Living Shorelines Design Options

Tracy Skrabal
Coastal Scientist

North Carolina
Coastal Federation
Working Together for a Healthy Coast

Our Approach

Since 1982, the Coastal Federation has worked to protect and restore the coastal water quality and habitats throughout the N.C. coast.

This is how we do our work:

We Collaborate

From community groups to local businesses to research institutions to government agencies.

We achieve long-lasting results by working together.

We Advocate

We take action by engaging people from all walks of life in decisions about the future of our coast.

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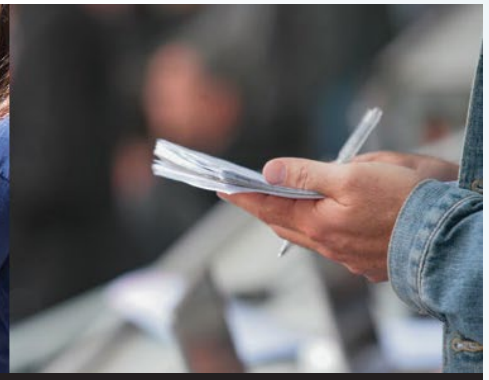

We Restore and Protect

In the field, we restore and protect critically important habitats and water quality.

By building and preserving:

-living shorelines
-oyster reefs
-wetlands
-& native coastal forests

We Educate

-Service learning and community projects

-Outdoor and hands-on education using local environmental issues

-Create coastal stewards and informed decision-makers.

We Inform

- Coastal Review Online (CRO), is our award-winning, daily, not-for-profit news and feature service covering the N.C. coast.

- A member of the N.C. Press Association.

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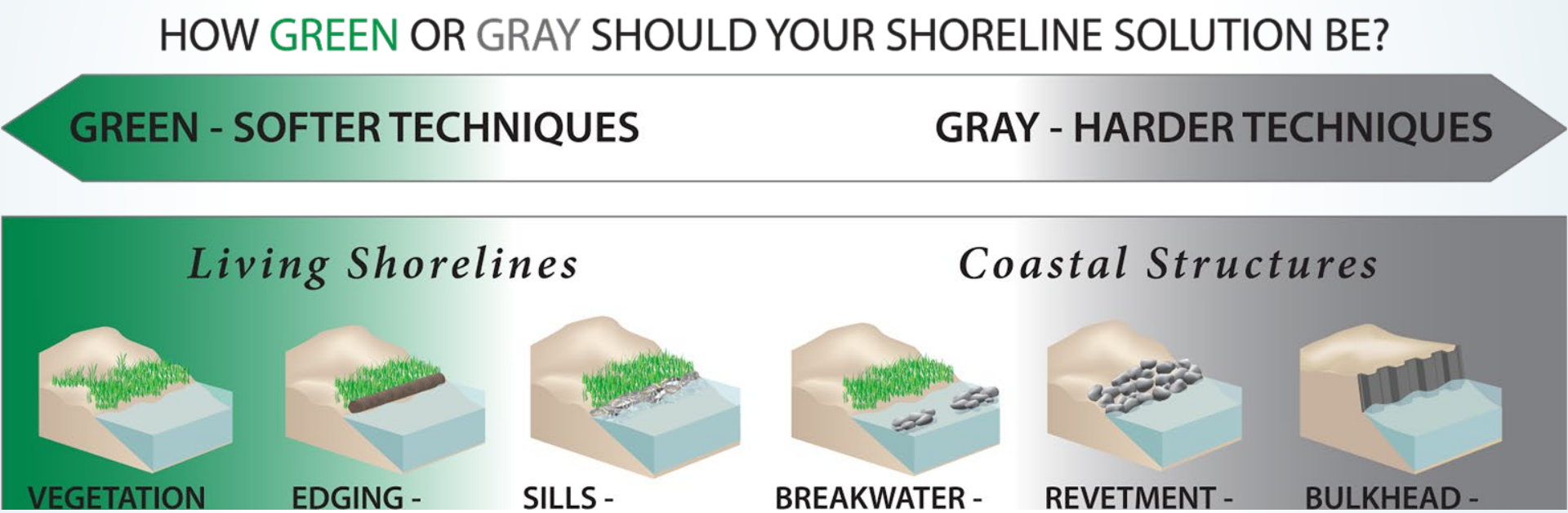
Review of Shoreline Stabilization Techniques



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Camp Albemarle Post- Hurricane Florence

Pre- and Post-Hurricane Matthew, New River, Sneads Ferry

Case Studies of Living Shoreline Projects

Photo: by North Carolina Coastal Federation

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Beach Nourishment at Cape Lookout Lighthouse

