Living Shorelines

Protecting Property the Natural Way

Indian River Marina, Shoreline Restoration and Beautifying

Background

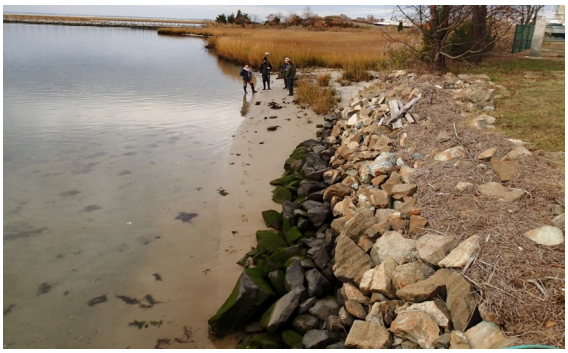
A "living shoreline" is a method of bank stabilization that reinforces the shoreline to protect coastal properties from erosion. This infrastructure enhances water quality, provides habitat for fish and wildlife, improves water quality, and restores wetland areas.

Unlike bulkheads and stone rip rap, living shorelines use natural materials to maintain existing connections between the shoreline and aquatic areas. A number of living shoreline materials and tactics are available, including coconut fiber coir logs, natural fiber matting, recycled shell, and native wetland vegetation.

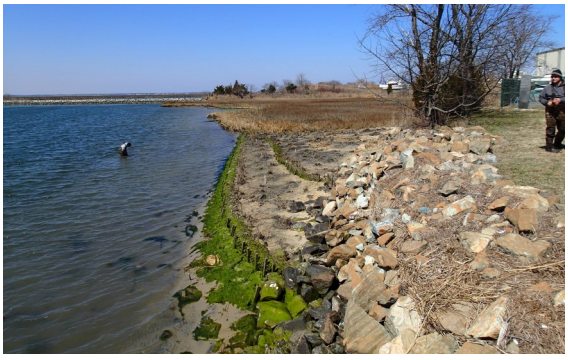
Living shorelines have been built throughout Delaware's coastal regions and are a popular option for bank stabilization because they protect property from erosion while attracting fish and shellfish, filtering polluted runoff, and absorbing wave energy during storms.

See the Site: Rehoboth Beach, DE

Pre-installation winter 2013



Plant installation spring of 2015



Conceptual Plan

Similar concept as the completed shoreline project at the Heislerville Fish & Wildlife Management Area's Marina in New Jersey

May 2010
Coir materials installed prior to planting

June 2011
One year later plants established

Indian River Marina Approach

The goal of this **traditional design** addressed erosion within the existing riprap.

Two uniquely different shorelines were restored at the Indian River Marina in Rehoboth Beach, Delaware.

- The marsh restoration site was constructed to address an undercut and deteriorating existing salt marsh shoreline.
- The rip-rap restoration site was built along a sandy shoreline as an option for greening-up an existing rip-rap structure.

Both sites are exposed to low wave energy, so standard vegetated living shoreline tactics were selected. Shorelines subject to high wave energy may require marsh sills or offshore breakwaters but should only be used when necessary.

Coconut fiber matting and logs were positioned in the intertidal zone before being staked down and tied in place. Oyster shell bags were then arranged in front of the coir logs to further armor the shoreline and absorb wave energy. Following installation, clean sand fill was brought to the restoration sites and graded to the desired elevation and slope before planting with Smooth Cordgrass (*Spartina alterniflora*).

Material Costs

Below is a comprehensive list of materials used for each of the living shoreline sites at the Indian River Marina and their associated costs. Like all shoreline restoration projects, costs can vary greatly depending on the extent of the project, whether sand fill is needed, and if additional structures are installed for higher energy sites. Please note, the costs listed do not include expenses related to labor, surveys, field studies, modeling, design, permitting or special equipment.

This particular project did not use any Cost-Share Program assistance. To aid landowners installing living shorelines on their property, the Sussex Conservation District and DNREC may provide financial assistance. For additional information: https://www.sussexconservation.org/services/agriculture/cost-share-programs.html

Rip-Rap Site (closest to loading dock, 84 linear ft)

Item	Price	Notes	Quantity	Costs	Per ft.
Coir Logs	$127.89	12' x 16" log	12 logs	$1,534.68	$18.27
Coir Mat	$201.60	165 linear ft	1 roll	$201.60	$2.40
Twine	$40.00	1 roll	1 roll	$40.00	$0.48
Spartina plugs	$0.50	1 per sq ft	867 plugs	$433.50	$5.16
4' stakes	$1.95	12 per log	144 stakes	$280.80	$3.34
Oyster shell	$5.00	per linear ft	84ft	$420.00	$5.00
Sand	varies		$500	$500	$5.95
			TOTAL=	$3,410.58	$40.60

Marsh Site (closest to causeway, 48 linear ft)

Item	Price	Notes	Quantity	Costs	Per ft.
Coir Logs	$127.89	12' x 16" log	7 logs	$895.23	$18.65
Coir Mat	$201.60	165 linear ft	1 roll	$201.60	$4.20
Twine	$40.00	1 roll	1 roll	$40.00	$0.83
Spartina plugs	$0.50	1 per sq ft	366 plugs	$183.00	$3.81
4' stakes	$1.95	12 per log	84 stakes	$163.80	$3.41
Oyster shell	$5.00	per linear ft	48 ft	$240.00	$5.00
Sand	varies		$300	$300	$6.25
			TOTAL=	$2,023.63	$42.16

Project Photos

Installation spring of 2014 →

← Post-construction fall 2014

Collaborative Partners

The Delaware Living Shoreline Committee is a voluntary group of state, private and non-profit professionals coordinating research, education, funding and opportunities for projects in Delaware.

DELAWARE LIVING SHORELINES COMMITTEE

Find out more about the committee at delawarelivingshorelines.org

Permitting

State and Federal Permits:

DNREC-State Level Permit Information: Available through the Wetlands and Subaqueous Lands Section at https://dnrec.alpha.delaware.gov/water/wetlands-subaqueous/

U.S. Army Corps of Engineers, Federal Level Permits Information: available through the Philadelphia District & Marine Design Center Website at https://www.nap.usace.army.mil/Missions/Regulatory/Permits/