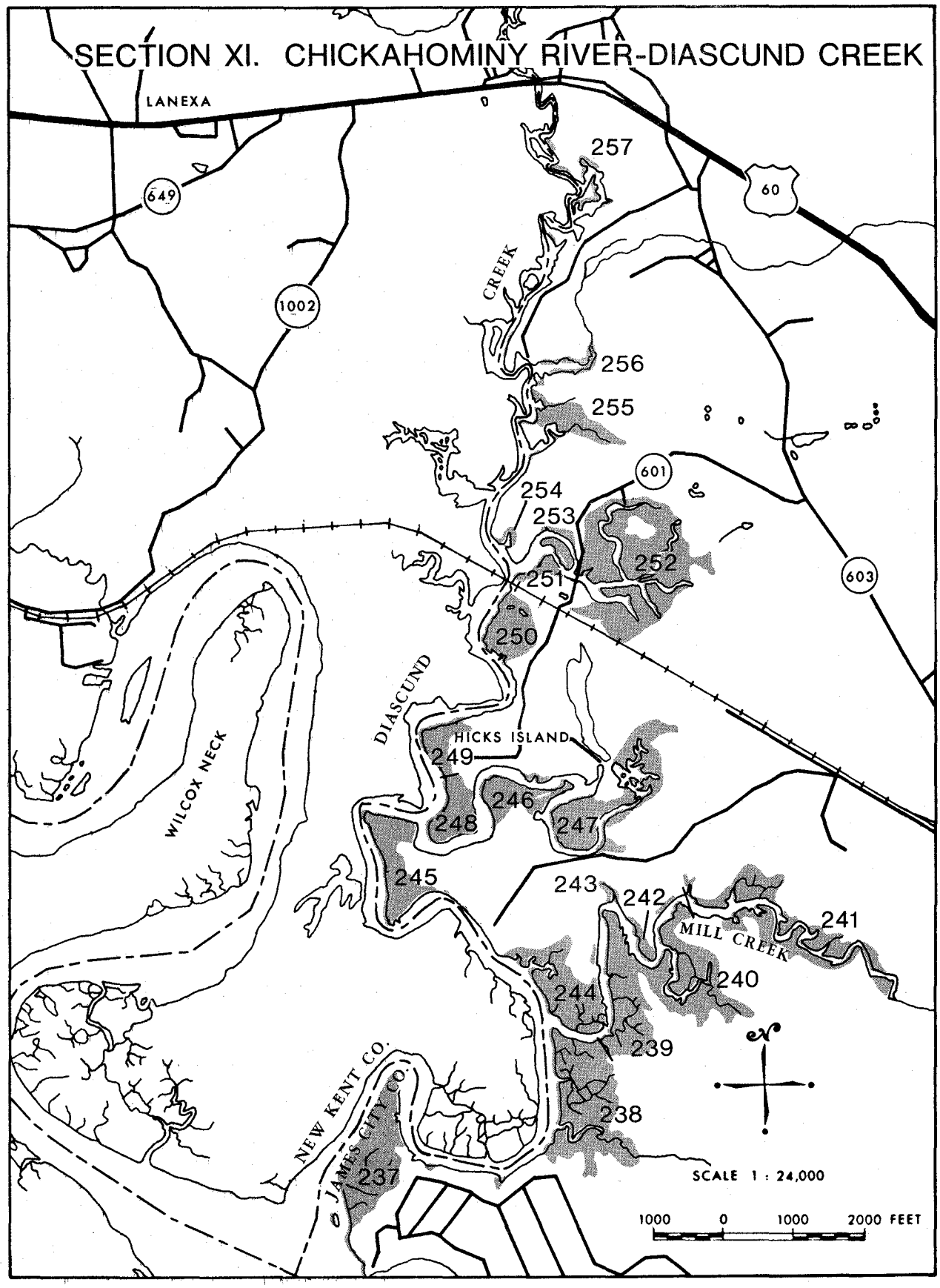
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

SECTION XI

CHICKAHOMINY RIVER-DIASCUND CREEK

The shoreline in this section includes the marshes located along the eastern side of Diascund Creek, a tributary of the Chickahominy River, and marks the last of five sections of James City County shoreline (VII, VIII, IX, X, XI) found along the Chickahominy River and its tidal tributaries. As with most of the other marsh areas found along the Chickahominy, arrow arum, wild rice and other freshwater species (Type XI) predominate. In addition, many of the marshes found here contain large stands of yellow pond lily (Type IX), an emergent, broad-leaved species that generally grows along the creek channels from an elevation below mean low water.

Diascund Creek is a valuable nursery and spawning area for several species of shad and herring as well as the striped bass. It serves as well as a habitat for many species of resident freshwater fish as well as ducks and other waterfowl.


SECTION XI. CHICKAHOMINY RIVER-DIASCUND CREEK
LANEXA
649
1002
60
601
603
257
CREEK
256
255
254
253
252
251
250
DIASCUND
HICKS ISLAND
249
246
248
247
245
243
242
241
MILL CREEK
240
244
239
238
237
WILCOX NECK
NEW KENT CO.
JAMES CITY CO.
SCALE 1 : 24,000
1000 0 1000 2000 FEET

