



New York – New Jersey Harbor & Estuary Program

# ACTION AGENDA 2017-2022

———— *May 2017 DRAFT FOR DISCUSSION* ————



## ACKNOWLEDGEMENTS

This draft document was prepared by the staff of the NY-NJ Harbor & Estuary Program and Hudson River Foundation with the assistance of HEP's Policy, Management and Citizens Advisory Committees; technical work groups addressing Water Quality, Restoration, and Public Access issues; and the participants at HEP's public workshops and conferences. The report was written by Robert Pirani, Ariane Giudicelli, Isabelle Stinnette, Sarah Lerman-Sinkoff, James Lodge and Kate Boicourt (former HEP staff). Graphic design by Square Water, Inc. Although the information in this document has been funded wholly or in part by the United States Environmental Protection Agency under agreement to the Hudson River Foundation, it has not undergone the Agency's publications review process and therefore, may not necessarily reflect the views of the Agency, and no official endorsement should be inferred. Photo credits: cover, shutterstock; above, Amy Bolger, NYC SWIM; back cover, Kate Boicourt.



New York - New Jersey  
Harbor & Estuary Program  
[www.harborestuary.org](http://www.harborestuary.org)

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**ACTION AGENDA 2017-2022**

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## Purpose and Overview of this Document

This draft Action Agenda describes the shared priorities of the NY-NJ Harbor & Estuary Program (HEP) and the commitment of the program and HEP's partners to address them. It describes our five long-term goals and outlines specific objectives and actions that HEP and partners will advance over the next five years.

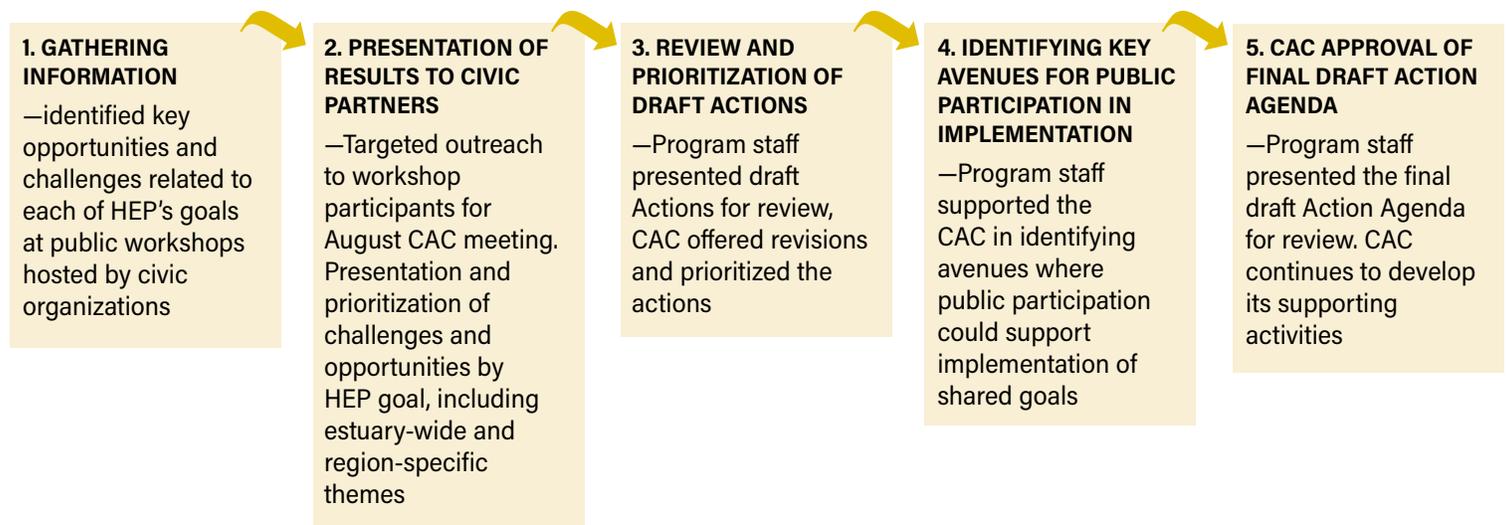
These actions are intended to help HEP and its partners realize five long term generational goals: Reduce the sources of pollution so that the waters of Harbor Estuary will meet the fishable/swimmable goal of the Clean Water Act, where attainable; Protect and restore the vital habitat, ecological function, and biodiversity that provide society with renewed and increased benefits; Improve public access to the waters of the Estuary and the quality of experience at public spaces along the waterfront; Support port and associated maritime operations so that they are both economically and ecologically viable; and Foster community stewardship and involvement in decisions about the Harbor This draft document was created through a series of discussions with HEP's government, utility, civic and academic partners and the public. These conversations were organized through our Management Committee and Citizens Advisory Committee as well as several technical work groups addressing Water Quality, Restoration, and Public Access issues. These priorities also reflect the voices of more than 500 people at 25 outreach events—large and small—organized by HEP and more than 30 civic partners.

Based on public comment, the Program will refine this list of objectives and actions, adding detail where possible and appropriate, and engaging in more detailed conversation with our partners in preparing to implement this body of work.

Over the next year, HEP will also start preparing a State of the Estuary report and Monitoring Plan, as well as an accounting of the progress made in the estuary since the establishment of HEP thirty years ago in 1987. Together with this Action Agenda, these documents will be the cornerstones of the revised Comprehensive Conservation and Management Plan required under Section 320 of the Clean Water Act. The package of documents will be finalized and released in 2018.

Implementing these actions will require concerted attention by HEP and our many partners. Our success in addressing them and making progress towards our goals is contingent on these partnerships and the leadership knowledge and resources they provide.

### Action Agenda Public Engagement Process



## Towards an action agenda for the NY-NJ Harbor Estuary

### 2016: Engage Work Groups and Public

- 25 Workshops and Events
- Work Group Meetings
- Restoration Conference

### Spring 2017: Draft Action Agenda

- Final draft with clarified and consolidated priority actions
- May 23rd Public Release of Draft
- Public Review Closes July 14

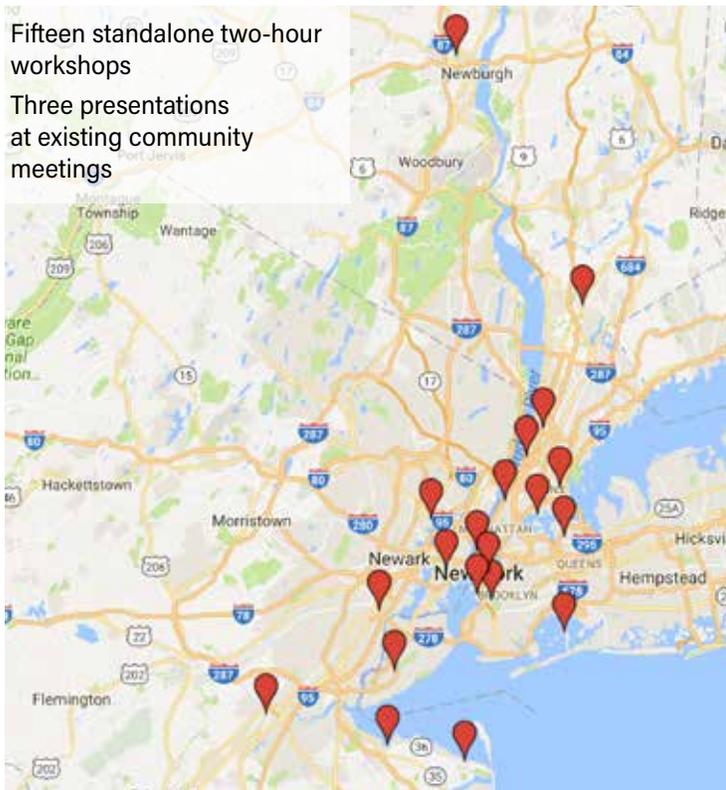
### Winter 2018: Adoption of CCMP

- Final Action Agenda
- State of the Estuary, Monitoring, Funding, and Communications Plans

## Location of Public Workshops

Fifteen standalone two-hour workshops

Three presentations at existing community meetings



# ACTION

## Your input

can help ensure that the New York- New Jersey Harbor & Estuary Program (HEP) and its many partners are meeting the needs of the Estuary, its rich ecosystems, critical economic activities, and unique and diverse communities.

This document contains a proposed set of five long-term Goals, 14 Objectives and 35 specific Actions that will guide the Estuary Program and its staff and partners over the next five years. It offers details on the partnership commitments and work that will be necessary to achieve this work.

### We welcome your insight and comments.

Tell us about possible collaborations that will help advance the activities proposed in this document.

Let us know about additional objectives and actions that are appropriate for HEP's unique role of convening partners, producing and disseminating science and data, and advancing better management across many jurisdictional boundaries and interests that will shape the future of the New York – New Jersey Harbor Estuary.

### Comments are due by July 14 2017

to [HEPAgenda2017@hudsonriver.org](mailto:HEPAgenda2017@hudsonriver.org)  
or by mail to NYNJ HEP Action Agenda,  
Hudson River Foundation,  
17 Battery Place, Suite 915,  
NY, NY 10004.

Based on these comments and additional review and discussion with HEP's Policy and other committees and work groups, a final Agenda will be released in 2018.

## Public and Expert Participation: by the Numbers

### E-Survey

93 Responses

### Public Workshops

25 Host Partners  
400 Attendees

### Outreach at Public Events

Waterfront Alliance City of Water Day  
Elizabeth Environmental Day  
400 People Engaged

### Discussion with Technical Experts

Public Access Work Group  
Water Quality Work Group  
Restoration Work Group  
2016 HEP Restoration Conference



Photo credit: Robert Pirani

## THE NEW YORK – NEW JERSEY HARBOR ESTUARY AND THE HARBOR & ESTUARY PROGRAM

The New York – New Jersey Harbor Estuary is the biggest public resource in the nation's largest and most densely developed metropolitan area. The estuary's core waters from the Tappan Zee Bridge south to Sandy Hook, NJ, including the lower reaches of the Hudson, Passaic, Hackensack, and Raritan rivers, include more than 250 square miles of open water and approximately 1600 miles of shoreline. The estuary's watershed extends for more than 16,000 square miles, about three-quarters of which drains to the Hudson River and its 65 major tributaries.

The mixing of fresh and sea water in this tidal estuary has created a rich, productive and diverse ecosystem. Every day, roughly 60 billion gallons of salt water comes in from the ocean on the incoming tide and every day an average of 80 billion gallons a day goes out, driven by tides and the flow of fresh water from the Hudson, Passaic, Raritan, Hackensack, Bronx and many smaller rivers. This fresh water includes about two billion gallons a day of sewage, mostly treated in one of 25 publicly owned treatment plants that line the shoreline. This tidal flux and the nutrients that it carries helps support 12 square miles of tidal wetlands, more than 100 fish and over 300 bird species. The estuary also provides an amenity for the more than 14 million people living in the counties encompassing the estuary's core waters. Five million people live within a ten minute walk from the shoreline. There are more than 500 waterfront parks and public spaces that are accessible to the public. The shorelines of these public spaces—ranging from small urban street-ends and esplanades to sandy beaches and marshes—stretch for about 600 miles or 37% of the 1600 mile waterfront. In both states millions of residents and visitors swim, boat, and enjoy the view. There are about 180 places where the public can launch a human powered boat, and 11 public swimming beaches.

Our harbor waters are a critical economic engine. Almost 200,000 people work at jobs directly associated with port and maritime operations. The whole regional economy benefits from hosting the nation's third largest port operation, and its capacity to affordably and reliably deliver goods to the marketplace. The Harbor's waters are a critical part of the region's public transportation system with more than 38 million ferry trips every year.

The public's desire for a healthy and vibrant ecosystem in our region, supported by excellent water quality, is stronger than ever. Millions have rediscovered the estuary through more than 41,000 acres of waterfront parkland and lively public programs at and on the water. Savvy businesses, including maritime operators, excursion boats, and creators of waterfront residences and commercial spaces, understand how cleaner water creates value. There is robust public participation in water-based activities, workshops, forums and events.

Managing this public resource and its many services and uses, is the shared responsibility of at least five core federal agencies, two states, 11 major sewerage agencies, hundreds of counties, cities and towns, and millions of property owners. Critical stakeholders include

maritime businesses and several hundred civic and community-based organizations.

Success requires addressing core challenges posed by this Harbor and Estuary: A large population and dense urban development; a legacy of toxics left by past industrial uses; enclosed bays and tributaries that magnify the impacts of pollution; communities with concentrations of pollution and poverty that limit access to decision makers and options for residents; and limited funding and political attention in a very crowded public agenda. These ongoing challenges are compounded by the likely impacts of a changing climate including rising air and water temperatures, increases in incidences of extreme weather from large storms to rainfall, and rising sea levels.

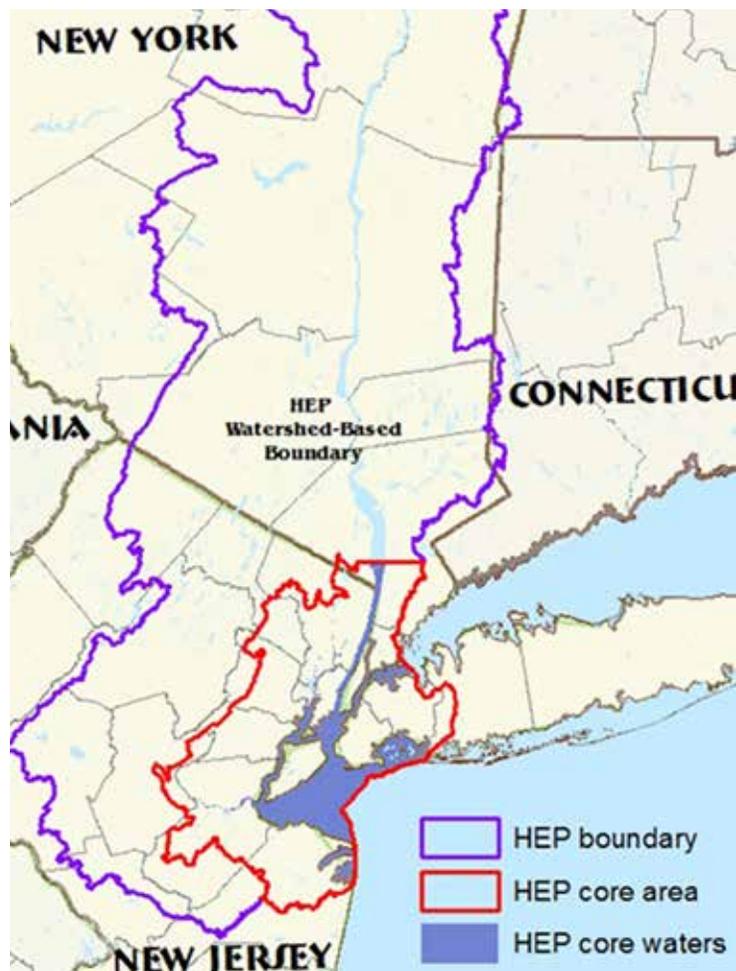
The New York – New Jersey Harbor & Estuary Program (HEP) helps bring stakeholders together around common goals. One of the Nation’s 28 Estuaries of National Significance, HEP was created by the U.S. Environmental Protection Agency (EPA) at the request of the governors of New York and New Jersey in 1988 under the Clean Water Act as an ongoing effort to develop and implement a consensus driven plan to protect, conserve and restore the estuary. HEP decisions and activities are carried out by staff and partners organized through the committees and work groups convened by the Program. Management of the Program is one of the many activities of the Hudson River Foundation, including underwriting scientific research that provides the non-federal match to funds received under Section 320 of the Clean Water Act. This critical match is highlighted as an important resource for addressing research actions identified in this document. The Foundation assumed management of HEP in 2014.

HEP and its partners work together to enable people and wildlife to benefit from the fishable and swimmable waterways called for under the Clean Water Act. HEP provides a forum to develop and implement actions that improve the health of the Estuary by convening interested stakeholders from across familiar divides of geography and expertise, producing and disseminating science and data to illuminate the issues, and collaborating with others to identify and address management challenges and opportunities in a way that is environmentally and economically responsible. The geographic scope of the Program is the tidal waters of the New York – New Jersey Harbor Estuary, focusing on a core area south of the Tappan Zee Bridge, including the waters of Jamaica Bay, Raritan Bay, Newark Bay, the East River and the tidal tributaries that feed into these water bodies. HEP takes a watershed approach to better address certain management goals.

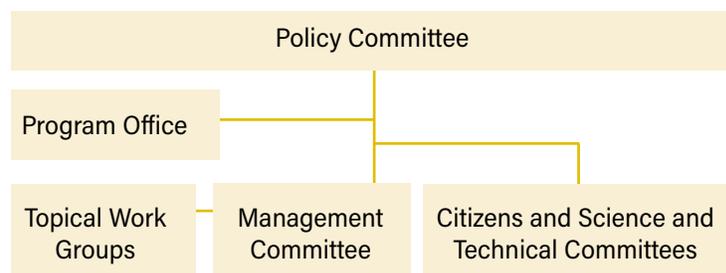
## OVERVIEW OF ACTION AGENDA

This draft Action Agenda defines our shared set of priorities and the commitment of HEP’s partners to address them. It describes our five long-term generational goals, and the specific 14 objectives and the 35 actions that the Program

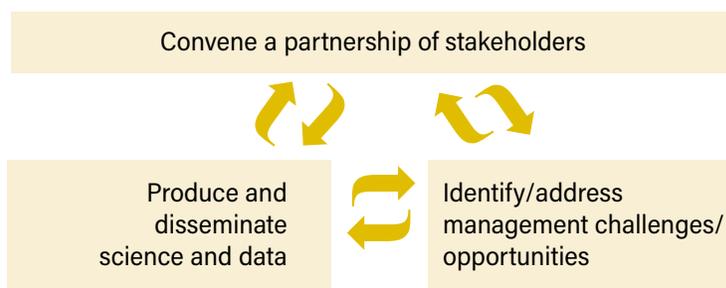
### HEP Jurisdictional Boundaries



### HEP Organizational Chart



### How HEP Adds Value



## Policy Committee

Chris Daggett, HRF (Chair)  
Catherine McCabe, Regional Administrator, (acting) , USEPA  
Alternate—Javier Laureano, Director, Clean Water Division, USEPA  
COL David Caldwell, Commander, NY District, USACE  
Alternate—Thomas M. Creamer, Chief of Operations, USACE  
Basil Seggos, Commissioner, NYSDEC  
Alternate—James Tierney, Deputy Commissioner, NYSDEC  
Robert Martin, Commissioner, NJDEP  
Alternate—Dan Kennedy, Assistant Commissioner, NJDEP  
Bernice Malione, Deputy Director, Port Authority of NY/NJ  
J. Christian Bollwage, Mayor, City of Elizabeth (NJ Local Government)  
Angela Licata, Deputy Commissioner, NYC DEP, (NY Local Government)  
Charles S. Warren, Citizens Advisory Committee Representative  
Dennis Suszkowski, Science and Technical Advisory Committee Representative

## Management Committee

Rob Pirani, HEP (Chair)  
Rick Balla, USEPA  
Douglas Adamo, USDOL  
Peter Weppler, ACOE  
Karen Greene, NOAA  
Jeff Myers, NYSDEC  
Vacant, NYSDOS  
Clay Sherman, NJDEP  
Bridget McKenna, NJHJDG  
Pinar Balci, NYCDEP  
Gabriel Rodriguez, NJ Local Govt  
Evelyn Powers, IEC  
Bernice Malione, Port Authority of NY/NJ  
Meredith Comi, CAC Co-Chair (NJ)  
Joe Reynolds, CAC Co-Chair(NJ)  
Sean Dixon, CAC Co-Chair(NY)  
Shino Tanikawa, CAC Co-Chair (NY)  
Judith Weis, STAC Co-Chair  
Dennis Suszkowski, STAC Co-Chair  
Vacant, NY Environment Justice  
Laureen Boles, NJ Environmental Justice  
Ann Fraioli, NY student  
Vacant, NJ Student  
Lisa Baron, RWG Chair  
Phil DeGaetano, WQWG Chair

Photo credit: New York Harbor School



will address over the next five years.

