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KING GEORGE COUNTY TIDAL MARSH INVENTORY

Special Report No. ⁶³~~68~~ in Applied Marine Science and Ocean Engineering

Kenneth A. Moore

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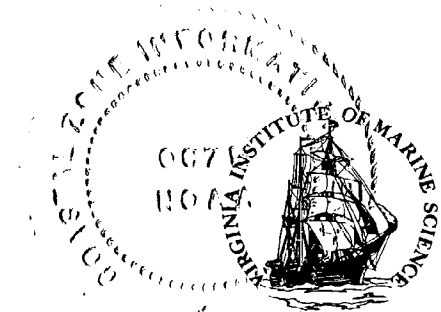
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Gloucester Point, Virginia 23062

Dr. William J. Hargis, Jr., Director

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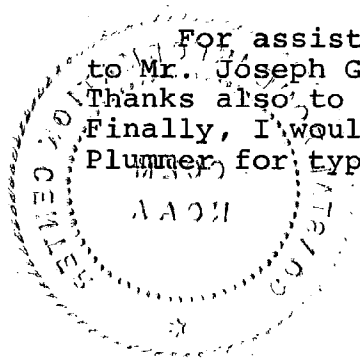
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Acknowledgments

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I would like to express my sincerest gratitude to Dr. Gene M. Silberhorn. His invaluable guidance and assistance made this report possible. I wish also to thank Mr. James Mercer for his field assistance and Mr. Larry L. Pater, former Chairman of the King George County Wetlands Board, for his help in mapping the wetlands located within the Dahlgren Weapons Station. Thanks also to Dr. William J. Hargis, Dr. Michael E. Bender, Miss Christine Plummer, Col. George Dawes, Mr. Thomas Barnard, Mr. James Mercer, and Mr. John Pleasants for their constructive criticisms and suggestions.

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King George County
Tidal Marsh Inventory

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Introduction

This publication is the seventh in a series of marsh inventory reports compiled by the Wetlands Research Section, Virginia Institute of Marine Science. The six previous reports that have been published are: Lancaster County, Mathews County, York County and Town of Poquoson, Northumberland County, Stafford County, Prince William County. This report is presented in much the same format as the preceding 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.

A recently 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 explaining marsh vegetation types and their evaluation, are included in the following text.

The recommendations submitted in the above publication have been adopted and promulgated by the Virginia Marine Resources Commission in booklet form. Titled Wetlands Guidelines, it may be obtained from VMRC, 2401 West Avenue, Newport News, Virginia 23607.

It is our desire that this inventory report and the marsh guidelines study will be useful to those concerned with this valuable resource.

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, these 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. 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 those instances where an individual plant species is estimated to amount to less than 0.5 percent or 0.05 acre, 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).

This inventory report is organized into four sections. Each section attempts to describe one creek-marsh drainage system or significant length of shoreline. Section I includes the section of King George County shoreline in Rosier Creek. Section II covers the Upper Machodoc Creek drainage including Deep Creek, Williams Creek, and nearby Gambo Creek. Section III covers most of the Potomac River shoreline. Section IV covers the Rappahannock River shoreline within King George County.

Marsh Types and Evaluation

For a better understanding of what is meant by marsh types, some background information is required. The personnel of the Wetlands Research Section have classified 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 shellfish by clogging their gills. Additionally marshes can assimilate 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 up 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 lodges.
- 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-Pickerel Weed Community

- a. 2-4 tons per acre per annum.
- b. Detritus readily available 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 IX 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-Pickerel Weed (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 Lands
Virginia Marine Resources Commission
2401 West Avenue,
Newport News, Virginia 23607

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

Marsh Plants

Common Names and Scientific Names as found in the Data Tables

Arrow Arum	<u>Peltandra virginica</u> (L.) Kunth
Beggar Ticks	<u>Bidens</u> spp.
Big Cordgrass	<u>Spartina cynosuroides</u> (L.) Roth.
Black Needlerush	<u>Juncus Foemerianus</u> Scheele.
Button Bush	<u>Cephalanthus occidentalis</u> L.
Cattails common	<u>Typha latifolia</u> L.
narrow-leaved	<u>Typha angustifolia</u> L.
Common Threesquare	<u>Scirpus americanus</u> Pensoon
Ironweed*	<u>Vernonia noveboracensis</u> (L.) Michaux
Jewel-Weed*	<u>Impatiens capensis</u> Meerb.
Marsh-Fleabane	<u>Pluchea purpurascens</u> (Swartz) DC.
Marsh Hibiscus	<u>Hibiscus moscheutos</u> L.
Marsh Mallow*	<u>Kosteletzkya virginica</u> (L.) Presl.
Pickerel Weed	<u>Pontederia cordata</u> L.
Reed Grass	<u>Phragmites australis</u>

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

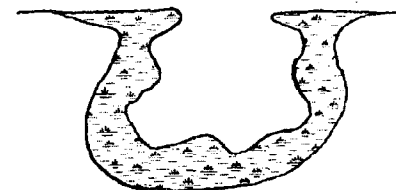
Rice Cutgrass	<u>Leensia oryzoides</u> (L.) Swartz
Saltbushes	
Marsh Elder	<u>Iva frutescens</u> L.
Groundsel Tree	<u>Baccharis halimifolia</u> L.
Saltmarsh Aster*	<u>Aster tenuifolius</u> L.
Saltmarsh Bulrush	<u>Scirpus robustus</u> Pursh.
Saltmarsh Cordgrass	<u>Spartina alterniflora</u> Loisel.
Saltmeadow Hay	<u>Spartina patens</u> (Aiton) Muhl.
Smartweed	<u>Polygonum</u> spp.
Swamp Milkweed*	<u>Asclepias incarnata</u> L.
Switch Grass	<u>Panicum virgatum</u> L.
Tearthumb	<u>Polygonum arifolium</u> L.
Walter's Millet*	<u>Echinochloa walteri</u> (Pursh) Heller
Water Dock	<u>Rumex verticillatus</u> L.
Water Hemp	<u>Amaranthus cannabina</u> (L.) J. D. Sauer
Water Willow*	<u>Decodon venticillatus</u> (L.) Ell.
Wild Rice	<u>Zizania aquatica</u> L.
Wool Grass*	<u>Scirpus cyperinus</u> (L.) Kunth.
Yellow Pond Lily	<u>Nuphar luteum</u> (L.) Sibthrop & Smith

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

Glossary of Descriptive Terms

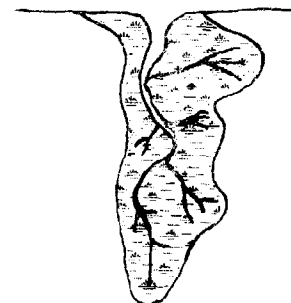
cove marsh

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.



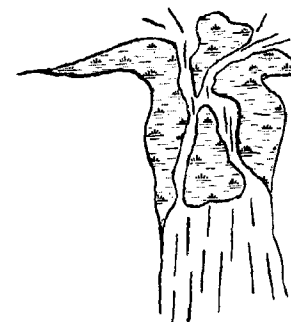
creek or
embayed marsh

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

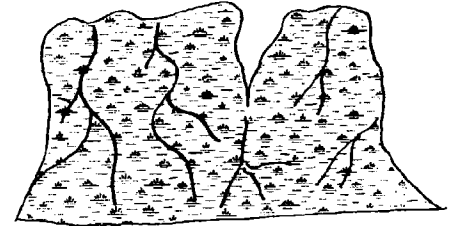
a marsh found growing on sediment deposited at the mouth of a tidal creek; tidal exchange through the creek mouth is usually restricted to narrow channels by the marsh.



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.

Glossary of Descriptive Terms

marsh island

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



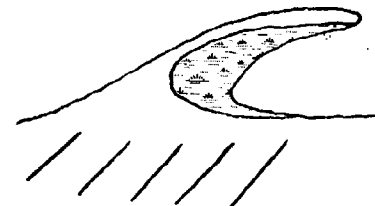
pocket marsh

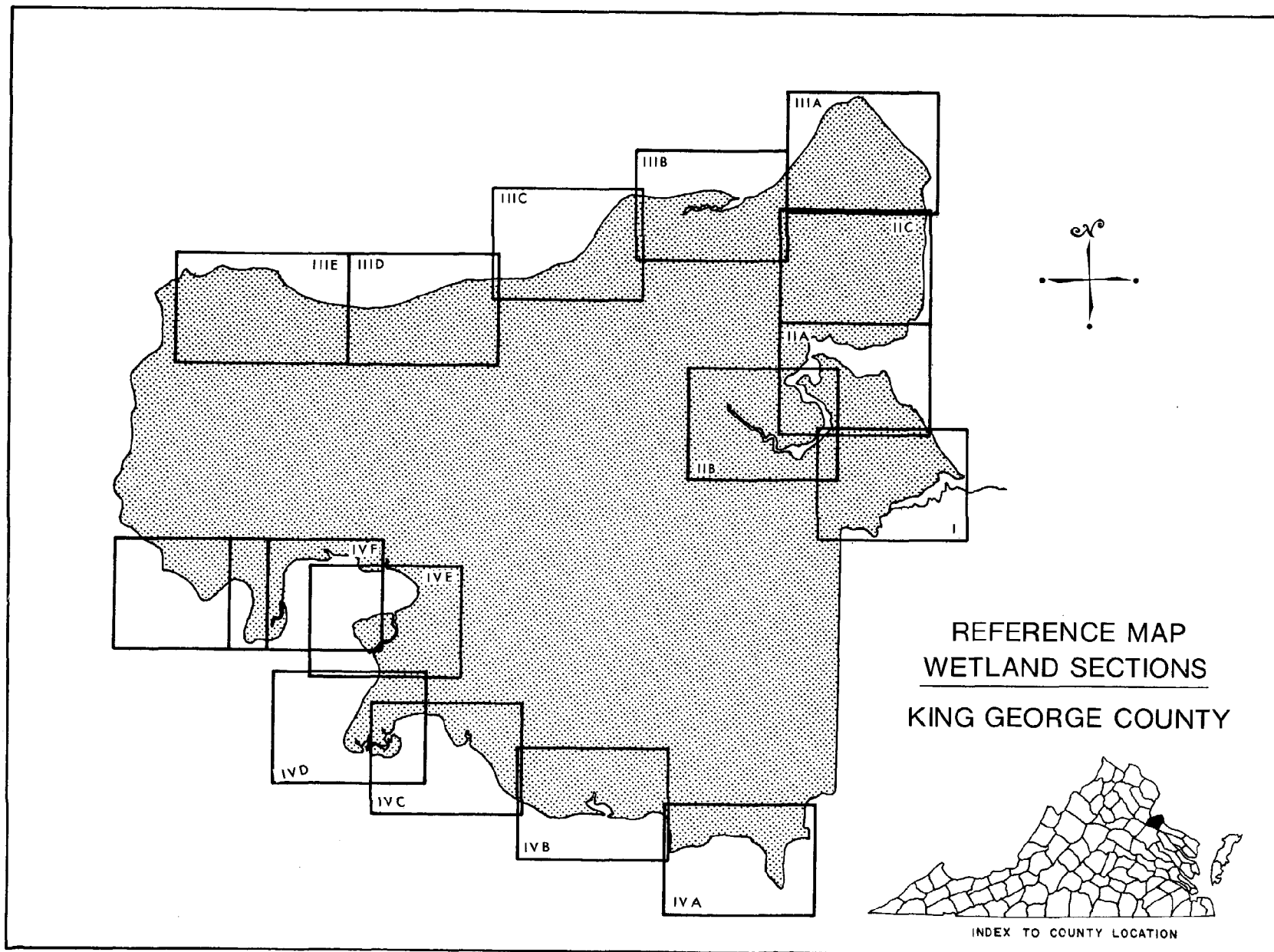
a marsh contained within a small, essentially semi-circular area on a shoreline.



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.





SECTION I

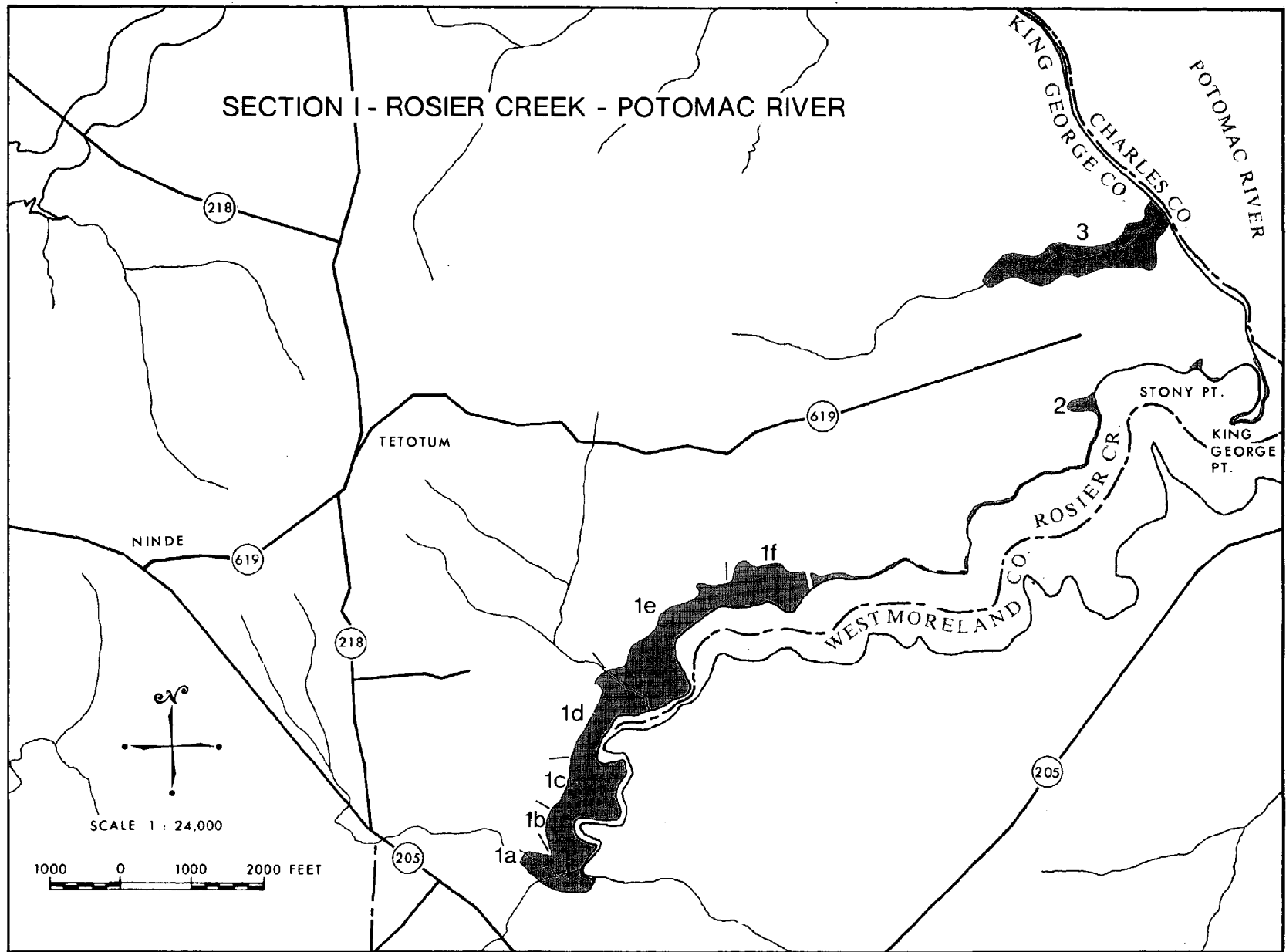
Rosier Creek and Potomac River

Rosier Creek marks the southern boundary of King George County and only the King George County section of the creek is described here. Rosier Creek is both an important spawning and nursery area for many species of fish including: striped bass, white perch, yellow perch, blueback herring, alewife, American shad and menhaden. This section of shoreline is also an important habitat for many species of waterfowl and birds including the bald eagle.