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
237	Diascund Creek	22.4	%			-		5	-	20	5	5	20	-	5	-	20	-	-	-	-		10	-	-	-	i,n,q,t,-h,5 r,5	Cypress and yellow pond lily along channel edge; interior of marsh is arrow arum with beggar ticks, tear thumb, etc.	XI
			acres			-		1.1	-	4.5	1.1	1.1	4.5	-	1.1	-	4.5	-	-	-	-		2.3	-	-	-	i,n,q,t,-h,1.1 r,1.1		
238	Diascund Creek	33.4	%			-		-	-	25	-	5	10	-	35	-	10	-	-	-	-		15	-	-	-	c,h,i,m,n,o,q,r,-	Yellow pond lily along creek channels; interior of wild rice, arrow arum, beggar ticks etc.	XI
			acres			-		-	-	8.4	-	1.7	3.3	-	11.7	-	3.3	-	-	-	-		5.0	-	-	-	c,h,i,m n,o,q,r,-		
239	Mill Creek	18.6	%			-		-	-	30	-	5	10	-	30	-	10	-	-	-	-		15	-	-	-	c,h,i,j,n,o,q,r,-	Yellow pond lily in band along creek channel and other low areas; interior largely arrow arum, wild rice; scattered cypress.	XI
			acres			-		-	-	5.6	-	0.9	1.9	-	5.6	-	1.9	-	-	-	-		2.7	-	-	-	c,h,i,j,n,o,q,r,-		
240	Mill Creek	22.5	%			-		-	-	40	-	5	5	5	10	-	10	-	-	-	-		25	-	-	-	h,i,m,n,o,r,-	Creek marsh that forms large pocket area; yellow pond lily along channels; interior of marsh largely arrow arum.	XI
			acres			-		-	-	9.0	-	1.1	1.1	1.1	2.3	-	2.3	-	-	-	-		5.6	-	-	-	h,i,m,n,o,r,-		
241	Mill Creek	21.8	%			-		-	-	30	-	10	5	-	10	-	10	-	-	-	-		30	-	-	-	h,i,m,n,r,-i,5	Upstream section of creek; yellow pond lily along channels grades to arrow arum; scattered areas of swamp throughout.	XI
			acres			-		-	-	6.5	-	2.2	1.1	-	2.2	-	2.2	-	-	-	-		6.5	-	-	-	h,i,m,n,r,-j,1.1		
242	Mill Creek	2.1	%			-		-	-	25	-	5	10	-	10	-	5	-		-	-		45	-	-	-	h,i,j,n,o,r,-	Yellow pond lily in zone along channel; grades to arrow arum, wild rice, etc; shrubs and swamp trees along upland.	XI
			acres			-		-	-	0.5	-	0.1	0.2	-	0.2	-	0.1	-		-	-		0.9	-	-	-	h,i,j,n,o,r,-		
243	Mill Creek	0.70	%			-		-	-	25	-	5	5	-	40		10	-		-	-		15	-	-	-	h,j,m,o,r,q,-	Small pocket marsh dominated by wild rice and arrow arum; scattered cypress, gum, ash trees.	XI
			acres			-		-	-	0.18	-	0.04	0.04	-	0.28		0.07	-		-	-		0.10	-	-	-	h,j,m,o,r,q,-		
244	Mill Creek	20.0	%			-		-	-	30	-	5	5	5	30		5	-		-	-		20	-	-	-	c,h,i,j,r,o,-	Yellow pond lily at lowest elevations; arrow arum and wild rice predominate throughout; stands of cypress.	XI
			acres			-		-	-	6.0	-	1.0	1.0	1.0	6.0		1.0	-		-	-		4.0	-	-	-	c,h,i,j,r,o,-		

a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
d - Olney Threesquare
e - Reed Grass
f - Saltmarsh Loosestrife
g - Sedge
h - Bald Cypress
i - Swamp Rose
j - Black Gum
k - Switch Grass
l - Saltmarsh Aster
m - Water Parsnip
n - Ironweed
o - Wool Grass
p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

Section XI. Chickahominy River-Diascund Creek
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
245	Diascund Creek	14.4	%			-		-	-	30	-	10	5	-	5	-	5	-	-	-	-		40	-	-	-	i,j,n,o,r,-h,5	Creek marsh with yellow pond lily along creek channel and other areas of low elevation; scattered stands of cypress.	XI
			acres			-		-	-	4.4	-	1.4	0.7	-	0.7	-	0.7	-	-	-	-		5.8	-	-	-	i,j,n,o,r,-h,0.7		
246	Diascund Creek	10.4	%			-		-	-	10	-	5	5	5	-	-	5			-	-		35	-	-	-	i,q,r,-h,35	Creek marsh with band of yellow pond lily along channel; interior of cypress with marsh and shrub understory.	XI
			acres			-		-	-	1.0	-	0.5	0.5	0.5	-	-	0.5			-	-		3.7	-	-	-	i,r,q,-h,3.7		
247	Diascund Creek	25.6	%			-		-	-	30	-	-	-	-	5	-	10			-			45	-	-	-	i,r,n,-h,10	Upstream section of creek marsh; yellow pond lily dominates large section with other species, including cypress, throughout.	XI
			acres			-		-	-	7.6	-	-	-	-	1.3	-	2.6			-			11.5	-	-	-	i,r,n,-h,2.6		
248	Diascund Creek	9.5	%			-		-	-	20	-	5	-	-	-	-	5			-	-		40		-	-	n,o,q,r,-h,30	Creek marsh section with yellow pond lily along channels; arrow arum, cypress, other species throughout interior.	XI
			acres			-		-	-	1.9	-	0.5	-	-	-	-	0.5			-	-		3.8		-	-	n,o,q,r,-h,2.8		
249	Diascund Creek	6.0	%			-		-	-	30	-	10	5	-	5	-	10	-	-	-	-		30	-	-	-	i,m,o,u,-h,10	Marsh section with yellow pond lily along channels; interior of arrow arum, etc. with cypress; lotus present.	XI
			acres			-		-	-	1.8	-	0.6	0.3	-	0.3	-	0.6	-	-	-	-		1.8	-	-	-	i,m,o,u,-h,0.6		
250	Diascund Creek	11.8	%			-		-	-	35	-	5	5	-	5	-	10	-		-	-		30	-	-	-	i,j,m,n,r,-h,10	Creek marsh with large stands of yellow pond lily; interior areas of arrow arum, other species including cypress.	XI
			acres			-		-	-	4.1	-	0.6	0.6	-	0.6	-	1.2	-		-	-		3.5	-	-	-	i,j,m,n,r,-h,1.2		
251	Diascund Creek	2.6	%			-		-	-	30	-	5	-	-	-	-	10			-	-		40	-	-	-	i,j,n,o,r,-h,15	Yellow pond lily along channel grades to interior of arrow arum and other species; scattered stands of cypress.	XI
			acres			-		-	-	0.8	-	0.1	-	-	-	-	0.3			-	-		1.0	-	-	-	i,j,n,o,r,-h,0.4		
252	Diascund Creek	46.4	%			-		-	-	30	-	5	5	5	5	-	10	-	-	-	-		30	-	-	-	j,n,o,-h,10	Extensive marsh at head of creek branch; upland island in center; pond lily and arrow arum predominate with scattered cypress.	XI
			acres			-		-	-	14.0	-	2.3	2.3	2.3	2.3	-	4.6	-	-	-	-		14.0	-	-	-	j,n,o,-h,4.6		

a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
d - Olney Threesquare
e - Reed Grass
f - Saltmarsh Loosestrife
g - Sedge
h - Bald Cypress
i - Swamp Rose
j - Black Gum
k - Switch Grass
l - Saltmarsh Aster
m - Water Parsnip
n - Ironweed
o - Wool Grass
p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

Section XI. Chickahominy River-Diascund Creek
(continued)

