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King William County and Town of West Point Tidal Marsh Inventory

Gene M. Silberhorn
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KING WILLIAM COUNTY
and
TOWN OF WEST POINT
TIDAL MARSH INVENTORY

Special Report No. 289 in Applied Marine Science and Ocean Engineering

Gene M. Silberhorn and Andrew W. Zacherle

Gene M. Silberhorn, Project Leader

VIRGINIA INSTITUTE OF MARINE SCIENCE
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College of William and Mary
Gloucester Point, Virginia 23062

Dr. Frank O. Perkins, Dean/Director

SEPTEMBER 1987
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
- Northumberland County
- Mathews County
- York County and the Town of Poquoson
- Stafford County
- Prince William County
- King George County
- City of Hampton
- Fairfax County
- Gloucester County
- City of Virginia Beach
- Vol. 1 and 2
- City of Newport News
- and Fort Eustis
- Accomack County
- Northampton County
- Westmoreland County
- James City County
- and the City of Williamsburg
- Surry County
- Spotsylvania and Caroline Counties
- and the City of Fredericksburg
- New Kent County
- Essex County
- Isle of Wight County
- Middlesex County
- City of Norfolk

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 Arthur Harris and Thomas Luckam, Jr., for their invaluable field assistance and help in data reduction. We also thank Walter I. Priest, III, 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

King William County forms a peninsula between the Pamunkey and Mattaponi rivers with the Town of West Point at its terminus where the two rivers join to become the York River. All of the tidal marshes within the county and West Point are found along these nearly pristine, largely undeveloped rivers. Very few tributaries of any consequence branch off either one of the two rivers. The Mattaponi and the Pamunkey are tidal to just a few miles beyond U.S. Highway #360. Tidal marshes and swamps are found along the Mattaponi River from its mouth to the Village of Aylett (route #360 bridge) or approximately 31 river miles northwest from West Point. On the Pamunkey, tidal wetlands occur from West Point to mile 45 (Piping Tree Ferry), a few miles downstream from route #360.

The wetlands in these two watersheds are quite typical of those found along tidal rivers where salinity ranges from brackish (oligohaline) to fresh. Oligohaline marshes (5.0 to 0.5 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 both rivers. As salinity decreases, diversity of 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 8). 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 in May or June are often in competition with rice cutgrass (*Leersia oryroides*) and beggars ticks (*Bidens* spp.) in September. These marshes are highly valuable to the estuarine environment. They are known to provide a wide variety of wildlife and waterfowl with cover and food. These wetlands are also associated with the spawning and nursery areas for anadromous fish species such as herring, shad, striped bass and white perch.

King William County contains a total of 5,905.35 acres of tidal marshes with 2,623.7 acres on the Mattaponi and 3,281.65 acres on the Pamunkey River. The largest single marsh in King William County is Lee Marsh (#59) on the lower Pamunkey, totalling 1,450 acres. Lee Marsh is a typical oligohaline marsh, dominated (75%/1,087.5 acres) by big cordgrass (*Spartina cynosuroides*). The marsh is largely above mean high water. The lower intertidal zone is mainly vegetated with saltmarsh cordgrass with 15%/217.5 acres. Arrow arum (*Peltandra virginica*) is a species typically found in the freshwater intertidal zone and appears in this marsh in interior, small, tidal creeks.
The largest marsh (Glass Island Marsh #10) on the Mattaponi River is also an oligohaline marsh (642 acres) dominated by (60%/385.2 acres) by big cordgrass. Saltmarsh cordgrass dominates the intertidal zone (128.4 acres) with arrow arum appearing only as a trace. This marsh is adjacent to West Point and has been subjected to solid waste fill and other impacts.

Other large marshes that are considered freshwater because of salinity and plant species composition are Sweet Hall Marsh (#63) with 991 acres on the Pamunkey River and Gleason Marsh (#18, 574 acres) on the Mattaponi.