These are the collective steps that HEP and its partners will advance progress towards HEP's five long term goals: Reduce the sources of pollution so that the waters of Harbor Estuary will meet the fishable/swimmable goal of the Clean Water Act, where attainable; Protect and restore vital habitat, ecological function, and biodiversity, that provides society with renewed and increased benefits; Improve public access to the waters of the Estuary and the quality of experience at public spaces along the waterfront; Support port and associated maritime operations so that they are both economically and ecologically viable; and Foster community stewardship and involvement in decisions about the Harbor. Details about the proposed actions, key partners and resources that will be needed can be found in the pages that follow. Actions related to HEP's goal to foster community stewardship and involvement in decisions about the Harbor are embedded throughout this document. Those actions are highlighted in the community engagement section at the end of the document.

Importantly, these priorities reflect and incorporate an assessment of how a changing climate will likely impact these goals and objectives.

They are presented with a clear understanding of where HEP adds value to the many efforts underway to improve the Harbor: when convening partners and moving toward consensus is appropriate and timely; when science, data, or best management strategies are not readily available or clearly defined; and when actions need to be oriented on a watershed basis across jurisdictions or management silos.

This draft Action Agenda represents the consensus of our guiding Policy Committee, including the Regional Administrator of the US Environmental Protection Agency (EPA) , the Commander of the New York District of the United State Army Corps of Engineers (USACE) and the Commissioners of the New York State Department of Environmental Conservation (NYSDEC) and New Jersey Department of Environmental Protection (NJDEP) as well as representatives from the Port Authority of New York & New Jersey (PANYNJ), New York City Department of Environmental Protection (NYCDEP), local government in New Jersey; HEP's Citizens Advisory Committee (CAC) and Science and Technical Advisory Committee (STAC); and the Hudson River Foundation (HRF).

The specific Goals, Objectives and Actions were created through a series of discussions and review with HEP's government, utility, civic and academic partners. These conversations were organized through our working Management Committee as well as several technical work groups addressing Water Quality, Restoration, and Public Access.

These priorities also reflect the input of more than 500 people at 25 outreach events—large and small—organized by HEP and more than 30 civic partners. HEP's public participation process was designed to reach harbor estuary residents

at all levels of engagement, from leaders of stewardship organizations and the membership of those organizations to the public at large. The participation tools used to reach these different constituencies included major conferences focused on Raritan Bay and habitat restoration issues, 18 standalone two-hour workshops, five shorter presentations at stakeholder meetings and conferences including a meeting with the Hudson River Estuary Program staff and Management Committee, tabling at City of Water Day and the Waterfront Alliance Conference, and an online survey. This public input was refined through additional discussion with members of HEP's Citizens Advisory Committee.

Responsibility for undertaking these actions rests with the staff of the Harbor Estuary Program, other Hudson River Foundation staff, and the members of HEP's Management Committee, with support from the Citizens Advisory Committee and technical work groups. Specific core partners are identified for each action as appropriate.

Undertaking these actions requires resources. The Action Agenda identifies the kind and level of funding that will be required for each priority, including leveraging provided by program staff and the leveraging of staff time from our many partners. As appropriate, the actions reference the need for grant funding to support larger (>\$200,000) and smaller (<\$200,000) research, planning, or demonstration projects; major capital investments; and on-going operating or programming needs.

HEP and the Hudson River Foundation are the likely but not exclusive administrators for grants and funding supporting project-level priorities. As appropriate, HEP will propose using Clean Water Act 320 funding and the non-federal match provided by the Hudson River Foundation to undertake these projects as part of our annual workplan. HEP will also seek, in partnership with others, new public and private grants. Existing and possibly new federal, state and local government authorities, funding sources, and programs will be the vehicles for meeting major capital and long term operational needs.

While these actions are refined, and as HEP begins to prepare a State of the Estuary Report, Environmental Monitoring Plan, and an accounting of the progress made in the estuary since the establishment of HEP thirty years ago in 1987, specific indicators and targets will be developed for each objective and action so that progress towards these goals can be tracked. HEP will also produce a communications strategy that outlines how best to report-out on progress to HEP's multiple audiences.

As a package, these documents will constitute a revision of the Comprehensive Conservation and Management Plan (CCMP) approved by the EPA Administrator, with the concurrence of the governors of New Jersey and New York, in 1997. This revision is required under by the guidance provided by EPA as a condition of funding under Section 320 of the Clean Water Act.

## Acronym Key

NY-NJ Harbor & Estuary Program (HEP)  
U.S. Environmental Protection Agency (EPA)  
United States Army Corps of Engineers (USACE)  
New York State Department of Environmental Conservation (NYSDEC)  
New Jersey Department of Environmental Protection (NJDEP)  
Port Authority of New York & New Jersey (PANYNJ)  
New York City Department of Environmental Protection (NYCDEP)  
Citizens Advisory Committee (CAC)  
Science and Technical Advisory Committee (STAC)  
Hudson River Foundation (HRF)  
Stormwater Infrastructure Matters Coalition (SWIM Coalition)  
New Jersey Harbor Dischargers Group (NJHDG)  
Interstate Environmental Commission (IEC)  
New England Interstate Water Pollution Control Commission (NEIWPCC)  
Trash Free Waters Partnership (TFW)  
Great Lakes Environmental Center (GLEC)  
Restoration Work Group (RWG)  
New York City Department of Parks and Recreation (NYCDPR)  
Hudson River Estuary Program (HREP)  
The Nature Conservancy (TNC)  
Hudson River Park Trust (HRPT)  
New York City Economic Development Corporation (NYCEDC)  
National Oceanic and Atmospheric Association (NOAA)  
New York State Department of State (NYSDOS)  
Science and Resiliency Institute at Jamaica Bay (SRIJB)  
New York State Governor's Office of Storm Recovery (NYSGOSR)  
United States Department of Agriculture (USDA)  
National Park Service (NPS)

## Glossary

Comprehensive Conservation and Management Plan (CCMP)  
Wastewater Treatment Plants (WWTPs)  
Combined Sewer Overflows (CSOs)  
Long Term Control Plans (LTCPs)  
Municipal Separate Sewer System (MS4)  
Harmful Algal Bloom (HAB)  
Regional Environmental Monitoring and Assessment Program (REMAP)  
Hudson River Environmental Conditions Observing System (HRECOS)  
Total Maximum Daily Load (TMDL)  
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)  
Resource Conservation and Recovery Act (RCRA)  
Contaminant Assessment and Reduction Project (CARP)  
Target Ecosystem Characteristics (TECs)  
Hudson-Raritan Estuary Comprehensive Restoration Plan (HREC RP)  
New York City Open Accessible Space Information System (OASIS)  
Geographic Information System (GIS)  
Natural and Nature Based Features (NNBF)  
Stewardship Mapping and Assessment Project (STEW-MAP)  
Historic Area Remediation Site (HARS)  
Best Management Practices (BMPs)  
Polychlorinated Biphenyls (PCBs)

# Summary Table of Goals & Objectives



## **WATER QUALITY—Reduce the sources of pollution so that the waters of Harbor Estuary will meet the fishable/swimmable goal of the Clean Water Act, where attainable**

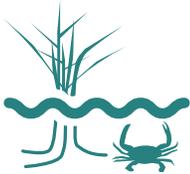
Water Quality Objective A: Improve coordination and begin to establish consensus amongst regulatory agencies on science, standards and design conditions in shared waters

Water Quality Objective B: Accelerate creation, adoption and implementation of Long Term Control Plans and MS4 Permits

Water Quality Objective C: Address monitoring gaps and lack of information for key locations, parameters and state and local track-down programs

Water Quality Objective D: Share water quality information in a clear and easy to understand way with the public, focusing on uses and potential public health risks

Water Quality Objective E: Assess the potential impacts of climate change on water quality



## **HABITAT AND ECOLOGICAL HEALTH—Protect and restore the vital habitat, ecological function, and biodiversity that provide society with renewed and increased benefits**

Habitat Objective A: Make progress towards restoring the Estuary's target ecosystem characteristics

Habitat Objective B: Improve the quality and likely success of habitat restoration

Habitat Objective C: Support restoration monitoring and the utility of monitoring data

Habitat Objective D: Advance understanding and incorporation of climate change impacts in habitat management and restoration



## **PUBLIC ACCESS AND STEWARDSHIP—Improve public access to the waters of the Estuary and the quality of experience at public spaces along the waterfront**

Public Access Objective A: Increase public access and new possibilities for contact recreation, particularly in areas of higher need

Public Access Objective B: Improve stewardship and programming at existing public access sites, particularly in areas of highest need

Public Access Objective C: Promote and expand awareness of public access opportunities and issues



## **PORT AND MARITIME—Support port and associated maritime operations so that they are both economically and ecologically viable**

Maritime Objective A: Improve understanding and management implications of changing sediment contamination in the Estuary, including the timeline for achieving HARS suitable sediments in the navigation channels

Maritime Objective B: Help design and implement port and maritime improvement—projects that are more environmentally friendly



## **COMMUNITY ENGAGEMENT—Foster community stewardship and involvement in decisions about the Harbor**

Specific objectives that will further HEP's community engagement goal are embedded throughout this document. A list of relevant objectives and actions is provided in the Community Engagement section

# Goals, Objectives, and Priority Actions

## WATER QUALITY

**Goal Statement:** Reduce the sources of pollution so that the waters of Harbor Estuary will meet the fishable/swimmable goal of the Clean Water Act, where attainable.

### Context

*Water quality affects everything that HEP and our partners strive for. It is key to healthy habitats and biodiversity, safe public recreation, sustainable sediment management, and long-lasting public stewardship. Indeed, thanks to committed public leadership and billions of dollars in investments, the region has made great strides in attaining the goals of the Clean Water Act. The region's stakeholders have reaped many ongoing benefits from this work, most notably the transformation of the waterfront as a driving amenity for urban living.*

*But many challenges lie ahead if this progress is to be sustained. Primary issues include pathogen contamination, excessive levels of nutrients and low dissolved oxygen, legacy toxic pollution, floatable debris, and microplastics and other contaminants that are of emerging concern. In addition, the likely effect of climate change on future water quality, especially impacts of higher temperatures, sea level rise and shifting precipitation patterns, is unknown.*

*Over the next five years, HEP seeks to make substantial progress on achieving the visionary goal of the Clean Water Act: opening more waters to primary contact recreation and shellfishing, making them suitable for fish survival and reproduction, and eliminating the impacts of toxic contamination and floatable debris on community and ecosystem health. HEP will continue to convene stakeholders through technical workgroups and workshops to ensure that open dialogue is maintained across jurisdictions and agencies and promote data sharing. Fostering stewardship through targeted project opportunities such as pathogen monitoring and trash reduction will also continue to be a main focus. HEP will also work with HRF to prioritize funding for specific research projects through the Hudson River Fund that will help advance these goals.*

The New York-New Jersey Harbor Estuary lies at the heart of the largest and most densely populated urban area in the country. While considerable investments have been made in upgraded systems and newer technology, the region is also served by wastewater collection and treatment systems and stormwater management provided by older and sometimes outdated infrastructure that is expensive and technically difficult to upgrade and maintain. Responsibility is fragmented across political jurisdictions and agency responsibilities. The region's long history of industrial activities left a legacy of toxic contamination. Continued poor water quality, especially in smaller bays and tributaries, limits public access and awareness in many communities.

Major sources of pollutants in the region include discharges from wastewater treatment plants (WWTPs), legacy industrial contamination, combined sewer overflows (CSOs) and stormwater. Government, utilities, and landowners have invested billions of dollars in an attempt to minimize and control these sources and will continue to do so for the foreseeable future. WWTPs are being upgraded to address nutrient pollution. Gray and green infrastructure is being planned and implemented to address pathogens from CSOs and stormwater runoff through Long Term Control Plans (LTCPs) and Municipal Separate Storm Sewer System (MS4) Permits, and sediment dredging has begun in some Superfund and other hotspot locations to reduce legacy toxics.

Although these efforts have significantly improved water quality over the years, the cost for the remaining work will be significant and the timelines are long. Upgrades through

new capital investments must be balanced with the general need for improved asset management of an aging water infrastructure system. There is a clear need for additional support, financially and through coordination, collaboration, research and communication with the numerous stakeholders to address the four pollutants that currently limit public use and ecological health of the estuary—pathogens, nutrients, toxics, and floatable debris—as well as the likely impacts of emerging contaminants and climate change.

The presence of pathogenic bacteria in both marine and freshwaters is the result of fecal contamination from untreated waste and stormwater. State and federal agencies use these indicators to determine whether waters are safe for primary contact recreation (swimming) and consuming shellfish. Generally, water quality in the Harbor has improved with regards to swimming and other contact recreation, with impacts limited primarily by wet-weather events that result in stormwater discharges and CSOs. This is not the case in all waters of the Harbor however, because of either dry-weather contamination or the limited dilution and flushing in smaller bays and tributaries. Pathogen levels still severely limit shellfish consumption, as the shellfish standard is more stringent than the swimming standard.

While nutrients such as nitrogen are essential to plant growth, excessive amounts can cause a number of issues such as low dissolved oxygen and algal blooms, which can result in fish kills. Much has been done in the Harbor to reduce nutrient loads. However, some waterbodies are still lagging behind in terms of dissolved oxygen levels and can-



not currently support fish reproduction and survival.

Toxic contamination—from both legacy and more recent sources—remains a significant and challenging issue to address in the region's water, soil and air. It affects wildlife and is the reason that many fish species are unsafe to consume. Toxic contaminants include heavy metals, persistent pollutants such as PCBs and dioxins, as well as a variety of pharmaceuticals and chemicals found in personal care products. Microplastics, have become a new concern, as they can be harmful to wildlife and human health.

Floatable debris includes any man-made materials originating from deliberate littering, decaying shoreline structures, vessel discharges, CSOs and other sources. This debris is unsightly and negatively impacts our economy, and can also be hazardous to boaters and wildlife. The quantity of debris in the Harbor has been greatly reduced since the 1980s, when floatables caused many beach closures, but there are still areas where persistent trash remains a problem. Addressing floatable debris at the source is key to the estuary's health.

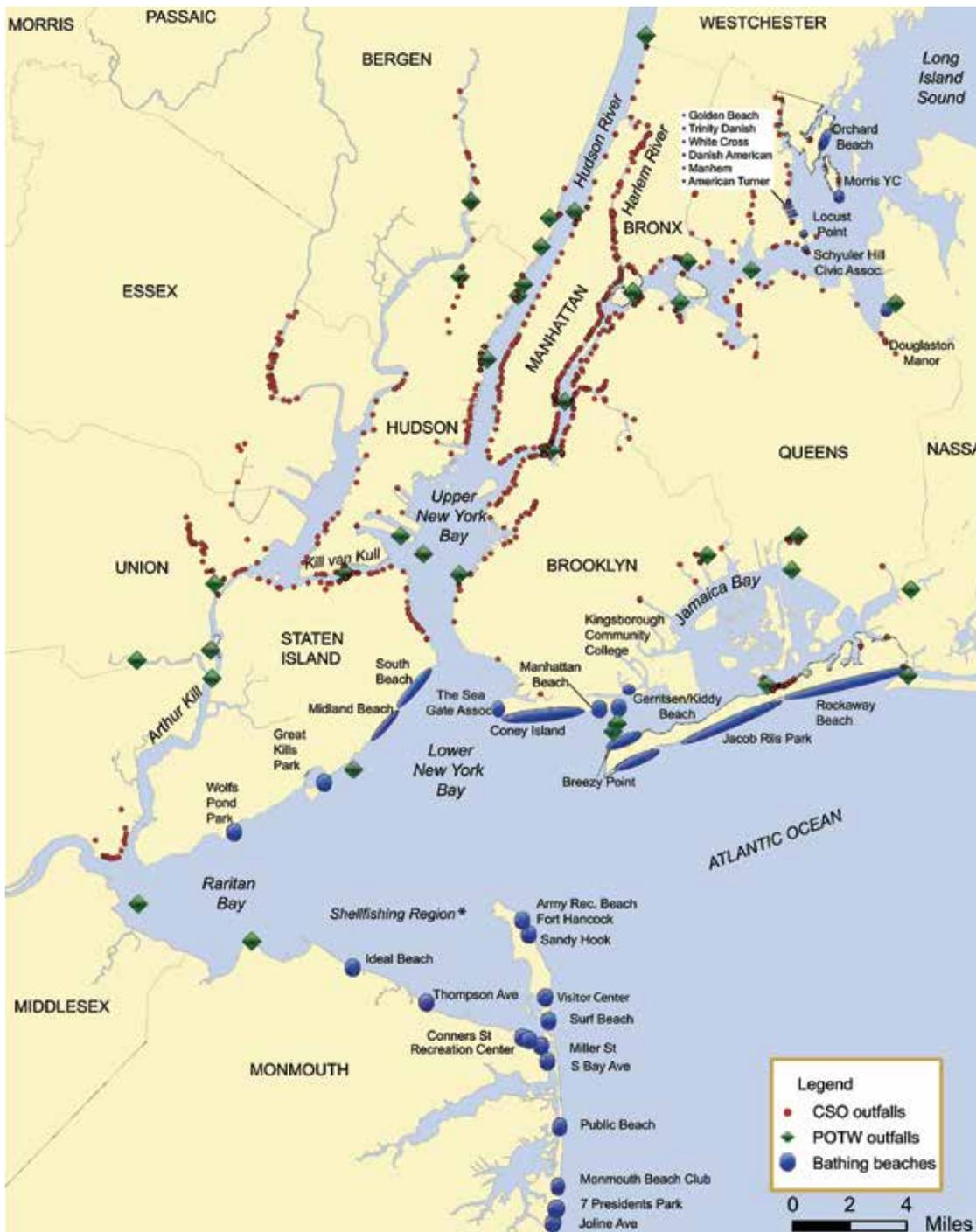
One of the great challenges of this generation is understanding and adapting to climate change. In this estuary, warmer air and water temperatures, shifting precipitation patterns, and sea level rise will be major stressors affecting ecosystem and community health. Increased precipitation and high volume storms will increase the stress on sewage and wastewater infrastructure, leading to increased combined sewer overflow events, increased floatable debris, and difficulty in treating water. In addition to causing more severe droughts, temperature increases combined with shifting precipitation patterns may reduce the total amount of dissolved oxygen that can be held in water, potentially exacerbating existing dissolved oxygen problems in both extent and severity, affecting fish survival and health. In particular, areas that are less well-flushed and where the main sources of fresh water are sewage treatment plants, such as Jamaica Bay and the Hackensack River, are more susceptible. There are significant needs in terms of research and monitoring to understand how water quality may be impacted and possible adaptive responses.

