Promoting Living Shorelines for Erosion Control

March 25 & 26

Brunswick County Association of Realtors
29 National Estuarine Research Reserves
To promote informed management and stewardship of North Carolina’s estuarine and coastal habitats through research, education, and example.
Connect with us!

Facebook: North Carolina Coastal Reserve
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www.nccoastalreserve.net
Past Workshop Resources

To obtain additional course documents from past workshops, please contact Coastal Training Program Coordinator Whitney Jenkins at 252-838-0882.

Promoting Living Shorelines for Erosion Control - March 25 & 26, BCAR

March 25 Agenda
Resources For Homeowners and Professionals

Below is a list of available resources for homeowners and technical professionals (e.g., marine contractors, landscape architects, engineers, etc.) who are interested in learning more about implementing a living shoreline.

How to Protect your Property from Shoreline Erosion: A Handbook for Estuarine Property Owners in North Carolina - Weighing Your Options

- This guide serves as a tool for those interested in learning about the options available in for shoreline stabilization in North Carolina. In addition to providing information about stabilization methods, permitting, and costs, the guide also has a worksheet that asks site-specific questions designed to help users learn more about their estuarine shoreline property before making a decision about which control option to implement.

Living Shoreline Workshops

- The N.C. Coastal Reserve & National Estuarine Research Reserve's Coastal Training Program held a living shorelines workshop - Living Shorelines for Erosion Control on Estuarine Shorelines - for realtors and technical professionals. Click on the link to access presentations by speakers from partnering organizations, like DCM, the N.C. Coastal Federation, and N.C. Sea Grant.

Shoreline Erosion Control Using Marsh Vegetation and Low-Cost Structures

- North Carolina Sea Grant developed this helpful publication that not only explains the role of marsh vegetation in reducing shoreline erosion but also highlights the types of plants that work best based on site-specific characteristics and provides advice for planting various types of vegetation.
North Carolina Sea Grant developed this list of marsh grass suppliers. The Division of Coastal Management does not endorse these entities.

This video is a compilation of presentations by various experts about living shorelines.

Living Shorelines: A Habitat-Friendly Alternative for Shoreline Stabilization

The N.C. Coastal Federation has been involved in numerous living shoreline projects in North Carolina. Details and photos from projects in the northeast, central, and southeast regions of our coast are available on this site.

Search: NC DCM Resources for Homeowners & Professionals

Or

https://deq.nc.gov/about/divisions/coastal-management/coastal-management-estuarine-shorelines/stabilization/resources-homeowners-professionals
Living Shorelines: Benefits & Limitations

Adapted from Carolyn Currin & Rachel Gittman
Coastal Habitat Benefits

Habitat

Tourism, Recreation, Aesthetics

Shoreline Stabilization

Sediment, Nutrient, & Carbon Storage
North Carolina Coastal Habitats
Shoreline Erosion

Causes:
• Natural wave energy
• Storm events
• Disruption in sediment supply
• Changes in shoreline topography
• Removal of vegetation
• Boat wakes

Sediment bank
Salt marsh
Forest
Shoreline Hardening

- Bulkhead
- Groin/Jetty
- Seawall
- Riprap Revetment
- Breakwater
Changes occur **BELOW** the MHW line:

- Sediment transport & particle-size change
- Vegetation loss
- Animal abundance reduced
- Ability to remove nitrogen is reduced

...all of which are negative impacts to our public trust resources.
What’s the alternative?

**Living shorelines** are erosion control methods that include a suite of options

- Marsh grasses
- Sills made of stone, oyster shell, or wood
- Maintain connections between upland, intertidal, and aquatic areas
- Proven effective erosion control during hurricanes
Living Shoreline Types
Marsh Plants
Living Shoreline Types

Marsh Plants
Living Shoreline Types – Sills
Living Shoreline Types
Oyster Bag Marsh Toe Revetment
Living Shoreline Types

Loose Oyster Shell
Living Shoreline Types
Oyster Shell
Living Shoreline Types
Habitat Comparison
Fish Habitat

• Living shorelines provide better habitat for fishes and crustaceans than bulkheads

• Sills may function similar to oyster reefs in terms of providing habitat for fish

• Marsh planting is important
Marshes Dampen Wave Energy
How long before you see the benefits of a living shoreline?

Year 1

Year 3

Year 5
What about hurricanes?

Hurricane Irene 2011
Bulkhead vs. Living Shoreline
Pivers Island Living Shoreline
After Hurricane Irene – 2011
Shoreline Accreted Sediment
Monitored living shorelines before and after Hurricane Florence

8 living shorelines monitored along the coast
List of Monitored Living Shorelines

1. Morris Landing Rock Sill - Wilmington
2. Morris Landing Oyster Sill - Wilmington
3. Springers Point Rock Sill - Ocracoke
4. Woodall Rock Sill - Ocracoke
5. Cahoon-Davis Oyster Sill - Ocracoke
6. Chowan River Boat Ramp Rock Sill - Edenton
7. St. James Oyster Sill - Wilmington
8. Southport Rock Sill - Wilmington
LIVING SHORELINE EROSION POST HURRICANE FLORENCE

Average scour of 3.5 inches
Average sill width increased by 9.8 inches
Average sill height decreased by 1.5 inches
Average vertical erosion of 1.2 inches
Average marsh edge horizontal erosion 11.8 inches
Average loss of 14% of marsh vegetation coverage

Diagram By: B. Puckett
Morris Landing Rock Sill - Wilmington

AUGUST
{1 MONTH PRE STORM}

OCTOBER
{1 MONTH POST STORM}
Springers Point Rock Sill - Ocracoke

AUGUST
{1 MONTH PRE STORM}

DECEMBER
{3 MONTHS POST STORM}
Woodall Rock Sill - Ocracoke

**AUGUST**
{1 MONTH PRE STORM}

**DECEMBER**
{3 MONTHS POST STORM}
Chowan River Boat Ramp Rock Sill - Edenton

AUGUST
{1 MONTH PRE STORM}

OCTOBER
{1 MONTH POST STORM}
St. James Oyster Sill - Wilmington

AUGUST
{1 MONTH PRE STORM}

NOVEMBER
{2 MONTHS POST STORM}
Summary

- Hardened structures (bulkheads/riprap) do not provide the ecosystem services that natural shorelines do, and may not perform as well during storm events.

- Lack of design standards may contribute to overuse of hard structures.

- In N.C., intertidal oysters are a viable alternative to stone sills in many settings.

- Marshes and oyster reefs can increase their elevation, unlike hardened structures.

- Incorporating marsh and oyster reefs into a ‘living shorelines’ approach to shoreline stabilization can result in cost-effective and sustainable shoreline protection.