

ESTUARINE SANCTUARY MANAGEMENT PLAN

FOR HUDSON RIVER PARK

PROGRESS REPORT & ACTION AGENDA

2021–2030



Approved September 2021

Image: Melissa Rex of The River Project

HUDSON RIVER PK®



ESTUARINE SANCTUARY MANAGEMENT PLAN

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Figure 1: Hudson River Park is a beloved public space where people connect with the Sanctuary.

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PART 1: BACKGROUND & PURPOSE

BACKGROUND

The Hudson River is the heart, soul and defining framework of Hudson River Park. The approximately 400 water acres within the Park's boundaries provide critical habitat to 85 species of fish, and Manhattan's history has been indelibly shaped by the events and activities that have taken place in the river and along its shoreline.

In 1998, a New York State law known as the Hudson River Park Act (Act) designated the Park's open water areas as the Hudson River Park Estuarine Sanctuary (Sanctuary) and charged the Hudson River Park Trust (Trust) with developing an Estuarine Sanctuary Management Plan (ESMP) to guide Park development and operations in and along the Hudson River within the Park's boundaries.

Since its creation in 2002, the ESMP has served as a foundational management document that guides the Trust and its partners in protecting and conserving critical aquatic habitat while also facilitating public access to the river and fostering awareness and public education about this vital natural resource.



Figure 2: Common terns, pictured here, are among the many migratory birds that make use of the Park's pile fields for fishing and respite.

The Trust is a public benefit corporation that reflects a partnership between New York State and New York City. The mission of the Trust is to encourage, promote and expand public access to the Hudson River, promote water-based recreation and enhance the natural, cultural and historic aspects of the river in New York City for residents and visitors to the area.

The Trust is governed by a thirteen-member Board of Directors comprised of five members appointed by the Governor, five appointed by the Mayor and five appointed by the Manhattan Borough President. The Commissioners of New York State Department of Environmental Conservation (NYSDEC), the New York State Office of Parks, Recreation & Historic Preservation (OPRHP) and the New York City Department of Parks & Recreation (NYC Parks) are all voting *ex officio* members of the Trust's Board.

The Trust's Board and staff work together to oversee the Park's continuing planning, construction, maintenance and operations in accordance with the Act and other requirements. The Trust also works closely with local community boards, elected officials and a multitude of civic and non-profit partners as well as the business community to advance the Park's mission. A 51-member Advisory Council comprised of elected officials and representatives from the business, environmental and civic communities also plays an integral role in Park planning.



Figure 3: Kayakers and paddle boarders benefit from numerous ways to access the river itself thanks to the Park's partnerships with multiple boating organizations that operate the Park's non-motorized boathouses.

Hudson River Park is located in Manhattan from just north of Chambers Street to 59 Street, an expanse of approximately four miles. The Act defines the Sanctuary as "the water section" of the Park. The "water section" is in turn defined as "all the area of the park west of the bulkhead line, including the water, but not including the piers and float bridge as they exist on the effective date of this act."¹ Pursuant to the Act, NYSDEC owns the lands underwater within the Park and has additional authority with respect to the ESMP.

¹ Throughout the document there are numerous references to definitions and other text within the Park's enabling legislation, Hudson River Park Act, Sess. Laws of N.Y. Chap. 592 (S.7845). The Hudson River Park Act (HRPA) and its amendments can be found digitally at hudsonriverpark.org. Reference to the "water section" of the Park can be found at HRPA, Section 3.



Figure 4: Lined seahorse found in the Park's Sanctuary waters.

Hudson River Park's 400-acre Estuarine Sanctuary is a thriving urban estuary ecosystem that is tidally influenced, resulting in a mixture of salt and fresh water that creates a dynamic, nutrient-rich environment with high biodiversity. Aside from providing critical habitat for fish like seahorses, eels and striped bass, the Sanctuary also serves as a vital migration corridor for birds and other wildlife. Sanctuary waters are a small but essential component of the lower Hudson River Estuary. The Hudson River is one of the most significant estuarine habitats in the United States, recognized under the National Estuary Program and designated by NYS Department of State as a Significant Coastal Fish and Wildlife Habitat.

In recognition of the importance of the Park's water area, the Act mandated the creation of an ESMP to provide a plan for:

- Conservation of marine resources found in the area, with special consideration for habitat values, environmental education and research;
- Public recreational use of the water, including for boating, fishing and swimming;
- Authorized commercial maritime uses in the portions of the water adjacent to "park/commercial uses" as defined in the Act;
- Other water dependent uses as permitted under the Act.²

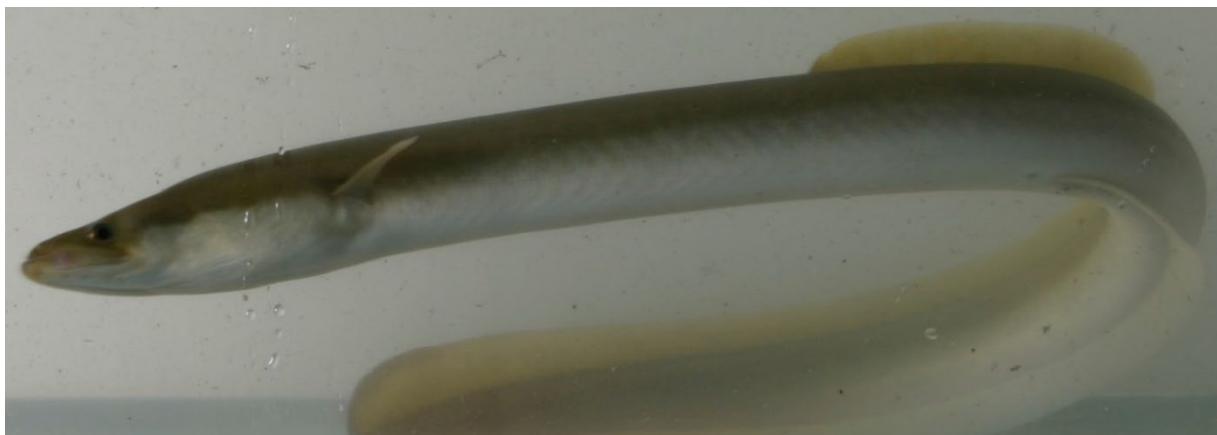


Figure 5: American eel caught by a participant practicing catch and release fishing at one of the Park's Big City Fishing programs.

² HRPA, Section 8.

ORGANIZATION AND PURPOSE

The ESMP is organized into two sections. The first section provides an overview of ESMP progress and accomplishments under the original 2002 ESMP Action Agenda. The second section sets forth a new 2021–2030 Action Agenda intended to guide the Trust and its partners in managing the Sanctuary through the current decade.

The 2002 ESMP was prepared prior to the completion of any of the Park's public piers and also before almost all of its open spaces. Its goals and objectives were heavily shaped by the guidance provided by the Act, various planning and policy documents, environmental review documents and regulatory permit conditions. The 2002 ESMP Action Agenda was organized into four management areas: Public Access & Recreation, Education, Resource Protection and Environmental Research. NYSDEC formally approved the ESMP in July 2004 following public review and comment.

Because most public park areas did not exist in 2002, the goals and objectives set forth in the 2002 ESMP Action Agenda did not benefit from the significant operational experiences that the Trust now has. Nevertheless, that plan proved to be a successful tool for advancing both action and planning related to the Sanctuary.



Figure 6: Park patrons on Pier 45 enjoying the river vista.

The 2021–2030 Action Agenda has been prepared in partnership with a Technical Advisory Committee (TAC) comprised of experts in three separate but overlapping topical areas: Public Access and Recreation, Environmental Education and Research and Habitat Enhancement.³ TAC members have worked side by side with the Trust and NYSDEC to establish goals and priorities in each of these areas that are ambitious and aspirational while also reflecting operational and managerial realities and experiences. A list of current TAC members can be found in Appendix A.

³ The original 2002 ESMP separated Resource Protection and Environmental Research. Given the overlap between these areas, the 2021–2030 Action Agenda consolidates and integrates them into the subject area now called "Research and Habitat Enhancement."

Twenty-one years ago, topics like climate change, coastal resiliency and plastics contamination were not household words. Now, each is a daily and ever more urgent concern for the environment. Over the next ten years, new priorities will again likely emerge: current research may lead to a compelling need for follow-up research; an ecological enhancement project may do the same. For all these reasons, the Action Agenda should be viewed as a living document, and the Trust, NYSDEC and the members of the TAC who helped draft this document will need to revisit Action Agenda goals periodically to ensure it, and the Park's work, remains relevant.

As with the 2002 ESMP Action Agenda, the current Action Agenda is grounded by the principles and requirements of the Act. Accordingly, this document builds upon the original goals established in 2002 rather than substantially altering them. Its overarching purpose is to set forth a plan that preserves and refines current best management practices, and to provide a blueprint for expanding environmental priorities in ways that weren't possible twenty years ago. The 2021–2030 Action Agenda will serve as both a management tool for the Park's Board and staff and as a reliable resource for research, education and community partners who are collectively working toward advancing shared goals for the Sanctuary.

One of the goals for the current ESMP update is to solicit broad community feedback regarding awareness of the Sanctuary, perceptions on progress and goals for the future. On May 27, 2021, the Trust issued the draft ESMP and Action Agenda for public review and comment. Feedback will be considered, including by the Trust's Board of Directors, before the document is finalized. Additionally, in 2017, the Trust conducted three surveys targeted to specific groups of stakeholders focused on Resource Protection and Environmental Research, Education and Public Access and Recreation. Each of the three surveys was unique in both content and distribution. The Education and Resource Protection and Environmental Research surveys were both sent to practitioners in those fields while the Public Access and Recreation survey was aimed at general park users and boating groups. Overwhelmingly, survey respondents



Figure 7: Hudson River Park's River Project team regularly monitor tide pool wildlife at the Pier 26 Tide Deck.

reported great satisfaction with the progress made to date. Many respondents expressed a great appreciation for the fact that the Park has allowed them unparalleled visual and physical access to the river itself. Survey respondents also provided helpful feedback on goals and priorities for the future. These community responses were helpful in shaping the Goals and Actions of the 2021–2030 Action Agenda. Survey documents are attached as Appendix B.

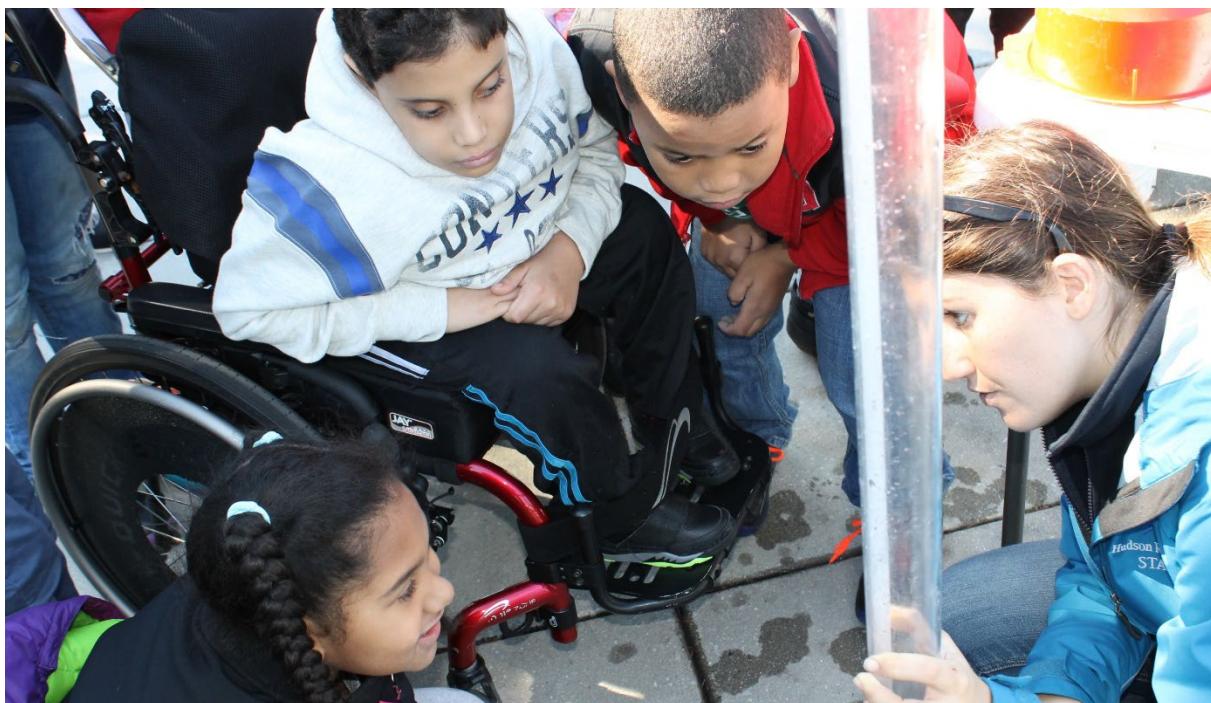


Figure 8: Students learning about Hudson River water quality during an environmental education field trip program.

Finally, it is important to recognize that the Trust is but one of many governmental entities at the federal, state and local levels making decisions that affect the Sanctuary. While the Trust—with support from teachers, universities, scientists, citizen scientists and a wide range of community advocates and partners—can, and should, take the lead on most initiatives proposed herein, other government agencies with broader purviews will need to take the lead on certain major issues, such as addressing water contamination from New York’s existing combined sewer overflow system. Nevertheless, the Trust intends to use the 2021–2030 Action Agenda as a platform for continuing to encourage action and change even in such areas given their impact on the Sanctuary.

PART 2: PROGRESS REPORT

To a very large extent, the goals and objectives identified in the 2002 ESMP have been accomplished. Most of the public recreational areas envisioned for Hudson River Park are now complete, enabling millions of people each year to access the Hudson River physically and visually. Kayaks, sailboats, historic vessels, water taxis, ferries and commercial recreation boats operate from numerous piers. Sustainability efforts have extended far beyond protecting existing resources, and now include Park-wide initiatives related to composting and plastics reduction. In 2019⁴ alone, the Park delivered environmental education programming to nearly 30,000 children and adults. Meanwhile, the Trust and its partners are researching and monitoring oysters, microplastics, water quality and biodiversity. Contracts for the first of several large estuary habitat enhancement projects have been approved with installation to begin in 2021. Overall, progress toward accomplishing the 2002 ESMP Action Agenda has created a strong foundation for the next ten years of Sanctuary planning and management.



Figure 9: Park visitors relaxing along the Sanctuary waters on Pier 84 in Midtown.

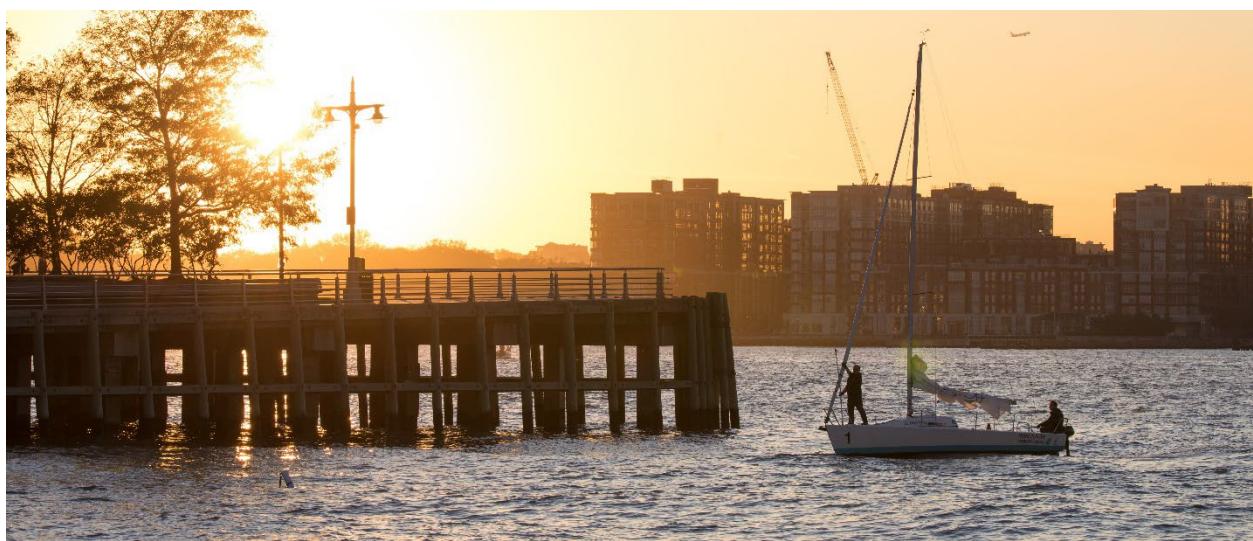


Figure 10: Students learning to sail with Hudson River Community Sailing in the Chelsea section of the Park.

⁴ Given the COVID pandemic's restrictions on in-person activities, this report uses data from 2019 to share participation in Park programs.

PUBLIC ACCESS & RECREATION

It seems hard to believe now, but when the Act was passed in 1998, the piers and adjacent inland areas intended for public access along Manhattan's Hudson River waterfront south of West 59 Street were almost universally in a deteriorated condition. Most piers were closed, and many had even been removed to protect public safety.

Hudson River Park was the first of New York City's former working waterfronts to be planned as a coordinated network of public spaces focused on creating physical and visual connections to the water itself. The Act set the bar for community involvement and provided a nearly pier-by-pier land use template to guide Park planning.

PUBLIC PIERS & ESPLANADE

The Hudson River Park Act called for at least 13 public piers to be connected by a continuous esplanade and a chain of landscaped upland areas bordering the adjacent New York State Department of Transportation (NYSDOT) Bikeway. At that time, the existing piers varied in condition and

use, with most of the slated public access piers needing to be reconstructed entirely because of their poor condition. The plan called for public piers to be distributed throughout the Park's length, with the Act calling for a mix of passive and active public open space uses; public recreation and entertainment, including the arts and performing arts; small scale boating; environmental education and research; historic and cultural preservation; wildlife habitat and protection; and park concessions and amenities for visitors.

To date, Piers 25, 26, 34, 45, 46, 51, 55 (Little Island), 62, 63, 64, 66, 66a, 84, 95 and 96 have been rebuilt and are open to the public for public recreation, educational opportunities, relaxation and contemplation. The Trust also rebuilt Pier 86, home to the Intrepid Sea, Air and Space Museum; that pier provides free public access during the museum's operating hours.



Figure 11: Native plants such as eastern red cedar trees and seaside grasses line the Park's Tribeca boardwalk.

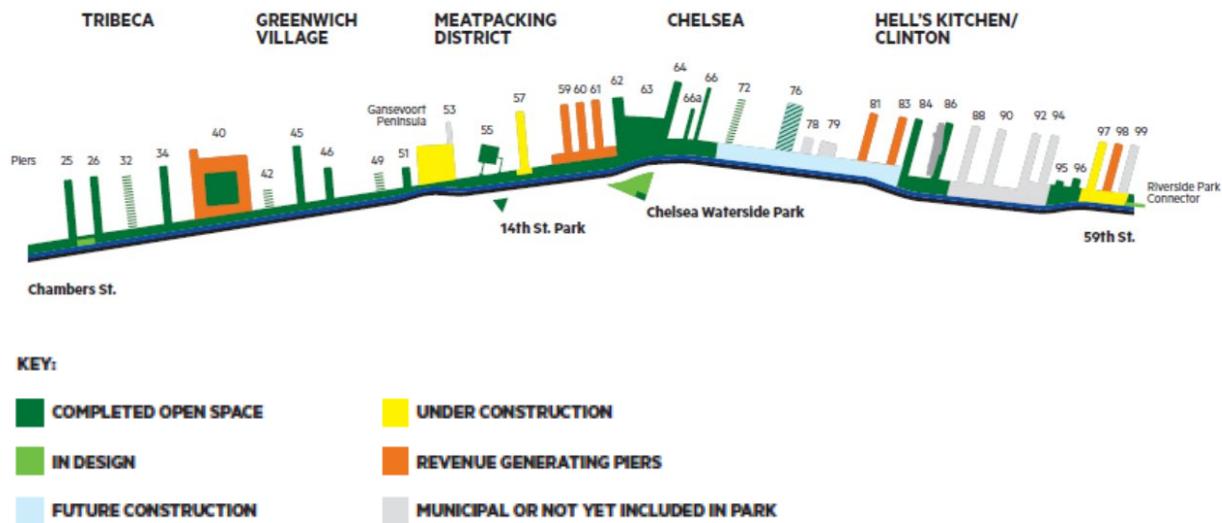


Figure 12: Map of Hudson River Park illustrating current completion status of park areas.

Construction in Greenwich Village, the first Park area to undergo design, began in 1999 on the upland area and in 2000 on Piers 45, 46 and 51 following receipt of regulatory permits. A portion of Clinton Cove (Piers 95 and 96) followed in 2005, and then Piers 66 and 84 in 2006. During this period, the Trust also completed the upland area from West 26 Street to West 29 Street plus the Courtyard Ballfields in Pier 40. In 2010, the Trust opened four more piers and major new upland sections in Chelsea (Piers 62, 63 and 64) and Tribeca (Pier 25.) A widened pedestrian esplanade opened between Gansevoort Peninsula and Pier 57 in 2019, and Pier 26 opened in September 2020. Appendix C identifies each park pier, its construction status and a brief description of its use program for reference.

There is more to come. Gansevoort Peninsula's design process is complete and the Trust commenced construction on this large expanse in 2021. Pier 97 was previously rebuilt structurally along with its adjacent upland area; this pier is slated to commence its landscaping construction phase in 2021.⁵ Consistent with its historic practices, the Trust sought community input during the design processes for both of these areas and the resulting plans enjoy wide community support.

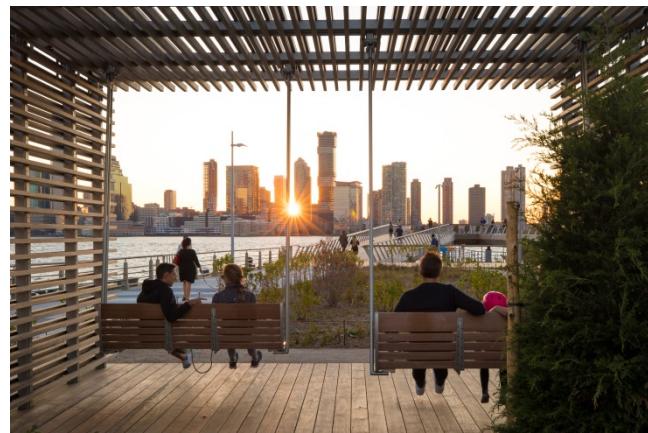


Figure 13: Since opening in September 2020, Park visitors have enjoyed the swings on Pier 26 overlooking the Tide Deck and Sanctuary waters.