Many freshwater marshes in this system are often associated with tidal swamps which are dominated mainly by such trees as black gum (*Nyssa sylvatica*), ash (*Fraxinus pennsylvanica*), and red maple (*Acer rubrum*). It is difficult to estimate the acreage of the tidal swamps because they often gradually grade into bottomland hardwood forests which are non-tidal.

In final analysis, the marsh/swamp ecosystem of these two Rivers is extremely valuable to estuarine ecological integrity and should be protected from developmental pressures and impoundments.
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 of 1977. Subsequent field work and aerial photograph interpretation was done in 1986-87. 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*
Arrow Head*
Beggar Ticks*
Big Cordgrass*
Buttonbush*
Cattail*

Common Threesquare*
Giant Bulrush*
Jewelweed
Marsh Fern
Marsh Hibiscus*
Marsh Mallow
Orach
Pickerelweed*
Reedgrass*
Rice Cutgrass*
Saltbush
  Groundsel Tree*
  Marsh Elder*
Saltgrass*
Saltmarsh Aster
Saltmarsh Bulrush*
Saltmarsh Cordgrass*
Saltmarsh Fleabane*
Saltmeadow Hay*
Softrush
Swamp Loosestrife
Swamp Milkweed
Swamp Rose
Sweet Flag*
Tearthumb*

Peltandra virginica (L.) Kunth
Sagittaria latifolia Willd.
Bidens spp.
Spartina cynosuroides (L.) Roth
Cephalanthus occidentalis L.
Typha latifolia L.
Typha angustifolia L.
Scirpus americanus Pers.
Scirpus validus Vahl
Impatiens capensis Meerb.
Thelypteris palustris Schott
Hibiscus moscheutos L.
Kosteletzkya virginica Presl
Atriplex patula L.
Pontederia cordata L.
Phragmites australis (Cav.) Trin. ex Steud.
Leersia oryzoides (L.) Sw.

Baccharis halimifolia L.
Iva frutescens L.
Distichlis spicata (L.) Greene
Aster tenuifolius L.
Scirpus robustus Pursh
Spartina alterniflora Loisel.
Pluchea purpurascens (Sw.) DC.
Spartina patens (Ait.) Muhl.
Juncus effusus L.
Decodon verticillatus (L.) Ell.
Asclepias incarnata L.
Rosa palustris Marsh.
Acorus calamus L.
Polygonum arifolium L.
P. sagittatum L.
<table>
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<tr>
<th>Turks Cap Lily</th>
<th><em>Lilium superbum</em> L.</th>
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</thead>
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<tr>
<td>Walters Millet</td>
<td><em>Echinochloa walteri</em> (Pursh) Nash</td>
</tr>
<tr>
<td>Water Dock*</td>
<td><em>Rumex verticillatus</em> L.</td>
</tr>
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<td>Water Hemp*</td>
<td><em>Amaranthus cannabinus</em> (L.) J.D. Sauer</td>
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<td>Water Smartweed*</td>
<td><em>Polygonum punctatum</em> E11.</td>
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<td>Water Willow</td>
<td><em>Justicia ovata</em> (Walt.) Lindau</td>
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<td>Wild Rice*</td>
<td><em>Zizania aquatica</em> L.</td>
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<tr>
<td>Yellow Pond Lily*</td>
<td><em>Nuphar luteum</em> Sibth. &amp; Sm.</td>
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*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
MATTAPONI RIVER - LOWER REACH
WEST POINT TO THE MATTAPONI INDIAN RESERVATION

Section I contains those tidal marshes in King William County, along the Mattaponi River and its tributaries from West Point to the Mattaponi Indian Reservation, located approximately 15 river miles from the mouth. This segment of the Mattaponi River contains 2,063 acres of oligohaline and tidal freshwater marshes, representing 78% of the tidal marshes in the entire River system.

