CASE STUDY: HAVERSTRAW BAY PARK

HUDSON RIVER SUSTAINABLE SHORELINES

The Hudson River Sustainable Shorelines Project is a multi-year effort lead by the New York State Department of Environmental Conservation Hudson River National Estuarine Research Reserve, in cooperation with the Greenway Conservancy for the Hudson River Valley.

The Project is supported by NOAA through the National Estuarine Research Reserve System Science Collaborative.

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OVERVIEW

The park shoreline, originally built in 2003 was improved with a less-is-more maintenance plan and redesign after being damaged by Hurricane Sandy in 2012 to include a wide buffer zone of native vegetation between the mowed park lawn and cobble beach at the water's edge. This redesign protects and enhances shoreline habitat, accommodates public access to the water, pro-vides riverfront views, and allows for other recreational activities.

LOCATION & ACCESS

Haverstraw Bay Park is in the Village of West Haverstraw, New York, located at the end of Gagan Road off of Beach Road. It is on the west side of the Hudson River at river mile 33. The site is a county park which is open to the public from dawn until dusk and is accessible from the water by motorized and paddled boats.

PARTICIPANTS

Owner: County of Rockland
Manager: R. Allan Beers, Coordinator, Rockland County Division of Environmental Resources; Mike DiMola, County Park Operations Manager, Rockland County Division of Environmental Resources
Design: McLaren Engineering Group, LLC
Cost: $60,000
Project Timeframe: 2 years

BACKGROUND AND STORY

The site of Haverstraw Bay Park was once a heavily industrialized brick yard from the 1770s to the 1920s. It became the staging site for the construction of Pier-57 and the Tappan Zee Bridge in the 1950s. To accommodate those projects two embayments were built, resulting in the box-like form of the shoreline, (See Figure 1. Map from year 2008 by Rockland County Planning Department focusing on amenities and paths.) The remnant timber piles for the staging are still visible in the southern embayment. (See Figure 2) The site was mostly vacant until it was purchased by the County of Rockland in 1999. The park was built be-tween 2001 and 2003 and included gazebos, playgrounds, a double-wide boat launch, park office and a pedestrian bridge outfitted with fishing stations. The shoreline was protected by stone rip-rap and steel bulkheads capping the peninsulas, with planted beds and manicured lawn at the top of the banks. In 2003, the September 11th Memorial was built. In all, it is 27 acres of open space located on the widest part of the Hudson River, Haverstraw Bay.

Keeping up the manicured lawn, planting beds, and controlling the volunteer plants in the rip-rap was already becoming an operations and man-power problem by the time that Hurricane Sandy damaged the park in 2012. Sandy flooded the entire park, including the park office building 100 feet from the river. A large amount of debris littered the park after the storm and plants were torn from the ground. The pedestrian bridge that crossed the southern embayment was completely destroyed. However, according to County Park Operations Manager Mike DiMola, "the northern section of the shoreline without rip-rap fared better (than other areas) after Sandy." As a result, the County ended its practice of cutting back plants on the shoreline. Through a grant from the Sandy Hurricane Relief Fund and FEMA, they planned to reconstruct the shoreline by replanting native vegetation and regrading eroded banks.

ASSESSMENT, PLANNING & DESIGN

The original (2001-2003) design consisted of rip-rap revetments along the shoreline and interior embayments. Sheet pile bulkheads fortified each of the rectangular peninsulas. The beach sediment is made up of sand, cobbles, and broken brick pieces from historical brickyards. The hard built shoreline protected the park. There were no vegetated buffer zones between water hard-engineering and lawn. Buffer zones of native plants and wrack (decaying vegetation washed in by the water) and woody debris is ecologically valuable.

After Hurricane Sandy, the Park was approved for FEMA funding to repair and restore the shoreline. A decision was made to regrade undercut banks and add native plants instead of replacing lost rip-rap.