⁵ The Trust recognizes that the continuing economic effects of the COVID pandemic on New York State and New York City budgets may result in changes to these schedules.



Figure 14: Pier 25 in Tribeca was completed in 2010 and has become one of the busiest public piers in the Park.



Figure 15: Completed in 2003, Pier 45 was one of the first piers to be rebuilt by the Trust and is a treasured asset for the West Village community and beyond.



Figure 16: The former building once located on Pier 63 was removed, creating a magnificent river view and an expansive lawn bowl for outdoor relaxation.



Figure 17: An area once filled with deteriorating steel beams is now lined with tall trees and shaded lawns. Pier 64 in Chelsea is part of the largest contiguous green area in the Park.

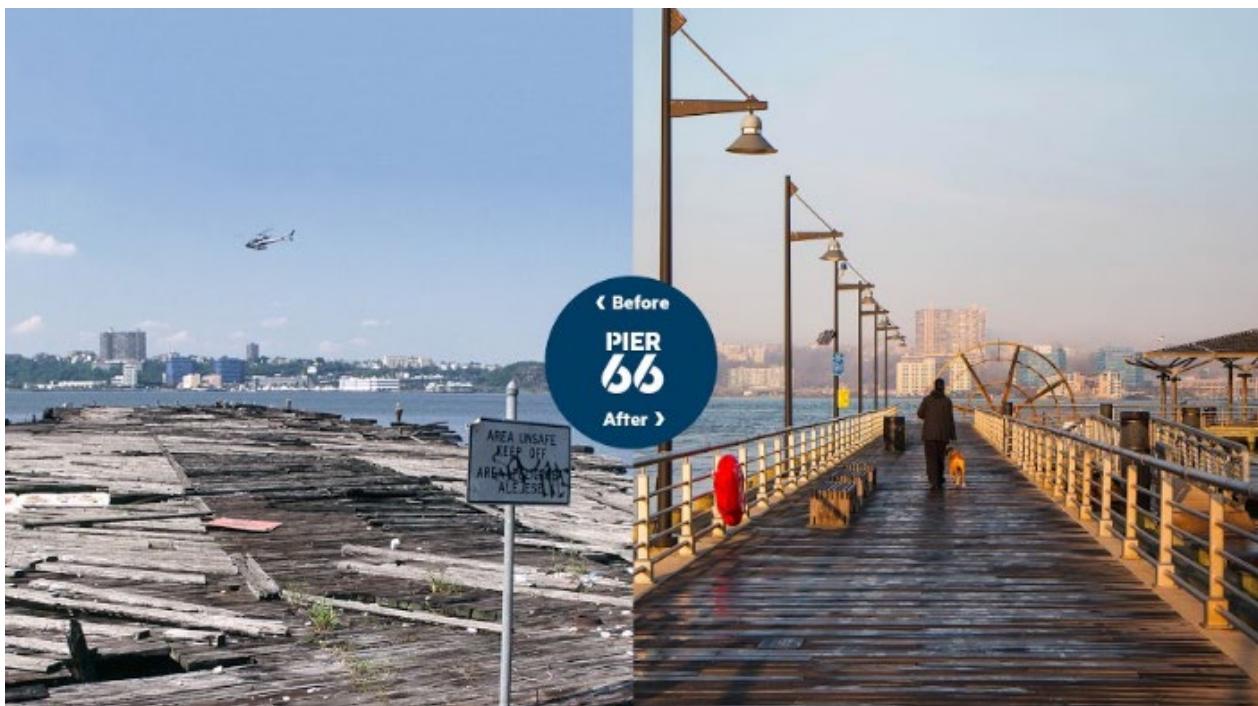


Figure 18: Pier 66, an area once condemned as unsafe, is now a public pier featuring a non-motorized boathouse and *Long Time* by Paul Ramires-Jonas—a water wheel sculpture that captures the beauty of the Hudson River while harkening back to its shipping and milling history.

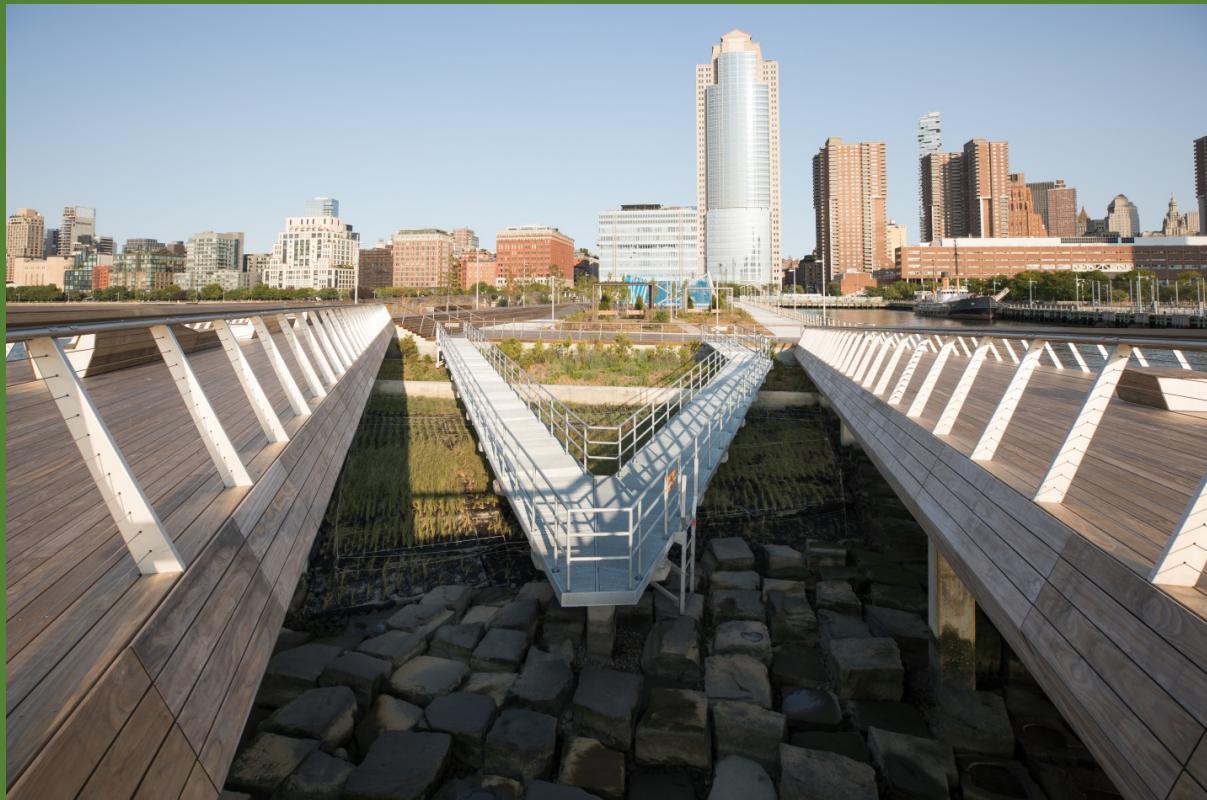


Figure 19: Rebuilt in 2006, Pier 84 stretches almost 1,000 feet into the River and measures nearly 100,000 square feet, making it one of the largest piers on the Manhattan waterfront.

WATER ACCESS: VISUAL & PHYSICAL

The 2002 ESMP called for many design features to increase visitors' connections to the water. Aside from the piers themselves, which enable visitors to get close to and enjoy the river visually, other design features were intentionally developed to enhance people's relationship with the river. Examples include grates between the bulkhead and piers in certain areas to emphasize the transition between land and water, overlooks for fishing and enjoying river scenery, an open railing system and designated visual corridors to preserve views, a lighting system designed to minimize glare on the water and "get-downs"—places where the public can step below the level of the esplanade to get closer to the water's edge.

PIER 26 TIDE DECK



The Park's most recent public park pier—Pier 26 —opened in September 2020 and includes a Tide Deck on its western edge. The Tide Deck is an ecological get-down, created to provide an immersive and educational river ecology experience for Park patrons and a salt marsh-like environment for wildlife. Pier 26's ecological theme also features a habitat walk that leads visitors through five native ecological zones: woodland forest, coastal grassland, maritime scrub, rocky intertidal zone and finally the Hudson River itself.

In rebuilding many of the piers, the Trust focused on creating opportunities for direct physical access to the Sanctuary. This has entailed building and/or securing the approvals for the boathouses, docks and other infrastructure required to accommodate the wide range of boating uses now located within the Sanctuary: kayaks, outrigger canoes, kayak polo, Whitehall boats, sailboats, historic vessels, recreational boating moorings, water taxis and berths for larger vessels.



Figure 20: The Pier 84 Boathouse is one of four purpose-built, non-motorized boathouses in the Park. Here, Park visitors are participating in a stand-up paddle boarding class offered by partner boating group, Manhattan Kayak.

State procurement rules require the Trust to provide for competition periodically, even when the occupant is a non-profit, and even when a program is highly successful. Nevertheless, today the Sanctuary is awash in boating activity, with much of it free or low cost to the public. A survey by the Waterfront Alliance in 2017 indicated that more than 100,000 people went boating in human-powered boats on New York Harbor in 2017, with most of the trips originating in Hudson River Park. Since inception, the Trust has relied on partners to operate the various boating uses within Park waters, with the Trust providing a dock master to provide certain on-water support and boathouse maintenance. Thanks to these partners, there has been a significant increase in public participation in non-motorized boating programs over the years.

In selecting operators for the various boathouses, the Trust has endeavored to provide for a variety of operating and programming models as well as boat types. Currently, Piers 26 and 96 focus on free, volunteer-led experiences for kayakers, while Pier 84 operates as a for-profit business and offers expert lessons and excursions for kayakers and paddle boarders as well as boat storage. The boathouse at Pier 66 uniquely combines a community sailing program, outrigger canoeing and kayak polo, each operated by a different partner. In 2019, these four permanent park boathouses served a combined 65,000 people. In addition, the Trust has long provided free space at Pier 40 for the Village Community Boathouse's Whitehall rowing and boat-building program.

Beyond non-motorized boating, Hudson River Park also includes 3 mooring fields (Piers 25, 40 and near Pier 66 for the sailing program) and vessels for commercial dining, excursion and sightseeing at multiple piers. The Park waters are also used for maritime transportation at Pier 79, a major ferry terminal operated by New York City and several water taxi locations.

BOATING PARTNERS OFFER A WIDE RANGE OF IN-WATER RECREATION FOR ALL



Hudson River Park is home to five non-motorized boating locations: Pier 26, Pier 40, Pier 66, Pier 84 and Pier 96, each operated by a different boating organization. Collectively, these partners offer a wide range of boating experiences for all ages and abilities such as kayaking, sailing, outrigger canoeing, paddling, rowing and stand-up paddle boarding.

The Downtown Boathouse, an all-volunteer nonprofit organization, pioneered kayaking in the Sanctuary in 1987 and launched its signature free public programming for 100 members of the public in 1995 on Pier 26. When the Trust began redeveloping Pier 26, the Downtown Boathouse continued operations from Piers 40 and 96, growing its program all the while. In 2014, the Downtown Boathouse was able to return to Pier 26, into the newly built boathouse where the program continues to expand and introduce incredible numbers of recreational boaters to the Sanctuary each year.

MARITIME HISTORY

New York State and New York City have a long and rich maritime history. For centuries, areas along the Hudson River that now comprise the Park were used primarily to transport people and goods. The design intent for the Park has always included celebrating its working waterfront and industrial past.

The 2002 ESMP called for the Park's design and operations to include ways for maritime heritage to be incorporated and even showcased through the preservation of existing historic elements, the inclusion of historic interpretive elements in designs and historic vessels at certain piers. Highlights of some completed activities are described below.



Figure 21: Pier 25 is one of several Park sites that host historic and visiting vessels. Pictured here is the historic fireboat *John J. Harvey* in the forefront and a visiting U.S. Coast Guard vessel at the western end of the pier.

HISTORIC PRESERVATION

By the time the Trust assumed management responsibility for Hudson River Park's four-miles of waterfront in 1998, most of the original pier buildings and other infrastructure had already been demolished or were unsalvageable. Fortunately, there are some notable exceptions. The Trust sought historic designation for the entire length of the Park's bulkhead, which was then determined to be eligible for listing on the State and National Registers of Historic Places. While much of the bulkhead is in very good condition, the Trust has had to make significant repairs to portions of it and has worked closely with the State Office of Historic Preservation since Park inception to ensure that plans for repairs and treatments respect this important resource. Most recently, the Trust undertook an urgent repair program for an approximately 350 foot length of bulkhead near Morton Street at a cost of approximately \$17 million.

HISTORIC HUDSON RIVER PARK BULKHEAD



After two centuries of unrestricted filling in the river, the decision to construct a bulkhead was made in the 1870s by the City's newly created Department of Docks. With the goal of demonstrating New York's newfound status as the premier American port, the result was a massive granite bulkhead (seawall) spanning miles of the west side waterfront from the Battery north. The actual construction of the bulkhead was one of the largest public works projects ever undertaken at that time. It was also an extremely difficult process, requiring tremendous time, money and effort.

Although certain portions have been reconstructed over the years in response to changing needs (including damage by ships and changes in ownership), the bulkhead continues to perform its essential function remarkably well. While not obvious when walking or boating alongside it, the bulkhead is a very complicated structure, and the six-foot granite capstones you may see are only a small part of it—most of the structure is actually buried. In addition to its importance in the history of urban planning and international commerce, the varied bulkhead masonry sections reflect evolving marine substructure design. For these reasons, the bulkhead has been listed as eligible for the State and National Registers of Historic Places, and the Hudson River Park Trust has worked closely with the New York State Historic Preservation Office to coordinate its repair and incorporation into the Park.

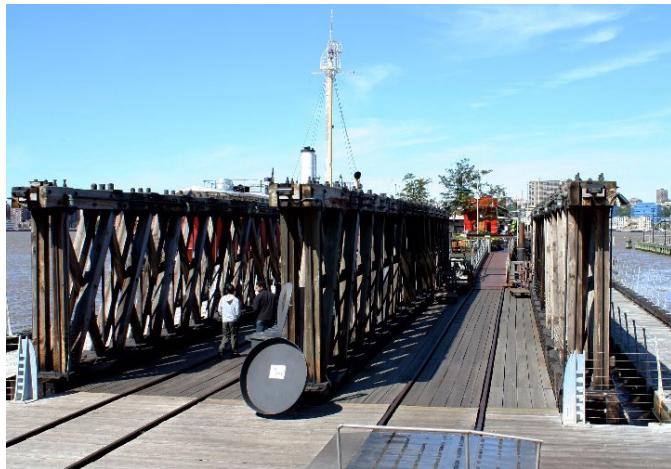


Figure 22: The historic Baltimore and Ohio Railroad Float Bridge is also known as Pier 66a and previously transported goods across the River.

Pier 57, which is listed on the State and National Registers of Historic Places, is presently undergoing a high-quality restoration adhering to the Secretary of Interior's Standards as part of an ongoing redevelopment as a mixed use facility. Finally, the Trust recently restored a remnant of Pier 54—a steel archway that supported the original pier's headhouse. This pier was once home to the Cunard-White Star Line and in its heyday, Pier 54 berthed hundreds of transatlantic ocean liners including the *Lusitania* and *RMS Carpathia*, which transported the surviving passengers of the *RMS Titanic* to Manhattan in 1912.

EDUCATION & INTERPRETATION

The Park has strived to incorporate its maritime and industrial history in other ways, from physically incorporating vestiges of the waterfront's past into the Park's design to creating walking tours and educational programs that allow the public to explore significant places, events and people. The bow notches located between Piers 45 and 46 and south of Pier 97 commemorate the era when the shoreline was excavated inland to accommodate longer vessels. Bulkhead stones have been repurposed for park seating and salvaged features enliven a playground in Chelsea.

Similarly, the Trust recently restored the Baltimore and Ohio Railroad Float Bridge, now known as Pier 66a, which once enabled railcars carrying goods and freight to move between barges and an inland warehouse on West 26 Street. Today, the float bridge helps provide public access to the area known as "Pier 66 Maritime" which includes a concession that also provides free public access to a barge, the historic *Lightship Frying Pan*, an authentic 1900s Lackawanna caboose and the retired New York City Fireboat, *John J Harvey*.



Figure 23: This steel archway from the former Pier 54 headhouse was left in place when the building was removed prior to the Park's construction and was recently preserved as an icon of the bygone oceanliner era.



Figure 24: A bow notch located on the esplanade between Piers 45 and 46 in the West Village highlights an era of maritime history when, during the early twentieth century, port operators cut out notches from the existing seawall to accommodate larger and longer vessels.

In addition, the Park has commissioned custom historical interpretive elements such as *Private Passage*, located in Clinton Cove, an artistic interpretive of a stateroom from the era of the grand passenger ships that berthed in the Park during the early twentieth century. Between the Gansevoort Peninsula and Pier 57, the rich transatlantic cruise liner history of the early twentieth century is newly being commemorated through interpretive signage.



Figure 25: In 2020, a series of educational interpretive glass panels and accompanying cast medallions were installed in the Park.



Figure 26: Limestone cow heads once decorating the façade of the New York Butchers' Dressed Meat Company building now serve as a water play feature at the newly renovated Chelsea Waterside Park.

In 2018, the Trust was able to preserve a unique piece of west side waterfront history by salvaging and restoring 100-year-old limestone cow heads that once served as part of the ornamental façade for the New York Butchers' Dressed Meat Company building on nearby 11 Avenue. These remnants memorialize the waterfront's past history as a location for numerous slaughterhouses. These unique historical artifacts were incorporated into the recently renovated Chelsea Waterside Park playground.

Hudson River Park also offers guided history tours that teach Park visitors about the ever-changing waterfront. In order to provide tours that are informative, engaging and diverse in material and voice, the Park has worked with experts from organizations like Brooklyn Brinery, St. John's University, Municipal Art Society and the LGBTQ Community Center. In addition to public walking tours, the Trust designed maritime history lessons as field trips for classroom students and summer campers in partnership with the historic vessels *Lilac* and *Frying Pan*.



Figure 27: Students learn about NYC's waterfront history and enjoy historic vessel tours on board the *Lilac* during field trip programs.



Figure 28: A view of the historic lightship *Frying Pan*, one of several historic vessels that berth in the Park.

HISTORIC VESSELS

Historic vessels play an important role in conveying New York City's long and rich maritime history in an authentic, tangible way. In 2003, the Trust's Board adopted a Historic Vessel Policy to establish goals and selection criteria for historic vessel docking in the Park. Three piers—Piers 25, 54 and 97—were identified as host sites for historic vessels because these piers had been identified in early Park planning documents in part for this purpose.

Pier 25 in Tribeca was the first of these piers to undergo construction and was completed in 2010. Its design includes berths for four historic vessels. Over the years, the Trust has hosted a number of historic vessels at these locations, and the pier has been fortunate to welcome *USCGC Lighthouse Tender Lilac*, *Tug Pegasus*, *Lightship Nantucket* and *Sherman Zwicker* for long-term docking. This pier has also hosted visiting historic vessels such as the *Liberty Clipper*, *Lehigh Valley Barge*, *SSV Corwith Cramer* and *Sloop Clearwater*.

Hudson River Park has encountered some unanticipated challenges and opportunities with respect to historic vessels as compared to what was anticipated during the earlier days of park planning. These include shallow water depths at many piers, the height of pier elevations and the desire by many historic vessel operators to include commercial uses as a means of supporting the vessels' high maintenance costs. Public procurement and regulatory requirements are other limiting factors, as is the need to balance uses on piers so that public piers do not become overwhelmed by commercialized uses.

The Trust has been able to address some of these challenges. For example, when Pier 54 was approved to be rebuilt in a different configuration and location as Little Island, the opportunity to berth a historic vessel there was eliminated. The Trust committed to designate one of the two vessel berths planned for Pier 26 for a historic vessel instead,

with the other reserved for a science or educational use. Because water depth at Pier 26 is deeper than it is at the original Pier 54 location, there is a broader range of vessels that could potentially berth at Pier 26. Pier 26 opened in September 2020 and a historic vessel is under consideration for the berth as part of a still-active public procurement process.

The restoration of Pier 66a provided an opportunity for the Park to host the complex known as “Pier 66 Maritime” which was not anticipated during the Park’s early planning process. Pier 66 Maritime encompasses an original Lackawanna Railroad Barge plus two additional historic vessels, *Lightship Frying Pan* and *Fireboat John J. Harvey*. Primarily through a federal grant, the Trust was able to rebuild Pier 86 so that the naval aircraft carrier *U.S.S. Intrepid* and various visiting vessels could remain or be hosted at the pier. Pier 84 has also served as a site for occasional visiting vessels including the *Sloop Clearwater* and the *El Galeon*.

LILAC HISTORIC LIGHTHOUSE TENDER



The USCGC *Lilac* berthed at Pier 25 is the last surviving steam-propelled lighthouse tender in America and is listed on the National Register of Historic Places. Measuring 174 feet, this 1933 lighthouse tender once carried supplies to lighthouses and maintained buoys for the U.S. Lighthouse Service and the U.S. Coast Guard. Decommissioned in 1972, *Lilac* is now a museum ship owned and operated by the non-profit Lilac Preservation Project (LPP). LPP’s mission is to rehabilitate the ship to operate once again on her own steam engines, promote maritime education and provide a venue for history and art. Each year, from spring through fall, LPP offers vessel tours, public exhibits and events for thousands of visitors and partners with the Trust and other organizations on educational programming.

A current unresolved challenge is at Pier 97. While the Act authorizes dredging for navigation purposes only, dredging was neither anticipated in the Park's Final Environmental Impact Statement nor in any foundational permitting documents. It is thus not permitted at this time. As such, while Pier 97 design documents include a berth location at this site, the especially shallow depths at this location make this site a very challenging location for historic vessels. In short, the Trust expects that discussion of historic vessels will continue as the Park progresses.

PARK SUSTAINABILITY & OPERATIONS

The Trust's Board of Directors long ago established a design standard that called for new park areas to be built to achieve at least a 50-year design life wherever feasible. In practice, this means that materials and design techniques were selected to be durable and maintainable. Tropical Storm Irene in 2011 and Superstorm Sandy in 2012 put these standards to the test. During Superstorm Sandy, over 35 inches of storm surge flooded certain areas of the Park, inundating buildings and underground utilities. Fortunately, most structures and landscapes proved to be resilient, with reconstructed piers, bulkheads, esplanade and plant materials remaining mostly intact following the storm. However, tens of millions of dollars in utility repairs and upgrades were

nevertheless needed, and the Trust has subsequently worked to raise the heights of critical infrastructure and make other design enhancements when possible to protect it from future storms. As with other government entities throughout the region, the Trust now better understands its vulnerabilities as a waterfront park affected by climate change impacts including more frequent and stronger storms.