Photo: North Carolina Coastal Federation

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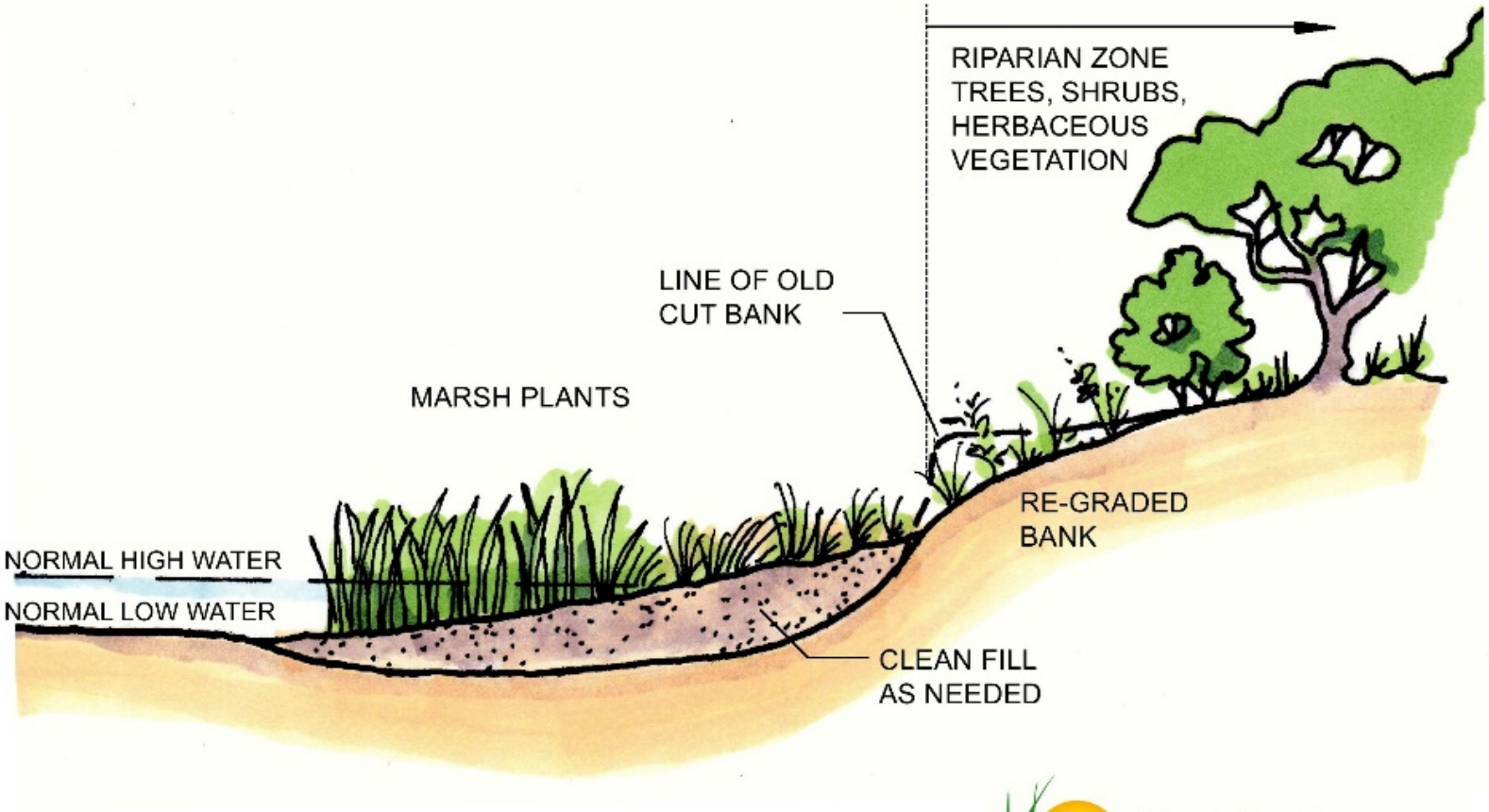

VEGETATION PLANTING WITH BANK RE-GRADING

not to scale

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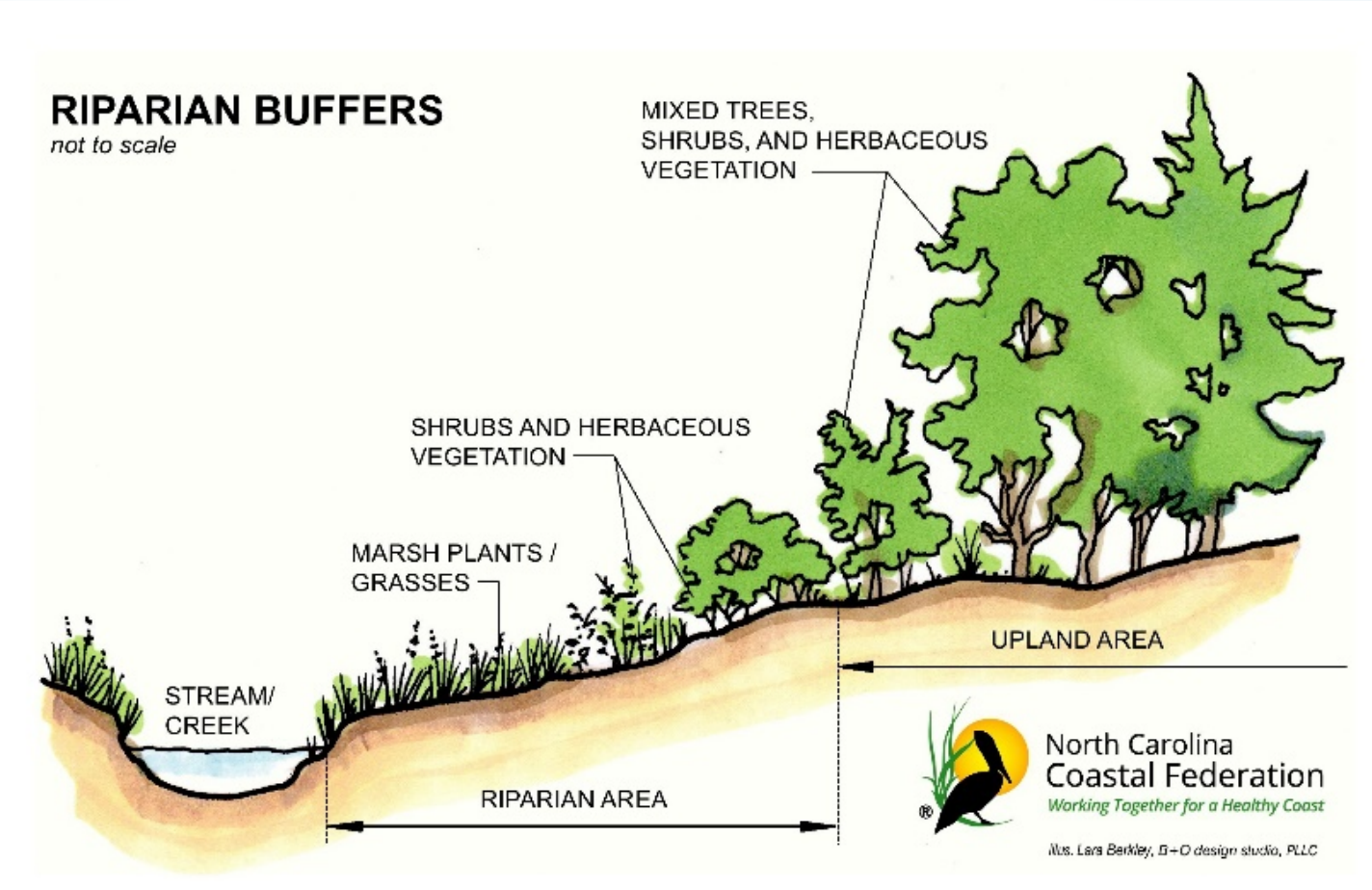
Riparian Buffer Restoration with Marsh Creation