## Water Quality Work Group

Phil DeGaetano, WQWG (Chair)  
Greg Alber, NJHDG  
Marzooq Al-Ebus, NJDEP  
Kate Anderson, USEPA  
Francisco Artigas, Meadowlands Environmental Research Institute (MERI)  
Pinar Balci, NYCDEP  
Rick Balla, USEPA  
Rob Buchanan, NYC Water Trail Association  
Kimberly Cenno, NJDEP  
Meredith Comi, NYNJ Baykeeper, CAC Co-Chair (NJ)  
Mick DeGraeve, Great Lakes Environmental Center (GLEC)/NJHDG  
Sean Dixon, Riverkeeper, CAC Co-Chair (NY)  
Brent Gaylord, USEPA  
Biswarup Guha, NJDEP  
Wayne Jackson, USEPA  
Josh Kogan, USEPA  
Jim Lodge, HRF  
Keith Mahoney, NYCDEP  
Debbie Mans, NYNJ Baykeeper  
Bridget McKenna, NJHDG  
Jeff Myers, NYSDEC  
Rosella O'Connor, USEPA  
Lisa Oberreiter, NJHDG  
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Susan Rosenwinkel, NJDEP  
Clay Sherman, NJDEP  
Stan Stephansen, USEPA  
Chris Sturm, NJ Future  
Dennis Suszkowski, HRF, STAC Co-Chair  
Dan Van Abs, Rutgers/Jersey Water Works  
Judith Weis, Rutgers, STAC Co-Chair  
Rick Winfield, USEPA  
Steve Zahn, NYSDEC

Photo credit: NYNJ HEP





NY-NJ Harbor areas CSOs, POTWs, bathing beaches and shellfishing regions

Source: HEP, 2006 Water Quality Report



Great Blue Heron  
Photo credit: Don Riepe



**WATER QUALITY: Reduce the sources of pollution so that the waters of Harbor Estuary will meet the fishable/swimmable goal of the Clean Water Act, where attainable.**

**Water Quality Objective A: Improve coordination and begin to establish consensus amongst regulatory agencies on science, standards and design conditions in shared waters**

Action	Key Partners	Project type and amount	Timeline
WQ-A-1. Maintain an ongoing dialogue across agency and state boundaries.	Water Quality Work Group	Staff and Leveraging	2017-2022
WQ-A-2. Support the states and EPA in their development of consistent (where possible) water quality standards that are both scientifically defensible and protective of appropriate highest attainable uses in shared waters.	Water Quality Work Group	Staff and Leveraging	2017-2018

**Water Quality Objective B: Accelerate creation, adoption and implementation of Long Term Control Plans and MS4 Permits**

Action	Key Partners	Project type and amount	Timeline
WQ-B-1. Communicate the benefits and outcomes of LTCP, MS4 work and associated infrastructure improvements to the public.	EPA, NYSDEC, NYCDEP, NJDEP, NJCSO Group, SWIM Coalition, Jersey Water Works	Staff and Leveraging; Grant Funded Project <\$200 K; Major Capital	2017-2019
WQ-B-2. Support implementation of green infrastructure opportunities in CSO and MS4 communities.	EPA, NYSDEC, NYCDEP, NJDEP, NJCSO Group, SWIM Coalition, Jersey Water Works	Staff and Leveraging; Grant Funded Project >\$200 K; Major Capital; On Going Operating	2017-2020
WQ-B-3. Synthesize information on LTCP/CSO controls and MS4 permit implementation to determine the effects on shared waters.	EPA, NYCDEP, NJDEP, NJHDG	Grant Funded Project <\$200 K	2018-2020
WQ-B-4. Advance Means and Methods for Public Notification of CSO Events.	EPA, NYCDEP, NJDEP, NJCSO Group, local municipality and community groups	Staff and Leveraging; Grant Funded Project <\$200 K	2018-2020
WQ-B-5. Reduce sources and develop solutions for trash and floatables in both CSO and MS4 areas.	EPA TFW Partnership, NYCDEP, NJHDG	Staff and Leveraging; Grant Funded Project >\$200 K	2017-2020

**Water Quality Objective C: Address monitoring gaps and lack of information for key locations, parameters and state and local track-down programs**

Action	Key Partners	Project type and amount	Timeline
WQ-C-1. Design an intensive pathogen monitoring and notification plan in select near-shore areas.	IEC, NYCDEP, NJDEP, EPA, NJHDG, NJCSO, NYSDEC, State and local health departments, NGOs	Staff and Leveraging; Grant Funded Project >\$200 K; On-going Operating	2017-2022
WQ-C-2. Address monitoring gaps and lack of information especially related to DO requirements for different life stages of benthic and pelagic fauna.	NYCDEP, NJHDG, NJDEP, NYSDEC, NGOs, Academia	Staff and Leveraging; Grant Funded Project >\$200 K	2017-2020
WQ-C-3. Support and share research to help assess the fate, transport and ecosystem impact of known and emerging contaminants, in particular microplastics, in the Harbor Estuary.	EPA, NYCDEP, NJHDG, NJDEP, NYSDEC, NGOs, Academia, Community Groups	Staff and Leveraging; Grant Funded Project >\$200 K	2018-2021

**Water Quality Objective D: Share water quality information in a clear and easy to understand way with the public, focusing on uses and potential public health risks**

Action	Key Partners	Project type and amount	Timeline
WQ-D-1. Prepare an updated Joint Harbor-Wide Water Quality Report.	NYCDEP and NJHDG	Staff and Leveraging; Grant Funded Project <\$200 K	2017-2018
WQ-D-2. Develop briefs and stories about water quality conditions of individual waterways and watersheds.	NYSDEC, NJDEP, NGOs	Staff and Leveraging	2018-2022

**Water Quality Objective E: Assess the potential impacts of climate change on water quality**

Action	Key Partners	Project type and amount	Timeline
WQ-E-1. Support and share research to assess climate change impacts on nutrient input, eutrophication, availability of dissolved oxygen, and harmful algal blooms (HABs).	HRF, EPA, NYSDEC, NJDEP, NYCDEP, NJHDG, Academia	Grant Funded Project >\$200 K	2019-2022
WQ-E-2. Identify parameters and potential for establishing a long-term monitoring to assess climate change impacts on temperatures and other water quality variables.	IEC, EPA, NYSDEC, NJDEP, Academia	Grant Funded Project >\$200 K; On-going Operating	2019-2022
WQ-E-3. Advance understanding and consideration of water quality in the analysis of hazard mitigation and coastal resilience projects.	USACE and EPA	Staff and Leveraging	2017-2022

**WQ-A-1. Maintain an ongoing dialogue across agency and state boundaries.**

**NEED**

Water quality management in the Estuary is complicated by the distinct political jurisdictions of New York and New Jersey, which dictate regulatory approaches and can hinder communications. For example, water quality standards may differ between states and thus determining what constitutes "achievement" for a shared waterbody may be unclear. Defining the end goals is crucial for measuring success. Continued dialogue across agencies is therefore a key element in meeting the fishable/swimmable goal of the Clean Water Act.

**DESCRIPTION**

HEP and its Water Quality Work Group (WQWG), and in particular the regulatory agency partners, will work together to advance discussion of new science/research related to pathogens, nutrients and dissolved oxygen, and toxic contaminants. HEP will work with its partners to identify the most important issues and relevant ways to share information.

The WQWG was formed under HEP in 2013 to help address complex issues and facilitate communication across agencies and organizations working towards the common goal of cleaner, healthier waters. Its membership includes EPA, NYS DEC, NJ DEP, NYC DEP, New Jersey Harbor Dischargers Group, and representatives of the scientific and civic community. The WQWG meets at least quarterly and more frequently when necessary.

**KEY PARTNERS**

Water Quality Work Group

**RESOURCES**

Staff and Leveraging

**TIMELINE**

2017-2022

**OUTCOMES**

Short-term:

- Agreement on shared goals for water quality improvement
- Clear definitions of impairment status and fully supported uses
- Discussions will also help frame and advance action A-2

Long-term:

- State agencies have a shared vision for water quality improvements, including appropriate standards and uses, and work cooperatively towards achieving it

**WQ-A-2. Support the states and EPA in their development of consistent (where possible) water quality standards that are both scientifically defensible and protective of appropriate highest attainable uses in shared waters.**

**NEED**

Due to different laws, policies and management approaches in NY and NJ, water quality criteria, attainable uses, and intermediate goals for water quality improvement often differ. This is problematic when considering the impact of improvements for shared waters and can lead to confusion among stakeholders and the public.

**DESCRIPTION**

HEP will work with EPA and the two states to identify and discuss how best to translate differing standards and data on water quality parameters of shared waters, including how to communicate those conditions and goals to stakeholders and the public. Discussion items could include hydrology, hydrodynamics, design period, return period, target indicator, water quality standards, and boundary conditions. This effort could start with a focus on a particular water body, such as Raritan Bay and/or a specific pollutant of concern, such as pathogens or nutrients. These discussions will help inform the collaboration on the water quality modeling effort proposed as Action B-3 and help provide a basis for communication about these shared waters to the public. An outcome will be better consistency between states on Long-Term Control Plan (LTCP) implementation and Municipal Separate Stormwater Sewer System (MS4) and will assist the principal parties as they develop long term goals for other water quality improvements in shared waters. This effort will start with the members of the Water Quality Work Group but could involve other stakeholders.

**KEY PARTNERS**

Water Quality Work Group

**RESOURCES**

Staff and Leveraging

**TIMELINE**

2017-2018. This action will begin in 2017 with the establishment of a special work group devoted to addressing this topic.

**OUTCOMES**

Short-term:

- Agreement on translation and communications for specific water quality criteria/standards for one or more shared waters

Long-term:

- Coordination between agencies on LTCP and MS4 implementation and other water quality improvements affecting shared waters
- Unified public communication strategies on water quality status and public health effects for shared waters



**WQ-B-1. Communicate the benefits and outcomes of the implementation of LTCP, MS4 permits and associated infrastructure improvements to the public.**

**NEED**

Billions of dollars are being invested in crucial projects to improve water quality in both NY and NJ. Stakeholders, including ratepayers and local government officials, are often unaware of what work is currently underway and what improvements will mean for their communities.

**DESCRIPTION**

HEP will develop factsheets, story maps, and/or other material intended for a broad audience to describe what LTCPs, MS4 and other infrastructure improvements will achieve in terms of water quality improvements and how. This effort will likely focus on one or more specific nearshore areas such as sections of the Hudson River, Coney Island Creek, Harlem River, Passaic River, or Raritan Bay. The effort will be conducted in partnership with appropriate public agencies, utilities, and civic partners such as Jersey Water Works and the SWIM Coalition. This grant funded work could contribute to broader campaigns conducted by civic partners in support of needed capital investment for LTCP and MS4 implementation. HEP will also participate in public outreach opportunities with states and permittees in LTCP development.

**KEY PARTNERS**

EPA, NYSDEC, NYCDEP, NJDEP, NJ CSO Group, SWIM Coalition, Jersey Water Works

**RESOURCES**

Staff and Leveraging; Grant Funded Project <\$200 K; Major Capital Investment

**TIMELINE**

2017-2019. This action will begin in 2017 with a focus on one waterbody to start. Additional materials will be developed for other waterbodies during 2018 and 2019.

**OUTCOMES**

Short-term:

- Clear information describing what the LTCPs and MS4 work will achieve for specific waterbodies, including timelines and associated costs, and what this will mean in terms of waterbody uses

Long-term:

- Greater support from local government, business and community stakeholders
- Investments and other steps to improve water quality management infrastructure

Rain garden treating stormwater in the Bronx  
Photo credit: NYC DEP

**WQ-B-2. Support implementation of green infrastructure opportunities in CSO and MS4 communities.**

**NEED**

Green infrastructure is a crucial tool for improving water quality in urban areas. Local communities and private property owners require assistance in terms of planning, designing, and managing implementation options that suit their particular watershed.

**DESCRIPTION**

HEP will work with a variety of stakeholders, in particular community representatives, local government, transportation agencies and development interests to encourage implementation of green infrastructure in advancing their Long-Term Control Plans. This effort will include sponsoring workshops and review of technical guidance offered by agencies and permittees. A key partner and focus will be the implementation of green infrastructure in New Jersey and the efforts of the Jersey Water Works collaborative. Grant funding will be required for work on targeted projects or locations. Implementation of green infrastructure will require securing major capital funding and meeting on-going operating needs. Advancing adoption and implementation of local stormwater utilities will also be a point of emphasis given their ability to generate resources.

**KEY PARTNERS**

EPA, NYSDEC, NYCDEP, NJDEP, NJCSO, SWIM Coalition, Jersey Water Works, local government, transportation agencies, private developers and property owners

**RESOURCES**

Staff and Leveraging; Grant Funded Project >\$200 K; Major Capital Investment; On-Going Operating

**TIMELINE**

2017-2020. HEP began supporting green infrastructure implementation efforts in 2016, focusing on one community in NJ and supporting statewide efforts through Jersey Water Works. HEP will target an additional community and/or projects in NJ for support by 2018 to be completed by 2020.

**OUTCOMES**

Short-term:

- Implementation of one large-scale, or several small-scale, green infrastructure project(s) in a CSO target community
- Advancement of efforts to establish stormwater utilities and/or adoption in one local CSO community

Long-term:

- Reduced number of CSO overflow events in targeted communities



### **WQ-B-3. Synthesize information on LTCP/CSO controls and MS4 permit implementation to determine the effects on shared waters.**

#### **NEED**

The combined effects of controls and permits on NY and NJ's shared waters are uncertain. The timelines for the LTCPs currently underway in NYC and NJ are varied and complex and expected water quality improvements following implementation are unclear. In addition, as required by the New York City's first MS4 permit, NYCDEP is also developing a Stormwater Management Program.

#### **DESCRIPTION**

HEP will advance the creation of a unified modeling framework that will predict expected outcomes of combined LTCP/CSO implementation in a specific shared waterbody. The modeling efforts will focus on areas such as the Raritan Bay that do not meet primary contact recreation goals and/or fish survival and reproduction goals. Key partners include EPA, state agencies, utilities, local municipalities, Jersey Water Works and the SWIM Coalition.

This action will build on other actions to improve coordination and communication about shared water bodies, including the "road map" discussions proposed in Action A-2. While it is anticipated that such a modeling effort will build on existing efforts, including work being done in both states on LTCPs, preparing such a model will require significant additional grant funding or sponsorship by the regulated utilities. A specific first step in this action will be to develop the scope of work for the modeling framework.

#### **KEY PARTNERS**

EPA, NYCDEP, NJDEP, NJHDG, NYSDEC, SWIM Coalition, Jersey Water Works

#### **RESOURCES**

Grant Funded Project >\$200 K

#### **TIMELINE**

An appropriate bi-state waterbody will be selected as a pilot area by 2018. Modeling will be completed by 2020.

#### **OUTCOMES**

Short-term:

- Creation of a project-specific modeling framework for bi-state waters
- Identification of expected water quality improvements following implementation of controls for the modeled waterbody

Long-term:

- Observable water quality improvements for all pollutants addressed by the controls in all shared waters

### **WQ-B-4. Advance Means and Methods for Public Notification of CSO Events.**

#### **NEED**

CSO discharges can occur with as little as one tenth of an inch of rain and can pose significant health risks to humans that come into contact with this water. The vast majority of the public is not aware of these discharges or the hazards they pose.

#### **DESCRIPTION**

HEP will engage agencies, utilities and user groups to share lessons learned and identify additional pilot projects. This effort will build on the experience of programs such as NYS DEC's NY-Alert Sewage Pollution Right-to-Know program, the NYCDEP text messaging pilot program and CSO Advisory Web Page, the NJ CSO Group's public notification web application that predicts CSO events and public signage installed by the City of Hoboken with the goal of adding value and improving these existing and in some cases mandated efforts. New grant funding will be required to undertake any pilot projects.

#### **KEY PARTNERS**

NYCDEP, NJDEP, NYSDEC, EPA, NJCSO Group, local municipalities and community groups

#### **RESOURCES**

Staff and Leveraging; Grant Funded Project <\$200 K

#### **TIMELINE**

2018-2020. HEP will begin reaching out to align with and expand current efforts in 2018. A pilot project will be undertaken in 2019.

#### **OUTCOMES**

Short-term:

- Communities are more aware of CSO overflow events in their local waterbodies and know not to come into contact with the water during these times

Long-term:

- Individuals and CSO communities are helping to reduce the number of CSO discharge events through personal choices and support LTCP and other water quality improvements.



## WQ-B-5. Reduce sources and develop solutions for trash and floatables in both CSO and MS4 areas.

### NEED

Trash and debris in the estuary are a persistent problem. While various clean-up programs and techniques are essential, innovative solutions that expand the engagement of stakeholders are necessary to make a lasting impact.

