



CASE STUDY: HABIRSHAW PARK TIDAL MARSH SHORELINE

OVERVIEW

A degraded industrial shoreline was restored to a functioning brackish tidal marsh protected by a sill and an adjacent dune with native vegetation. The restoration project took place in a public park, providing an outdoor classroom where students and the public can experience a tidal marsh and natural shoreline.

LOCATION & ACCESS

Habirshaw Park is in the City of Yonkers, New York, located on Alexander Street at the site of the Beczak Environmental Education Center. This site is open to the public. It is located on the east side of the Hudson at river mile 18.

PARTICIPANTS

Owner: Westchester County

Manager: Beczak Environmental Education Center

Design: Creative Habitat Corp. & Westchester County Planning

Contractor: Burtis Construction Co.

Cost: \$515,234

Grants Received: New York State Environmental Protection Fund (\$250,000) and National Fish & Wildlife Foundation (\$50,000)

Project Timeframe: 2003-2004



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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BACKGROUND AND STORY

Habirshaw Park has a history of industrial use as the site of a manufacturing facility for Habirshaw Cable & Wire. In the 1950s, the Naval Militia Reserve and the Habirshaw Social Club used the buildings for recreational facilities. However, the buildings were later neglected and fell into disrepair. Soils contaminated with industrial debris, heavy metals, and petroleum were a legacy of the industrial use.

Westchester County purchased the Habirshaw Club property in 1999 with financial support from Scenic Hudson. In addition to committing to repay Scenic Hudson, Westchester County granted Scenic Hudson a conservation easement limiting property development to use only as a public park for recreational and educational purposes. The shoreline stabilization project was managed and funded by Westchester County with additional help from the NYS Office of Parks, Recreation and Historic Preservation and the National Fish & Wildlife Foundation.

The overall project goal was to clean up the parcel, restore the shoreline, and renovate one of the buildings to create an interactive education center along the Hudson River. As a result, Habirshaw Park and the Beczak Environmental Education Center in Yonkers have become important components of outdoor education for Westchester County students and the public.

ASSESSMENT, PLANNING & DESIGN

The upland and shoreline needed to be restored to a more natural state. The entire site had significant impervious cover. The sloped shore zone had little vegetation with poorly functioning concrete and asphalt armoring, 4000 square feet of which was inundated by the tides. The shore zone was envisioned as a waterfront with public access and a place for outdoor environmental education. With these two uses in mind, design objectives were to:

- Increase natural features of the shoreline;
- Improve access to the water and restored vegetated areas;
- Utilize non-functioning armoring materials to assist success of new tidal marsh;
- Showcase a natural shoreline with native species in the Hudson River and an urban area; and
- Naturalize upland parkland to decrease run-off and allow for water infiltration.

To achieve these objectives, the design included a brackish tidal marsh and a beach and dune area that would highlight the differences and interactions between habitats. Diverse native plants were used to attract native fish and animal species, and are most effective at safeguarding the shoreline site from the forces of erosion. Marshes and dunes can provide natural flood and storm surge protection, whose frequency is projected to increase with global warming.

The shoreline is exposed to very high energy due to the proximity of the Hudson River's shipping channel and the frequent, high wind-driven waves. Some remnants of the concrete shoreline armoring were removed and others were used as a partial sill¹ to protect the tidal marsh from erosion.

¹ Sills are typically low profile, continuous structures placed parallel to the shore at mean low water. Sills can be made of broken rock, cobbles or other hard material and typically have a trapezoidal cross-section. Sills reduce shoreline erosion by dissipating wave energy which may cause sediment to build up between it and the shoreline.



Figure 1: Conditions of site prior to shoreline stabilization, February 2001.



Figure 2: Vegetation plantings, May 2004.

PLAN IMPLEMENTATION

The site preparation, including removal of hardened shoreline features, grading of the shoreline, and re-configuration of the upland, took place in 2003. The clean-up and groundwork necessary to maintain the future native planting and restoration was the first step, along with the creation of the marsh sill. Invasive vegetation and contaminated soils from the site were removed. This included excavation and removal of soils to a depth of 24 inches and refilling with a sand/soil mix. The existing rip-rap at the toe of a vertical stonewall which protects part of the waterfront was reinforced with additional rip-rap.

The creation of the tidal marsh began in 2004. The tidal area was expanded from 4,000 square feet to approximately 10,500 square feet. The new area included a freshwater marsh receiving site run-off from stormwater drainage swales, a tidal brackish water marsh, a tidal channel, and a tidal pool (see figure 7 on page 5). Following the basic construction of the site features, including the beach, dune, and marsh beds, the native low and high marsh and dune vegetation was planted. The park infrastructure of pathways and a bridge over the tidal marsh were constructed prior to the planting. Several erosion control measures were implemented to minimize construction impacts, including floating silt curtains and silt fences.