Marsh no. 10, Glass Island Marsh, near West Point, is the largest marsh in the system with 642 acres. The marsh is dominated by big cordgrass (*Spartina cynosuroides*) and is typical of low saline (oligohaline) marshes in this region. The next largest marsh is Gleason Marsh (574 acres, no. 18), lying approximately 12 miles upstream from Glass Island Marsh. This marsh is characterized as a freshwater marsh because of its diversity of vegetation and the essentially freshwater conditions that exist there. Gleason Marsh is actually a marsh/tidal swamp complex, with trees such as red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*) and ash (*Fraxinus americanus*) dominating the swamp areas. Tidal swamps are more prevalent than marshes from this point in the River to the head of tide (fall line) above the Village of Aylett.

This marsh/swamp system, with the accompanying wetlands on the opposite side of the River in King and Queen County, are very valuable to the ecological integrity of the York River estuarine system.
### Section I. Mattaponi River - West Point to the Mattaponi Indian Reservation

<table>
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<th>#</th>
<th>Marsh Location</th>
<th>Total Acres</th>
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<th>Cordgrass</th>
<th>Big Cordgr</th>
<th>Saltbushes</th>
<th>Hibernia</th>
<th>Sweet Flag</th>
<th>Saltmeadow Hay</th>
<th>Saltmarsh Blur</th>
<th>Bulrush</th>
<th>Three Squares</th>
<th>Cattails</th>
<th>Pioneerweed</th>
<th>Arrow Arum</th>
<th>Yellow Pond Lily</th>
<th>Marshmallow</th>
<th>Water Hemp</th>
<th>Wild Rice</th>
<th>Smartweeds</th>
<th>Teatnub</th>
<th>Rice Cutgrass</th>
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<th>Other</th>
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<td>Embayd/fringe marsh</td>
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<td>acres</td>
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<td>2.0</td>
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d=ARROWHEAD  
e=SWITCH GRASS  
f=WATER DOCK  
g=SWAMP LOOSESTRIFE  
h=SOFT RUSH  
i=ORACH  
j=SWAMP ROSE  
k=BEGGAR TICKS  
l=FERNS  
m=BUTTON BUSH  
n=SALTMARSH ASTER  
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- c=WATERWILLOW
- d=ARROWHEAD
- e=SWITCH GRASS
- f=WATER DOCK
- g=SWAMP LOOSESTRIFE
- h=SOFT RUSH
- i=ORACH
- j=SWAMP ROSE
- k=BECKGAR TICKS
- l=FERNS
- m=BUTTON BUSH
- n=SALT MARSH ASTER
- o=JEWELWEED
- p=BULTONGE
SECTION I-B. MATTAPONI RIVER
LOWER REACH
## Section I. Mattaponi River - West Point to the Mattaponi Indian Reservation

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<td>26.59%</td>
<td>42.32%</td>
<td>29.67%</td>
<td>13.18%</td>
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<td>143.45%</td>
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a=WALTER'S MILLET  
b=SWAMP MILKWEED  
c=WATER WILLOW  
d=ARROWHEAD  
e=SWAMP LOOSESTRIFE  
f=WATER DOCK  
g=SWAMP ROSE  
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i=SWAMP ROSE  
j=SWAMP ROSE  
k=SWAMP ROSE  
l=SWAMP ROSE  
m=SWAMP ROSE  
n=SWAMP ROSE  
o=SWAMP ROSE  
p=SWAMP ROSE  
q=SWAMP ROSE  
r=SWAMP ROSE  
s=SWAMP ROSE  
t=SWAMP ROSE  
u=SWAMP ROSE  

| 24 |
This segment of the Mattaponi River contains 560 acres of tidal marshes situated from approximately river mile 15 to mile 31, the termination of tidal action or the fall line. The marsh systems in this Reach are smaller in area than in the Lower Reach. In this area, tidal marshes characteristically occur as units within larger tidal swamps. As in the Lower Reach, the swamps are dominated by black gum, ash and red maple.

