

CASE STUDY: DOCKSIDE PARK

OVERVIEW

The shoreline of a riverside park with picturesque views of the Hudson Highlands will be engineered and enhanced to provide ecological, recreational, and floodplain functions. It will contain design elements that allow for continued functionality as sea level rises, while accommodating increased frequency and intensity of wave action and inundation.

LOCATION & ACCESS

Docksides Park is a six-acre property located on the eastern bank of the Hudson River, in Cold Spring and approximately 50 miles north of New York City. It is part of the Hudson Highlands State Park Preserve, managed and maintained by the Village of Cold Spring. Docksides can be accessed via West Street.

PARTICIPANTS & COST

Owner: New York State Office of Parks, Recreation and Historic Preservation

Manager: Village of Cold Spring

Design: Milone & MacBroom, Inc., Contract managed by NEIPWCC

Design Cost \$75,000

Construction Cost Estimate: \$618,000 (based on 90% designs)

Funding of Design: Hudson River Estuary Program and Environmental Protection Fund

Project Timeframe: Design and permitting were completed in 2018 and project construction is anticipated to take place in 2019.



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. This case study builds on the work of the partners:

- Cary Institute of Ecosystem Studies
- Consensus Building Institute
- Greenway Conservancy for the Hudson River Valley
- NYSDEC Hudson River Estuary Program
- Stevens Institute of Technology

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

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BACKGROUND AND STORY

Dockside Park is located on the east side of the Hudson River at mile 54. Visitors to the park enjoy spectacular views of Storm King Mountain, Breakneck Ridge, (Figure 1) and West Point. Over the years, the site was home to an iron foundry, brick works, private swim club and marina and most recently, a popular local restaurant. Between 1987 and 2003, the property was purchased first by the Hudson River Foundation, to provide and preserve land, and then by the Open Space Institute. Finally, in 2007, ownership of Dockside Park was transferred to NYS Office of Parks, Recreation and Historic Preservation (NYSOPRHP). In order to provide incentives for designs of sustainable shoreline projects, the NYSDEC Hudson River Estuary Program provided funds for a design. Funds were managed by NEIWPC who issued an RFP for the design in 2013. Milone and MacBroom, Inc. was awarded the contract. Hudson River Estuary Program staff coordinated the project with NEIWPC, NYSOPRHP and the consultants.



Figure 1. The western boundary of Dockside Park, looking north toward the Hudson Highlands. Concrete, bricks, and wooden debris can be seen along the eroded shoreline of the park. The sustainable shorelines designs aim to enhance the ecological community and stabilize the bank.

ASSESSMENT, PLANNING & DESIGN

The shoreline is made up primarily of eroding soils, fill material, and riprap of various sizes with a significant amount of wrack and woody debris. In several areas portions of the bank have been washed away to expose tree roots. Thick vegetation and larger rip-rap is characteristic of the northern end of the shoreline. Timber pilings, and a remnant boat launch are visible at the northern extent of the property.

The development of the sustainable shoreline designs was guided by community input and planning documents, including the Village of Cold Spring Comprehensive Plan (updated and adopted in 2012), and the Cold Spring Local Waterfront Revitalization Strategy (LWRS 2011). These plans outline village goals and objectives, including improving utilization of the waterfront, protecting shorelines, habitat, scenic views, steep slopes, and water supply. The LWRS specifically outlines recommendations related to Dockside Park. The sustainable shoreline designs fulfill the recommendations to protect the eroding shoreline with planting of native vegetation and preserving community access to the river.

In order to gather community input, two public meetings were held in January and April 2014 prior to preparing the site designs. The meetings were well attended and brought to light a variety of community thoughts on the site's future. A common topic that presented itself was the community's wish for the shoreline project to not limit any future use of the site. The importance of preserving views of the river for park visitors was also voiced. Designers were asked by NYSDEC staff to create the project designs in accordance to sea-level rise (SLR) projections for the site.

PLAN DESIGN

The shoreline plan, besides bank stabilization, includes pedestrian walkways, boat launches, and vegetation plantings with approximately 800 feet of shoreline being stabilized. The bank stabilization elements include tiers of boulder revetments, native vegetation, and off shore boulders. The tiered boulder revetments (Figure 2) are designed to protect the bank and prevent the loss of park land. A row of off shore boulders will act as an ice break, to lessen the damage of ice scour (Figure 2). Native vegetation (Figure 3) was incorporated into the designs to enhance the ecology and assist in stabilizing the shoreline. Once the site is built, the maintenance plan will stipulate that wrack and woody debris will not be removed. The construction cost estimate includes the following: the construction site preparation; the removal of vegetation, invasive plants, concrete slabs and rip-rap; sediment and erosion control; excavation and grading; construction of the bank stabilization; other features such as signs, boat launches and gravel walkway; and trees, shrubs and other plantings.