Typical of many marsh creeks, the wetlands vegetation of Rosier Creek increases in diversity, upstream, as salinity gradually decreases. Several small, pocket marshes and narrow fringe marshes dominated by saltmarsh cordgrass (Type I) are found in the lower portion. The upper portion grades from brackish to freshwater tidal marsh, with the most upstream freshwater areas changing to woody swamp. Above Route 205 there are several large areas of freshwater marsh, but these areas are non-tidal.

Marsh #3 is a large pocket marsh dominated by several freshwater species (Type XI). A berm of sand across its mouth covered with vegetation causes a reduction in salinity by partially restricting tidal flushing to the interior and trapping upland runoff.

This section of shoreline includes 125 of the 2122 acres of tidal wetlands found in King George County.



Section I. Rosier Creek and Potomac River

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickrel Weed-Arrow Arum	Saltmeadow Hey	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush	Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other	Observations	Marsh Type
1a	Upper Rosier Creek	12	%		20			25				20	5	5		10	10									c,5	This section of marsh grades into woody swamp; channel bottom covered with milfoil.	XI
			acres		2.4		3.0					2.4	0.6	0.6		1.2	1.2											
1b	Upper Rosier Creek	11	%		10			50				30	2	3		5											Large amount of cattails in this section of creek marsh.	VI
			acres		1.1		5.5				3.3	0.2	0.3		0.6													
1c	Upper Rosier Creek	15	%	2	30			32				30		2	-	2	2										Saltmarsh cordgrass first evident in this section of creek freshwater community changes to brackish water community.	XII
			acres	0.3	4.5		4.8			4.5		0.3	-	0.3	0.3		-											
1d	Upper Rosier Creek	12	%	50	25			20	5						-												Significant increase in saltmarsh cordgrass over upper sections of creek. Both narrow-leaved and common cattails observed.	I
			acres	6.0	3.0		2.4	0.6								-												
1e	Upper Rosier Creek	27	%	30	55		2	7	5		1				-												Significant increase in big cordgrass in this section over other sections of creek.	V
			acres	8.1	14.8		0.5	1.9	1.4		0.3					-												
1f	Upper Rosier Creek	20	%	40	30			20			10				-												Road has recently been built across this section of marsh.	XII
			acres	8.0	6.0		4.0		2.0							-												
2	Lower Rosier Creek	3	%	50	5	5		20	4		5			10	-											a,1	Small pocket marsh; pickrel weed fringe; saltmarsh cordgrass dominates interior; other species along upland border.	I
			acres	1.5	0.2	0.2		0.6	0.1	0.2					0.3	-												
3	Potomac River	25	%					40				5	20	30		5											Freshwater creek marsh with large stands of cattails. Bald eagle sighted here.	XI
			acres				10.0				1.2	5.0	7.5		1.2													

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
 e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare

Section I. Rosier Creek and Potomac River
(continued)

#	Marsh Location	Total Acres																	Observations	Marsh Type									
			Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickereel Weed-Arrow Arum	Saltmeadow Hay	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush			Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Matter's Millet	Other		
	Total Section I.	125	%	19	26	-	-	23	5		2	9	5	7	-	3	1									a, c, i			
		acres	23.9	32.0	0.2	0.5	28.2	6.1		2.5	11.4	5.8	9.0	-	3.3	1.5											a, c, 0.6		

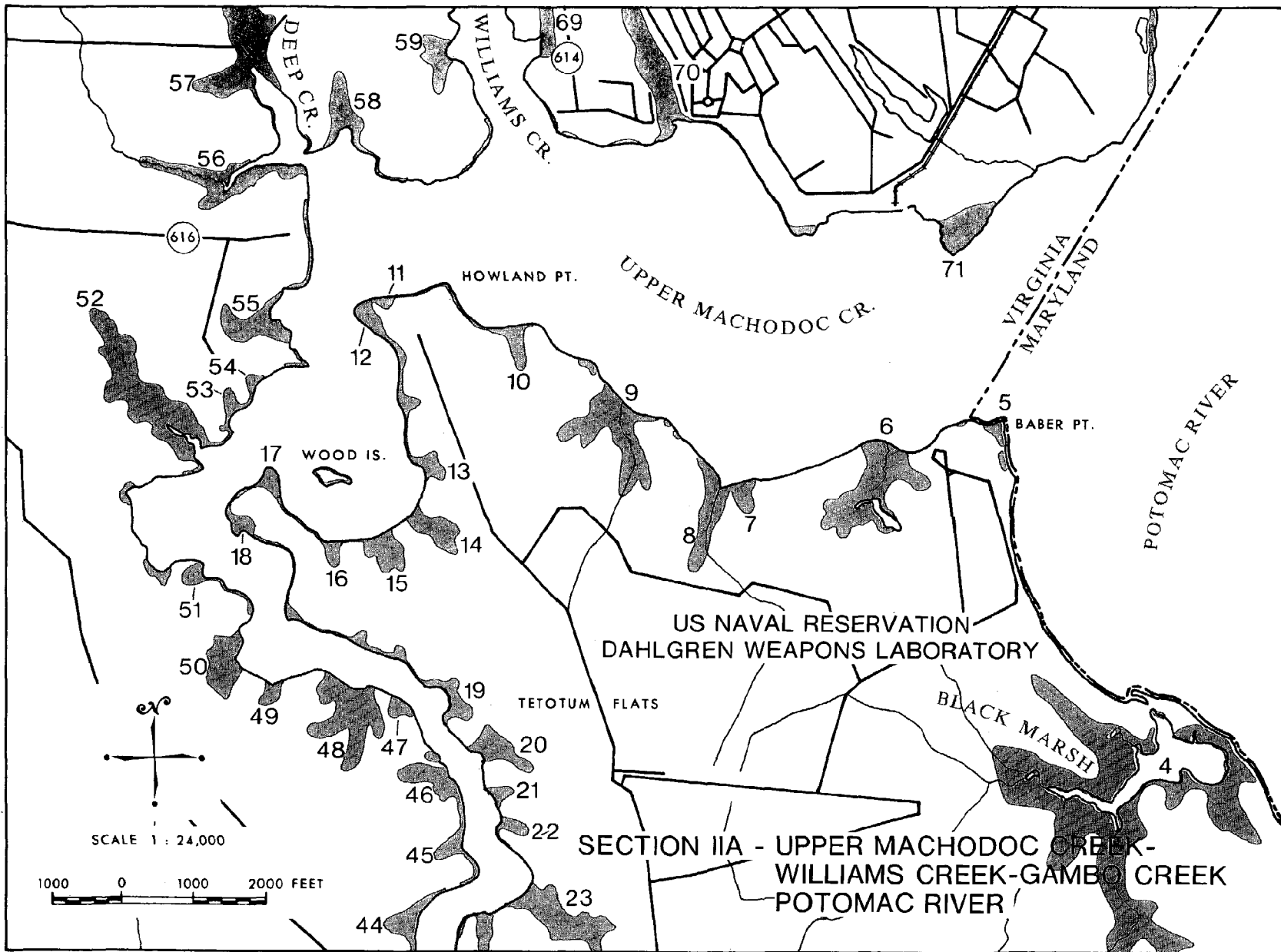
a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare
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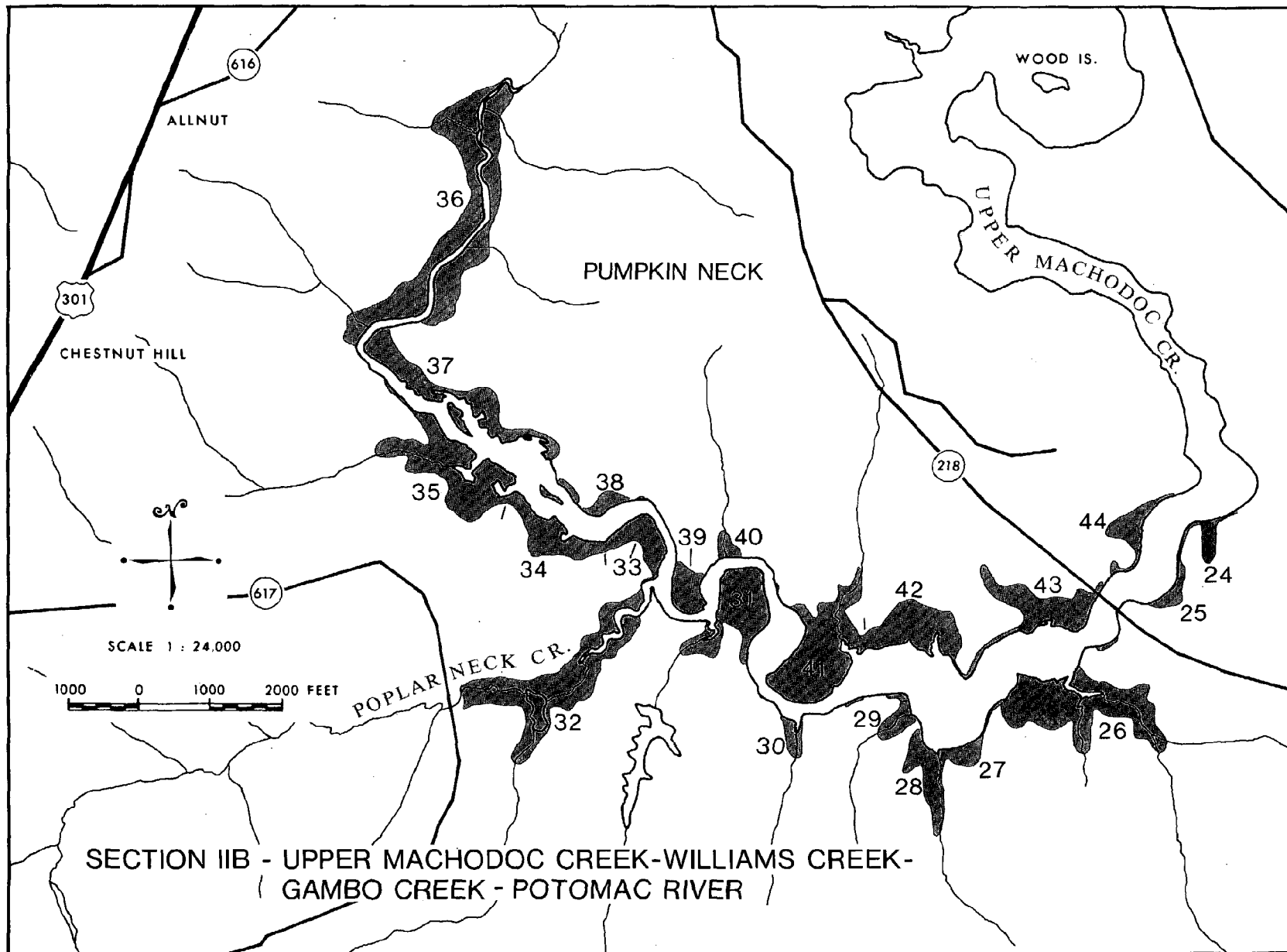
SECTION II

