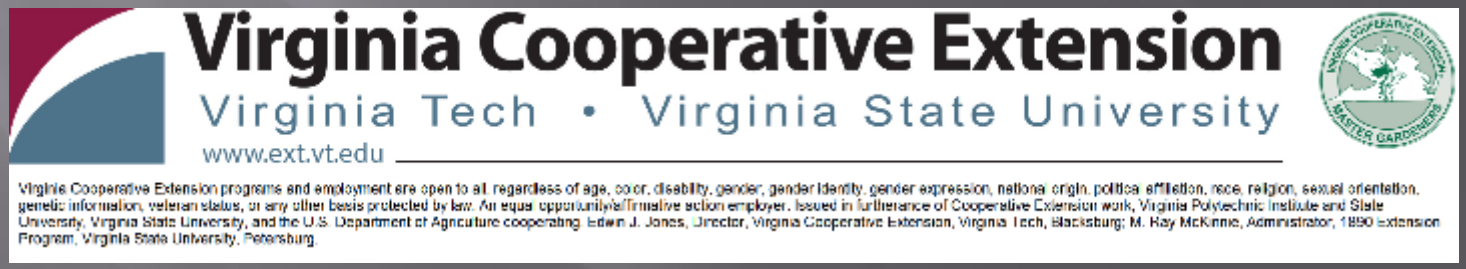
The Reedville Fishermen's Museum

LIVING SHORELINE DEMONSTRATION GARDEN

A Guide

Shoreline Evaluation Program

Northern Neck Master Gardeners



Welcome to the Garden

Situated on picturesque Cockrell Creek and covering a 100 foot slope between the creek and the asphalt parking lot, the garden is located behind Bethany United Methodist Church in Reedville, just beside the Museum campus.

Reedville Living Shoreline Garden

Shoreline Management

Many waterfront property owners who live on protected creeks and rivers see their neighbors' wooden bulkheads and rock revetments and think that they are the only solution to erosion concerns. But is 'armoring' your shoreline really necessary?

Where there is low-to-moderate wave energy and minimal erosion, it is usually not necessary to install these hard structures. Not only are they more costly, but they can destroy shallow water habitats and often cause additional erosion on adjacent properties.

Consider a Living Shoreline

A living shoreline treatment is a shoreline management practice that addresses erosion in lower energy situations. It is accomplished through the strategic placement of plants, stone, sand fill and other structural and organic materials.

Living shorelines have many benefits. They:

- absorb wave energy and reduce bank erosion
- provide shoreline access and shallow water habitat for wildlife
- improve water quality and clarity
- offer more affordable construction costs

The ideal living shoreline contains a succession of natural filters that mimic those found in undisturbed ecosystems. These filters include:

- riparian buffers above the high tide line, made up of native trees, shrubs, and herbaceous perennials,
- grasses, rushes, and sedges at mid-tide elevation, and
- marsh grasses at low tide

The Marsh Sill

A marsh sill living shoreline application was chosen for this garden because sills are most effective in low wave energy situations with minimum erosion. Ours was constructed with stone placed about 10 feet out from an eroding stretch of bank caused by storm water runoff from the parking lot.

It was then backfilled with sand and planted with marsh grasses. The white poles in the water mark the edge of the sill. It is visible at low tide. The sill, built in 2005, has gradually encouraged outward migration of existing marsh grass resulting in the expansion of the marsh along this stretch of shoreline.

Garden Development

The garden you see before you was created by the Northern Neck Master Gardeners in 2005 to solve several problems at the site and demonstrate an environmentally friendly approach to shoreline stabilization and upland runoff control.

The shoreline was first cleaned up to remove weeds, unsightly overgrowth, and debris which prevented the shoreline grasses from growing, and then an eroding area was stabilized (see Marsh Sill).

Shrubs, perennials, and grasses were planted above the shoreline to slow down and filter pollutants in the rainwater running off the adjacent buildings and parking lot. While the initial concern was correcting water pollution issues, the garden has also improved wildlife habitat and is an attractive addition to the community.

Using Native Plants

Native trees and shrubs, as well as herbaceous perennials (wildflowers), naturally occur in the region in which they evolved. They are adapted to local soil, rainfall, and temperature conditions, and have developed natural defenses to many insects and diseases. Once established, native plants will thrive without added water, fertilizers, and pesticides. Many wildlife species have co-evolved with native plants and are dependent on them for food and habitat.

