New York-New Jersey Harbor Estuary Program

HUDSON RIVER FOUNDATION for Science & Environmental Research, Inc.

Restoring the New York-New Jersey Harbor Estuary

the WATERS we SHARE

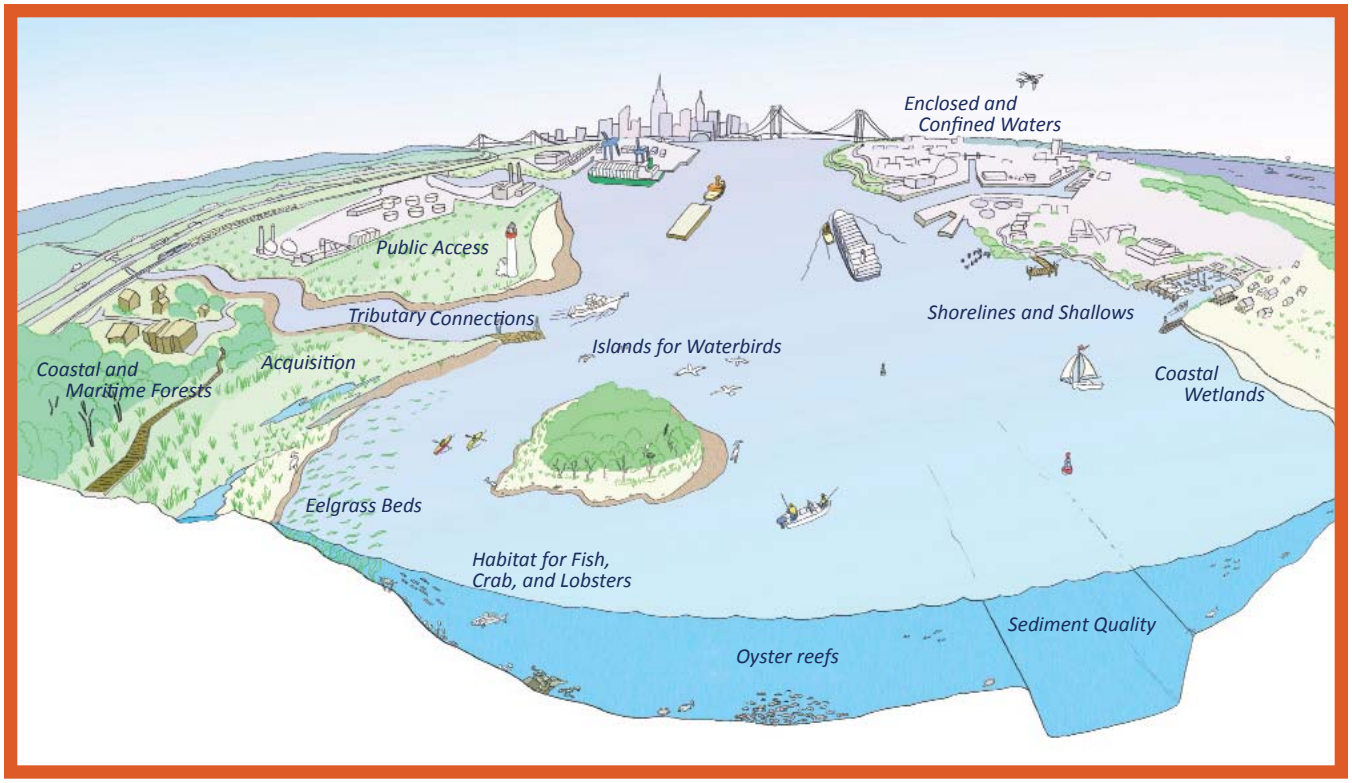
Restoration Progress 2014-2016

Overview and Summary

The New York – New Jersey Harbor Estuary is a vibrant and ecologically significant resource, despite its location at the heart of the North America's largest metropolitan area. Its open water, countless tidal tributaries, and wetlands are home to an amazing array of fish and wildlife. Through the creation of the Hudson Raritan Estuary Comprehensive Restoration Plan (HRE CRP), HEP and its partners have set goals for the conservation and restoration of 12 Target Ecosystem Characteristics (TECs) to be met by 2020 and 2050.* These shared aspirations for wetlands, habitat for waterbirds, tributary connections, oyster reefs, and other TECs provide a path towards a healthy and renewed urban ecosystem.