Several marsh islands, dominated by yellow pond lily (*Nuphar luteum*) were found in this segment of the River that were not indicated on topographic maps or aerial photographs taken in the late 1960's and early 1970's. It appears that *N. luteum* has invaded mud flats that were previously unvegetated. It is also interesting to note that several areas listed as mud flats on topographic maps are now rather large, fringe marshes, vegetated with *N. luteum, Peltandra virginica, Pontederia cordata* and *Acorus calamus*. Shifting channels and sediment dynamics are the main processes in altering mud flat configuration and subsequent succession of marsh vegetation.
SECTION II-A. MATTAPONI RIVER - UPPER REACH

SCALE 1 : 24,000

1000 0 1000 2000 FEET

KING & QUEEN CO
KING WILLIAM CO

SANDY POINT

BROOKES CREEK

23

SHANTY CREEK

23

22

MATTAPONI INDIAN RESERVATION

26
## Section II. Mattaponi River - Mattaponi Indian Reservation to Aylett

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<th>#</th>
<th>Marsh Location</th>
<th>Total Acres</th>
<th>Saltmarsh Cordgrass</th>
<th>Big Cordgrass</th>
<th>Saltmarsh Saltmeadow Hay</th>
<th>Saltmarsh Bur Rush</th>
<th>Giant Bulrush</th>
<th>Three Square</th>
<th>Cattails</th>
<th>Pickelweed Arrow-Arum</th>
<th>Yellow Pond Lily</th>
<th>Marshmallow</th>
<th>Water Hemp</th>
<th>Wild Rice</th>
<th>Smartweeds</th>
<th>Tearthumb</th>
<th>Rice Cutgrass</th>
<th>Reed Grass</th>
<th>Other</th>
<th>Observations</th>
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<td>Narrow, marsh island, submerged mud flat</td>
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<td>Narrow, marsh island, intertidal</td>
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- a=WALTER'S MILLET
- b=SWAMP MILKWEED
- c=WATER WILLOW
- d=ARROWHEAD
- e=SWITCH GRASS
- f=WATER DOCK
- g=SWAMP LOOSESTRIFE
- h=SOFT RUSH
- i=ORACH
- j=SWAMP ROSE
- k=BEGGAR TICKS
- l=FERNS
- m=BUTTON BUSH
- n=SALTMARSH ASTER
- o=JEWELWEED
- p=BULTONGE
### Section II. Mattaponi River - Mattaponi Indian Reservation to Aylett

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<th>MARSH LOCATION</th>
<th>TOTAL ACRES</th>
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<th>CORDGRASS</th>
<th>BIG CORDBRUSH</th>
<th>SALTBRUSHES</th>
<th>HIBISCUS</th>
<th>SWEET FLAG</th>
<th>SALTMEADOW</th>
<th>HAY SALTGRASS</th>
<th>BURRUSH</th>
<th>GIANT BULRUSH</th>
<th>THREE SQUARE</th>
<th>CATTAILS</th>
<th>PICKERELWEED</th>
<th>ARROW ARUM</th>
<th>YELLOW POND LILY</th>
<th>MARSH MALLOW</th>
<th>WATER HEMP</th>
<th>WILD RICE</th>
<th>SMARTWEEDS</th>
<th>TEARTHLUMP</th>
<th>RICE CUTGRASS</th>
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<td>Mud flat vegetated with yellow pond lily, several patches</td>
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<td>Fringing mud flat dominated by yellow pond lily</td>
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</table>

a=WALTER'S MILLET  
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<th>#</th>
<th>MARSH LOCATION</th>
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<th>BIG CORDGRASS</th>
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<th>GIANT BULRUSH</th>
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- a = WALTER'S MILLET
- b = SWAMP MILKWEED
- c = WATER MILKWEED
- d = ARROWHEAD
- e = SWITCH GRASS
- f = WATER DOCK
- g = SWAMP LOOSESTRIPE
- h = SOFT RUSH
- i = ORACH
- j = SWAMP ROSE
- k = BEGGAR TICKS
- l = FERNS
- m = BUTTON BUSH
- n = SALTMARSH ASTER
- o = JEWELWEED
- p = BULTONGE
- q = TURK'S CAP LILY
SECTION II-E. MATTAPONI RIVER
UPPER REACH
## Section II. Mattaponi River - Mattaponi Indian Reservation to Aylett

