THE TEACHING MARSH

A Tidal Wetland Restoration & Education Project

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Wetlands Program

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Anonymous

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Brochure Designed By:

William Roberts
Wetlands Education Coordinator

Karen Duhring
Marine Scientist

For More Information:

Wetlands Program
Virginia Institute of Marine Science
College of William & Mary
P.O. Box 1346
Gloucester Point, VA 23062-1346 USA
(804) 684-7380

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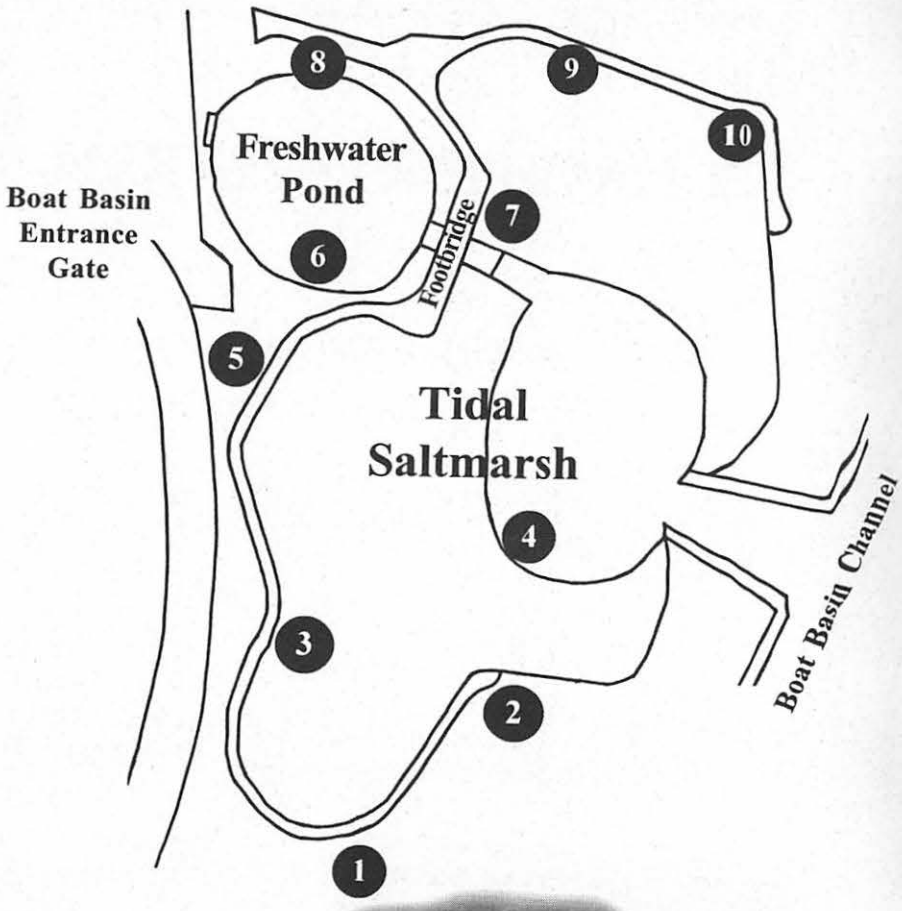
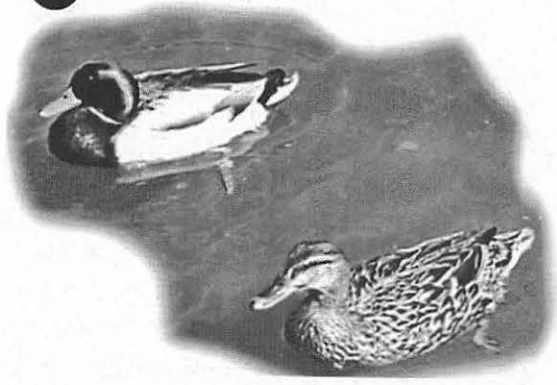
Viewing Stations





The Teaching Marsh

The Teaching Marsh at the Virginia Institute of Marine Science is a one-acre site restored to marshland for both practical and educational purposes. The marsh is designed and maintained by VIMS wetlands experts to naturally remove contaminants from Coleman Bridge storm water runoff, improving water quality in the York River.

The Teaching Marsh also provides a demonstration area for regulated wetland plant species identified in the Tidal Wetlands Act of 1972. The Wetlands Program at VIMS is charged by the Commonwealth to educate various interest groups, such as local wetlands boards, about the functions and values of tidal wetlands.