Using native plants helps preserve the healthy balance and beauty of natural ecosystems, and makes a fine addition to any garden.

All the plants in the garden are commercially available and can be purchased locally. Those growing naturally in woods or along shorelines should be left for all living things to appreciate.

Asters and Goldenrod

Butterfly Weed

Cardinal Flower

For further information contact the Northern Neck Master Gardeners at 804 580-5694 or online at www.nnmg.org

Northern Neck Master Gardeners · Reedville Fishermen's Museum · DCR · Bethany United Methodist Church · VirginiaTech Invent the Future · Virginia Cooperative Extension A partnership of Virginia Tech and Virginia State University www.ext.vt.edu · VSU Virginia State · Center for Coastal Resources Management · NAPS · The I-SEA Integrated Shoreline Evaluation Assistance

History

- Established in 2005 with funding assistance from the Northern Neck Soil and Water Conservation District.

- Labor and in-kind contributions were provided by a consortium of local environmental groups, including:

  NN Native Plant Society, Northumberland Association for Progressive Stewardship, NN Audubon Society, Chesapeake Bay Garden Club.

- Maintained by the Northern Neck Master Gardeners, it is used to demonstrate the principles of conservation landscaping and the benefits of a Living Shoreline in controlling erosion and improving water quality.

The Problem

Rain water from the steep roofs of the church building poured onto the parking lot.

This runoff flowed unimpeded into the creek, carrying, oil and gas residue into the creek.

Trash and debris had accumulated in the creek, creating an unsightly mess.

The view of the water was obstructed by tall, invasive plants.

Grass growing in a wet area was mowed to the water's edge, allowing sediment and garden chemicals to pollute the water.

The church parking lot (garden in the far distance)

Note the steep church roofs – all sending rain to the parking lot.

Site of the Garden, 2005

The Solution: A Call to Action

- Invite the local environmental community to mount a rescue effort.
- Research the ways a natural solution could solve the problems.
- Identify plants that would grow in the existing conditions and that would benefit and enhance the location.
- Create a workable and sustainable garden design.

The Goals

1. Demonstrate best management practices (BMPs) in storm water management:
   a. Control runoff and improve water quality;
   b. Stop erosion and stabilize the bank.

2. Eliminate invasive plants.

3. Beautify the area and demonstrate that natural solutions can be environm[illegible] effective and aesthetically.

Storm Water Management

Terraced steps from the parking lot to the lower bank slow storm runoff from the parking lot.

Rain water drains into the soil/stones at each step.

Sediment is dropped.

Any runoff finally entering the creek will have been cleansed of pollutants from the roofs and the asphalt.

What is a Living Shoreline?

A Living Shoreline is defined as a shoreline management practice that:

- Provides erosion control and water quality benefits;
- Protects, restores or enhances shoreline habitat;
- Maintains coastal processes through the strategic placement of plants, stone, sand fill and other structural and organic matter.

Know the Law!

Effective July 1, 2020, Virginia revised its shoreline protection regulations. The revision requires that the Virginia Marine Resources Commission

…permit only living shoreline approaches to shoreline management unless the best available science shows that such approaches are not suitable. If the best available science shows that a living shoreline approach is not suitable, the Commission shall require the applicant to incorporate, to the maximum extent possible, elements of living shoreline approaches into permitted projects.

(Code of Virginia § 28.2-104.1)

In other words:

You are legally required to use the strategies of natural protection (rather than engineered solutions) unless you can prove that such an approach would not work.

Threats to the Shoreline

- Tides, currents, wave action, and wakes create erosive forces that can undermine the shoreline.
- Upland runoff can create eroding gullies that carry sediment and chemical pollutants into the adjacent water.

Benefits of a Living Shoreline:

A stand of shoreline plants acts as a **buffer**, absorbing the energy of moving water in the creek/river/bay, and a **sponge**, taking up freshwater runoff.

A **Living Shoreline** provides shallow-water protection for aquatic creatures, habitat and shoreline access for other wildlife, and conditions for these birds and animals to feed, nest, breed, and raise their young.

Our marshes are the nurseries of the Chesapeake Bay, upon which the maritime food chain depends!