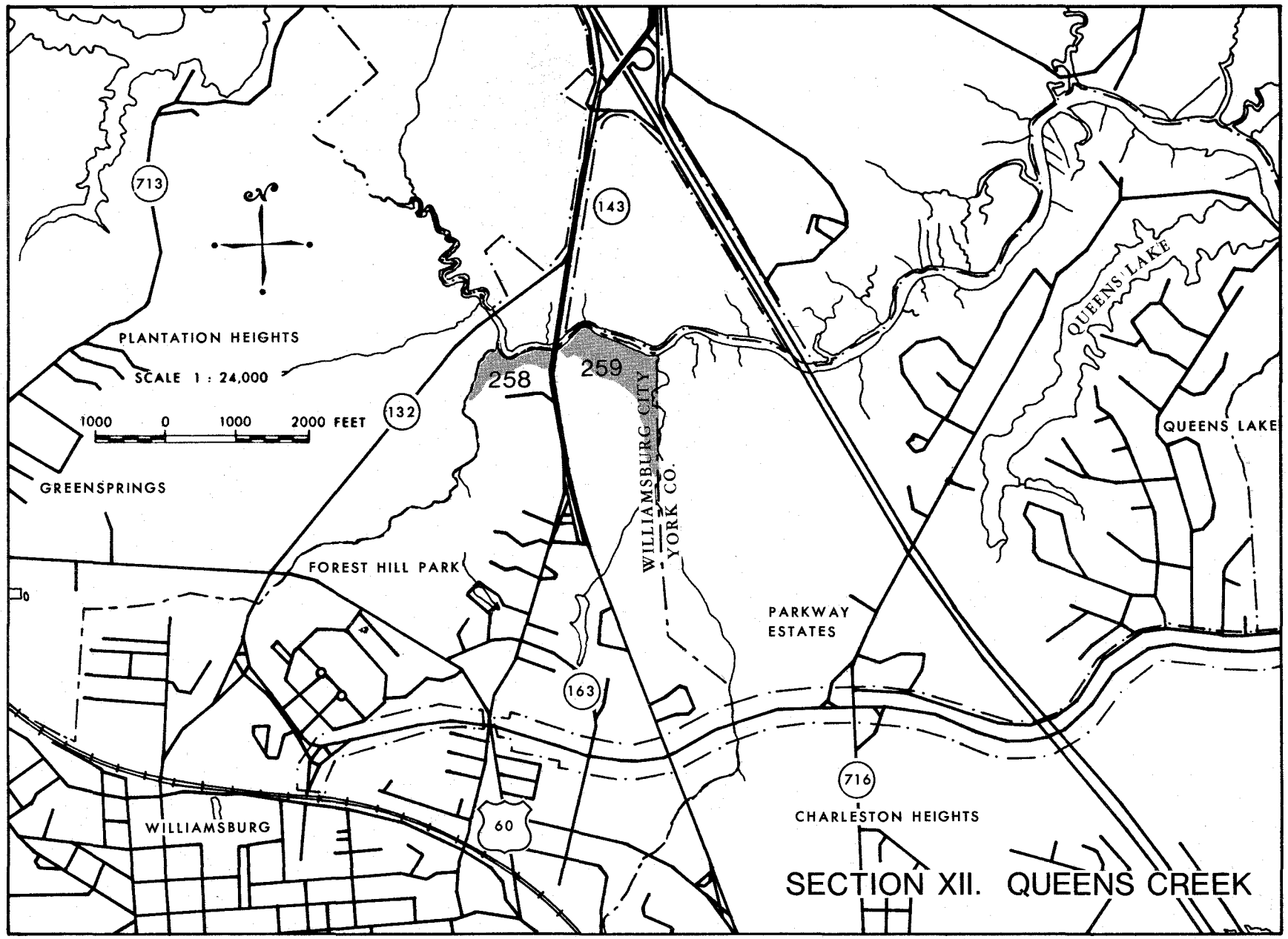
#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum-Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
253	Diascund Creek	4.6	%			-		-		10	-		5	-	10	-	5			-	-		70	-	-		h,i,r,-	Creek marsh with large area of yellow pond lily; wild rice, other species in fringe along upland.	IX
			acres			-		-		0.5	-		0.2	-	0.5	-	0.2			-	-		3.2	-	-		h,i,r,-		
254	Diascund Creek	1.4	%			-		-	-	15	-	-	5	-	-	-	10	-		-	-		70	-	-	-	h,i,n,o,r,-	Small pocket marsh of yellow pond lily surrounded by cypress dominated swamp.	IX
			acres			-		-	-	0.2	-	-	0.1	-	-	-	0.1	-		-	-		1.0	-	-	-	h,i,n,o,r,-		
255	Diascund Creek	8.2	%			5		-	-	30	-	5	5	-	5	-	15			-	-		30	-	-	-	h,j,m,n,t,-o,5	Pocket marsh; open marsh of yellow pond lily and arrow arum grade to tidal swamp.	XI
			acres			0.4		-	-	2.5	-	0.4	0.4	-	0.4	-	1.2			-	-		2.5	-	-	-	h,j,m,n,t,-o,0.4		
256	Diascund Creek	3.4	%			-		-		20	5	-	-	5		-	10			-	-		60	-	-	-	h,i,j,p,-	Pocket area with marsh fringe of yellow pond lily and other species along both sides of channel.	IX
			acres			-		-		0.7	0.2	-	-	0.2		-	0.3			-	-		2.0	-	-	-	h,i,j,p,-		
257	Diascund Creek	1.5	%					-		50	5	-		-	-	-	5				-		40		-	-	h,j,-	Scattered fringing marshes at head of creek border along large areas of swamp.	VII
			acres					-		0.7	0.1	-		-	-	-	0.1				-		0.6		-	-	h,j,-		
	TOTAL SECTION XI.	287.3	%			-		-	-	28	-	5	6	2	12	-	10	-	-	-	-		28	-	-	-	c,- i,- m,- o,- r,- u,- h,6 j,- n,- q,- t,-		
			acres			0.4		1.1	-	81.0	1.4	14.5	18.2	5.1	35.5	-	28.3	-	-	-	-		81.5	-	-	-	c,- i,- m,- o,0.4 r,1.1 u,- h,17.7 j,1.1 n,- q,- t,-		

a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
d - Olney Threesquare
e - Reed Grass
f - Saltmarsh Loosestrife
g - Sedge
h - Bald Cypress
i - Swamp Rose
j - Black Gum
k - Switch Grass
l - Saltmarsh Aster
m - Water Parsnip
n - Ironweed
o - Wool Grass
p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

SECTION XII

YORK RIVER-QUEENS CREEK

The corporate limits of the City of Williamsburg extend as a narrow peninsula to Queens Creek, a large, tidal creek which connects to the York River. A similar situation is found at the head of the College Creek (Section III), which drains into the James River. The marshes within Williamsburg that occur along Queens Creek are dominated by big cordgrass (Type V) with scattered arrow arum and cattails in areas bordering along the uplands. These marsh areas are merely a small section of the continuum of tidal wetlands which are found along Queens Creek. This continuum grades from saltmarsh cordgrass (Type I) dominated wetlands near the creek mouth, through a zone of brackish marsh dominated by big cordgrass (Type V) to a freshwater zone at the head of the creek that is dominated by arrow arum (Type VII). The remainder of these wetland areas of Queens Creek not described in this section are located within York County.