This report addresses the achievements made by the HEP Restoration Work Group Partners between 2014 and 2016, and overall progress towards the 2020 and 2050 goals Restoration progress made between the release of the HRE CRP in 2009 and 2014 was summarized in the previous HEP Restoration Progress Report (HEP 2015).

Due to a large influx of funding at the federal and state levels following Superstorm Sandy, the most significant progress toward the targets was in the acquisition category. More than 360 acres of flood-prone properties were acquired, primarily along the eastern shore of Staten Island and in the Raritan River watershed. Strong progress also continued in the coastal & maritime forest TEC, where over 33 acres of coastal forest were created. At least $450 million dollars was spent on restoration or protection of over 450 acres of habitat since 2014. But efforts to restore eelgrass beds, enclosed and confined waters, and oysters remain challenging.

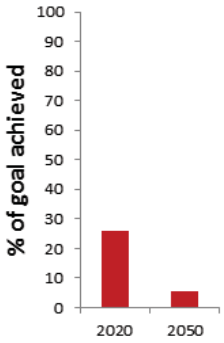


The *Hudson-Raritan Estuary Comprehensive Restoration Plan* set goals for 12 Target Ecosystem Characteristics - *www.watersweshare.org*

Wetlands

2020 goal: create or restore a total of 1,000 acres of freshwater and coastal wetlands.

2050 goal: continue creating or restoring an average of 125 acres per year for a total system gain of 5,000 acres.



Recent Projects: since 2014, one large-scale project in New Jersey (Woodbridge Waterfront Park, 38.5 acres) and a few smaller-scale projects in New York City have been completed. While a number of large-scale restoration projects have occurred in the past few years, they only make up 25% of the 2020 goal. A number of important upcoming projects (Spring Creek North and South in Jamaica Bay, future phases of Woodbridge Waterfront Park, and Teaneck Creek Park) are expected to be completed in the next few years, increasing the goal progress by 10%. Looking forward, the Hudson Raritan Estuary Restoration Feasibility Study has recommended 26 new wetland restoration sites (totaling approximately 424 acres) in Jamaica Bay, the Lower Passaic River, the Hackensack River, Flushing Creek, and the Bronx River (USACE, 2017).

GreatEcology

Restored wetlands at Woodbridge Waterfront Park, NJ

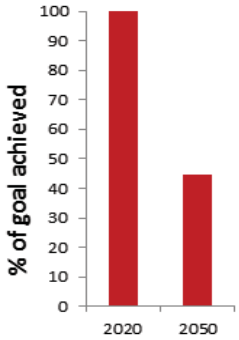
Funding is a primary limitation to meeting 2020 goals, though there are many funding opportunities highlighted in the Comprehensive Restoration Plan. These proposed investments in wetland restoration are important as wetlands are particularly vulnerable to the impacts of sea level rise and development, and can provide resiliency benefits.

Habitat for Waterbirds

2020 goal: enhance at least one island without an existing waterbird population in Hudson-Raritan Estuary (HRE) regions containing islands and create or enhance at least one foraging habitat.

2050 goal: all suitable islands provide nesting sites and have nearby roosting and foraging habitat.

Recent Projects: while the goal of enhancing one potential nesting island was met in 2014, no additional islands have since been enhanced. However, multiple foraging habitats have been restored, and eight out of 18 islands had nesting long-legged wading birds as of the 2015 nesting survey (Winston 2015). A number of islands that used to house nesting birds still have no nesting pairs (Shooters and Pralls Islands, Isle of Meadows, North Brother, among others). In the near-term, multiple large-scale wetland restoration projects and the repair of the West Pond berm breach in Jamaica Bay are expected to be completed in the next few years providing long-legged wading bird forage habitat.



Coastal and Maritime Forests

2020 goal: establish one new coastal and maritime forest community of at least 50 acres and restore at least 200 additional acres among several coastal forest and upland habitat types.

