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King and Queen County Tidal Marsh Inventory

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KING AND QUEEN COUNTY TIDAL MARSH INVENTORY

Special Report No. 291 in Applied Marine Science and Ocean Engineering

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Preface

This publication is one of a series of county and city tidal marsh inventories prepared by the Wetlands Advisory Group of the Virginia Institute of Marine Science. The previously published reports include:

Lancaster County	Accomack County
Northumberland County	Northampton County
Mathews County	Westmoreland County
York County and the Town of Poquoson	James City County and the City of Williamsburg
Stafford County	Surry County
Prince William County	Spotsylvania and Caroline Counties and the City of Fredericksburg
King George County	New Kent County
City of Hampton	Essex County
Fairfax County	Isle of Wight County
Gloucester County	Middlesex County
City of Virginia Beach Vol. 1 and 2	City of Norfolk
City of Newport News and Fort Eustis	King William County and Town of West Point

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. This inventory program is designed to aid the local wetlands boards, the state and federal regulatory agencies, and regional planning districts in making informed rational decisions on the uses of these valuable resources. They are also intended for use by the general public as a natural history guide and the scientific community as a research data source.

The reader is referred to the Shoreline Situation Report, New Kent, King William, and King and Queen Counties, C. H. Hobbs, III, M. Peoples, G. Anderson and P. Rosen, 1975, SRAMSOE No. 99. This report focuses on various shoreline characteristics including areas of erosion and accretion, beaches, marshes, artificially stabilized areas, and fastland types and uses.

Also of interest may be a booklet, Wetlands Guidelines, available from the Marine Resources Commission, Newport News, Virginia, which describes the wetlands types and the types of shoreline activities which affect wetlands and what these effects are.

Acknowledgements

First among the many people that we owe thanks are Robert E. Croonenberghs, Damon Doumlele and Thomas Luckam, Jr., for their invaluable field assistance and help in data reduction. We also thank Sharon Killeen and Judy Hudgins for reviewing and editing the manuscript. We are also indebted to Mary Jo Shackleford and Harold Burrell for map illustrations and cover design and William Jenkins for photographic assistance. We also greatly appreciate the talents of Janet Walker for text processing and reproduction and Sylvia Motley for printing.

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Introduction

Tidal marshes in King and Queen County are found along the northwest shoreline of the Poropotank River, which borders Gloucester County, and the northern shoreline of the York and the Mattaponi rivers. A total of 4,177.8 acres of tidal marshes occur in King and Queen County. More than half (53.3 percent) of the marshes are found along the Mattaponi River from its mouth at West Point to the Village of Aylett, a distance of approximately 31 river miles. Tidal influence ceases in the Mattaponi several miles above Aylett.

The wetlands in the Mattaponi watershed are very typical of those found along tidal rivers where salinity ranges from brackish (oligohaline) to fresh. Oligohaline marshes (0.5 to 5.0 ppt salinity) are often dominated by big cordgrass (*Spartina cynosuroides*) with associate species such as marsh elder (*Iva frutescens*), saltmeadow hay (*Spartina patens*), salt grass (*Distichlis spicata*), saltmarsh cordgrass (*Spartina alterniflora*) and others occupy the first 8 to 10 miles of the river. As salinity decreases to essentially freshwater (0.0 to < 0.5), diversity of the marsh vegetation increases.

Many of the tidal freshwater marshes support such great diversity of species that they are classified as Type XI Freshwater Mixed Community (see page 7), where no single plant species dominates. Tidal freshwater marshes characteristically also exhibit a significant seasonal succession, and therefore species composition as estimated by percent cover is strongly dependent on the period of observation. Many marshes, for example, that are dominated by arrow arum (*Peltandra virginica*) in May or June are often dominated by rice cutgrass (*Leersia oryzooides*) and beggars ticks (*Bidens* spp.) in September.

These wetlands are highly valuable to the estuarine environment. They are known to provide a wide variety of wildlife and waterfowl with cover and food. Tidal freshwater wetlands are also associated with the spawning and nursery areas for anadromous fish species such as herring, shad, striped bass and white perch.

The marshes in King and Queen County along the York and Poropotank rivers are, for the most part, brackish and typically vegetated by saltmarsh cordgrass, big cordgrass and saltmeadow species. Freshwater marsh communities are commonly found towards the upper end of the Poropotank River and other smaller tributaries of the York River such as Goalders and Hockley creeks.

Methods

Aerial photographs and topographic maps (U.S.G.S.) were utilized to determine 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.

Most of the field work was done in the summer and autumn of 1978. Subsequent field work and aerial photograph interpretation was done in 1987. Significant data was also obtained from the junior author's Master of Science thesis, A Method for Evaluating the Long-Term Cumulative Impacts of Tidal Marsh Alterations: The York River System -- A Case Study, VIMS, 1984.

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 (color) 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 areas 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.

Marsh Types and Evaluation

For a better understanding of what is meant by marsh types, some background information is required. The personnel of the Wetland Advisory Group 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 homogeneously 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 grow. 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 are 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.

Wetland Plants

Common and Scientific Names as Found in the Tables

Arrow Arum*	<i>Peltandra virginica</i> (L.) Kunth
Arrow Head*	<i>Sagittaria latifolia</i> Willd.
Asian Dayflower	<i>Aneilma keisak</i> Hassk.
Beggar Ticks*	<i>Bidens</i> spp.
Big Cordgrass*	<i>Spartina cynosuroides</i> (L.) Roth
Black Needlerush*	<i>Juncus roemerianus</i> Scheele
Buttonbush*	<i>Cephalanthus occidentalis</i> L.
Cattail*	<i>Typha latifolia</i> L.
	<i>Typha angustifolia</i> L.
Common Threesquare*	<i>Scirpus americanus</i> Pers.
Giant Bulrush*	<i>Scirpus validus</i> Vahl
Jewelweed	<i>Impatiens capensis</i> Meerb.
Marsh Fern	<i>Thelypteris palustris</i> Schott
Marsh Hibiscus*	<i>Hibiscus moscheutos</i> L.
Marsh Mallow	<i>Kosteletskya virginica</i> Presl
Orach	<i>Atriplex patula</i> L.
Pickernelweed*	<i>Pontederia cordata</i> L.
Reedgrass*	<i>Phragmites australis</i> (Cav.) Trin. ex Steud.
Rice Cutgrass*	<i>Leersia oryzoides</i> (L.) Sw.
Saltbush	
Groundsel Tree*	<i>Baccharis halimifolia</i> L.
Marsh Elder*	<i>Iva frutescens</i> L.
Saltgrass*	<i>Distichlis spicata</i> (L.) Greene
Saltmarsh Aster	<i>Aster tenuifolius</i> L.
Saltmarsh Bulrush*	<i>Scirpus robustus</i> Pursh
Saltmarsh Cordgrass*	<i>Spartina alterniflora</i> Loisel.
Saltmarsh Fleabane*	<i>Pluchea purpurascens</i> (Sw.) DC.
Saltmeadow Hay*	<i>Spartina patens</i> (Ait.) Muhl.
Softrush	<i>Juncus effusus</i> L.
Spikerush*	<i>Eleocharis</i> spp.
Swamp Loosestrife	<i>Decodon verticillatus</i> (L.) Ell.
Swamp Milkweed*	<i>Asclepias incarnata</i> L.
Swamp Rose	<i>Rosa palustris</i> Marsh.
Sweet Flag*	<i>Acorus calamus</i> L.

Tearthumb*

Walters Millet

Water Dock*

Water Hemp*

Water Smartweed*

Wild Rice*

Yellow Pond Lily*

Polygonum arifolium L.

P. sagittatum L.

Echinochloa walteri (Pursh) Nash

Rumex verticillatus L.

Amaranthus cannabinus (L.) J.D.Sauer

Polygonum punctatum Ell.

Zizania aquatica L.

Nuphar luteum Sibth. & Sm.

*Species included in the Wetlands Act of 1972.

Glossary of Descriptive Terms

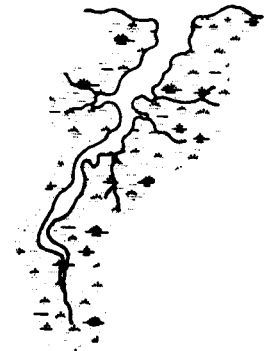
Cove Marsh

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.



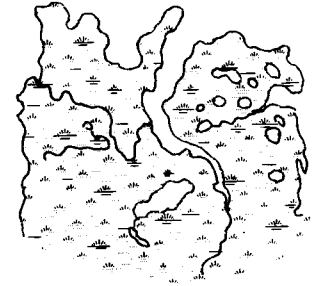
Delta Marsh

A marsh 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.



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 a section of shoreline and generally has a much greater length than width or depth.



High Marsh

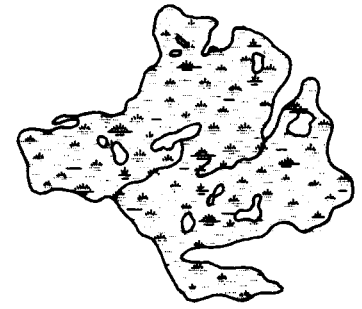
The marsh surface is at an elevation of mean high water or above; it is usually inundated less than twice daily by tidal action.

Low Marsh

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

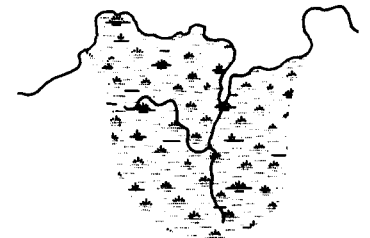
Marsh Island

An isolated marsh surrounded on all sides by open water. Interior portions of the marsh may contain trees scattered at highest elevations.