713
143
PLANTATION HEIGHTS
SCALE 1 : 24,000
1000 0 1000 2000 FEET
132
258
259
WILLIAMSBURG CITY
YORK CO.
QUEENS LAKE
QUEENS LAKE
GREENSPRINGS
FOREST HILL PARK
PARKWAY
ESTATES
163
716
CHARLESTON HEIGHTS
60
WILLIAMSBURG
SECTION XII. QUEENS CREEK

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum-Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
258	Queens Creek	5.0	%	-	85	10		-		5				-								-					b,c,v,-	Predominately big cordgrass with cattails along upland; abundant muskrat lodges throughout marsh.	V
			acres		4.3	0.5		-		0.2				-								-					b,c,v,-		
259	Queens Creek	19.4	%	-	90	5	-	-		5				-								-					b,c,v,-	Creek marsh section; big cordgrass with cattails along upland; arrow arum in interior pocket areas.	V
			acres	-	17.6	0.9	-	-		0.9				-								-					b,c,v,-		
	TOTAL SECTION XII.	24.4	%	-	90	6	-	-		4				-								-					b,- v,- c,-		
			acres	-	21.9	1.4	-	-		1.1				-								-					b,- v,- c,-		

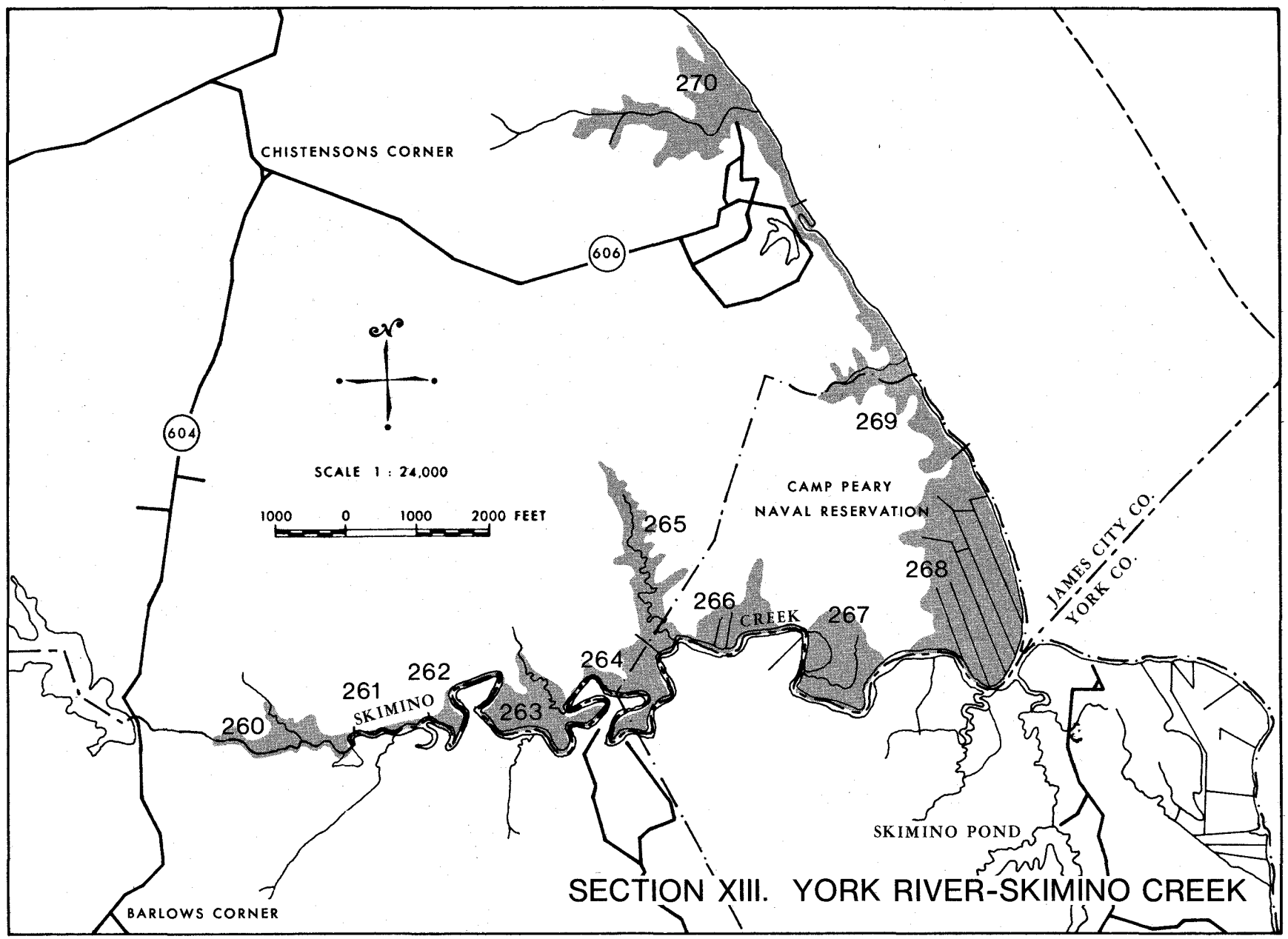
a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
d - Olney Threesquare
e - Reed Grass
f - Saltmarsh Loosestrife
g - Sedge
h - Bald Cypress
i - Swamp Rose
j - Black Gum
k - Switch Grass
l - Saltmarsh Aster
m - Water Parsnip
n - Ironweed
o - Wool Grass
p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

SECTION XIII

YORK RIVER-SKIMINO CREEK

Skimino Creek marks the southern boundary of James City County's York River shoreline and only those marsh areas which are located within the county line are described here. The creek itself presents an interesting gradation of marsh types, due primarily to salinity, from its head to its mouth with the most upstream tidal marsh areas (#261, 262) being dominated by arrow arum (Type VII) and other freshwater marsh species. In the middle zone of the creek (#262, 263) big cordgrass (Type V) is dominant. This species is tolerant of low salinities. At the mouth of Skimino Creek (#266, 267, 268) the salt tolerant saltmarsh cordgrass community (Type I) is found, with saltmeadow grasses (Type II) occurring in areas of highest elevations. Several of these marsh areas have been criss-crossed by a series of mosquito ditches. However, currently this practice is considered ineffectual in controlling mosquito populations many of which come from the adjacent low woodlands and not the tidal marshes. The entire creek system presents an excellent, natural area for wildlife. An obvious example of this value is demonstrated by the nesting pair of American bald eagles observed in a tall loblolly pine, along the upland-marsh boundary of marsh #268.

Several other pocket marsh areas which drain into the York River are included in this section. The interiors of these marshes consist largely of dense stands of big cordgrass with a fringing zone of saltmarsh cordgrass along the river shoreline.