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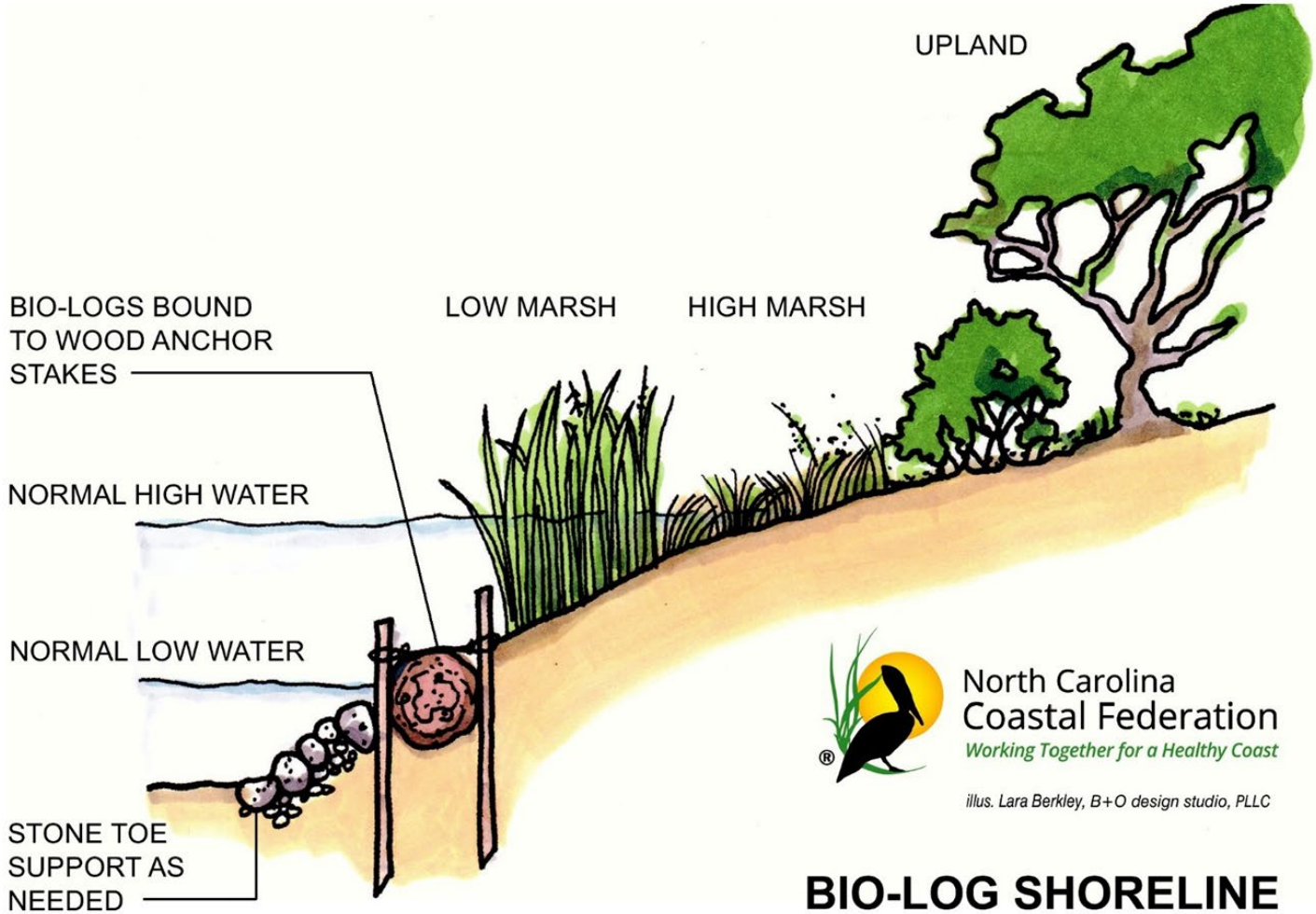
UPLAND
BIO-LOGS BOUND TO WOOD ANCHOR STAKES
LOW MARSH
HIGH MARSH
NORMAL HIGH WATER
NORMAL LOW WATER
STONE TOE SUPPORT AS NEEDED
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BIO-LOG SHORELINE
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Marsh Plantings and Biologs

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Marsh Plantings with Biologs

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Living Shoreline (Hybrid)Projects

