New Jersey Resilient Coastlines Initiative

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Discussion Questions

1. How have you seen municipal perception change in the last 5 years regarding resiliency planning?

2. Which words come to mind when you think of a healthy shoreline for Upper Township?

RETAINING WALL

Steep dropoff from land to water

> Erosion can occur behind the bulkhead

Almost no wildlife along water's edge

'Hard' infrastructure like retaining walls abruptly severs the ecological connection between the coast and water.

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LIVING SHORELINE

Gentle slope from land to water

Wildlife has easy access to water from land

Much more wildlife along water's edge

> Not only do Living Shorelines defend land against destructive waves, but they also provide crucial habitat for fish and wildlife.

Community Benefits of Living Shorelines



Upper Township



Upper Township Shoreline Statistics

- Upland 60%
- Marsh 40%
- Across the township, nearly 20% of the coastline has been experiencing moderate to high rates of erosion.

Shoreline Change – Ocean Dr.



Potential Proposed Technique: Marsh Sill

Marsh Sill

Marsh sills are low elevation structures (e.g., rocks or bagged oyster shell) that run parallel to the shoreline and are below water at high tide. The area between the sill and the marsh is often filled and planted with marsh vegetation to speed up shoreline stabilization.



Restoration Explorer Imagery: Marsh Sill



Ocean Dr. - Project Goals

- Absorb wave energy and strengthen the shoreline
- Reduce erosion impacts
- Increase marsh (re)growth
- Enhance aquatic habitat benefits
- Reduce nuisance flooding along the coastal evacuation route (Ocean Dr.)

Marsh Sill

Key Environmental Conditions

Environmental Condition	Environmental Conditions met	Applicable Range for Marsh Sill	Project location information
Shoreline Change	Depends on selected 10x10 meter square	2 – 4ft/yr	1 - >6ft./yr
Tidal Range	Depends on selected 10x10 meter square	0 – >6 ft.	4.4 ft.
Salinity	Yes	0 – >30 ppt	32 ppt
Wave Height	Yes	<1 - 3 ft.	0.5 – 3.1 ft.
Ice Cover	Yes	Low - Moderate	none
Shoreline Slope	Depends on selected 10x10 meter square	0 -20%	1-26%
Nearshore Slope	Yes	0 -10%	1-10%

Why Potentially Include a Marsh Sill in the Design Process?

- Attenuates waves in moderate energy environments
- Leads to a reduction in erosion
- Enhances sediment accretion
- Enhances aquatic habitat benefits for fish and bivalves

Potential Proposed Technique: Breakwater

Breakwater

Breakwaters are typically constructed parallel to the shoreline and designed to reduce the amount of wave energy experienced by the shoreline directly behind them. Sometimes a vegetated (typically marsh) shoreline is established behind the breakwater. Unlike marsh sills, they are typically constructed in deeper water with more energetic waves. They also tend to be slightly larger and are typically visible at high tide.



Restoration Explorer Imagery: Breakwater



Which Environmental Conditions are Met in this Area?

Erosion Shoreline Change: Yes - 3 feet/year Tidal Range: Not Appilcable Salinity: Yes - 31.9 ppt Wave Height: Not Appilcable Ice Cover: Yes - None Shoreline Slope: Yes - 4% Nearshore Slope: Yes - 4% Total Conditions Satisfied: 7

Map Legend

Number of key environmental conditions met for Breakwater technique

Breakwater Project Location -

Marsh Sill Project Location -

Breakwater

Key Environmental Conditions

Environmental Condition	Environmental Conditions met	Applicable Range for Breakwaters	Project location information
Shoreline Change	Yes	1 – >6ft/yr	1 - 6ft/yr
Tidal Range	Yes	0 – >6ft	4.4 ft.
Salinity	Yes	0 – >30 ppt	31.9 ppt
Wave Height	Yes	<1 - >4ft	3.1ft
Ice Cover	Yes	Low - Highest	none
Shoreline Slope	Yes	0 ->20%	0 - 15%
Nearshore Slope	Yes	0 - >20%	3 -10%

Why Potentially Include a Breakwater in the Design Process?

- Attenuates waves in <u>high</u> energy environments
- They can lead to a reduction in <u>strong</u> wave action reaching the roadway
- A breakwater can provide benefits associated with healthy coastal habitats, including increased habitat for bivalves, SAV, and fish

Shoreline Change – Bayview Dr.

🐧 Map Legend

Boat Ramp

Erosion Rate Shoreline Change

No Change 0.1-3.0 ft/yr 4.1-6 ft/yr >6 ft/yr Accretion

Bayview Dr. - Project Goals

Strengthen the shoreline and combat erosion

 Extend aquatic habitat benefits beyond the boat ramp living shoreline project

Increase sediment accretion & marsh regrowth

Potential Proposed Technique: Marsh Sill

Marsh Sill

Marsh sills are low elevation structures (e.g., rocks or bagged oyster shell) that run parallel to the shoreline and are below water at high tide. The area between the sill and the marsh is often filled and planted with marsh vegetation to speed up shoreline stabilization.



Restoration Explorer Imagery: Marsh Sill

Marsh Sill Erosion Shoreline Change: Yes - 1 feet/year Tidal Range: No - 4.4 feet Salinity: Yes - 31.6 ppt Wave Height: Yes - 1 feet Ice Cover: Yes - 1 feet Ice Cover: Yes - None Shoreline Slope: Yes - 15% Nearshore Slope: Yes - 5% Total Conditions Satisfied: 6

Map Legend

Which Environmental Conditions are Met in this Area?

Number of key environmental conditions met for Marsh Sill technique

Marsh Sill Project Location -

Marsh Sill

Key Environmental Conditions

Environmental Condition	Environmental Conditions met	Applicable Range for Marsh Sill	Project location information
Shoreline Change	Yes	2 – 4ft/yr	1ft./yr
Tidal Range	Depends on selected 10x10 meter square	0 – >4 ft.	0 – 4.4 ft.
Salinity	Yes	0 – >30 ppt	31.6 ppt
Wave Height	Yes	>4 ft.	1 ft.
Ice Cover	Yes	Low - Highest	none
Shoreline Slope	Depends on selected 10x10 meter square	0 -20%	2-26%
Nearshore Slope	Yes	0 -10%	4-5%

Why Potentially Include a Marsh Sill in the Design Process?

- A Marsh Sill can enhance aquatic habitat benefits by creating additional spawning areas for fish
- A Marsh Sill creates a means by which wave energy is reduced before hitting the shoreline.
- Contiguous with current living shoreline plans in Upper Township
- Potentially enhanced water quality benefits

Potential Funding Sources

- NOAA Regional Coastal Resilience Grants Program
- <u>The Department of the Interior Fish and Wildlife Service, Coastal</u> <u>Program</u>
- <u>U.S. Environmental Protection Agency (EPA) Urban Waters Small</u> <u>Grants Program</u>
- <u>New Jersey State Department of Environmental Protection (NJDEP) -</u> <u>Shore Protection Grants and Loans program</u>
- <u>The New Jersey Corporate Wetlands Restoration Project</u>
- <u>Environmental Solutions for Communities initiative</u>

PROJECT PERMITTING

- State Permitting Requirements
- Federal Army Corps of Engineers (USACE)
 Permit
- NJ Bureau of Tidelands Licensing Requirements

IMMEDIATE NEXT STEPS

- 1. Form your team.
- 2. Reach out to engineers and ecologists to verify the results from the Restoration Explorer.
- 3. Determine a timeline for your proposed project.