Figure 29: This photo captures the significant flooding at Pier 84 during Superstorm Sandy.

Prior to the Park's construction, most of its physical area consisted of paved, impervious surfaces. With the exception of several London plane trees dating from the 1930s in what is now Chelsea Waterside Park, and a smattering of plants like mugwort, ragweed and Ailanthus, very little habitat existed for birds or insects.

Today, 2,000 trees provide benefits for improved air quality and natural cooling within the City. Consistent with the adopted Park plan, landscape features range from traditional open lawns with shade trees to habitat areas for native plants. Certain areas are planted with species intended to attract distinct wildlife such as butterflies. Virtually

all are designed to tolerate and thrive in a relatively harsh environment featuring wind, salt and salt spray, as well as proximity to the adjacent State highway. Collectively, the Park's plants are reducing water runoff, abating pollutants from entering the Sanctuary and providing other health benefits for Park users. Throughout the Park, the Trust uses an Integrated Pest Management (IPM) approach to control pests and weeds found within the Park. IPM is a pest control strategy that uses biological and physical procedures to remove pests to minimize risks to health and the environment.

The 2002 ESMP specifically promoted using native plants for landscaping and to attract wildlife. Presently, the majority of plants and trees found throughout the Park are classified as native to this region of New York. In particular, the two-acre Chelsea Habitat area and the Tribeca Boardwalk both feature a broad variety of native plants and host extensive environmental programming.



Figure 31: Students learn about native plants during field trip programs in the Habitat Garden.

eliminated 354 metal halide light fixtures and switched to energy efficient LED bulbs. That change alone results in a reduction of approximately 350,000 pounds of CO₂ emissions per year, the equivalent of nearly 230 barrels of gasoline burned. Because each LED light can last up to 50,000 hours, 5 times longer than traditional bulbs, they save the Park nearly \$20,000 per year in traditional bulb replacements as an additional benefit. The Trust is currently looking to change to LED bulbs at other locations including through the upcoming Chelsea Waterside Park ballfield reconstruction project.



Figure 30: Monarch butterfly in the Chelsea Habitat Garden, which is also a Certified Monarch Waystation.

Newly constructed Pier 26 also showcases native plants. Its design was inspired by the Manhattan shoreline that would have existed prior to Henry Hudson's 1609 expedition, and includes a series of ecological communities representing this native landscape, including a woodland forest, coastal grassland, maritime scrub and rocky intertidal zone.

Hudson River Park continues to make strides on reducing its consumption of energy and water. The Park's fleet of vehicles is 70% electric and in 2016, the Trust



Figure 32: Students learn about composting at Hudson River Park's composting center.

COMPOSTING

In 2015, the Trust initiated a compost program to process horticulture waste and organic waste generated in the Park's offices. In June 2017, with support from New York City's Department of Sanitation, Council Member Corey Johnson and Hudson River Park Friends, the program grew to include community composting as well. Today, the Community Compost Program incorporates 10 food scrap drop off bins dispersed throughout the Park's footprint, each open daily from 7:00 AM–7:00 PM.

In 2019, Park staff collected 81,000 pounds of organic waste from these and other Park locations and processed it with another 350,000 pounds of horticultural waste generated through plant maintenance. In total, the Trust turned nearly 430,000 pounds of organic waste into compost—an increase of 10,000 pounds from 2018. Moving forward, the Park expects to compost at least 400,000 pounds of organic waste annually, thereby diverting thousands of pounds of waste from New York City's waste stream.

Hudson River Park has also used its staff and resources to encourage best practices in composting



Figure 33: Participants support the Community Compost Program at the annual Pumpkin Smash event.

at community workshops, volunteer events and through public programs. One of these events, HRPK's Pumpkin Smash, invites local residents to turn their pumpkins into compost. In 2019 1,200 local residents smashed 380 pumpkins weighing more than 2,000 pounds. Participants left with a free bag of fresh compost and tips on how they can support composting efforts in New York City.

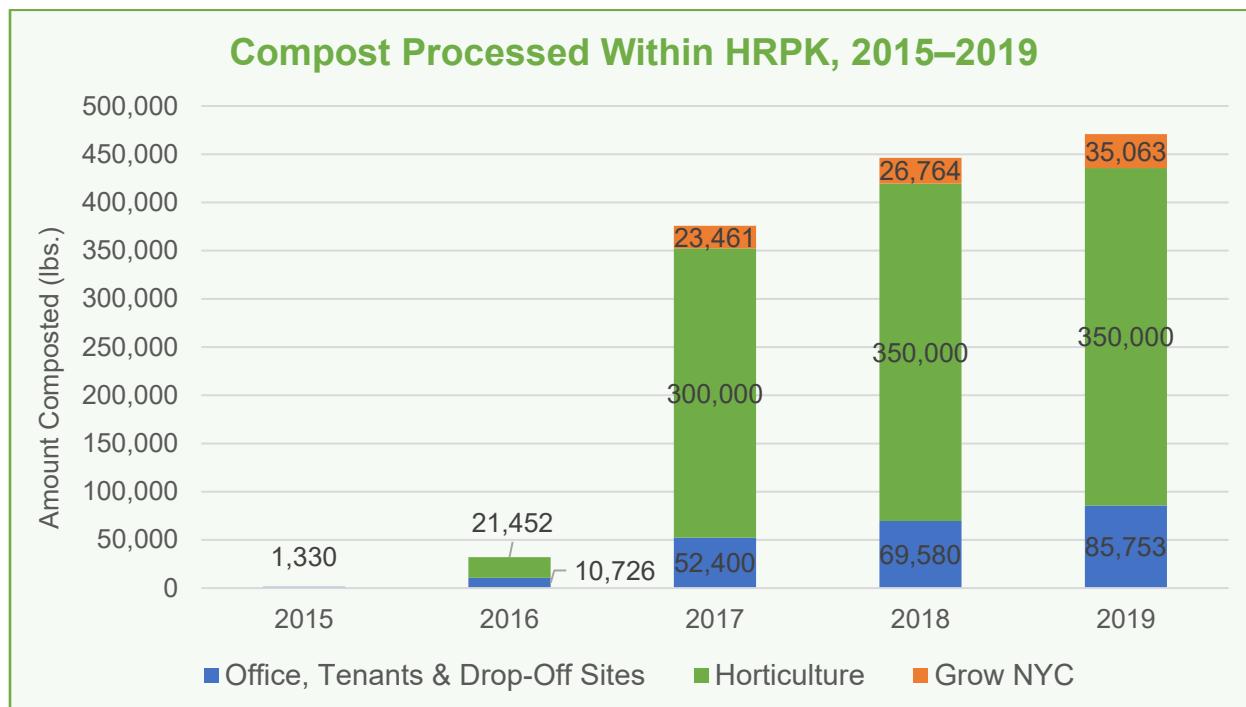


Figure 34: Annual total weight of food scraps and horticultural yard waste collected in the HRPK Community Compost Program from 2015 to 2019.

PARK OVER PLASTIC

While managing the Park, the Trust sees first-hand the harm that plastics create on the River and its wildlife. Over the last four years, the Park helped to propel macro- and microplastics research in the region by developing an ongoing monitoring program tracking concentrations of plastic pollution within the Estuarine Sanctuary. This research inspired the 2019 launch of the "Park Over Plastic" program, which aims to reduce single-use plastics in the Park through a replicable model for parks across the country working toward plastic-free goals as well.

Since 2019, Hudson River Park has ceased purchasing and using nearly all single-use plastics at its offices and in its operational areas. In addition, the Trust also asked all its tenants and occupants to do the same. Thus far, fourteen tenants and occupants have signed Green Partnership Agreements that discontinue the use of single-use plastic



Figure 35: The logo above is used to promote the Park Over Plastic initiative throughout the Park.

bottles, straws, stirrers and flatware in favor of green products. Other tenants and occupants are making efforts to reduce their plastic use as well. As new tenants, occupants and permittees join the Park community, they are now asked to join the Park Over Plastic initiative by becoming Green Partners in their lease and permit agreements. Trust staff has created a Green Guide available on its website to help interested parties access resources and pricing information for plastics alternatives.



Figure 36: Pictured is one of the bottle fillers that the Trust installed throughout the park to promote use of refillable water bottles.

A comprehensive communications strategy has also been paired with these new plastics reduction features to help promote awareness of the negative effects some plastics have on the environment. Most recently, the Park worked

successfully with Coca-Cola to trial selling only canned products, including canned water, in the Park's vending machines.

To accommodate the transition away from single-use plastics to green products, the Trust installed additional recycling bins throughout the Park, as well as water fountains/bottle fillers and portable hydration stations in key areas to encourage park-goers to make use of reusable water bottles.



Figure 37: Witnessing the prolific single-use plastics washing up within Hudson River Park was a major factor in the Park's decision to launch the Park Over Plastic initiative.



Figure 38: Parks Enforcement Patrol conducting outreach to encourage the public to observe social distancing during the COVID pandemic.

PARK & WATER SAFETY

As the Park has grown, it has become a beloved “backyard” for nearby residents and a go-to destination for tourists and regional visitors. Each year, millions of park patrons use the park’s piers and esplanade, and tens of thousands of these visitors find their way onto and even into Sanctuary waters for recreation. To ensure everyone can enjoy Hudson River Park safely, the Trust has developed rules and policies that provide for public safety, including boating safety, and protection of the environment, park landscapes and infrastructure.⁶ In addition to enforceable regulations outlining prohibited uses, the Trust has also developed a policy related to “Kayaking and Canoeing in the Park.”⁷

The Trust contracts with the New York City Parks Enforcement Patrol (PEP) to help keep the Park and its patrons safe through education and enforcement of rules. As an added security measure, sections of the Park and Sanctuary are now also being monitored remotely through video surveillance cameras. The Trust’s full-time dockmaster helps oversee water/boating rules, helps maintain some marine

⁶ New York City Rules and Regulations Part 751, Amended—Hudson River Park Rules and Regulations can be found digitally at hudsonriverpark.org

⁷ Hudson River Park’s Kayak and Canoe Policy can be found digitally at hudsonriverpark.org



Figure 39: NYC students learning how to build and row Whitehall boats on the Hudson at Pier 40 with the Village Community Boathouse.

function. For example, “Water Play” areas surround most of the boathouses and have been successful in creating safe, accessible areas for non-motorized boating. “Reserves” were identified as the best places for habitat restoration and research. “Motorized Boat” areas include park piers with historic ships, mooring fields, water taxis and the Chelsea Piers marina. The original Water Use Map also designated areas with large recreational, commercial and sightseeing vessels and ferries separately, as well as certain properties excluded from Park boundaries.

Because the 2002 Water Use zones were identified based on the proposed or preexisting uses for the adjacent piers, the need to update them has not often arisen over the years. The Action Agenda section of this report makes a few select changes based on TAC feedback and the Trust’s own observations, experiences and current Park plans for locations like the Gansevoort Peninsula to reflect current Park use and to clarify certain terminology from the 2002 plan. The currently proposed Water Use Map is included in Appendix D.

infrastructure, operates the Pier 40 mooring field and supports the boating community. The Trust and PEP also work closely with the United States Coast Guard, the Army Corps of Engineers, New York City Police Department’s Harbor Unit, NYSDEC and other agencies on issues affecting safe uses of the waters in and around the Park.

The Park’s Water Use Map is another key safety and protection measure. The Act provides that the Trust may designate “water surface use zones including the establishment of sanctuary/preserve areas and areas where motorized and non-motorized craft are or are not permitted.”⁸ The 2002 ESMP included a Water Use Map for Hudson River Park that divided the water area into five zones, each of which performs a different



Figure 40: As a safety measure, life ring cabinets, like the one pictured here, were installed throughout the Park in 2018.

⁸ The Trust has the authority under the Act to determine where water dependent activities as defined by the Act may occur; generally, water dependent uses and structures are those that by their nature require utilization of or access to the water section.

With the park upland nearing completion and so many ways to access the water, there are more people than ever using the Sanctuary waters in many different ways. For this reason, the 2021–2030 Action Agenda reflects a vision for strengthening boater safety in the coming decade. The Trust will work with its boating partners to ensure that divergent water uses can operate compatibly and safely while still enabling other Sanctuary and Park goals.



Figure 41: The Tide Deck, located at the western end of Pier 26, is an engineered rocky tidal marsh created to provide an immersive and educational river ecology experience for students and Park visitors.

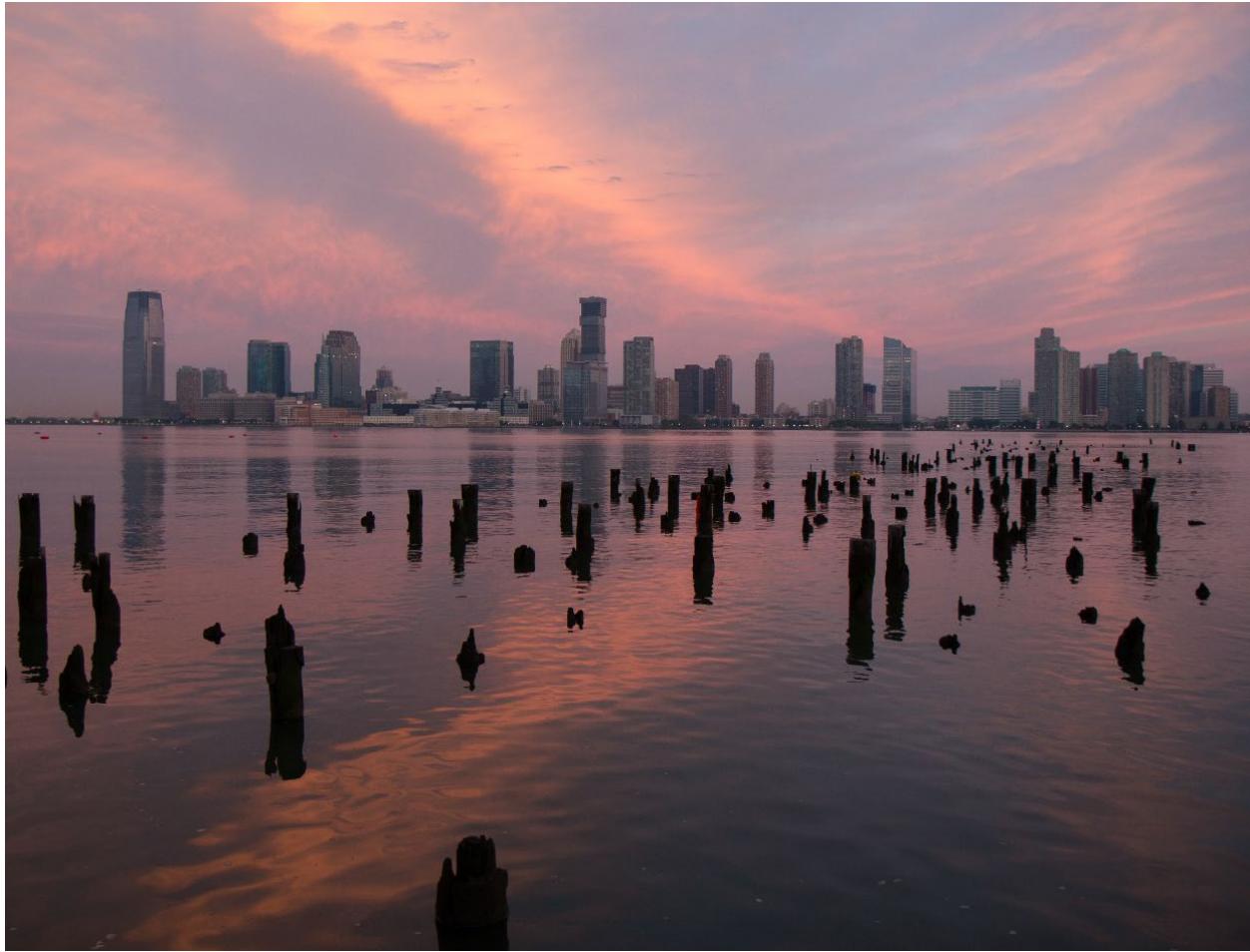


Figure 42: Sunset over the Pier 32 pile field, one of the main sites for ongoing oyster restoration and research.

ENVIRONMENTAL EDUCATION

Shortly after the Hudson River Park Act was passed, and considerably before construction of the Park had even commenced, the Trust began hosting place-based environmental programs to teach students and the public about the Sanctuary on the then-decrepit west side waterfront. Since then, the Park has become a connecting point between the city and the Sanctuary—the place where water and waterfront are transformed into a 550-acre classroom.

Education is a fundamental mechanism for engaging local communities, building stewardship and supporting the long-term health of the Sanctuary. Hudson River Park's hands-on programs provide opportunities for science, ecological and historical learning that have impacted hundreds of thousands of New Yorkers since 2002. Every year, the Trust offers a wealth of field trips, public programs, volunteer opportunities, teacher trainings and conservation internships that expand awareness about the Sanctuary and make science relevant and accessible. The Park's prominent location in Manhattan, adjacent to many schools, non-profits and businesses, creates unparalleled opportunities to engage with diverse audiences throughout its four-mile footprint.



Figure 43: Students learning about native birds found in the Park.



Figure 44: Students planning a more resilient shoreline while discussing the impacts of climate change.

the Gansevoort Peninsula both include multiple areas for outdoor education.

To so many teachers, students and the general public, Hudson River Park has become an essential “outdoor classroom” and environmental education resource. Over the past decade, the Park’s environmental education programming has grown significantly, with the number of programs and participants typically increasing each year. In 2019 alone, the Trust directly engaged over 30,000 program participants and increased the size of its science and education staff by 2 full-time members. The popularity and impact of Sanctuary programs has also influenced Park design. For example, the newly completed Pier 26 and design for



Figure 45: The Park's River Project staff teaches about the estuary outside the Pier 84 classroom.

In 2019, the breadth and depth of marine science education and research in the Park leapt forward as The River Project, a community-supported marine field station, laboratory and native aquarium that preceded the Park's creation, became a formally integrated component of Hudson River Park. Through a formal partnership, certain River Project staff joined the Trust as full-time staff members. In Summer 2020, the Trust officially renamed its environment and education department to reflect its heritage, and is now known as "Hudson River Park's River Project." The original River Project legacy will live on as its research initiatives, programs and even staff members are now fully embedded within the Trust.



Figure 46: The public can engage with the Sanctuary and learn more about Hudson River fishes at the River Project Wetlab at Pier 40.



Figure 47: Students become scientists at the Park's field trip programs as the Park's River Project staff help them discover and even conduct water quality experiments.

FIELD TRIP PROGRAMS

The Trust staff educates and empowers students through a range of environmental field trip programs offered to schools and other organized academic and community groups, including summer camps. Topics covered in these programs include: fish biology, water quality, plankton ecology, human impacts and maritime history. Program themes have evolved over time to support New York City's adopted curriculum requirements. A chart outlining current programming themes and audiences is attached as Appendix E. In 2005, a total of 890 students attended field trip programs in Hudson River Park; by 2019, that number had increased tenfold, with over 10,000 students attending comparable programs provided directly by the Park's River Project. These programs aim to empower students as scientists and stewards of the Hudson River.

The Park's model for environmental education prioritizes access for all by offering free and low-cost environmental education programming to schools and summer camp groups. In order to provide financially accessible educational experiences, the Trust maintains a robust, need-based fee waiver program, ensuring that all interested groups, regardless of ability to pay, can learn about the Estuarine Sanctuary. The Trust has also emphasized accessibility for all by prioritizing Title I schools and communities historically underrepresented in STEM fields. In 2019, 66% of all groups served had Title I designation, and the Trust waived 70% of program fees fully on the basis of need.



Figure 48: Children participating in an education program within the Park's Chelsea Habitat area.

2019 FIELD TRIP STATISTICS

- In total, 10,700 students engaged in field trip programming
 - 7,500 students were educated at 250 school field trip programs
 - 3,200 students were educated at 100 summer camp programs
- 70% of programs were awarded need-based fee waivers
- 66% of schools served have Title I designation
- Over 50% of schools served are in the outer boroughs of New York City
- 90% of teachers rated educational programs as “excellent” or “good” in post-program surveys

DAY IN THE LIFE OF THE HUDSON RIVER AND HARBOR



Hudson River Park is proud to help facilitate Day in the Life (DITL) of the Hudson and Harbor as part of a wider annual snap shot day organized by NYSDEC and Lamont-Doherty Earth Observatory. Each year, students from Troy to New York City visit sites along the Hudson River to collect scientific information about the health of this vibrant ecosystem through monitoring water quality and collecting biodiversity data. This data is then aggregated to create a detailed snap shot of weather, water quality and fish species encountered by students on this day. In 2019, 335 students from 8 New York City schools conducted DITL programs in Hudson River Park facilitated by Park educators and partner organizations including NYSDEC, The River Project and the New York City Soil & Water Conservation District. Hudson River Park also partners with NYSDEC to serve as a DITL educator training site and helps educators prepare to lead student groups at other DITL sites each year.



Figure 49: Participants learn about local wildlife at the popular Release of the Fishes event at the River Project Wetlab.

PUBLIC EDUCATION PROGRAMS

Another way the Trust educates is through drop-in and other more casual programming tailored for regular Park visitors. As with organized field trip programs, the number and range of such public programs has continued to expand since the 2002 ESMP was implemented. In 2019, Park staff hosted 16,000 individuals ranging from toddlers to older adults interested in wildlife, waterfront history, oyster restoration and sustainability.

Over the last five years, the Trust has created and expanded opportunities for the public to engage in community science projects related to habitat monitoring and restoration. Programs like Community Ecopaddle and Shell-ebrate Oysters invite the public to take part in oyster research. Marine debris research occurs through regularly conducted macroplastic surveys performed by volunteers on Gansevoort Peninsula.



Figure 50: The Park's Shell-ebrate Oysters program invites community members to measure and monitor oysters.

These and other programs engage community members with diverse backgrounds, interests and abilities in authentic research, and teach STEM skills through use of scientific instruments and methods.

PUBLIC EDUCATION PROGRAM STATISTICS

- 130 public programs offered to over 21,000 participants including:
 - 7,500 participants at SUBMERGE Marine Science Festival
 - 5,000 participants practicing catch and release fishing at Big City Fishing

BIG CITY FISHING



Big City Fishing (BCF), the Park's oldest and most popular public environmental education program, began in 2001 and helped establish the case for offering hands-on science programming that is both educational and fun. BCF is a free, guided, all-ages catch-and-release fishing program offered at multiple locations throughout the Park every summer and fall. Aside from attracting over 5,000 participants annually, BCF fosters stewardship of local waterways while encouraging recreation in the Sanctuary. BCF serves the supplemental purpose of providing real-time insight into river health and biodiversity through logs maintained by Trust staff. As a community-assisted research initiative, BCF is an opportunity for program participants to engage with Park educators and learn more about river research and restoration projects affecting the Sanctuary.