Photo: North Carolina Coastal Federation

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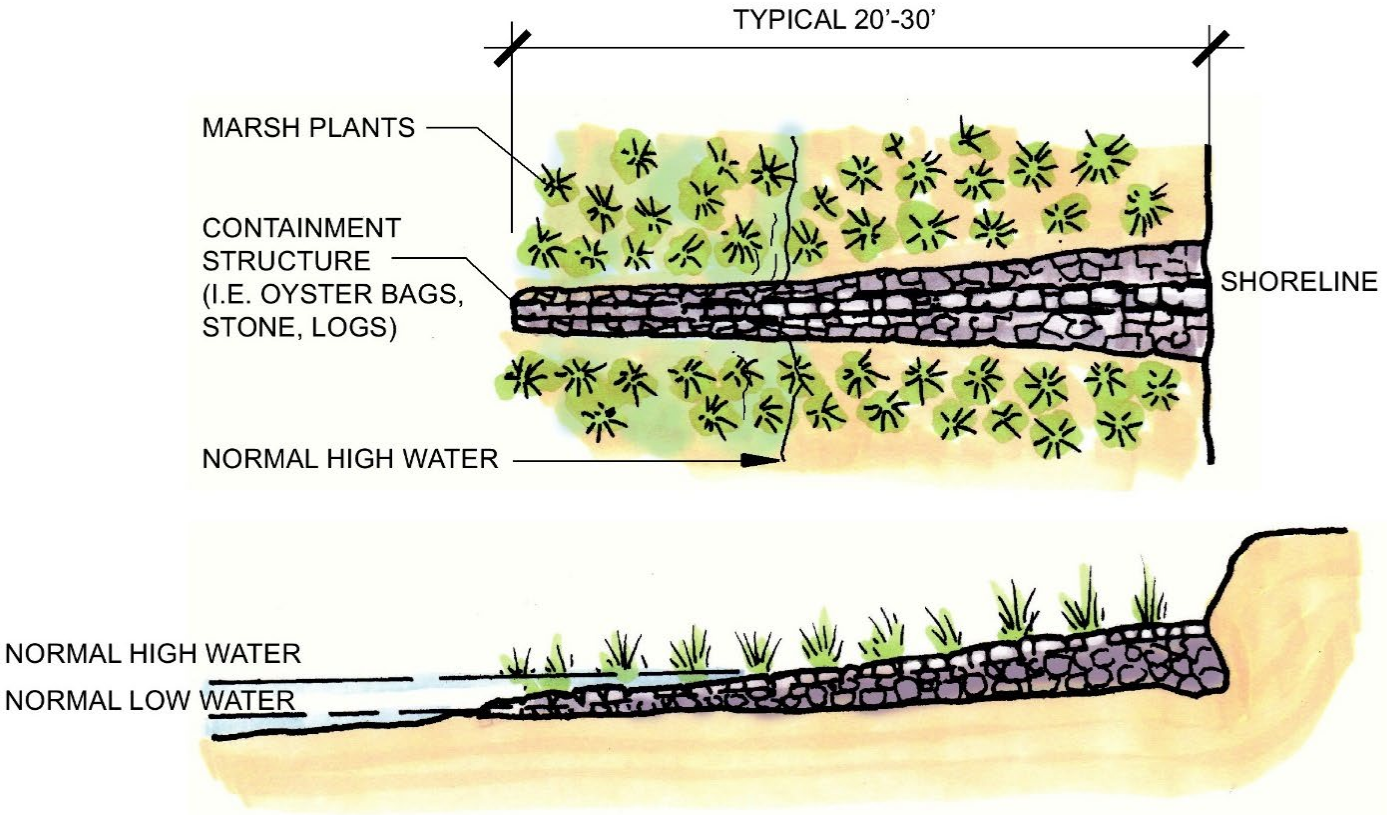

CONTAINMENT STRUCTURES WITH PLANTINGS

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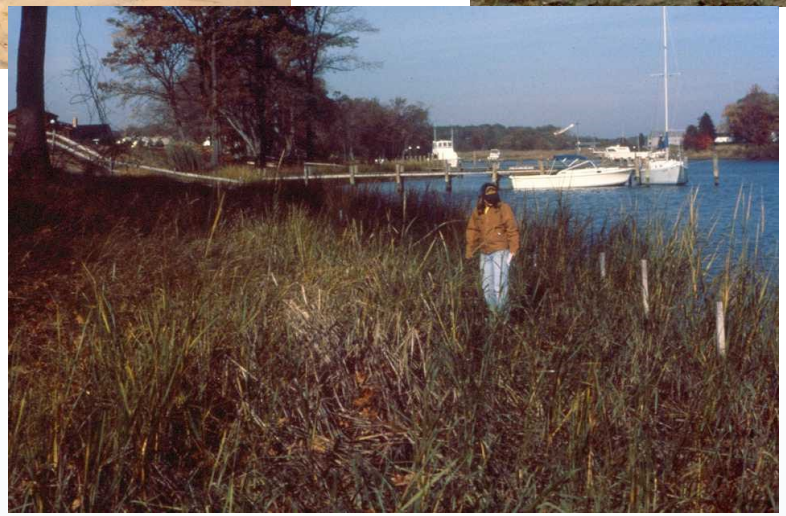
Stone Containment Structures

Stone Containment Structure



Stone Containment Structure

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Vertical Wall Living Shoreline Sills