### DESCRIPTION

HEP will continue working with stakeholders to develop sustainable, long-lasting, proactive solutions to trash prevention and detection, concentrating on addressing land-based sources. Efforts will build on partnerships created during the "Stopping Trash Where it Starts" NEIWPCC funded project in collaboration with Montclair State University. Potential projects include developing innovative monitoring techniques to identify debris hotspots, creating a shoreline 311 system and/or Unified Phone Application to report on floatables and overflowing trash booms, compiling metrics on floatables collected to assess trends and determine if current measures are having desired effects, and encouraging adoption of trash "hotspots" through stewardship grants. HEP will also assess the feasibility of piloting a trash water wheel or similar trash trap device in a Harbor tributary. Undertaking any of these projects will require additional grant funding.

### KEY PARTNERS

NY/NJ TFW Partnership, NYCDEP, NJHDG, NJCSO, NGOs, Community Groups

### RESOURCES

Staff and Leveraging; Grant Funded Project >\$200 K

### TIMELINE

2017-2020. HEP began a trash track down project with Montclair State University through a NEIWPCC grant in 2016. Future projects will be pursued starting in 2018 through 2020.

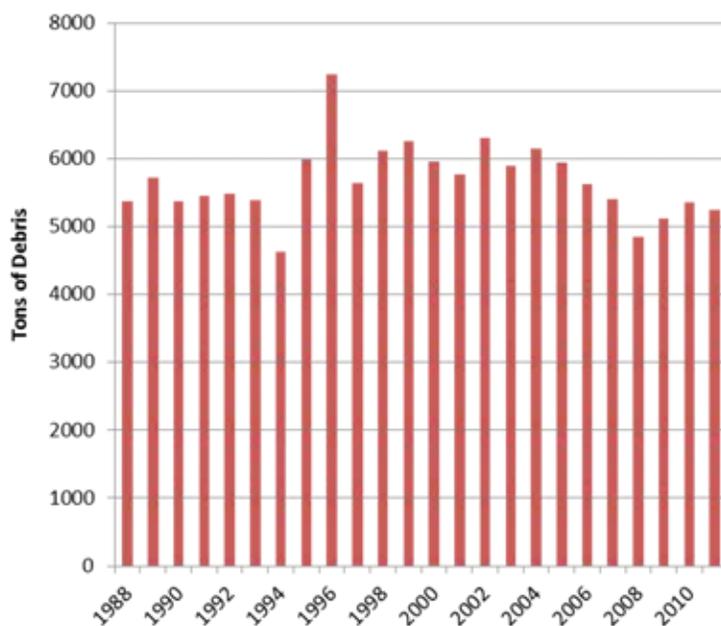
### OUTCOMES

Short-term:

- Community awareness of the negative impacts of disposable items on the environment
- Increased use of re-usable bags, bottles and travel mugs
- Local business buy-in into waste-free alternatives for dishware and carry-out items

Long-term:

- Significantly reduced floatable debris in the estuary



Floatable Debris Collected by Skimmer Vessels & Booms  
Source: HEP, State of the Estuary 2012



Photo credit: Don Riepe

**WQ-C-1. Design an intensive pathogen monitoring and notification plan in select near-shore areas.**

**NEED**

While there has been significant overall improvement in pathogen levels in the estuary over the past 20 years, water quality in many near-shore areas remains unknown. Routine agency sampling is typically conducted mid-channel via boat, while recreational season shoreline sampling only occurs at designated beaches. Many residents and visitors boat and swim in areas that are either being monitored infrequently or not at all.

**DESCRIPTION**

HEP funded two groups to conduct pathogen sampling in near shore areas of Staten Island and the Raritan Bayshore in 2016. This effort was made possible by a close partnership with IEC. HEP will continue and expand its work with IEC and other partners to develop a systematic approach for determining pathogen levels for near shore areas in reference to contact recreation and other uses. This effort will also involve EPA, state agencies, and NGOs involved in citizen science efforts. Another parameter of interest is harmful algal blooms (HABs). Monitoring for HABs could occur during pathogen sampling efforts. The pathogen effort could also involve working with states and utilities to accelerate track down efforts to identify 'dry weather' sources of bacterial contamination. It will require new grant funding to support local collection efforts.

**KEY PARTNERS**

IEC, NYCDEP, NJDEP, EPA, NJHDG, NJCSO, NYSDEC, State and local health departments, NGOs

**RESOURCES**

Staff and Leveraging; Grant Funded Project >\$200 K; On-Going Operating

**TIMELINE**

2017-2022. HEP will work with partners beginning in 2017 to develop a monitoring plan and needs. Monitoring will be conducted as needed through 2022.

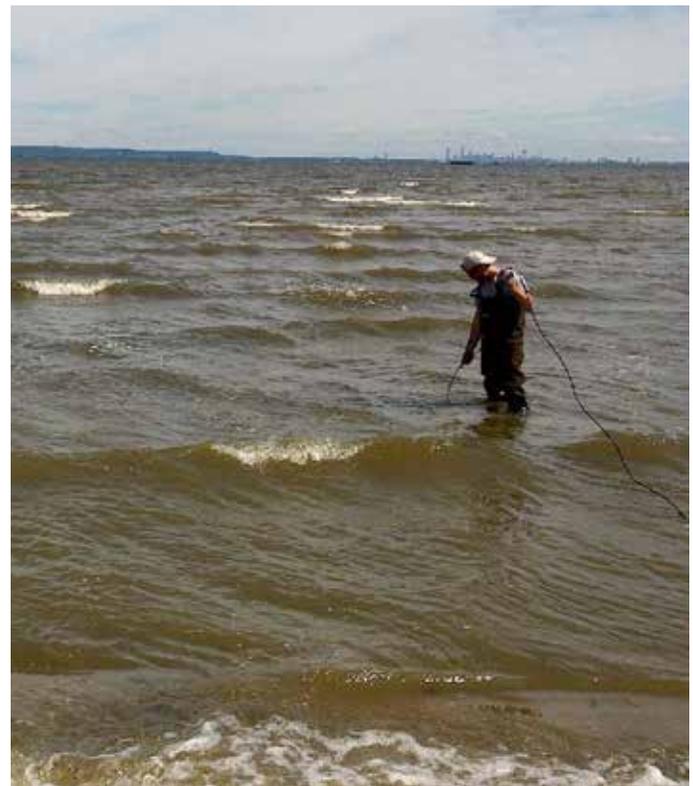
**OUTCOMES**

Short-term:

- Routine monitoring at select sites during the recreational season
- Valuable data that will help to fill in data gaps and complement other sampling programs
- Early warning to agencies of potential water quality issues, such as HABs

Long-term:

- Improved understanding of recreational water quality in the estuary
- An established monitoring program that provides high quality data



Upper: Citizen science groups performing pathogens analyses on water quality samples.

Lower: Measuring in-situ water quality (temperature, pH, dissolved oxygen and salinity) in Port Monmouth, NJ

Photo credit this page: NY/NJ Baykeeper



## **WQ-C-2. Address monitoring gaps and lack of information especially related to DO requirements for different life stages of benthic and pelagic fauna.**

### **NEED**

Sufficient dissolved oxygen is essential for all aspects of an aquatic organism's lifecycle. In order to accurately measure levels of DO in an aquatic system, and the effects they may have on the biota, continuous measurements are crucial but very frequently lacking. Targeted projects addressing these data gaps are necessary to fully grasp what standards are sufficiently protective of aquatic life requirements.

### **DESCRIPTION**

HEP will continue building on the HEP/HRF Great Lakes Environmental Center (GLEC) DO study and upcoming work in the Hackensack River. The GLEC study was conducted during 2015-2016 and evaluated the effects of projected and measured low DO on marine organisms in the estuary. GLEC is continuing their investigations in 2017 by focusing on the Hackensack River in NJ on behalf of NJHDG.

HEP will provide a forum for reviewing the results of the ongoing study of the Hackensack River and discussing its implications for DO criteria. Consistent standards are needed to provide for protection of aquatic life. This forum may also discuss the role of nutrients in DO impairments and the need to consider nutrient loading reductions. In addition, one project possibility is to design an intensive monitoring plan in select areas to capture fluctuations in surface and bottom DO, in addition to reviewing the HRECOS continuous monitoring data. EPA's REMAP data will also be reviewed for any relevant information on benthic organisms. Conducting additional monitoring will require new grant funding.

### **KEY PARTNERS**

NYCDEP, NJHDG, NJDEP, NYSDEC, NGOs, Academia

### **RESOURCES**

Staff and Leveraging; Grant Funded Project >\$200 K

### **TIMELINE**

2017-2020. HEP will explore funding possibilities for a project beginning in 2017. If funding allows, a project will be completed by 2020.

### **OUTCOMES**

Short-term:

- An understanding of DO requirements for certain species in the estuary
- Valuable data that will help to fill in spatial and temporal data gaps

Long-term:

- Site-specific DO criteria where appropriate
- DO criteria fully protective of all stages of aquatic life

## **WQ-C-3. Support and share research to help assess the fate, transport and ecosystem impact of known and emerging contaminants, in particular microplastics, in the Harbor Estuary.**

### **NEED**

In addition to the Estuary's legacy of toxic contamination, a variety of newer chemicals, pharmaceutical by-products, and microplastics, are now a cause for concern. For many of these substances, their effects on organisms in terms of reproduction and survival are unknown, including their effects on human health.

### **DESCRIPTION**

HEP and partners will build on the Harbor Toxics TMDL work and recent sampling conducted by Riverkeeper/Cornell University to look at the feasibility of undertaking a risk assessment for our region. Similar work is underway in the Netherlands and is being undertaken under EPA CERCLA/RCRA to characterize and develop response actions for various emerging contaminants, including working with states to accelerate track down efforts of contaminants. HEP and the HRF will also support projects that document the impact of these new and emerging contaminants in the Estuary, such as the microplastic trawling surveys conducted by Baykeeper in the Harbor as well as sediment/beach sampling and will advance research opportunities into shellfish and fish consumption of microplastics. HEP will also encourage the research and development of novel tools and controls to prevent and remove microplastics, such as that developed by the Rozalia Project (<http://rozaliaproject.org/>) to prevent microfibers from entering our waterways. HEP and HRF could also support a program to track down and reduce ongoing sources of toxic contaminants, as identified through the Contaminant Assessment and Reduction Project (CARP). These assessments and projects will require new grant funding.

### **KEY PARTNERS**

EPA, NYCDEP, NJHDG, NJDEP, NYSDEC, NGOs, Academia, Community Groups

### **RESOURCES**

Staff and Leveraging; Grant Funded Project >\$200 K

### **TIMELINE**

2018-2021. HEP and HRF will explore possibilities for funding a research project beginning in 2018.

### **OUTCOMES**

Short-term:

- Additional data on concentrations and distribution of contaminants in the estuary
- Better understanding of the consumption of microplastics by fish and shellfish

Long-term:

- Reduce effects of microplastic consumption on human health
- Limit ecosystem impacts of various widespread contaminants

**WQ-D-1. Prepare an updated Joint Harbor-Wide Water Quality Report.**

**NEED**

The last joint harbor report was published in 2011. This report combined data collected throughout the Harbor by NYCDEP and NJHDG and gave a clear picture of water quality trends in both NY and NJ waters. Presenting this data in a joint fashion is a key communication tool for interested stakeholders and users of the region's waters.

**DESCRIPTION**

HEP will work with NYCDEP, NJHDG and other partners to compile data on water quality and show trends throughout the Harbor. This information should describe what impairments mean and how the EPA, the states and the public can use this information. The report will focus on data interpretation and identifying gaps in information. Parameters will include those of importance to stakeholders with long-term datasets such as pathogens and dissolved oxygen. It may include information on contaminants. Reports will be available on HEP's new website as well as in hardcopy. In addition, an interactive web-based map will identify all existing sampling locations in the Harbor Estuary with pertinent information associated with each. Creation of the map will require new grant funding.

**KEY PARTNERS**

NYCDEP, NJHDG

**RESOURCES**

Staff and Leveraging; Grant Funded Project <\$200 K

**TIMELINE**

2017-2018. HEP will work with partners beginning in 2017 on both the joint report and the web-based map. Moving forward, a joint report will be prepared once every two years.

**OUTCOMES**

Short-term:

- Clear, easily-accessible, information on water quality trends and impairments in the Harbor

Long-term:

- Better informed stakeholders that are aware of what "safe uses" means and how to incorporate that information into their decisions on where and when to recreate
- Collaboration between sampling programs in NY and NJ

**WQ-D-2. Develop briefs and stories about water quality conditions of individual waterways and watersheds.**

**NEED**

Waterbody and watershed-specific information focused on potential public health risks related to uses and ways that agencies and organizations are working to eliminate or minimize these risks is currently lacking. Breaking down overall Harbor water quality trends into easily digestible, locally relevant, information is another key communication tool that is needed for the region's stakeholders.

**DESCRIPTION**

This material can be distributed through the HEP website and newsletter to effectively communicate activities and progress. The effort will help support NYSDEC fact sheets and NJ DEP watershed planning efforts as well as information prepared by local stewardship organizations. Waterbody specific story maps can also be used to share information on fish and shellfish consumption advisories.

**KEY PARTNERS**

NYSDEC, NJDEP, NGOs

**RESOURCES**

Staff and Leveraging

**TIMELINE**

HEP will work with partners to develop two waterbody and/or watershed-specific briefs in 2018 to start. This effort will continue with additional waterbodies.

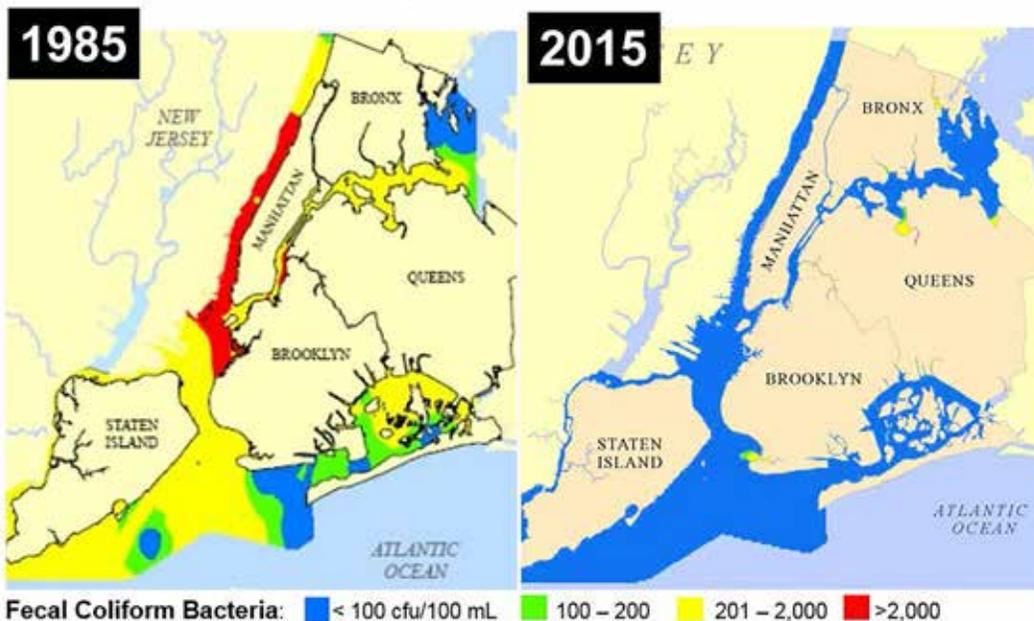
**OUTCOMES**

Short-term:

- Accurate, current and clear information on waterbody-specific conditions as well as ongoing initiatives and projects within the watershed

Long-term:

- Better informed stakeholders that are aware of local waterbody conditions and efforts to improve them



\$10B investment since the early 2000s has yielded the highest water quality observed in the NYC Harbor in recent history

Source: NYC DEP, Harbor Survey Program



**WQ-E-1. Support and share research to assess climate change impacts on nutrient input, eutrophication, availability of dissolved oxygen, and harmful algal blooms (HABs).**

**NEED**

It is certain that climate change will affect water quality in the Harbor Estuary but specific impacts and the magnitude, duration and frequency of these impacts, are not well understood. Modeling future possibilities through a range of climate change scenarios is crucial to help advance policy options.

**DESCRIPTION**

HEP and HRF will support research projects seeking to model these relationships, and communicate this information to stakeholders to discuss possible policy responses. Research projects will require new grant funding. Of particular concern are the effects of changing precipitation patterns on streamflow and residence time in the estuary, which could in turn affect nutrient levels and cause undesirable effects such as algal blooms and reduced dissolved oxygen.

**KEY PARTNERS**

HRF, EPA, NYSDEC, NJDEP, NYCDEP, NJHDG, Academia

**RESOURCES**

Grant Funded Project >\$200K

**TIMELINE**

HEP and HRF will seek research proposals beginning in 2019 and will target one project for funding between 2019 and 2022.

**OUTCOMES**

Short-term:

- Additional information on the potential impacts of climate change on the Harbor Estuary
- Accurate models demonstrating water quality impacts for a variety of climate change projections

Long-term:

- Adaptive policies that take into account water quality impacts
- Projects specifically intended to mitigate effects on water quality

**WQ-E-2. Identify parameters and potential for establishing a long-term monitoring program to assess climate change impacts on temperatures and other water quality variables.**

**NEED**

There are many uncertainties in the ways that climate change will impact water quality. Collecting observable data to track changes will assist in future planning and mitigation efforts.

**DESCRIPTION**

HEP will convene partners to identify specific parameters, including dissolved oxygen, algal blooms, and nutrients as well as how best to support this long term monitoring need and reporting over time. This effort may focus on especially susceptible waterways, such as the Hackensack, where dams and drinking water reservoirs may exacerbate future temperature increases. Monitoring could involve citizen scientists to help collect data on algal blooms and other parameters. Creation of the monitoring system will require grant funding and on-going operating support.

**KEY PARTNERS**

IEC, EPA, NYSDEC, NJDEP, Academia

**RESOURCES**

Grant Funded Project >\$200K; On-Going Operating

**TIMELINE**

HEP will convene partners in 2019. Monitoring will be established in at least one watershed by 2021.