Limits to Natural Shorelines:

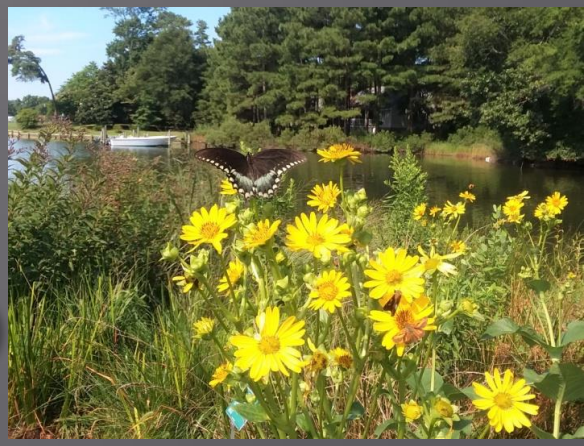
- High energy shorelines will likely require hardscaping (engineered solutions – riprap, bulkheads, groins, etc.)
- A fetch (distance waves driven by wind may travel) of more that 0.5 miles will experience too much wave action for shoreline plants to survive.
- Predicted sea level rise impacts may change the long-term prospects of success for natural solutions.

The RFM Garden: Site Review

Features to consider:

- Light: sun or shade? Ways to let in more light?
- Soil conditions: dry/moist/waterlogged? Type of soil?
- Slope: drainage, runoff issues, gullies, low spots?
- Existing vegetation: weeds, invasives, competing undesirable plants?

RFM Garden Design
(What to plant, where to plant it, what are the desired outcomes?)



1. What to Plant?

- Choose native plants;
- Choose plants that will thrive in the specific conditions – dry soil/moist soil, sun/shade.
- Choose plants that will stabilize the soil – strong root structure, dense growth habit.
- Choose plants that are easily available commercially and locally.

2. Where to plant it?

The RFM garden has two zones:

- the **upper bank** that experiences periodic heavy storm-water runoff, but dries out rapidly

and

- the **lower, flatter region** at the water's edge that is often water-logged and experiences occasional inundations of brackish water from the creek.

The two areas are divided by a grassy path.

Right Plant, Right Place

PLANTS FOR
THE DRY SLOPE

PLANTS FOR
THE DAMP EDGE

3. Desired outcomes

- To stop storm water runoff from the parking lot polluting the waters of Cockrell Creek;
- To stabilize the soil, minimizing the flow of sediment that impacts water quality;
- To prevent erosion of the bank by tidal action, currents, wakes.

Why Native Plants?

Because

- They are adapted to local conditions – climate, soil, insects;
- They require less water, fertilizers, pesticides;
- Native wildlife depends upon plants they have co-evolved with;
- They are essential partners in preserving the balance of the eco-system.

Itea virginiana (Sweetspire)

Plants to Avoid/Eradicate: Invasive Species

For example:

Phragmites australis

- Grows 10 -12 feet tall;
- Spreads vigorously;
- Dense root mat can impede water flow (encourage mosquito breeding), crowds out beneficial shoreline plants;
- Has little food value for wildlife.

Phragmites australis (Common Reed)

Other undesirables:

Poison Ivy

Greenbrier

Autumn Clematis

Trumpet Vine

Chinese Privet

Zones of the Garden

1. **Upland Slope and Lower Bank:**

This planted area between the parking lot and the water's edge comprise the **Riparian Buffer.**

2. **Inter-tidal Shoreline:**

A thin strip of marsh grasses, inundated twice daily by the rising and falling tides, provides essential protection from erosion.

The Riparian Buffer

First Line of Defense:

Wax Myrtle (*Myrica cerifera*)

These hardy natives are disease and insect resistant and thrive in shoreline conditions. Their roots stabilize the soil and help absorb the runoff pouring from the church roofs and the parking lot after heavy rain.

A year after planting a row of these trees, the deep gullies caused by the runoff had largely disappeared: the water was absorbed before it could carry pollutants into the creek.

Perennials for the Upper Bank.

Although these plants will be exposed to very moist conditions during periods of rainfall, the slope and the condition of the soil cause the earth to dry out rapidly. Therefore, these plants need to be drought resistant.

Black Eyed Susans

New England Aster

White Heath Aster

Plants with a clump-forming growth habit spread out and fill the available spaces, crowding out weeds and preventing the soil from being swept into the creek by storm runoff.

Native Shrubs
for height, texture, flowers, fall color and extensive root structures

St John's Wort
(*Hypericum frondosum*)

Virginia Sweetspire
(*Itea virginica*)

Oak Leaf Hydrangea
(*Hydrangea quercifolia*)

The Lower Area

Challenges:

Runoff from the slope and ground water creates constantly moist conditions;

Occasional tidal inundations add brackish water from the creek;

Existing weedy growth crowds out everything else;

Threats from spreading invasives.