2050 goal: 500 acres of coastal and maritime forest community among at least three sites and 500

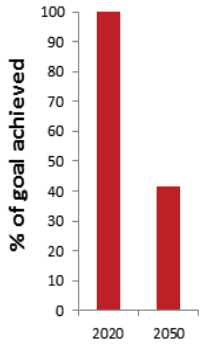
NYC Department of Parks and Recreation

Restored Maritime Forest at Cedar Grove Beach, Staten Island, NY

*The first draft of the HRE CRP was published in 2009 by the United States Army Corps of Engineers in partnership with the Port Authority of New York & New Jersey and HEP. The HRE CRP was revised and Version 1.0 was released in June 2016 representing a milestone of regional consensus for the NY and NJ Harbor Estuary.

additional acres of restored coastal forest and upland habitat.

Recent Projects: fewer coastal and maritime forest restoration projects were completed in the past two years compared to the annual average between 2009-2014, with a few larger projects on Governors Island and Oakwood and Cedar Grove Beaches (Staten Island), providing 15.4 of the 33.6 acres of coastal forest created. A number of smaller, less than one-acre projects were completed during this time frame in New York City and Monmouth County. In the next few years, Spring Creek North and South in Jamaica Bay will be restored, including an estimated nearly 224 acres of maritime forest, shrub, and grassland habitat.

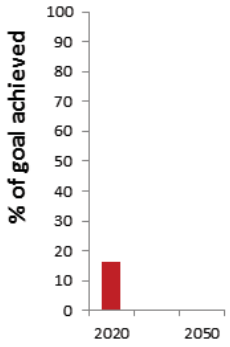


Oyster Reefs

2020 goal: 20 acres of self-sustaining, naturally expanding reef habitat across several sites.

2050 goal: 2000 acres of established oyster reef habitat.

Recent Projects: since the 2014 report, two pilot projects have been constructed. The first, in Ware Creek leading to Raritan Bay incorporated oyster spat set on "oyster castles" as part of a living shoreline project. In Thurston Basin in Jamaica Bay, a 0.5 acre reef was installed in 2016. Additionally, though not counted towards restoration goals, experimental restoration research led by the Hudson River Foundation and others was recently funded as partial mitigation for the Tappan Zee bridge expansion. Educational oyster gardens supported by the Billion Oyster Project and Urban Assembly New York Harbor School continue to expand and be monitored by students. Future sites and expansion of existing reef locations comprising 58 acres of oyster habitat at Bush Terminal Piers Park, Governor's Island, Soundview Park, Jamaica Bay and Naval Station Earle were recommended for construction by the HRE Feasibility Study (USACE 2017).



While oyster reefs once were prevalent habitat in the NY-NJ Harbor estuary, their restoration is challenging.

S.P. Sullivan, NJ Advance Media

A field technician at U.S. Naval Station Earle, Ware Creek, NJ

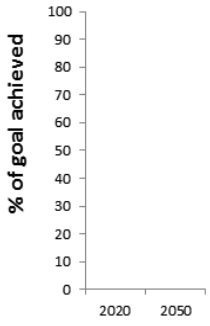
To increase in population naturally, oyster larvae have to successfully settle on viable oyster habitat and then survive to a spawning adult stage, both difficult in a harbor where there is little oyster habitat or spawning adult reef to be found, and where multiple factors (predation, disease, strong physical forces, pollution) impact success. The results of the Tappan Zee Bridge, Naval Station Earle and Soundview Park (Bronx, NY) projects will continue to inform the scientific understanding of best practices for restoring oysters in the harbor.

Eelgrass Beds

2020 goal: create one bed in at least three HRE regions.

2050 goal: three established beds in each suitable HRE region.

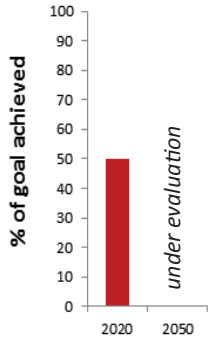
Recent Projects: while none have survived for multiple years, a number of experimental eelgrass restoration plots were created in Jamaica Bay, providing scientific insight into the issues affecting restoration potential. The difficulty in establishing plots in the bay is thought to be caused by a number of factors including: a large blue mussel set in 2011 settling on the leaves, sediment waves impacting early shoots, and predation. It is also possible that the small size of the beds may have negatively influenced survival. Much like oysters, eelgrass has been decimated in the harbor to the point of functional extirpation and will likely require significant



investment in larger projects to achieve success and remain established over time.