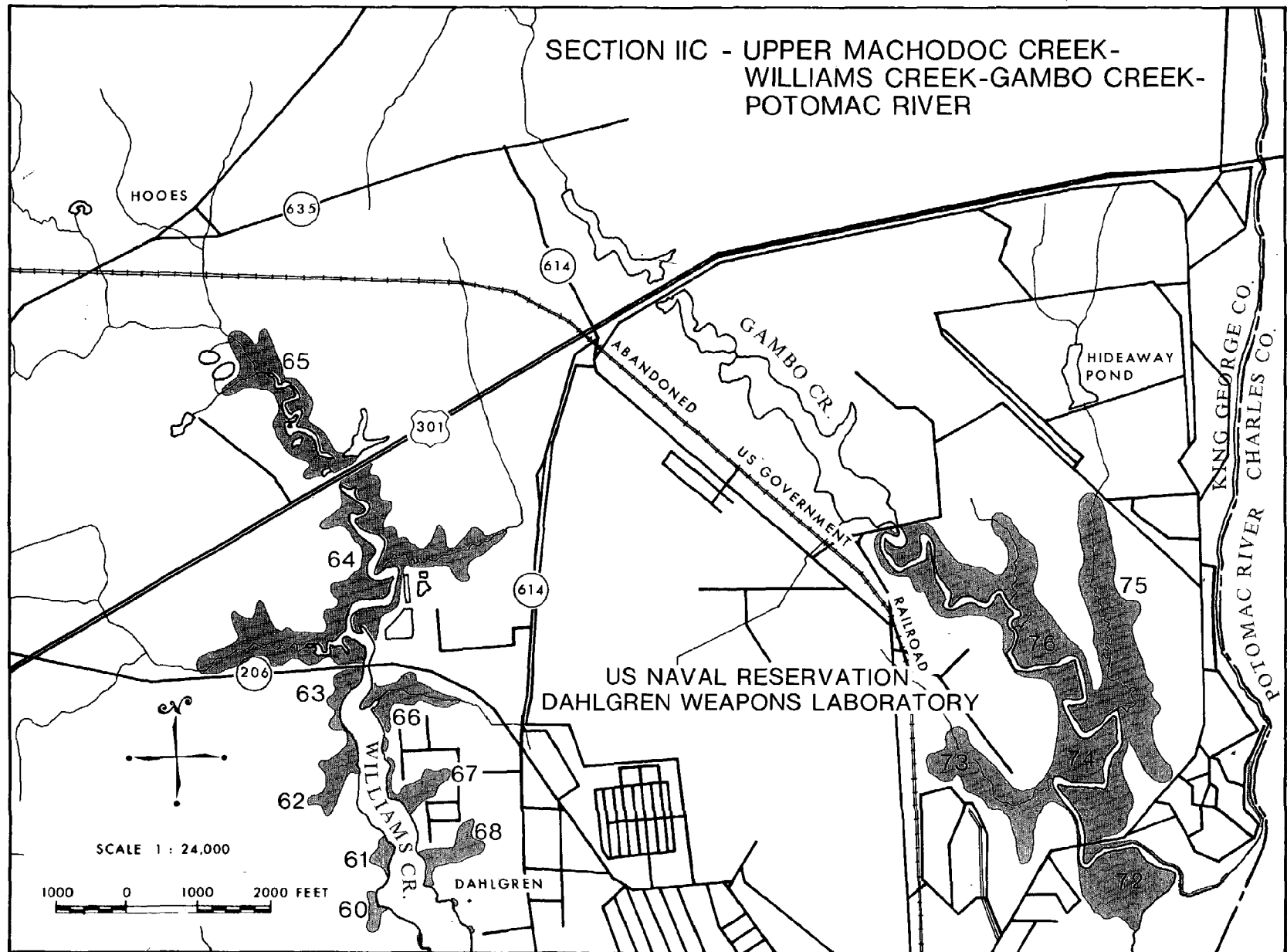
Upper Machodoc Creek, Williams Creek, Gambo Creek, Potomac River

The tidal creeks along this section of King George County shoreline are illustrated on three map plates (A,B,C). The wetlands within Upper Machodoc Creek consist largely of pocket or fringing marshes. Proceeding upstream from the mouth of Upper Machodoc Creek the change in the marsh plant species due to decreasing salinity is clearly evident. The most downstream, brackish water marshes are dominated by both big cordgrass (Type V) and saltmarsh cordgrass (Type I). These species, however, are replaced in the most upstream sections by many freshwater species including wild rice and pickerel weed (Types VII and XI). The other creeks in this section, although containing some freshwater species in their most upstream sections, are clearly dominated by brackish water plants such as big cordgrass for their entire length. A large upstream section of Gambo Creek has been dammed forming a non-tidal freshwater pond. The freshwater marsh found in this area should therefore not be considered "tidal wetlands".

As with Rosier Creek, (Section I) all of the tidal creeks in this section are valuable spawning and nursery areas for many species of fishes. The marshes within this section total 878 of 2122 acres of wetlands found in King George County.







Section II. Upper Machodoc Creek, Williams Creek, Gambo Creek, Potomac River

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickereel Weed-Arrow Arum	Saltmeadow Hay	Smartweed	Teatthumb	Beggar Ticks	Saltmarsh Bulrush	Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other	Observations	Marsh Type
4	Black Marsh	81	%		2		15	65			5		10			1				2							Large cattail marsh connected to river by small tidal channel.	VI
			acres		1.6		12.2	52.6			4.0		8.1				0.8				1.6							
5	Baber Point	8	%	10	90																						Big cordgrass dominated spit marsh.	V
			acres	0.8	7.2																							
6	Upper Machodoc Creek	21	%		50	15		10	5		20																Large pocket marsh; interior dominated by big cordgrass but saltbush scattered at higher elevations throughout.	V
			acres		10.5	3.2		2.1	1.0		4.2																	
7	Upper Machodoc Creek	3	%	5	75	10		5	2				3		-												Interior dominated by big cordgrass; berm of saltbush between marsh and river but tidal connection via small channel.	V
			acres	0.2	2.2	0.3		0.2	0.1					0.1		-												
8	Upper Machodoc Creek	6	%	20	20	5		25	5		5				-		10									b, 10	Pocket marsh with interior dominated by cattails; other species towards creek.	XII
			acres	1.2	1.2	0.3		1.5	0.3		0.3					-		0.6										
9	Upper Machodoc Creek	16	%	5	50	6		20	2				15		2											1, -	Interior of marsh dominated by big cordgrass; berm between marsh and creek vegetated with saltbush, cordgrass, saltmeadow hay.	V
			acres	0.8	8.0	1.0		3.2	0.3					2.4		0.3												
10	Upper Machodoc Creek	3	%		30	10		30					30														Marsh almost blocked from river by berm vegetated with saltbush; small channel allows tidal movement.	XII
			acres		0.9	0.3		0.9						0.9														
11	Upper Machodoc Creek	1	%	30	30			30	5						5												This section of the creek is generally fringed by a 1 to 10 ft. band of big cordgrass, salt-marsh cordgrass, saltmeadow hay.	XII
			acres	0.3	0.3			0.3	-							-												

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare
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Section II. Upper Machodoc Creek, Williams Creek, Gambo Creek, Potomac River
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickeral Weed-Arrow Arum	Saltmeadow Hay	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush	Giant Bulrush	Buttor Bush	Swamp Milkweed	Jewel-weed	Wool Grass	Walter's Millet	Other	Observations	Marsh Type	
12	Upper Machodoc Creek	7	%	10	25	50					1				10											1,2 d,2	Fringing marsh of cordgrasses; high bank along upland edge covered with saltbush.	IV	
			acres	0.7	1.8	3.5						0.1				0.7												- 0.1	
13	Upper Machodoc Creek	4	%	30	20	5	-	35			10																	Pocket marsh; cattails along upland border.	XII
			acres	1.2	0.8	0.2	-	1.4				0.4																	
14	Upper Machodoc Creek	5	%	40	50	-	2	-	3		5					-										1,-	Pocket marsh; saltmarsh cordgrass fringe; big cordgrass dominates interior.	V	
			acres	2.0	2.5	-	0.1	-	0.2			0.2					-										-		
15	Upper Machodoc Creek	6	%	10	30	-		20			40																	Pocket marsh; saltmarsh cordgrass fringe; cattails along upland border; large amount of water hemp.	XII
			acres	0.6	1.8	-		1.2				2.4																	
16	Upper Machodoc Creek	2	%	60		-		30	10																			Pocket marsh dominated by saltmarsh cordgrass.	I
			acres	1.2		-		0.6	0.2																				
17	Upper Machodoc Creek	3	%	20	50	20	1	3		5																a,1	Spit marsh; saltbush and switch grass along highest landward areas.	V	
			acres	0.6	1.5	0.6	-	0.1			0.2																-		
18	Upper Machodoc Creek	3	%	20	60	-			20																			Saltmarsh cordgrass fringe; big cordgrass dominates interior.	V
			acres	0.6	1.8	-				0.6																			
19	Upper Machodoc Creek	5	%	20	10	-		5	50		10	5																Pocket marsh; saltmarsh cordgrass fringe interior dominated by marsh mallow.	XII
			acres	1.0	0.5	-		0.2	2.5			0.5	0.2																

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare
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Section II. Upper Machodoc Creek, Williams Creek, Gambo Creek, Potomac River
(continued)

#	Marsh Location	Total Acres																		Observations	Marsh Type																
			%	Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickrel Weed-Arrow Arum	Saltmeadow Hay	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush			Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other									
20	Upper Machodoc Creek	5	%	10	80	-		5	5																									Pocket marsh; interior dominated by big cordgrass; saltmarsh cordgrass fringe.	V		
			acres	0.5	4.0	-		0.2	0.2																												
21	Upper Machodoc Creek	2	%	8				20	50		20																								Small fringe of pickrel weed; large amount of marsh mallow.	XII	
			acres	0.2				0.4	1.0		0.4																										
22	Upper Machodoc Creek	4	%	50	10	-		30																											Pocket marsh; interior dominated by saltmarsh cordgrass; cat-tails along upland border.	I	
			acres	2.0	0.4	-		1.2																													
23	Upper Machodoc Creek	12	%	5	65	-		10			10	10																							Pocket marsh; interior dominated by big cordgrass; saltmarsh cordgrass fringe.	V	
			acres	0.6	7.8	-		1.2				1.2	1.2																								
24	Upper Machodoc Creek	3	%	5	70	-		10	15																											Pocket marsh; interior dominated by big cordgrass.	V
			acres	0.2	2.1	-		0.3	0.4																												
25	Upper Machodoc Creek	3	%	25	60	-		5	10																											Fringing marsh; saltmarsh cordgrass at lower elevations along channel.	V
			acres	0.8	1.8	-		0.2	0.3																												
26	Upper Machodoc Creek	29	%	5	85	-		5	5																											Large pocket marsh; mostly big cordgrass with saltmarsh cordgrass fringing along channel.	V
			acres	1.4	24.8	-		1.4	1.4																												
27	Upper Machodoc Creek	3	%	40	50	-		5			5																									Pocket marsh; saltmarsh cordgrass along channel; big cordgrass at higher elevations.	V
			acres	1.2	1.5	-		0.2				0.2																									

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare
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Section II. Upper Machodoc Creek, Williams Creek, Gambo Creek, Potomac River
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickrel Weed- Arrow Arum	Saltmeadow Hay	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush	Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other	Observations	Marsh Type
28	Upper Machodoc Creek	7	%	20	50	-		5	5			20															Pocket marsh; large stand of wild rice; marsh dominated by big cordgrass.	V
			acres	1.4	3.5	-		0.4	0.4				1.4															
29	Upper Machodoc Creek	4	%	5	80	-		10			5																Pocket marsh; saltmarsh cordgrass fringe; cattails in most interior upland portion; remainder largely big cordgrass.	V
			acres	0.1	3.2	-		0.4				0.2																
30	Upper Machodoc Creek	2	%	5	80	-		10			5																Pocket marsh; very similar to #29 above.	V
			acres	0.1	1.6	-		0.2				0.1																
31	Upper Machodoc Creek	18	%	2	90	-					2	2	2	2													Creek marsh; dominated by big cordgrass.	V
			acres	0.4	16.2	-						0.4	0.4	0.4	0.4													
32	Upper Machodoc Creek	28	%		20			20				10	10	20		20											Creek marsh; diverse flora progresses from brackish to freshwater species.	XII
			acres		5.6			5.6					2.8	2.8	5.6		5.6											
33	Upper Machodoc Creek	6	%		65			5				5	5	10		10											Creek marsh dominated by big cordgrass.	V
			acres		3.9			0.3				0.3	0.3	0.6		0.6												
34	Upper Machodoc Creek	11	%					30			10	40		10		10											Fringing creek marsh; freshwater species dominate.	XI
			acres					3.3			1.1	4.4		1.1		1.1												
35	Upper Machodoc Creek	28	%								10	50		30		10											Creek marsh; interior dominated by wild rice; pickerel weed fringe.	XI
			acres								2.8	14.0		8.4		2.8												

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare

Section II. Upper Machodoc Creek, Williams Creek, Gambo Creek, Potomac River
(continued)

#	Marsh Location	Total Acres	Plant Species																	Observations	Marsh Type							
			Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickereel Weed-Arrow Arum	Saltmeadow Hay	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush	Giant Bulrush			Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other	
36	Upper Machodoc Creek	43	%					30			10	25	10	10													Creek marsh; cattails in highest areas; pickereel weed along channel border.	XI
			acres				12.9			4.3	10.8	4.3	4.3		4.3	0.9			0.9		0.4							
37	Upper Machodoc Creek	16	%							10	50		30		10											Fringing creek marsh; large stands of wild rice.	XI	
			acres							4.8	8.0		4.8		1.6													
38	Upper Machodoc Creek	2	%				40		15	5	10	20		10												Fringing marsh; cattails in higher landward zone; pickereel weed along channel.	XI	
			acres				0.8			0.3	0.1	0.2	0.4		0.2													
39	Upper Machodoc Creek	2	%	2	90				2		5	1													Creek marsh; small fringe of pickereel weed and saltmarsh cordgrass along channel.	V		
			acres	0.1	1.4					0.1		0.3	0.1															
40	Upper Machodoc Creek	3	%	5	80		3	5			5	2													Pocket marsh; almost completely big cordgrass.	V		
			acres	0.2	2.4		0.1	0.2				0.2	0.1															
41	Upper Machodoc Creek	27	%	5	90						4	1													Creek marsh; small saltmarsh cordgrass fringe along channel.	V		
			acres	1.4	24.3							1.1	0.3															
42	Upper Machodoc Creek	16	%	20	75	-					5														Pocket marsh; saltmarsh cordgrass fringe along channel.	V		
			acres	3.2	12.0	-						0.8																
43	Upper Machodoc Creek	13	%	10	75	-	1	10			2	2													Pocket marsh; saltmarsh cordgrass fringe along channel; cattails along upland border.	V		
			acres	1.3	9.8	-	0.1	1.3			0.3	0.3																