SUBMERGE: MARINE SCIENCE FESTIVAL



Since 2012, Hudson River Park has created and offered SUBMERGE, New York City's only Marine Science Festival. SUBMERGE is an annual celebration of New York City's coastal waters that brings marine science to life for visitors of all ages. This event offers hands-on experiments, kid-approved science entertainment, catch & release fishing, kayaking and more, for free. In 2019, SUBMERGE attracted over 7,000 visitors and over 40 exhibitors from across the country. Exhibitor organizations include local non-profits like Gotham Whale, government agencies like the National Oceanic and Atmospheric Administration (NOAA) and NYSDEC, academic partners like Borough of Manhattan Community College and many more. Thanks to collaborations with these organizations, SUBMERGE offers a huge variety of interactive learning opportunities about sustainability, ocean exploration, wildlife and other STEM topics. Hudson River Park is committed to bringing together science education and research organizations to share marine science, increase awareness and inspire tomorrow's stewards. The Park's prominent Manhattan location and the inspiring pier setting within the Hudson River make the Park uniquely suited to offering programs like this.

LEARNING SPACES

The Trust leverages both the Sanctuary and the Park's adjacent green spaces as exciting outdoor classrooms. Pier 25 in Tribeca, Pier 46 in Greenwich Village, Pier 66 in Chelsea and Pier 84 in Hell's Kitchen are historically most frequently used for this purpose, though staff expects Pier 26 to be equally popular now that it is open. In addition, the Habitat Garden in Chelsea provides a unique, terrestrial outdoor classroom.

At Pier 84, an indoor classroom was incorporated into the Park's design so that the Trust could offer year-round environmental programming at that location. The Trust makes the classroom available to outside academic and community groups such as the Coast Guard Auxiliary and NYSDEC upon request.



Figure 51: The Park's River Project staff utilizes green spaces as outdoor classrooms for students.



Figure 52: STEM learning at Hudson River Park's Pier 84 classroom.

THE WETLAB



The original River Project pioneered the “Wetlab”—a native aquarium and marine biology field station on Pier 40 now operated by the Trust. The Wetlab features a 3,500-gallon flow-through aquarium system of over a dozen tanks that seasonally host such Hudson River fishes as striped bass, black sea bass, oyster toadfish and lined seahorses. The flow-through system ensures that River water is constantly pumped directly from the Hudson River, enabling fish and other animal residents in the Wetlab to experience the same water quality conditions as those in the Hudson River.

The Wetlab is one of the Park’s most valuable educational venues, providing opportunities for students and members of the public alike to meet Hudson River wildlife face-to-face during field trips and open public park hours. The Wetlab is also an important place for research and monitoring, and is helping inform plans for the future Estuarium in Tribeca.

Pier 26, completed in Fall 2020, was specifically designed with terraced seating near the Tide Deck for the purpose of conducting outdoor classes. The Tide Deck will also provide an engaging location for hands-on programming and discovery walks for both students and the general public alike. In 2021, the Park expects to open a new indoor classroom at Pier 57 through a partnership with Google, the pier's anchor tenant. The classroom and related exhibits will focus on integrating technology into STEM and estuary education.

The Park is very fortunate that multiple tenants and permittees prioritize public education either as their primary or secondary mission. The Lilac Preservation Project, Village Community Boathouse, Hudson River Community Sailing and Intrepid Sea, Air and Space Museum all regularly host school classes and environmental groups for Sanctuary-focused programming. Other partners like NYSDEC, Lamont-Doherty Earth Observatory of Columbia University, New York City Soil and Water Conservation District and many more also make frequent use of the Park's piers and open spaces for outdoor education programming and teacher training workshops. The Trust provides permitting, support, space and resources to facilitate such organizations' use of Hudson River Park as an inspiring outdoor education classroom and environment.

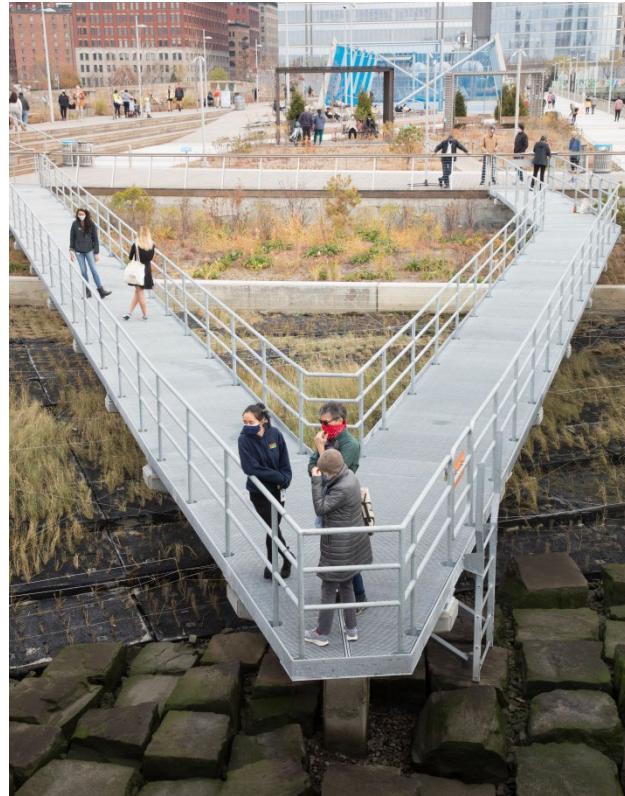


Figure 53: The Park's River Project staff offers regular guided public tours of the Pier 26 Tide Deck.

NYSDEC, Lamont-Doherty Earth Observatory of Columbia University, New York City Soil and Water Conservation District and many more also make frequent use of the Park's piers and open spaces for outdoor education programming and teacher training workshops. The Trust provides permitting, support, space and resources to facilitate such organizations' use of Hudson River Park as an inspiring outdoor education classroom and environment.

STEM INTERNSHIPS

Hudson River Park provides meaningful hands-on internships and trainings to raise awareness about the Hudson River Estuary and to cultivate the next generation of environmental stewards. Paid internships are provided for both high school and college students to support job-readiness training and career pathways in the environmental field. Over the last decade, the Trust has worked closely with organizations like the Student Conservation Association and several New York City high schools to create career stepping stones for students historically underrepresented in STEM. Since 2011, Hudson River Park has provided these opportunities to over 125 high school and college-aged students, many of whom are now pursuing careers in science and STEM education.

INCLUDES: SUMMER RESEARCH INTENSIVE INTERNSHIP



Since 2018, the Trust has been a partner in a consortium of New York City institutions funded by a grant from the National Science Foundation known as INCLUDES—"Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science." Along with Columbia University's Lamont-Doherty Earth Observatory, The Young Women's Leadership School of East Harlem, the City College of New York and the Intrepid Museum, the Trust facilitates and provides a rigorous summer internship opportunity for high school students interested in field-based research projects. A unique facet of the program is the tiered mentoring model, which incorporates and integrates undergraduate college mentors, early-career scientists and leading researchers guiding the project. The tiered mentoring model has been highly successful in encouraging students to work together as a research team, and the model was presented at the 2019 American Geophysical Union (AGU) conference. Surveys completed by students following the program report that students feel more confident about their science skills. Critically, the surveys also show that the majority is interested in pursuing scientific interests in college. Hudson River Park intends to continue running this program to empower young scientists and help these students excel in STEM careers.

SANCTUARY RESEARCH

The Sanctuary's waters have long been defined by human impacts. Over a period of several centuries, Manhattan's coastline was widened with fill, eliminating most native shorelines, including the original shores along the entirety of the Park's present-day location. In addition to expanding and hardening the shorelines, for over a century, the city's waters were used as a dumping ground for every sort of waste and refuse, further degrading aquatic habitat and polluting water.

In recent decades, major improvements in Hudson River health have occurred thanks to a combination of regulatory action and increased citizen stewardship. Nevertheless, contaminants from sewer outflows and other sources, which release pathogen-contaminated waste water and debris into local waterways, continue to affect water quality today. Climate change effects, including warming waters, increased precipitation, sea level rise, extreme heat and more frequent and extreme storms also threaten habitat, water quality and wildlife. Emerging issues like the proliferation of invasive species, pharmaceutical waste and microplastics pose additional concerns.

Despite such human disturbance, Park waters support remarkably diverse and abundant biological communities. Over 200 species of fish have been observed in the greater Hudson River watershed, with 85 species of fish represented within the Park's Sanctuary waters. Understanding how the Sanctuary can better support this wildlife community and the larger estuary environment through research, adaptive enhancements and advocacy has been, and must remain, an important Sanctuary goal.



Figure 54: The Park's River Project staff measures a pipe fish collected from fish surveying equipment.

Hudson River Park conducts research¹ (see Appendix F) and supports partner efforts to advance water quality and habitat enhancement improvements in the Sanctuary and beyond. Scientific research and environmental monitoring increases understanding of the Sanctuary's ecological, physical, hydrodynamic and water quality features, and the relationship among these features. Data informs and guides habitat enhancement projects within the Sanctuary and establishes baseline conditions against which future changes and trends can be measured. Now that the Park is nearing completion and the

¹ The cited research statistics reflect the 2019 season due to the COVID pandemic.

Trust has an established and respected environmental education program, the Trust sees an opportunity to prioritize the expansion of its research and habitat enhancement efforts in the decade ahead.

RIVER CONDITIONS

Changes in water quality can impact habitat, wildlife and human health. Beginning in 2012, the Trust started working with the Hudson River Ecosystem Conditions Observing System (HRECOS) network, a group of near real-time instruments in the Hudson River collectively managed by United States Geological Survey, NYSDEC and other governmental agencies and academic institutions. The HRECOS network is the most comprehensive set of continuous hydrological and meteorological weather stations in the Hudson River.

The Park currently manages two HRECOS stations. The Trust purchased and installed the Pier 84 station in 2012 and the Pier 26 station in 2016. In 2019, the Pier 26 station was relocated to nearby Pier 25 to accommodate the construction of Pier 26.

HRECOS stations have sensors that measure dissolved oxygen, pH, salinity, turbidity, depth, rainfall, wind, and water and air temperature. Data are recorded and transmitted every 15 minutes to the HRECOS / United States Geological Survey database, providing open access to all interested parties. The Park also shares collected data publicly on monitors mounted to the Pier 84 boathouse's exterior and in the Pier 40 lobby to help communicate near real-time river conditions to Park users. Cantina, a human-centered design firm, awarded the Park with pro bono design support in 2021 to create a water quality dashboard that is integrated on the Park's website, making HRECOS data even more accessible. Aside from supporting science and education, HRECOS data helps inform Park management policies, habitat enhancement efforts and extreme event preparedness.

While HRECOS data proves that the Hudson River water quality within the Sanctuary usually meets healthy standards, one ongoing water quality challenge is the continuing impacts of CSOs. Within the Park's boundaries there are 32 CSOs that contribute untreated sewage into the Hudson River during certain wet weather events. These CSOs are part of a much larger network of CSOs throughout New York City that

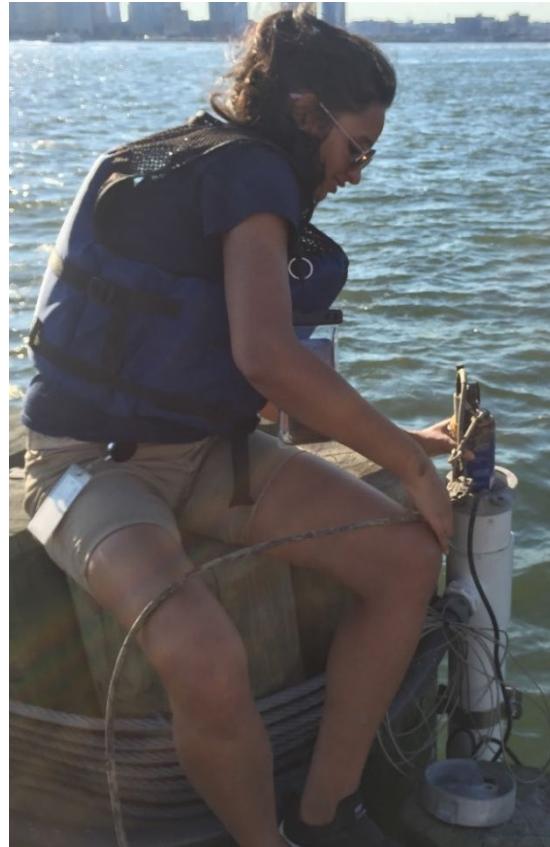


Figure 55: The Park's River Project staff conducts maintenance on the Pier 25 HRECOS station.

predates the Park, and the Trust does not control that infrastructure. The environmental community has long recognized CSOs as one of the most pressing issues to address as New York continues its progress toward achieving cleaner waters, yet it also happens to be one of the costliest and most difficult to fix.

In 2018, the Park partnered with the EPA and Interstate Environmental Commission to conduct high density water sampling at several interpier locations within the Sanctuary. This pilot project sampled at both surface and bottom locations along multiple transects running from the bulkhead to the channel to study the distribution of pathogens in the tidal estuary. The study showed variation between the sites as well as between top and bottom samples in near shore areas, suggesting that additional high density pathogen research is needed. As part of the 2021–2030 Action Agenda, the Trust aspires to build from this pilot project to further understand pathogenic bacteria distribution in the Sanctuary to inform mitigation strategies and public decision-making by involved agencies.



Figure 56: The Park's River Project staff reads pathogen results from incubated water samples dispersed in an IDEXX Qaunti-Tray using ultraviolet light.

community volunteers occurs at six unique water access points: Pier 26, Pier 40, Gansevoort Peninsula, Pier 66, Pier 84 and Pier 96. In 2020, the Park's River Project began directly processing and analyzing collected samples as part of its commitment to sustain the original River Project's research efforts. Moving forward, the Park will continue to develop monitoring projects to track pathogens within the Sanctuary, leverage community scientists and partner with governmental agencies to mitigate CSO and municipal separate storm sewer system (MS4) impacts, and advocate for the Sanctuary to be a priority location for trialing solutions that can mitigate CSO's harmful effects.

Beginning in 2013, volunteers from the New York City Water Trail Association established a Citizen's Water Quality Testing Program, with support from The River Project. A coalition of small boaters concerned about CSO discharges collected water samples and The River Project analyzed the samples for the presence of harmful bacteria levels. By 2019, the program had grown to include over 70 locations around New York City where community scientists collect water samples for analysis. Within the Sanctuary, sampling by Park staff, boathouse tenants and

PLASTIC POLLUTION

Scientists around the world are seeking to better understand the scale and impacts of plastics in global waters. In 2016, Hudson River Park began collaborating with Brooklyn College to survey the concentration of microplastics, plastics smaller than 5mm, within the Sanctuary to provide a baseline understanding of the presence, distribution and significance of microplastics locally. Park staff collects samples at two channel and two near-shore locations, and then processes the samples to remove non-plastic materials. Samples are then counted and sorted based on plastic type (fragments, foam, line, pellet, film and nurdles) using microscopes, with the data from 2016-2019 published in the Marine Pollution Bulletin scientific journal.

As expected, this study has demonstrated that microplastics are present in the Hudson River in high abundance, with the majority of samples containing hundreds of pieces of microplastics, and some with as many as 6,000 microplastic pieces. In 2018, the study found an average concentration of 830,762 microplastics per km² within the Sanctuary; which is three times greater than the 2016 amount and six times greater than in 2017.² Additional research is needed to understand how hydrological conditions impact microplastic distribution and the impact it has on wildlife in the estuarine environment.



Figure 57: River Project staff rinsing microplastics into a sample container.

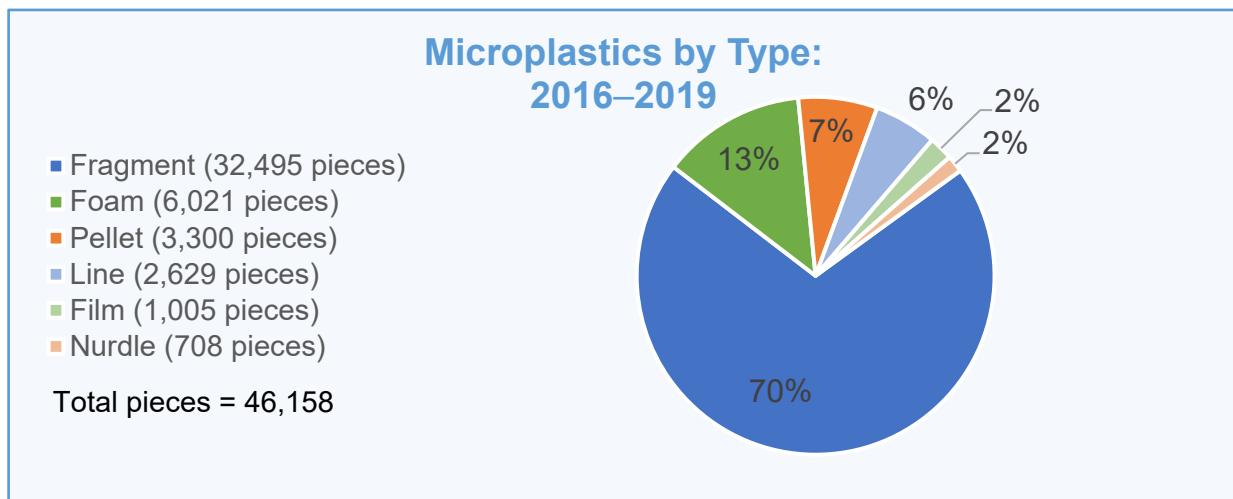


Figure 58: Results of monthly sampling between June–October from 2016–2019 at four Park sites. Seventy-two (72) samples were collected in total; for more information, visit the Park's [website](#).

² In 2020, Hudson River Park Trust's work on microplastics was published in the Marine Pollution Bulletin, an international peer-reviewed journal for marine environmental scientists, engineers, administrators, politicians and lawyers.

Hudson River Park also conducts surveys on macroplastics, plastics larger than one inch, in tandem with shoreline cleanups at the Gansevoort Peninsula and Pier 76. Since 2013, community scientists and other Park volunteers have partnered to collect and categorize macroplastics at those areas. In 2019, the Park removed 4,121 pieces of macroplastics weighing 555 pounds from Gansevoort Peninsula and Pier 76 combined and engaged 100 volunteers in river stewardship in the process. The Trust reports data from this litter removal and plastics research project to NOAA's Marine Debris Program.

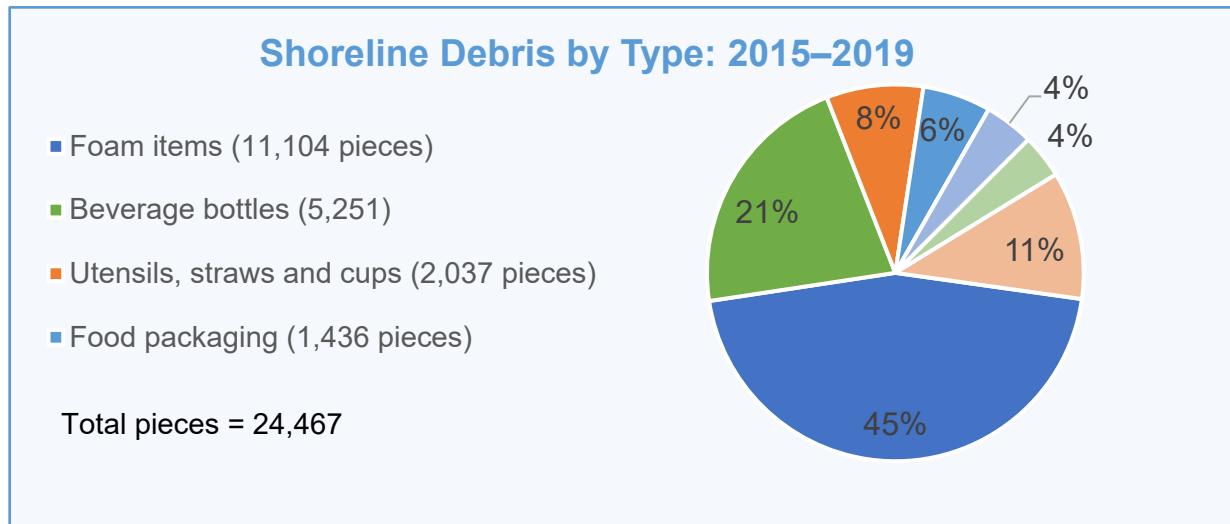


Figure 59: Chart shows results of debris removals from 41 days of shoreline clean-ups conducted at the Gansevoort Peninsula and south of Pier 76 between 2015–2019. For more information, visit the Park's [website](#).



Figure 60: The Park's River Project staff and volunteers from the Whitney Museum of American Art point to bags of plastic pollution removed from Gansevoort Peninsula after a shoreline cleanup.

OYSTER RESEARCH & RESTORATION

In recognition of oysters' astonishing ability to filter water, create habitat and support resiliency goals, former Governor Cuomo has made oyster restoration a signature component of his statewide Restore Mother Nature initiative, an aggressive effort to restock and restore aquatic habitats throughout the State, while also promoting research, education and resiliency.



Figure 61: Former Governor Cuomo announcing Restore Mother Nature while placing an oyster gabion in the Park's Sanctuary.

Restore Mother Nature was announced in September 2019 when former Governor Cuomo deployed a gabion filled with thousands of juvenile shellfish, provided by the Billion Oyster Project (BOP), in the Sanctuary and announced \$1.5 million in capital funding to enhance habitat in the area between Pier 26 and Pier 34. Subsequently, the Trust worked with NYSDEC and its TAC to design an enhancement project that will deploy reef balls, gabions, oyster wraps and textured pile encasements to create new habitat corridors between piers and provide habitat for oysters and finfish under this initiative. The project will be installed in the Park's Sanctuary waters in summer 2021.

The Sanctuary is already the largest site for student-monitored oyster cages in New York City thanks to collaborations with BOP, among others. Teachers, students and the community help to maintain and monitor 24 BOP Oyster Research Stations at a variety of piers. This BOP project welcomes schools and students to be community scientists as they study the growth of oysters over time and track local recruitment of sessile and mobile species.

In addition, in 2017, the Trust began piloting a new restoration technique in the Pier 32 pile field to study oyster growth and recruitment. This project suspends oysters from wooden piles in marine-grade aquaculture mesh bags and then monitors oyster mortality, growth and recruitment of juvenile oysters and other marine organisms. Students and members of the public support the monitoring effort through programs like Community Eco-Paddle. In 2018 and 2019, oysters at Pier 32 significantly increased in both weight and length on average. Beyond demonstrating that the oyster wraps provide good, affordable habitat for juvenile oysters, fish and invertebrates, participant surveys show that the Pier 32 Community Oyster Project has had a positive impact on River knowledge and attitudes. Oyster wraps have been folded into the overall Tribeca Habitat Enhancement Project now that the pilot phase has concluded.