Shorelines and Shallows

2020 goal: develop new shorelines and shallows sites in two HRE regions.
2050 goal: restore all available shoreline habitats in three HRE regions.
Recent Projects: in 2014, a new shallow water area was established in Brooklyn Bridge Park – Pier 4 beach, with tide pools incorporated into the design. Expected near-term projects include living shorelines at Ware Creek and Newark Bay. While there have not been many projects for this target, and they are all located in the same HRE region (Harlem River/East River/Western Long Island Sound), there has also been a push to develop a greater understanding of sustainable shorelines. In 2015, HEP produced a report on developing a protocol for urban shoreline assessment (Reid et al. 2015). In 2014-2016, the Hudson River Sustainable Shorelines effort and HEP, among others, have conducted studies on the ecological and structural values associated with living shorelines.

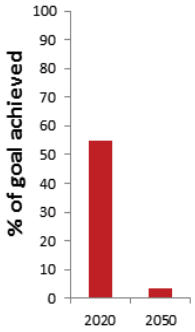


Kate Boicourt

Pier 4 Beach, Brooklyn Bridge Park, NY

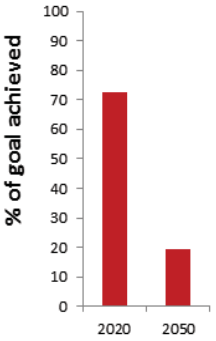
Sediment Contamination

2020 goal: isolate or remove at least 25 acres of contaminated sediment.
2050 goal: isolate or remove at least 25 acres of contaminated sediment every two years.
Recent Projects: contaminated sediment has been removed from three superfund sites in the Hudson-Raritan watershed. At the Horseshoe Road and Atlantic Resources superfund sites, sediments were removed from the Raritan River and disposed offsite. Additionally, a small amount of material was removed from the Gowanus Canal superfund site. In the longer term, additional contamination removal or stabilization is expected in these areas as well as in Newtown Creek and the Lower Passaic River. In 2016 the EPA released the Record of Decision for the cleanup of the lower 8.3 miles of the Lower Passaic River (removal of 3.5 million cubic yards), which was an important milestone towards restoration.



Tributary Connections

2020 goal: restore connectivity or habitat within one tributary reach per year.
2050 goal: continue rate of restoring and reconnecting areas.
Recent Projects: There has been one new project completed since 2014, the second phase of the Sawmill River daylighting in Yonkers. The 2014-installed 182nd Street fish ladder is now in place and has begun to pass eels and other species upstream. Other expected near-term projects include two upstream fish ladders in the Bronx River (Stone Mill Dam and Bronx Zoo), the potential Weston Mill Dam removal along the Raritan River, and culvert replacements further upstream in the Hudson River Watershed. Additionally, the Lawrence Brook Fish Ladder feasibility study presents an opportunity for future fish passage development. Going forward, the HRE Feasibility Study has also identified and developed a prioritization tool for ranking future fish passage projects (USACE 2017).



Kate Boicourt

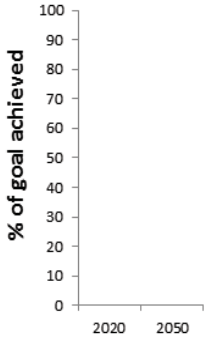
Gowanus Canal, Brooklyn, NY

Enclosed and Confined Waters

2020 Goal: upgrade water quality of eight enclosed waterways.

2050: upgrade water quality of all enclosed waterways.

Recent Projects: there are currently no examples of areas that have been improved to meet their designated use. There are, however, actions that have been undertaken, such as sewage treatment plant upgrades in Jamaica Bay, and a number of planning and regulatory efforts underway that are required to address unsatisfactory water quality conditions. The Long Term Control Plan and MS4 permitting processes in New York and New Jersey are being currently developed. If implemented, the plans will improve a number of water bodies, such as the Gowanus Canal in Brooklyn, the Passaic and Harlem Rivers, and Flushing Bay. These are longer-term projects requiring significant financial and construction efforts, that have multiple-year horizons of implementation.