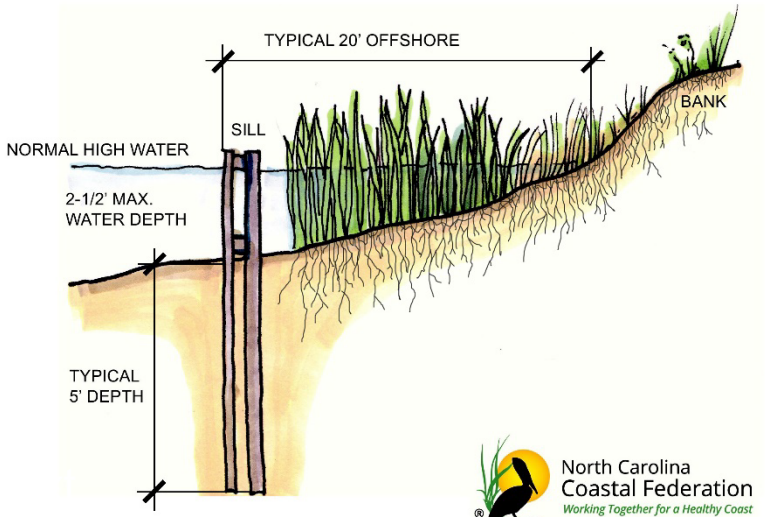
Typical construction costs for 50 linear feet of vertical wall sill *

Vertical sill installed (materials + labor) Estimate includes 8’ vinyl sheeting panels, marine treated whalers, galvanized hardware

$120-$140/linear foot= $6,000- $7,000

Plantings, 1,500 plants (1,500 square feet) @ $1.00/per plant = $1,500

Total cost = $7,500- $8,500



VERTICAL WALL SILL
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Wilmington, NC
Photos by North Carolina Coastal Federation.

* Note: Costs of sills vary significantly by size of structure, mobilization/demobilization costs, location, availability/transport of material, and market conditions

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Vertical Wall Sills

Photos: North Carolina Coastal Federation

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3 OPTIONS: OYSTER REEF / SILL WITH PLANTINGS

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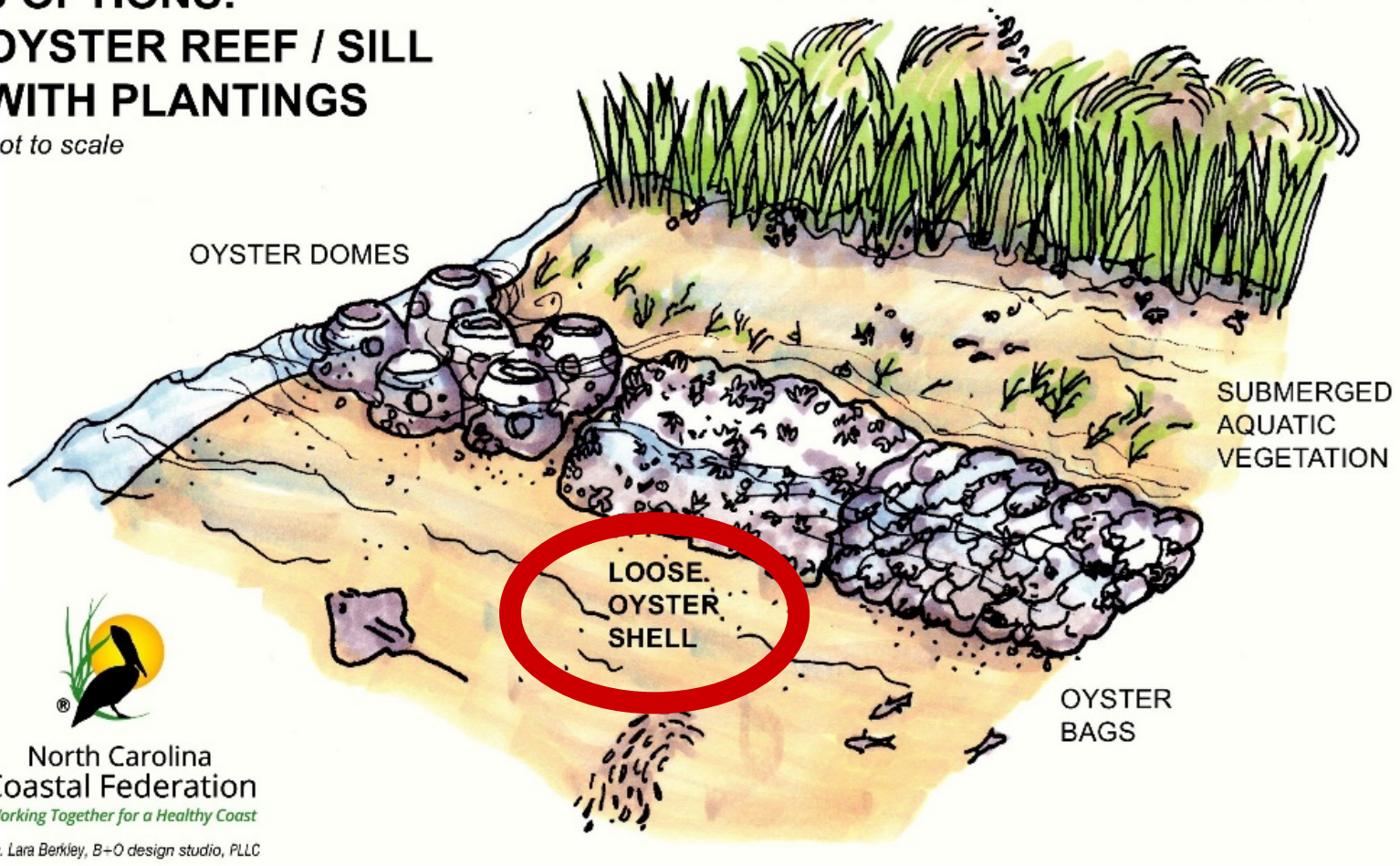

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Use of Oyster Domes For Living Shorelines

Photos by North Carolina Coastal Federation.