Figure 62: River Project staff installs an oyster wrap at Pier 32.

BIG OYSTERS & EPIBENTHIC PIER SURVEYS



The Trust strives to be nimble so that it can learn more about Sanctuary habitat and take advantage of opportunities as they emerge to advance Sanctuary science. For example, in 2018, during the repair process for floating docks at Pier 25, staff discovered an abundance of wild oysters of impressive size living beneath the docks. A few weeks later, a diver maintaining Pier 40's piles found and collected an oyster that measured 22 centimeters (more than 8 inches). This oyster became an instant New York City celebrity because it was the largest wild oyster seen in the New York City Harbor in over a century. Its presence was all the more remarkable because at 15 acres, Pier 40 is both the largest Park pier and is supported by steel piles, which were previously assumed to support little to no biodiversity.

The discovery prompted the Trust to initiate a biological survey of five distinct piers distributed throughout the Park's length using a methodology designed by scientific partners at New Jersey City University with Trust staff. The Trust asked its contracted divers to use a Clearwater box—a videography tool that increases visibility in turbid systems—to video selected piles at piers and pile fields constructed of different substrate materials and with varying ages. The videos were analyzed for species composition and richness to understand settlement patterns on varying forms of Park pile infrastructure.

FISH SURVEYS

Many fish species use Sanctuary waters for food, protection and as breeding grounds. Historically, fishes in the Park have been surveyed through the Big City Fishing catch-and-release program during approximately five to six months each year. Through this program, staff manually track data on fish species, size, location and date. This survey helps inform understanding of fish diversity and abundance at four Park locations. Bluefish, striped bass, oyster toadfish, white perch and American eel have consistently remained the species caught at the highest rates. Since 2019, this data has expanded to include surveying fishes through trapping and continuing a longitudinal study that began in the 1980s by the original River Project. By tracking fish diversity over time, and pairing this data with information received from HRECOS, the Trust can consider how seasonal changes, longitudinal River conditions or major weather events affect local

THE RIVER PROJECT FISH ECOLOGY SURVEY



For over 30 years, the original River Project monitored the abundance and diversity of fishes in the Tribeca waterfront. Begun at Pier 26 with minnow and crab traps deployed around the perimeter of the then derelict pier, and later moved to the historic *LILAC* lighthouse tender at Pier 25, this fish survey constitutes the longest ongoing surveillance of fish biodiversity in the Lower Hudson River Estuary.

Over 12,500 fishes from a total of 52 different species have been observed through this enormous effort. All fishes caught in the survey are measured and recorded to produce robust data on the biodiversity of the Lower Hudson River Estuary and Sanctuary. The Park is committed to continuing these surveys.

fishes. The data is also helpful for spotting emerging trends for population dynamics within specific species and for the community at large.

In 2018, the Park began an exciting collaboration with Cold Spring Harbor Laboratory to expand its Sanctuary fish survey program to include an environmental DNA (eDNA) research project. Twice each month, Park staff and student science partners collect water samples from multiple pier locations and then extract and sequence fish DNA. Species are identified by amplifying short “barcode regions”—DNA sequences from variable regions of genomes that are unique to each species—and using next-generation sequencing to determine the presence of specific Hudson River fish DNA.



Figure 63: The Park’s River Project staff and community scientist filter sampled River water to collect DNA, which will then be sequenced to learn about fish presence and diversity.

Although there is mounting evidence that eDNA is a useful tool for the assessment of fish in marine environments, it is still unclear how sensitive the method is, how far DNA moves within the water and how long DNA persists after being shed from fish. For these reasons, traditional sampling will also continue. However, based on the results to date, it seems clear that eDNA sampling has immense potential to be an affordable and effective tool for deepening understanding of fish population dynamics.

Biological data on species richness and abundance is necessary for achieving a fuller understanding of the ecological health of the Sanctuary, and for the entire Hudson River Estuarine system as well. Aside from increasing baseline knowledge, such data will inform habitat enhancement, policy and management decisions regarding the Sanctuary.

SCIENTIFIC PARTNERSHIPS

Part of the Park's responsibility as a steward for the Sanctuary is to facilitate opportunities for scientists to access it. The Park's River Project staff proactively reaches out to researchers engaged in relevant fields of study to invite their participation in Sanctuary research. In addition, staff members have worked successfully with scientists to secure grants that staff uses to lower costs or otherwise ease project implementation. The Park's partnerships with Brooklyn College and Cold Spring Harbor Lab are two prime examples of these successes. Most recently, the Trust, in partnership with Hunter College and Killer Snails, was awarded a National Institute of Health grant to continue research and education on oysters within the Sanctuary.



Figure 64: River Project team with partners from the Interstate Environmental Commission after collecting water samples to study pathogen levels within the Sanctuary.



Figure 65: The Park's River Project staff, Brooklyn College students and a high school intern walk to the boat with microplastic trawling gear, prepared for a day of sampling.

HABITAT ENHANCEMENT

While the Sanctuary has always informed park planning, the design processes for several recent projects have been particularly focused on and inspired by the River environment. Pier 26, the Tribeca Habitat Enhancement Project and eventually the adjacent Estuarium will create a centerpiece for ecology in Tribeca. Pier 26's Tide Deck was populated with wetland, rock and tide pool features to offer habitat for wildlife, including marine birds, oysters and other shellfish.



Figure 66: The Park's River Project staff measure transects for salt marsh grass monitoring on the Pier 26 Tide Deck.

Gansevoort Peninsula's design for its 5.5 acre site includes the creation of a salt marsh and oyster habitat on its northern edge. The construction of this pier began in 2021 and will expand habitat enhancements within the Park. In the future, the upland area south of Pier 76 will include a habitat-enhancing beach. The Park is also exploring a variety of techniques to restore mollusks to the Sanctuary. All of these projects have the potential to help diversify local habitat and encourage the recruitment of intertidal species.

While the projects and initiatives described above are helping scientists and ecologists gain a better understanding of baseline conditions in the Sanctuary, it is indisputable that there is still much more to be done. As such, the Trust has set forth an ambitious research and habitat enhancement Action Agenda to inform Trust staff and its partners in the coming decade.



Figure 67: A Hudson River Park community scientist measures the length of a tagged oyster.

SANCTUARY FUNDING

Funding related to Hudson River Park's Estuarine Sanctuary is inextricably linked to the entirety of Hudson River Park. For this reason, it is not possible to segregate the costs of building and caring for the overall Park from the costs specific to the Sanctuary. Nevertheless, certain costs are clearly more directly related to the Sanctuary's planning, care and operations than others, and the Action Agenda highlights such costs where possible.



Figure 68: The Tribeca Boardwalk provides an elevated view of the Sanctuary waters while walking alongside native grasses, flowers and trees.

FUNDING CONTEXT

As of March 31, 2020, approximately \$749.8 million has been expended on new park construction, equipment and for capital maintenance. With the recent openings of Pier 26 and Little Island on Pier 55, and with the start of construction at both the Gansevoort Peninsula and Pier 97, the Park has recently taken giant steps forward towards completion. The status of Park build-out as of February 1, 2021 is detailed in the Trust's annual Financing Plan which is found on the Park's website www.hudsonriverpark.org. Audited financial statements and other financial information are also available on the website.



Figure 69: Park visitors enjoying Sanctuary views at the western end of Pier 25.

Capital funds associated with new park construction have been provided primarily by the State and the City, with supplemental monies received from the Federal government, private foundation sources and allocations of air rights transaction proceeds. In addition, the Trust has received restricted funding as a beneficiary in connection with certain litigation and administrative settlement agreements.

The Act states that, to the extent practicable and consistent with the public interest and limitations placed on commercial activity, the costs of the operation and maintenance of the Park should be paid by revenues generated from within the Park. From its founding to the present day, the Trust has not received funds to support direct operating and

maintenance costs from either the City or the State.

The Trust publishes its annual budget, independent annual audit, annual Financing Plan, quarterly financial reports, Board agendas and minutes, Board resolutions and other information on its website: hudsonriverpark.org.

As detailed in the Park's annual adopted budgets, operating revenue is generated within the Park from lease and other occupancy agreements, parking, user fees and sponsorships. Total operating revenue in fiscal year 2020 was \$32.2 million. Due primarily to the economic impact of COVID-19, operating revenue in FY21 is projected to be significantly reduced to approximately \$22.6 million. For FY22, which began on March 1, 2021, operating revenue is budgeted at \$24.8 million.

In the year prior to COVID-19 (FY20), approximately 70% of operating revenue, or \$22.4 million, was derived from leases and other occupancy agreements; 24%, or \$7.7 million, came from Pier 40 parking charges (net of local and state taxes); and 7%, or \$2.1 million, was from user fees and other revenue sources. Separately, the Trust receives contributions from Hudson River Park Friends (HRPF), interest income, foundation support and private contributions and grants. The Trust uses this income to pay for all Trust staff, park security, insurance, horticulture, routine grounds and facilities maintenance, and public and environmental programming and related initiatives.

Operating expenses in FY20 including all salaries, utilities, maintenance, insurance, security etc., net of reimbursement revenue but excluding capital maintenance, totaled \$20.8 million. Operating expenses in FY21 are projected to be relatively flat compared to the prior fiscal year at \$20.9 million. For FY22, the Trust's operating cost is budgeted at \$25.3 million, as the physical area of the Park has grown since FY20 and in-person activities are resuming. Thus, the operating surplus dedicated to capital maintenance that was generated in FY 20 will likely not be available in FY 21 or FY 22. This is largely because the amount of available funding remains reduced as businesses that pay rent and fees to the Park continue to recover from the economic impact of COVID-19.

Capital maintenance is a cost category that was not fully considered when the Act was passed. It includes repair and replacement of heavily-used, physical park elements that reach the ends of their intended design lives, or that simply break. Examples include renovations and replacements to docks, repairs to existing piers and pavement, and replacements and upgrades to mechanical systems in boathouses, public restrooms and other park structures. In addition, the Trust has also had to make significant unanticipated investments related to stabilizing legacy assets inherited in poor condition when the Park was created, such as to the historic Morton Street Bulkhead, and jacketing the 3,600 piles that support Pier 40. Capital maintenance can also include costs associated with addressing damage caused by natural disasters or other unforeseeable incidents. The Park uses the surplus of operating income in excess of operating expenses whenever possible to support capital maintenance, but this approach is insufficient for many types of repairs and there is still no long-term solution to this issue.

As a public entity, the Trust is subject to a variety of restrictions related to the sources of funding, public procurement and other requirements. For example, funding from New York State or New York City designated as capital funding cannot be used for operating costs. In the context of the Sanctuary, this means that most research, programming, many demonstration projects, staffing and other desired objectives cannot be funded with State, City or federal capital construction funds. Similarly, operating budgets are limited primarily by the amount of revenue that can be generated in any given year.



Figure 70: A multitude of passive and recreational uses can be observed in the Clinton Cove section of the Park.



Figure 71: An aerial view of Pier 57 in the Meatpacking District looking south.

BUDGET ESTIMATES & PROJECTIONS

As noted above, it is not possible to segregate the costs of building and caring for the overall Park from the costs of the Sanctuary, given that creating and sustaining access to the River is a core principle of both the Act and ESMP. Staff across the entire Trust perform critical activities needed to advance construction and maintain piers and adjacent landscapes. Insurance, security and sanitation services are also essential underlying costs that cannot be segregated between the Park and the Sanctuary. Nevertheless, certain costs are clearly directly associated with the Sanctuary.



Figure 72: Hudson River Park staff tend to the gardens and lawns east of the waterfront esplanade that create permeable surfaces once occupied by hardscape.

EDUCATION & SCIENCE STAFF

The Trust currently employs five full-time staff members in the River Project department, as well as four part-time staff. The Department has more than doubled since 2012, which reflects the Trust's continuing commitment to high quality environmental education as well as the significant growth in marine research, stewardship and restoration projects. As further described in the Action Agenda, the number of full-time

staff is expected to grow as the Pier 57 and Estuarium facilities come online in the coming few years.

RESTORATION & ENHANCEMENT PROJECTS



Figure 73: The Park's River Project team monitoring fish populations using minnow traps and crab pots.

enhancements or research in this area. The recently completed Pier 26 Tide Deck cost approximately \$10 million, and the habitat features at the Gansevoort Peninsula including the salt marsh are expected to cost approximately \$12 million.

RESEARCH PROJECTS

The Trust has also invested increasingly in the advancement of environmental science and habitat enhancement research projects in the Park. Operational funds now support original research projects and expanded staffing, including the positions of Aquaria & Research Coordinator and two Field Science Coordinators. In addition to staffing commitments, the Trust has secured ongoing funding and in-kind or grant funding contributions to enable research and monitoring projects to continue. Currently funded projects include a three year microplastic survey, a study to report on the colonization of piles within the Park, an environmental DNA fish survey and ongoing continuous monitoring of HRECOS stations.

The Trust has provided cost estimates for restoration and enhancement projects and for other capital construction projects associated directly with the Sanctuary (such as the Gansevoort habitat enhancements and Estuarium) in the Action Agenda where feasible. Currently, the salt marsh at the Gansevoort Peninsula is under construction, and the Trust has reserved \$2million for implementation of the Tribeca Habitat Enhancement Project along with another \$1 million for scientific monitoring and other



Figure 74: At low tide on the Pier 26 Tide Deck, numerous tide pools and smooth cordgrass, *Spartina alterniflora*, emerge for onlookers to observe.

PART 3: 2021–2030 ACTION AGENDA

INTRODUCTION

Hudson River Park's ESMP Action Agenda sets forth a management framework that will guide the Trust and its partners over the next decade as progress continues on the collective goals of protecting and conserving estuarine ecology and habitat, facilitating physical and visual public access to the river and fostering environmental awareness and public education about this vital natural resource.

The Action Agenda is organized into three management areas: (1) Environmental Education; (2) Research & Habitat Enhancement; and (3) Public Access & Resource Management. Within each management area, the Trust has identified projects that would advance the enumerated goals. While the individual projects reflect current thinking, it is likely that over the course of the nine-year Action Agenda period, specific projects may change or evolve due to new information, technologies and opportunities. Thus, the Action Agenda should be understood as a living document designed to inspire and drive progress toward Sanctuary goals while also being flexible enough to take advantage of new opportunities when warranted. Similarly, while the project status/funding column shows the Trust's best current projections for project implementation time horizons and funding availability, the nature of City, State and the Trust's annual budgeting processes necessitates awareness that these too could change.

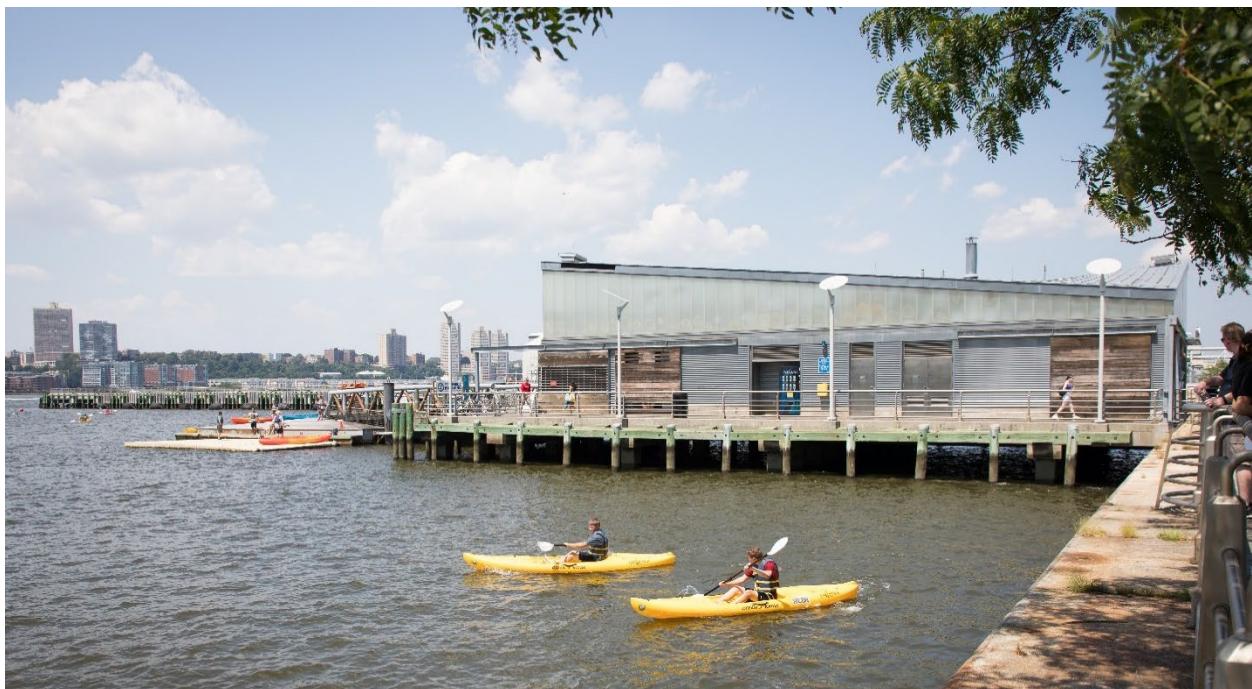


Figure 75: Kayakers paddle near Pier 96 in the Park's Sanctuary waters.

While the ESMP serves as an essential management resource for the Trust and its partners, it is important to remember that the Sanctuary waters are only a small fraction of the Hudson River, the New York Harbor and the surrounding watershed. Thus, the wildlife and water within the Sanctuary are clearly affected by decisions impacting these larger water bodies as well. For this reason, the Trust has attempted where possible to coordinate ESMP goals with those identified in broader regional plans. Appendix G summarizes how the ESMP and these regional plans reflect and reinforce shared goals.

The original 2002 ESMP Base Plan, available on the Trust's website, remains a useful planning tool in that it sets forth the historic, environmental and regulatory context for the Sanctuary. With a few notable exceptions noted herein, the 2021–2030 Action Agenda builds upon but does not replace the original 2002 ESMP Base Plan in these respects.

Specifically, the current Action Agenda consolidates the four original management areas from the 2002 ESMP Base Plan (Public Access and Recreation, Education, Resource Protection and Research) into three areas in response to input from the Technical Advisory Committee (TAC). Specifically, Resource Protection and Research have been consolidated into one new area referred to as Research and Habitat Enhancement. Additionally, the timeframe for the current Action Agenda of 2021–2030 has been extended to create better alignment with regional action plans like the NY/NJ Harbor and Estuary Program Action Agenda and the NYSDEC Estuary Program Action Agenda and to reflect the longer horizon periods needed to implement the majority of the projects. The Trust has committed to an annual review of progress toward defined goals and actions in conjunction with its TAC and Board.

OUR TECHNICAL ADVISORY COMMITTEE

The 2002 ESMP established the need for a Technical Advisory Committee (TAC) to advise and assist the Trust to achieve the ESMP Action Agenda goals and objectives. Original TAC members were named in 2002 by Trust staff in consultation with NYSDEC and the Hudson River Park Advisory Council. This group met periodically for several years after the publication of the 2002 ESMP. Thereafter, Trust staff engaged with individual TAC members on an as needed basis until the Trust reconvened the entire TAC in 2017 to commence drafting of the 2021–2030 Action Agenda.

A dedicated and well informed committee of advisors has been a key driver in the effort to set focused yet ambitious Sanctuary goals that will guide successful implementation of the Action Agenda. TAC members have a demonstrated commitment to the Hudson River Park Estuarine Sanctuary and hold expertise in one or more of the three management areas: Public Access and Resource Management, Environmental Education and Research and Habitat Enhancement. Appointments to the TAC are advisory and voluntary and may change as needed at the discretion of the Trust. A list of TAC members is attached as Appendix A. In addition, several organizations that serve on the TAC are also on the Trust's Advisory Council, a statutorily created body

that includes elected officials representing the Park area as well as representatives of local community, park, environmental, civic, labor and business organizations.

In Summer 2017, as the process for updating the ESMP was commencing, the Trust formally reconvened the TAC and the first meeting of the full TAC regarding the drafting of the 2021–2030 Action Agenda was held in June 2017. Thereafter, Trust staff worked with TAC subcommittees to craft goals and actions in each of these three management areas. TAC subcommittee members have been invaluable in helping to push for goals that are simultaneously clear, aspirational and actionable. As an example, the Research and Habitat Enhancement subcommittee has invested much time and effort into identifying areas where research and enhancement are most needed as well as helping shape the Trust's current Tribeca Habitat Enhancement Project. The resulting goals established through these discussions serve as a critical foundation for the Trust to make significant and meaningful advancements in this area in the coming decade.

The full TAC was reconvened in December 2019 and again in January 2021 to review Action Agenda drafts, Water Use Map updates and the role of the TAC moving forward. The Trust is grateful to all members of the TAC for their enormous enthusiasm for and contributions to the drafting of the 2021–2030 Action Agenda.



Figure 76: The Park's River Project staff monitors oysters with students and members of the public during educational programs.

Ongoing roles and responsibilities of TAC members include advising and assisting the Trust with the implementation of the 2021–2030 Action Agenda. Such implementation assistance could include contribution of technical expertise, active collaboration or partnership in implementing particular actions, or contribution of funding, staffing, or other resources. TAC members will also be called upon to provide advice on future revisions and updates to this Action Agenda. Following the Trust’s adoption of the 2021–2030 Action Agenda, the Trust will convene a full meeting of the TAC at least once a year, as described in more detail in the section immediately following. In addition, the Trust may call upon individual members or subcommittees periodically, as needed, to consult and collaborate on specific projects.

SANCTUARY RESEARCH AND HABITAT ENHANCEMENT MEETING

As outlined in the Action Agenda, Sanctuary research and habitat enhancement is the management area where the Trust anticipates the most growth over the coming decade. As outlined in that section of the Action Agenda, sanctuary research and habitat enhancement projects must be done in a manner that is adaptive and responsive to relevant scientific data and research. Accordingly, the Trust will convene an annual meeting of scientists and stewards, including members of the TAC and outside experts, for the purpose of reviewing relevant data and research findings from the Park and comparable waterways to inform continuing Sanctuary decision-making and to expand awareness of the Sanctuary within the science community. Information from this meeting and continuing TAC discussions will help inform future scientific and enhancement projects and priorities. Once identified, that the Trust can create preliminary budgets for enhancement projects and can work with its partners to seek funding for such initiatives.