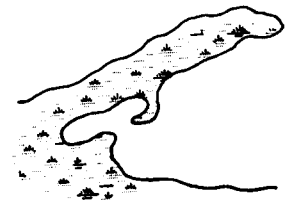
Pocket Marsh

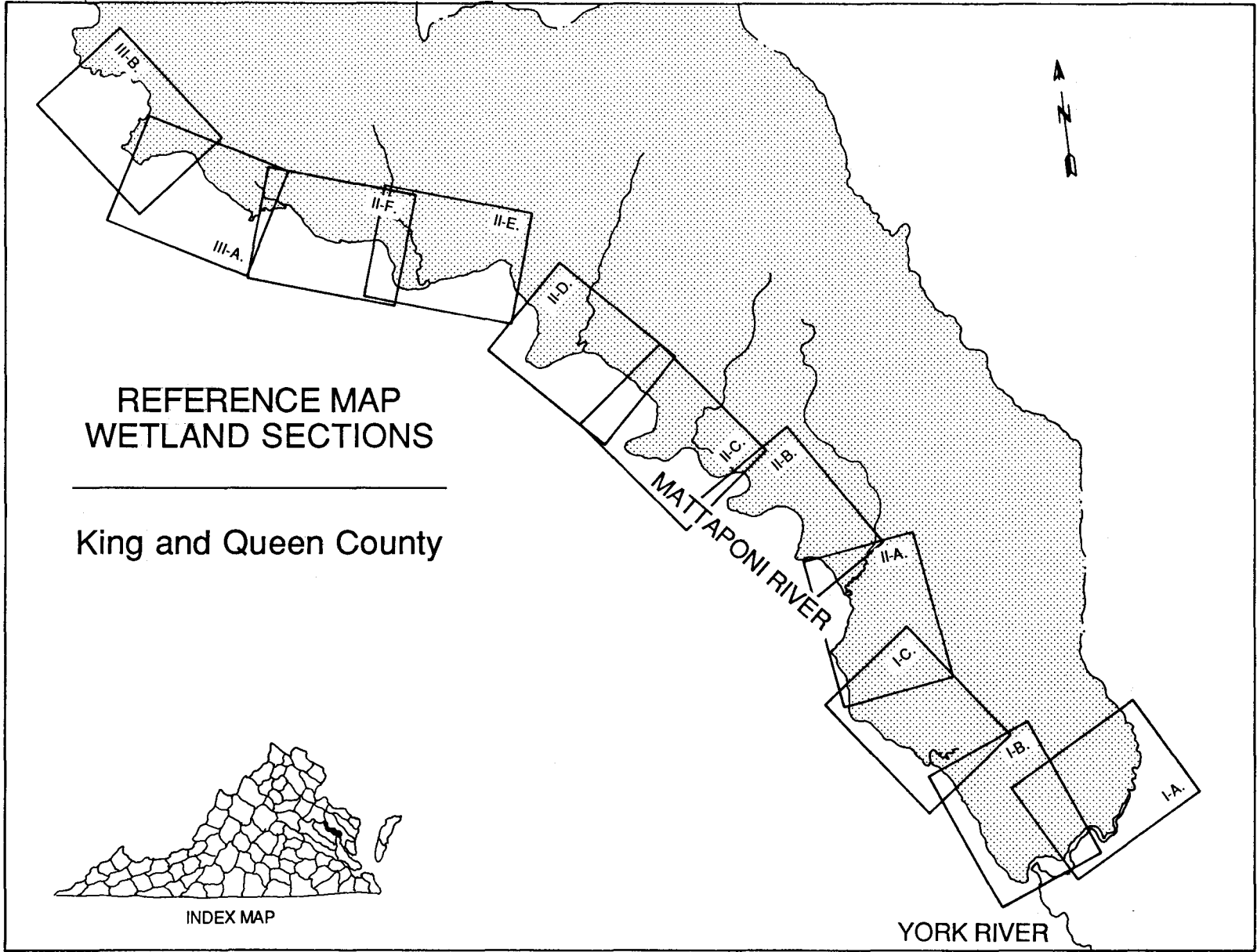
A marsh contained within a small, essentially semi-circular area on a shoreline.



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.





SECTION I

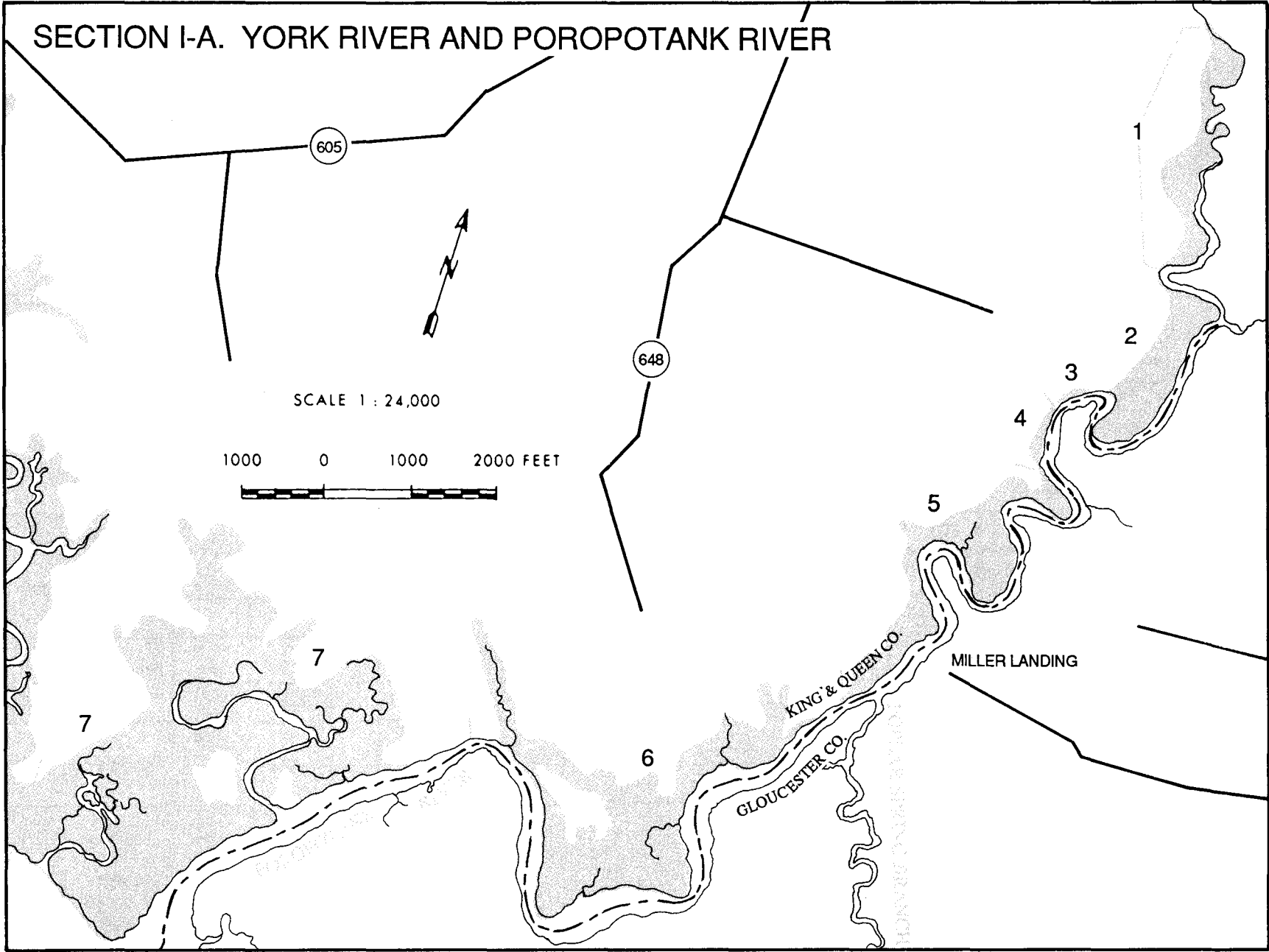
YORK RIVER AND POROPOTANK RIVER

There are 1824 acres of tidal marshes in this section, representing 43.6 percent of the tidal marshes in King and Queen County. This section includes all the marshes on the King and Queen side of the Poropotank River. Information regarding the other marshes in this system is found in the Gloucester County Tidal Marsh Inventory. Section I also contains those marshes that occur along the York River from the mouth of the Poropotank River to West Point where the York forks to become the Pamunkey and Mattaponi rivers.

The most dominant marsh type in these waterways is saltmarsh cordgrass (Type I), *Spartina alterniflora* with 990 acres, followed by big cordgrass (Type V), *Spartina cynosuroides* with 342 acres and salt meadow hay/salt grass (Type II), *Spartina patens* and *Distichlis spicata* with 234 acres.

Near the upper end of the Poropotank River and certain tributaries of the York such as Goalders and Hockley creeks, freshwater marsh species are evident. Arrow arum (*Peltandra virginica*) and pickerel weed (*Pontederia cordata*) dominate in the intertidal zone of the marsh in these locations. Wild rice (*Zizania aquatica*) occurs in rather large stands in the upper Poropotank. Here salinity is greatly diluted by upland runoff and seepage resulting in an increase of plant diversity.

Field checks made in October of 1987, indicated that wild rice populations at the upper reaches of the Poropotank River and Burnt Mill Creek (Section II) were much smaller when compared to the original field work done in 1978. Possibly drought conditions in recent years have caused higher salinities and reduced upland runoff, impacting the growth of this valuable freshwater marsh grass. The tables reflect the 1978 data for historic purposes.



Section I. York River and Poropotank River

#	MARSH LOCATION	TOTAL ACRES		SALTMARSH CORDGRASS	BIG CORDGRASS	SALTBUSHES	MARSH HIBISCUS	SWEET FLAG	SALTMeadow HAY SALTGRASS	SALTMARSH BULRUSH	GIANT BULRUSH	THREESQUARE	CATTAILS	PICKERELWEED-ARROW ARUM	YELLOW POND LILY	MARSH MALLOW	WATER HEMP	WILD RICE	SMARTWEEDS	TEARTHUMB	RICE CUTGRASS	REED GRASS	OTHER	OBSERVATIONS	MARSH TYPE	
1	Upper Poropotank River	29	%	1	--	--					--	--	1	15			1	80	1	--	1		o	Utilized by wood ducks and mallards	XI	
			acres	.29											.29	4.35			.29	23.2	.29		.29			
2	Upper Poropotank River	33	%	40	--						--		--	22			1	35	2	--	--		f- k- o	Duck habitat	XI	
			acres	13.2												7.26			.33	11.55	.66					
3	Upper Poropotank River	1.0	%	75	1		--		--		--		19	5		--	--		--						Fringe marsh	I
			acres	.75	.01										.19	.05										
4	Upper Poropotank River	2.0	%	75	5		--			--	--	--	5	10		--	1		1		3		f-	Fringe marsh	I	
			acres	1.5	.10										.10	.20			.02		.02		.06			
5	Miller Landing	55	%	44	49	--	--		--	--	--	--	2	1		--	2		1		1				Large riverine marsh	XII
			acres	24.2	26.95										1.1	.55			1.1		.55		.55			
6	Poropotank River	101	%	65	30	--			1	2		--	1	1		--	--						e- j- i- o-	Large riverine marsh, muskrat lodges	I	
			acres	66.65	30.3					1.01	2.02				1.01	1.01										
7	Lower Poropotank	291	%	46	4	2			40	4		2	--				--		--				i 1 n- j 1	Extensive riverine marsh, muskrat lodges	XII	
			acres	133.86	11.64	5.82				116.4	11.64		5.82													
8	Guthrie Creek	259	%	80	1	--	--		8	8		--	--				1		1				i- n- j 1	Extensive creek marsh	I	
			acres	207.2	2.59					20.72	20.72								2.59		2.59					