The Teaching Marsh was excavated and planted in the fall of 1999. Gravel paths and a footbridge guide visitors through the project. Plant labels assist with identification of each species. This brochure describes each numbered viewing station illustrated on the site map. The first viewing station is located at the concrete boat ramp just inside the entrance gate to the VIMS Boat Basin.

Red Cedar
Juniperus virginiana

Wax Myrtle
Myrica cerifera

1

When the boat basin and channel were excavated, the sand was deposited adjacent to the channel. Later, with the construction of the Coleman bridge, additional material was placed on top of the existing fill. The Teaching Marsh was excavated from this landfill area. A portion of this area, located in front of you and to your right, was left undisturbed to represent a plant community that will grow on dredge material.

The plants observed here include red cedar (*Juniperus virginiana*), salt bushes (*Baccharis halimifolia & Iva frutescens*), seashore goldenrod (*Solidago sempervirens*), switch grass (*Panicum virgatum*) and saltmeadow hay (*Spartina patens*). This plant community is similar to natural habitats occurring in dry, sandy areas.

Switch Grass
Panicum virgatum

2

Created wetlands, like the Teaching Marsh, provide similar functions as natural wetlands. A saltmarsh cordgrass (*Spartina alterniflora*) marsh was planted landward of the boat channel riprap about 10 years ago. The wetland area immediately in front of you was planted on a 15:1 slope and the various plant species planted according to their preferred elevation with respect to the changing tide levels. The rocks stabilize the channel banks while tidal inundation over and through the rock revetment allows important ecological functions of the marsh to continue. The opening in the rock revetment is the tidal connection between the Teaching Marsh and the York River via the VIMS boat basin channel. Shorebirds, like the great blue heron, are commonly observed feeding among cordgrass marshes.

Saltmarsh Cordgrass
Spartina alterniflora

Great Blue Heron
Ardea herodias

3

As you walk down towards the water, you pass through several zones demonstrating where each species becomes established based on the elevation and resulting duration of tidal inundation. This area represents a more gentle slope approaching 20:1 .

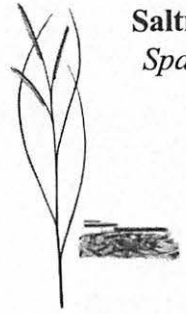
At the highest elevation, two types of salt bushes (*Iva frutescens* and *Baccharis halimifolia*) were planted along the gravel walkway. This represents the upland edge of tidal saltmarsh wetlands.

Groundsel Bush
Baccharis halimifolia

Marsh Elder
Iva frutescens

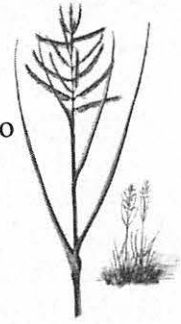
Notice the leaf arrangement on the two types of bushes. *Iva frutescens* has **opposite** leaves. *Baccharis halimifolia* has **alternate** leaves. Although these two species grow in association with each other, *Baccharis* is typically found at slightly higher elevations in the marsh than *Iva*.

Saltgrass
Distichlis spicata



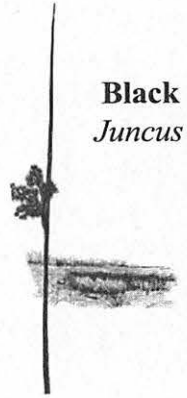
Saltmeadow Hay
Spartina patens

Big Cordgrass
Spartina cynosuroides



Saltgrass and saltmeadow hay dominate the storm tide zone or high marsh. These two hardy grasses can be mowed without injury to the plants. They can be successfully used to vegetate those transition areas between normal storm tides and the more typical upland grasses that will not tolerate nutrient-poor, sandy soils that are often flooded by saltwater.

Saltmarsh Bulrush
Scirpus robustus



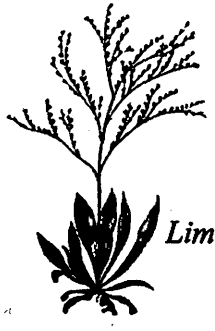
Black Needlerush
Juncus roemerianus

Saltmarsh Aster
Aster tenuifolius

Sea Oxeye
Borrichia frutescens

The next zone in elevation contains big cordgrass, saltmarsh bulrush and black needlerush in an intertidal area. The most channelward zone, the low marsh, is dominated by smooth cordgrass (*Spartina alterniflora*), which is the most adapted to long periods of inundation by saltwater.