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Typical Costs for Oyster Dome Project Morris Landing, NC

Typical costs for 150 linear feet*:

Plantings: 1,500 plants @ $1.50 = $750

Domes: 200 @ $90/dome= $18,000

Delivery of domes (from VA): $1,500

Installation of domes: $7,000

Total cost = $27,250, or $182/ft.

(For comparison: $9,083 for 50 feet)

* Note: Costs of sills vary significantly by size of structure, mobilization/demobilization costs, location, availability/transport of material, and market conditions.

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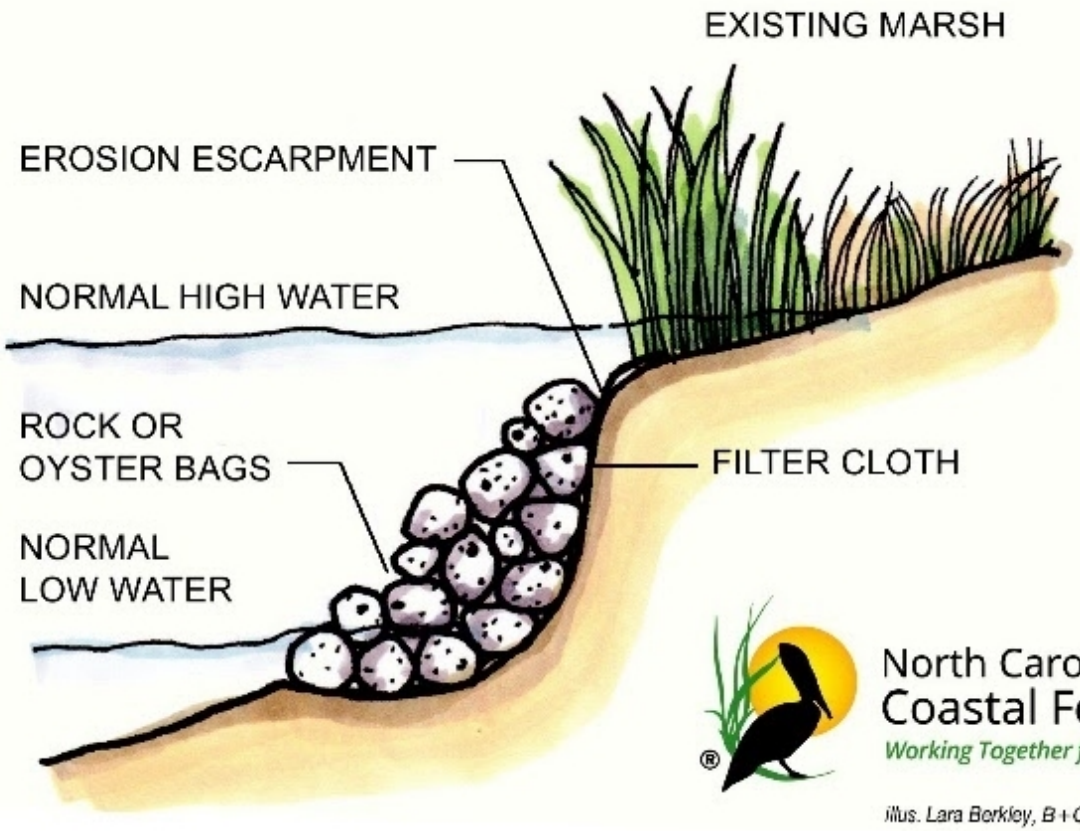
Oyster Shell Bag Living Shorelines

Photo: North Carolina Coastal Federation



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MARSH TOE REVETMENT

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Typical Costs for Oyster Shell Bag Marsh Toe Revetments

Typical construction costs for 50 linear feet*

700 bags, 175 bushels @ $3.00/bushel = $525 (14 bags/lf)

3 rolls of mesh @ $125/roll = $375

Bagging frame = $100

Labor, $5.00 per bag = $3,500

Plantings, 1,500 plants @ $1.00 = $1,500

Total cost = $6,000 or $120/linear ft.

* Note: Costs of stone sills vary significantly by size of structure, mobilization/demobilization costs, location, availability/transport of material, and market conditions

