

Small-scale Coastal Adaptation Projects: effective in big ways



Rhode Island shorelines are eroding, and coastal properties and public infrastructure are becoming more vulnerable as sea levels rise. As a result, Rhode Island communities and property owners are investigating options for erosion control and flood prevention. Save The Bay and CRMC, with funding from NOAA, conducted an assessment of coastal erosion and flooding impacts to municipal properties throughout the state. This assessment resulted in 13 coastal adaptation projects that employ a variety of alternatives to traditional shoreline hardening. These alternative methods of addressing coastal erosion and flooding include: non-structural shoreline protection using natural materials; bank re-grading; removal of coastal infrastructure; stormwater treatment; coastal buffer planting; dune restoration; intertidal shellfish reefs, and hybrid techniques that combine hard materials with vegetation.

The assessment examined the suitability of these various shoreline adaptation techniques for locations in Narragansett Bay and Rhode Island's southern coastal ponds. Projects were completed in Warwick, Barrington, Warren, Bristol, Newport, and Cranston. These projects are all examples of small-scale efforts that are relatively low-cost and simple to construct, but can still have significant environmental and public access benefits. More information on these projects will be available at www.crmc.ri.gov/coastalresilience.html, as well as Save The Bay's web site: www.savebay.org.

Rhode Island's shoreline is eroding and migrating inland.

Sea level rise, wave energy, and other shoreline dynamics contribute to landward shoreline migration in R.I. Hardened shoreline structures can interfere with this natural process, and negatively impact habitat and public access. This leaves homeowners and municipalities with difficult decisions about how to protect their property. The coastal adaptation projects undertaken by Save The Bay and CRMC showcase alternatives to shoreline hardening.

Long-term shoreline erosion rates are available from the CRMC's shoreline change maps at www.crmc.ri.gov/maps/maps_shorechange.html. The CRMC's Sea Level Affecting Marshes Model (SLAMM) for RI is a planning tool that shows where marshes might migrate inland with future sea level rise (www.crmc.ri.gov/maps/maps_slamm.html).

Bank re-grading and erosion control

At the beach at **WACK** **K** erosion had damaged an existing boardwalk. The boardwalk was removed, and the slope reduced to increase the beach area and lessen erosion from waves.

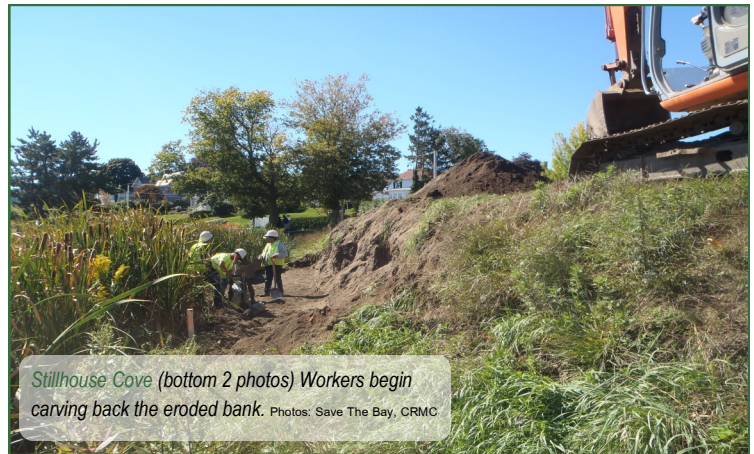
V, a small waterfront park in Cranston, had a severely eroded bank which was a safety hazard. The steep bank was carved back to make a gentler slope to reduce wave energy and lessen erosion. Sand-filled coir tubes were added to the bank in a step formation, then covered and planted with native grasses. During recent storms, the upland edge of the beach and grassy park area in **K** in Newport had



Warwick's City Park (first 2 photos). CRMC's Janet Freedman stands at the eroded bank.