Along the right side of the walkway many of the smaller, more difficult to find tidal wetland species have been planted such as the cactus-like saltworts, bright yellow sea oxeye, delicate saltmarsh aster and sea lavender.

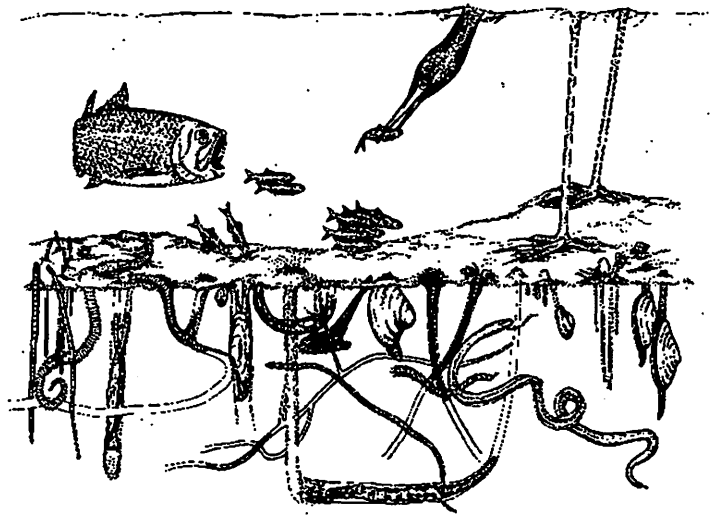


Sea Lavender
Limonium carolinianum

Saltworts
Salicornia bigelovii
Salicornia virginica

4

While most of the marsh has been planted to demonstrate the functions and appearance of vegetated tidal wetlands, non-vegetated wetlands and permanently flooded "subaqueous" areas are also important components of the estuarine ecosystem.



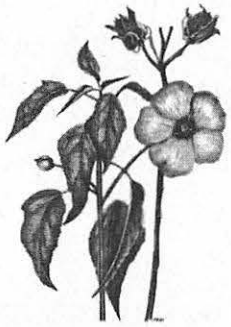
These sand and mud flats are the preferred habitat for a variety of bottom-dwelling animals, or benthos, including clams, worms, snails and mussels. Benthic communities in non-vegetated wetlands perform important functions.

They feed on decaying plant material (detritus) from the marsh, then provide food for many other species, including many commercially important ones such as blue crab, spot, and croaker. This relationship represents the wetlands food chain. Benthic communities also mix the sediment and filter the water as they burrow and feed. This "bioturbation" process helps degrade pollutants.

5

This area was planted as a butterfly garden. Over 40 species of butterflies are likely to be seen in Tidewater Virginia. A variety of flowering perennials provide nectar for adult butterflies and add a diversity of colors to the Teaching Marsh, including coneflower, milkweed, goldenrod and asters.

Butterfly-attracting plants grow best in full sun and butterflies need sun to warm their bodies in order to fly. Using native plants reduces the need for pesticides that can harm both adult and larval butterflies.



Marsh Hibiscus
Hibiscus moscheutos

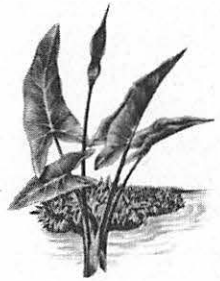
Marsh Mallow
Kosteletzkya virginica

Bald Cypress
Taxodium distichum

6

This freshwater marsh is supplied with runoff from the Coleman Bridge. Stormwater is collected in a large holding pond and passes under the adjacent entrance road, through the two pipes on the far side by the fence. This wetland is planted with freshwater emergent vegetation and shrubs listed in the 1972 Tidal Wetlands Act. The freshwater wetland plants on these two pages can be observed from this vantage.

Arrow Arum
Peltandra virginica



Bultongue
Sagittaria falcata

Arrowhead
Sagittaria latifolia

Spice Bush
Lindera benzoin

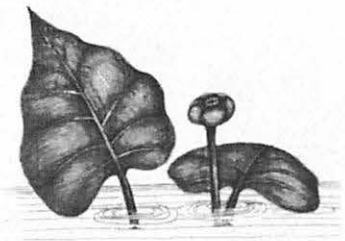
Soft Rush
Juncus effusus

Buttonbush
Cephalanthus occidentalis

7

A one-way valve, located on the saltwater marsh side of the footbridge, controls the water level in the freshwater wetland. This valve prevents saltwater from flowing into the freshwater marsh on the rising tide and during storm events. Some freshwater plants will not survive if salt water intrudes, while others are adapted for varying salinity levels.