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare

Section II. Upper Machodoc Creek, Williams Creek, Gambo Creek, Potomac River
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickeral Weed-Arrow Arum	Saltmeadow Hay	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush	Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other	Observations	Marsh Type
44	Upper Machodoc Creek	4	%	20	30	-	2	5	30			3	10														Pocket marsh; road constructed across interior section.	XII
			acres	0.8	1.2	-	0.1	0.2	1.2				0.1	0.4														
45	Upper Machodoc Creek	2	%	40	20	-		2	30		4	2	2														Pocket marsh; large stand of saltmarsh cordgrass.	XII
			acres	0.8	0.4	-		-	0.6			0.1	-	-														
46	Upper Machodoc Creek	7	%	25	20	-	1	20	20		5	4	5														Pocket marsh; cattails and marsh mallow at highest elevations.	XII
			acres	1.8	1.4	-	0.1	1.4	1.4			0.4	0.3	0.4														
47	Upper Machodoc Creek	2	%	40	5	-	1	35	14		5																Pocket marsh; saltmarsh cordgrass at lower elevations with cattails landward.	XII
			acres	0.8	0.1	-	-	0.7	0.3			0.1																
48	Upper Machodoc Creek	17	%	25	30	-		10	20		10		5														Pocket marsh; low marsh with large stands of saltmarsh cordgrass.	XII
			acres	4.2	5.1	-		1.7	3.4			1.7		0.8														
49	Upper Machodoc Creek	2	%	50	5	-		5	20		20																Pocket marsh; dominated by saltmarsh cordgrass.	I
			acres	1.0	0.1	-		0.1	0.4			0.4																
50	Upper Machodoc Creek	10	%	30	25	-	3	10	25		5	2															Pocket marsh; saltmarsh cordgrass fringe along channel.	XII
			acres	3.2	2.5	-	0.3	1.0	2.5			0.6	0.2															
51	Upper Machodoc Creek	10	%	40	5	-	5	10	20		15														1.5	Pocket marsh; threesquare fringe along creek.	XII	
			acres	0.8	0.1	-	0.1	0.2	0.4			0.3	0.2															0.1

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare

Section II. Upper Machodoc Creek, Williams Creek, Gambo Creek, Potomac River
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickernel Weed- Arrow Arum	Saltmeadow Hay	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush	Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other	Observations	Marsh Type
		%	acres																									
52	Upper Machodoc Creek	21	%	10	50	-		5	20		10		2													3	Large pocket marsh; freshwater species found in interior, upland section.	V
			acres	2.1	10.5	-		1.0	4.2		2.1		0.4													0.6		
53	Upper Machodoc Creek	2	%	10		5		10	60		15																Pocket marsh; interior dominated by marsh mallow.	XII
			acres	0.2		0.1		0.2	1.2		0.3																	
54	Upper Machodoc Creek	2	%	30		5		10	45		5		5														Pocket marsh; dominated by big cordgrass and marsh mallow.	XII
			acres	0.3		-		0.1	0.4		-		-															
55	Upper Machodoc Creek	6	%	30	40	10				5	5		10														Pocket marsh; saltbushes and switch grass at highest elevations.	XII
			acres	1.8	2.4	0.6				0.3	0.3		0.6															
56	Lower Deep Creek	10	%	20	20	5		5	25		25																Pocket marsh; interior dominated by marsh mallow, water hemp, cattails.	XII
			acres	2.0	2.0	0.5		0.5	2.5		2.5																	
57	Deep Creek	19	%	10	30	-	5	5	20		30																Creek marsh; marsh is crossed by small road.	XII
			acres	1.9	5.7	-	1.0	1.0	3.8		5.7																	
58	Lower Deep Creek	5	%	40	20	-	5	5	25		5																Pocket marsh; marsh mallow dominates interior upland section.	XII
			acres	2.0	1.0	-	0.2	0.2	1.2		0.2																	
59	Williams Creek	5	%	30	20	-		10	30	10	5																Pocket marsh; marsh mallow, cattails, switch grass at highest elevations.	XII
			acres	1.5	0.8	-		0.5	1.5	0.5	0.2																	

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare

Section II. Upper Machodoc Creek, Williams Creek, Gambo Creek, Potomac River
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickeral Weed-Arrow Arum	Saltmeadow Hay	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush	Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other	Observations	Marsh Type
60	Williams Creek	2	%	30	15	-	5	10	5		35								-								Pocket marsh; saltmarsh cordgrass at lowest elevations.	XII
			acres	0.6	0.3	-	0.1	0.2	0.1			0.7									-							
61	Williams Creek	3	%	30	30	-	5	5	30										-								Pocket marsh; cattails and marsh mallow along uplands; cordgrasses along channel.	XII
			acres	0.9	0.9	-	0.2	0.2	0.9												-							
62	Williams Creek	8	%	20	30	-	5	10	30		5								-								Pocket marsh; cattails and marsh mallow along uplands; cordgrasses along channel.	XII
			acres	1.6	2.4	-	0.4	0.8	2.4			0.4									-							
63	Williams Creek	2	%	30	20	-			40		10								-								Fringing marsh separated from main creek marsh by road.	XII
			acres	0.6	0.4	-			0.8			0.2									-							
64	Williams Creek	66	%	20	35	-		10	15		5		5		5				5								Large creek marsh dominated by big cordgrass; saltmarsh cordgrass at lower elevations.	XII
			acres	13.2	23.1	-		6.6	9.9			3.3		3.3		3.3				3.3								
65	Williams Creek	20	%	5	30	-		30	5	1			20	2	3	2			2								Upper end of Williams Creek above Rt. 301. Fringe of trees aids in controlling runoff from nearby housing development.	XII
			acres	1.0	6.0	-		6.0	1.0	0.2				4.0	0.4	0.6	0.4			0.4								
66	Williams Creek	8	%	15	10	-	5	10	30		30								-								Pocket marsh; large amount of water hemp.	XII
			acres	1.2	0.8	-	0.4	0.8	2.4			2.4									-							
67	Williams Creek	4	%	10	10	-	5	10	30	5	30								-								Pocket marsh; highest areas of marsh covered with switch grass.	XII
			acres	0.4	0.4	-	0.2	0.4	1.2	0.2	1.2										-							

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare
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Section II. Upper Machodoc Creek, Williams Creek, Gambo Creek, Potomac River
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickereel Weed- Arrow Arum	Saltmeadow Hay	Smartweed	Heartthumb	Beggar Ticks	Saltmarsh Bulrush	Giant Bulrush	Burton Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other	Observations	Marsh Type
68	Williams Creek	5	%	15	10	-	5	10	30	-	30								-								Pocket marsh; extends into Dahlgren; some fill evident.	XII
			acres	0.8	0.5	-	0.2	0.5	1.5	-	1.5																	
69	Williams Creek	4	%	10	20	5		5	30		30								-								Pocket marsh; cordgrasses along creek channel.	XII
			acres	0.4	0.8	0.2		0.2	1.2		1.2																	
70	Upper Machodoc Creek	11	%	40	10	10	5		30		4								-						a,1	Deep pocket marsh; cordgrasses fringe creek.	XII	
			acres	4.4	1.1	1.1	0.6		3.3		0.4																	
71	Upper Machodoc Creek	6	%	-	80	20																				Spit marsh of high elevation ; dominated by big cordgrass	V	
			acres	-	4.8	1.2																						
72	Gambo Creek	24	%	5	30	4		5	5				10		5				35							e,1	Creek marsh; interior dominated by bulrush; cordgrasses and reed grass fringe along the Potomac.	XII
			acres	1.2	7.2	1.0		1.2	1.2					2.4		1.2				8.4								
73	Gambo Creek	18	%	5	5	10		15	20				40						5								Creek marsh; grades from high marsh to swamp; cordgrasses fringe channel.	XII
			acres	0.9	0.9	1.8		2.7	3.6					7.2						0.9								
74	Gambo Creek	27	%	3	30	20				10					2				35								Creek marsh; cordgrasses fringe channels; bulrush at higher elevations.	XII
			acres	0.8	8.1	5.4					2.7					0.5				9.4								
75	Gambo Creek	35	%	10	15	5		5	15	2			30		3				15								Creek marsh; large areas of high marsh dominated by mallow and hibiscus.	XII
			acres	3.5	5.2	1.8		1.8	5.2	0.7				10.5		1.0				5.2								

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush

e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare

Section II. Upper Machodoc Creek, Williams Creek, Gambo Creek, Potomac River
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickeral Weed-Arrow Arum	Saltmeadow Hay	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush	Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-weed	Wool Grass	Walter's Millet	Other	Observations	Marsh Type		
76	Gambo Creek	50	%	10	10	-	5	20	10			25	3		5				7								c, 5	Creek marsh; upper portion dammed forming non-tidal pond.	XII	
			acres	5.0	5.0	-	2.5	10.0	5.0				12.5	1.5		2.5					3.5									
Total Section II		878	%	10	31	3	2	15	8	-	6	7	6	3	1	2	-		4	-							-			
			acres	88.0	270.1	23.1	18.2	134.9	73.8	4.3	53.0	57.2	55.3	26.5	10.1	17.4	1.5			31.1	2.5		0.4				0.6	a, 0.1 b, 0.6	c, 2.5 d, 0.1	e, 0.2 f, 0.1

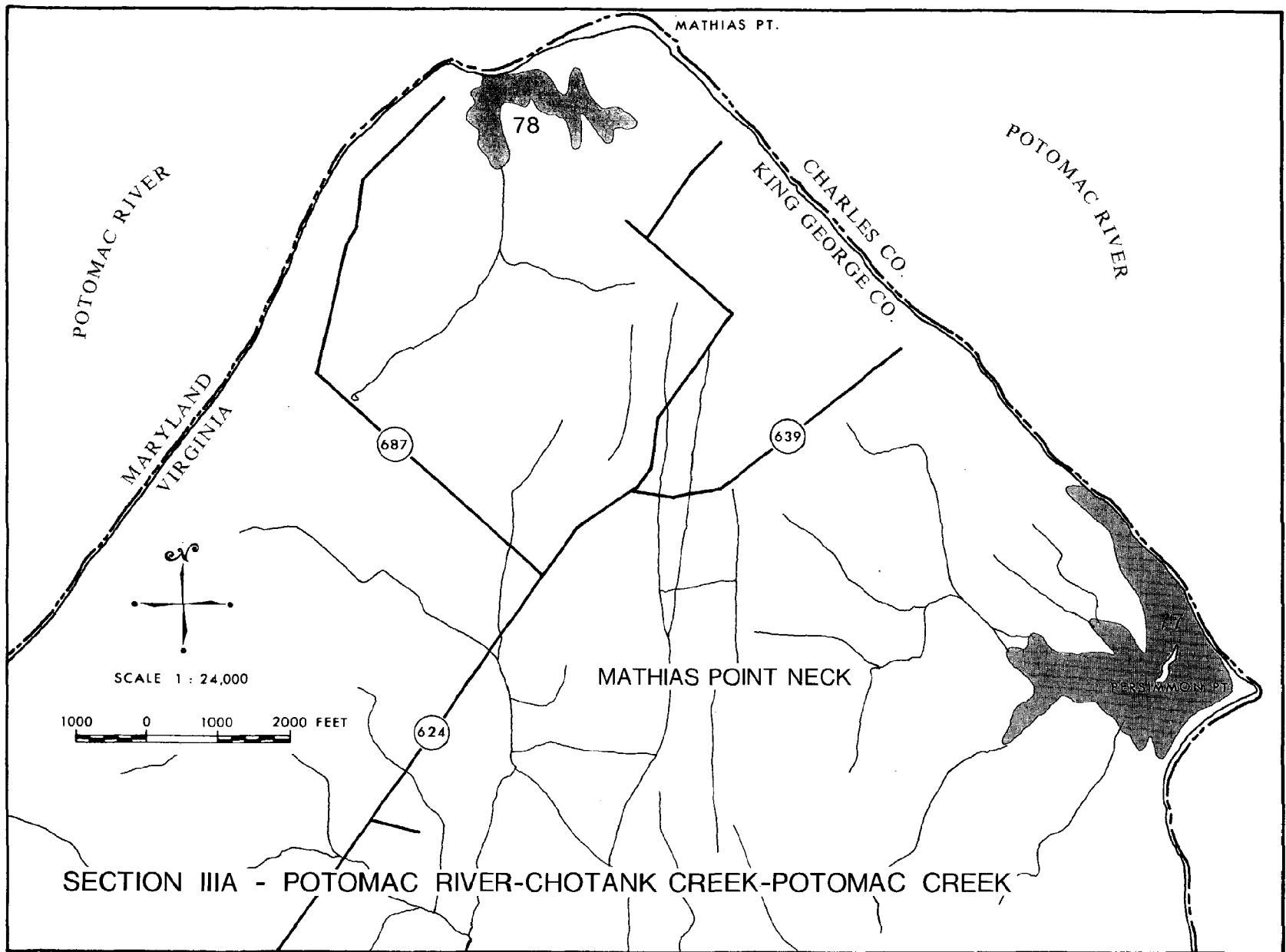
a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare

SECTION III

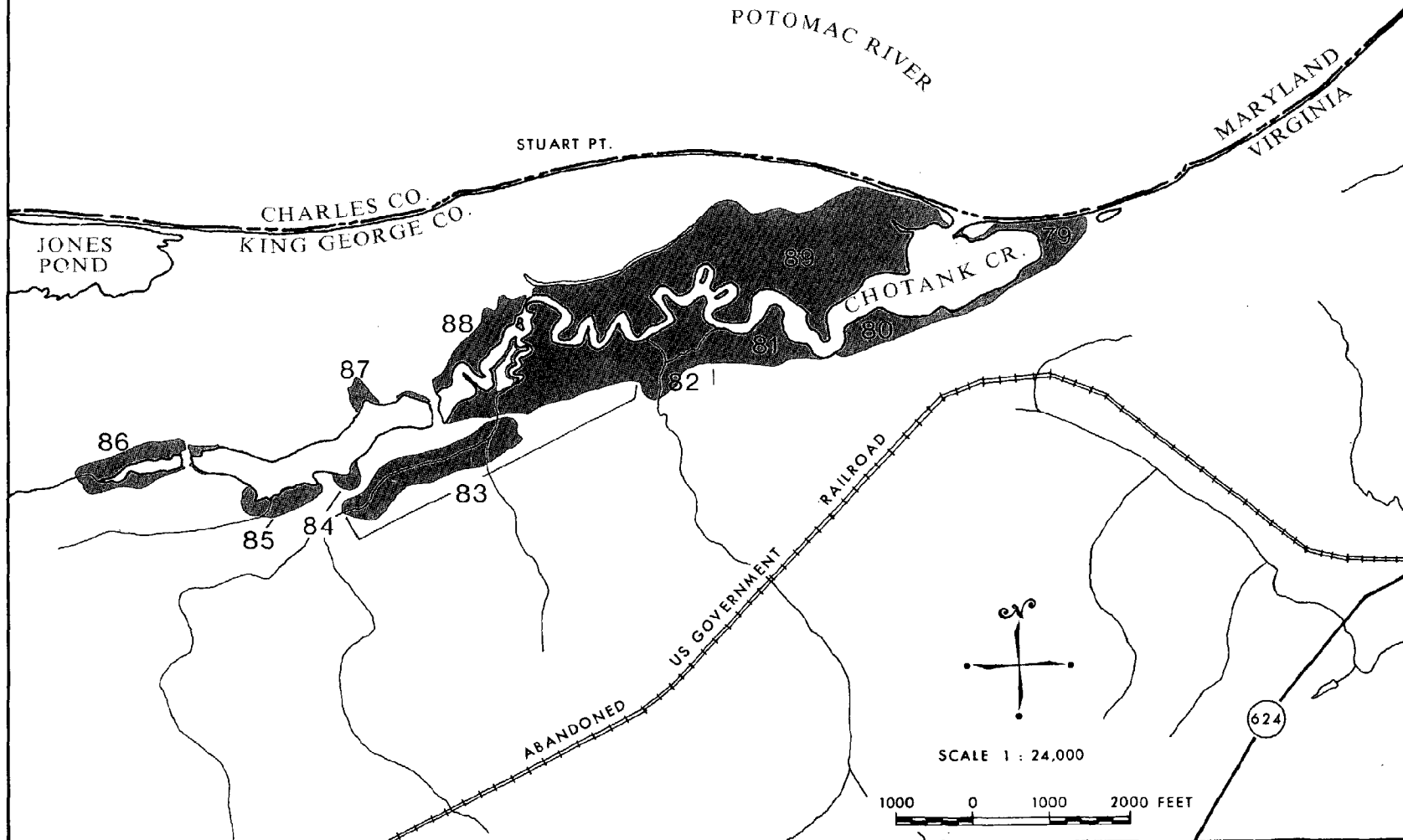
Potomac River, Chotank Creek, Potomac Creek

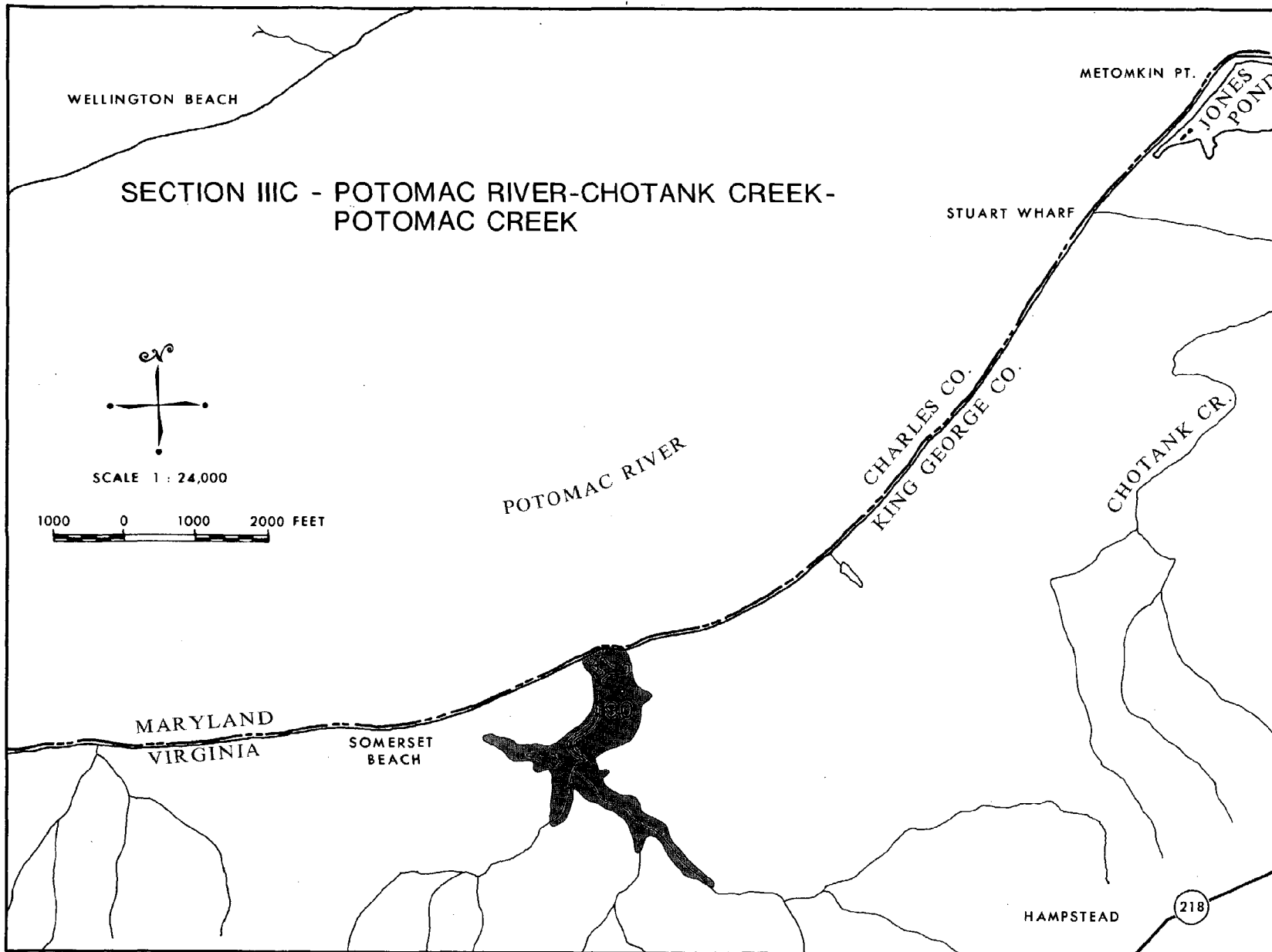
This section of King George County is illustrated using five map plates (A,B,C,D,E), and includes much of the shoreline in King George County which borders the Potomac River. The marshes total 524 of the county's 2122 acres of tidal wetlands. The shoreline is for the most part very active and subject to erosion. The tidal wetlands are therefore limited to a number of large creek or pocket marshes located along streams draining into the Potomac River.

Mathias Point Neck includes two large brackish (Type V) marshes dominated by big cordgrass. Another large marsh area is found along Chotank Creek. All three marshes are valuable spawning and nursery areas for certain fishes, as well as important wildlife habitats. Three bald eagles and at least twelve great blue herons were noted upon first entering Chotank Creek. The remaining marshes in this section of King George County consist of several large creek marshes dominated by big cordgrass and cattails. The Stafford County - King George County border divides Black Swamp marsh (#92) approximately in half. Only the King George section of this marsh is recorded here.