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- a=WALTER'S MILLET
- b=SWAMP MILKWEED
- c=WATER WILLOW
- d=ARROWHEAD
- e=SWITCH GRASS
- f=WATER DOCK
- g=SWAMP LOOSESTRIFE
- h=SOFT RUSH
- i=ORACH
- j=SWAMP ROSE
- k=BEGIN TACK TICS
- l=FERNS
- m=BUTTON BUSH
- n=SALTMARSH ASTER
- o=JEWELWEED
- p=BULTONGE
### Section II. Mattaponi River - Mattaponi Indian Reservation to Aylett

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<th>Saltmarsh Burrush</th>
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<th>Threesquare</th>
<th>Cattails</th>
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<th>Yellow Pond Lily</th>
<th>Marsh Mallow</th>
<th>Water Hemp</th>
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- a=WALTER’S MILLET
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- j=SWAMP ROSE
- k=BEGGAR TICS
- l=FERNs
- m=BUTTON BUSH
- n=SALTMARSH ASTER
- o=JEWELWEED
- p=BULTONGE
SECTION III
PAMUNKEY RIVER - LOWER REACH
WEST POINT TO THE PAMUNKEY INDIAN RESERVATION

This section contains the tidal marshes in the Town of West Point and King William County along the Pamunkey River and its tributaries from its mouth to the Pamunkey Indian Reservation, a distance of approximately 27 river miles. This segment of the River has 2,571 acres of oligohaline and tidal freshwater marshes or nearly 79% of the tidal marshes in the entire Pamunkey River.

Lee Marsh (no. 59) is the largest marsh in the Pamunkey River and the largest in King William County with 1,450 acres. The marsh is dominated by big cordgrass (75%/1,087.5 acres) and is likely the largest marsh of this type (Type V, Big Cordgrass Community) in the Commonwealth.

The largest tidal freshwater marsh in the Pamunkey River occurs in this section, at river mile 12. Sweet Hall Marsh (no. 63) with 991 acres supports a high diversity of vegetation and is classified as a Type XI Freshwater Mixed Community with no single marsh plant specie dominating. Marshes of this type are very important to the estuarine environment, especially as a fish spawning/nursery habitat. Wetland scientists from the Virginia Institute of Marine Science are conducting a series of ecological research projects in this marsh. Results from these studies should yield in-depth information as to the ecological functions of this valuable wetland system and others similar to it.
### Section III. Pamunkey River - West Point to the Pamunkey Indian Reservation

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<th>SALTBUSHES</th>
<th>MARSH HIBISCUS</th>
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<th>HAY SALT GRASS</th>
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- a=WALTER'S MILLET
- b=SWAMP MILKWEED
- c=WATER WILLOW
- d=ARROWHEAD
- e=SWITCH GRASS
- f=WATER DOCK
- g=SWAMP LOOSESTRIFE
- h=SOFT RUSH
- i=ORACH
- j=SWAMP ROSE
- k=BEGGAR TICKS
- l=FERNS
- m=BUTTON BUSH
- n=SALT MARSH ASTER
- o=JEWELWEED
- p=BULTONGE
### Section III. Pamunkey River - West Point to the Pamunkey Indian Reservation

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c=WATER WILLOW  
d=ARROWHEAD  
e=SWITCH GRASS  
f=WATER DOCK  
g=SWAMP LOOSESTRIFE  
h=SOFT RUSH  
i=ORACH  
j=SWAMP ROSE  
k=BEGGAR TICKS  
l=FERNS  
m=BUTTON BUSH  
n=SALT MARSH ASTER  
o=JEWELWEED  
p=BULTONGE
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- a=WALTER'S MILLET
- b=SWAMP MILKWEED
- c=WATER WILLOW
- d=ARROWHEAD
- e=SWITCH GRASS
- f=WATER DOCK
- g=SWAMP LOOSESTRIFE
- h=SOFT RUSH
- i=ORACH
- j=SWAMP ROSE
- k=BEGGAR TICKS
- l=FERNS
- m=BUTTON BUSH
- n=SALTMARSH ASTER
- o=JEWELWEED
- p=BULTONGE
This reach of the Pamunkey River contains 710 acres of tidal marshes from the Pamunkey Indian Reservation to Piping Tree Ferry, a distance of about 14 river miles. The individual marshes in this section are smaller in size than in the Lower Reach. The tidal marshes in this zone characteristically occur as units within larger tidal swamps. As in the swamps along the Mattaponi River, these wetlands are dominated by black gum, ash, and red maple.