270
CHISTENSONS CORNER
606
604
SCALE 1 : 24,000
1000 0 1000 2000 FEET
269
CAMP PEARY
NAVAL RESERVATION
265
268
JAMES CITY CO.
YORK CO.
266
CREEK
267
264
262
261
SKIMINO
263
260
SKIMINO POND
BARLOWS CORNER
SECTION XIII. YORK RIVER-SKIMINO CREEK

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
260	Skimino Creek	12.6	%		-	50		-		50		-		-	-				-	-					-	-	g,-	Creek marsh at head of creek; arrow arum and pickerelweed mixed with cattails; other species scattered throughout.	VII
			acres		-	6.3		-		6.3		-		-	-				-	-					-	-	g,-		
261	Skimino Creek	1.1	%	-	30	-	-			70		-		-											-	-	g,-	Marsh fringe with pickerelweed, arrow arum and big cordgrass; other species scattered.	VII
			acres	-	0.3	-	-			0.8		-		-											-	-	g,-		
262	Skimino Creek	3.1	%	5	70	20				5		-		-								-			-	-	g,v,-	Creek marsh section dominated by big cordgrass; large stands of cattails with scattered arrow arum and saltmarsh cordgrass.	V
			acres	0.2	2.1	0.6				0.2		-		-								-			-	-	g,v,-		
263	Skimino Creek	21.1	%	10	70	20	-			-												-					c,g,1,v,-	Creek marsh dominated by big cordgrass with saltmarsh cordgrass; large patches of cattails.	V
			acres	2.1	14.8	4.2	-			-												-					c,g,1,v,-		
264	Skimino Creek	17.3	%	30	10	2	45															7					o,5 1,1 c,d,v,-	Creek marsh section; saltmarsh cordgrass along channels; interior of saltmeadow with scattered saltbushes, big cordgrass etc.	XII
			acres	5.2	1.7	0.3	7.8															1.2					b,0.9 1,0.2 c,d,v,-		
265	Skimino Creek	18.6	%	30	30	-	30	-														5					b,5 d,1,v,-	Large pocket marsh area; saltmarsh cordgrass and saltmeadow grasses, grade upstream to areas of big cordgrass and bulrush.	XII
			acres	5.6	5.6	-	5.6	-														0.9					b,0.8 d,1,v,-		
266	Skimino Creek	13.5	%	50	5	3	30															10					d,2 b,1,v,-	Creek marsh dominated by zones of saltmarsh cordgrass; large areas of salt meadow with scattered bulrush, olney threesquare.	I
			acres	6.7	0.7	0.4	4.0															1.4					d,0.3 b,1,v,-		
267	Skimino Creek	25.6	%	65	3	-	30													-		2					b,d,1,v,-	Creek marsh dominated by saltmarsh cordgrass; interior areas of saltmeadow; numerous drainage ditches throughout.	I
			acres	16.6	0.8	-	7.7													-		0.5					b,d,1,v,-		

a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
d - Olney Threesquare
e - Reed Grass
f - Saltmarsh Loosestrife
g - Sedge
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m - Water Parsnip
n - Ironweed
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p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

Section XIII. York River-Skimino Creek
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
268	Skimino Creek	73.9	%	60	10		25															5					b,c,d,1,-	Extensive marsh at mouth of creek; predominately saltmarsh cordgrass with large areas of meadow; ditching evident.	I
			acres	44.3	7.4		18.5															3.7					b,c,d,1,-		
269	York River	23.1	%	10	70	10	5	-														-					b,5	Saltmarsh cordgrass fringe along river grades back to big cordgrass then saltmeadow and saltbushes; big cordgrass in pocket area.	V
			acres	2.3	16.3	2.3	1.1	-														-					b,1.1		
270	York River	28.7	%	20	60	10	5	-														-					b,5 d,1,-	Saltmarsh cordgrass along river grades to big cordgrass; interior areas of saltmeadow with cattails at head of pocket.	V
			acres	5.8	17.2	2.9	1.4	-														-					b,1.4 d,1,-		
	TOTAL SECTION XIII.	238.6	%	37	28	7	19	-		3		-		-	-				-	-		3			-	-	b,2 d,- c,- g,-	1,- v,-	
			acres	88.8	66.9	17.0	46.1	-		7.3		-		-	-				-	-		7.7			-	-	b,4.3 d,0.3 c,- g,-	1,0.2 v,-	

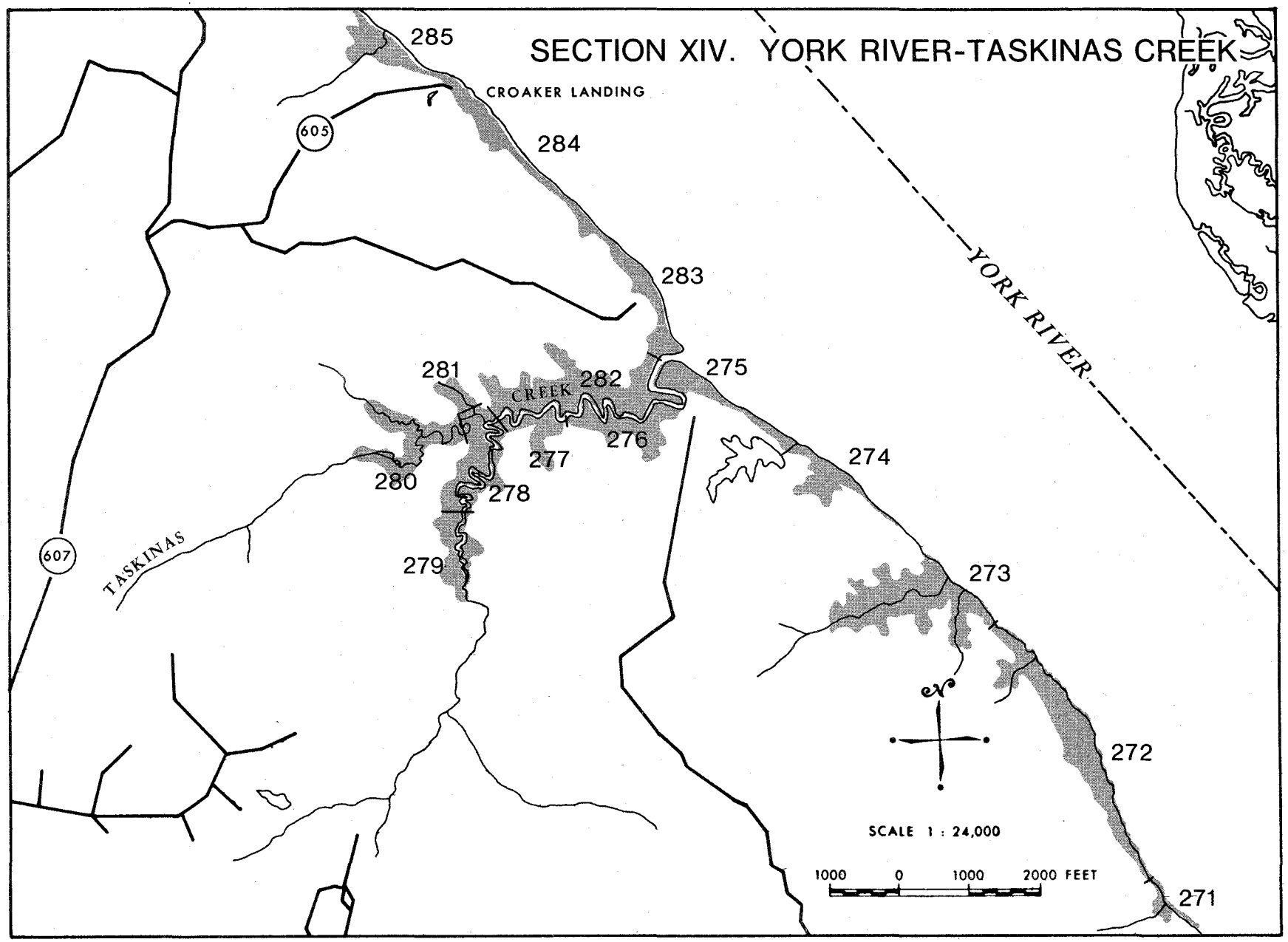
a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
d - Olney Threesquare
e - Reed Grass
f - Saltmarsh Loosestrife
g - Sedge
h - Bald Cypress
i - Swamp Rose
j - Black Gum
k - Switch Grass
l - Saltmarsh Aster
m - Water Parsnip
n - Ironweed
o - Wool Grass
p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