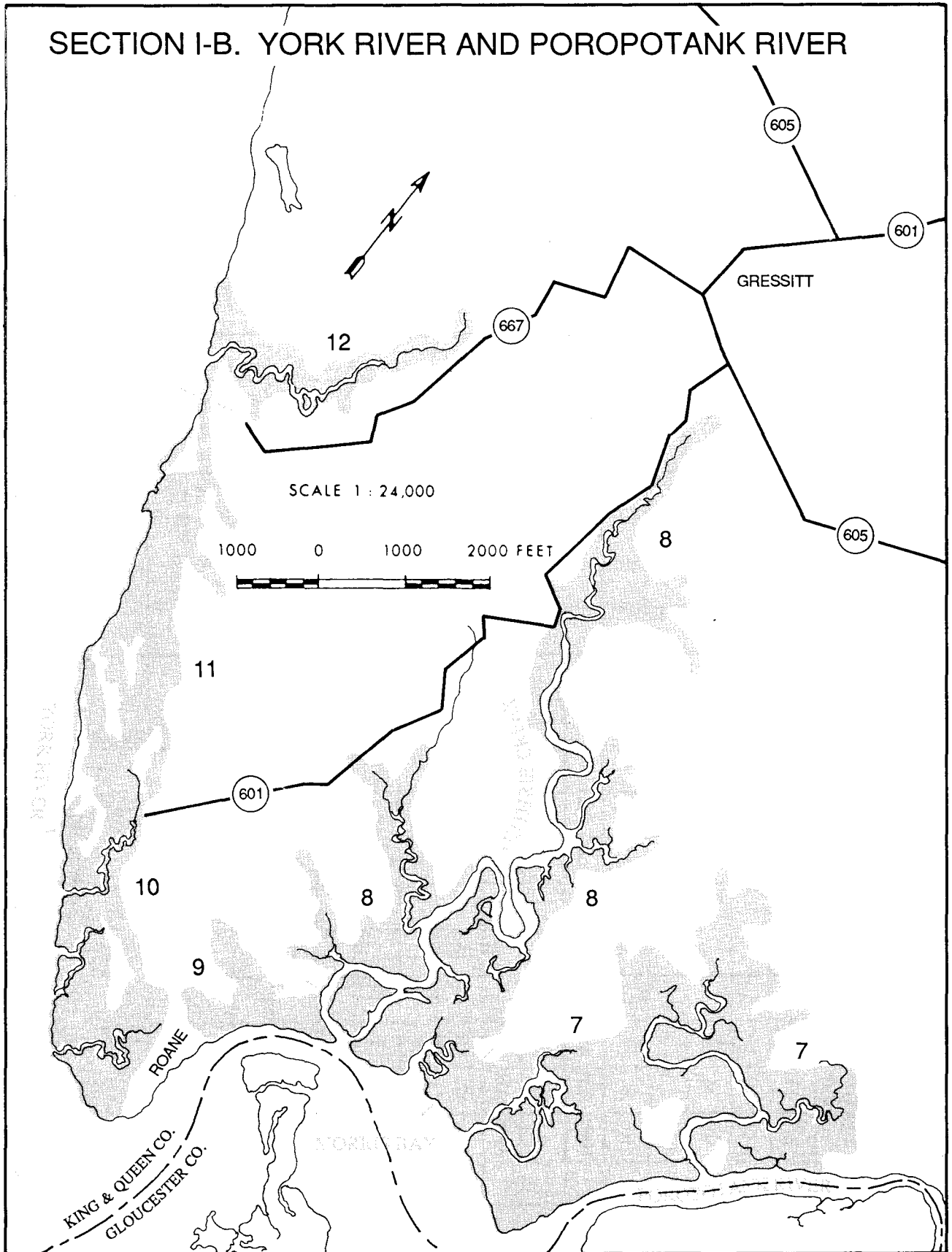
a=WALTER'S MILLET
b=SWAMP MILKWEED
c=WATER WILLOW
d=ARROWHEAD

e=SWITCH GRASS
f = WATER DOCK
g=SWAMP LOOSESTRIPE
h=SPIKE RUSH

i=ORACH
j=BLACK NEEDLERUSH
k=BEGGAR TICKS
l=FERNS

m=BUTTON BUSH
n=SALTMARSH ASTER
o=JEWELWEED
p=BULTONGE
q=ASIAN DAYFLOWER

SECTION I-B. YORK RIVER AND POROPOTANK RIVER



Section I. York River and Poropotank River

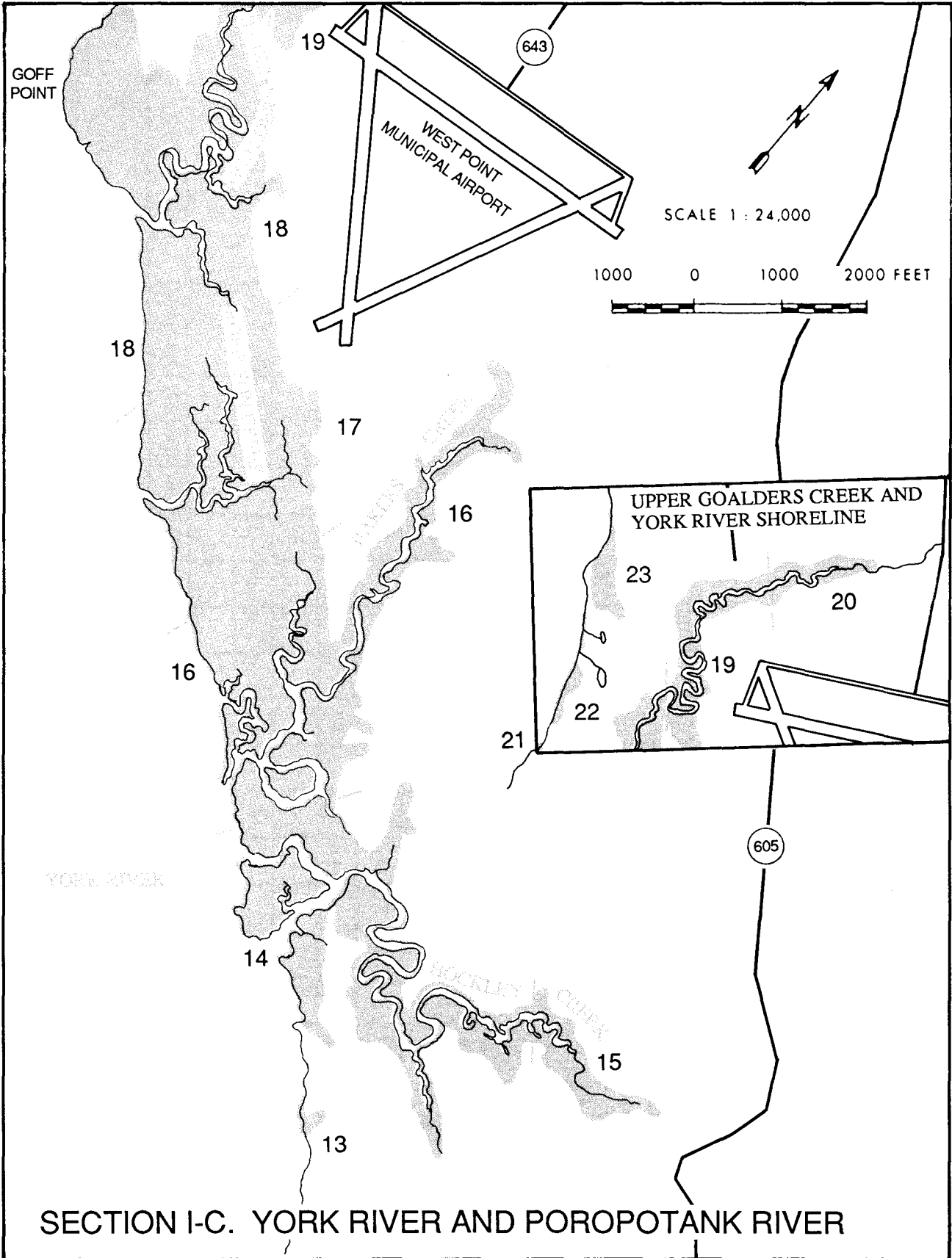
#	MARSH LOCATION	TOTAL ACRES		SALT MARSH CORDGRASS	BIG CORDGRASS	SALTBUSHES	MARSH HIBISCUS	SWEET FLAG	SALT MEADOW HAY SALTGRASS	SALT MARSH BULRUSH	GIANT BULRUSH	THREESQUARE	CATTAILS	PICKERELWEED-ARROW ARUM	YELLOW POND LILY	MARSH MALLOW	WATER HEMP	WILD RICE	SMARTWEEDS	TEARTHUMB	RICE CUTGRASS	REED GRASS	OTHER	OBSERVATIONS	MARSH TYPE
9	Roane-Guthrie Creek	29	%	50	--	--	--		25	--			--				--						j 25	Marsh between relic dune ridges	I
			acres	14.5						7.25															
10	York River	97	%	75	--	1			20	1													i- j 3 e- n-	Muskrat lodges	I
			acres	72.75		.97				19.40	.97														
11	York River	106	%	38	1	--	--		14	1		1	--										e- n- j 45	Scattered hummocks of pine and cedar	XII
			acres	40.28	1.06					14.84	1.06		1.06												
12	York River	52	%	90	--	--			8	2			--			--	--						j- n-	Creek marsh	I
			acres	46.80						4.16	1.04														
13	York River	1.0	%	87	3	4	--		5	1			--			--	--						e- j- i- n-	Pocket marsh, dominated by saltmarsh cordgrass	I
			acres	.87	.03	.04				.05	.01														
14	Hockley Creek	121	%	85	3	--			9	2			1			--	--		--				e- j- i-	Creek marsh, dominated by saltmarsh cordgrass	I
			acres	102.85	3.63					10.89	2.42			1.21											
15	Upper Hockley Creek	21	%	45	37		--		1	1			--	1	1	--	7	1	2	--	4		f- n-	Upper creek marsh	XII
			acres	9.45	7.77					.21	.21					.21	.21		1.47	.21	.42		.84		
16	Bakers Creek	208	%	47	48	--	--		4			1	--				--		--				j-	Big cordgrass dominating upper part	XII
			acres	97.76	99.84					8.32			2.08												