ACTION AGENDA ANNUAL REVIEW

The Action Agenda should remain a meaningful, well-utilized document for years to come. Toward this end, the Trust will convene an annual meeting of the full TAC for the purposes of: 1) sharing and reviewing progress toward accomplishing Action Agenda goals in the preceding year; and 2) identifying and discussing Action Agenda priorities and funding targets and opportunities for accomplishing Action Agenda goals for the coming year. A report on annual progress, priorities and Sanctuary funding opportunities will be made available to the Trust’s Board of Directors and Advisory Council.

ENVIRONMENTAL EDUCATION

OVERVIEW

Environmental education within the Park leverages the Hudson River as both the setting and inspiration for increasing the public's understanding of and connection to the Sanctuary. Over the last two decades, Hudson River Park has prioritized environmental education as a core element of its work, and each year has continued to grow the breadth and depth of programs it offers.

For each of the past five years,¹ the Park has served at least 25,000 people annually through free and low-cost, place-based programs that reach an impressive range of New Yorkers across the demographic spectrum. Whether geared for school children or the general public, programs emphasize experiential, hands-on learning that engages the senses and brings the Hudson River to life.

Over the next decade, the Trust seeks to build upon these successes in environmental education and participatory science. Creatively designed, dedicated indoor educational spaces at Pier 57 and the Estuarium will broaden the impact and reach of Park programming, in particular during the colder weather months. At the Estuarium, live Hudson River animals and "wet" classrooms will bring the Sanctuary to life with discovery-driven exhibition spaces infused with water, while at Pier 57, technology-fueled visual interactions will enhance learning experiences by making river science and history more accessible and dynamic.

Expanding the number and range of environmental education facilities will require more staff. The Trust's recent strategic alliance with The River Project, a nonprofit marine research and education center that operated independently within the Park for the past 30 years, resulted in a Trust commitment to increase the size of its science and education staff, and the Trust envisions hiring additional full-time education staff in the future to staff new educational facilities assuming budget is available. Strategic partnerships with other educational, environmental and cultural organizations and government agencies will also remain necessary as the Trust seeks to achieve the vision and results articulated in this Action Agenda.



Figure 77: The Park's River Project staff introducing students to native estuary wildlife.

¹ The COVID pandemic has affected many Park activities. Throughout this document, references to attendance at Park programs generally exclude 2020 unless specifically noted.

In recent years, the Trust has built academic collaborations with such institutions as City University of New York and Columbia University, which have provided funding for paid summer research internship opportunities and job training within the Sanctuary for 25 students since 2018. Given its location within a highly socioeconomically diverse city, the Trust will continue to expand these efforts to attract and serve communities historically underrepresented in STEM fields.

In 2020, the challenges created by the COVID pandemic prompted the Trust to create digital programming that could be experienced remotely. While born from crisis, such programming helped reach new audiences, demonstrating that the Trust should continue investing in such initiatives moving forward.

Overall, the Environmental Education Action Agenda seeks to continue spurring the Trust and its many partners to strengthen and expand the culture of river stewardship and sustainability, and to encourage decision-makers, program partners and residents to reimagine a more river-centric city. The Park remains committed to ensuring that Sanctuary education is participatory, accessible and inspirational for years to come.



Figure 78: The Park's River Project staff teaching a summer camp group about water quality and river ecology.

ACTION AGENDA: ENVIRONMENTAL EDUCATION

VISION STATEMENT

To increase knowledge of the Estuarine Sanctuary and foster dedication to the Hudson River by expanding and improving environmental education in the Park, New York City and the region.

In highly urbanized locations like New York City, parks offer invaluable opportunities to connect with nature and to learn about the environment. Environmental education helps students and members of the public gain a deeper connection to our natural world and an applied understanding of how people affect it. By providing the general public with reliable information about their local environments, parks like Hudson River Park serve an important role in filling the STEM gap in today's education system. Through enriching curricula, discovery-based programming, hands-on volunteering and job training for tomorrow's STEM leaders, Hudson River Park should continue fostering awareness of the Sanctuary and inspiring stewardship to protect it for the future.

Goal 1: Use the Sanctuary as the inspiration and setting for high quality environmental education programs and resources that serve the broadest spectrum of Park audiences.

ACTIONS	PROJECTS	STATUS / FUNDING ¹
1.1 Enrich NYC K-12 education with hands-on, place-based programs that draw from the Sanctuary's ecology and history to inspire curiosity and engagement.	A) Offer an adaptable STEM curriculum focused on the Sanctuary and informed by scientific research, current education standards and creative learning tools.	Ongoing Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.
	B) Provide training workshops for NYC Department of Education teachers and other educators interested in incorporating the Hudson River Estuary curriculum into their classrooms.	Ongoing Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.

1.1 Cont'd	C) Integrate additional relevant themes including climate change and environmental justice into education programs.	<p>In Progress</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
<p>1.2 Leverage the Park's prominent setting and high visitorship to broaden public awareness of the Sanctuary's ecological value.</p>	A) Showcase Sanctuary wildlife through programming, technology and dedicated aquaria facilities to engage diverse audiences.	<p>Ongoing; Estuarium is a Long Term project</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budgets. Some HRPT budget growth assumed for staffing new facilities. Additional capital funding also required.</p>
	B) Conduct Sanctuary-focused drop-in programs throughout the Park that attract and engage visitors across a wide range of demographics.	<p>Ongoing</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
	C) Host events that bring environmental, educational and waterfront partners together to increase public knowledge of the Sanctuary and greater Hudson River Estuary.	<p>Ongoing</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>

1.2 Cont'd	<p>D) Support and contribute to a local and regional network for harbor educators to collaborate, share resources and provide relevant trainings.</p>	<p>In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
	<p>E) Ensure that Park policies and practices enable partners and other experts to conduct educational programming in the Park.</p>	<p>In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
1.3 Foster self-guided education in the Park and extend Sanctuary learning beyond Park boundaries.	<p>A) Develop enriching digital resources, exhibits and interpretives that inspire self-guided exploration of Park ecology, history and climate change.</p>	<p>In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget. Grants and/or partnerships required for larger scale projects.</p>
	<p>B) Create educator resources that enhance in-school learning and extend Sanctuary education beyond the Park's boundaries.</p>	<p>Near Term Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
	<p>C) Develop and maintain a robust, accessible environmental learning hub on the Park's website to broaden programmatic and content reach</p>	<p>Near Term Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>

<p>1.4</p> <p>Ensure that Park programs are widely accessible to historically underserved populations.</p>	<p>A) Continue targeted outreach to ensure and grow participation from NYC Title I Schools and summer camps educating underserved communities.</p>	<p>Ongoing Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
	<p>B) Increase outreach and enhance services and materials available for English as a New Language (ENL) students and non-English speakers by translating lessons.</p>	<p>Near Term Additional funding, grants or pro bono collaboration required.</p>
	<p>C) Maintain a need-based fee waiver policy to provide financial support for school and camp groups to attend field trip programs in the Park.</p>	<p>Ongoing Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
	<p>D) Provide administrative support and resources for groups traveling to Hudson River Park for educational programming.</p>	<p>Ongoing Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
<p>1.5</p> <p>Regularly evaluate Park program content and impact to ensure quality and reach of program offerings.</p>	<p>E) Evaluate student understanding of lessons and track audience demographics where feasible to measure reach and effectiveness of educational initiatives.</p>	<p>Ongoing Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
	<p>F) Periodically assess Park user attitudes and changes in behavior toward Sanctuary health and stewardship.</p>	<p>Ongoing; Other projects to be prioritized for Near Term and Long Term Continued funding for staff and normal</p>

1.5 Cont'd		operating expenses assumed through HRPT's annual operating budgets. Other projects unfunded and to be determined based on scale, methods and timing.
	G) Ensure programming metrics are publicly accessible through the Park's website.	In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.

Goal 2: Expand Park educational venues to increase the range and reach of both spontaneous and structured learning opportunities.

ACTIONS	PROJECTS	STATUS / FUNDING ¹
2.1 Enhance current Park features and facilities to bolster learning opportunities and enrich visitor experiences.	A) Install enriching interpretative signage and other creative elements within the Park to facilitate self-guided education about the Estuary's history, ecology and changing climate.	In Progress First phase of interpretive signage recently completed. HRPT will seek grants or other funding for additional projects.
	B) Integrate native Hudson River wildlife exhibits into existing Park facilities such as the Pier 40 Wetlab.	In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.

2.1 Cont'd	<p>C) Continue leveraging the Park's landscape including the Habitat Garden and Pier 26 as outdoor classrooms to educate about the significance of native plants, birds, insects, marine life and composting.</p> <p>D) Identify and support opportunities for historic and educational vessels to berth and conduct educational programming in the Park.</p>	<p>Ongoing Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p> <p>In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget and through partnering historic and scientific vessels and collaborators.</p>
2.2 Work with the Park's design teams and partners to plan and create new educational spaces that host organized student groups and encourage informal learning by the public.	<p>A) Identify educational content for an experiential public gallery and classroom at Pier 57 focused on the Sanctuary.</p> <p>B) Create site-specific programming and interpretives reflecting the Gansevoort Peninsula's history and salt marsh ecology.</p> <p>C) Curate aquaria, exhibits and content for the Pier 26 Estuarium.</p>	<p>In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget. Capital construction costs funded.</p> <p>Near Term Funded through capital budget for the Gansevoort Peninsula.</p> <p>Long Term HRPT has identified funding sources for nearly half of the estimated \$30 million cost of the Estuarium. Continued funding assumed in future HRPT operating budget for staff costs.</p>

2.2 Cont'd	D) Seek additional opportunities to incorporate educational elements within the Park.	Ongoing; Long Term Private fundraising in progress for the Sturgeon Science Playground adjacent to the Estuarium. HRPT will seek grants or other funding for additional projects.
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Goal 3: Foster community science and cultivate partnerships to empower current and future Hudson River stewards.

ACTIONS	PROJECTS	STATUS / FUNDING ¹
3.1 Prioritize initiatives that improve diversity, equity, inclusion and justice in STEM education to better support a more representative NYC environmental community.	A) Create and lead internship programs that provide mentorship and early exposure to environmental careers, focusing on serving communities historically underrepresented in STEM.	In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget. HRPT will seek grants or other funding for additional opportunities.
	B) Hire, retain and support a diverse staff seeking to become leaders in the STEM and sustainability fields.	In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.
	C) Provide career stepping stones within NYC's environmental field by coordinating job opportunities with local partners and STEM networks.	In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.

3.1 Cont'd	<p>D) Participate actively in networks that share resources and trainings on diversity, equity, inclusion and justice.</p>	<p>In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
3.2 Implement meaningful community science and volunteer projects to engage the public in authentic scientific research.	<p>E) Continue to promote internship opportunities that support college and graduate students focused on marine science, sustainability, climate science, education and other STEM fields.</p>	<p>In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
3.3 Develop partnerships with community and research institutions to promote knowledge of the Sanctuary and build stewardship.	<p>A) Where feasible, integrate opportunities for community science and volunteering within current and future estuary stewardship and monitoring.</p> <p>B) Ensure future ecological habitat enhancement projects include community science and volunteer programming.</p>	<p>Ongoing Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p> <p>In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>

3.3 Cont'd	C) Involve Park tenants in science and outreach to create an informed Park culture and community that supports Park and greater New York initiatives.	In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.
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Goal 4: Promote sustainability and offer programs that build positive environmental behaviors in the Park and beyond.

ACTIONS	PROJECTS	STATUS / FUNDING ¹
4.1 Facilitate Park-wide sustainability programs that increase community participation in initiatives that benefit the environment.	A) Develop and implement content and events to help the public learn about composting, plastic reduction and low waste behaviors.	In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.
	B) Provide volunteer opportunities for community members and students to participate in the Park's composting and plastic reduction efforts.	In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.
	C) Develop branding and messaging that advances public awareness of sustainability both within the Park and more broadly.	In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.
	D) Regularly evaluate the effectiveness of the Park's sustainability efforts through surveys and other tools that assess participant knowledge and behavior.	In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.

4.1 Cont'd	E) Work with city and state agencies to further sustainability goals.	Ongoing Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.
4.2 Build a Park culture of sustainability by educating and engaging Park staff and tenants in environmental behaviors.	A) Educate, train and empower Park staff and tenants to apply a sustainability lens to their work.	In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.
	B) Facilitate regular meetings to encourage consistent participation in Park sustainability initiatives and create a genuine culture of stewardship.	In Progress Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.

1 Project Status / Funding Key

Ongoing: Reflects established projects with a sustained commitment that are expected to continue on a comparable or expanded scale for the foreseeable future.

In Progress: Reflects projects where work is in the planning phase or has already begun but which are expected to expand or be completed within 1-3 years.

Near Term: Reflects projects expected to be implemented within 3-5 years.

Long Term: Reflects projects that require long lead times, involve multiple partners, require phased implementation and/or exceed current resources. For such projects, the Trust expects to demonstrate measurable progress, and in some cases, completion by 2030.

Funded: Unless otherwise indicated, funding "assumed through HRPT's annual operating budget" means that HRPT foresees comparable levels of staffing and operating expenses enabling project to continue. Projects that require additional or specific budget needs are noted. Actual amounts are subject to the HRPT budgeting process and Board of Directors review and approval.

RESEARCH & HABITAT ENHANCEMENT

OVERVIEW

In its first two decades, Hudson River Park has succeeded in creating access to the Hudson River and in offering a robust environmental education program that fosters both learning and stewardship. Now that completion of Hudson River Park's public piers and landscapes is in sight, the Trust has identified the Research & Habitat Enhancement management area of the ESMP as the one most requiring focused growth over the next decade.

A number of important projects in this realm are already under way: a salt marsh habitat planned for the Gansevoort Peninsula, a suite of in-water habitat enhancements for oysters and other marine species planned for the area between Pier 26 and Pier 34, and a robust monitoring program on the newly completed Pier 26 Tide Deck. Nevertheless, more is needed.

While there is consensus in the scientific community that the Sanctuary and its wildlife would benefit from additional enhancements to habitat, there is also consensus that there are many unknowns about the estuarine system and the most effective techniques for improving long term ecosystem health. Therefore, this 2021–2030 Action Agenda aims to establish the foundation for collecting and synthesizing biological and physical data about the Sanctuary and for piloting scalable habitat enhancements within Park waters that can become the basis for future restoration initiatives. For this reason, the Trust plans to integrate evaluation measures into all phased habitat enhancements to promote an adaptive approach for meeting habitat health outcomes. Expanded oyster, mussel and select finfish habitat enhancements are envisioned as key areas of ecological uplift. In this way, informed by science and in collaboration with the NYSDEC and other partners, the Trust foresees creating and monitoring habitat enhancements in varying environmental settings to promote research and understanding across the range of habitat zones.



Figure 79: Community scientist monitors oysters from the Park's Pier 32 Oyster research project.



Figure 80: Native Sanctuary fishes on display at Hudson River Park's River Project Wetlab.

Scientific research is another area targeted for expanded growth in the next decade. Over the last three years in particular, the Trust has initiated research projects that are informing increased understanding of baseline water quality conditions as well as fish utilization and health. However, the Trust recognizes that there is a need to conduct additional research with the ultimate goal of developing a comprehensive characterization of the Sanctuary's baseline biological and geophysical conditions. Such an understanding is needed to inform both short- and long-term decision-making that advances the biotic health of the Sanctuary.

The Trust should explore both park-wide and geographically targeted approaches to undertaking such studies. Given the extent of research projects that will be required (e.g., sediment characterization, benthic sampling and a range of biological surveys) as well as funding limitations, the Trust will likely need to explore incremental approaches to advancing research in the Sanctuary. The Trust will work with the NYSDEC, the TAC and other experts to identify and promote priorities and opportunities for advancing scientific understanding of the Sanctuary.

Hudson River Park's Manhattan location facilitates participation in Sanctuary research by scientific partners, educational institutions and the community at large. An important aspect of the Research & Habitat Enhancement Action Agenda is to leverage and involve this natural audience to assist with achieving Action Agenda goals and projects. Making data and research broadly available and creating science partnerships will help build meaningful data sets and maintain and evaluate habitat enhancement projects.

ACTION AGENDA: RESEARCH & HABITAT ENHANCEMENT

VISION STATEMENT

Improve the health and ecological vitality of the Estuarine Sanctuary by using science to inform adaptive management strategies and habitat enhancements.

Hudson River Park's Sanctuary waters are known to provide vital habitat for 85 species of fish, hundreds of benthic species and a large variety of marine birds, but there are numerous gaps in scientific knowledge regarding its ecological, physical and water quality features. Additional research is needed to fill these gaps and to inform best practices regarding design and operations with the potential to affect the Sanctuary. In the meantime, existing science should be used to create enhanced habitat areas that support greater biodiversity and improve ecosystem health. Hudson River Park's prominent location and broad audience should also be leveraged to promote scientific partnerships, disseminate data and build dialogue about scientific and ecological issues related to the Sanctuary.

Goal 1: Significantly increase knowledge of today's Estuarine Sanctuary baseline conditions and trends through continuous monitoring and targeted research of biological and geophysical conditions.

ACTION	PROJECTS	STATUS / FUNDING ¹
1.1 Characterize fish utilization of the Park's Sanctuary waters by surveying species abundance and diversity.	A) Monitor and report on fish presence and abundance through seasonal trapping and catch and release fishing.	Ongoing Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.
	B) Conduct trawl, seine, acoustic and/or gill net surveys of pelagic and bottom fishes in representative inter-pier nearshore areas.	In Progress for Tribeca area Funding secured for 5 years of studies associated with the Tribeca Habitat Enhancement Project. Procurement to commence in 2021.

1.1 Cont'd		<p>Additional projects and funding to be determined based on scale, methods, timing and partnerships.</p>
	<p>C) Investigate emerging methods for measuring fish presence and biodiversity including through deploying underwater cameras and environmental DNA.</p>	<p>In Progress Current eDNA studies funded through HRPT's annual operating budgets, grants and partnerships. Additional projects and funding to be determined based on scale, methods, timing and partnerships.</p>
	<p>D) Conduct survey of pelagic and bottom fishes in pile fields and under pier areas.</p>	<p>Long Term Projects and funding to be determined based on scale, methods, timing and partnerships.</p>
1.2 Characterize benthic habitat in the Sanctuary by surveying benthic biological community composition.	<p>A) Conduct representative benthic sampling surveys that build off of existing studies of the benthic invertebrate community composition.</p>	<p>In Progress for Tribeca area Baseline survey associated with Tribeca Habitat Enhancement Project commenced in 2020, and additional funding secured for ongoing research through 5 years following installation. Additional projects and funding to be determined based on scale, methods, timing and partnerships.</p>

<p>1.3</p> <p>Assess population levels, biodiversity and health of epibenthic organisms on hard substrates including the bulkhead, piles and other built structures.</p>	<p>A) Conduct a study that analyzes the species richness and abundance of colonizing organisms at representative pile locations.</p> <p>B) Pursue additional monitoring opportunities of hard substrates including piers, bulkheads and floating docks.</p> <p>C) Analyze the health, including reproduction and recruitment, of organisms that colonize built structures such as oysters and mussels.</p>	<p>In Progress</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p> <p>Long Term</p> <p>Projects and funding to be determined based on scale, methods, timing and partnerships.</p> <p>In Progress for Tribeca area</p> <p>Funding secured for the Tribeca Habitat Enhancement Project for 5 years following installation.</p> <p>Additional projects and funding to be determined based on scale, methods, timing and partnerships.</p>
<p>1.4</p> <p>Study and characterize the Sanctuary's physical environmental features including bathymetry, currents, sediment types, sediment transport and seasonal variations.</p>	<p>A) Conduct bathymetric surveys throughout the Sanctuary.</p>	<p>In Progress for projects listed below</p> <p>Pier 26 to Pier 34, Pier 97 and Gansevoort projects funded through HRPT capital budget.</p> <p>Additional projects and funding to be determined based on scale, methods, timing and partnerships.</p>

1.4 Cont'd	<p>B) Conduct bottom mapping surveys to characterize the Sanctuary's sediment and study geophysical conditions such as sediment movement, chemical properties and trends.</p>	<p>In Progress for Tribeca area</p> <p>Baseline work commenced for bottom mapping of sediment types for Tribeca Habitat Enhancement Project in 2020. Funding secured for ongoing research through 5 years following installation.</p> <p>Additional projects and funding to be determined based on scale, methods, timing and partnerships.</p>
1.5 Conduct continuous and long-term water quality monitoring to provide data on Sanctuary waters.	<p>C) Conduct targeted hydrodynamic studies to inform future habitat enhancements.</p>	<p>Long Term</p> <p>Projects and funding to be determined based on scale, methods, timing and partnerships.</p>
1.6 Collect and review data on indicators commonly associated with CSO and storm water discharges such as enterococcus and plastic pollution.	<p>A) Maintain weather and water quality monitoring station(s) to provide continuous quality-controlled data.</p>	<p>Ongoing</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budgets, NEIWPCC grants and HRECOS / NYSDEC and USGS partner operating budgets.</p> <p>Ongoing</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budgets and partner support including NYC Water Trail Association.</p> <p>Additional projects and funding to be determined based on scale, methods, timing and partnerships.</p>

1.6 Cont'd	<p>B) Conduct pathogen concentration study comparing conditions at various depths and distances from discharge sites.</p> <p>C) Study concentration and impacts of microplastics in Sanctuary waters.</p> <p>D) Conduct event-based pathogen sampling connected to wet weather events.</p>	<p>Long Term</p> <p>Projects and funding to be determined based on scale, methods, timing and partnerships.</p> <p>In Progress</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budgets.</p> <p>Near Term</p> <p>Projects and funding to be determined based on scale, methods, timing and partnerships.</p>
1.7 Survey birds, insects and land-based plants within the Park.	<p>A) Map Park trees and plants in GIS.</p> <p>B) Monitor and report on seasonal bird and insect populations, including through regular survey events.</p>	<p>Ongoing</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p> <p>In Progress</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
1.8 Collect and review data on common climate change indicators such as warming waters and rising sea levels.	<p>A) Use HRECOS and other long-term data sets to conduct trend analysis related to climate change and inform discussions on resiliency.</p>	<p>Long Term</p> <p>Projects and funding to be determined based on scale, methods, timing and partnerships.</p>

1.8 Cont'd	B) Track rising river levels and study its impacts through such assessments as bulkhead algae and colonizer distributions.	Long Term Projects and funding to be determined based on scale, methods, timing and partnerships.
	C) Assess impacts from warming waters on the Sanctuary and track changes on algae blooms and plankton communities.	Long Term Projects and funding to be determined based on scale, methods, timing and partnerships.
	D) Study the impact of flooding on Park landscape after large storm events.	Long Term Projects and funding to be determined based on scale, methods, timing and partnerships.

Goal 2: Develop and implement a phased and adaptive program of habitat enhancements targeted at improving water quality and species productivity.

