



# Assessing Ecological and Physical Performance of Sustainable Shoreline Structures

## Overview

### Project Location

Hudson River Estuary, New York

### Project Duration

September 2015 to December 2018

### Project Lead

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### Project Type

Collaborative research – generating science that informs decisions

### Products

- [Rapid Assessment Protocol Manual](#) that describes simple, low-cost methods for evaluating the function and integrity of ecologically enhanced shoreline projects and includes worksheets to guide data collection.
- [Website](#) that hosts the Rapid Assessment Protocol Manual and connects the project to prior work and associated resources.

### Project Partners

- Cary Institute of Ecosystem Studies
- Consensus Building Institute
- Hudson River National Estuarine Research Reserve
- Stevens Institute of Technology

Nature-based, ecologically enhanced, or soft shoreline stabilization techniques (hereafter termed “sustainable shorelines”) have the potential to maintain and enhance important ecological services, provide greater resilience to physical forces, and be cost-competitive with traditional approaches, such as revetments and bulkheads. Wider application and acceptance of these techniques in the Hudson River Estuary requires local evaluation of their performance. Landowners, site designers, and decision makers in the region expressed this need to increase their confidence in proposing innovative designs to clients, investing in sustainable shoreline construction, and steering permit applications toward these less traditional options.

From 2010 to 2018, the National Estuarine Research Reserve System’s Science Collaborative supported several phases of the Hudson River Sustainable Shorelines Project, which engages a regional research team to quantify the ecological functions and physical stresses on the full range of Hudson River shorelines. This research is the basis for development of information and tools to identify the best settings and approaches for shoreline stabilization in the Hudson River Estuary.

This work has included the establishment of a distributed demonstration network of seven sites—with varying modes of sustainable shoreline construction—along the Hudson. The most recent project, and the focus of this fact sheet, expanded that effort by working closely with regulators, engineers, and land managers to 1) develop and field-validate a rapid assessment protocol manual for physical and ecological functions of ecologically enhanced shorelines; and 2) train local land managers in the protocols.

## Project Approach

The project was led by researchers from the Cary Institute of Ecosystem Studies, the Stevens Institute of Technology, staff from the Hudson River Research Reserve and collaboration facilitators from the Consensus Building Institute. Their approach consisted of the following elements:

- A collaborative structure that involved both a coordinating team and an advisory committee to engage users and seek their input throughout the project;
- Refinement and validation of an ecological rapid assessment for application at the sites in the demonstration network;
- Development of a physical assessment to complement the ecological assessment. This work expanded upon prior forensics analyses of shoreline performance completed after major storm events;
- Data collected through the application of these assessment protocols; and
- Training of local land stewards and land managers in these techniques so they can track how well their shorelines are performing, physically and ecologically.

## Benefits

This work helped solidify confidence in the suitability of novel shoreline techniques in the Hudson River Estuary and enabled local managers to track performance into the future. The project also resulted in the following benefits:

- Local data for ecological and physical performance of sustainable shorelines have been collected, establishing baseline conditions and creating a foundation for monitoring into the future;
- A common database now exists for tracking local sustainable shoreline performance;
- Local land stewards and managers are trained and committed to track sustainable shoreline performance, especially after major storms or modifications;
- Consultant engineers have access to performance information for local demonstration sites and can use it to inform design considerations with clients;
- State and federal regulators, as well as those funding shore zone projects, have examples of the feasibility and performance of more sustainable treatments, which will support their ability to guide applicants toward innovative, more ecologically enhanced approaches to stabilization;
- State and federal regulators are able to direct permit and grant recipients and their engineers to the protocols as an element of required performance monitoring; and
- The Sustainable Shorelines Project and the Rapid Assessment Protocol positively contributed toward the development of a statewide shoreline monitoring framework, as one of the first efforts in New York to support and promote improved understanding of living shorelines.

## What's Next

Following completion of the project in 2018, local land stewards have continued to collect observations on particular sites to track performance over time. New sites with sustainable shoreline designs will be assessed as they are planned and built. For example, a side channel restoration at Gays Point was assessed in the first year following construction.

### About the Science Collaborative

*The National Estuarine Research Reserve System's Science Collaborative supports collaborative research that addresses coastal management problems important to the reserves. The Science Collaborative is managed by the University of Michigan's Water Center through a cooperative agreement with the National Oceanic and Atmospheric Administration (NOAA). Funding for the research reserves and this program comes from NOAA. Learn more at [coast.noaa.gov/nerrs](http://coast.noaa.gov/nerrs) or [nerrsciencecollaborative.org](http://nerrsciencecollaborative.org).*