SECTION XIV

YORK RIVER-TASKINAS CREEK

The York River shoreline found along this section of James City County is characterized by a zone of fringing marsh with several pocket and creek marsh areas extending back into the uplands. The marsh fringe consists primarily of a band of saltmarsh cordgrass (Type I) along the river's edge, with interior areas of higher elevation dominated by big cordgrass (Type V). Areas of saltmeadow grass (Type II) and saltbushes (Type IV) are also found throughout this high marsh zone.

Taskinas Creek is composed largely of saltmarsh cordgrass and saltmeadow grass zones in its lower half. However, other species are scattered throughout including big cordgrass, saltmarsh bulrush, olney threesquare and cattails. At the head of Taskinas Creek (#279) many of these brackish water plants are replaced by those species common in a freshwater marsh community (Types VII, XI). Such species include arrow arum, wild rice, marsh hibiscus, smartweeds and many others. Adjacent to Taskinas Creek, facilities for the new York River State Park are currently under construction. When completed they will provide a unique opportunity for the public observe this natural wetland system without the difficulties of access associated with many of these marsh areas found along Virginia's coastline.


SECTION XIV. YORK RIVER-TASKINAS CREEK
285
CROAKER LANDING
605
284
283
YORK RIVER
281
CREEK
282
275
276
277
274
280
278
607
TASKINAS
279
273
272
SCALE 1 : 24,000
1000 0 1000 2000 FEET
271

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
271	York River	1.4	%	65	10		20															-					b,5 1,-	Small fringe and pocket marsh area; salt marsh cordgrass along river grades to zone of meadow and saltbushes; big cordgrass in pocket area.	I
			acres	0.9	0.1		0.3															-					b,0.1 1,-		
272	York River	30.2	%	25	40	5	25	-													-	-					a,b,c,h, 1,v,- d,5	Broad fringing marsh; saltmarsh cordgrass along river and interior channels; big cordgrass and meadow areas dominate interior.	XII
			acres	7.6	12.0	1.5	7.6	-													-	-					a,b,c,h, 1,v,- d,15		
273	York River	21.3	%	70	15	5	10	-													-	-					b,c,d, 1,v,-	Pocket marsh with big cordgrass at mouth; saltmarsh cordgrass dominates interior with areas of saltmeadow along uplands.	I
			acres	14.9	3.2	1.1	2.1	-													-	-					b,c,d, 1,v,-		
274	York River	9.1	%	15	75	-	5	-														-					b,5 d,v,-	Big cordgrass dominates throughout; saltmarsh cordgrass in areas of lowest elevation; saltmeadow along uplands.	V
			acres	1.3	6.8	-	0.5	-														-					b,0.5 d,v,-		
275	Taskinas Creek	6.6	%	20	15		50															-					b,15 d,1,v,-	Creek marsh section; saltmarsh cordgrass in zone along channel; interior areas of saltmeadow, saltbushes, big cordgrass.	II
			acres	1.3	1.0		3.3															-					b,1.0 d,1,v,-		
276	Taskinas Creek	9.6	%	50	-	-	45	-														1					d,2 a,b,r,v,-	Saltmarsh cordgrass zone along channels; interior areas of saltmeadow; big cordgrass, cattails along uplands.	I
			acres	4.8	0.1	0.1	4.3	-														0.1					d,0.2 a,b,r,v,-		
277	Taskinas Creek	2.9	%	60	2	-	35															3					b,d,-	Pocket marsh; saltmarsh cordgrass dominates but large, interior area of meadow; scattered big cordgrass, bulrush, etc.	I
			acres	1.7	0.1	-	1.0															0.1					b,d,-		
278	Taskinas Creek	16.6	%	60	25	5	5	-												-							d,5 b,1,-	Lower section of creek branch; saltmarsh and big cordgrass predominates; large patch of olney threesquare.	I
			acres	10.1	4.1	0.8	0.8													-							d,0.5 b,1,-		

a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
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j - Black Gum
k - Switch Grass
l - Saltmarsh Aster
m - Water Parsnip
n - Ironweed
o - Wool Grass
p - Wool Reed
q - Water Willow
r - Button Bush
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum-Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
279	Taskinas Creek	7.8	%	5	5	25		5		60	-	-		-	-	-			-	-	-					-		Upstream section of creek branch; mixture of arrow arum, pickerelweed, cattails; other species scattered.	VII
			acres	0.4	0.4	1.9		0.4		4.7	-	-		-	-	-			-	-	-					-			
280	Taskinas Creek	14.2	%	80	15	-	-	-		5				-	-	-				-	-					-		Creek branch; saltmarsh cordgrass predominates throughout with scattered big cordgrass; freshwater species at head.	I
			acres	11.4	2.1	-	-	-		0.7				-	-	-				-	-					-			
281	Taskinas Creek	3.4	%	10	-	-	-	-							5							85					d,-	Pocket marsh area dominated by saltmarsh bulrush; wild rice at head.	XII
			acres	0.3	-	-	-	-							0.3							2.8					d,-		
282	Taskinas Creek	26.5	%	40	2	-	30	-														15					b,10 d,3	Saltmarsh cordgrass grades to areas of saltmeadow grass and saltbushes; saltmarsh bulrush in pockets along uplands.	XII
			acres	10.6	0.5	-	7.9	-														4.0					b,2.7 d,0.8		
283	York River	7.9	%	15	85	-	-					-									-	-					a,b,d, 1,v,-	Saltmarsh cordgrass fringe along river; interior area mostly big cordgrass.	V
			acres	1.2	6.7	-	-					-									-	-					a,b,d, 1,v,-		
284	Croaker Landing	10.1	%	20	75	-	-														-	-					b,5 1,v,-	Saltmarsh cordgrass fringe along river; interior predominately big cordgrass.	V
			acres	2.0	7.6	-	-														-	-					b,0.5 1,v,-		
285	York River	8.0	%	20	75	-	-														-	-					b,5 1,v,-	Saltmarsh cordgrass fringe along river; interior mostly big cordgrass with some saltbush.	V
			acres	1.6	6.0	-	-														-	-					b,0.4 1,v,-		
	TOTAL SECTION XIV.	175.6	%	40	29	3	16	-		3	-	-		-	-	-			-	-	-	4				-	a,- c,- h,- r,- b,3 d,2 1,- v,-		
			acres	70.1	50.7	5.4	27.8	0.4		5.4	-	-		-	0.3	-			-	-	-	7.0				-	a,- c,- h,- r,- b,5.2 d,3.3 1,- v,-		