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SECTION I-C. YORK RIVER AND POROPOTANK RIVER

Section I. York River and Propotank River

#	MARSH LOCATION	TOTAL ACRES		SALTMARSH CORDGRASS	BIG CORDGRASS	SALTBUSHES	MARSH HIBISCUS	SWEET FLAG	SALTMeadow HAY SALTGRASS	SALTMARSH BULRUSH	GIANT BULRUSH	THREESQUARE	CATTAILS	PICKERELWEED-ARROW ARUM	YELLOW POND LILY	MARSH MALLOW	WATER HEMP	WILD RICE	SMARTWEEDS	TEARTHUMB	RICE CUTGRASS	REED GRASS	OTHER	OBSERVATIONS	MARSH TYPE
17	Robinson Creek	173	%	45	45	--			5	5			--				--						e- j-	Creek marsh, big cord-grass dominating upper part	XII
			acres	77.85	77.85				8.65	8.65															
18	Goalders Creek	200	%	35	30	--			10	8		2	--				--					--	e- j 15 i- n-	Creek marsh	XII
			acres	70.0	60.0	--			20	16.0		4.0													
19	Goalders Creek	23	%	20	79	--	--		--	--		--	--	--			--		1	--	--		f- j-	Creek marsh	V
			acres	4.6	18.17															.23					
20	Upper Goalders Creek	11	%	50	1											--	--	45	--	3	--		e- i-	Wild rice at upper end	I
			acres	5.5	.11															4.95		.33			
21	York River	0.4	%	8	70	10			8			4					--						e-	Fringe marsh	V
			acres	.03	.28	.04			.03			.01													
22	York River	5.0	%	10	17	10			8	20		20					--						e- j 15	Pocket marsh	XII
			acres	.5	.85	.5			.40	1.0		1.0													
23	York River	6.0	%	--	20	3	--		40	1		1				--	--						e- j 35	Embayed marsh	XII
			acres		1.2	.18			2.4	.016		.016													
	Total Section I	1824.4	%																						
			acres	990.39	342.38	7.55				234.73	65.76		13.99	3.9	13.63	.21			5.8	39.91	4.76	.33	1.74		99.11

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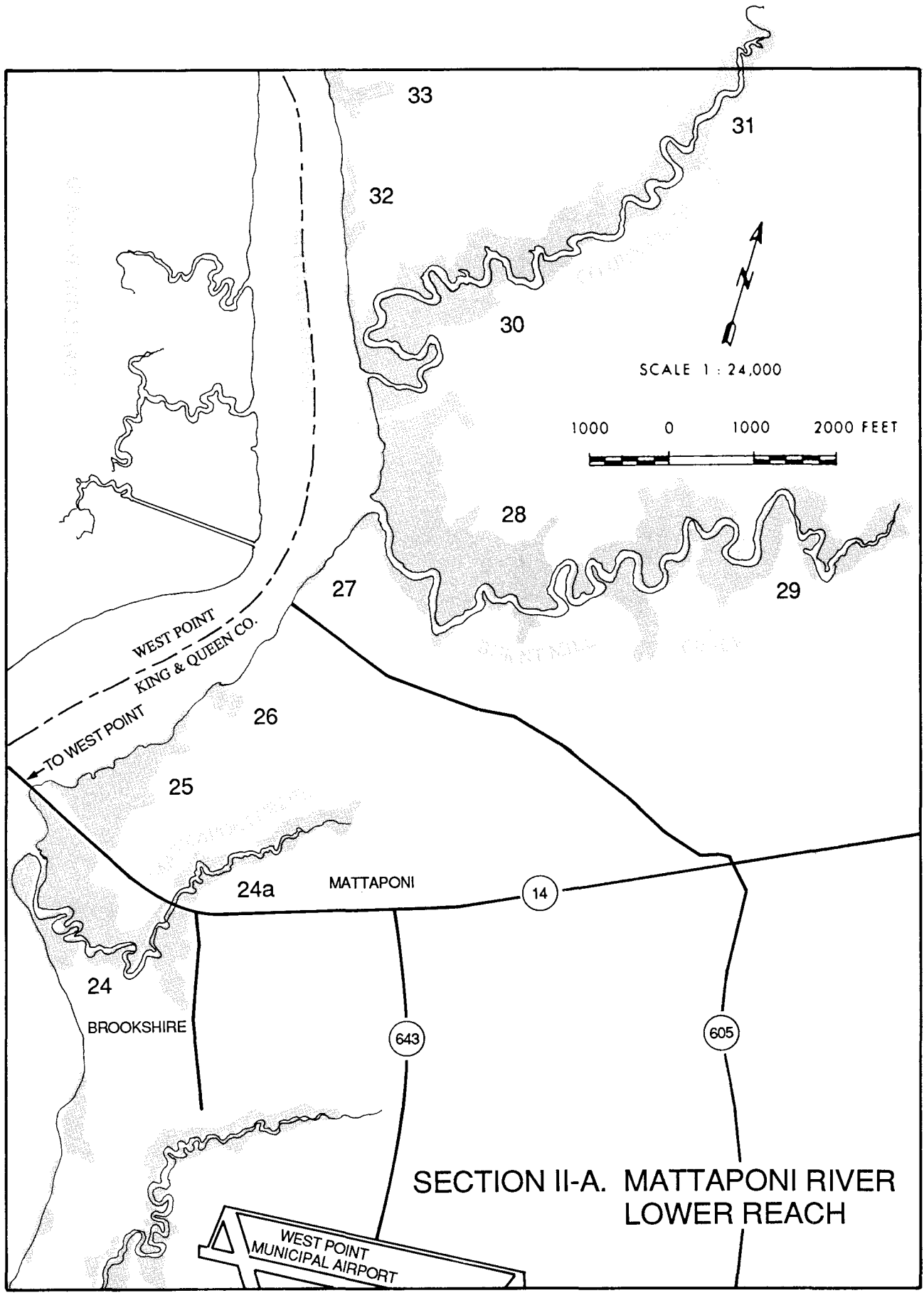
SECTION II

MATTAPONI RIVER - LOWER REACH

This section includes the tidal marshes of the Mattaponi River and its tributaries in King and Queen County from its mouth to the Village of Walkerton, a distance of approximately 24 river miles. The other tidal wetlands on the Mattaponi River System are documented in the King William County Tidal Marsh Inventory Report.

The marshes in this reach total 2227 acres, representing more than 50 percent of all of the tidal marshes in the County. A large number of these wetlands are oligohaline marshes dominated by big cordgrass with an overall total for this species of nearly 1,000 acres. The largest oligohaline marsh in this section is marsh # 37, with 327 acres and dominated by big cordgrass.

The largest single marsh in King and Queen County is marsh # 43, totalling 481 acres. This extensive wetland is classified as a Type XI Freshwater Mixed Community because of its diversity of marsh vegetation. Although big cordgrass is predominant, other plant communities such as arrow arum/pickerel weed, smartweed and tearthumb (*Polygonum* spp.), marsh hibiscus (*Hibiscus moscheutos*), beggar's ticks (*Bidens* spp.) and Walter's millet (*Echinochloa walteri*) are indicative of freshwater conditions.



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SECTION II-A. MATTAPONI RIVER LOWER REACH

Section II. Mattaponi River - Lower Reach

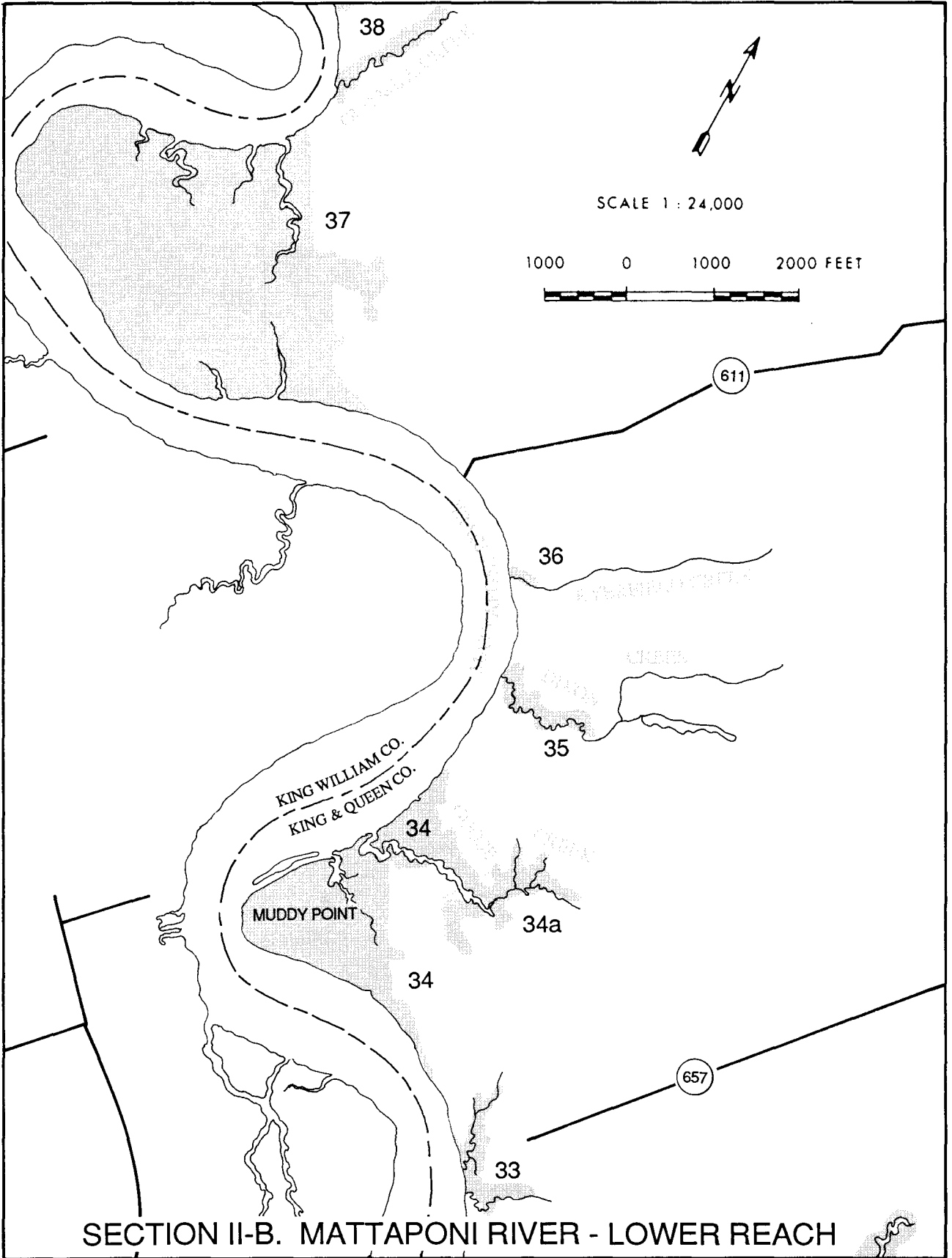
#	MARSH LOCATION	TOTAL ACRES		SALTMARSH CORDGRASS	BIG CORDGRASS	SALTBUSHES	MARSH HIBISCUS	SWEET FLAG	SALTMEADOW HAY SALTGRASS	SALTMARSH BULRUSH	GIANT BULRUSH	THREESQUARE	CATTAILS	PICKERELWEED-ARROWARUM	YELLOW POND LILY	MARSH MALLOW	WATER HEMP	WILD RICE	SMARTWEEDS	TEARTHUMB	RICE CUTGRASS	REED GRASS	OTHER	OBSERVATIONS	MARSH TYPE
24	Mattaponi Creek	71	%	28	65	1	--		5	--		1				--	--						e-j-	Creek marsh, dominated by big cordgrass	V
			acres	19.88	46.15	.71				3.55				.71											
24A	Upper Mattaponi Creek	20	%	48	47	--				1	--		1									--	n3	Upper creek marsh	XII
			acres	9.6	9.4					.20				.20											
25	Mattaponi River	31	%	65	30	1			3	--		1				--	--						e-j-	Large pocket marsh, partially filled	I
			acres	20.15	9.3	.31				.93				.31											
26	Mattaponi River	4	%	25	70	1	--		3	--		--	--										e-	Pocket marsh	V
			acres	1.0	2.8	.04				.12															
27	Mattaponi River	2	%	20	42	20	1		1							1	--						e10 j5	Pocket marsh	XII
			acres	.40	.84	.40	.02			.02							.02								
28	Burnt Mill Creek	165	%	20	76	--	--		2				--	1		--	--						e-j- f-91	Creek marsh, dominated by big cordgrass	V
			acres	33.0	125.4					3.3						1.65									
29	Burnt Mill Creek	49	%	40	--	--	--				--	15	30			--	3	1	1	5	5		f-h- o-	Creek marsh	XII
			acres	19.6										7.35	14.7			1.47	.49	.49	2.45	2.45			
30	Corbin Creek	100	%	9	85	--	1		3	--	--	1	--	--	1	--	--						e- f-	Creek marsh	V
			acres	9.0	85		1.0			3.0				1.0			1.0								