It is evident the yellow pond lily and arrow arum/pickerel weed communities have invaded previously unvegetated mud flats in several areas in this reach.

The largest single marsh system in this section is marsh no. 89, Old Town Creek, which is a part of a larger tidal swamp.

No tidal marshes were found beyond mile 42 on the Pamunkey River, although tidal influence is still evident several miles above the route #360 bridge. Tidal swamps and bottomland hardwood forests, however, were observed in this stretch of the River.
SECTION IV-A. PAMUNKEY RIVER - UPPER REACH
## Section IV. Pamunkey River - Upper Reach

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a=WALTER'S MILLET  
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c=WATER DOCK  
d=SWAMP LOOSESTRIFE  
e=SWAMP ROSE  
f=SWAMP ROSE  
g=BEGGAR TICKS  
h=JEWELWEED  
i=FERNS  
j=BUTTON BUSH  
k=ORACH  
l=ORACH  
m= correlates with  
n=SALTMARSH ASTER  
p=BULTONGE
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<th>ARROW ARUM</th>
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a=WALTER'S MILLET  
b=SWAMP MILKWEED  
c=WATER WILLOW  
d=ARROWHEAD  
e=SWITCH GRASS  
f=WATER DOCK  
g=SWAMP LOOSESTRIFE  
h=SOFT RUSH  
i=ORACH  
j=SWAMP ROSE  
k=BEGGAR TICKS  
l=FERNS  
m=BUTTON BUSH  
n=SALTMARSH ASTER  
o=JEWELWEED  
p=BULTONGE
## Section IV. Pamunkey River - Upper Reach

| #   | Marsh Location | Total Acres | Saltmarsh | Cordgrass | Big Cordgrass | Saltbushes | Marsh Hibiscus | Sweet Flag | Saltmeadow Hay Saltgrass | Saltmarsh Burley | Giant Bulrush | Threesquare | Cattails | Pickeralweeed-Arrow Arum | Yellow Pond Lily | Marsh Mallow | Water Hemp | Wild Rice | Smartweeds | Teartumb | Rice Cutgrass | Reed Grass | Other | Observations | Marsh Type |
|-----|----------------|-------------|-----------|-----------|---------------|-------------|---------------|------------|--------------------------|----------------|--------------|-------------|-----------|--------------------------|----------------|---------------|-------------|-----------|-------------|----------|-------------|-----------|-------|
| 93  | Elsing Green   | 8.0         | %         |           |               |             |               |            |                          |                 |              |             |           |                          |                |               |             |           |             |         |             |           |       | Two, low marsh islands | IX        |
| 94  | Jacks Creek    | 49          | %         |           |               |             |               |            |                          |                 |              |             |           |                          |                |               |             |           |             |         |             |           |       | Creek marsh, dominated by wild rice | XI       |
| 95  | Polkwest Creek | 42          | %         |           |               |             |               |            |                          |                 |              |             |           |                          |                |               |             |           |             |         |             |           |       | Creek marsh within tidal swamp | XI       |
| 96  | Polkwest Creek | 6.0         | %         |           |               |             |               |            |                          |                 |              |             |           |                          |                |               |             |           |             |         |             |           |       | Pocket marsh within tidal swamp. Turk's cap lily | XI       |
| 97  | Putneys Mill   | 9.0         | %         |           |               |             |               |            |                          |                 |              |             |           |                          |                |               |             |           |             |         |             |           |       | Small, creek marsh within tidal swamp | IX       |
| 98  | Montague Creek | 22          | %         |           |               |             |               |            |                          |                 |              |             |           |                          |                |               |             |           |             |         |             |           |       | Creek marsh associated with tidal swamp | XI       |
| 99  | Pamunkey River | 3.0         | %         |           |               |             |               |            |                          |                 |              |             |           |                          |                |               |             |           |             |         |             |           |       | Pocket marsh within tidal swamp | IX       |
| 100 | Pamunkey River | 4.0         | %         |           |               |             |               |            |                          |                 |              |             |           |                          |                |               |             |           |             |         |             |           |       | Pocket marsh within tidal swamp | XI       |