The riprap spillway was installed as a safety device to prevent flooding of the roadway and surrounding area in times of extremely heavy rainfall. If the water level in the freshwater pond exceeds a certain level, it will flow over the spillway under the footbridge.



Yellow Pond Lily
Nuphar luteum

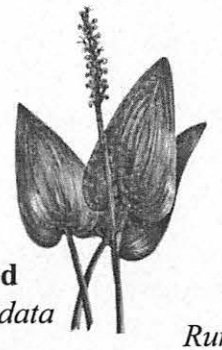
Sweet Flag
Acorus calamus

Seashore Goldenrod
Solidago sempervirons

Hazel Alder
Alnus serrulata

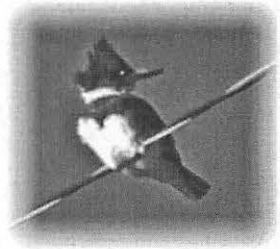
8

These freshwater plants and others can be observed from this viewing station. Some of these wetland species are not specifically listed in the Tidal Wetlands Act but are commonly found wetland plants and shrubs. They were planted to increase biodiversity in the Teaching Marsh, plus provide habitat and food for wildlife. A belted kingfisher has been observed diving for minnows in this pond while they try to hide among the plants.



Pickerelweed
Pontedaria cordata

Water Dock
Rumex verticillatus



Belted Kingfisher
Megaceryle alcyon alcyon

9

Dredge material can be effectively converted to natural habitat with proper plant selection and minimum effort. The bermed area visible on the south side of the walkway will be used to contain future dredge material removed from the boat basin and channel. This containment area will allow the water/mud/sand solution to slowly dewater over time and prevent any solids from reentering the York River through runoff.

American Beach Grass
Ammophila breviligulata

Mexican Tea
Chenopodium ambrosiodes

Some plants naturally appeared, or colonized, disturbed areas of the Teaching Marsh and adjace berms, like American beach grass, Mexican tea and short dune grass.

After the new dredge material is dewatered, any remaining open areas will be planted with species adapted to dry, sunny conditions, like prickly pear. Within several years the entire area should be a functioning shoreline habitat, similar to Station **1**.

Killdeer
Charadrius vociferus

Sea Rocket
Cakile edentula

10

A flat area called a panne or salt flat, was created along the raised gravel walkway extending from the footbridge to this point. This area is inundated only during extreme tides. Saltwater is trapped within the panne with each inundation and results in higher than normal salinity levels in the soil due to evaporation. Plant species that prefer irregularly flooded, higher salinity areas were planted here, such as sea oxeye, sea lavender and saltwort.

The same vegetated zones based on elevation, inundation and plant species can also be observed on this side of the tidal wetland as from Station **3**, although the change in elevation is different.

Short Dune Grass
Panicum amarum

Prickly Pear
Opuntia compressa

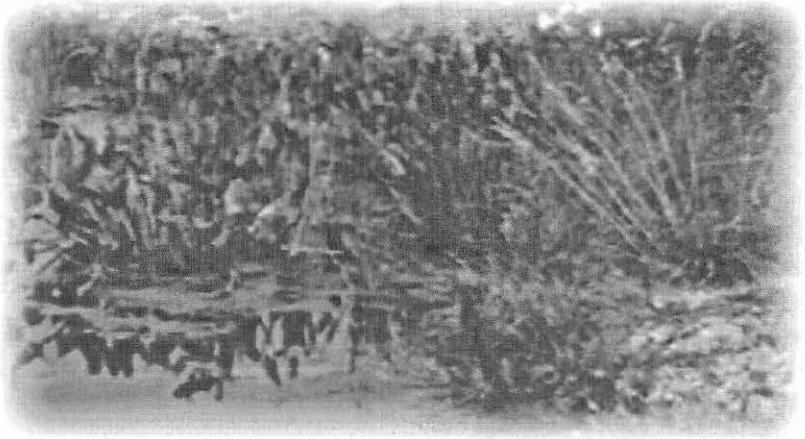
Important Lessons of the Teaching Marsh

- A wide variety of grasses, shrubs, flowers and trees are adapted to both fresh and salt water wetlands. Where each plant grows in the wetlands depends on the frequency and salinity of tidal inundation.

- Tidal wetlands provide important ecological functions by stabilizing shorelines, absorbing nutrients and other pollutants, and providing food and cover for native wildlife.

- Even dredge material can be incorporated into an environmentally sensitive shoreline landscape.

- Non-vegetated wetlands also provide important functions, especially in concert with vegetated marshes.



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