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SECTION II-B. MATTAPONI RIVER - LOWER REACH

Section II. Mattaponi River - Lower Reach

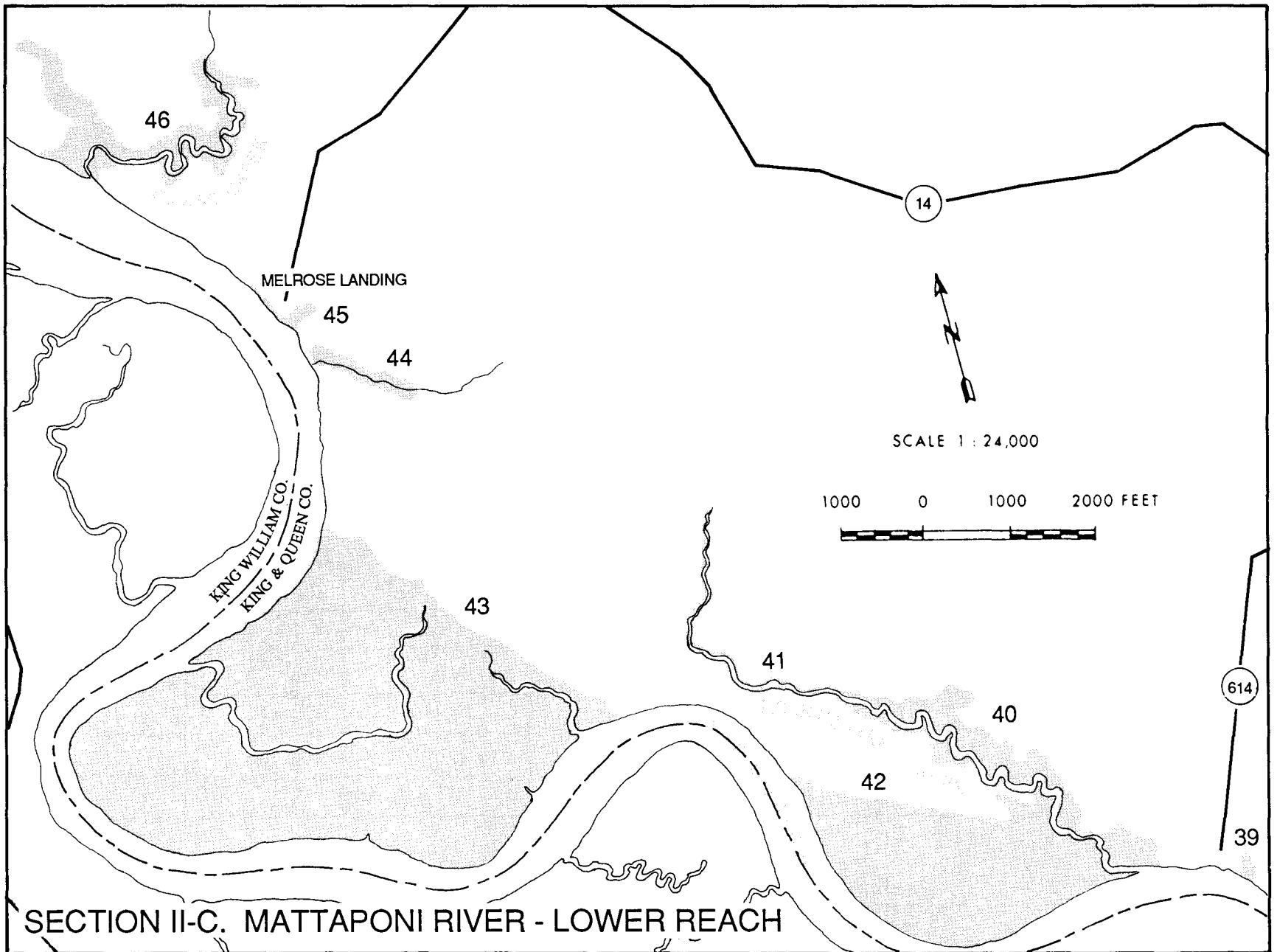
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31	Upper Corbin Creek	36	%	17	2		-				-		15	44			-	15	3	3	-		f-a 1	Creek marsh	XI
			acres	6.12	.72										5.4	15.84				5.4	1.08	1.08			
32	Mattaponi River	4.0	%	2	94	--	1		1		--	--	2			--	--		--				e-i-f-	Pocket marsh, dominated by big cordgrass	V
			acres	.08	3.76		.04		.04		.08				.08										
33	Mattaponi River	11	%	1	93	--	1		3	--	--	--	2	--		--	--						i-	Pocket marsh	V
			acres	.11	10.23		.11		.33		.22														
34	Muddy Point	104	%	5	85	--	--		1	--	--	3	--	2		--	--	--	--	2	2		e-f-	Extensive marsh dominated by big cordgrass	V
			acres	5.2	88.4				1.04		3.12				2.08						2.08	2.08			
34A	Goose Creek	14	%	27	20						--	--	3	15		--	1	10	1	2	20		f 1	Creek marsh	XI
			acres	3.78	2.8										.42	2.1			.14	1.4	.14	.28	2.8		
35	Dixon Creek	9	%	1	92	--	2		--		--	--	--	2		--	--	--		2	1		f-o-	Creek marsh	V
			acres	.09	8.28		0.18									0.18						0.18	.09		
36	Mattaponi River	1.0	%	2			--				--	--		1		--	--	94	--	1	2		f-	Small creek marsh	XI
			acres	.02								--	--	--	.01					.94		.01	.02		
37	Mattaponi River	327	%	2	85	--	2				--	--	--	5		--	--	--	2	2	--	--	f 1 a 1 o-	Extensive marsh	V
			acres	6.54	278		6.54								16.35						6.54	6.54			

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SECTION II-C. MATTAPONI RIVER - LOWER REACH

Section II. Mattaponi River - Lower Reach

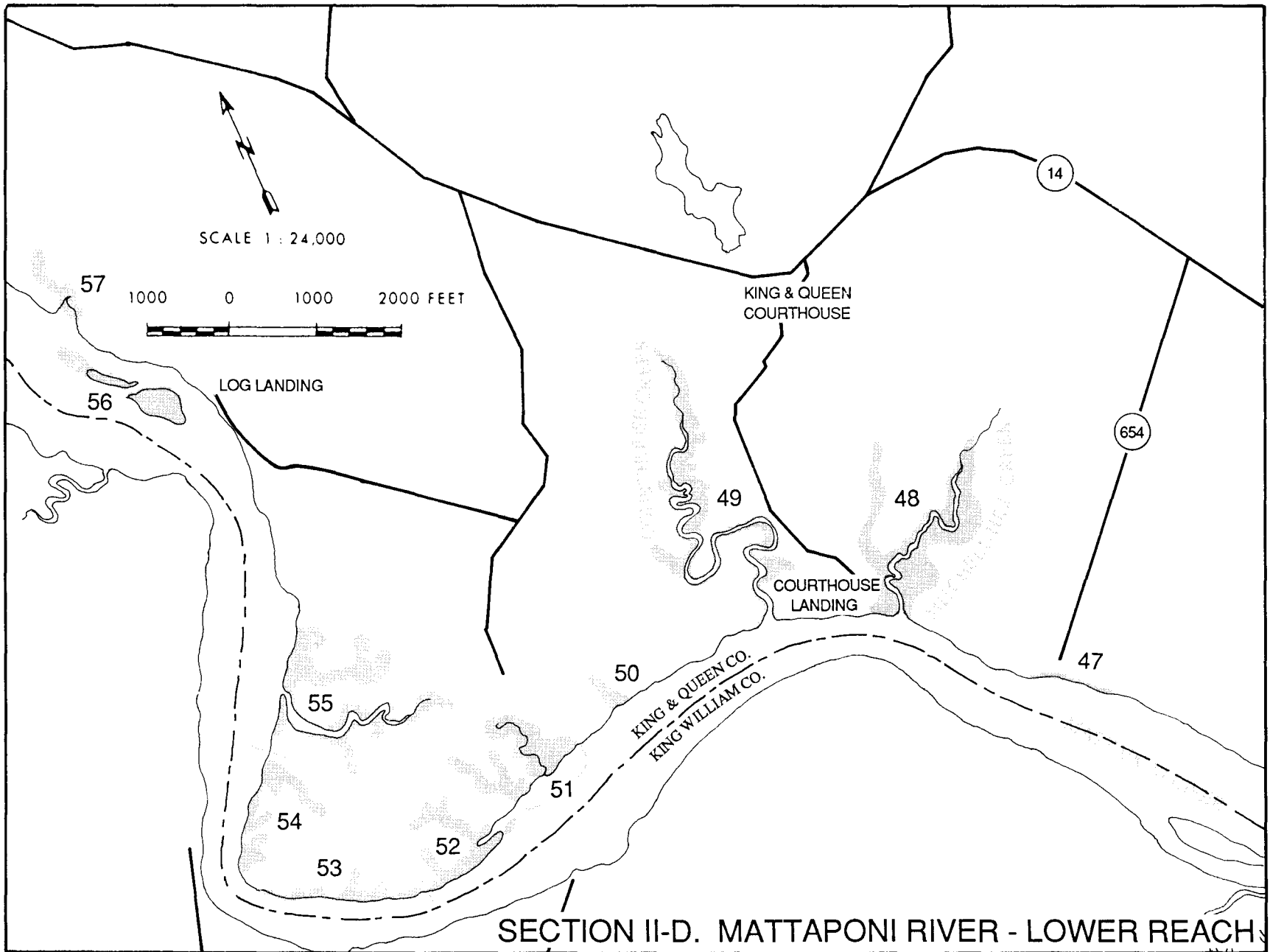
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38	Old Mill Creek	9	%	--	25	--	--				--	--	--	30		--	--	4	--	4	2		f - k 35 o -	Creek marsh	XI
			acres		2.25											2.7				.36		.36	.18		
39	Mattaponi River	1.0	%	4	20	--	5				1	1	10	35			--	--	5	10	2		k 5 a 2 o -	Pocket marsh	XI
			acres	.04	.20		.05				.01	.01	.1	.35						.05	.10	.02			
40	Heart-quake Creek	75	%	1	81	--	4				--		--	5		--	--		2	3	--	3	k 10 - n -	Creek marsh	V
			acres	.75	60.75		3.0									3.75				1.5	2.25		2.25		
41	Upper Heart-quake Creek	11	%		--		5				--		1	30			7	2		7	7	--	f - o 1 k 35 n - a 5	Upper creek marsh	XI
			acres				.55							.11	3.3			.77	.22		.77	.77			
42	Mattaponi River	109	%	--	79		2					--		3		--	2	10		3			k 1 o -	Extensive marsh	V
			acres		86.11		2.18								3.27			2.18	10.9		3.27				
43	Mattaponi River	481	%	--	37	--	6				--	4	--	12		--	3	1	15	10	--	--	f - a 2 o - k 10	Extensive marsh	XI
			acres		178.0		29.0				19.2				57.7			14.4	4.81	72.15	48.1				
44	Melrose Landing	6	%		5		--						--	12			1	40		2	5		a 5 o - k 30	Small creek marsh	XI
			acres		.3										.72			.06	2.4		.12	.3			
45	Melrose Landing	1.0	%	--	--		--					--	10	22			3	5	--	--			k 60 o -	Pocket marsh	XI
			acres											.10	.22			.30	.5						