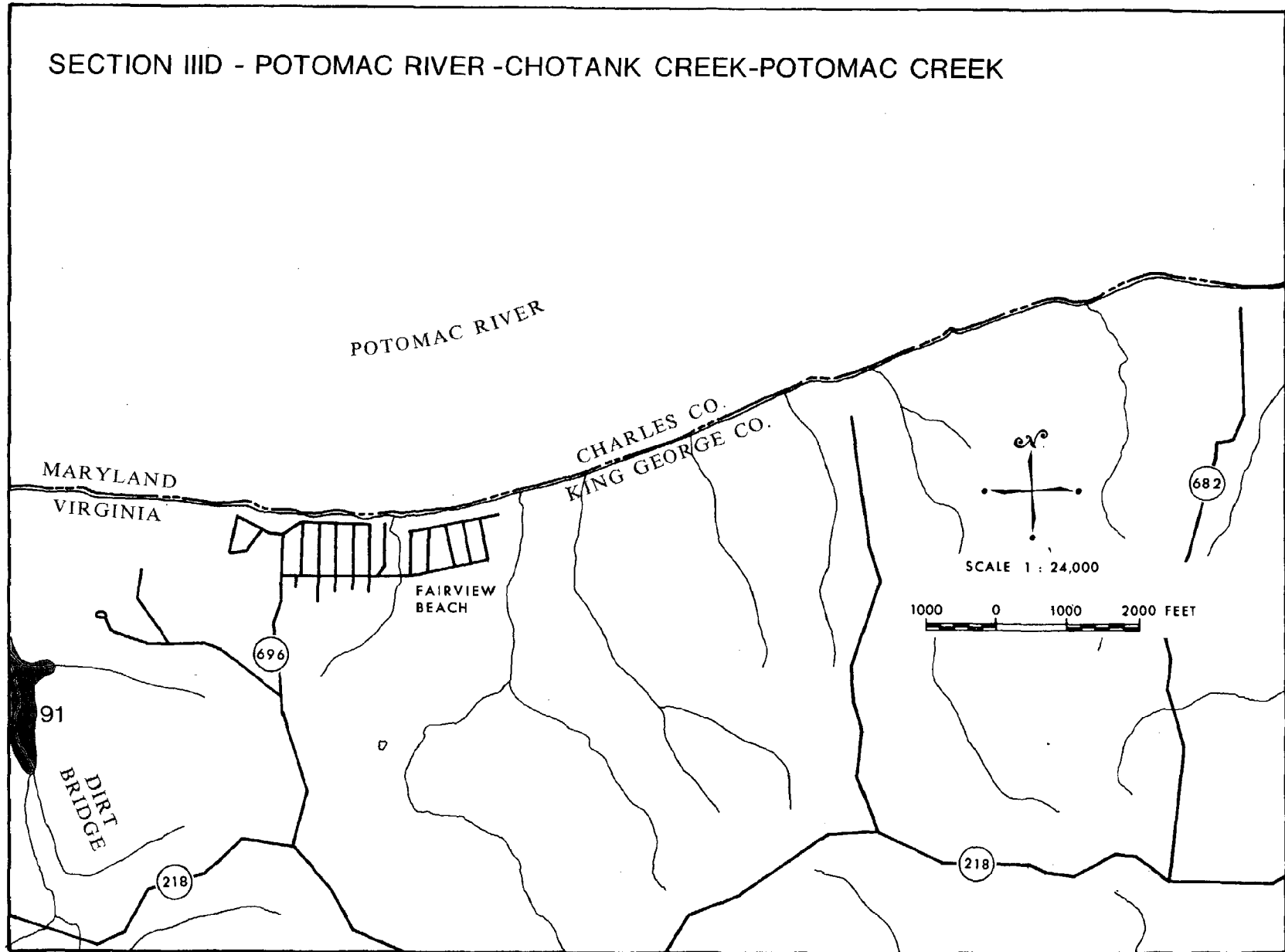


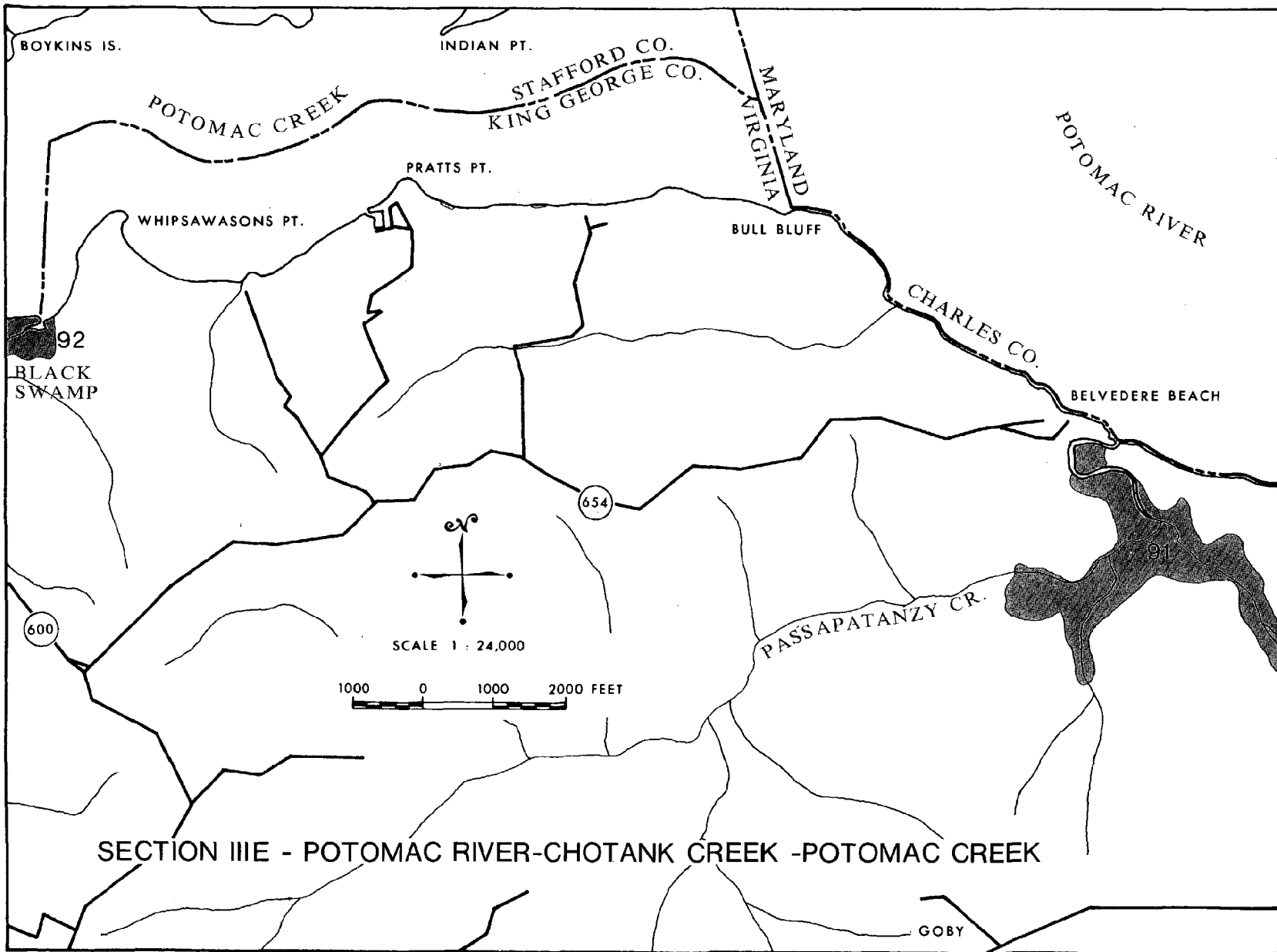
SECTION III B - POTOMAC RIVER-CHOTANK CREEK-POTOMAC CREEK





SECTION IIID - POTOMAC RIVER -CHOTANK CREEK-POTOMAC CREEK





Section III. Potomac River, Chotank Creek, Potomac Creek

#	Marsh Location	Total Acres																		Observations	Marsh Type							
			%	Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickarel Weed-Arrow Alum	Saltmeadow Hay	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush			Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-weed	Wool Grass	Walter's Millet	Other
77	Persimmon Point	108	%	3	60	5		15	4	2	5							4								e,2	Large spit marsh dominated by big cordgrass with cattails at higher interior areas.	V
			acres	3.2	64.8	5.4		16.2	4.3	2.2	5.4								4.3									
78	Mathias Point Neck	23	%		60	20		10	2	5			1		-	2											Pocket marsh; several areas have been filled to allow construction of dirt roads.	V
			acres		13.8	4.6		2.3	0.5	1.2			0.2		-	0.5												
79	Chotank Creek	9	%	5	45	-	2	5	15	2	5		10	2	2	2		5									Spit marsh; mixture of brackish and freshwater species; partially restricts mouth of creek.	XII
			acres	0.4	4.0	-	0.2	0.4	1.4	0.2	0.4		0.9	0.2	0.2	0.2			0.4									
80	Chotank Creek	10	%		40	5		5	20	1	15		10	2											f,2	Fringe marsh; pickerel weed along channel; interior dominated by big cordgrass.	XII	
			acres		4.0	0.5		0.5	2.0	0.1	1.5		1.0	0.2														
81	Chotank Creek	14	%		50	10		5	10	5			10					10								Creek marsh; many brackish water species; big cordgrass generally predominates.	V	
			acres		7.0	1.4		0.7	1.4	0.7			1.4						1.4									
82	Chotank Creek	18	%		80	-			10		5		5													Creek marsh; largely big cordgrass.	V	
			acres		14.4	-			1.8		0.9		0.9															
83	Chotank Creek	53	%	2	65	5		5	10	1	5					5		2								Creek marsh; crossed by dirt road; tidal flushing through culvert.	V	
			acres	1.1	34.5	2.6		2.6	5.3	0.6	2.6					2.6			1.1									
84	Chotank Creek	3	%	5	10	-		30	20	5	5		20					5								Pocket marsh; interior largely mallow, hibiscus, cattail.	XII	
			acres	0.2	0.3	-		1.0	0.6	0.2	0.2		0.6						0.2									

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
 e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare

Section III. Potomac River, Chotank Creek, Potomac Creek
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickrel Need- Arrow Arum	Saltmeadow Hay	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush	Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other	Observations	Marsh Type
85	Chotank Creek	7	%	5				80	5	5			5														Fringe marsh; high marsh dominated by cattails.	VI
			acres	0.4					5.6	0.4	0.4			0.4														
86	Chotank Creek	13	%					70	5	3			2	20													Marsh partially blocked by road but good tidal flushing permitted by culvert; upper portion progresses to woody swamp.	VI
			acres						9.1	0.6	0.4			0.3	2.6													
87	Chotank Creek	3	%	5	5			60	10		5		10	5													Pocket marsh; fringe of pickerel weed at lowest elevations.	VI
			acres	0.2	0.2		1.8	0.3		0.2	0.3	0.2		0.3	0.2													
88	Chotank Creek	10	%	5	50		5	5	15		5		15														Creek marsh; cordgrasses along channel.	V
			acres	0.5	5.0		0.5	1.5		0.5	1.5		1.5															
89	Chotank Creek	100	%	70	3		5	5		5			2		-				10								Large creek marsh dominated by big cordgrass.	V
			acres	70.0	3.0		5.0	5.0		5.0	2.0		-		10.0													
90	Somerset Beach	43	%	5	5			75		5			5				5										Large creek marsh dominated by cattails.	VI
			acres	2.2	2.2		32.2		2.2		2.2		2.2		2.2													
91	Passapatanzy Creek	105	%	45				30	3	2			4	2			10	1	3								Large creek marsh; large stands of cattails in upstream portions.	XII
			acres	47.2			31.5	3.2	2.1	4.2	2.1		10.5	1.0	3.2													
92	Black Swamp	5	%					40		5			10	30											c, 5 i, 10	King George County section only; pickerel weed and yellow pond lily fringe.	XI	
			acres				2.0		0.3	0.5	1.5														0.3 0.5			

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare

Section III. Potomac River, Chotank Creek, Potomac Creek
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Mild Rice	Marsh Hibiscus	Pickeral Weed-Arrow Arum	Saltmeadow Hay	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush	Giant Bullrush	Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other	Observations	Marsh Type	
	Total Section III	524	%	1	51	4	-	21	5	1	4		3	2	-	1	2	-	4										
		acres	5.8	267.4	19.9	0.7	111.4	28.3	6.0	21.3		14.2	9.0	0.2	3.3	12.7	1.0	20.6								c, 0.3 e, 2.2	f, 0.2 i, 0.5		