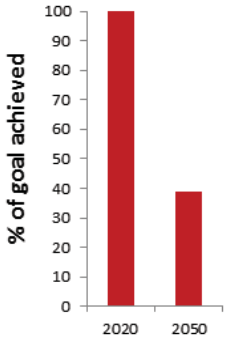


Public Access

2020 goal: create one access and upgrade one existing access per year.

2050 goal: all waters of the HRE are accessible.

Recent Projects: seven new access improvement projects were completed in both New York and New Jersey including the newly-acquired Swimming River Park along the Navesink River, New Stapleton Waterfront Park along the northeast coast of Staten Island, a small addition along the Harlem River (Muscota Marsh Park), as well as new walkways and esplanades



NYSDEC R2

Paddlers at the opening of the Old Place Creek boat launch, Staten Island, NY.

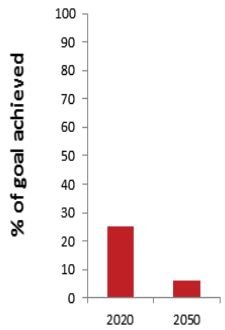
along the Harlem River waterfront. Additionally, the High Bridge, a pedestrian path connection between Manhattan and the Bronx, was restored and reopened for the first time in 45 years, and a new kayak launch and viewing platform were created in Old Place Creek on Staten Island. Upcoming expected projects include Woodbridge Waterfront Park in New Jersey and Sunset Cove Park in Jamaica Bay.

Habitat for Fish, Crab, and Lobsters

2020 Goal: complete a set of two related habitats in each HRE region

2050 Goal: complete four sets of at least two related habitats in each HRE region.

Recent Projects: no projects have been completed since the last report. Calvert Vaux Park in Brooklyn, NY, which was restored in 2013, provides habitat for a number of wildlife, and serves as spawning habitat for horseshoe crabs. Many of the projects recommended for construction by the HRE Feasibility Study restore fish, crab and lobster habitat throughout five of the planning regions.

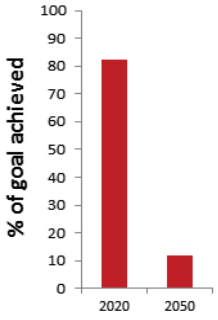


Acquisition

2020 Goal: acquire 1000 acres of habitat for protection.

2050 Goal: continue to acquire at a rate of 200 acres per year (6,000 acres) for a total of 7,000 acres.

Recent Projects: significant progress toward this goal was made in the past two years. This progress was primarily due to many purchases of small flood-prone properties in both New York and New Jersey (over 200 were less than one-quarter acre in size) by the States of New York and New Jersey. There were also a few larger-parcel purchases, such as the 89-acre addition to Freneau Woods and the 17-acre Big Brook Park in Monmouth County, NJ.



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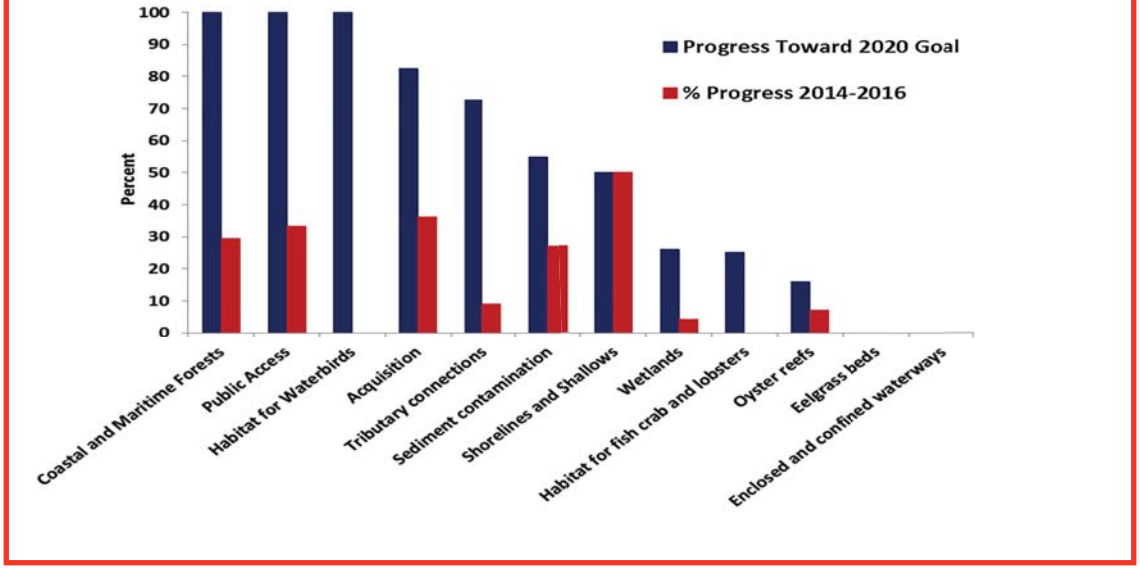
Google Street Veiw September 2013