ACTIONS	PROJECTS	STATUS / FUNDING ¹
2.1 Use available science to locate and develop enhancements that provide structured and diverse fish habitat.	A) Construct habitat in inter-pier areas in a phased and adaptive manner for the purpose of studying and promoting spawning, nursery areas and refuge for cover-seeking fishes.	In Progress; Tribeca Habitat Enhancement Project funded and underway. Additional projects to be identified as feasible.
2.2 Enhance pile fields and pier areas to improve existing vertical habitat and refuge.	A) Design and implement ecological enhancements within pile fields and pier areas to strengthen their ability to provide habitat for shellfish and finfish populations.	In Progress; Tribeca Habitat Enhancement Project funded and underway. Additional projects to be identified as feasible.

2.2 Cont'd	B) Maintain and monitor ecological get-down with a rocky intertidal pool, marsh planting area and pile enhancements at the western end of Pier 26.	<p>Ongoing</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
2.3 Enhance edge environments, including shallows and sloping habitat, where possible within the Sanctuary.	A) In the redevelopment of Gansevoort Peninsula, design and construct a salt marsh and ecological enhancements.	<p>In Progress</p> <p>Funding secured for design and construction; estimated cost is \$10 million.</p>
	B) Design and construct ecological enhancements on the south side of Pier 76.	<p>Long Term</p> <p>Preliminary capital funding identified and subject to confirmation; estimated cost is \$7 million.</p>
	C) Pilot techniques to enhance the ecosystem services of Hudson River Park's historic bulkhead.	<p>Long Term</p> <p>Projects to be identified as feasible.</p>
2.4 Enhance water quality and mitigate impacts from CSO discharges.	A) Promote the Sanctuary as a site for piloting emerging technologies to quantify and communicate CSO and MS4 discharge information.	<p>Long Term</p> <p>Projects to be identified as feasible.</p>
	B) Pilot emerging technologies and green infrastructure to improve water quality after CSO and MS4 discharges.	<p>Long Term</p> <p>Projects to be identified as feasible.</p>

Goal 3: Collect, synthesize and share data gained from habitat enhancement monitoring and research to inform future Sanctuary enhancement and management practices and public understanding of its value.

ACTIONS	PROJECTS	STATUS /FUNDING ¹
3.1 Evaluate habitat enhancement projects and share research protocols, data and findings with experts to inform future research and partnerships.	<p>A) Create metrics for ecological enhancements and conduct monitoring of habitat improvements.</p>	<p>Ongoing for Pier 26 Tide Deck; In Progress for Tribeca Habitat Enhancement Project; Near Term for Gansevoort Salt Marsh</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budgets.</p> <p>Additional projects to be identified as needed.</p>
	<p>B) Broadly share findings from ecological enhancement projects and Sanctuary research including publishing on Park and partner websites and participating in conferences.</p>	<p>Ongoing</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
	<p>C) Develop quality assurance and quality control measures for original research projects in the Park.</p>	<p>Ongoing</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>

<p>3.2</p> <p>Throughout the Park, integrate science findings and data using technology to share Sanctuary research in relatable formats.</p>	<p>A) In Park educational facilities, incorporate scientific displays to communicate Sanctuary research.</p>	<p>In Progress</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget. HRPT will seek grants or other funding for additional opportunities.</p>
	<p>B) Share real-time water quality and weather data in Park spaces and on website to help the public visualize and understand changing water and climate conditions.</p>	<p>In Progress</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget and partner operating budgets. HRPT will seek grants or other funding for additional opportunities.</p>

¹ Project Status / Funding Key

Ongoing: Reflects established projects with a sustained commitment that are expected to continue on a comparable or expanded scale for the foreseeable future.

In Progress: Reflects projects where work is in the planning phase or has already begun but which are expected to expand or be completed within 1-3 years.

Near Term: Reflects projects expected to be implemented within 3-5 years.

Long Term: Reflects projects that require long lead times, involve multiple partners, require phased implementation and/or exceed current resources. For such projects, the Trust expects to demonstrate measurable progress, and in some cases, completion by 2030.

Funded: Unless otherwise indicated, funding "assumed through HRPT's annual operating budget" means that HRPT foresees comparable levels of staffing and operating expenses enabling project to continue. Projects that require additional or specific budget needs are noted. Actual amounts are subject to the HRPT budgeting process and Board of Directors review and approval.

PUBLIC ACCESS & RESOURCE MANAGEMENT

OVERVIEW

As a four-mile waterfront expanse on Manhattan's west side, Hudson River Park welcomes 17 million visits each year and has dramatically improved public access to and into the Hudson River. Prior to the Park's creation, most of the area was off limits due to its inaccessible and deteriorating infrastructure. Today, people of all ages from New York City and the region rely on the Park's reconstructed piers, boathouses, mooring areas, landscapes and esplanades for respite, discovery, water access and play. The Park's four purpose-built, non-motorized boathouses have been instrumental in getting thousands of people paddling, rowing and sailing in the Hudson River for the first time. Hudson River Park's contribution to creating and improving both the quantity and quality of public spaces along Manhattan's western edge is indisputable.

The vast majority of the intended Park has been completed and is enjoyed annually by millions of residents, workers and visitors. In Fiscal Year 2018-2019, former Governor Cuomo and Mayor de Blasio announced their intentions to complete Hudson River Park and have provided financial contributions through their respective budgets to achieve this goal. Thanks to these commitments supplemented by private contributions, ecologically themed Pier 26 opened in 2020, Little Island opened in 2021, Gansevoort Peninsula began construction in 2021 and Pier 97 is planned to start construction in 2021.² In addition, a large habitat enhancement project will begin construction in 2021 in Tribeca. Soon Pier 76, for the first time, will provide interim public access to the Hudson River as well.



Figure 81: Installed in 2019, new wayfinding signage helps Park users navigate the Park and explore its many offerings.

Over the past twenty years of Park operations, the Trust has learned many valuable lessons that now inform thinking on construction, plant selection, maintenance, boating, environmental stewardship and programming. In the face of increasing sea levels and precipitation, it has been necessary to rethink certain aspects of design. For example, electrical infrastructure that was once thought to be hardened and flood-proofed below-ground has had to be replaced and elevated due to the after-effects of salt from Superstorm Sandy.

² At this time, the financial effects of the COVID pandemic on State and City budgets is uncertain, and it is possible that projected funding for portions of Hudson River Park including projects like these could be affected as the State and City continue to plan for their recovery.

Even in normal weather conditions, the Sanctuary's waters have proven to be a demanding physical environment for docks and other in-water structures. The dynamic marine environment and wake action has caused damage to multiple docks. While wave attenuation systems, such as breakwaters, may mitigate such damage, the Trust has elected not to pursue such structures because of habitat concerns, and instead has modified both its maintenance and design protocols to respond proactively to the marine environment. In short, while the Park's legislated location is its greatest asset, the Sanctuary's high energy waters, poor quality river soils, depth to bedrock and generally shallow bathymetry are among the factors that have posed unforeseen challenges during design and construction, creating significant capital maintenance demands that were not foreseen when the Park was being planned. As the Trust looks to the future, it is designing and programming with this place-based knowledge in hand.

As compared to the original ESMP, the current operational focus has evolved from "not doing damage," such as the early commitment to an Integrated Pest Management Plan, to taking proactive measures to advance environmental goals, such as the park-wide Park Over Plastic and Community Composting initiatives begun in 2019 and 2017, respectively. The Sanctuary environment also continues to inform Park operations. More native trees and plants create increased habitat for birds and insects while also providing environmental benefits linked to improved air quality and resiliency in our warming climate.



Figure 82: Hudson River Community Sailing sailors and students prepare for a regatta.

Advances in accessibility, including through improved signage, improved docks and better promoting tenant-driven safety protocols, will enable more people to use and enjoy the Sanctuary safely. To the extent that water quality will safely allow it, increased direct access to the Sanctuary should continue to be a goal. The Sanctuary must remain and be recognized as a cherished resource for generations to enjoy.

Over the next decade, the Park will continue to mature and the Trust must adapt both to lessons learned and to emerging issues of concern, while staying committed to providing safe public access to the Sanctuary. The Trust foresees completing the currently unfinished park areas to provide greater access to the Sanctuary, while also growing its initiatives in the areas of sustainability and resiliency both internally and with Park tenants and partners.

ACTION AGENDA: PUBLIC ACCESS & RESOURCE MANAGEMENT

VISION STATEMENT

Connect the public to the Estuarine Sanctuary by providing increased physical and visual access to the Hudson River in a manner that promotes and preserves natural resources.

The original vision for Hudson River Park was inspired by the Hudson River itself, a natural resource of extraordinary beauty, history and value. For this reason, design, construction, maintenance and management of the Park's many piers, docks, landscapes and facilities must continue to be guided by a combination of best practices and innovation. In the face of a changing climate, resiliency must inform smart planning as progress on the Park continues, and ongoing sustainability initiatives should continue and expand. Because the Park's operating model relies on partnerships with tenants and others to offer many programs serving the public, staff should remain focused on expanding and improving outreach and coordination with such groups to maximize their potential. Finally, in the next ten years, the Trust should complete the vision of the Hudson River Park embodied in its enabling legislation so that public access to the river can be expanded and protected for decades to come.

Goal 1: Complete the public open space portions of Hudson River Park to provide access to the Sanctuary.

Actions	Projects	Project Status / Funding ¹
1.1 Design and construct additional public park areas and elements to provide increased access to the Hudson River and fulfill the vision of the Hudson River Park Act.	A) Work with the Pier 57 tenant to design and construct a dynamic environmental educational facility operated by the Trust.	In Progress Facility costs funded through Pier 57 redevelopment process.
	B) Create a shoreline that provides direct access to the Sanctuary at the Gansevoort Peninsula to capitalize on the unique absence of a historic bulkhead on its edges.	In Progress with construction to commence in 2021 Capital funding secured for this project; estimated cost is \$73 million inclusive of salt marsh and all other Gansevoort construction.

1.1 Cont'd	<p>C) Construct Pier 97 as a public Park pier including infrastructure for a historic vessel.</p> <p>D) Create interim public access at Pier 76 following NYC's removal of the existing tow pound while planning for Pier 76's future as a park/commercial pier.</p> <p>E) Finish the Park from 29 Street to 44 Street to increase public access while including an ecological beach area on the south side of Pier 76 as well as a permanent composting center.</p> <p>F) Construct the Estuarium on Pier 26 to serve as the hub for public Estuary education in the Park.</p>	<p>In Progress with construction to commence in 2021 Capital funding secured for this project; estimated cost is \$44 million.</p> <p>Ongoing; Near Term Funded by New York State.</p> <p>Long Term Capital funding secured for this project; estimated cost is \$75 million inclusive of habitat beach.</p> <p>Long Term Partially funded with \$14.6 million identified for this project; estimated cost \$30 million.</p>
1.2 Further climate-smart planning that anticipates rising river levels, extreme heat and more frequent storms while balancing other mandates for access and preservation.	<p>A) Strengthen existing and planned Park facilities to meet climate-smart standards for waterfront areas including flood proofing new Park buildings and incorporating improved drainage, trees, porous surfaces and bioswales where feasible.</p>	<p>Ongoing; Long Term projects associated with the Estuarium and West 34 Street area Funding incorporated into capital budgets for Gansevoort and Pier 97. Partial funding identified for Estuarium. Additional funding to be determined based on specific projects that may be identified.</p>

1.2 Cont'd	B) Continue to engage with policy makers on the federal, State and City levels to ensure consideration of the Sanctuary in long-term coastal planning and design.	<p>Ongoing</p> <p>Continued funding for staff and normal operating expenses assumed through HRPT's annual operating budget.</p>
1.3 Advance remaining Park design and construction in a manner that promotes the integrity of the Sanctuary and Park ecosystem.	A) Work with designers, regulators, government agencies and research institutions to advance sustainable practices including the use of renewable energy systems and sustainable materials in the Park.	<p>Ongoing</p> <p>Funding incorporated into capital budgets for Gansevoort, Pier 97 and the West 29–West 44 Street areas. Partial funding in place for Estuarium. Additional funding to be determined based on specific future capital maintenance projects.</p>
	B) Evaluate opportunities to incorporate storm water capture/recirculation elements into the Park's existing and future landscape and building design, such as green roofs, bioswales, permeable pavers and rainwater catchment basins.	<p>Ongoing; Long Term</p> <p>Funding incorporated into capital budgets for certain water retention features in new Park areas. Additional funding required to retrofit completed Park areas with such features.</p>
	C) Work with designers to minimize light pollution spillage into the Sanctuary.	<p>Ongoing</p> <p>Funding incorporated into capital budgets for ongoing Park design projects.</p>
	D) Continue enforcing seasonal restrictions on marine construction work to protect overwintering of key species.	<p>Ongoing</p> <p>Standard construction practice built into procurement process and contracts.</p>

1.3 Cont'd	E) Prioritize incorporating native plant species with wind and salt tolerant attributes into Park design.	Ongoing Funding incorporated into capital budgets for ongoing Park design projects. Other funding sources to be determined based on specific future capital maintenance projects.
	F) Continue using best management practices to minimize effects of construction on the Sanctuary.	Ongoing Funding incorporated into capital budgets for ongoing Park design projects.

Goal 2: Implement new sustainability measures to protect the integrity of the Sanctuary and to increase public stewardship of natural resources.

ACTIONS	PROJECTS	STATUS / FUNDING ¹
2.1 Create and implement practices to increase sustainable Park operations in and near the Sanctuary.	A) Conduct a sustainability audit on water and energy use to evaluate ways to reduce the Park's environmental footprint.	In Progress Funded through HRPT operating budget.
	B) Continue waste audits to better understand opportunities for waste reduction, increased recycling/composting and mitigating waste contamination.	In Progress Funded through HRPT operating budget.
	C) Expand the Park Over Plastic initiative to reduce single-use plastics in the Park including engagement with Park tenants and permittees.	In Progress Routine operations are assumed to remain funded through HRPT operating budget. Special projects may need additional funding.

2.1 Cont'd	D) Create a long term, Park-wide sustainability plan.	<p>In Progress</p> <p>Unless a special consultant is required, funding assumed through future HRPT operating budget.</p>
	E) As feasible, upgrade Park building systems and infrastructure to reduce water, energy and waste.	<p>Long Term</p> <p>Unfunded. Funding and funding sources to be determined based on specific future capital maintenance projects.</p>
	F) Continue to staff and educate about existing compost program and ensure Park designs allow for continued capacity to host and conduct composting.	<p>Ongoing</p> <p>Current operations are assumed to remain funded through future HRPT operating budget. Special projects such as additional composting equipment would need additional capital funding from source to be determined.</p>
	G) Install additional waste and recycling receptacles and create improved recycling, composting and trash collection areas to support Park waste reduction.	<p>In Progress</p> <p>Funding incorporated into capital budgets for ongoing park design projects. Other funding and funding sources to be determined based on specific future capital maintenance projects.</p>
	H) Continue maintaining Park facilities and landscapes in a manner that protects the health of the Sanctuary, such as using an Integrated Pest Management plan, increasing native plants and using LED lights and energy-efficient timers.	<p>In Progress</p> <p>Current operational standards are assumed to remain funded through HRPT operating budget. Special projects may need additional funding.</p>

<p>2.2 Further local and regional sustainability initiatives through the use of Park property and resources when possible.</p>	<p>A) Facilitate efforts to expand community composting by providing collection, transport and physical composting services within the Park boundaries.</p> <p>B) Actively participate in City, State and regional conversations on sustainability best practices.</p> <p>C) Work with New York City and other partners to provide waterborne transportation opportunities such as water taxis and ferries at appropriate pier locations within the Park while educating such agencies and partners to be mindful of safety, estuary wildlife and infrastructure concerns as such services expand.</p> <p>D) Look for opportunities to provide more amenities for cyclists using the adjacent bikeway, such as more bike parking, ride share opportunities or bicycle care locations.</p> <p>E) Promote sustainability initiatives including those within the greater region through activations on Park property, events and the Park's website to broaden public education and increase participation.</p>	<p>In Progress Partially funded through HRPT operating budget and estimated remaining costs to fund to be determined annually.</p> <p>Ongoing Continued funding assumed through future HRPT operating budget.</p> <p>Near Term Funding for any construction or operations assumed to be provided by others.</p> <p>In Progress Funding for bike racks assumed in future operating or capital budgets. Ride share facilities' costs, if any, assumed to be funded by others.</p> <p>In Progress Funding generally assumed through HRPT future operating budgets. Other funding required for non-Trust initiatives.</p>
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Goal 3: Manage the Sanctuary to support a wide range of water-dependent activities while preserving habitat and minimizing in-water conflicts.

ACTIONS	PROJECTS	STATUS / FUNDING ¹
3.1 Define, manage and maintain the Sanctuary's water use zones.	A) Increase frequency and coordination of communication with Park tenants and permittees conducting water-based operations, including at least one meeting of all such parties annually to gather and share important information and coordinate best practices.	Ongoing Standard Operating Procedure.
	B) Conduct regular reviews of the water use map to ensure appropriateness of use areas and any need for refinements and ensure the map is publicly accessible.	Ongoing Continued funding assumed through future HRPT operating budget.
	C) Manage water use areas to promote safe recreational access to the River while protecting Sanctuary habitat and communicating other information about use of the Sanctuary.	Ongoing Continued funding assumed through future HRPT operating budget.
	D) Provide oversight of water areas through the Park's Dockmaster, security personnel and systems, coordination with Park tenants and strong relationships with enforcement agencies.	Ongoing Continued funding assumed through future HRPT operating budget.

3.1 Cont'd	<p>E) Regularly review and update the Park's boating rules and policies as necessary to ensure updates are reflected in permits, leases and concession agreements with Park tenants.</p> <p>F) Work with federal, State and City agencies involved with overseeing safe and responsible navigation and operations in and along the Sanctuary.</p>	<p>Ongoing</p> <p>Continued funding assumed through future HRPT operating budget.</p> <p>Ongoing</p> <p>Continued funding assumed through future HRPT operating budgets.</p>
3.2 Ensure other governmental agencies and planning bodies are familiar with Hudson River Park's unique habitat status to inform long term priorities and policies.	<p>A) Use the Trust's unique City-State status to work with regional leaders to advance long-term goals involving multiple partners, such as water quality improvements.</p> <p>B) Work with stakeholders to advocate for MS4/CSO discharge abatement and other projects to improve water quality conditions within the Sanctuary.</p> <p>C) Participate in City, State and regional stakeholder groups to address harbor-wide boating and water use issues such as wakes and boating safety.</p> <p>D) Engage with the NYCDEP to prioritize and implement CSO Long Term Control Plans (LTCPs) as noted in the Citywide Open Waters Retained Alternatives Summary.</p>	<p>Ongoing; Long Term</p> <p>Continued funding assumed through future HRPT operating budgets.</p> <p>Ongoing; Long Term</p> <p>Continued funding assumed through future HRPT operating budget.</p> <p>Ongoing</p> <p>Continued funding assumed through future HRPT operating budgets.</p> <p>Near Term</p> <p>Continued funding assumed through future HRPT operating budget.</p>

Goal 4: Seek ways to increase access and enhance safety for Sanctuary visitors.

ACTIONS	PROJECTS	STATUS / FUNDING ¹
4.1 Provide additional wayfinding and safety signage as needed to facilitate safe access to Sanctuary features.	A) Install clear on-site signage explaining access requirements and limitations to the public seeking to launch non-motorized boats at existing boathouses.	In Progress Partial funding in place; additional funding may be needed based on specific projects.
	B) Expand wayfinding, informational and regulatory signage both on land and in water, while protecting scenic views.	In Progress Partial funding in place assumed through future capital construction projects; additional funding may be needed based on specific projects.
	C) Expand buoys and navigation aids within the Sanctuary to support safe navigation and manage designated water use areas.	Near Term Costs are dependent on specific solutions and locations.
4.2 Continually review ways to improve safety through Park maintenance, management and additional facility enhancements.	A) Enhance Park safety and security for patrons by providing in-park security personnel and safety enhancements such as video cameras, lit paths, emergency call boxes and life rings.	In Progress Continued funding at current level assumed through future HRPT operating budget.
	B) Conduct regular inspections and maintenance of the Park's public water-based infrastructure including pier infrastructure and floating docks.	Ongoing Routine maintenance funded through HRPT operating budget. Funding sources for significant or unforeseen capital maintenance will be sought on an as needed basis.

4.2 Cont'd	C) Explore additional opportunities beyond ADA requirements to expand public access to the water for all ages and abilities through design and programming.	In Progress Partial funding in place assumed through future capital construction projects; additional funding may be needed based on specific projects.
	D) Review and inventory access points to the Sanctuary to determine opportunities for increasing capacity and safety of water recreation activities.	Near Term Continued funding assumed through future HRPT operating budget.

Goal 5: Offer a diverse range of activities and programs that are welcoming to all visitors and invite access to the Sanctuary by leveraging partnerships.

ACTIONS	PROJECTS	STATUS / FUNDING ¹
5.1 Actively seek opportunities and partnerships to offer a variety of accessible and affordable ways to engage with the Sanctuary.	A) Implement an evolving program of activities involving multiple partners that attract new and diverse audiences.	Ongoing Continued funding assumed through future HRPT operating budget.
	B) Actively plan Park programs on multiple piers to ensure geographic reach across neighborhoods.	Ongoing Continued funding assumed through future HRPT operating budget.
	C) Utilize resources and opportunities provided by the Park's Advisory Council to leverage expertise that supports programming extent, diversity and outreach.	Ongoing Standard operating practice.

5.1 Cont'd	<p>D) Within the requirements for public procurement, select qualified and mission aligned tenants to operate non-motorized boat houses and historic vessels within the Park.</p>	<p>Ongoing Standard operating practice.</p>
	<p>E) Through partnerships, offer a wide range of boating and in-water recreation options such as kayaking, sailing and stand-up paddle boarding in the Park.</p>	<p>Ongoing Standard operating practice.</p>
	<p>F) In the award of permits for non-motorized boathouses and historic vessels, ensure that affordability, accessibility and diversity of programming and boating types are all considered.</p>	<p>Ongoing Standard operating practice.</p>
5.2 Build an invested community of Park tenants that value and actively support the Sanctuary in their operations and programs.	<p>A) In conjunction with outreach and regular communications, update tenant leases and permit agreements as feasible to promote practices that protect and preserve the Sanctuary.</p> <p>B) Facilitate trainings and create educational resources for tenants in such areas as sustainability, environmental health, waste management and safety to ensure tenants are aware of and adhere to practices that protect and preserve the Sanctuary.</p>	<p>Ongoing Continued funding assumed through future HRPT operating budget.</p> <p>In Progress Continued funding assumed through future HRPT operating budgets.</p>
	<p>C) Encourage the sharing of information and best practices amongst boating groups in Hudson River Park by creating a network for open communication.</p>	<p>In Progress Continued funding assumed through future HRPT operating budget.</p>

5.2 Cont'd	D) Support Park tenants and community partners focused on in-water recreation by facilitating the cross-promotion of partner operations using Hudson River Park's website and social media channels.	In Progress Continued funding assumed through future HRPT operating budgets and coordination with Hudson River Park Friends.
5.3 Through intentional outreach and programming partnerships, foster a park environment that is welcoming and inclusive for all people.	A) Work with new and existing tenants, permittees, the Advisory Council and others to build increased partnerships that invite broader participation by new communities to use the Park for respite, play and environmental education.	In Progress Continued funding assumed through future HRPT operating budgets.
	B) Conduct targeted outreach to new audiences to increase access to and engagement with the Park from people of all ages, backgrounds and abilities.	In Progress Continued funding assumed through future HRPT operating budgets.