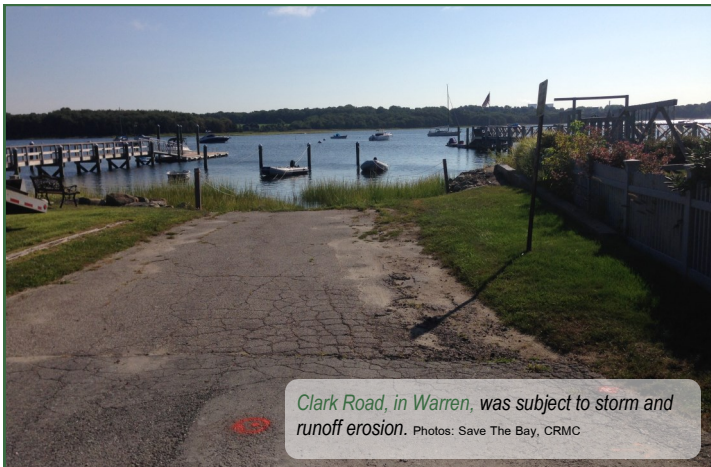
The newly re-graded shoreline.
Photos: Save The Bay, CRMC



Stillhouse Cove (bottom 2 photos) Workers begin carving back the eroded bank. Photos: Save The Bay, CRMC



Save The Bay's Wenley Ferguson stands beside the coir tubes, laid in a stepped formation.



Clark Road, in Warren, was subject to storm and runoff erosion. Photos: Save The Bay, CRMC

eroded, and the bank was undercut. Coir logs and tubes were installed along the eroding bank and covered with sand to create a gentler slope. The access road into! V in Barrington had eroded at the base. Sand-filled coir tubes were installed, and beach grasses were planted.

Infrastructure Removal

" " C suffered from erosion due to wave energy and stormwater runoff at a number of locations. A section of the parking lot was removed at the western end, the remainder of the lot was moved inland 10 feet, and a dune created and grass planted in the now unpaved area.

End-of-Road Retrofits

Many roads along the shoreline suffer from erosion from coastal flooding, storm events, and stormwater runoff. The following projects were designed to address these issues while preserving shoreline habitat and public access.



At Clark Road, pavement was removed and a filter strip installed to improve stormwater infiltration.

◆ CK M ! V Bristol- stormwater infiltration added to formerly paved area, shoreline re-graded;

◆ K Warren- pavement removed, coir tubes installed at bank edge, then planted with marsh plants to enhance existing marsh; filter strip installed;

◆ V Warwick- pavement removed, filter strip installed, site planted;

◆ V ! V , Warwick- pavement removed, a filter strip was installed;



Mill Cove Road, in Warwick, was subject to rain and storm event flooding. Photos: Save The Bay, CRMC

◆ CK ! V , Warwick-pavement removal and filter strip installed.

Dune creation and planting

Z " C , in Newport, experienced significant storm-driven erosion and sand overwash onto Ocean Drive during Superstorm Sandy. A small sand dune was restored and planted by volunteers with dune grass. The dune has reduced flooding of Ocean Drive during storm events.



Pavement was also removed at the end of Mill Cove Road, and the area revegetated.



Pictures of Barrington Beach— (Top left) Before: erosion is evident at the western end of the parking area. (Top right) After: the parking lot is reduced in width and beach grass planted. (Right) After: Parking lot pavement removed, beach grass planted. This project also included the installation of stormwater infiltration practices to address runoff from the adjacent streets. (Photos courtesy of Save The Bay)



Adaptation project information

End-of-road projects

Bristol: Kickemuit Ave
Partner: Town of Bristol
Project Cost: \$20,013

Warren: Clark Road end of road retrofit
Partner: Town of Warren
Project Cost: \$10,577

Warwick end of road retrofits
Partner: City of Warwick, Riverview Neighborhood Association
Mill Cove Road: \$10,700
Rock Ave: \$5,375
Pender Ave: \$4,200
Van Zandt Ave: \$4,200
Grove Ave: \$4,375

Bank grading and stabilization

Allins Cove bank stabilization
Partner: Allins Cove Neighborhood Coalition, Barrington Land Trust, Town of Barrington, US Army Corps of Engineers
Coir envelope installation: \$5,321

Kings Park coir envelope installation
Partner: City of Newport
Project Cost: \$20,282

Stillhouse Cove bank regrading
Partners: City of Cranston, Edgewood Waterfront Preservation Association, NOAA, NRCS
Project Cost: \$28,678

City Park bank regrading
Partner: City of Warwick
Project Cost: in-kind regrading/boardwalk removal by City

Infrastructure removal and dune creation

Barrington Beach parking lot removal and dune creation
Partner: Town of Barrington

Dune restoration

Hazard Beach dune creation
Partners: City of Newport, Hazard Beach Association
Project Cost: in-kind Save The Bay, \$552 for plant costs

* For more project information, contact Wenley Ferguson, Save The Bay at WFerguson@SaveBay.org