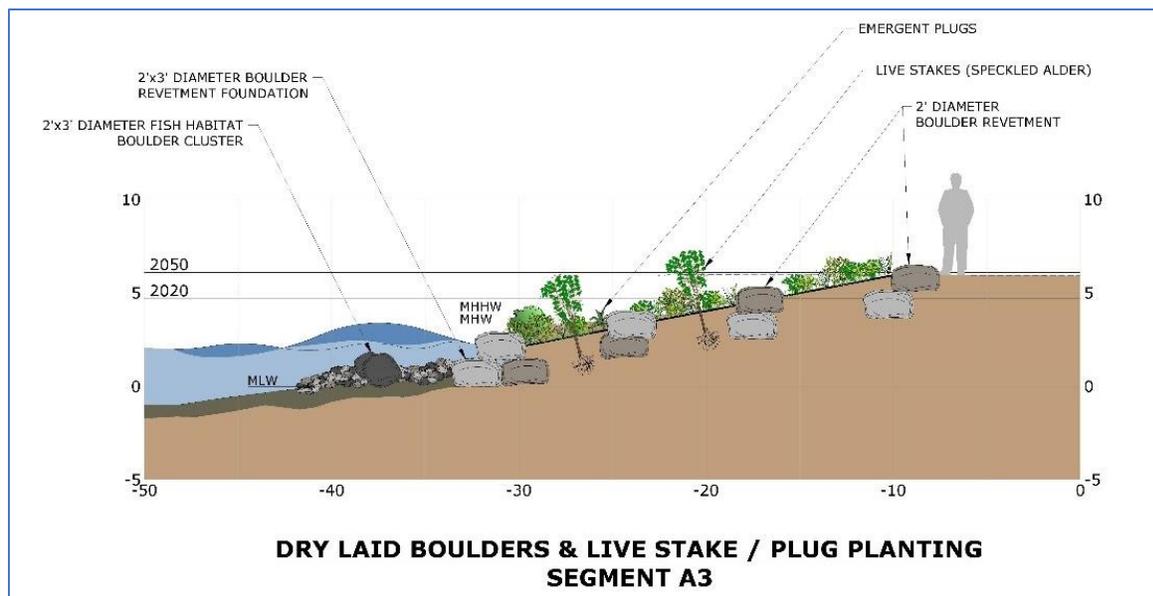


Figure 2. In some locations, tiered, boulder revetments will be used to stabilize the shoreline at Dockside Park. These structures will hold sediment in place, provide complexity to the shoreline and mimic the natural bank of the Hudson River that often consists of rocky outcroppings. Segment A3 is located along the southwest shore. Credit: Milone & MacBroom.

In the interest of designing a resilient waterfront habitat, a gradually sloping shoreline will be constructed, allowing for distinct shore zones to migrate as sea-levels rise. High marsh shore zones will transition to a low marsh zone as tidal inundation rises higher up the bank over time (Figure 2). Design criteria are based on the central range sea-level rise projections due to the high probability that MHHW levels

will increase from 2.3 feet to 2.6 feet by the 2020's, 3.1 feet by the 2050's, and 3.8 feet by the 2080's as identified in the NYS Sea Level Rise Task Force Report (2010) and the NYS Commission Report (2013).ⁱ



Figure 3. A few of the native species planned to replace the invasive vegetation along the shoreline. Butterfly Weed (*Asclepias tuberosa*), Gray Dogwood (*Cornus racemosa*) and Lurid Sedge (*Carex lurida*). Photos courtesy of the NY Flora Atlas.

IMPLEMENTATION

Construction is planned to begin in 2019.

LESSONS LEARNED

- Woody debris and wrack, often will accumulate along shorelines. Although some consider this material unsightly, it provides food and habitat for many species of wildlife.
- It is important to consider changes in sea-level rise when designing projects along the Hudson River. High sea-level rise projections (i.e., rapid ice melt scenario) were considered, but under that scenario the entire site would be submerged. Medium range projections were used.
- There was debate during the design process about whether to entirely clear the site of vegetation and “start over” using native species, or alternatively, to retain some of the existing non-native species, which are stabilizing the shoreline. Ultimately the decision was made to remove invasive plants and entirely replant the site with native species.

ⁱSea level rise projections were taken from “New York Sea Level Rise Task Force Report to the Legislature” and “NYS 2100 Commission: Recommendations to Improve the Strength and Resilience of the Empire State’s Infrastructure.”