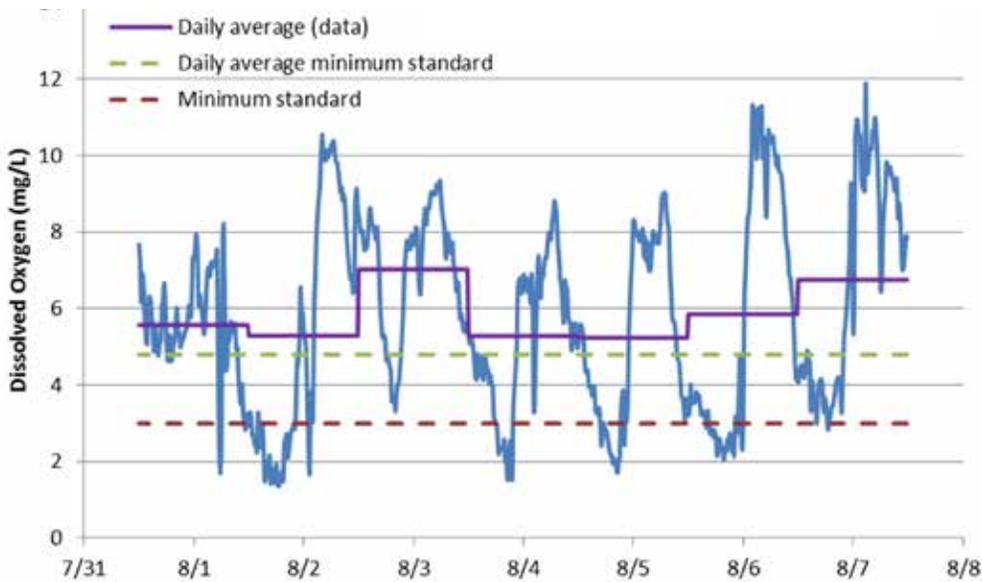
**OUTCOMES**

Short-term:

- A monitoring plan that lays out appropriate locations and parameters for long-term data collection with the specific goal of assessing climate change impacts
- Pilot data for at least one susceptible waterbody/watershed

Long-term:

- Data throughout the Harbor Estuary that will supplement other monitoring programs
- Clear information on how climate change is impacting water quality



Dissolved Oxygen (mg/L), High-Frequency Readings, Broad Channel, Jamaica Bay 2010

Source: HEP, State of the Estuary 2012



Upper: Water quality sampling at Lemon Creek Park, Staten Island. Photo credit: Gotham Whale.

Lower: Passaic Valley Sewerage Commission skimmer boat on the Passaic River in Kearny, NJ. Photo credit PVSC.

### **WQ-E-3. Advance understanding and consideration of water quality in the analysis of hazard mitigation and coastal resilience projects.**

#### **NEED**

Water quality is infrequently taken into account when the focus of a project is long-term resiliency. Primary concerns are human health and safety as well as habitat protection, however understanding potential impacts on water quality will facilitate the design and selection of appropriate projects. This will help ensure that projects are not working against water quality goals for the broader Harbor Estuary.

#### **DESCRIPTION**

HEP staff will participate in advisory committees and, through the Water Quality Work Group and Citizens Advisory Committee, help ensure that hazard mitigation projects, such as proposed tidal barriers, fully assess implications of their construction on water quality issues.

#### **KEY PARTNERS**

USACE and EPA

#### **RESOURCES**

Staff and Leveraging

#### **TIMELINE**

Participation in advisory committees will occur as needed with the project schedule, beginning in 2017 onwards.

#### **OUTCOMES**

Short-term:

- Input from water quality experts on potential impacts of climate adaptation projects in the Harbor Estuary
- Approved projects take into account these potential impacts and ways to address them

Long-term:

- Projects are able to properly mitigate hazards without negatively impacting water quality



# Goals, Objectives, and Priority Actions

## HABITAT AND ECOLOGICAL HEALTH



**Goal Statement:** Protect and restore the vital habitat, ecological function, and biodiversity that provide society with renewed and increased benefits.

### Context

*While the Harbor Estuary is an incredibly vital and important landscape, the natural resources remaining today do not compare with the rich habitats our estuary supported before European colonization. Through the creation of the Hudson Raritan Estuary Comprehensive Restoration Plan, HEP and its partners have set goals for the conservation and restoration of 12 Target Ecosystem Characteristics (TECs) including wetlands, habitat for waterbirds, tributary connections, and maritime forest. These goals provide a path towards a healthy and renewed urban ecosystem.*

*Over the next five years, HEP will undertake 13 actions that will help implement the Comprehensive Restoration Plan. These include actions intended to reduce the costs and secure required funding for the individual restoration projects. HEP will also continue to support the community of practice for urban restoration, notably seeking to address challenging issues related to the recontamination of restoration sites, understanding the value of urban shallows and shorelines, documenting the value of ecosystem services, supporting the sharing of monitoring results, and advancing the understanding of how impending sea level rise and other climate change impacts will affect restoration work.*

The Harbor Estuary is an ecologically significant resource, despite its location at the heart of the North America's largest metropolitan area. The more than 250 square miles of open water and countless tidal tributaries are home to more than 100 fish species for some or all of their lifecycles, including 16 for which the estuary provides essential habitat. Lining the 1600 miles of shoreline are shallow mudflats and about 7,600 acres of wetlands that shelter shellfish, fiddler crabs, juvenile fish, and resident and migratory birds. There are 68 small islands critical to nesting shorebirds and hundreds of acres of rare coastal and maritime forests and grasslands.

Managing these existing resources, and restoring the ecological characteristics of the historic estuary, involves many challenges. There is intense pressure to develop and fragment much of the remaining unprotected habitat area for transportation, commercial, residential and recreational uses, and other purposes. Even for areas protected as public parkland, toxic contamination of soil and sediments, historical and illegal filling of wetlands, interference with natural hydrological functions, and overuse can stress and degrade habitat in the Harbor. The impacts of climate change will pose new challenges associated with increasing air and water temperatures, rising sea levels, and larger coastal storms.

Published in 2016, Version 1.0 of the Hudson-Raritan Estuary Comprehensive Restoration Plan (HRE CRP) provides a blueprint for guiding ecosystem restoration and conservation efforts. Development of this science-based plan was led by the US Army Corps of Engineers and the Port Authority of New York & New Jersey, and involved many partners, notably HEP's Restoration Work Group (RWG). The plan, available at <http://www.harborestuary.org/watersweshare/>, provides goals for each of 12 TECs for the years 2020 and 2050.

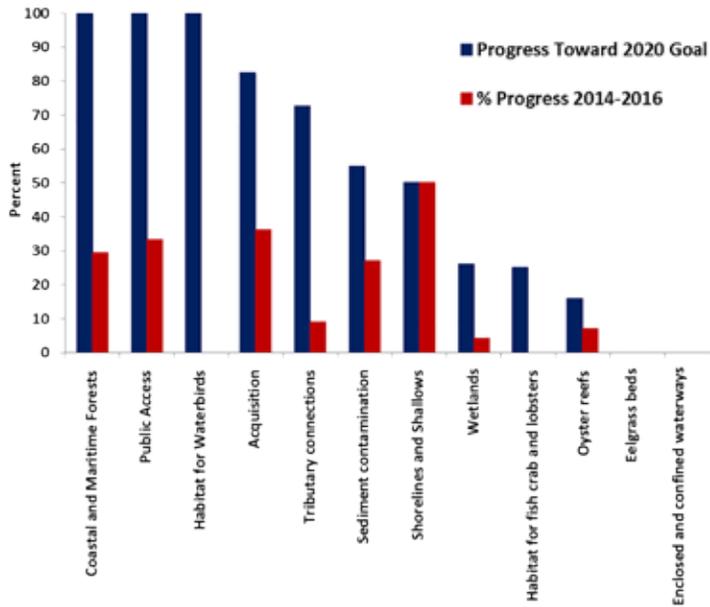


Progress towards these goals since the 2009 publication of the initial draft plan has been varied. Some 2020 goals have already been met or exceeded, including targets for habitat for waterbirds, coastal and maritime forests, and improving tributary connections critical to migratory fish. However, progress toward other goals such as restoring wetlands, oyster reefs, shorelines and shallows, and eelgrass beds, has proved more challenging. Achieving these and other Comprehensive Restoration Plan goals will require substantial funding and leveraging efforts, above existing amounts. Advancements in our understanding and development of additional data on shorelines and shallow water habitat, sediment management, and the ecological value and efficacy of "nature based" resiliency features are critical to reaching these goals successfully.



Restoration of Lincoln Park in Jersey City. Photo Credit: NOAA

## TEC Progress Graph

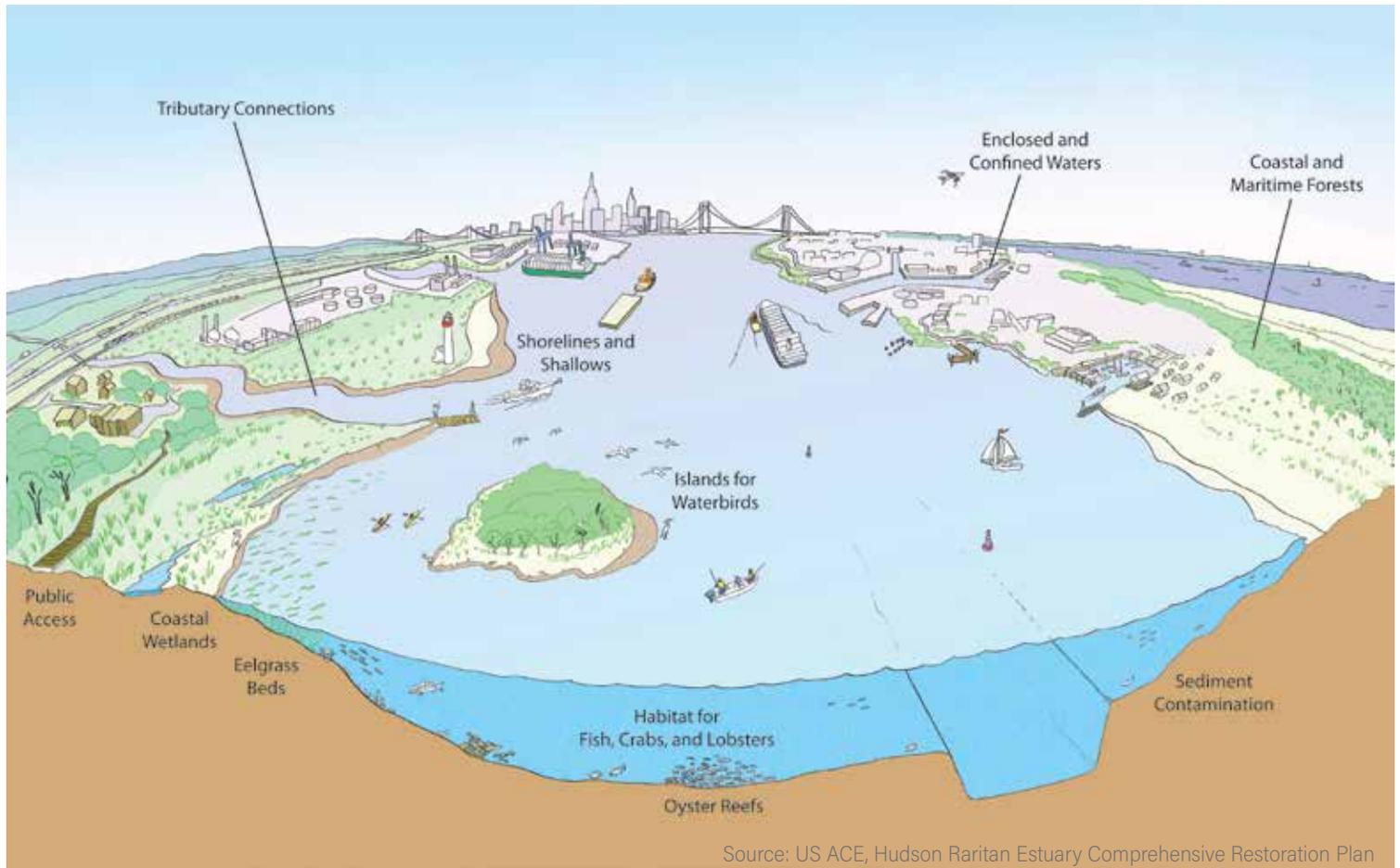


Source: HEP, Restoration Progress 2014-2016

## Restoration Work Group

Lisa Baron, U.S. Army Corps of Engineers (chair)  
 Carl Alderson, National Oceanic and Atmospheric Administration  
 Susan Elbin, NYC Audubon  
 Grace Jacob, NJ Department of Environmental Protection  
 Melissa Jaishwar, The Trust for Public Land  
 Marit Larson, New York City Department of Parks and Recreation  
 Jim Lodge, Hudson River Foundation  
 Deborah Mans, New York-New Jersey Baykeeper  
 Susan Maresca, NYS Department of Environmental Conservation  
 Emily Maxwell, The Nature Conservancy (New York City)  
 John McLaughlin, New York City Department of Environmental Protection  
 Dana Mecomber, Port Authority of New York and New Jersey  
 Daniel Montella, US Environmental Protection Agency  
 Lisa Oberreiter, Passaic Valley Sewerage Commission  
 Andrew Peck, The Nature Conservancy  
 Ken Scarlatelli, NYS Department of Environmental Conservation  
 Clay Sherman, NJ Department of Environmental Protection  
 Carter Strickland, The Trust for Public Land (New York)  
 Nellie Tshipoura, New Jersey Audubon  
 Judith Weis, Rutgers University  
 Ben Weiland, The Trust for Public Land  
 Rick Winfield, US Environmental Protection Agency

## The 12 Target Ecosystem Characteristics of the Hudson Raritan Estuary



Source: US ACE, Hudson Raritan Estuary Comprehensive Restoration Plan



**HABITAT: Protect and restore vital habitat, ecological function, and biodiversity that provide society with renewed and increased benefits.**

**Habitat Objective A: Make progress towards restoring the Estuary's target ecosystem characteristics**

Action	Key Partners	Project type and amount	Timeline
H-A-1. Increase investment in conservation and restoration projects.	Restoration Work Group, CAC, USACE, NYSDEC, NJDEP	Staff and Leveraging; Major Capital Projects	2017-2022
H-A-2. Evaluate ways to reduce costs of restoration.	RWG	Staff and Leveraging	2018-2022
H-A-3. Document value of ecosystem services delivered through restoration for decision makers.	HRF, USACE, RWG, EPA, Academia	Staff and Leveraging; Grant Projects<\$200 K	2017-2019
H-A-4. Create a decision making tool for prioritization of restoration opportunities.	RWG, USACE, NYS DEC, NJ DEP, NYC DPR, Academia	Staff and Leveraging; grant Projects<\$200k	2018-2019

**Habitat Objective B: Improve the quality and likely success of habitat restoration**

Action	Key Partners	Project type and amount	Timeline
H-B-1. Share research and best practices among partners.	RWG, Harbor Herons and Oyster Restoration Committees.	Staff and Leveraging	2017-2022
H-B-2. Assess and interpret shoreline and shallow-water habitat condition and value.	HRF, Academia, TNC, NYC DPR, NJDEP, NYSDEC, HREP, HRPT, EDC, PANYNJ	Staff and Leveraging; Grant Projects>\$200k	2017-2021
H-B-3. Understand the risks of recontamination of restored sites.	Restoration Work Group, USACE, NOAA, EPA, USFWS	Staff and Leveraging; Grant Projects><\$200k	2018-2019

**Habitat Objective C: Support restoration monitoring and the utility of monitoring data**

Action	Key Partners	Project type and amount	Timeline
H-C-1. Increase support for monitoring and consistency among metrics.	USACE, NYSDEC, NYSDOS, NYCDPR, NYCDEP NJDEP, SRIJB, IEC, TNC, Academia, Consultants	Staff and Leveraging, Grant Projects<\$200k; On-going operating needs	2017-2020
H-C-2. Synthesize existing monitoring data to better understand and communicate trends.	RWG	Staff and Leveraging	2018-2020

**Habitat Objective D: Advance understanding and incorporation of climate change impacts in habitat management and restoration**

Action	Key Partners	Project type and amount	Timeline
H-D-1. Incorporate sea level rise into restoration and management practices.	RWG, USACE, NJDEP, NYSDEC, SRIJB, NYCDPR, NOAA, HRF, NGOs	Staff and Leveraging, Grant Projects ><\$200k;	2017-2022
H-D-2. Advance conservation and restoration planning for properties eligible or already acquired through flood plain/buyout programs.	USACE, NJDEP, NYSGOSR, NYSDEC, NYCDPR, NOAA, NGOs	Grant Projects <\$200k	2017-2019

**H-A-1 Increase investment in conservation and restoration projects.**

**NEED**

There is limited funding for restoration efforts in the NY-NJ Harbor Estuary.

**DESCRIPTION**

HEP will work with the members of the Restoration Work Group and the Citizens Advisory Committee (CAC) to identify and assess measures to increase funding such as finding new ways to justify and incentivize investment, broadening the scope of potential investors, and integrating HRE CRP priorities in other, related efforts such as the creation of NYSDEC's Regional Action Plan and hazard mitigation/coastal resiliency projects. A primary focus for this action will be the 33 sites recommended for near-term construction as part of the USACE's Hudson-Raritan Estuary Ecosystem Restoration Feasibility Study. HEP will work with the CAC and other partners to further evaluate the options identified in HEP's draft Funding and Finance Report and to undertake campaigns required to secure new capital funding. This could include funding available under the USACE's restoration and other authorities, greater use of environmental benefit agreements, and other sources.

**KEY PARTNERS**

Restoration Work Group, CAC, USACE, NYSDEC, NJDEP

**RESOURCES**

Staff and Leveraging, Major Capital Projects

**TIMELINE**

2017–2022

**OUTCOMES**

Short term:

- Identification and support for additional resources for restoration.
- Restoration projects will secure funding in a timelier manner.

Long-term:

- Implementation of additional restoration projects and progress toward the Estuary's goals for target ecosystem characteristics.

**H-A-2 Evaluate ways to reduce costs of restoration.**

**NEED**

Restoration projects in the estuary are costly. Identifying ways to be economical with existing funding will enable additional and/or enhanced projects to move forward in a timely way.

**DESCRIPTION**

HEP will work with the Restoration Work Group to identify and assess cost-reduction measures for individual projects, such as improving and communicating guidance on permitting standards for living shorelines and other restoration work, and encouraging cost-sharing across projects as was done for the Jamaica Bay Marsh Islands and NYC's clean soil bank. Employing community and volunteer stewardship and monitoring is becoming an increasingly important approach. HEP-led efforts may include the creation of an estuary-wide hub, engaging corporate involvement, and/or partnering with existing volunteer organizations to assist managers with recruiting participants.

**KEY PARTNERS**

Restoration Work Group

**RESOURCES**

Staff and Leveraging

**TIMELINE**

2018-2022

**OUTCOMES**

Short-term:

- Creation of a more streamlined approach towards cost-sharing with partners and access to volunteers.