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare
-44-

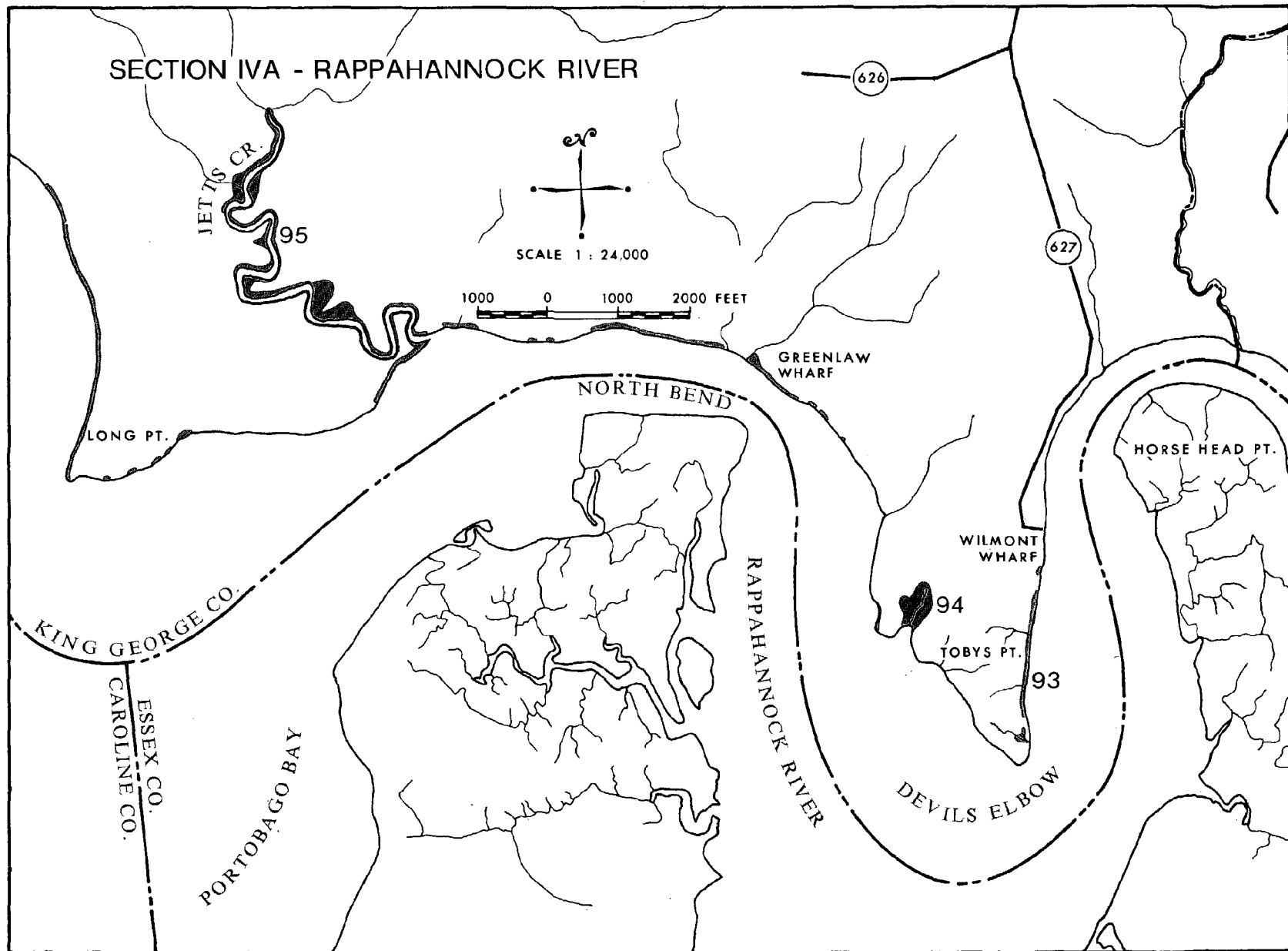
SECTION IV

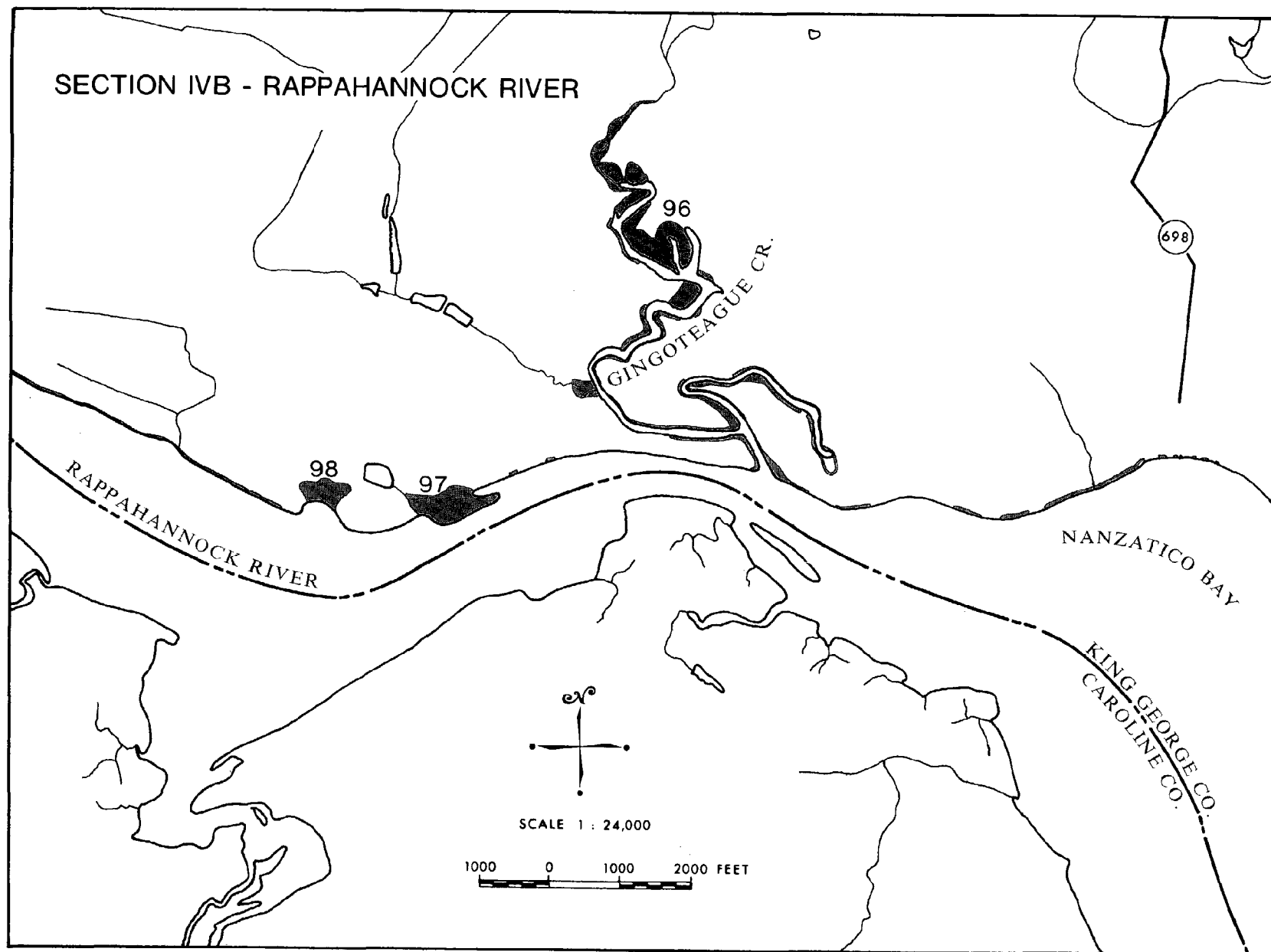
Rappahannock River

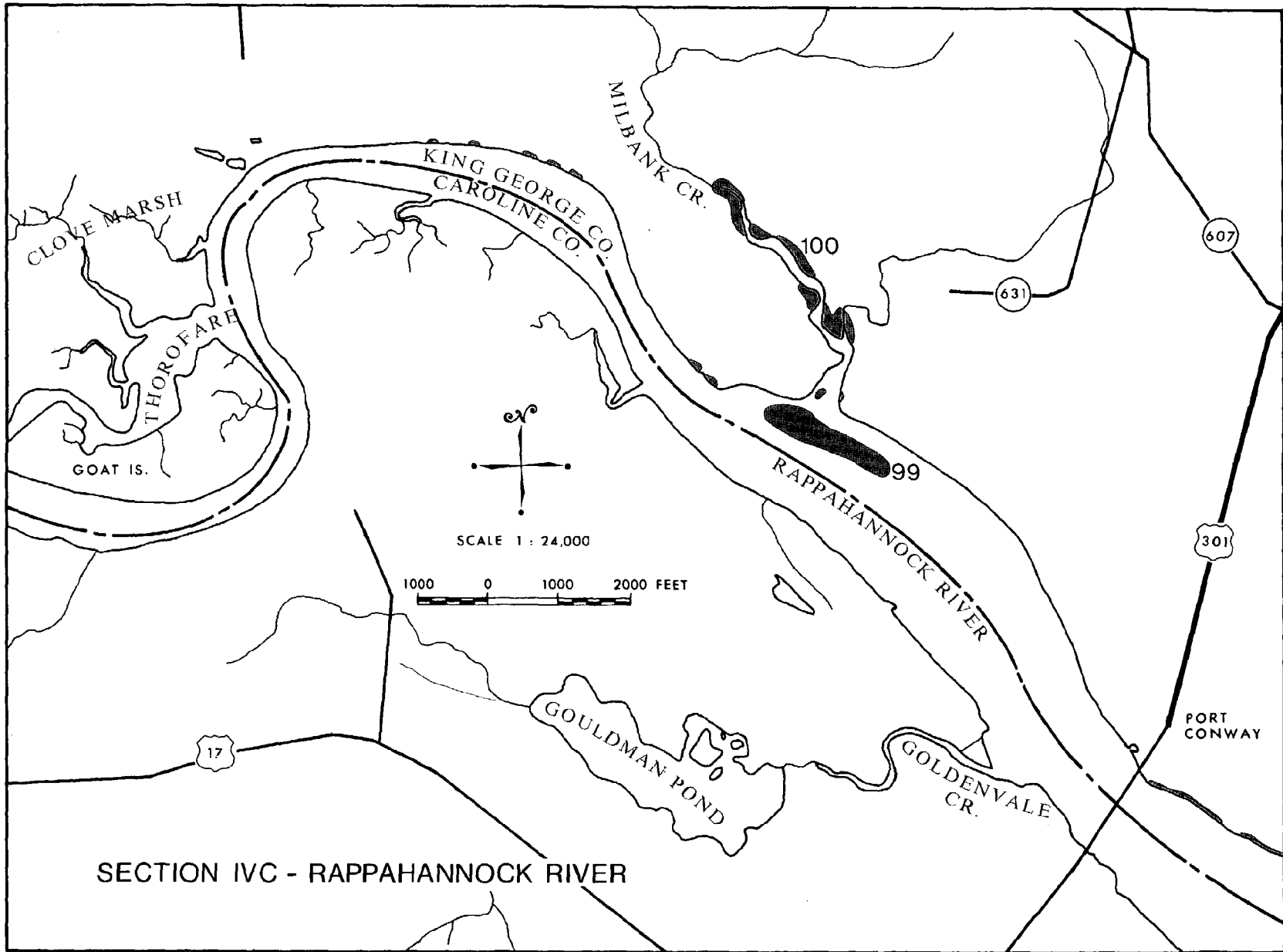
The southern boundary of King George County is formed by the Rappahannock River and this section of shoreline is illustrated with seven map plates (A,B,C,D,E,F,G). Although it is tidal, this portion of the Rappahannock River is also freshwater and therefore the cordgrasses which dominate much of the tidal wetlands in King George County are not found here. The marshes are composed largely of such species as wild rice, pickerel weed, smart weeds and beggar ticks.

Most of the marshes in this section are surrounded by woody swamp composed of such species of trees and shrubs as swamp dogwood, black willow, red maple, black gum and button bush. The apparent invasion of a number of the marshes by these swamp species suggests that many of the marshes are changing into swamp. Since the woody swamps found here include black gum, Nyssa sylvatica, which is listed in the Virginia Wetlands Act, those areas of swamp which are contiguous to the tidal marshes and meet the elevational requirements of the Act are to be considered "wetlands". To determine these areas, an accurate elevational survey would be required. Therefore, only those areas with marsh-type vegetation are included in this inventory.

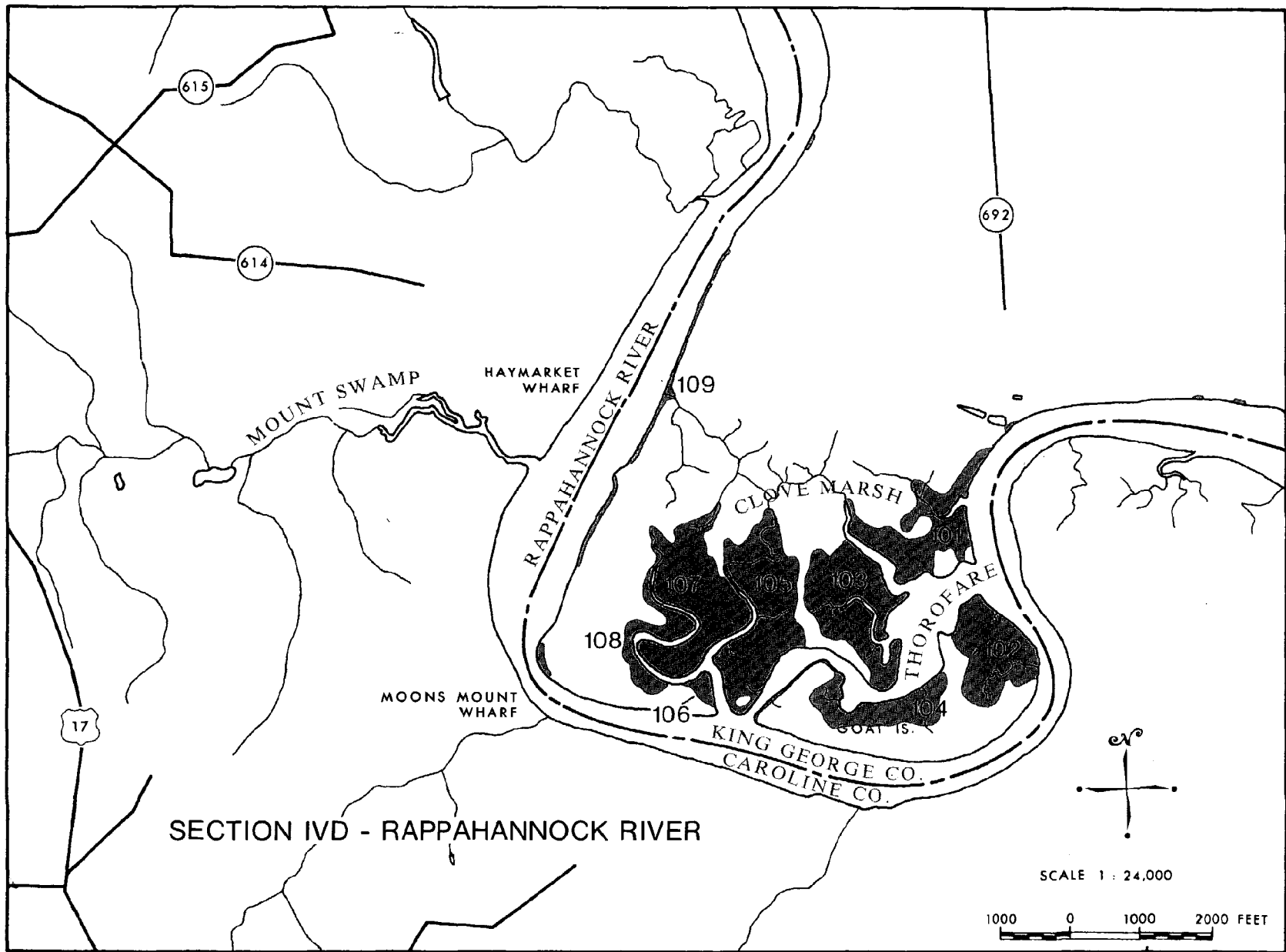
The marshes along this section of the Rappahannock River are valuable spawning and nursery areas for many species of fish including American shad, alewife, white perch, menhaden and blueback herring. They support, as well, large numbers of resident species such as catfish, bass, and minnows. In all, they total 595 of the county's 2122 acres of tidal wetlands.