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Section II. Mattaponi River - Lower Reach

#	MARSH LOCATION	TOTAL ACRES		SALTMARSH CORDGRASS	BIG CORDGRASS	SALTBUSHES	MARSH HIBISCUS	SWEET FLAG	SALTMEADOW HAY SALTGRASS	SALTMARSH BULRUSH	GIANT BULRUSH	THREESQUARE	CATTAILS	PICKERELWEED-ARROW ARUM	YELLOW POND LILY	MARSH MALLOW	WATER HEMP	WILD RICE	SMARTWEEDS	TEARTHUMB	RICE CUTGRASS	REED GRASS	OTHER	OBSERVATIONS	MARSH TYPE	
46	Grass Creek	46	%	--	--					--	--	--		24			4	10	--	4	3		f- o 5 k 50	Creek marsh	XI	
			acres													11.0			1.84	4.6		1.84	1.38			
47	Mattaponi River	2.0	%	--			--			1		5	--	61	--		--	30						a 1 h 1 d 1	Fringe marsh	VII
			acres							.02			.1			1.22			.6							
48	Mitchell Hill Creek	33	%	--			--				--	--		15			4	32	4	1	5			j- o 1 h- k 38	Creek marsh	XI
			acres													4.95			1.32	10.56	1.32	.33	1.65			
49	Court-house Creek	40	%		--		--				--	--	--	30	2			3	2	1	5			k 35 q 2 o 19	Creek marsh	XI
			acres													12.0	.8		1.2	.8	.4	2.0				
50	Mattaponi River	3.0	%				--	3			--			2	20	1		2	5	--	--	--		d 2 o 1 k 64	Small creek marsh	XI
			acres						.09							.06	.6	.03	.06	.15						
51	Mattaponi River	18	%		--		--				1		1	30	5		1	10	--	--				d 1 o 1 k 50	Two cove marshes	XI
			acres									.18		.18	5.4	.9		.18	1.8							
52	Mattaponi River	7.0	%										--		10		5	65		3	2			a- k 15 d- o-	Embayed marsh	XI
			acres													.70		.35	4.55		2.1	.14				
53	Mattaponi River	6.0	%		5		1							20	5		10		6	5	2			d 20 q- o 1 k 25	Diverse fringe marsh	XI
			acres			.3		.06								1.2	.3		.06		.36	.3	.12			

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Section II. Mattaponi River - Lower Reach

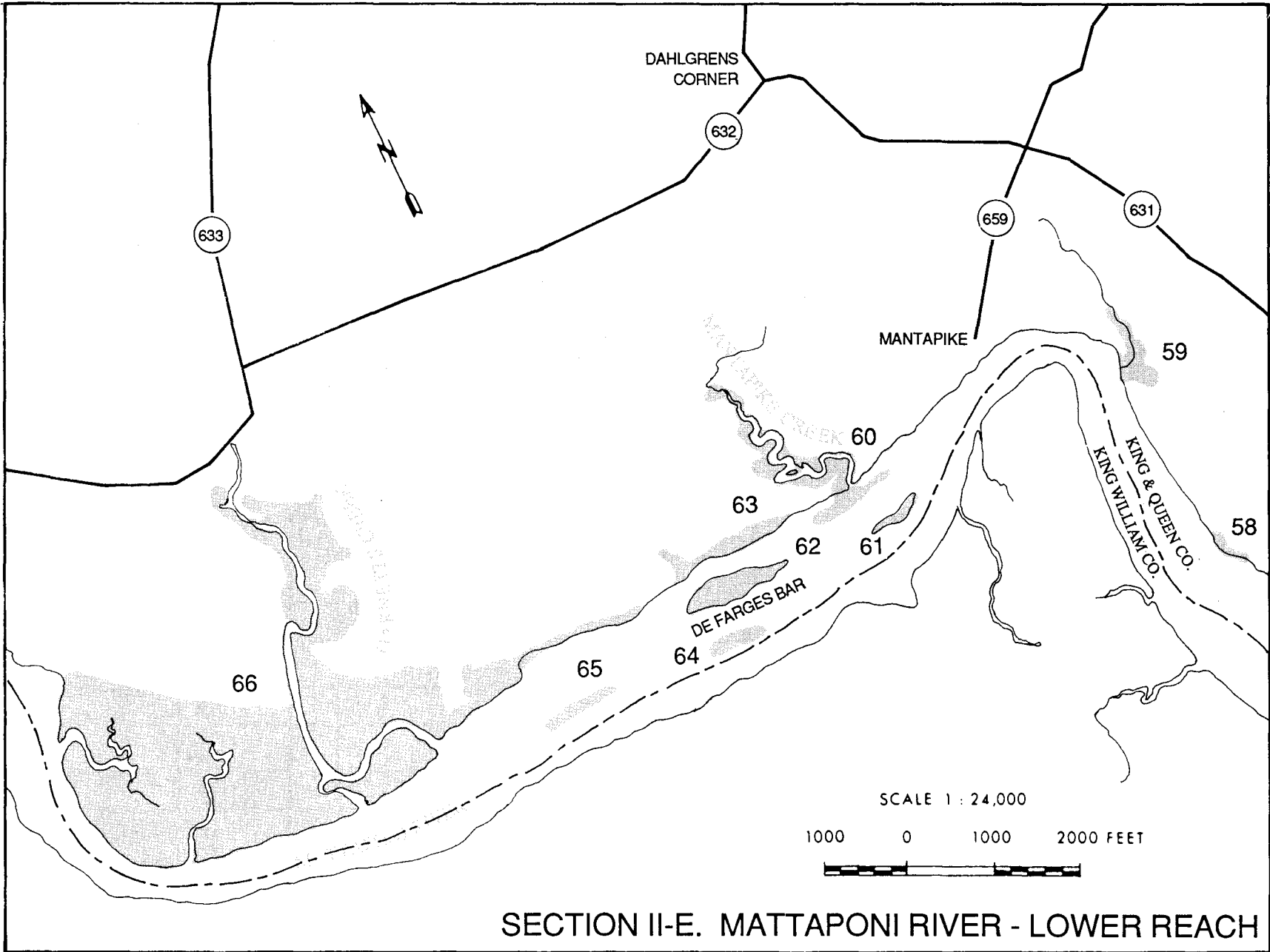
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54	Mattaponi River	9.0	%				-					2		20	15		3	4	3	3	-		d 20 k 30	3 small embayed marshes	XI
			acres										.18		1.8	1.35		.27	.36	.27	.27				
55	Mattaponi River	29	%				-							17	5		5	22	4	4	3		a 1 b - k 30 d 4 o 5	Creek marsh	XI
			acres												4.93	1.45		1.45	6.38	1.16	1.16	.87			
56	Mattaponi River	11	%				-				-			3	5			85					d - k 7	Marsh island	XI
			acres												.33	.55			9.35						
57	Mattaponi River	4.0	%				1							8	2		--	75	--	--	1		a - k 13 o -	Small creek marsh	XI
			acres				.04								.32	.08			3.0			.04			
58	Mattaponi River	2.0	%		--		--	75						7	10			2	--	2	2		a - h - d 2 o -	Fringe marsh	XI
			acres					1.5							.14	.20			.04		.04	.04			
59	Near Mantapike Creek	5.0	%				3							5	4		--	75	--			--	a - k 13	Small marsh creek	XI
			acres				.15								.25	.20			3.75						
60	Mantapike Creek	30	%				--						1	20	3		3	15	1	1	5		a 1 d - k 46 p - f - q 1	Creek marsh	XI
			acres											.30	6.0	.90		.90	4.5	.30	.30	1.5			
61	Near Mantapike Creek	4.0	%											4	25			65					k 6	Marsh island	XI
			acres												.16	1.0			2.6						