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f=WATER DOCK  
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j=SWAMP ROSE  
k=BEGGAR TICKS  
l=FERNS  
m=BUTTON BUSH  
n=SALTMARSH ASTER  
o=JEWELWEED  
p=BULTONGE
SECTION IV-C. PAMUNKEY RIVER - UPPER REACH
### Section IV. Pamunkey River - Upper Reach

| #    | Marsh Location | Total Acres | Saltmarsh Cordgrass | Cattails | Pickerelweed-Arrow Arum | Yellow Pond Lily | Marsh Mallow | Water Hemp | Wild Rice | Smartweeds | Tearthumb | Rice Cutgrass | Reed Grass | Other | Observations                                      | Marsh Type |
|------|----------------|-------------|---------------------|----------|-------------------------|-----------------|--------------|------------|-----------|-----------|-----------|------------|---------------|------------|--------|--------------------------------------------------|------------|
| 101  | Broad Creek    | 3.0         | %                   | .1       | 10                      | 10              | 70           | .1         | .1        | .1        | .1        | .1          | .1             | .1          | .2     | Low, pocket marsh dominated by yellow pond lily | IX         |
| 102  | Broad Creek    | 0.7         | %                   | .1       | 10                      | 10              | .1           | .1         | .1        | .1        | .1        | .1          | .1             | .1          | .1     | Low, pocket marsh dominated by yellow pond lily | IX         |
| 103  | Broad Creek    | 1.21        | %                   | .1       | 10                      | 10              | 70           | .1         | .1        | .1        | .1        | .1          | .1             | .1          | .1     | Large creek marsh dominated by wild rice       | XI         |
| 104  | Broad Creek    | 1.0         | %                   | .1       | 10                      | 20              | .1           | .1         | .1        | .1        | .1        | .1          | .1             | .1          | .1     | Narrow, fringe marsh                           | XI         |
| 105  | Broad Creek    | 3.0         | %                   | .1       | 5                       | .15             | .45          | .1         | .1        | .1        | .1        | .1          | .1             | .1          | .1     | Fringe marsh                                    | XI         |
| 106  | Chericoke      | 1.0         | %                   | .1       | 5                       | 80              | .1           | .1         | .1        | .1        | .1        | .1          | .1             | .1          | .1     | Narrow, fringe marsh                           | IX         |
| 107  | Chericoke      | 7.0         | %                   | .1       | 5                       | 10              | .1           | .1         | .1        | .1        | .1        | .1          | .1             | .1          | .1     | Creek marsh, turk's cap lily                   | XI         |
| 108  | Piping Tree Ferry | 1.0       | %                   | .1       | 5                       | 30              | .1           | .1         | .1        | .1        | .1        | .1          | .1             | .1          | .1     | Pocket marsh within tidal swamp                | XI         |

*a=WALTER'S MILLET  
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h=SOFT RUSH  
I=ORACH  
j=SWAMP ROSE  
k=BEGGAR TICKS  
l=FERRNS  
m=BUTTON BUSH  
n=SALTMARSH ASTER  
o=JEWELWEED  
p=BULTONGE*
### Section IV. Pamunkey River - Upper Reach

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- b=SWAMP MILKWEED
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- d=ARROWHEAD
- e=SWITCH GRASS
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- j=SWAMP ROSE
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- l=FERNERS
- m=BUTTON BUSH
- n=SALTMARSH ASTER
- o=JEWELWEED
- p=BULTONGE
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