NYSDEC R2

One of the many houses acquired by the State of NY in Oakwood Beach, Staten Island, NY. The houses were demolished and the lots were planted with native grasses until it is determined what will be done with these flood-prone lots.



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Meeting Key Challenges

In 2014, participants in HEP's Bi-Annual Restoration Conference made suggestions on how to achieve habitat restoration and protection goals. These suggestions will be incorporated into HEP's Draft Action Agenda, to be released in May, 2017. Objectives for the habitat and ecological health section include 1) Making progress towards restoring the estuary's Target Ecosystem Characteristics 2) improving the quality and likely success of habitat restoration practices 3) supporting restoration monitoring and the utility of monitoring data and 4) Advancing the understanding and incorporation of climate change impacts in habitat management and restoration. The NY-NJ Harbor & Estuary Program and partners are already working towards these objectives including the following developments since 2014:

Making progress towards restoring the estuary's Target Ecosystem Characteristics.

- Goals are nearly met for some targets, but others are hindered by cost, implementation challenges, and regulatory concerns. Small-scale projects for shorelines, eelgrass, and shallows and oyster reefs have continued. Research and collaboration, such as through the Oyster Restoration Research Partnership, HRE Feasibility Study and a current project to investigate the amounts and spatial patterns of eelgrass in the Hudson River, is expected to continue to shed light on status and opportunities. Significantly increased efforts will need to be made to further the eelgrass beds target.

Improving the quality and likely success of habitat restoration practices

- A standard monitoring protocol for urban shorelines was piloted in the Harbor in 2014-2015, and the Hudson River Sustainable Shorelines program is currently piloting a rapid assessment protocol.
- Pilot projects incorporating oysters are underway or planned in New York City, and at US Naval Weapons Station Earle in Middletown, NJ at Ware Creek.

Supporting restoration monitoring and the utility of monitoring data

- There is still a need to increase consistency among resiliency metrics and monitoring, something that HEP, the Science and Resilience Institute at Jamaica Bay, NYSDEC, NYCDPR and other partners, plan to pursue as a follow-up to the previously-published *Research Plan to Advance the Understanding of Potential Green Infrastructure Strategies in New York City* report.

Advancing the understanding and incorporation of climate change impacts in habitat management and restoration

- An evaluation of all HRE CRP restoration opportunities was conducted to determine which sites provide the potential to serve as NNBFs for coastal resilience. These sites are presented in the HRE Feasibility Report and Environmental Assessment (USACE 2017).
- The North Atlantic Division of the US Army Corps of Engineers recently released a Comprehensive Study, the goals of which were to provide a risk management framework and support resilient coastal communities and robust, sustainable coastal landscape systems including natural and nature-based features.
- With respect to wetlands habitat, the New Jersey Department of Environmental Protection and NYC Department of Parks and Recreation are developing methods and tools for evaluating existing wetland condition and opportunities for potential restoration, given sea level rise predictions.
- Efforts to monitor the ability of regional wetlands to adapt to sea level rise and studies of sediment dynamics near marshes in Jamaica Bay are being undertaken by the NYC Department of Parks and Recreation and Rutgers University.

How can you get involved?

Interested in learning about the estuary? Subscribe to Tidal Exchange E-news or check out www.harborestuary.org. Have a question about habitat restoration or want to nominate a site for inclusion in the Hudson-Raritan Estuary Comprehensive Restoration Plan? Contact us at habitat@harborestuary.org or check out www.watersweshare.*org*.