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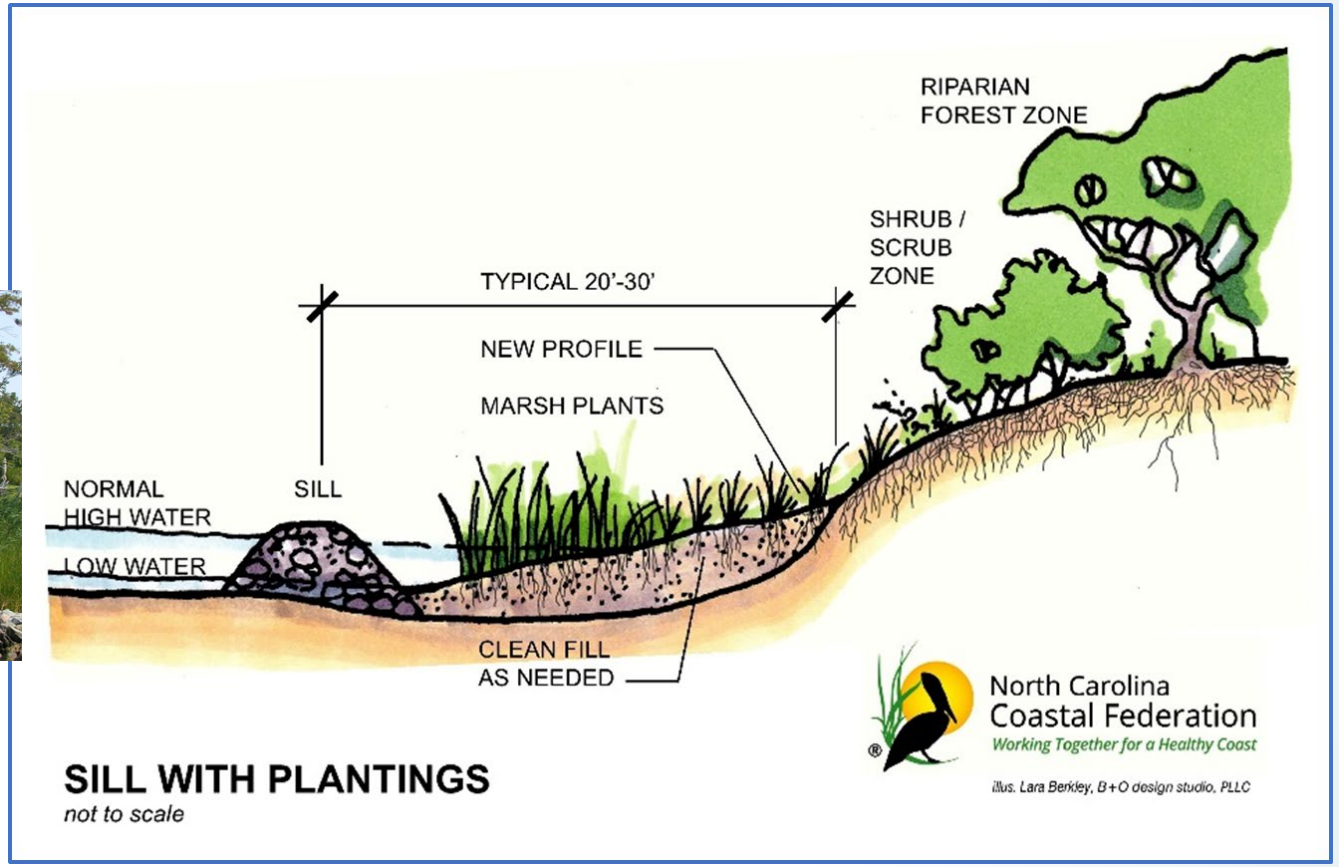
Living Shoreline Sills With Plantings



Typical Costs for Stone Sills

Typical construction costs for 50 linear feet of stone sill *

Stone installed (materials + labor) @ $150-$200/linear foot= $7,500-$10,000

Plantings, 1,500 plants (1,500 square feet) @ $1.00/per = $1,500

Total cost = $9,000- $11,500

* Note: Costs of sills vary significantly by size of structure, mobilization/demobilization costs, location, availability/transport of material, and market conditions

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Oyster Shell Bag Sills at Jones Island

Photo: North Carolina Coastal Federation

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Stone Sills with Marsh Plantings

Photo: North Carolina Coastal Federation

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Stone Sills with Marsh Plantings

Columbia, North Carolina (Albemarle Sound)

Pivers Island, Beaufort, North Carolina
(Beaufort Channel)

Photo: North Carolina Coastal Federation

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Edenhouse Boat Ramp, Chowan

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Edenhouse Boat Ramp, Chowan River Edenton, NC 2020

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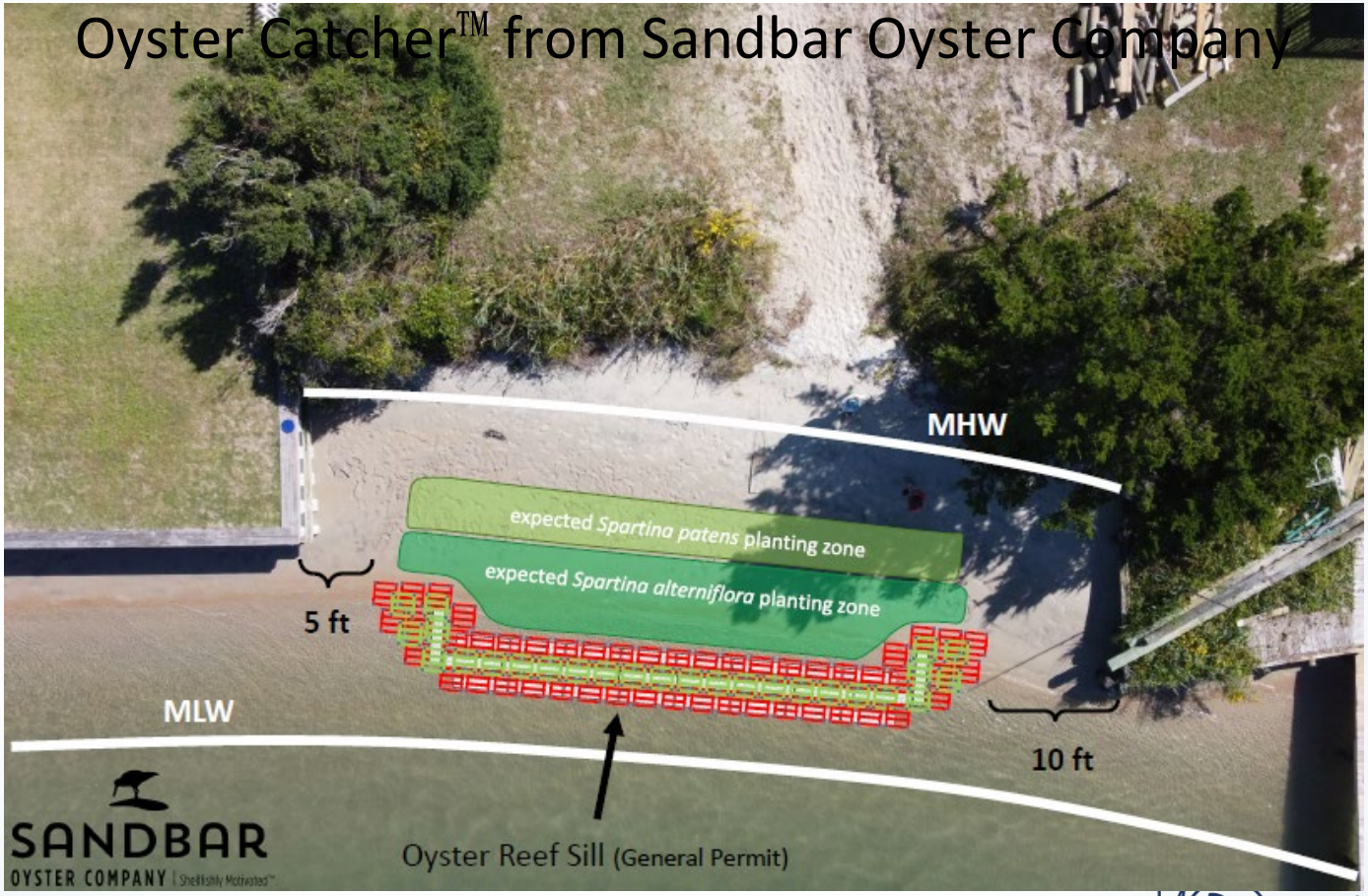
Living Shorelines: Innovative Approaches

