

Stay in touch

The NERRS Science Collaborative is committed to sharing information about the projects we fund in the most effective way we can. Updates about this project will be communicated through nerrs.noaa.gov, webinars, conferences, and meetings. If you would like to stay in touch with this project, contact our program coordinator, Cindy Tufts: cindy.tufts@unh.edu

For information about the applied science, contact Betsy Blair, manager, Hudson River NERR, New York State Department of Environmental Conservation (NYS DEC), at 845.889.4745 ext. 113, or bablair@gw.dec.state.ny.us

For information about the collaborative aspect of this project, contact Emilie Hauser, outreach and coastal training program coordinator, Hudson River NERR, at 845.889.4745 ext. 112, or eehauser@gw.dec.state.ny.us

Sustainable Shorelines:
<http://www.hrner.org/hudson-river-sustainable-shorelines>

What's happening?

A team led by the Hudson River National Estuarine Research Reserve (NERR) received funding to assess shoreline stabilization treatments in the wake of three historic storms, including “super-storm” Sandy. The team is using collaborative techniques to work with stakeholders to study why some stabilization treatments along the Hudson River Estuary were badly damaged and failed during these storms, while others survived. The project includes a forensic engineering analysis to determine the critical factors that contributed to each treatment’s performance in extreme weather events. The team will share findings from this project with Hudson River communities as they plan for climate change.

Why this project?

Shorelines, tidal wetlands, and aquatic vegetation along the Hudson River Estuary are at risk from impending shoreline changes associated with development, larger and more frequent storms, and sea level rise. Tropical storms Irene and Lee in 2011 and Sandy in 2012 damaged some shoreline stabilization structures along the Hudson River Estuary, while other structures had only minimal damage. As communities continue to rebuild or modify their shorelines, the project will help landowners, developers, and



The Coxsackie, New York, waterfront is an example of natural shoreline restoration that provides erosion protection and improved habitat.

engineers to protect infrastructure from erosion while also enhancing or conserving natural shoreline ecology.

This project is building on the Hudson River NERR-led Sustainable Shorelines Project, which has provided science-based information about best shoreline management options over the past six years. The team has worked collaboratively with engineers, landscape architects, regulators, municipal officials, and public land managers to provide recommendations. These groups now want to know what shoreline treatments were resilient and which failed under severe weather conditions.

Using collaborative processes, this project is assessing performance of both traditional hard engineered, and non-traditional ecologically enhanced, shoreline stabilization approaches under extreme weather conditions. With \$229,183 in funding, the team will provide perspective on, and augment the Sustainable Shorelines Project findings. Results will guide future recommendations and investments in demonstration sites.

[Learn more on back page...](#)

About the funder

The NERRS Science Collaborative puts Reserve-based science to work for coastal communities coping with the impacts of land use change, stormwater, non-point source pollution, and habitat degradation all in the context of a changing climate. Our threefold approach to connecting science to decision making includes:

- Using a competitive RFP, we fund projects that incorporate collaboration and applied science to address coastal management problems identified as priorities for Reserves and their communities.
- Transfer of knowledge: Through our transfer program, the science we fund is shared throughout the NERRS and the communities they serve.
- Graduate education: Through TIDES (Training for the Integration of Decision Making and Ecosystem Science), a non-thesis Master's degree program hosted by the University of New Hampshire, we train the next generation of professionals to link science to coastal decision making.

The program operates by a cooperative agreement between the University of New Hampshire (UNH) and the National Oceanic and Atmospheric Administration.

Learn more at....
[nerrs.noaa.gov/
ScienceCollaborative.aspx](http://nerrs.noaa.gov/ScienceCollaborative.aspx)



Shoreline treatment at Esopus Meadows, New York, incorporated natural features, to improve habitat and recreational access (left). The wrack line after “superstorm” Sandy is about 7 feet above the mean high water line (right). (Photo credit: Sven Hoeger)

How will this project work?

The Hudson River Estuary region was intensely affected by three recent severe tropical storms, Irene, Lee, and “superstorm” Sandy. Shoreline stabilization treatments varied in their ability to prevent damage to the shore, adjacent land, and the built environment. Isolating the causes of failure and reasons for success of various shoreline stabilization approaches has important implications for coastal management. This project team will work collaboratively with key stakeholders to conduct a forensic engineering analysis of those treatments.

A Research Team of project scientists and collaborative leads manages the project and moves it forward, and a Technical Advisory Panel of stakeholders provides input to ensure the research is relevant and useful.

The groups have identified six study sites with either hard engineered or ecologically enhanced stabilization.

Researchers are collecting all available information about the sites, including design drawings, permit applications, and historical and recent aerial photography. Field surveys are being conducted to examine the structure, adjacent areas, and assess the ecological and physical conditions.

A high resolution numerical model (NYHOPS general circulation model) will be used to replicate or hindcast the conditions of the three storms: deriving physical data about storm surge, currents, vertical shear, mixing, and wind waves at each site.

Together the numerical model results, desk studies, and field data will provide a picture of the conditions during each storm. Key questions will be addressed in the analysis:

- What factors were critical in the success or failure of each treatment?
- What aspects of structural design were pivotal in determining survival or failure?
- What were the impacts of water levels and currents?
- Did vegetation factor into the success or failure of the treatment?
- Were there patterns among structures that survived or failed?

The team will provide reports for each site and an overall summary, as well as a technical report, journal publication, workshop, and website update at www.hrner.org/hudson-river-sustainable-shorelines.