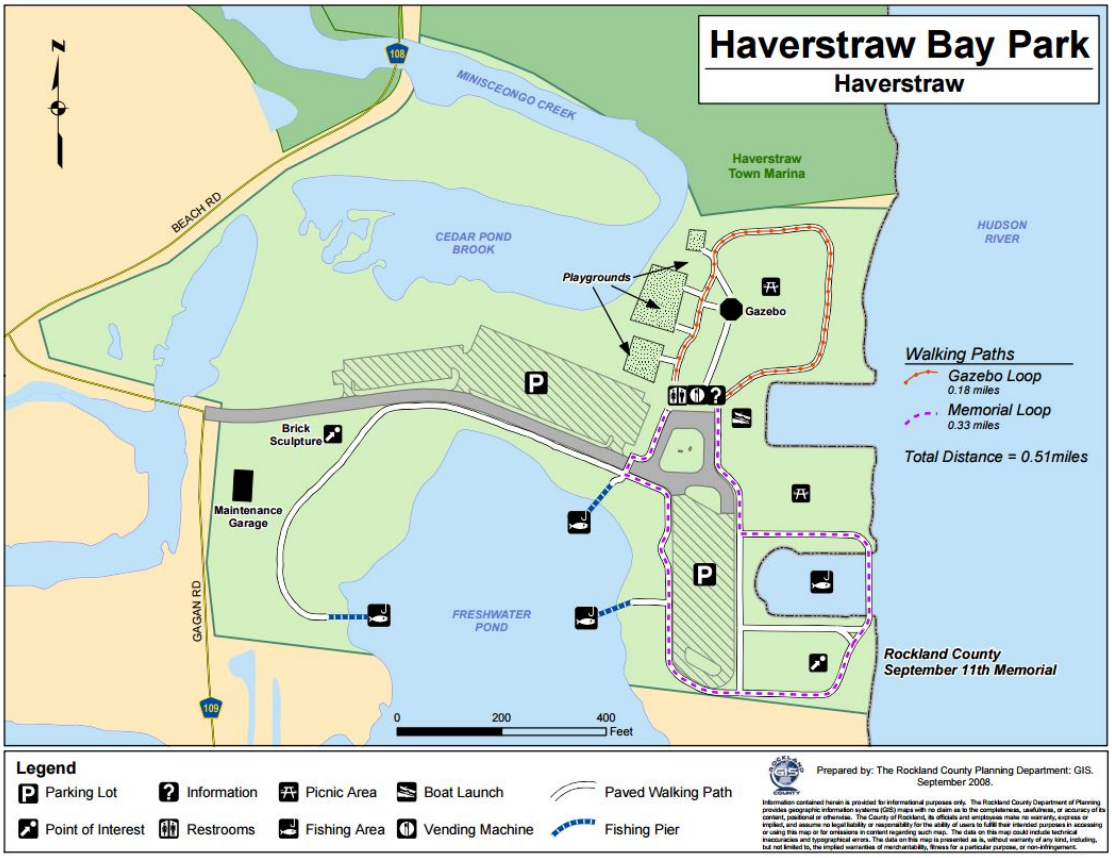

Figure 1. Map from year 2008 by Rockland County Planning Department focusing on amenities and paths

Figure 2. View west from southern embayment at low tide. Yellow flag iris, false indigo and other plantings in the rip-rap. Remnant steel piles from prior industrial activity are visible. Native false indigo shrubs have self-seeded and are cut-back annually.

Figure 3. View of north shore zone looking north, with rip-rap, cobble and brick beach, woody debris and vegetated slope.

Figure 4. View from northern beach looking to the south. From left to right: displaced rip-rap, wrack line, and transition zone between native planting buffer (not yet planted for this year in early summer 2016). There was some re-grading of this low slope area at the far left where low banks were undercut.

Figure 5. View from southern beach looking west at growing vegetation in the late summer. Wrack-line with large woody debris and brick cobbles visible.

PLAN IMPLEMENTATION

Shoreline Restoration Design:
In 2015, the engineering firm McLaren was brought on to design a softer shoreline, per the County's specifications and needs. Undercut banks caused by erosion were regraded to smooth the slope between the upland and lowland elevations using clean fill, compost, and sand mixture. Both the north and the south beach have low slopes. Native perennials and grasses were interplanted among the existing vegetation along the shoreline (see textbox). Shredded leaf mulch was used as compost around all new plantings. Any exposed synthetic geotextile underlying the original armoring was cut away.

Plant species used:
Trees:
- *Acer rubrum* (red maple)
- *Sassafras albidum* (sassafras)

Grasses:
- *Panicum v.* ('Shenandoah' switchgrass)
- *Panicum v.* ('Cape Breeze' switchgrass)
- *Bouteloua curtipendula* (sideoats gramma grass)

Shrubs:
- *Aster oblongifolius* (New York aster)
- *Solidago* ('Solar Cascade' milkweed)
- *Baptisia a.* (blue false indigo)
- *Amorpha fruticosa* (false indigo bush)
- *Rosa virginiana* (common wild rose)

Maintenance:
County Park Rangers installed a temporary fence to keep people from walking through the native plant area to get to the beach. This allows the plants to naturalize. Park staff trim exposed geo-textile as needed. Native plants that self-seeded in the remaining rip-rap are weed-whacked annually in the fall to allow the roots to grow while keeping the height of plants low in order to afford views of the river. As a policy, the shoreline is now no longer "cleaned;" all wrack and driftwood are left on the shore.

Public access:
The design of the northern section of the park encourages public access to the water but the southern section does not. It is understood that people will create social trails to the water and these may be formalized later.

Other park improvements:
During the same project but unrelated to shoreline restoration, an application for NYS DEC Hudson River Estuary Program grant funding was submitted towards the construction of a ADA-accessible kayak and canoe launch, the boat launch and docks will be renovated, and the pedestrian bridge with handicap accessible fishing stations was replaced in September of 2016.

LESSONS LEARNED

There are many unexpected benefits of leaving shoreline vegetation to grow in addition to lowered maintenance costs. R. Allan Beers, Coordinator of Rockland County Division of Environmental Resources said: "Working with our NYS DEC partners allowed us to realize the many benefits of transistioning from a "hardened" shoreline to a more "eco-friendly" shoreline. County Park Manager, Mike DiMola said: "We saved money, worked less, and did something more natural all at the same time." He also wanted to make clear that "[we are] transitioning our management plan from actively manicured landscape into a natural habitat."