



## LIVING SHORELINE CASE STUDY

The western shoreline of Mordecai Island: undercutting and slumping of the marsh edge caused by wave energy. © Bill Shadel/TNC

# Mordecai Island

*The goal of this project is to reduce wave energy reaching the marsh edge, capture sediment, and provide suitable habitat for oyster settlement.*



Mordecai Island is an undeveloped marsh island situated near the densely developed Long Beach Island. The 45-acre island buffers 30 percent of Beach Haven's bayside shoreline, protecting the community from waves and storm

surge. Its deteriorating condition prompted the formation of the Mordecai Land Trust, which purchased the island in 2001 and has been responsible for its stewardship ever since.

The western shoreline of Mordecai Island had severely eroded over decades from storms and boat wakes (the Intracoastal Waterway was moved closer to the island in 1945). In the mid-1980s, the erosion created a cut that split the island fully in two. Since 2006, the Land Trust has been piloting various natural and hybrid living shoreline projects along segments of the island's western shore.

## Project Description

Multiple living shoreline projects were installed along segments of the shoreline. In 2010, sand-filled geotube sills were installed. In 2017, '18, and '19, a series of Oyster Castle® breakwaters and sills were constructed. All of the project management and construction labor was provided by volunteers, saving significant cost.

## Overview

### Living Shoreline Type

Breakwater, Marsh Sill

### Project Location

Beach Haven, NJ

### Lead Organization

Mordecai Land Trust

### Point of Contact

Jim Dugan, Vice President, Mordecai Land Trust, jimdugan@comcast.net

### Land Owner

Mordecai Land Trust

### Project Funders

(2018 breakwater and sills):  
Mordecai Land Trust, Atlantic City Electric, The Nature Conservancy

### Project Team

(2018 breakwater and sills):  
Mordecai Land Trust, ReClam the Bay, USFWS Partners Program

# Beach Haven, NJ: Mordecai Island Living Shoreline

## Features of this living shoreline



Geotube sills (top): Installed in 2010, two heavy-duty polypropylene tubes filled with fine sand were installed parallel to the shoreline to intercept oncoming waves. Oyster Castle® Breakwater (center): Units were assembled in a larger pod to form a breakwater a few units were seeded with oyster spat to jump-start shellfish settlement (Mordecai Land Trust). Marsh sills (bottom): Oyster Castles® were assembled in smaller pods along the marsh edge to stem erosion, trap sediment, and encourage plant growth (Mordecai Land Trust).

The Land Trust has approached each of these installations as a way to learn and inform future work. Therefore, they have a robust monitoring plan: shoreline position, wave attenuation (of the breakwaters), and nearshore bathymetry. In addition, monitoring is performed on nesting birds (including threatened and endangered species) and other wildlife, such as diamondback terrapins. Adaptive management and maintenance of the living shoreline features is ongoing.



### Project Champion

**Jim Dugan**

Jim Dugan has dedicated several years of his life to Mordecai Island. A business owner and engineer, Jim has led the restoration efforts at Mordecai Island, donating countless hours to protecting and restoring the shoreline of Mordecai Island. It was Jim's responsibility to install the island's first living shoreline feature (the geotube sills) and he managed the entire process. He has led many volunteer workdays to build the breakwaters and marsh sills and continues to share the lessons learned from the project.

### Costs

**Note:** Below is the cost breakdown for the breakwater and five sills installed in 2018. Because so much of the work at Mordecai Island—project management, design, permit applications, construction labor, and some monitoring—is done by volunteers, the costs have been very low.

**Total 2018 Project Costs \$41,650**