Long-term:

- A greater number or larger restorations will occur, making progress towards the restoration goals outlined in the HRE CRP and eventually leading to enhanced habitat and ecological health.

Recently restored salt marsh, Woodbridge NJ. Photo credit: NOAA



### **H-A-3 Document value of ecosystem services delivered through restoration for decision makers.**

#### **NEED**

Better documentation of the value (monetary and otherwise) ecosystems provide to humans will help urban restoration projects compete for funding on regional and national levels.

#### **DESCRIPTION**

Valuation of ecosystem services has become an important tool for understanding and communicating the benefits of the Harbor Estuary, especially for people outside of the restoration and conservation communities. In partnership with other staff at the Hudson River Foundation (HRF), HEP is already working with environmental economists and other academics to refine ecosystem services valuation for our urban environment. The results will be documented in a policy white paper that illustrates how valuation of ecosystem services for restoration projects would be beneficial to managers and funders, and identifies the analytical methods and possible protocols that could be used to incorporate a range of the most important ecosystem services in those decisions. These will include considerations of the value of providing habitat and nature-based experiences in a densely developed urban environment as well as processes such as improved water quality. The protocol can be adapted for use in future restoration prioritization efforts (Action H-A-4). An additional possibility is undertaking such an analysis for a case study demonstration project.

#### **KEY PARTNERS**

HRF, USACE, EPA, RWG, Academia

#### **RESOURCES**

Staff and Leveraging; Grant Projects <\$200,000. Undertaking the case study demonstration project will require additional commitments of time and funding.

#### **TIMELINE**

2017-2019. The initial policy paper expected by Fall 2017.

#### **OUTCOMES**

Short-term:

- An assessment of how ecosystem services valuation could be used to analyze restoration projects in the estuary.

Long-term:

- Greater understanding of the ecosystem services provided by restoration projects in the estuary.
- Incorporation of ecosystems service valuation as a factor by decision makers.

### **H-A-4 Create a decision making tool for prioritization of restoration opportunities.**

#### **NEED**

The NY NJ Harbor Estuary Program has compiled a list of over 300 restoration opportunities within the Hudson-Raritan Estuary study area as part of the HRE CRP. HEP's Restoration Work Group also regularly adds to this list of opportunities after vetting new projects. Identifying the most appropriate restoration projects for different funding opportunities is a challenge for public agencies and conservation groups.

#### **DESCRIPTION**

A decision-making tool will help HEP and its partners identify and assess the important or appropriate restoration projects by geography, TEC, or potential funding sources. This effort will build on the existing HRE CRP database, the OASIS GIS mapping platforms, as well as previous efforts by NYC DPR and others. Understanding of specific restrictions on existing grant programs or other available funding sources would increase the utility of the tool. An initial step for determining possible search criteria and the level of detail required for data will be to survey members of the Restoration Work Group for their take on how their agencies could use the tool, as well as other current users of the HRE CRP database. The creation and utility of this tool may also depend on the development of a method for evaluating ecosystem services (see Action H-A-3).

The tool should be comprehensive and user-friendly, as well as adaptable to different scales, TECs, and the changing needs of its users. The efficacy of this tool is limited to the completeness and quality of the data used as inputs. Through this process, HEP staff or contractors will assess the availability of the data required and desired, and work towards filling data gaps. HEP staff will assume responsibility of managing the user interface and updating the tool as needed.

#### **KEY PARTNERS**

RWG, USACE, NYS DEC, NJ DEP, NYC DPR, Academia

#### **RESOURCES**

Staff and Leveraging; Grant Projects <\$200,000. Funding will likely be required to develop the decision-making tool.

#### **TIMELINE**

2018-2019

#### **OUTCOMES**

Short-term:

- Understanding of user need and availability of the data required for a decision making tool.
- Creation of the decision making tool and integration into an online platform.

Long-term:

- More efficient and appropriate selection of a restoration project when funding is available or restoration is required.
- Additional restoration as tool helps justify projects for funding.

## H-B-1 Share research and best practices among partners.

### NEED

Restoration in the NY-NJ Harbor can be quite complex, involving a large number of projects and stakeholders. Projects are often designed to meet multiple goals in addition to restoration, such as resiliency and public access. The size of the restoration community necessitates and offers opportunities to learn from successes and mistakes of past restoration projects and to build collective understanding in design, implementation or monitoring of restoration projects.

### DESCRIPTION

HEP will continue to promote the exchange of research and best practices through many avenues, notably through meetings of the Restoration Work Group, which provides a regular means of elevating common concerns and facilitating conversation within the restoration community. Members reach consensus on common goals and objectives, share the lessons learned from their own restorations, and hear presentations from others outside the group that have new research or techniques or data to share. Likewise HEP will also continue to support the Oyster Restoration and Harbor Herons committees. Their planning and outreach efforts and may launch additional Restoration Work Group committees focused of specific TECs such as shorelines and shallows—see B-2. Key deliverables include the bi-annual restoration conference and restoration progress reports.

### KEY PARTNERS

Restoration Work Group, Harbor Herons and Oyster Restoration Committees

### RESOURCES

Staff and Leveraging

### TIMELINE

2017-2021. This action is ongoing; the Restoration Work Group meets quarterly.

### OUTCOMES

Short-term:

- Improved restoration practice and projects
- Greater learning and collaboration among the restoration partners

Long-term:

- Ensure continuity of community knowledge and experience and help pave the way for the next generation of restoration projects and professionals.



Earth Day Volunteers on Plum Beach. Photo credit: Don Riepe



## H-B-2 Assess and interpret shoreline and shallow-water habitat condition and value

### NEED

The restoration of urban shorelines and shallow water habitat is poorly understood, in large part because there is a limited history of such projects, in comparison to more common wetland restoration projects. Clarification is needed to better define restoration goals, how restoration can improve habitat and biodiversity, and the viability of specific techniques.

### DESCRIPTION

HEP, in partnership with the Hudson River Foundation, public agency, NGO, and academic partners, will support and undertake research to improve understanding of the ecology of shoreline and shallow water areas in this urban estuary, including their projected future conditions. Research topics may include: the value of cleaner waters delivered by stormwater improvements, the importance of shoreline habitat connectivity and how to achieve it, how to assess habitat condition and the benefits of restoration along urban shorelines, biological use by shoreline type or sediment substrate, and how to assess the relative impact to shorelines from development or the relative value of different habitat types.

This work will continue past efforts by HEP, the Hudson River Foundation, and other partners to assess the value of urban shorelines and shallow water habitat. Additional grant funding will enable new research efforts and pilot restoration projects. Any pilot restoration efforts are likely to be conducted in cooperation with public landowners along the waterfront including park agencies, PANYNJ, and/or EDC.

### KEY PARTNERS

HRF, Academia, TNC, NYC DPR, NJDEP, NYSDEC, HREP, HRPT, EDC, PANYNJ

### RESOURCES

Staff and Leveraging; Grant Projects >\$200k

### TIMELINE

2017-2021

### OUTCOMES

Short-term:

- Identification of important questions and creation of consensus research agenda.
- Undertake and publish one or more research or pilot restoration project.

Long-term:

Improved understand and practice of restoration of shorelines and shallow water habitat

## H-B-3 Understand the risks of recontamination of restored sites.

### NEED

The polluted nature of our waterways, in terms of both water quality and sediment contamination, has raised concerns that restored estuarine ecosystems could become recontaminated over time. This recontamination may be more harmful than leaving the project area in its current state because, in some cases, it may lead to greater bioaccumulation of toxins in marine animals.

### DESCRIPTION

HEP will gather and summarize available information and organize one or more meetings of interested parties to identify the current state of knowledge and regulatory and management concerns. The goal will be to develop a shared understanding and possible agreement among HEP's partners, including but not limited to USACE, NOAA, EPA and USFWS, regarding how to approach restoration projects given this concern, and what further research efforts are needed. Improved understanding of the current and future levels of sediment contamination resulting from the Contaminant Assessment and Reduction Project referenced under Maritime Objective A may be particularly useful.

HEP staff will produce a report detailing the result of the meetings and any further steps required. Based on this initial assessment, HEP and the Foundation may support such research and/or seek funding to undertake further steps may include conducting an ecological risk assessment or developing a protocol for analyzing risk on a project basis.

### KEY PARTNERS

Restoration Work Group, USACE, NOAA, EPA, USFWS, HRF

### RESOURCES

Staff and Leveraging; All efforts beyond initial meetings will require grant projects > <\$200,000

### TIMELINE

2018-2019

### OUTCOMES

Short-term:

- Greater understanding on scope of the issue and state of knowledge, available remedies and data needs. Common agreement on how to address concerns through the establishment of a protocol, method of site selection or other agreement.

Long-term:

- Improved restoration projects and practices



Scientists from Columbia University monitoring the habitat value of our urban shorelines.

Photo credit: NYNJHEP

**H-C-1 Increase support for monitoring and consistency among metrics.**

**NEED**

Insufficient monitoring is taking place for restoration projects in the NY-NJ Harbor Estuary. The monitoring that is taking place is not consistent, and offers limited opportunities for practitioners to compare projects and improve practice.

**DESCRIPTION**

HEP will identify opportunities (e.g. permitting; project funding; dedicated funding) for increasing the extent and duration of project monitoring; evaluating overlapping purposes, needs, and metrics to determine whether there are ways to leverage efforts and encourage (or require) consistent data collection and possibly entrance into a shared database. Creation of a shared database will require grant funding, while new support for monitoring will require sources of on-going operational funding.

As one step, HEP will specifically work with partners to determine common monitoring metrics for Natural and Nature Based Features (NNBF), and engage with other regional groups to build off of previous research. This work is currently managed by SRIJB and has been funded through grants from NYSEDA and NOAA.

**KEY PARTNERS**

USACE, NOAA, NYSDEC, NYSDOS, NYCDPR, NYCDEP NJDEP, SRIJB, IEC, TNC, Academia, Consultants

**RESOURCES**

Staff and Leveraging, Grant Projects<\$200k; On-going operating needs

**TIMELINE**

2017–2020

**OUTCOMES**

Short-term:

- Identification of core list of metrics and protocols for monitoring NNBF projects.
- Evaluation and actions to improve the collection and sharing of monitoring data, possibly including creation of a shared database.

Long-term:

- Advancement in the design, implementation, and management of restoration projects

**H-C-2 Synthesize existing monitoring data to better understand and communicate trends.**

**NEED**

In the past, many restoration projects in the NY-NJ Harbor have included monitoring, either because it was required by regulators or just done a best practice. Unfortunately, there has been no formal or informal collection of the restoration monitoring data. This monitoring data is a key element to improving our understanding of what makes a restoration successful and sustainable.

**DESCRIPTION**

HEP will work with the Restoration Work Group to synthesize monitoring data for water quality, fisheries, and other data sets to support analysis of and communication about ecological health. Compilation of past monitoring data will provide a more complete picture of lessons learned from previous restorations. This data can be collected through outreach to the agencies conducting the restorations, regulators or consultants.

HEP will also assess and potentially create a shared monitoring database (see Action H-C-1). Before this database is developed, monitoring trends can be shared by means of the State of the Estuary Report, Comprehensive Restoration Plan Progress Reports, HEP website or other media.

**KEY PARTNERS**

Restoration Work Group

**RESOURCES**

Staff and Leveraging

**TIMELINE**

2018-2020

**OUTCOMES**

Short-term:

- Understanding of monitoring trends among the restoration/science community.
- Data will be ready for the shared monitoring database when it is designed.

Long-term:

- Advancement in the design, implementation, and management of restoration projects.



HEP is working with multiple partners to identify monitoring and metrics for natural and nature-based resiliency features. Photo credit: SRIJB

**H-D-1 Incorporate sea level rise into restoration and management practices.**

**NEED**

Historic sea level rise is expected to accelerate in the next 50 years; New York City is generally using a projected estimate of 30 inches for planning purposes. Restoration projects that do not incorporate sea level rise in their design may not be sustainable in the future.

**DESCRIPTION**

HEP will support integrating climate change considerations into restoration practices (e.g. encouraging partners to follow NOAA and New York State guidance) and pursue opportunities to expand or adapt guidance for conditions here in the Harbor Estuary where it does not currently exist.

HEP will work with its partners to assess and analyze the restoration opportunities in the HRE CRP for their adaptability to sea level rise, including conservation projects that provide an upland buffer and marsh migration of existing wetlands, and seek to prioritize such efforts. HEP and HRF will support research analyzing the impacts of climate change and sea level rise on past restoration efforts, including comparing adaptive responses of *Spartina* and *Phragmites* marshes; assessing the pros and cons of restoration that includes rock structures and other means of stabilizing shorelines; and advancing techniques for addressing marsh migration, elevation, and sediment budgets.

**KEY PARTNERS**

RWG, USACE, NJDEP, NYSDEC, SRIJB, NYCDPR, NOAA, HRF, NGOs

**RESOURCES**

Staff and Leveraging; grant projects >> \$200,000

**TIMELINE**

2017-2021. Some parts of this action are ongoing; however, priority projects should be identified by the RWG by Fall 2017.

**OUTCOMES**

Short-term:

- Incorporation of sea level rise as a factor in restoration design and implementation.

Long-term:

- Reduce loss of habitat due to sea level rise

**H-D-2 Advance conservation and restoration planning for properties eligible or already acquired through flood plain/buyout programs.**

**NEED**

In order to reduce risk to people and property, the states of NY and NJ as well as the City of New York have purchased houses and other property in flood prone areas. Only a few of these sites have had long-term planning undertaken with respect to identifying a long-term owner and manager, and determining management objectives. Many more buyout properties represent unique opportunities to pursue larger-scale restoration projects.

**DESCRIPTION**

HEP will work with the Restoration Work Group and other partners to determine status of these buyout properties, landowner needs, and to identify restoration opportunities. This includes assessing opportunities to allow for marsh migration and for improving habitat connectivity between in-water to upland areas.

An initial exploration and meeting with relevant state and city agencies may lead to identification of planning projects requiring grant funding. The Oakwood Beach area of Staten Island may be a good pilot project.

**KEY PARTNERS**

USACE, NJDEP, NYSGOSR, NYSDEC, NYCDPR, NOAA, NGOs

**RESOURCES**

Grant projects < \$200,000

**TIMELINE**

2017-2019

**OUTCOMES**

Short-term:

- Properties purchased to reduce risk will be evaluated for restoration opportunities and suitable ones will be added to the HRE CRP list.

Long-term:

- Appropriate properties will be restored, leading to progress towards the TEC goals from the HRE CRP and greater habitat for wildlife.



Cormorants and terns at Marine Park bridge. Photo credit: Don Riepe

# Goals, Objectives, and Priority Actions

## PUBLIC ACCESS AND STEWARDSHIP

**Goal Statement:** Improve public access to the waters of the Estuary and the quality of experience at public spaces along the waterfront.

### Context

*Access to the waters of the New York–New Jersey Harbor Estuary—whether for swimming, boating, fishing, or just enjoying the spectacular views—is an amenity that improves quality of life and drives spending and investments by residents, visitors, and businesses. Park use has been positively correlated with physical activity levels and improved public health. Most critically for HEP, access is a vital strategy for fostering a connection with and stewardship of the estuary, especially for young people.*

*For all these reasons, ensuring and improving access is an important goal shared by HEP’s federal, state, local government, utility, and civic partners. Over the next five years, HEP will focus on nine actions designed to increase public access and stewardship and programming of those public sites. To increase stakeholder and public understanding of waterfront safety issues, HEP will undertake an analysis of water quality for primary and secondary contact recreation and work with partners to develop effective ways of communicating that information to the public, including examining where there is a feasibility of creating new bathing beaches. HEP will continue to improve and expand our small grants program, providing a needed source of support for local stewardship efforts and leveraging their volunteers. HEP will seek to support direct public access to the water through public awareness efforts like updating our estuary paddling guide.*

HEP’s target (which it shares with the Hudson-Raritan Estuary Comprehensive Restoration Plan) is that all residents of the Harbor Estuary should be within a short walk or public transit trip from an accessible waterfront by 2050. To establish a baseline of current public access and to be able to document progress toward this goal, HEP worked with the USDA Forest Service and our Public Access Work Group, comprised of key public agencies and civic organizations, to characterize public access and its distribution around the Harbor Estuary, the relationship of these parks and public spaces to socioeconomic need, and where and how civic organizations are providing stewardship and programming at the waterfront. The 2016 report, “Connecting with Our Waterways: Public Access and its Stewardship in the New York–New Jersey Harbor Estuary” identifies 539 parks and public spaces totaling roughly 41,000 acres that are accessible to the public. The shorelines of these public spaces—ranging from the small urban street-ends and esplanades to the sandy beaches and marshes—stretch for about 600 miles or 37% of the 1600 mile waterfront in both states. The full report is available at [www.harborestuary.org/prs/Public-Access0316/PublicAccess-Draft\\_Print-Full\\_smallerfile.pdf](http://www.harborestuary.org/prs/Public-Access0316/PublicAccess-Draft_Print-Full_smallerfile.pdf).

Places where the public can enjoy swimming, boating and other programs involving actually touching the water are more limited; there are only seven public swimming beaches scattered throughout the estuary’s core waters and another six beaches on the ocean side of Sandy Hook and the Rockaways. Based on survey results, there are another 170 sites where the public can “safely touch the water” at a human powered boat launch. Creation of additional direct access areas is limited due to water quality impairments, timely knowledge of water quality conditions, and



other safety and management constraints.

These parks, public spaces and access sites are not evenly distributed across the estuary, especially when considered in the context of differing socioeconomic characteristics of the estuary’s waterfront populations. Only about nine percent of the waterfront is accessible for the more than 500,000 residents in 12 higher need areas around the bi-state estuary. These 12 waterfront areas, are defined by HEP as being those waterfront reaches having a limited number of parks, densely developed housing, and/or an otherwise disadvantaged population proximate to each other. In the Passaic River between Newark and Paterson, for example, over 96% of the waterfront is inaccessible. As detailed in HEP’s Public Access Report, the 12 areas include sections of The Bronx (Harlem River, Bronx River, Co-op City); Passaic River (Newark, Paterson, Passaic); Jamaica Bay (East New York, Ozone Park, Rosedale, Far Rockaway); Brooklyn (Sunset Park, Navy Yard, Bushwick); Elizabeth River; Green Brook (Plainfield, North Plainfield); Staten Island’s North Shore; Raritan Mouth/Arthur Kill; Hackensack River (Hackensack, Englewood, North Bergen); Yonkers; North Manhattan/Harlem River; and Flushing Bay.

