

Living Shoreline Case Study

Seagrass Plantation Living Shoreline, Dagsboro

Douglas Janiec, Sovereign Consulting Inc.

Project Details

Goals:

- Stop shoreline erosion
- Restore beach and marsh habitats

Energy Environment:

- High (back bay)
Strong, persistent westerly wind-borne waves in fall and winter, nor'easters, breached abandoned sluice flows

Construction Dates:

- 2018: Fall, 2-3 weeks
- 2019: Spring, plantings only

Partners:

- Seagrass Plantation Community Association
- Delaware Center for the Inland Bays
- Sovereign Consulting Inc.

See the Site Before and After

Pre-installation May 2018



Post-installation May 2020



Baseline Conditions

Rapid shoreline scouring resulting in loss of beach, marsh, and horseshoe crab spawning habitat

May 2018
Beach at low tide



May 2018
breached abandoned sluice



Baseline Conditions

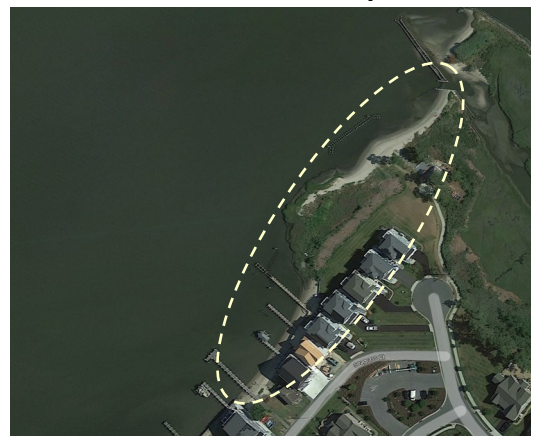
Issues:

- Rapid beach erosion in excess of 4ft. per year, loss of low marsh, up to 3ft. per year, loss of horseshoe crab spawning habitat

Site Characteristics/Important Features to Consider:

- Maximum and cost effective design for resilient beach restoration benefitting both wildlife and residents of community
- Improvement of low dune formation for storm protection
- Provide a solution with acceptable aesthetics
- Community outreach and involvement

Post-installation: July 2022



Living Shoreline Installation

Design Elements:

- Two nearshore reefs
- Extensive shell bag marsh toes
- Breached sluice retrofit
- Plantings

Permitting:

- State—Delaware Statewide Activity Approval (SAA) for Shoreline Stabilization Projects
- Federal—Army Corps Nationwide Permit No. 27 for Aquatic Habitat Restoration

Materials and Placement:

- Reef 1 double row array of WADs half of main northeastern shoreline
- Reef 2 double array of oyster castle/shell bag composite at corner of southwestern shoreline
- Free standing shell bag toe (more than 3,500 shell bags)
- Bulkhead and vertical control for sluice retrofit

Monitoring Efforts

Metric	Method
Shoreline position	Land survey off of established benchmarks
Reef settlement	Ground survey
Structural integrity	Visual inspection
Vegetation coverage	Stem count and stem height
Oysters recruitment on WADs	Estimate coverage based on observation
Impingement inspections	Visual inspection

Measured Environmental Results

- Landward of WADs, MHW line moved more than 30ft. channelward
- All installed structures and reefs remained in good condition
- Horseshoe crabs are once again spawning on the beach
- Southern beach gained vertical elevation by more than 14inches and MHW line moved channelward more than 15ft. in certain areas
- Shell bag toe stopped horizontal marsh erosion
- Successful community outreach and monitoring participation
- Project goals exceeded

Adaptive Management/Lessons Learned

Design Elements:

- The free standing shell bag toe required bimonthly inspections and restacking of some of the top rows of shell bags. Future installation recommend anchoring
- Southern nearshore reef ~100ft. long, restored more than 300 linear ft. of beach due to its strategic location
- Added additional plantings with single shell bag toe, with great success
- Accretion volume higher than expected

Project Photos

May 2019

WADs after approximately 7 months



October 2018

Oyster castle/shell bag reef at blowout tide



September 2022
Oyster recruitment on WADs



October 2018
Sluice retrofit