The native plant species survived the initial planting. However, the sill proved insufficient and needed additional height to protect the marsh from the high energy of the Hudson River. Maintenance of the shoreline since construction includes the periodic removal of stranded woody debris and the removal of Common Reed (*Phragmites australis*), to prevent invasion and spread into the marsh. Maintenance is performed by the staff and volunteers of the Beczak Environmental Education Center. Daily and seasonal maintenance at the site are important for maintaining the sill and the marsh. Beczak staff and community members often remove drift wood, debris, and trash as well as mend fencing and remove rocks that sometimes dislodge and redeposit into the tide pool and channel. In May 2007, the marsh plants were replanted because of overgrazing geese, and the following summer additional rock was installed on the sill to prevent erosion and control driftwood and debris from entering the marsh.



Figure 3: Replanting in May 2007 due to geese browsing.



Figure 4: Additional rock added to the sill in 2007 to prevent erosion and control driftwood.

This is the only “natural” shoreline along the Yonkers waterfront and it showcases the opportunities for shoreline restoration in traditionally urbanized areas. Adjacent parcels are structurally “harder” with traditional rip-rap and bulkhead techniques. The project used existing manmade features that resulted in a structurally sound shoreline that also has ecological and educational benefits. The marsh has attracted a variety of wildlife including fiddler crabs, great blue heron, monarch butterflies, killifish, blue crabs, and shrimp. In the summer of 2012, baby horseshoe crabs were even discovered in the tidal pool. The education programs at the marsh allow children to get first-hand experiences with the natural world of wetlands.

LESSONS LEARNED

- An isolated small natural site acts as a magnet for wildlife, including potentially destructive overuse by Canada geese.
- The physical forces of water and ice cause boulders making up the sill to get dislodged. Therefore, the site requires vigilant monitoring and maintenance, especially after storms and rigorous winters.
- The use of volunteers for maintenance work is an essential way to minimize labor costs.

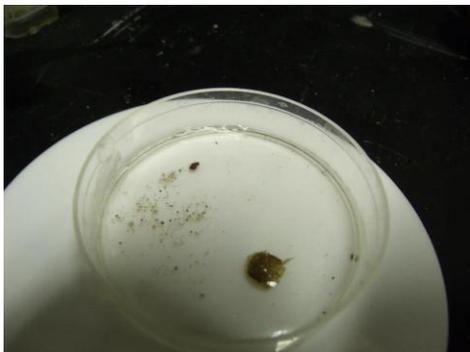


Figure 5: Baby horseshoe crab found in tidal pool in summer 2012.



Figure 6: The ecologically enhanced shoreline has attracted a variety of species, including the great blue heron.

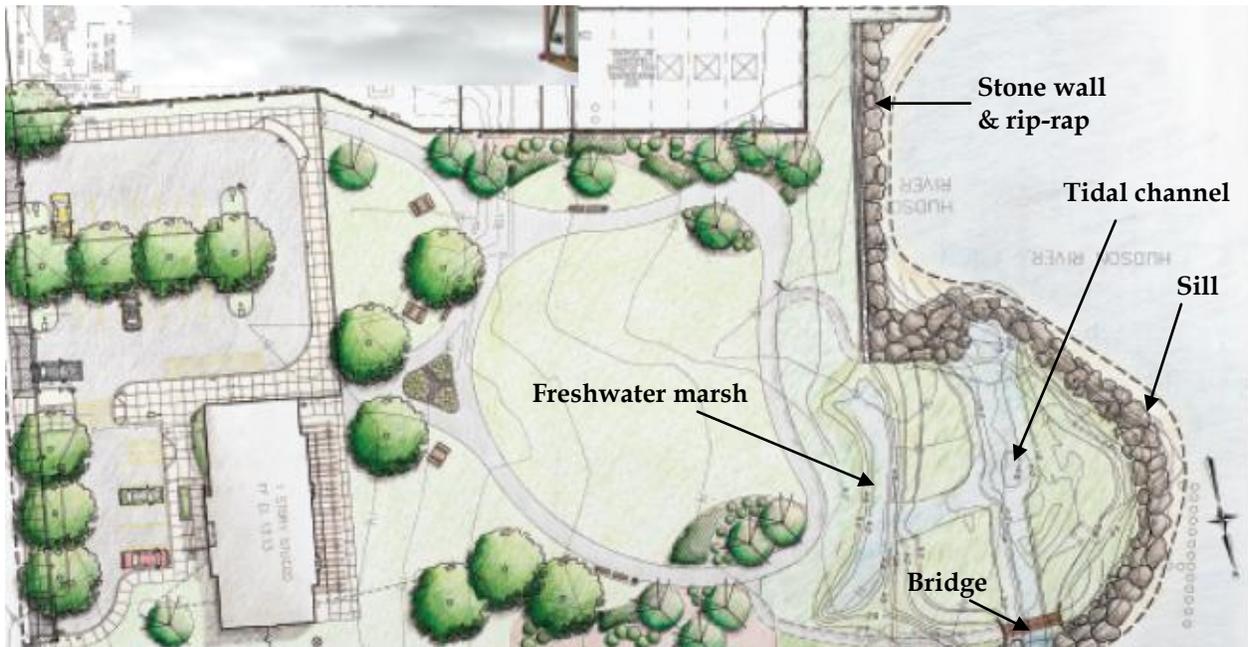


Figure 7: Site plan of park, including tidal wetland on right (west).



Figure 8: Completed shoreline stabilization and footbridge, September 2012.

Photos and drawings courtesy of Beczak Environmental Center and Creative Habitat Corp.