Meeting public access goals does not mean providing access to one hundred percent of the waterfront. In particular, vital maritime and other water-dependent uses require that some portions of the waterfront not be accessible to the public for national security, safety and practical business considerations. Respect for these concerns makes providing access to other waterfront areas even more important. This is particularly true in those communities impacted by essential water dependent uses.

Improving access is not only about creating public



spaces, but also about connecting people to existing parks and improving the quality of the visitor experience at those parks. This is particularly important for residents living in and around some of the higher need areas identified by HEP. A particular focus of the HEP study was documenting the critical role of civic organizations in improving the quality of these existing access points. An assessment of 146 civic organizations indicates that they offer a broad array of programs that help engage people with the Harbor Estuary through public outreach and stewardship activities. While small in size, with an average budget of less than \$ 50,000, these organizations in aggregate represent more than 900 paid staff, 237,000 members, and more than 116,000 volunteers contributing about 5,000 hours per organization. Almost all conduct educational programs about the local environment; about 20 % conduct boating, fishing, or swimming programs.



Upper: Egrets in Joco Marsh. Photo credit: Don Riepe

Lower: High school students catching blue crab in seine net. Photo credit: Betsy Ukeritis

### Public Access Work Group

Helena Andreyko, Hudson River Foundation

Lisa Baron, US ACE

Rob Buchanan, NYC Water Trail Association

Hugh Carola, Hackensack Riverkeeper

Mike Danko, NJ Sea Grant

Ted Enoch, City Parks Foundation

Margaret Flanagan, Waterfront Alliance

Rebecca Foster, NJ DEP

Meghan Gosselink, NJ DEP

Michelle Johnson, US Forest Service

Andrea Leshak, Debbie Mans, NY -NJ Baykeeper

Kerry Miller, ANJEC

Nicholas Molinari, NYC Parks

Michael Mullaley, City Parks Foundation

Jamie Ong, NYC Parks

Casey Person, New York Restoration Project

Robert Pirani, NY NJ HEP

Lucy Robson, NY4P

Bill Shultz, Raritan Riverkeeper

Jose Soegaard, Waterfront Alliance

Erika Svendson, US Forest Service

Shino Tanikawa, NY Soil and Water Conservation District

Ahmed Tigani, Manhattan Boro President's Office

Nellie Tsipoura, NJ Audubon

Ben Weiland, The Trust for Public Land

Allan Zaretsky, NYC DCP

**PUBLIC ACCESS: Improve public access to the waters of the Estuary and the quality of experience at public spaces along the waterfront.**

**Public Access Objective A: Increase public access and new possibilities for contact recreation, particularly in areas of higher need**

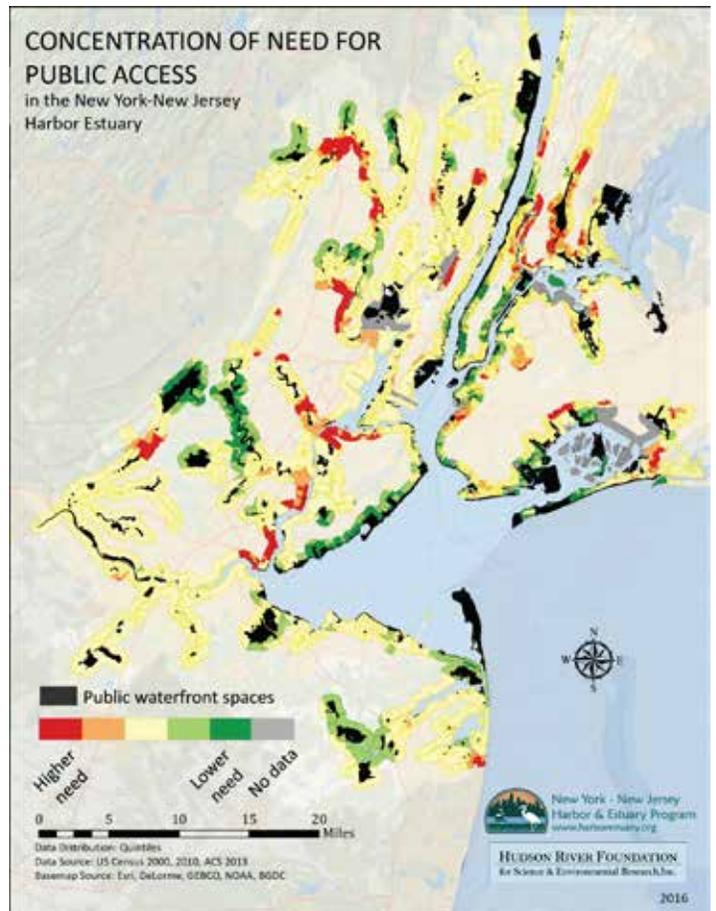
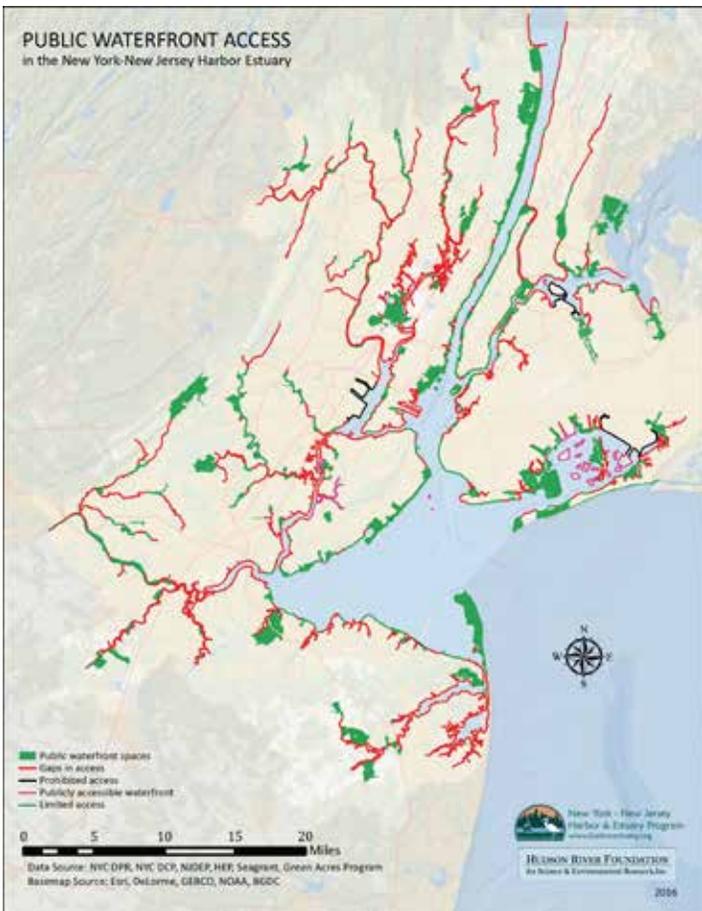
Action	Key Partners	Project type and amount	Timeline
PA-A-1. Advance opportunities for increasing public access, particularly in areas of higher need.	Lower Passaic and Bronx & Harlem River Urban Water Partnerships, NJDEP, NYC DCP, NYCDPR, Partnerships for Parks, local municipalities and community-based organizations.	Staff and Leveraging; Grant Projects > <\$200,000; Capital Funding	2017-2022
PA-A-2. Assess prospects and refine goals for increasing direct access for boating, swimming, and wading, incorporating associated water quality considerations.	Public Access Work Group; NYCDPR; NJ DEP; Waterfront Alliance; NYC Water Trails Association; and other state and local park agencies in both states.	Staff and Leveraging	2018-2019

**Public Access Objective B: Improve stewardship and programming at existing public access sites, particularly in areas of highest need**

Action	Key Partners	Project type and amount	Timeline
PA-B-1. Identify and support strategies for increasing public engagement in higher need areas.	NGO Partners, NYC Parks, Partnerships for Parks, Funders	Staff and Leveraging	2019-2021
PA-B-2. Support stewardship activities and public programming in higher need areas through small grants.	Hudson River Foundation; Public Access Work Group	Staff and Leveraging; Grant Projects > <\$200,000	2017-2022

**Public Access Objective C: Promote and expand awareness of public access opportunities and issues**

Action	Key Partners	Project type and amount	Timeline
PA-C-1. Increase public understanding of the safety and risks associated with direct contact with the water.	EPA, NYS DEC, NJ DEP, Health Departments, Public Access Work Group, CAC	Staff and Leveraging; Grant Projects <\$200,000	2019-2021
PA-C-2. Encourage and support public participation in water-based activities.	Public Access Work Group; NYC Parks; NJ DEP; Waterfront Alliance; NYC Water Trail Association; Other paddling organizations.	Staff and Leveraging; Grant Projects <\$200,000	2020-2021



Source: HEP, Public Access and its Stewardship in the New York - New Jersey Harbor Estuary



**PA-A-1. Advance opportunities for increasing public access, particularly in areas of higher need.**

**NEED**

Access to the public waters of the Harbor Estuary is limited, especially for waterfront communities with few public parks, dense residential development, and a disadvantaged population.

**DESCRIPTION**

HEP will identify access opportunities, pursue creation of community supported plans and implementation of capital projects and other improvements. This work will focus on the 12 waterfront communities of higher need identified in HEP's 2016 Public Access Report.

In particular, HEP will continue to work with Urban Waters Federal Partnerships in the Passaic and Bronx & Harlem Rivers by staffing Partnership Ambassadors at each location. The primary role of the Ambassador and the Urban Waters Federal Partnership is to convene partners and to promote and facilitate activities to restore urban waters and the lands that surround them. On the Bronx & Harlem Rivers, the Ambassador and Partnership will initially focus on advancing improvements along the Harlem River waterfront and its watershed in the Bronx through a community planning effort being led by the New York City Department of Parks and Recreation. On the Passaic River, the Ambassador and Partnership will improve community involvement in federal and state projects to help integrate public access into planned resiliency measures. The Ambassador will also advance regional planning to improve the quality of planned recreation opportunities, and highlight potential models for municipalities looking to expand their public access amenities.

HEP will also work with coastal zone management programs in both states on advancing their public access goals in all of these higher need areas. This includes working with NJ DEP and local municipalities in creating municipal public access plans or otherwise complying with state requirements and working with the New York City Department of City Planning as they revise their Local Waterfront Revitalization Plan.

**KEY PARTNERS**

Lower Passaic and Bronx & Harlem River Urban Water Partnerships, NJDEP, NYC DCP, NYCDPR, Partnerships for Parks, local municipalities and community-based organizations

**RESOURCES**

Staff and Leveraging; Grant Projects > <\$200,000; Capital Funding

**TIMELINE**

2017–2022. Efforts on the Passaic and Harlem / Bronx Rivers will be on-going, assuming continued federal funding for the Urban Waters Federal Partnership or from other sources. The creation of the Harlem River Watershed Plan started in 2016 and will be finalized in 2019. The Passaic River regional planning effort will be initiated in 2017.

**OUTCOMES**

Short term:

- Additional public access opportunities and other improvements will be identified for higher need waterways.
- Community organizations in the Lower Passaic and Bronx & Harlem River will be better engaged with local, state and federal decisions about their waterways.

Long-term:

- Improved access to waterways in higher need area, in particular the Lower Passaic and Bronx & Harlem Rivers

**PA-A-2. Assess prospects and refine goals for increasing direct access for boating, swimming, and wading, incorporating associated water quality considerations.**

**NEED**

Direct access to the public waters of the Harbor Estuary is limited due to water quality impairments, timely knowledge of water quality conditions, and other safety and management constraints.

**DESCRIPTION**

HEP will inventory opportunities for primary and secondary contact with the water; places where one can touch the water whether by swimming, wading or boating. HEP will work with the Public Access Work Group and other partners to assess how best to incorporate this information and associated water quality considerations into its goals for public access and the tracking of success. The information will also be used to create an updated version of HEP's Paddling Guide (Action PA-C-2).

HEP will also examine the water quality, management, and regulatory issues of enabling the public to access the water for swimming and/or wading at select pilot sites in both New York and New Jersey. One or more feasibility studies, conducted through a workshop, university studio or contractor will serve to identify possibilities and challenges. A latter phase could include efforts to work with partners to secure specific capital investments and operating funding.

**KEY PARTNERS**

Public Access Work Group; NYCDPR; NJ DEP; Waterfront Alliance; NYC Water Trails Association; and other state and local park agencies in both states

**RESOURCES**

Staff and Leveraging; Grant Projects > <\$200,000. Assessing the possibilities for increasing access at pilot sites will require new grant funding and/or a university partnership.

**TIMELINE**

2018-2019. The initial investigation of enabling the public to access the water for swimming and/or wading at pilot areas will commence in 2018.

**OUTCOMES**

Short term

- Inventory of existing direct access sites
- Improved understanding of the feasibility of additional direct access opportunities given water quality and management

Long-term:

- Creation of additional opportunities for the public to enjoy the estuary through swimming, wading, paddling, and boating.

**PA-B-1. Identify and support strategies for increasing public engagement in higher need areas.****NEED**

Engaging and strengthening connections to local residents is the key to the success of local stewardship organizations.

**DESCRIPTION**

HEP and the Public Access Work Group and the Citizens Advisory Committee will conduct a survey and possibly convene a workshop to identify and pursue strategies for increasing public engagement and stewardship activities in higher need areas. Participants will include civic and community-based organizations; funders like City Parks Foundation, Urban Waters Partnership and others; and local and state park agencies. This work will build on the HEP's on-going collaboration with the US Forest Service Urban Field Station Stewardship Mapping and Assessment Project (STEW-MAP).

The results of the survey and possible workshop will assist the more than 146 civic organizations that help engage people with the Harbor Estuary through a broad array of public programs and stewardship activities. Possible directions will include identifying how waterfront programming could help address broader issues / interests within the community including recreation/public health, employment and job training, and youth programs; creation of a peer exchange or other learning opportunities; and or other ongoing networking opportunities.

**KEY PARTNERS**

Public Access Work Group, Citizens Advisory Committee, USDA Forest Service Urban Field Station, NGO Partners, NYC Parks, Partnerships for Parks, federal Urban Waters Partnership, Philanthropy

**RESOURCES**

Staff and Leveraging

**TIMELINE**

2019-2021. This project will start following collection and analysis of the 2017 STEW-Map survey anticipated in 2018.

**OUTCOMES**

Short term:

- Greater understanding of the needs and potential of local stewardship organizations

Long-term:

- Increased capacity of stewardship organizations, in particular in high need areas

**PA-B-2. Support stewardship activities and public programming in higher need areas through small grants.****NEED**

Improving access requires improving the quality of the visitor experience at existing parks through enhanced programming and management. Local civic organizations can be a key vehicle for delivering these services because of their local knowledge of the community and waterways.

**DESCRIPTION**

HEP and the Hudson River Foundation will continue their public access and stewardship grants programs. They will seek support and/or leverage additional sources of funding to grow the grant program in order to ensure a grant cycle every year. The RFP and applications will be reviewed by a special committee of the Public Access Work Group. HEP will also continue to provide funding for the *In Your Neighborhood Program* at the Waterfront Alliance's City of Water Day each July.

This funding provides an important source of support for small civic organizations that have direct knowledge of the interest of local communities and the needs and opportunities afforded by existing parks and estuarine resources. Supporting civic stewardship complements and extends governments' ability to manage these public spaces. Funds at the Hudson River Foundation that have supported similar activities include the Hudson River Improvement Fund and the New York City Environmental Fund. Growing the grants program will require working with other sources of philanthropy; state and local actors involved in environmental benefit agreements; and state or city funding programs; and the advocates on the CAC to leverage or secure on-going funding.

**KEY PARTNERS**

Hudson River Foundation; Public Access Work Group

**RESOURCES**

Staff and Leveraging; Grant Projects > <\$200,000

**TIMELINE**

2017-2022

**OUTCOMES**

Short term:

- Direct support for local civic stewardship and programs, especially in high need areas
- Identification and securing of additional and sustainable non-federal sources of funding for distribution

Long-term:

- Increased capacity of stewardship organizations, in particular in high need areas



**PA-C-1. Increase understanding of the safety and risks associated with direct contact with the water.****NEED**

There is limited awareness and common understanding of the risks associated with poor water quality among the public and civic organizations that help support and manage the public's contact with the water. While bathing beach standards are well known and understood by managers and communicated to the public, standards for secondary contact are not as well defined and/or understood by stakeholders.

**DESCRIPTION**

HEP will undertake an analysis of the actual and the perceived safety of water quality for primary and secondary contact recreation, including car top boating and wading. The analysis will focus on the public health risk associated with pathogens associated with CSO events and stormwater runoff, and anticipated results from efforts to manage them via long term control plans and MS4 permits.

Based on analysis of perceived and actual risks, HEP will work with the Public Access Work Group and in particular the two states and EPA to develop consistent messaging for the public. This information will be displayed on the HEP website and other venues.

**KEY PARTNERS**

EPA, NYS DEC, NJ DEP, Health Departments, Public Access Work Group, CAC

**RESOURCES**

Staff and Leveraging; Grant Projects <\$200,000

**TIMELINE**

2019-2021. This action will require new grant funding.

**OUTCOMES**

Short term:

- Greater understanding and a unified message from managers, regulators, and key stakeholders as to the safety of the estuary's waters.

Long-term:

- Improved management of direct access to the water.

**PA-C-2. Encourage and support public participation in water-based activities.****NEED**

Public materials describing paddling opportunities for the entire Harbor Estuary are limited.

**DESCRIPTION**

Getting out on the water in a human powered boat is an important means for the public to enjoy the Harbor Estuary and better understand management issues. HEP will work with partners to revise and update the 2011 harbor-wide paddling guide. The new version will incorporate the inventory of opportunities for direct contact with the water created under Action A-2 as well as safety information and common messaging developed under C-1. As with the 2011 edition, this update will feature public access sites, associated facilities, safety considerations, and launch site conditions. This will be a general brochure aimed to inform the general public and novice paddler about estuary resources and paddling opportunities. It will complement the more detailed and up-to-date information about the launch sites available on-line by park managers and paddling organizations.

**KEY PARTNERS**

Public Access Work Group; NYC Parks; NJ DEP; Waterfront Alliance; NYC Water Trail Association; Other paddling organizations.

**RESOURCES**

Staff and Leveraging; Grant Projects <\$200,000. HEP will seek a sponsor and partners for creation and distribution of the harbor-wide water trail map.