Strategies:

Careful plant selection;

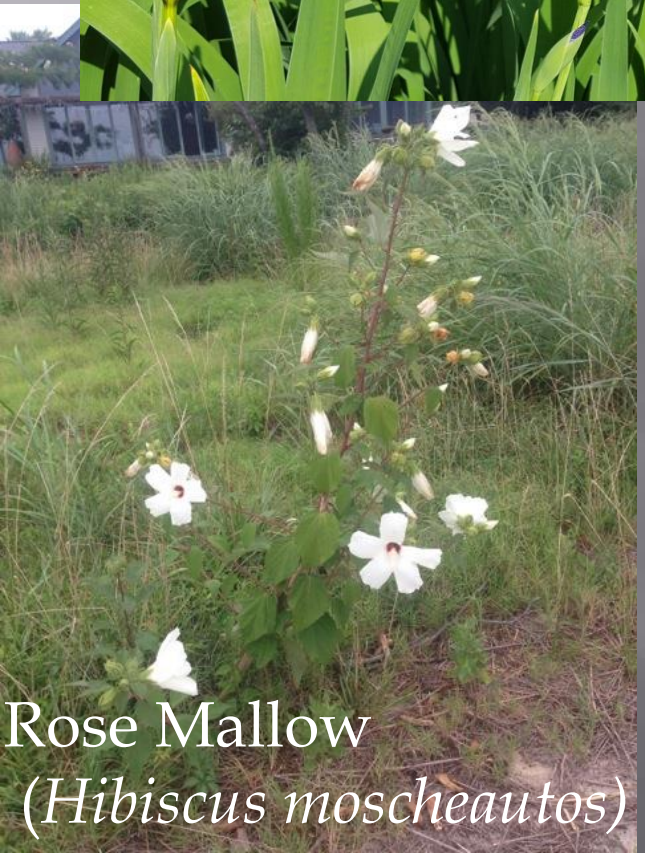
Constant monitoring to observe what does well, what struggles;

Allow appropriate existing growth to stay – remove aggressive plants and replace with better selections;

Eradicate invasives before they become dominant: monitor closely and regularly.

Blue Flag Iris (*Iris Virginica*)

Soft Rush (*Juncus effusus*)



Rose Mallow
(*Hibiscus moscheautos*)

Seashore mallow (*Kosteletzkya virginica*)

Cup Plant
(Silphium perfoliatum)

Swamp Sunflower
(Helianthus angustifolia)

New York Ironweed

Vernonia noveboracensis

Shoreline Marsh

Conditions:

- Daily tidal inundation;
- Potential bank erosion due to tidal action;
- Existing strip of marsh grasses *Spartina alterniflora* (Smooth Cordgrass) and *Spartina Patens* (Salt Marsh Hay);
- Possible spread of invasive *Phragmites australis* (Common Reed) from adjacent property.

Strategies:

- Eliminate conflicting weeds to promote healthy growth of marsh grasses;
- Monitor spread of *Phragmites australis* and, if necessary, spray to control;
- Establish a Marsh Sill, 4 – 6ft from bank, backfill with sand, plant plugs of *Spartina alterniflora*.

  (Note: this marsh sill is for demonstration purposes, to illustrate how a strip of marsh can be expanded to provide additional protection to the shoreline).

The Marsh Sill

2005

Today

Note: Dense cover of marsh grasses over the back-filled area.

Some Additional Plants in the Garden

See following presentation for plant identifications and portraits

Summary: A Natural Approach to Shoreline Stabilization

- Create a Living Shoreline with marsh grasses to protect against erosion;
- Plant a Riparian Buffer to stabilize the soil and absorb upland runoff;
- Use native plants for low maintenance, minimal chemical use and habitat preservation and enhancement;
- Select plants for multi-season interest and aesthetic enrichment of the shoreline region.

Visit the Garden

The RFM Living Shoreline garden is maintained by Northern Neck Master Gardener volunteers.

They work in the garden most Thursday mornings from 8:30 – 10:30 (weather permitting, and depending upon the garden needs).

They are always delighted to receive visitors and answer any questions (COVID restrictions permitting). The garden is open at all hours.

References.

- ‘Home Owners’ Guide to Shoreline Management’. NNMG/Shoreline Evaluation Program.

- Northern Neck Master Gardeners’ Shoreline Evaluation Program – http://www.nnmg.org/sep