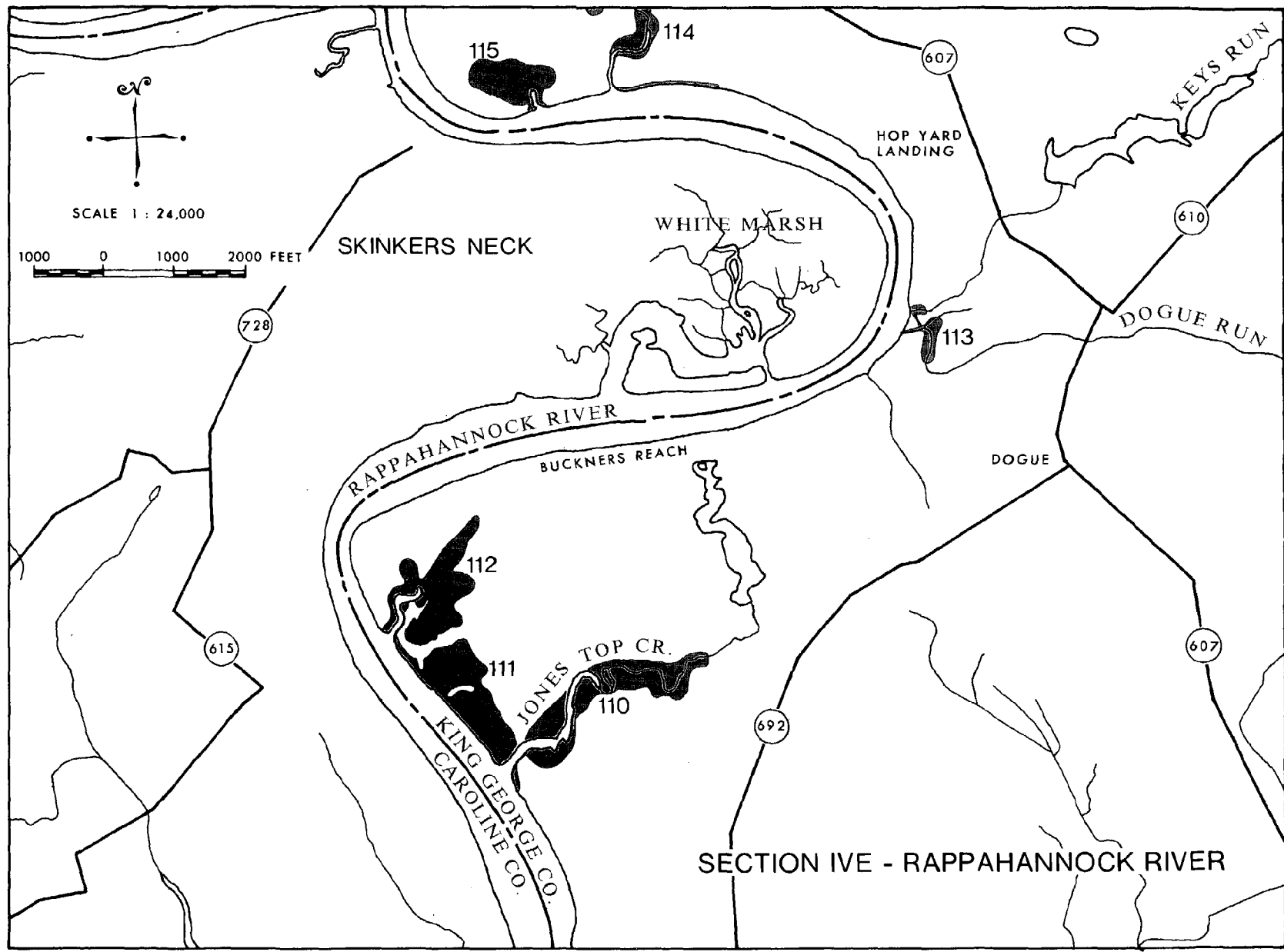
SECTION IVC - RAPPAHANNOCK RIVER

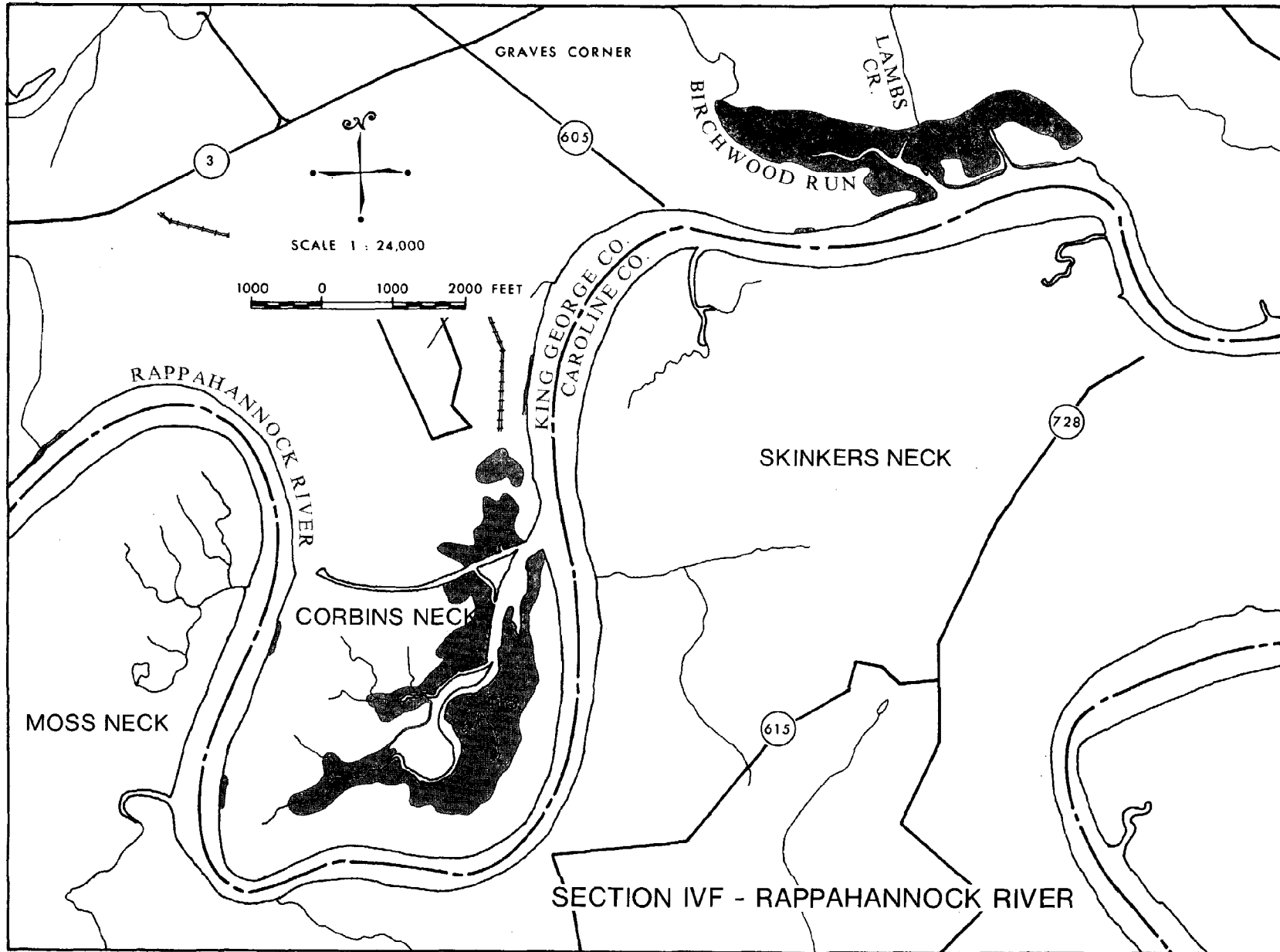


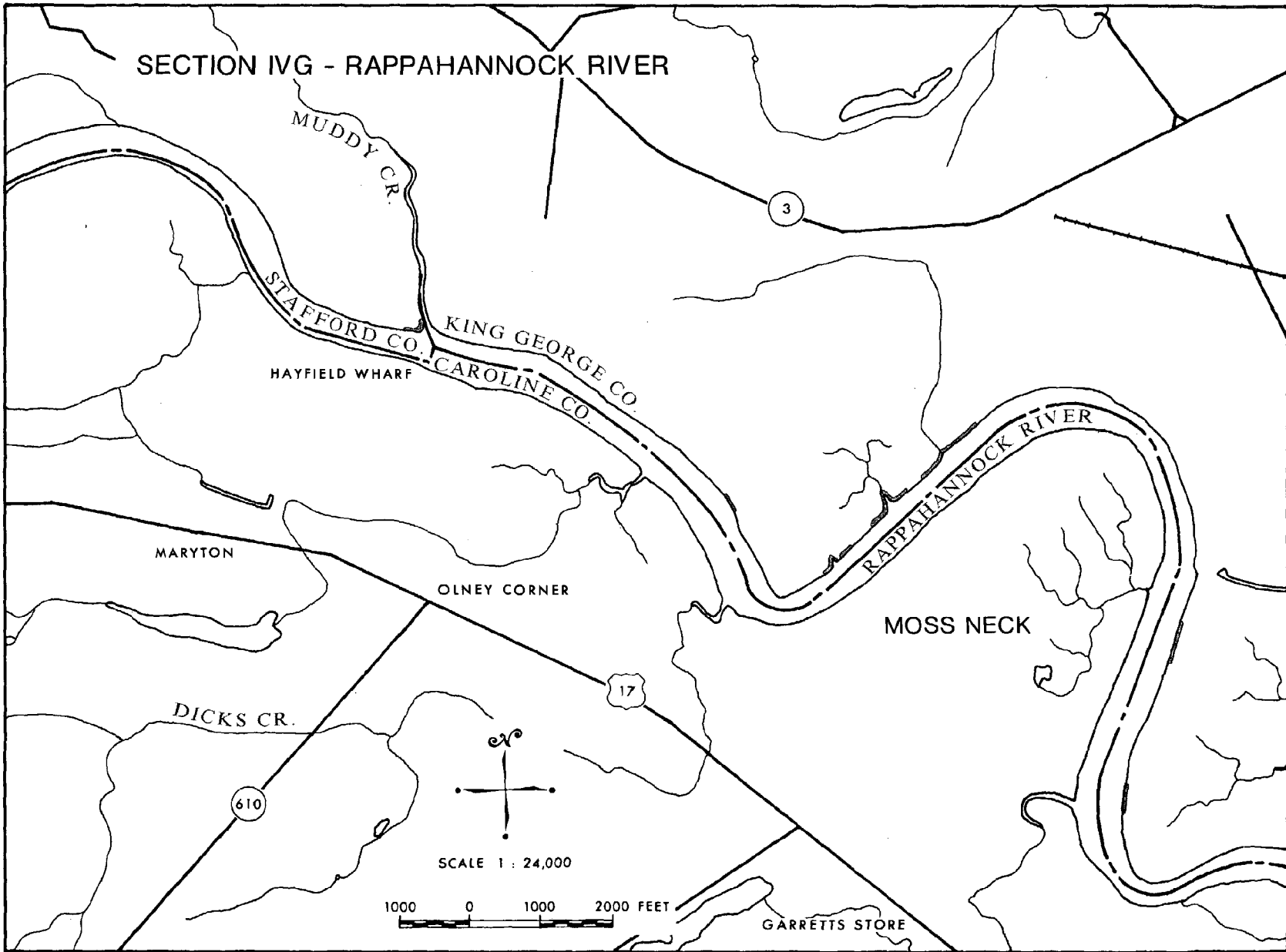
SECTION IVD - RAPPAHANNOCK RIVER

SCALE 1 : 24,000

1000 0 1000 2000 FEET







Section IV. Rappahannock River

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickereel Weed-Arrow Arum	Saltmeadow Hay	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush	Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other	Observations	Marsh Type
93	Tobys Point	2	%									10	5	60			5									c,20	Long fringing marsh 30 ft. wide; pickereel weed and yellow pond lily along river side.	VII
			acres										0.2	0.1	1.2			0.1										
94	Tobys Point	5	%									15	5	30		5	20						5			c,15 g,5	Pocket marsh surrounded by woody swamp.	XI
			acres										0.8	0.2	1.5		0.2	1.0					0.2			0.8 0.2		
95	Jetts Creek	8	%									8	10	10		5	15	15		5			5	2	5	c,15 i,5	Long fringing marsh bordering creek channel and surrounded by woody swamp.	XI
			acres									0.6	0.8	0.8		0.4	1.2	1.2		0.4			0.4	0.2	0.4	1.2 0.4		
96	Gingoteague Creek	30	%							4	20	5	10		5	30	10		1		-	5		2	c,5 i,3	Long fringing marsh bordering creek and surrounded by woody swamp.	XI	
			acres								1.2	6.0	1.5	3.0		1.5	9.0	3.0		0.3		-	1.5		0.6			1.5 0.9
97	Rappahannock River	8	%					2		5	55	2	2		2	10	20				2						Large fringing marsh dominated by wild rice.	XI
			acres					0.2			0.4	4.4	0.2	0.2		0.2	0.8	1.6				0.2						
98	Rappahannock River	4	%					2		2	5	10	10		5	60					5					g,-	Pocket marsh separated from river by 6 ft. wide border of trees; open to tidal flushing at several points.	XI
			acres				0.1			0.1	0.2	0.4	0.4		0.2	2.4						0.2						
99	Milbank Creek	12	%					5			15	2	20		5	40					10	1		2			Marsh island; several clumps of trees and shrubs at the highest elevations.	XI
			acres				0.6				1.8	0.2	2.4		0.6	4.8						1.2	0.1		0.2			
100	Milbank Creek	13	%					5			5	3	30		5	30					2					c,20	Long fringing marsh bordering creek and surrounded by woody swamp.	XI
			acres				0.6				0.6	0.4	3.9		0.6	3.9						0.3						

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare
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Section IV. Rappahannock River
(continued)

#	Marsh Location	Total Acres																		Observations	Marsh Type								
			%	Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickeral Weed-Arrow Arum	Saltmeadow Hay	Smartweed	Tearthumb	Beggar Ticks	Saltmarsh Bulrush			Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other	
101	Cleve Marsh	26	%							10		5		5	10	70												Freshwater creek marsh; beggar ticks dominant vegetation in September.	XI
			acres								2.6		1.3		1.3	2.6	18.2												
102	Cleve Marsh Goat Island	28	%					5		2	2	2	10		10	55	5			2	5		2				Creek marsh dominated by smartweeds; interior of marsh grades into woody swamp.	XI	
			acres					1.4		0.6	0.6	0.6	2.8		2.8	15.4	1.4			0.6	1.4		0.6						
103	Cleve Marsh	39	%						2	55		10			5	25				1							Creek marsh dominated by wild rice; grades into woody swamp of ash and willow.	XI	
			acres							0.8	21.4		3.2			2.0	9.8			0.4									
104	Cleve Marsh Goat Island	15	%				4		1	4	1	17		10	41	7			9	5		1				Fringing marsh dominated by smartweeds; willow, ash, button bush scattered throughout.	XI		
			acres				0.6		0.1	0.6	0.2	2.5		1.5	6.2	1.0			1.3	0.7		0.1							
105	Cleve Marsh	44	%				2		15	30		10			10	25		2	2					2	c,2	Creek marsh grades into woody swamp.	XI		
			acres				0.9		6.6	13.2		4.4			4.4	11.0		0.9	0.9					0.9	0.9				
106	Cleve Marsh	2	%				5		2	2		20		10	40	20						1				Creek marsh fringed by pickerel weed; interior dominated by smartweeds.	XI		
			acres				0.1		-	-		0.4		0.2	0.8	0.4							-						
107	Cleve Marsh	48	%				2		15	30		10		25	10			2	2				2		c,2	Creek marsh grades into woody swamp.	XI		
			acres				1.0		7.2	14.4		4.8		12.0	4.8				1.0	1.0				1.0				1.0	
108	Cleve Marsh	7	%				5		2	2		20		10	40	20							1			Fringing marsh dominated by smartweeds; grades into woody swamp.	XI		
			acres				0.4		0.1	0.1		1.4		0.7	2.8	1.4								0.1					

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare

Section IV. Rappahannock River
(continued)

#	Marsh Location	Total Acres																		Observations	Marsh Type								
			%	Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickrel Weed-Arrow Arum	Saltmeadow Hay	Smartweed	Teardrop	Beggar Ticks	Saltmarsh Bulrush			Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other	
109	Rappahannock River	1	%						10					20		20	40											Long fringing marsh; pickerel weed and wild rice along channel; cattails and smartweeds landward.	XI
			acres					0.1			0.1		0.2		0.2	0.4													
110	Jones Top Creek	27	%						2		5	30	2	10			25	20		2	2		2	-			Creek marsh; large stands of wild rice.	XI	
			acres					0.5		1.4	8.1	0.5	2.7			6.8	5.4		0.5	0.5		0.5	-						
111	Rappahannock River	22	%							2	5	2	10		10	35	25		1	5	5					Fringing marsh; interior grades into woody swamp.	XI		
			acres						0.4	1.1	0.4	2.2		2.2	7.7	5.5		0.2	1.1	1.1									
112	Rappahannock River	20	%						5		3	5	5			60	5		5	5		2		c.5	Fringing creek marsh; surrounded by woody swamp; interspersed with willow, maple, ash, alder trees.	XI			
			acres					1.0			0.6	1.0	1.0			12.0	1.0		1.0	1.0		0.4		1.0					
113	Dogue Run	3	%							10	5					40	25					20				Pocket marsh interspersed with trees and shrubs.	XI		
			acres						0.3	0.2						1.2	0.8						0.6						
114	Rappahannock River	11	%							5	5		5		10	50	20			3	2					Creek marsh; dominated by smartweeds; channel fringed by pickerel weed.	XI		
			acres						0.6	0.6		0.6		1.1	5.5	2.2			0.3	0.2									
115	Rappahannock River	11	%						5		5	15	10		20	30	15									Pocket marsh; trees and shrubs clumped throughout.	XI		
			acres					0.6		0.6	1.6	1.1		2.2	3.3	1.6													
116	Lambs Creek	28	%						5		10	3	10		10	40	20		2							Pocket marsh; part of Birchwood Run marsh.	XI		
			acres					1.4			2.8	0.8	2.8		2.8	11.2	5.6		0.6										

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare

Section IV. Rappahannock River
(continued)

#	Marsh Location	Total Acres		Saltmarsh Cordgrass	Big Cordgrass	Saltbushes	Saltmarsh Aster	Cattails	Marsh Mallow	Switch Grass	Water Hemp	Wild Rice	Marsh Hibiscus	Pickrel Weed-Arrow Arum	Saltmeadow Hay	Smartweed	Teatthumb	Beggar Ticks	Saltmarsh Bulrush	Giant Bulrush	Button Bush	Swamp Milkweed	Jewel-Weed	Wool Grass	Walter's Millet	Other	Observations	Marsh Type		
117	Birchwood Run	46	%								5	15		10		20	25	25										Creek marsh; an area along the western border of this marsh has been filled; upland sediment is evident in creek channel.	XI	
			acres									2.3	6.9		4.6		9.2	11.5	11.5											
118	Corbins Neck	135	%					5				20		10		5	20	15							5	c, 20	Creek marsh; large stands of wild rice and smartweeds; channels fringed with pickrel weed and pond lily; grades into swamp.	XI		
			acres				6.8		6.8				27.0		13.5		6.8	27.0	20.2							6.8			27.0	
Total Section IV.		595	%					3			4	19	2	11		8	25	17		1	2	1	1	-	1	c, 6 g, -	i, -			
			acres				16.3					22.1	115.5	9.3	63.6		47.1	148.8	102.8		3.9	9.0	4.5	3.2	2.6	8.7			c, 36.5 g, 0.2	i, 1.3
Total King George County		2122	%	6	27	2	1	14	5	-	5	9	4	5	-	3	8	5	2	-	-	-	-	-	-	-	2	-	-	-
			acres	117.7	569.5	43.2	19.4	290.8	108.2	10.3	98.9	184.1	84.6	108.1	10.3	71.1	164.5	103.8	51.7	6.4	9.0	4.9	3.2	2.6	9.3	a, 0.1 b, 0.6	c, 39.9 d, 0.1	e, 2.4 f, 0.2	g, 0.2 h, -	i, 1.9

a- Marsh Fleabane b- Rice Cutgrass c- Yellow Pond Lily d- Black Needlerush
e- Reed Grass f- Water Dock g- Water Willow h- Ironweed i- Common Threesquare

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