Coastal Habitat Benefits

Habitat

Shoreline Stabilization

Tourism, Recreation, Aesthetics

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
Shoreline Hardening

- Bulkhead
- Groin/Jetty
- Seawall
- Riprap Revetment
- Breakwater
Changes occur **BELOW** the “mean high water” 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 resilient to hurricanes
- Comparable in cost to bulkheads
Pivers Island Living Shoreline
March 2001
Pivers Island Living Shoreline
Oyster shells applied in 2000 and 2006
Pivers Island Living Shoreline
Pivers Island Living Shoreline

June 2003
Pivers Island Living Shoreline
July 2006
Marshes Dampen Wave Energy
Pivers Island Living Shoreline

After Hurricane Irene – 2011

Shoreline Accreted Sediment
What about hurricanes?

Hurricane Irene 2011
Bulkhead vs. Living Shoreline
Hurricane Irene (2011)

Before

Photos: Rachel Gittman
Hurricane Matthew, 2016

Scour landward of the wall
Monitored living shorelines before and after Hurricane Florence

8 living shorelines monitored along the coast

Image Source: NOAA
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. Edenhouse Boat Ramp, Chowan River – 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}
Woodall Rock Sill – Ocracoke

AUGUST
{1 MONTH PRE STORM}

DECEMBER
{3 MONTHS POST STORM}
St. James Oyster Sill – Wilmington

AUGUST
{1 MONTH PRE STORM}

NOVEMBER
{2 MONTHS POST STORM}
What about habitat?

Bulkhead vs. Living Shoreline
Habitat Comparison
Habitat Comparison
Habitat Comparison
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
Summary

- Hardened structures (bulkheads/riprap) do not provide the ecosystem services that natural shorelines do
- 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 natural materials into a ‘living shorelines’ approach can result in cost-effective, sustainable, and resilient shoreline protection
Pivers Island Living Shoreline