Oyster Catcher™ from Sandbar Oyster Company



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Living Shorelines: Innovative Approaches
Oyster Catcher™ from Sandbar Oyster Company

Figure 10. Examples of oyster growth on stacked Oyster Catcher™ Tables (top; 2 tables each stack); rows of single Oyster Catcher™ Tables (bottom) and close-up of oyster growth on Tables (bottom insert) 18 months after deployment in North Carolina.

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Surf City Soundside Park 090622

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Living Shorelines: Innovative Approaches- Oyster Castles®
Oyster Castles® from Allied Concrete alliedconcrete.com

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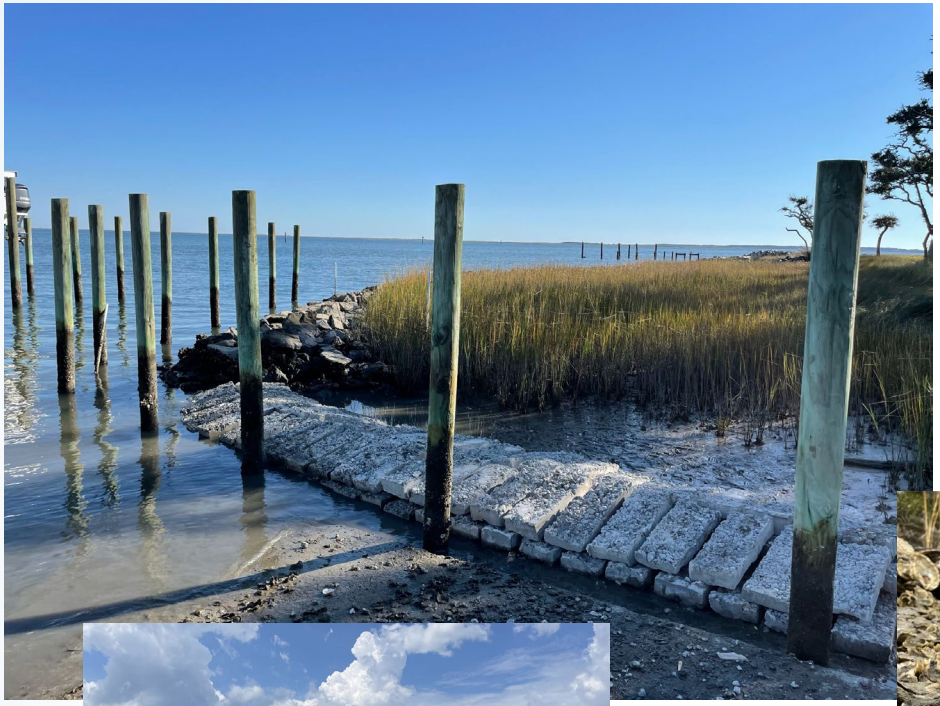
QuickReef™ (Restoration Systems) Living Shorelines



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Bulkhead & Rip-Rap Revetment Enhancement Projects

- Bulkhead or revetment enhancement projects can be utilized when existing structures are already in place or if there are infrastructure conflicts
- Elements such as rip-rap, marsh plantings, or other shoreline plants can provide wave dissipation and habitat
- These features can mitigate the effects of erosion on the existing structures and extend the life of the structure

Photo: North Carolina Coastal Federation

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North Carolina Erosion Control Costs Estimates*

*Costs vary across regions, material costs and market conditions

- **Oyster Sills** (Including Marsh Toe Revetments) with Marsh Plantings
  $100-$250/ linear foot
- **Stone Sills** (Marsh Toe Revetments)
  $125-$300/ linear foot
- **Vertical Wall Sills** (Wood or Vinyl)
  $125-$300/ linear foot
- **Rip-Rap Revetments**
  $150-$500/linear foot
- **Bulkheads**
  $150-$500/linear foot

Costs are based on typical residential settings and conditions

Questions?

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