**TIMELINE****OUTCOMES**

Short term:

- Greater awareness of paddling opportunities

Long-term:

Improved public access and enjoyment of the estuary for paddling activities

Photo credit: Kate Boicourt



# Goals, Objectives, and Priority Actions

## PORT AND MARITIME

**Goal Statement:** Support port and associated maritime operations so that they are both economically and ecologically viable

### Context

*The Port of New York and New Jersey and associated maritime activities are an integral and complementary part of the New York–New Jersey Harbor Estuary. The economic importance of moving cargo and people must be balanced with addressing historic and on-going impacts of port facilities and operations on estuarine ecology and host waterfront communities. HEP's role is to provide information and a forum for all stakeholders to help ensure that the estuary is environmentally sustainable, economically efficient, and safe for commercial and recreational navigation.*

*The second phase of the Contaminant Assessment and Reduction Project (CARP 2) will provide important information on the movement of sediment, and in particular the sources and fate of contaminated sediment. Over the next five years as the project's scope is delineated and data is collected and analyzed by a team led by the Hudson River Foundation, HEP will provide a vehicle for informing and engaging public and private stakeholders in this work. HEP will also convene a workshop and assess the means of addressing any unfinished work from the Regional Sediment Management Plan: Convening a Technical and Policy Workshop on the appropriate development and use of seasonal no-dredging windows.*



The Port of NY & NJ is the largest port on the Atlantic seaboard, with about 3.7 million containers, 500,000 automobiles, and other goods coming in and out each year. This cargo is valued at \$200 billion and supports about 190,000 direct jobs at the port and associated shipping and maritime trades.

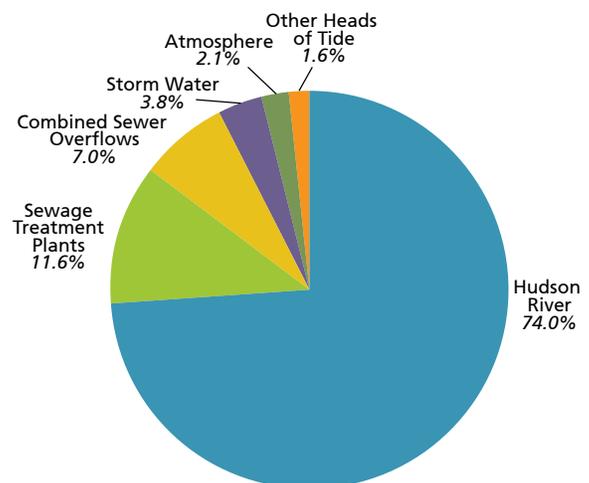
Successfully managing this critical industrial activity requires careful attention to the harbor estuary and surrounding waterfront communities. In particular, the management of the quantity and quality of sediment that flows into navigation channels and berthing areas, both for the large container ships as well as smaller tugboats and barges, can substantially reduce the costs of dredging while reducing the exposure of people and wildlife to toxic materials.

The Estuary is a machine for transporting sediment down the Hudson and other rivers into the harbor. Between 400,000 to 1.4 million metric tons each year move through the system. Conversion of agricultural and forested land to impervious surface creates surges of stormwater runoff that erodes streambeds and banks results in high sediment loads that can damage aquatic systems and fill channels in the port. Sediment runoff rates from construction sites can be 1,000 to 2,000 times greater than those of forested lands. In a short period, construction activity can contribute more sediment to streams than would be discharged over several decades. Understanding the movement of material in the system can help guide efforts to foster best management practices throughout the estuary to reduce this load while protecting habitat.

Unfortunately, a history of industrial activities along our waterways has left behind pollutants in the sediment that are toxic to people and wildlife, such as heavy metals, dioxin, and PCBs. Bioavailable contamination has resulted in reduced recreation opportunities, reduced water quality, re-

duced habitat quality, and reduced fisheries. Contamination of navigational dredged materials has resulted in multi-fold increases in dredging costs over the past decade. Cleaning up this material, concentrated at Superfund sites in the Passaic, Newtown Creek, Gowanus Canal and especially in the upper Hudson River, will help eliminate sources of these contaminants from the system. The original Contaminant Assessment and Reduction Project (CARP), completed in 2007, identified the relative contribution of these and other sources of toxic contamination across the estuary. A more detailed and updated mapping will further illuminate our understanding of the sources and fate of toxic material, and can be used to help guide decisions on dredging as well as restoration and public access projects.

The recent completion of the Harbor Deepening Project makes this improved understanding ever more important. By lowering the depth of eight navigation channels, this 12-



Loading of PCBs to the NY/NJ Harbor Estuary. Source: HRF, Contaminant Assessment and Reduction Project Summary Report



year, \$ 2.1 billion initiative reduced the need for annual appropriations for maintenance dredging. With its completion, the importance of understanding when and how dredged material might become clean enough for beneficial uses or disposal at Historic Area Remediation Site (HARS) is more critical than ever.

Dredging and dredged material management is the aspect of sediment management with the greatest visibility and economic impact to the Harbor Estuary. Proper construction practices must be used to mitigate direct dredging impacts. Dredging can alter or destroy aquatic habitat, remove benthic invertebrates that fish and wildlife feed upon, and interrupt spawning and other activities critical to fish life-cycles. Seasonal no-dredging windows have been developed to protect fish and wildlife resources but rely on incomplete scientific information. This uncertainty is compounded by the possible impact of climate change on these resources. Moreover, there are inconsistencies between the relevant federal agencies and the States of New York and New Jersey in their implementation of these windows.

Dredging can also result in unintended secondary effects such as the release of contaminants during transit to the processing site. Protective Best Management Practices (BMPs) to reduce turbidity—the dispersal of sediment-bound contaminants—have proven effective over the years in addressing these issues.



Sediment plume following Hurricane Irene. Photo credit Dave Ralston

## **MARITIME: Support port and associated maritime operations so that they are both economically and ecologically viable**

### **Maritime Objective A. Improve understanding and management implications of changing sediment contamination in the Estuary, including the timeline for achieving HARS suitable sediments in the navigation channels**

M-A-1 Map current sediment quality conditions in the estuary and identify changes over the last 15 years.	NJDOT, HRF, Monmouth University, USACE, EPA, NJDEP, NYDEC, PANY/NJ, NYCEDC, Rutgers University	Staff and Leveraging. HRF is managing the CARP 2 technical team with \$ 4.1 million of funding provided by NJ DOT.	2017-2020
M-A-2. Evaluate, Update and Refine the CARP I Sub-models to predict levels of contamination in the future.	NJDOT, HRF, Monmouth University, USACE, EPA, NJDEP, NYDEC, PANY/NJ, Rutgers University	Staff and Leveraging	2017-2020

### **Maritime Objective B: Help design and implement navigation related projects that are more environmentally friendly**

M-B-1. Convene Technical Workshop on the development of seasonal windows for dredging projects.	USACE, EPA, PANY/NJ, NOAA, NYDEC, NJ DEP, NJ DOT, NYC EDC	Grant Projects <\$200,000	2019-2020
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**M-A-1. Map current sediment quality conditions in the estuary and identify changes over the last 15 years..**

**NEED**

The changes in Harbor sediment quality over the last 15 years are not well documented.

**DESCRIPTION**

As part of the second iteration of the Contaminant Assessment and Reduction Project (CARP II), a team led by the Hudson River Foundation will create a current conditions map of levels of PCBs and dioxins in navigation channels and off-channel areas in the Estuary. The mapping and data analysis will be used to assess the adequacy and accuracy of previous CARP model projections of future contaminant levels in Harbor sediments and determine where improvements to the model are needed. The initial map will be based on existing information from regional assessments and dredged material testing data. Subsequent maps will be updated with new data collected under CARP II.

HEP will convene one or more meetings to provide a means of communicating this information to key stakeholders and managers, including the HEP Management Committee and Policy Committees, and will follow up with key stakeholders to help identify possible additional applications of the data.

**RESOURCES**

Staff and Leveraging. HRF is managing the CARP 2 technical team with \$ 4.1 million of funding provided by NJ DOT.

**TIMELINE: 2017–2020**

**KEY PARTNERS**

NJDOT, HRF, Monmouth University, USACE, EPA, NJDEP, NYDEC, PANY/NJ, NYCEDC, Rutgers University

**OUTCOMES**

Short term:

- Data on level of PCBs and Dioxins and associated maps of current Harbor contamination and changes in contamination over the last 15 years
- Identification of additional management applications and research needs.

Long-term:

- Improved forecast of dredged material placement costs

**M-A-2. Evaluate, Update and Refine the CARP I Sub-models to predict levels of contamination in the future.**

**NEED:**

The CARP I model forecasted that over the 30 period from 2010–2040, many of the current contaminants of concern in dredged material were expected to decrease to levels that would allow ocean placement. Since the 2002 CARP I model projections of time to HARS (ocean placement) suitability, the bathymetry of the Harbor has changed significantly and the Harbor has experienced a number of extreme events that were not simulated in the CARP I model projections. Therefore, it is necessary to refine the CARP models and to assess the impacts of extreme flow events on contaminant responses in Harbor sediments.

**DESCRIPTION:**

The refined CARP II model will be applied to reevaluate the Carp I forecasts to predict future (15 and 25 years from now) levels of contamination in the sediments within navigation channels of NJ/NY Harbor.

HEP will convene one or more meetings to provide a means of communicating key information to Harbor stakeholders and managers, including the HEP Management Committee and Policy Committees and the Restoration Work Group, and will follow up with key stakeholders to help identify possible additional applications of the data.

**RESOURCES**

Staff and Leveraging. HRF is managing the CARP 2 team with \$ 4.1 million of funding provided by NJ DOT.

**TIMELINE: 2017–2020**

**KEY PARTNERS**

NJDOT, HRF, Monmouth University, USACE, EPA, NJDEP, NYDEC, PANY/NJ, Rutgers University

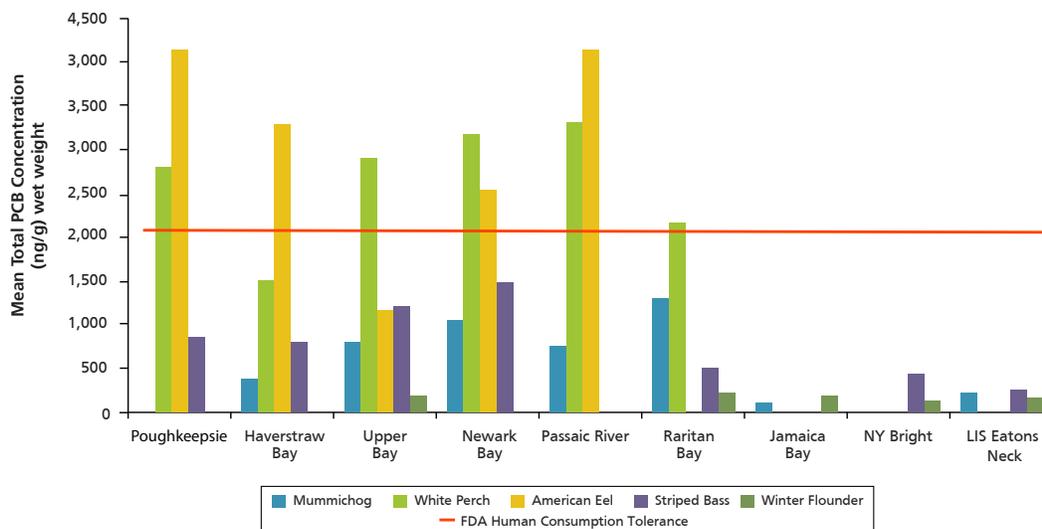
**OUTCOMES**

Short term:

- Report on the evaluations of the CARP II Models (hydrodynamic, sediment transport and organic carbon cycling, and contaminant fate and transport sub-models)
- Forecast of the time for dredged material to meet HARS suitability

Long-term:

- Improved forecast of future sediment quality including contaminant responses to extreme events to support improved dredged material planning.



Mean total PCB Concentration by Species and Area  
Source: HRF, Contaminant Assessment and Reduction Project Summary Report



**M-B-1. Convene Technical Workshop on the development of seasonal windows for dredging projects.**

**NEED:**

Building shared understanding and a scientifically valid and consistent approach to the use of seasonal no-dredge windows will aid decision-makers.

**DESCRIPTION:**

HEP will convene a workshop to review the science behind time-of-year restrictions on dredging (i.e. seasonal windows). Building on the information compiled by NY Sea Grant and data collected by the ACOE through the Harbor Deepening Program, this effort will incorporate recent biological and operational data, assess potential impacts of dredging operations to natural resources, and discuss the policy approach to implement consistent, environmentally sound, economically feasible seasonal windows. The anticipated deliverables coming out of this effort will be 1). A map identifying the locations and times-of-year dredging is restricted to protect natural resources; and 2). An updated decision matrix that incorporates biological data, operational considerations, and project information that will assist resource agencies with refining the application of seasonal windows to waterfront infrastructure projects.

**KEY PARTNERS**

USACE, EPA, PANY/NJ, NOAA, NYDEC, NJ DEP, NJ DOT, NYC EDC

**RESOURCES**

Staff and Leveraging. Grant Projects <\$200,000.

**TIMELINE**

2019–2020

**OUTCOMES**

Short term:

- A framework and shared understanding of the issues and available information affecting application of seasonal dredging windows

Long-term:

- More efficient and effective regulation of waterfront infrastructure projects

Photo credit: PANYNJ



# Goals, Objectives, and Priority Actions

## COMMUNITY ENGAGEMENT

**Goal Statement:** Foster community stewardship and involvement in decisions about the Harbor.

Actions related to HEP’s goal to foster community stewardship and involvement in decisions about the Harbor are embedded throughout this document and are highlighted with the other sections. These actions are summarized below. More details can be found in the preceding sections.



### Citizen Advisory Committee

Meredith Comi, NY/NJ Baykeeper (Co-Chair)

Joe Reynolds, Bayshore Regional Management Council (Co-Chair)

Sean Dixon, Riverkeeper (Co-Chair)

Shino Tanikawa, New York City Soil and Water Conservation District (Co-Chair)

Michelle Luebke, Bronx River Alliance

Harvey Morginstin, Passaic River Boat Club

Pamela Pettyjohn, Coney Island Beautification Project

Manuel Russ, Concerned Citizens of Bensonhurst

Robert Alpern, NYS Water Resources Planning Council

Maggie Flanagan, Waterfront Alliance

Michelle Doran McBean, Future City, Inc.

Nina Hitchins, The River Project

Ted Enoch, Partnerships for Parks

Nicholas Tufaro, Middlesex County Office of Planning

Dan Mundy, Jamaica Bay Ecowatchers

Nancy Brous, NYC Water Trail Association

Sally Yabra, Edison Township Boat Basin

Althea Mullarkey, Scenic Hudson

Bart Chezr, Gowanus Dredgers

Louis Kleinman, Waterfront Alliance

Julie Welch, SWIM Coalition

Noah Chesnin, WCS/NY Aquarium

Rebecca Kusa, WCS/NY Aquarium

Susan Elbin, NYC Audubon

Kathryn Heintz, NYC Audubon

Bill Schultz, Raritan Riverkeeper

Bill Surena, Future City, Inc.

Dan Recklies, Protectors of Pine Oak Woods

Ana Mendez, Future City, Inc.

Jenna Bonasmusa, Interstate Environmental Commission

Action	Key Partners	Project type and amount
WQ-B-1. Communicate the benefits and outcomes of LTCP, MS4 work and associated infrastructure improvements to the public.	EPA, NYSDEC, NYCDEP, NJDEP, NJCSO Group, SWIM Coalition, Jersey Water Works	Staff and Leveraging; Grant Funded Project <\$200 K; Major Capital
WQ-B-4. Advance Means and Methods for Public Notification of CSO Events.	EPA, NYCDEP, NJDEP, NJCSO Group, local municipality and community groups	Staff and Leveraging; Grant Funded Project <\$200 K
WQ-C-1. Design an intensive pathogen monitoring and notification plan in select near-shore areas.	IEC, NYCDEP, NJDEP, EPA, NJHDG, NJCSO, NYSDEC, NGOs, Health Departments	Staff and Leveraging; Grant Funded Project >\$200 K; On-going Operating
WQ-D-1. Prepare an updated Joint Harbor-Wide Water Quality Report.	NYCDEP and NJHDG	Staff and Leveraging; Grant Funded Project <\$200 K
WQ-D-2. Develop briefs and stories about water quality conditions of individual waterways and watersheds.	NYSDEC, NJDEP, NGOs	Staff and Leveraging;
H-A-3. Document value of ecosystem services delivered through restoration for decision makers.	HRF, USACE, RWG, Academia	Staff and Leveraging; Grant Projects<\$200 K
H-C-1. Increase support for monitoring and consistency among metrics.	USACE, NYSDEC, NYSDOS, NYCDPR, NYCDEP NJDEP, SRIJB, IEC, TNC, Academia, Consultants	Staff and Leveraging, Grant Projects<\$200k; On-going operating needs
PA-A-1. Advance opportunities for increasing public access, particularly in areas of higher need.	Lower Passaic and Bronx & Harlem River Urban Water Partnerships, NJDEP, NYC DCP, NYCDPR, Partnerships for Parks, local municipalities and community-based organizations.	Staff and Leveraging; Grant Projects > <\$200,000; Capital Funding
PA-A-2. Assess prospects and refine goals for increasing direct access for boating, swimming, and wading, incorporating associated water quality considerations.	Public Access Work Group; NYCDPR; NJ DEP; Waterfront Alliance; NYC Water Trails Association; and other state and local park agencies in both states.	Staff and Leveraging
PA-B-1. Identify and support strategies for increasing public engagement in higher need areas.	NGO Partners, NYC Parks, Partnerships for Parks, Funders	Staff and Leveraging
PA-B-2. Support stewardship activities and public programming in higher need areas through small grants.	Hudson River Foundation; Public Access Work Group	Staff and Leveraging; Grant Projects > <\$200,000
PA-C-1. Increase public understanding of the safety and risks associated with direct contact with the water.	EPA, NYS DEC, NJ DEP, Health Departments, Public Access Work Group, CAC	Staff and Leveraging; Grant Projects <\$200,000
PA-C-2. Encourage and support public participation in water-based activities.	Public Access Work Group; NYC Parks; NJ DEP; Waterfront Alliance; NYC Water Trail Association; Other paddling organizations.	Staff and Leveraging; Grant Projects <\$200,000





Agencies and Organizations Represented on the  
NY-NJ Harbor & Estuary Program's  
Policy and Management Committees

**HUDSON RIVER FOUNDATION**  
for Science & Environmental Research, Inc.



New York - New Jersey  
Harbor & Estuary Program  
[www.harborestuary.org](http://www.harborestuary.org)



**THE PORT AUTHORITY**  
OF NY & NJ



New Jersey Harbor  
Dischargers Group



**US Army Corps  
of Engineers.**