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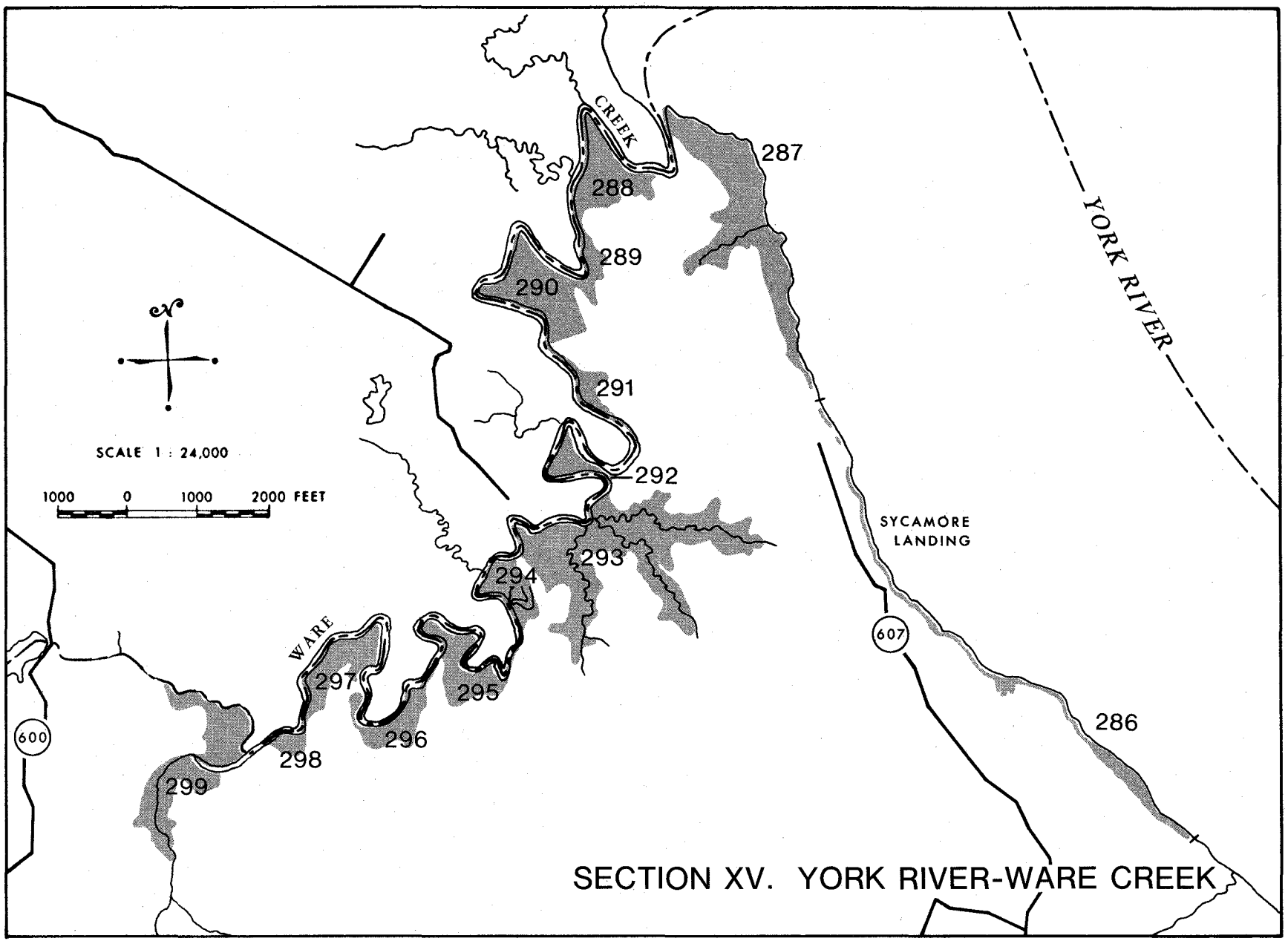
s - Dodder
t - Climbing Hempweed
u - American Lotus
v - Orach

SECTION XV

YORK RIVER-WARE CREEK

As with the shoreline located immediately to the south (Section XIV) this area of the York River is characterized by a marsh fringe of saltmarsh cordgrass (Type I) along the river's edge with interior areas of higher elevation vegetated with big cordgrass (Type V), saltmeadow grasses and saltmarsh bulrush (Type II). Much of the shoreline along this section of river consists of high bluffs which are protected to some extent by these narrow fringes of wetlands at their base.

Ware Creek marks a portion of the northern border of James City County and therefore only those tidal marsh areas located on the south side of the main creek channel are included in this report. As with other tidal creeks located along much of the York River, the marsh areas in Ware Creek are dominated by brackish water species in the downstream portions and freshwater species at the head. In a number of the downstream marsh areas (#286, 289, 290) big cordgrass and saltmarsh cordgrass are found bordering along creek channels, while interior areas are vegetated with saltmeadow grasses, olney threesquare and saltmarsh bulrush. In the middle third of Ware Creek (#293, 294) big cordgrass becomes dominant with some freshwater species such as arrow arum present in interior pocket areas along the uplands. At the head of Ware Creek (#296-299) wild rice, arrow arum, pickerelweed, and cattails (Types VI, VII, XI) have almost completely replaced the cordgrasses.