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q=ASIAN DAY FLOWER



SECTION II-E. MATTAPONI RIVER - LOWER REACH

Section II. Mattaponi River - Lower Reach

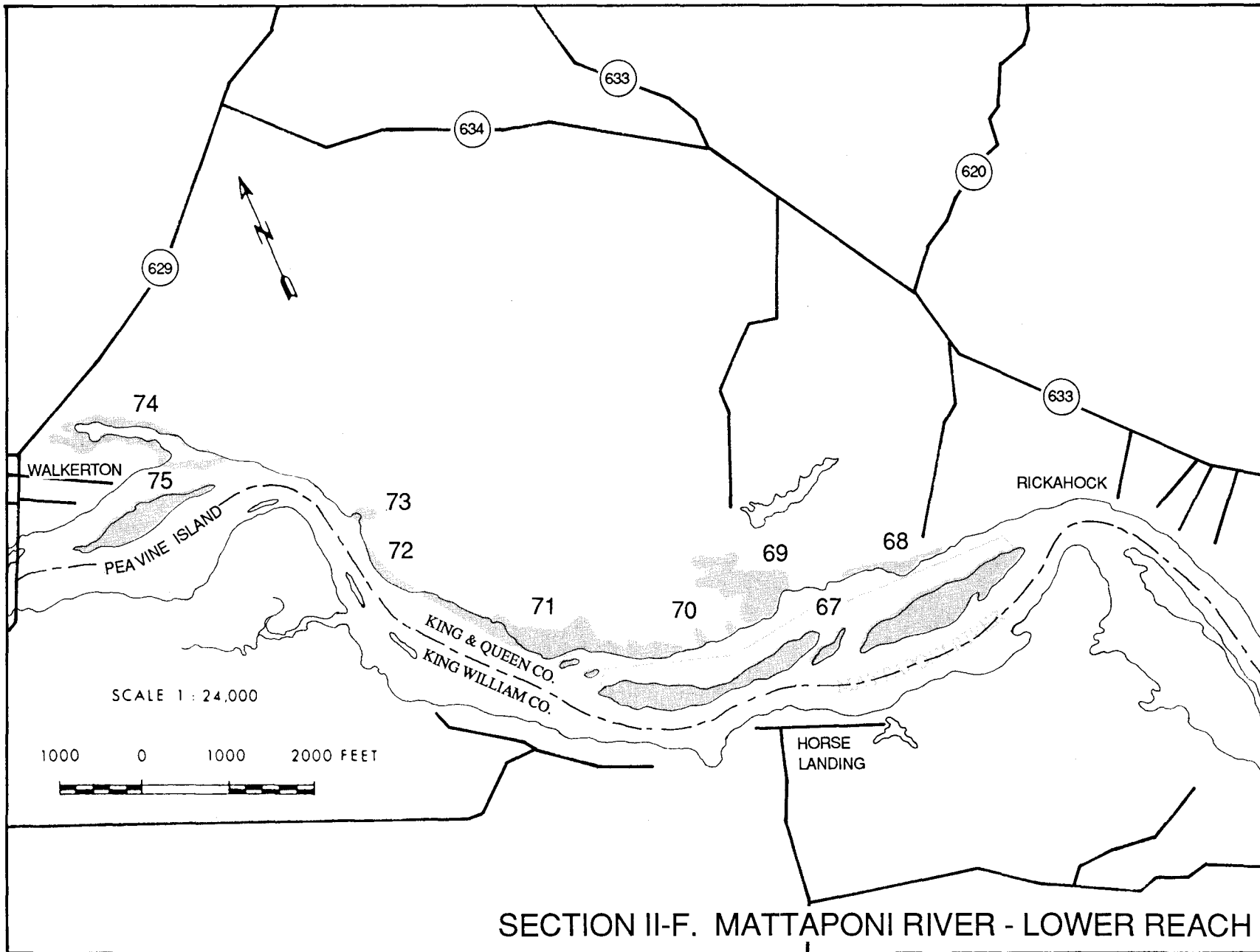
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62	DeFarges Bar	13	%											5	15			65	-				k 15	Marsh island	XI
			acres													.65	1.95			8.45					
63	DeFarges Bar	13	%				--			6	--	--		25	15		--	20	1	1	1		a 2 o 2 k 27	Fringe marsh	XI
			acres							.78					3.25	1.95			2.6	.13	.13	.13			
64	Mattaponi River	9	%												100									Low marsh island	IX
			acres													9.0									
65	Mattaponi River	5	%												100									Low marsh island	IX
			acres													5.0									
66	Garnetts Creek Marsh	176	%				--							15	7		--	38	1	2	2		a 1 d - b - o - k 34	Extensive marsh	XI
			acres												26.4	12.32			66.88	1.76	3.52	3.52			
67	Mattaponi River	53	%											8	14		--	39		--			k 39 o -	Three marsh islands	XI
			acres					--							4.24	7.42			20.67						
68	Mattaponi River	2	%						2		24			29	4		--	20	--	10			a - h - d 1 f 5 k 5	Fringe marsh	XI
			acres							.04		.48			.58	.08			.40		.20				
69	Mattaponi River	18	%				--							23	10		--	12	--	7	1		a - k 40 o 5 q 2	Large pocket marsh	XI
			acres												4.14	1.8			2.16		1.26	.18			

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SECTION II-F. MATTAPONI RIVER - LOWER REACH

Section II. Mattaponi River - Lower Reach

#	MARSH LOCATION	TOTAL ACRES		SALTMARSH CORDGRASS	BIG CORDGRASS	SALTBUSHES	MARSH HIBISCUS	SWEET FLAG	SALTMEADOW HAY SALTGRASS	SALTMARSH BULRUSH	GIANT BULRUSH	THREESQUARE	CATTAILS	PICKERELWEED-ARROW ARUM	YELLOW POND LILY	MARSH MALLOW	WATER HEMP	WILD RICE	SMARTWEEDS	TEARTHUMB	RICE CUTGRASS	REED GRASS	OTHER	OBSERVATIONS	MARSH TYPE	
70	Mattaponi River	0.6	%											30	10			-			20			b - k - o 10 q 30	Small pocket marsh	XI
			acres													.18	.06					.12				
71	Mattaponi River	15	%				-			4				10	1		1	35						a 1 o 3 d - k 45	Extensive fringe marsh	XI
			acres								.6					1.5	.15		.15	5.25						
72	Mattaponi River	3	%												100										Fringe marsh	IX
			acres													3										
73	Mattaponi River	2	%											5	40			5	-	7				a - k - q 3 h - o 40	Small pocket marsh	XI
			acres												.10	.80			.10		.14					
74	Walkerton	11	%											30	15		-	35	3	5	1			a - k 10 o 1	Creek marsh	XI
			acres												3.0	1.65			3.85	.33	.55	.11				
75	Peavine Island	17	%							1	-	-		20	20		-	24	1	12		2		a 10k - h - o 10	Marsh island	XI
			acres								.17				3.4	3.4			4.08	.17	2.04		.34			
	Total Section II	2,227.6	%																							
			acres	135.36	999	1.46	42.92	1.59	12.33	1.81	.19	25.11	14.52	222.66	58.04	.02	25.9	195.3	88.55	82.29	20.39	2.59	298.1			

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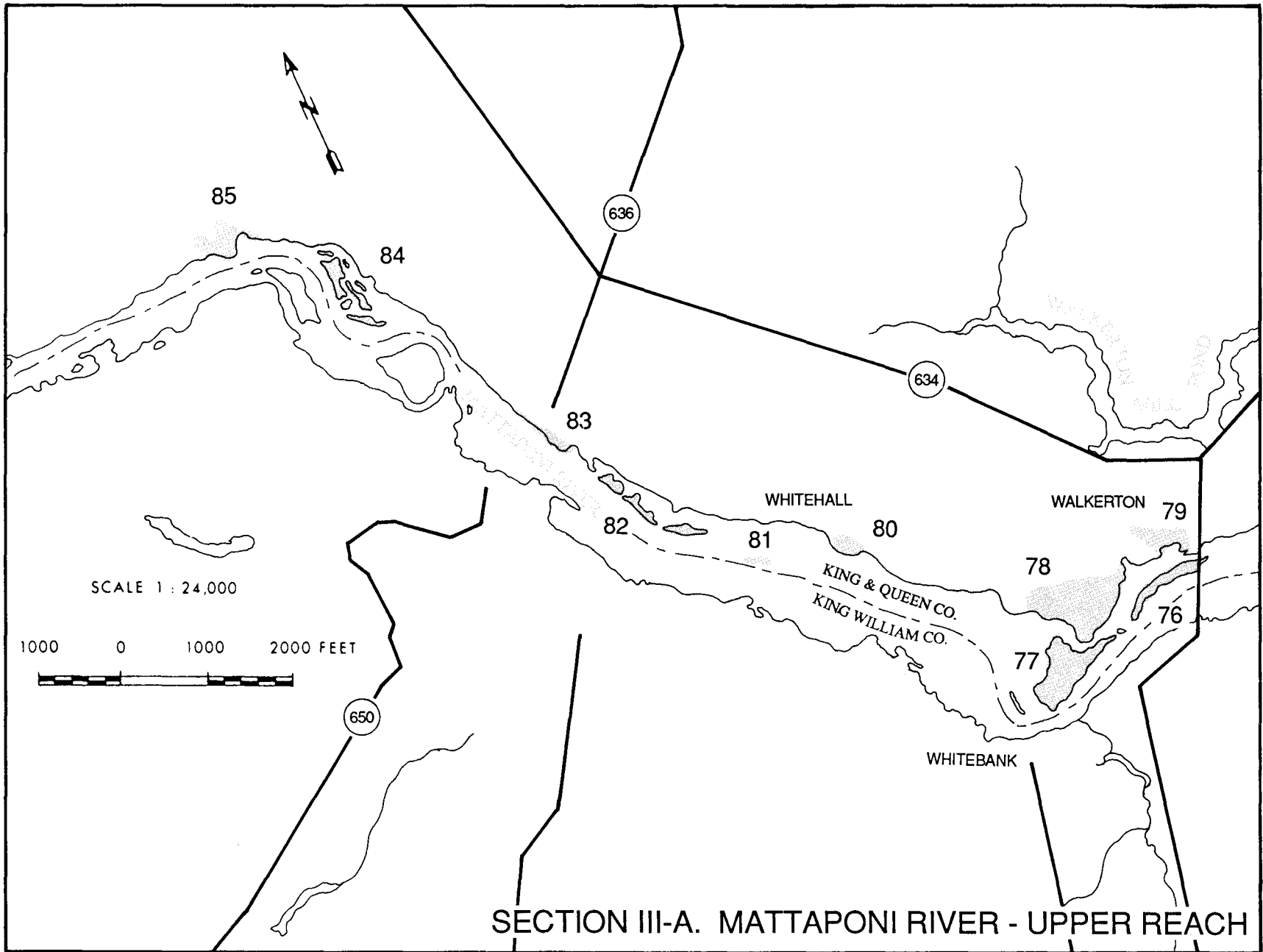
SECTION III

MATTAPONI RIVER - UPPER REACH

Documented in this section are the tidal marshes of the Mattaponi River from Walkerton to the Village of Aylett (near the terminus of tidal action), a distance of approximately eight river miles. This area contains 22 marshes ranging in size from .4 to 22 acres and totalling 125.8 acres. Most of the marshes can be characterized as small marshes of various forms: embayed, fringe, point, or marsh islands. All twenty-two marshes are Type XI, Freshwater Mixed Communities, indicating a rich, diverse flora. A number of the marshes are associated with tidal swamps or bottomland hardwood forests, dominated by black gum and red maple.

