

# Living Shoreline Creation

## A DOI Nature-Based Solutions Roadmap Fact Sheet



**Living shorelines** combine vegetation planted along a shoreline with structures to hold the vegetation in place<sup>1</sup>. They help to prevent erosion along the shoreline, providing an alternative to gray infrastructure like bulkheads<sup>2</sup>. Most living shorelines include a breakwater or sill composed of bagged oyster shells, granite, eco-friendly concrete, or reef balls. Many living shorelines use a hybrid of gray and green infrastructure components. Living shoreline creation typically involves planting vegetation, installing organic material, constructing oyster reefs or living breakwaters, and adding sills or other holding structures<sup>3</sup>.

### TECHNICAL APPROACH

The following steps are generally used to create a living shoreline:

- Removing any existing coastal barriers, including bulkheads, riprap, and revetments. Temporary breakwaters may be needed to shield the site from high wave energy during construction<sup>4</sup>.
- Creating the living shoreline structure using the selected materials. Options include organic materials like bio logs and coir logs; oyster reefs which can be made of reef balls, bagged oyster shells, or eco-concrete; and sills, which are low stone structures that stabilize vegetation<sup>3</sup>.
- Installing vegetation along the shoreline. This can include riparian, marsh, and submerged aquatic vegetation, depending on site conditions<sup>3</sup>.

### BENEFITS

#### Climate Threat Reduction

- Reduced flooding
- Storm protection
- Sea level rise adaptation and resilience

#### Social and Economic

- Reduced erosion
- Property and infrastructure protection
- Recreational opportunities
- Mental health and well-being
- Jobs
- Resilient fisheries
- Food security
- Cultural values

#### Ecological

- Improved water quality
- Enhanced biodiversity
- Invasive and nuisance species management

## SITE SUITABILITY FACTORS

- ✓ Low-to-moderate wave energy
- ✓ Fetch exposure of between 1 and 5 mi
- ✓ Low-to-moderate erosion
- ✓ Near an existing tidal marsh
- ✓ Shallow bathymetry
- ✗ Frequently covered by thick ice
- ✗ Infrastructure adjacent to shoreline
- ✗ Adjacent to a seawall that will not be removed
- ✗ Extreme water depths
- ✗ Located on a narrow waterway

## EXAMPLE PROJECT

The Nature Conservancy and the US Fish & Wildlife Service, along with other partners, collaborated to create a living shoreline at TNC's Gandys Beach Preserve in New Jersey. The project used oyster castles and bags or clam and oyster shells to construct a living breakwater to reduce erosion, protecting beach habitat for a threatened migratory shorebird, and enhance the oyster population in Delaware Bay.



The first phase of the Gandys Beach project involved placing oyster castles and bagged oyster shells just offshore. Photo credit: [Damon Noe / TNC](#). Public domain.

## REFERENCES

- 1 Olander, Lydia, Shepard Christine, Tallis Heather, Yoskowitz David, Coffey Kara, Hale Christine, Karasik Rachel, Mason Sara, Warnell Katie, Wowk Katya. 2021. "Gulf of Mexico Ecosystem Service Logic Models and Socioeconomic Indicators (GEMS): Living Shorelines." *Nicholas Institute for Energy, Environment and Sustainability, The Hart Research Institute and The Nature Conservancy*. <https://nicholasinstitute.duke.edu/eslm/living-shorelines>
- 2 NOAA. 2023. What is a Living Shoreline? *National Oceanic and Atmospheric Administration*. <https://oceanservice.noaa.gov/facts/living-shoreline.html>
- 3 NOAA. n.d. Understanding Living Shorelines. *National Oceanic and Atmospheric Administration Fisheries*. <https://www.fisheries.noaa.gov/insight/understanding-living-shorelines#:~:text=Installation%3A%20Typical%20living%20shoreline%20treatments,before%20it%20reaches%20the%20shore>
- 4 FFWCC. n.d. "Living Shorelines Training for Marine Contractors". *Florida Fish and Wildlife Conservation Commission*. [https://www.nccoast.org/wp-content/uploads/2021/06/FL-LS-Manual\\_Final\\_.pdf](https://www.nccoast.org/wp-content/uploads/2021/06/FL-LS-Manual_Final_.pdf)

## CITATION

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## KEY RESOURCES

Title and Link	Site Suitability	Design and Construction	Monitoring Guidance	Example Projects
<a href="#">Guidance for Considering the Use of Living Shorelines (NOAA)</a>	✓	✓	—	—
<a href="#">Natural and Structural Methods for Shoreline Stabilization (NOAA &amp; USACE)</a>	✓	✓	—	—

## LEARN MORE

Visit the DOI Nature-Based Solutions Roadmap for more information on living shoreline creation, other nature-based solutions, and principles and considerations broadly relevant for nature-based solutions projects. The living shoreline creation summary includes additional details on each section included in this fact sheet, plus information on operations and maintenance, common barriers, and more resources and example projects.

### Explore the Roadmap



Full Roadmap Document



Living Shorelines Section

[www.nicholasinstitute.duke.edu/roadmap](http://www.nicholasinstitute.duke.edu/roadmap)