CREEK
287
288
289
290
291
292
293
294
295
296
297
298
299
YORK RIVER
SYCAMORE
LANDING
607
600
WARE
286
SCALE 1 : 24,000
1000 0 1000 2000 FEET
SECTION XV. YORK RIVER-WARE CREEK

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
286	Sycamore Landing	5.5	%	15	70	-	10	-														-					b,5 a,d,-	Fringing marsh with saltmarsh cordgrass grading to big cordgrass; scattered black needlerush, saltbushes, saltmeadow.	V
			acres	0.8	3.9	-	0.5	-														-					b,0.3 a,d,-		
287	York River	36.8	%	25	10	-	5															45					d, a,c,l,-	Broad fringing marsh; saltmarsh cordgrass along water grades to areas of bulrush, threesquare; other species near northern end.	XII
			acres	9.2	3.7	-	1.8															16.6					d,5.5 a,c,l,-		
288	Ware Creek	15.8	%	30	20	-	10	-													-	30					a,5 d,5 b,l,v,-	Saltmarsh cordgrass along channels with interior areas of big cordgrass or saltmeadow, threesquare and bulrush.	XII
			acres	4.7	3.2	-	1.6	-													-	4.7					a,0.8 d,0.5 b,l,v,-		
289	Ware Creek	4.8	%	30	15	-	20	-		-												20					a,5 d,10 l,v,-	Saltmarsh and big cordgrasses along creek; interior areas of saltmeadow needlerush, bulrush, threesquare.	XII
			acres	1.4	0.7	-	1.0	-		-												1.0					a,0.2 d,0.5 l,v,-		
290	Ware Creek	22.8	%	25	25	-	5	-		-											-	30					d,15 l,v,-	Saltmarsh and big cordgrasses along channels; interior areas with stands of bulrush, threesquare.	XII
			acres	5.7	5.7	-	1.2	-		-											-	6.8					d,3.4 l,v,-		
291	Ware Creek	5.9	%	30	25	5	5	-		-												10					d,25	Saltmarsh and big cordgrass along creek with interior areas of olney threesquare and bulrush; cattails along upland.	XII
			acres	1.8	1.4	0.3	0.3	-		-												0.6					d,1.5		
292	Ware Creek	6.2	%	15	75	-	-	-		-											-	10					d,l,v,-	Creek marsh section dominated by big cordgrass; saltmarsh cordgrass along creek; interior areas of bulrush.	V
			acres	0.9	4.7	-	-	-		-											-	0.6					d,l,v,-		
293	Ware Creek	61.7	%	3	80	2	-	-		10						-				-	-	5					b,c,d,l,-	Creekmarsh extending back to several large pocket areas; big cordgrass grades to freshwater species at heads of pockets.	V
			acres	1.8	49.4	1.2	-	-		6.2						-				-	-	3.1					b,c,d,l,-		

a - Black Needlerush
b - Saltbushes
c - Marsh Fleabane
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u - American Lotus
v - Orach

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Cattails	Saltmeadow Grasses	Marsh Hibiscus	Marsh Mallow	Arrow Arum - Pickerelweed	Smartweed	Jewel-weed	Beggar Ticks	Water-hemp	Wild Rice	Common Threesquare	Tear Thumb	Marsh Milkweed	Southern Cutgrass	Giant Bulrush	Water Dock	Saltmarsh Bulrush	Yellow Pond Lily	Walter's Millet	Cardinal Flower	Arrowhead	Other	Observations	Marsh Type
294	Ware Creek	8.1	%	-	65	5		5		20						-					3	2				-	b,g,-	Creek marsh; predominately big cordgrass but interior sections of arrow arum, cattails etc.	V
			acres	-	5.3	0.4		0.4		1.6						-					0.2	0.2				-	b,g,-		
295	Ware Creek	12.3	%	-	50	3		2	-	40		-			-	-			-	-	5	-			-	-		Creek marsh with mixture of big cordgrass and arrow arum; other species scattered.	V
			acres	-	6.2	0.4		0.2	-	4.9		-			-	-			-	-	0.6	-			-	-			
296	Ware Creek	9.5	%		-	-		-	-	80				-	5	-			5	-	10				-	-		Creek marsh dominated by arrow arum and pickerelweed; other species scattered.	VII
			acres		-	-		-	-	7.6				-	0.5	-			0.5	-	0.9				-	-			
297	Ware Creek	13.5	%			35		5	-	50	-			-	5	-			-	-	5					-		Creek marsh dominated by pickerelweed and arrow arum with large stands of cattails.	VII
			acres			4.7		0.7	-	6.7	-			-	0.7	-			-	-	0.7					-			
298	Ware Creek	2.4	%			35		5	-	40					15	-			-	-	5					-		Creek marsh; predominately arrow arum mixed with cattail; swamp along uplands.	XII
			acres			0.8		0.1	-	1.0					0.4	-			-	-	0.1					-			
299	Ware Creek	28.4	%			20		-	-	55					25					-	-					-		Head of creek; arrow arum mixed with stands of cattail; wild rice throughout especially at heads of pockets.	VII
			acres			5.7		-	-	15.6					7.1					-	-					-			
	TOTAL SECTION XIV	233.7	%	11	36	6	3	1	-	19	-	-		-	4	-			-	-	1.0	14			-	-	a,- c,- g,- v,- b,- d,5 l,-		
			acres	26.3	84.2	13.5	6.4	1.4	-	43.6	-	-		-	8.7				0.5	-	2.5	33.6			-	-	a,10 c,- g,- v,- b,0.3 d,11.7 l,-		
	TOTAL JAMES CITY CO.	7028.4	%	5	16	1	1	2	-	30	3	2	13	2	15	-	3	-	-	-	-	1	2	-	-	-	a,- d,- g,- j,- m,- p,- s,- v,- b,- e,- h,- k,- n,- q,- t,- c,- f,- i,- l,- o,- r,- u,-		
			acres	346.6	1163.1	98.3	86.0	154.8	30.6	2121.1	197.5	149.0	913.2	136.8	1048.3	25.8	224.3	0.3	32.4	3.2	10.8	48.7	146.7	11.3	-	4.3	a,4.6 d,15.3 g,2.9 j,1.8 m,- p,- s,- v,- b,11.8 e,3.1 h,33.3 k,0.7 n,0.4 q,- t,- c,1.1 f,- i,- l,0.2 o,- r,1.1 u,-		

a - Black Needlerush
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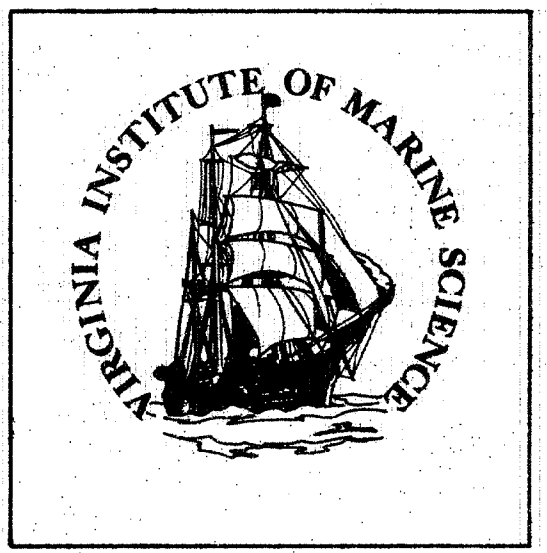
v - Orach

INDEX TO MARSH LOCATIONS

INDEX TO MARSH LOCATIONS (continued)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