During field checks made in October of 1987, it was observed that in marshes 92 - 95, Asian dayflower (*Aneilma keisak*) nearly dominated the marsh surface. This introduced species characteristically grows in dense, prostrate mats, and is particularly aggressive, often out-competing more desirable native species. The tables reflect the species composition of these marshes as recorded in 1978 (for historic record), when the original field work was done.

Tidal influence extends approximately three miles above Aylett, but no tidal marshes were found beyond this point.



SECTION III-A. MATTAPONI RIVER - UPPER REACH

Section III. Mattaponi River - Upper Reach

#	MARSH LOCATION	TOTAL ACRES		SALTMARSH CORDGRASS	BIG CORDGRASS	SALTBUSHES	MARSH HIBISCUS	SWEET FLAG	SALTMEADOW HAY SALTGRASS	SALTMARSH BULRUSH	GIANT BULRUSH	THREESQUARE	CATTAILS	PICKERELWEED-ARROWARUM	YELLOW POND LILY	MARSH MALLOW	WATER HEMP	WILD RICE	SMARTWEEDS	TEARTHUMB	RICE CUTGRASS	REED GRASS	OTHER	OBSERVATIONS	MARSH TYPE
76	Walkerton	5	%				--							5	10		--	65	5	5			a - o 5 k 5	Marsh island	XI
			acres													.25	.5			3.25	.25	.25			
77	White Bank	12	%				--							15	--		5	25	5	--			a 5 o 5 k 40	Marsh island	XI
			acres													1.8		.6	3.0	.6					
78	Walkerton area	17	%				--						--	15	10		5		5	5			a - o 10 k 50	Point marsh	XI
			acres													2.55	1.7		.85		.85	.85			
79	Walkerton	4	%				5	10					5	30	15		5		5	10			k 5 o 10	Embayed marsh	XI
			acres				.20	.40					.20	1.2	.6		.20		.20	.40					
80	Whitehall	3	%				--	25						10	5		--	5	5	45			b - o 5 k -	Point marsh	XI
			acres				.75								.3	.15			.15	.15	1.35				
81	Whitehall	0.4	%											5	5			90						Marsh island dominated by wild rice	XI
			acres													.02	.02			.36					
82	Whitehall	4.0	%											2	5		--	73		1	2		k 15 o 2	Two narrow islands	XI
			acres													.08	.20			2.92	.04	.08			
83	Mattaponi River	3.0	%												10			85		1			k 2 o 2	Fringe marsh	XI
			acres													.30			2.55		.03				

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Section III. Mattaponi River - Upper Reach

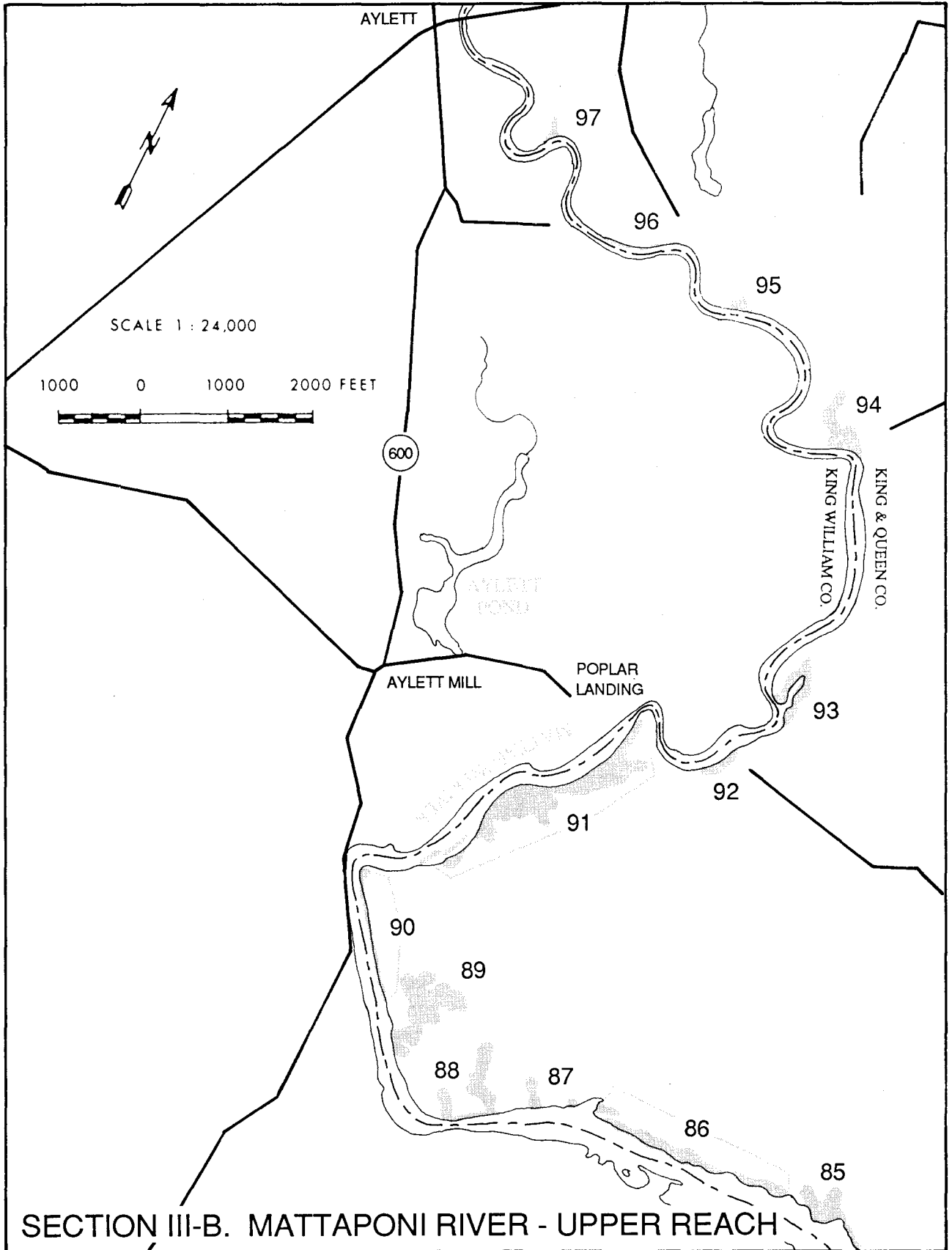
#	MARSH LOCATION	TOTAL ACRES		SALTMARSH CORDGRASS	BIG CORDGRASS	SALTBUSHES	MARSH HIBISCUS	SWEET FLAG	SALTMEADOW HAY SALTGRASS	SALTMARSH BULRUSH	GIANT BULRUSH	THREESQUARE	CATTAILS	PICKERELWEED-ARROW ARUM	YELLOW POND LILY	MARSH MALLOW	WATER HEMP	WILD RICE	SMARTWEEDS	TEARTHUMB	RICE CUTGRASS	REED GRASS	OTHER	OBSERVATIONS	MARSH TYPE	
84	Mattaponi River	9.0	%											20	10			10	10	10			k 20 o 20	Marsh island	XI	
			acres													1.8	.9			.9	.9	.9				
85	Mattaponi River	4.0	%						5					30	5		5	--	5	10				k 10 o 30	Embayed marsh	XI
			acres							.20						1.2	.20		.20		.20	.40				
86	Mattaponi River	10	%						10				--	20	10		10	15	10	5				a - o 10 k 10	Fringe marsh	XI
			acres							1.0						2.0	1.0		1.0	1.5	1.0	.5				
87	Mattaponi River	1.0	%										10	10			10	10	10					b - o 10 k 40	Small, embayed marsh	XI
			acres											.10	.10			.10	.10	.10						
88	Mattaponi River	6.0	%					--						5			--	5	5	5				a - o 20 k 60 m -	Embayed and fringe marsh	XI
			acres													.30				.30	.30	.30				
89	Mattaponi River	10	%					--					--	20	10		--	20	10	--				a - o 10 k 30	Embayed marsh	XI
			acres													2.0	1.0			2.0	1.0					
90	Mattaponi River	2.0	%					--					--	30			--	10	5	5				k 30 o 20	Narrow, fringe marsh	XI
			acres													.60				.20	.10	.10				
91	Poplar Landing	22	%					--					5	10	5		--	--	10	20				k 30 o 20	Fringe and embayed marsh	XI
			acres											1.1	2.2	1.1					2.2	4.4				

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SECTION III-B. MATTAPONI RIVER - UPPER REACH

Section III. Mattaponi River - Upper Reach

#	MARSH LOCATION	TOTAL ACRES		SALT MARSH CORDGRASS	BIG CORDGRASS	SALTBUSHES	MARSH HIBISCUS	SWEET FLAG	SALT MEADOW HAY SALTGRASS	SALT MARSH BULRUSH	GIANT BULRUSH	THREESQUARE	CATTAILS	PICKERELWEED-ARROW ARUM	YELLOW POND LILY	MARSH MALLOW	WATER HEMP	WILD RICE	SMARTWEEDS	TEAR THUMB	RICE CUTGRASS	REED GRASS	OTHER	OBSERVATIONS	MARSH TYPE
92	Poplar Landing	2.0	%										10	10				20	10	20			k 10 o 20	Fringe marsh	XI
			acres											.2	.2				.4	.2	.4				
93	Mattaponi River	4.0	%					-						30	10			10	20	20			k 10 o -	Small creek marsh	XI
			acres												1.2	.4			.4	.8	.8				
94	Mattaponi River	4.0	%				-							10	-			30	20	10			h 10 o 10 k - q 10	Small creek marsh	XI
			acres												.4				1.2	.8	.4				
95	Mattaponi River	2.0	%									2		10	5		3	5	10	25			h 10 o 10 k 10 q 10	Small cove marsh	XI
			acres									.04		.20	.10		.06	.10	.20	.50			h .20 o .20 k .20 q .20		
96	Mattaponi River	1.0	%				-							5	5			70	15	5			o 5	Narrow fringe marsh	XI
			acres												.05	.05			.7	.15	.05				
97	Aylett	0.4	%											5	10				5				o 20 q 60	Small cove marsh	XI
			acres												.02	.04				.02					
Total Section III		125.8	%																						
			acres					.20	1.15		1.2		.04	1.6	18.47	8.26		3.01	20.03	10.02	11.67	.08		50.12	
Grand Total		4,177.8	%	1,125.75	1,341.38	9.01	43.12	2.74	247.06	68.77	.19	39.14	20.02	254.76	66.51	.02	34.71	255.24	103.33	94.29	22.21	2.59	447.33		
			acres																						

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