Goal 6: Continue to seek ways to fund Sanctuary goals and initiatives.		
ACTIONS	PROJECTS	STATUS / FUNDING¹
6.1 Complete development of Park/commercial piers, as defined in the Hudson River Park Act, to support financial self-sufficiency and	A) Seek solutions to redevelop Pier 40 that increase funding generated from this pier and reduce continuing capital maintenance costs through permissible Park-compatible development while also providing required public open space.	Long Term Critical capital repairs to Pier 40 in progress. Legislative solution, public procurement, environmental review, etc. needed prior to more comprehensive solution.

ensure Sanctuary projects can advance.	B) Seek a long-term solution for Pier 76 so that Park-compatible development and permanent, planned, public open space can occur.	Long Term Now that Pier 76 has been converted to interim public park space by New York State, work with HRPT Board of Directors, New York State and New York City to plan long term solution, which may include legislation, environmental review, etc.
6.2 Seek other funding through grants, donations and in-kind partnerships to further Sanctuary goals.	A) Work with Hudson River Park Friends to seek and apply for funding opportunities.	Ongoing Standard operating practice.
	B) Monitor and apply for inter-governmental grants from agencies including DEC, NYS Parks, DOS and others as relevant.	Ongoing Standard operating practice.

¹ Project Status / Funding Key

Ongoing: Reflects established projects with a sustained commitment that are expected to continue on a comparable or expanded scale for the foreseeable future.

In Progress: Reflects projects where work is in the planning phase or has already begun but which are expected to expand or be completed within 1-3 years.

Near Term: Reflects projects expected to be implemented within 3-5 years.

Long Term: Reflects projects that require long lead times, involve multiple partners, require phased implementation and/or exceed current resources. For such projects, the Trust expects to demonstrate measurable progress, and in some cases, completion by 2030.

Funded: Unless otherwise indicated, funding “assumed through HRPT’s annual operating budget” means that HRPT foresees comparable levels of staffing and operating expenses enabling project to continue. Projects that require additional or specific budget needs are noted. Actual amounts are subject to the HRPT budgeting process and Board of Directors review and approval.

APPENDIX A

TECHNICAL ADVISORY COMMITTEE MEMBERSHIP

As of September 30, 2021

(listed in alphabetical order)

Brett Banco, Brooklyn College

Lisa Baron, US Army Corps of Engineers, NY District

Graeme Birchall, Downtown Boathouse *

Nancy Brous, NYC Water Trail Association *

Robert Burke, Hudson River Community Sailing

Alda Chan, NYC Department of Parks and Recreation

Cathy Drew, The River Project Founder *

Fran Dunwell, NYSDEC, Hudson River Estuary Program

George Jackman, Riverkeeper

Marcha Johnson, Landscape Architect / Ecological Restorationist

Jonathan Kramer, Hudson River Foundation

Fred Landa, New York State Department of State, Division of Coastal Resources

Mary Leou, Wallerstein Collaborative for Urban Environmental Education at NYU

Jeffrey Levinton, Stony Brook University

David Lipsky, New York City Department of Environmental Protection

Pete Malinowski, Billion Oyster Project

Susan Maresca, NYSDEC, Region 2 Office

Michael McCann, Nature Conservancy

Rob Pirani, NY-NJ Harbor and Estuary Program *

Shay Saleem, Intrepid Sea, Air & Space Museum *

Shino Tanikawa, NYC Soil & Water Conservation District

Bob Townley, Manhattan Youth *

Margie Turin, Lamont-Doherty Earth Observatory

Cortney Worrall, Waterfront Alliance *

* Notes that this organization also sits on Hudson River Park Trust's Advisory Council

APPENDIX B

PARK USER SURVEYS

At the onset of the process to update the Estuarine Sanctuary Management Plan (ESMP), the Trust's staff drafted surveys to solicit park user/partner feedback on progress made under the guidance of the 2002 ESMP, and also solicited feedback on priorities for the next decade. Survey content was personalized for specific groups, and was selected as the preferred outreach tool because they could reach a larger audience. Three distinct surveys were drafted and sent to three groups of stakeholders. *Resource Protection and Environmental Research* were combined into one survey; the other two surveys covered *Education* and *Public Access and Recreation*. All three surveys went live Thursday, February 16, 2017 with a due date of Monday, March 6, 2017. Recipients were encouraged to forward the survey via email to colleagues or other interested parties. Below is a brief narrative summary of findings for each survey, with recommendations and observations incorporated into the Action Agenda in each area.

Public Access and Recreation Survey

“Seeing the River itself, as well as the greenery and landscaping of the park, helps me get a needed break from the urban landscape and reconnect with nature.”

-Public Access and Recreation Survey respondent

The Public Access and Recreation survey was broadly distributed through Hudson River Park's Advisory Council as well as through the Park's adjacent Community Boards. It was also added to the Trust's website home page. The Trust received 209 unique responses to this survey. Generally, respondents to this survey acknowledged the progress Hudson River Park has made in increasing people's ability to connect with the river. “Enjoying nature” was the top reason people came to Hudson River Park, followed by relaxation/contemplation with exercise close behind.

The survey showed that the creation of the Park has had a positive impact on people's ability to access the river for both passive and active recreational uses as well as regarding their awareness of the River environment. However, the respondents were generally not aware of the Hudson River's history, nor informed on issues like water quality.

Respondents were provided with the opportunity to identify their priorities for Hudson River Park now and in the future. Most people want to see the public areas of the Park finished, but many respondents also specifically mentioned sanctuary components as a high priority, specifically “completing the Estuarium” and “River restoration.”

While respondents were complimentary toward the Park and its overall positive impacts, they also suggested areas for improvement. One theme was the desire for more information about current educational and volunteer offerings taking place in the Park. A second suggested an improvement area focused on the need for boating access for those not formally affiliated with the Park.

Resource Protection and Environmental Research Survey

"It's alive: there are living creatures in the water of the park, the park helps meet their habitat needs, and there are cool and fun ways to explore."

-Resource Protection and Environmental Research Survey respondent

This survey was targeted for individuals who work in government and related nonprofit fields and who have a deep familiarity with either the Hudson River or Hudson River Park's Sanctuary waters. It was emailed to 81 recipients with 23 people responding. Questions were asked about river ecology, research needs and conservation goals. Respondents to the Resource Protection and Research Survey singled out habitat enhancement as an area for improvement and growth. For future efforts, the respondents supported restoration efforts focused on oysters, the near-shore habitat and biodiversity. Popular research topics included water quality and the impact of the urban environment on the River. Some respondents felt that to highlight this research, the Park should promote the concept of the "living River" and use the Park's annual SUBMERGE Marine Science Festival to share research results.

Education Survey

"Without the Hudson River Park my students' access to the Hudson River would be almost nonexistent. With public access to the river, my students have been able to get out of the city, learn, have fun and gain a better understanding of the world around them."

-Education Survey respondent

The Education survey was sent to 72 individuals known to conduct environmental education within the Park, including teachers who bring their students to the Trust's environmental education summer camps and school-year field trip programs. 31 individuals responded. The vast majority of educators said the Hudson River itself is what attracts them to programs in Hudson River Park. The availability of low-cost and free programming, the high quality of environmental educational programming and the availability of field science focused lessons all comprised a high percentages of responses as well. For future efforts, respondents shared that they and their students could benefit from additional opportunities for professional development, plus additional opportunities for hands-on activities for their students. Some respondents also shared their beliefs that future efforts could focus on developing more educational opportunities for the community, especially with communicating data about the river.

Hudson River Park's River Access and Awareness Survey

Thank you for taking the time to complete Hudson River Park's River Access and Awareness Survey. Hudson River Park is a 550-acre park, of which 400 acres are waters within the Hudson River. These waters are protected as a New York State designated Estuarine Sanctuary.

Trust staff is currently updating our Estuarine Sanctuary Management Plan (ESMP). The ESMP has served the Trust as a management and planning tool outlining policies and goals for the following water-dependent uses: 1) river access and recreation; 2) education; 3) resource protection; and 4) research.

The ESMP update will report on the progress the Trust has made in achieving these management goals and will develop an action plan for the future. Through this survey we are collecting community feedback on the Park and its Hudson River Estuarine Sanctuary to inform both the progress update and the future action plan.

The survey should take you about 10 minutes to complete. We appreciate your taking the time to complete the survey and welcome all thoughts and comments.

All responses will be compiled and reported anonymously unless we contact you and get your permission to share an attributed quote.

Please complete by March 6, 2017.

Questions marked with an ***asterisk*** are required.

General Background

Name (Fill in--Optional)

Email (Fill in--Optional)

Zip Code (Fill in--Optional)

***Relationship to the Park (Check all that apply)**

- Neighbor
 - Park Visitor
 - Volunteer
 - Advisory Council Member
 - Park Tenant (Including employed by a tenant)
- If Y, which organization?

***How often do you visit Hudson River Park?**

- 4 or more times/week
- 2 – 3 times/week

- Once a week
- A couple of times a month
- Less than once a month
- Less than once a year

***Which area of the Park do you visit most often?**

- Tribeca
- Hudson Square
- West Village
- Chelsea
- Hudson Yards
- Clinton/Hell's Kitchen
- Multiple neighborhoods

***How do you typically access Hudson River Park? (Pick up to 2)**

- Walking
- Personal bike
- Citi Bike
- Public transportation + walking
- Car (including taxi)
- Boat

Relationship with the Hudson River

***Check the sentence that is most representative of your feeling towards how the Hudson River affects your relationship to Hudson River Park:**

- The Hudson River itself (for example, access, views, educational programs, or in-water recreation) is the primary reason I visit Hudson River Park
- The Hudson River is not the primary reason I visit Hudson River Park.

Please Explain. (Fill In)

***Are you aware that:**

- The Hudson River is an important natural resource with valuable habitat for over 200 species of fish? **(Y/N)**
- Hudson River Park's waters are a New York State designated marine sanctuary? **(Y/N)**
- Hudson River Park hosts many public environmental education programs as well as environmental research and stewardship programs to build public awareness of and protect the health of the River? **(Y/N)**
- Your actions (for example, water conservation especially during rain events, consuming products free of microbeads (tiny plastic beads used in many cosmetics), or picking up your pet waste) can directly influence the health of the Hudson River? **(Y/N)**

***The development of Hudson River Park has improved: (Likert Scale Strongly Disagree to Strongly Agree)**

- Ease of reaching the waterfront
- Ease of getting to/accessing the Hudson River
- Boating opportunities—human powered (For example, kayaking and rowing)
- Boating opportunities—motorized (For example, mooring, sailing, and excursions)
- Access to historic vessels
- Access to scenic Hudson River views

***The creation of Hudson River Park has contributed to: (Likert Scale Strongly Disagree to Strongly Agree)**

- My awareness of the wildlife and habitat within Hudson River
- My awareness of Hudson River history
- My connection to the Hudson River
- My opinion about the health and cleanliness of the Hudson River

Please explain any of your above answers. (**Fill in**)

Hudson River Park's Estuarine Sanctuary Management Plan establishes goals and objectives in four areas: 1) public access and recreation; 2) education; 3) resource protection; and 4) environmental research.

***Within these categories, how have you or your family members engaged with the Hudson River while in Hudson River Park? (Check all that apply)**

Public access and recreation:

- Direct contact with the river through boating and/or permitted swimming
- Enjoying access to the river's edge for scenery, contemplation, or river watching
- Other outdoor recreation including walking and biking

Education:

- Participation in the Park's environmental education and other programs for school-aged children
- Participation in the Park's nature walks and other programs for adults
- Participation in partner programs within Hudson River Park
- Touring historic vessels

Resource protection:

- Volunteer events such as river clean-ups or park landscaping
- Oyster restoration (for example, attending "Shell-ebrate Oysters")
- Composting in Hudson River Park

Environmental research:

- Attending research-focused park programming
- Attending the SUBMERGE NYC Marine Science Festival
- Participating in water quality monitoring initiatives

Please elaborate on any of your above answers. (Fill in)

*How can Hudson River Park best use its limited financial resources to enhance your enjoyment, access, awareness, and care of the Hudson River? (Check your top 4)

- More youth education programs
- More adult education programs
- More online wildlife and education materials
- Continued construction of public park spaces
- Completion of the “estuarium” – the Park’s planned river research and education center
- More educational signage
- More directional signage
- More community science
- More river restoration projects
- Volunteer opportunities
- Periodic alerts highlighting river initiatives

Please elaborate on any of your above answers. (Fill in)

* I come to Hudson River Park: (Check all that apply)

- to enjoy nature
- to boat
- to commute through the park
- to exercise
- for children’s activities
- for organized sports
- for catch and release fishing
- for relaxation and contemplation
- for educational programming
- for cultural programming
- for volunteer programming
- for senior programming

Specific Questions for Boating Organizations

***Are you affiliated with a boating group operating within Hudson River Park? (For example, employee, volunteer, member) (Y/N)**

If Y,

***Top four activities offered by your affiliated organization (Pick 4)**

- Kayaking
- Rowing
- Sailing
- Stand Up Paddleboard
- Boat Building
- Public mooring
- Pleasure/dinner/sightseeing cruises
- Tours
- Transportation
- Historic Preservation
- Education
- Research
- Stewardship
- Job Training
- Youth Development

***Which audiences does your affiliated organization predominately serve?**

- Individual Adults
- Individual Youth
- Families
- School Groups
- Adult groups

***Which Park features are most effective at increasing river access and in-water recreation? (Pick 3)**

- Boathouse facilities
- Floating docks
- Public docking & mooring facilities
- Water use zones & regulations
- Landings for water taxis and waterborne transportation
- Berths for historic vessels

Please elaborate on any of your above answers. (Fill in)

***How can Hudson River Park best use its limited financial resources to enhance river access and in-water recreation? (Check your top 3)**

- Continued construction of park infrastructure (for example, public piers, waterside walkways, floating docks)
- Access signage

- Educational signage
River clean-up/restoration projects
- Public display of current river conditions data
- Partnering with additional boating organizations
 - Which organization(s)? _____

Please elaborate on any of your above answers. (**Fill in**)

Demographics and Follow up

Age (Pick 1- Optional)

- Under 16
- 16-20
- 21-30
- 31-40
- 41-50
- 51-60
- 61-70
- 71-80
- 81 and over

Household makeup- (Optional)

(Excluding respondent)

- Under 16
- 16-20
- 21-30
- 31-40
- 41-50
- 51-60
- 61-70
- 71-80
- 81 and over

*May we follow up with you via email with additional questions? (**Y/N**)

Any other questions, comments or feedback? (**Fill in**)

Hudson River Park's Education Survey

Thank you for taking the time to complete Hudson River Park's River Access and Awareness survey. Hudson River Park is a unique park created by New York State legislation. Approximately 400 of its overall 550 acres are within the Hudson River and are designated as a New York State Estuarine Sanctuary.

The Hudson River Park Trust (Trust) is currently updating our Estuarine Sanctuary Management Plan (ESMP). The ESMP serves as a management and planning tool for the Sanctuary and outlines policies and goals for river access and recreation, education, resource protection, and research.

The ESMP update will report on the progress the Trust has made in achieving these management goals and will include an action plan for the future. Through this survey, we aim to collect community feedback on how you use, enjoy and learn from the Hudson River to inform both the progress update and the future action plan.

The survey should take you about 10 minutes to complete. We appreciate your taking the time to complete the survey and welcome all thoughts and comments.

While all responses will be compiled and reported anonymously, we encourage you to provide your contact information so we can spotlight specific responses in the report, or follow up with you if needed. However, you do not need to provide your contact information to complete the survey.

Please complete by March 6, 2017.

Questions marked with an *asterisk* are required.

General Background

Name (Fill in--Optional)

Email (Fill in--Optional)

Zip Code (Fill in--Optional)

School/Camp/Organization Name (Fill in--Optional)

***Relationship to the Park (Check all that apply)**

- Organizer or Participant in a Hudson River Park School or Camp Program
- Organizer or Participant in a Hudson River Park Public Education Program
- Participant at Hudson River Park's SUBMERGE NYC Marine Science Festival
- Educational organization that collaborates with Hudson River Park
- Park Tenant (including employed by a tenant) that facilitates educational programs in the Park
 - If Y, which organization?

***How often do you participate in educational programming within Hudson River Park?**

- Weekly
- Monthly
- Seasonally
- Annually
- Less than once a year

***How do you typically access Hudson River Park? (Pick up to two)**

- School Bus
- Public transportation/walking
- Walking
- Personal bike
- Citi Bike
- Car
- Boat

***How would you rate the ease of accessing Hudson River Park?**

- Excellent
- Good
- Average
- Below Average

***Have you attended an educational program hosted by a Hudson River Park Tenant group (For example, The River Project, Intrepid Museum, Hudson River Community Sailing, Historic Vessels)? (Y/N)**

If Y, which tenant? (Fill In)

***Have you participated in a school, camp, or public educational program offered by the Hudson River Park Trust? (Y/N)**

If Y then,

***What elements attract you to educational programs in Hudson River Park? (Check all that apply)**

- Availability of low-cost and free programming
- Quality of environmental education programming
- Scope of environmental education programming
- Educational programming is age appropriate
- Field science focused lessons
- Proximity to Hudson River Park
- The Hudson River itself
- Exposure to new parts of NYC
- Availability of a playground/carousel/green space for pre- or post- education experience fun
- Other _____ (Fill in)

***What program(s) would the children you work with find most engaging? (Check all that apply)**

- Wildlife
- Fishing
- Hands-on science
- Oysters
- Engineering / robotics
- Composting
- Other _____ **(Fill in)**

***Do you use Hudson River Park's website?**

- If Y, please explain how. **(Fill In)**

***Do you use Hudson River Park's educational printed materials? (For example, fish poster, pile poster, striped bass book, or river ranger book)? (Y/N)**

- If Y, please explain how. **(Fill In)**

***To what extent do you value Hudson River Park's correlation of educational programs to Common Core Learning Standards? (Likert Scale)**

- High
- Moderate
- Low
- None
- N/A

***Do Hudson River Park's correlations to Common Core Learning Standards influence your decision to participate in our school programs?**

(Y/N/NA)

- If Y, please explain how. **(Fill In)**

***Do you teach about Hudson River topics before or after attending the Park's educational programs? (Y/N/NA)**

- If Y, please explain how. **(Fill In)**

***Would you value and use pre/post program lessons and resources? (Y/N/NA)**

***Would you value and use pre/post program lessons connected to other outdoor spaces close to your facility? (Y/N/NA)**

***Would you be interested in using a multi-lesson Hudson River Park STEM curriculum that involves classroom, self-guided, and field lessons? (Y/N/NA)**

- If Y, please explain what topics could be most beneficial? **(Fill In)**

***Would you be interested in your students working on a stewardship project (For example, oyster restoration or marine debris removal) in Hudson River Park? (Y/N/NA)**

***How would you rate Hudson River Park's educational programs overall?**

- Excellent
- Good
- Average
- Below Average

***How can we improve our programs? (Fill In)**

***Have you recommended Hudson River Park's educational programs to others? (Y/N)**

***Check the sentence that is most representative of your feeling towards the Park's location within the Hudson River:**

- The Hudson River itself (for example, direct river access, science, and recreation) is the primary reason I bring my students or participate in Hudson River Park's educational programming
- The Hudson River is not the primary reason I bring my students or participate in Hudson River Park's educational programming.

Please Explain. (Fill In)

***Are you aware that:**

- Hudson River Park's waters are a New York State designated marine sanctuary? (Y/N)
- Hudson River Park hosts many public environmental education programs as well as environmental research and stewardship programs to build public awareness of and protect the health of the River? (Y/N)
- Your actions (For example, water conservation especially during rain events, consuming products free of microbeads (tiny plastic beads used in many cosmetics), or picking up your pet waste) can directly influence the health and restoration of the Hudson River? (Y/N)

***The development of Hudson River Park has improved: (Likert Scale Strongly Disagree to Strongly Agree)**

- Public ease of reaching the Hudson River
- Student and teacher ease of reaching the Hudson River
- Science literacy
- Interest in science
- Availability of environmental educational programs on the Hudson River
- Quality of environmental educational programs on the Hudson River

***The creation of Hudson River Park has contributed to: (Likert Scale Strongly Disagree to Strongly Agree)**

- My awareness of the Hudson River environment
- My awareness of Hudson River history
- My connection to the Hudson River
- My opinion about the Hudson River's water quality

***How can Hudson River Park best use its resources to further awareness, understanding, and stewardship of the Hudson River? (Pick Top 3)**

- Offer educational programming in multiple locations along the park's 4 miles
- Conduct teacher training workshops on park curricula
- Install interpretative/educational signage
- Create indoor educational facilities
- Partner with historic/research vessels
- Offer community science opportunities
- Provide river clean-up/restoration projects
- Provide internships & job training
- Create more community partnerships
- Other _____ **(Fill in)**

Please elaborate on any of your above answers. **(Fill in)**

***May we follow up with you via email with additional questions? (Y/N)**

Any other questions, comments or feedback? (Fill in)

Thank you for completing the Hudson River Park's Education Survey! We value your responses.

Hudson River Park's Resource Protection and Environmental Research Group Survey

Thank you for taking the time to complete Hudson River Park's Resource Protection and Environmental Research Survey. Hudson River Park is a unique park created by New York State legislation. Approximately 400 of its overall 550 acres are within the Hudson River and are designated as a New York State Estuarine Sanctuary.

The Hudson River Park Trust (Trust) is currently updating our Estuarine Sanctuary Management Plan (ESMP). The ESMP serves as a management and planning tool for the Sanctuary and outlines policies and goals for river access and recreation, education, resource protection, and environmental research.

The ESMP update will report on the progress the Trust has made in achieving these management goals and will include an action plan for the future. Through this survey, we aim to collect community feedback on how you use, enjoy and learn from the Hudson River to inform both the progress update and the future action plan.

The survey should take you about 10 minutes to complete. We appreciate your taking the time to complete the survey and welcome all thoughts and comments.

While all responses will be compiled and reported anonymously, we encourage you to provide your contact information so we can spotlight specific responses in the report, or follow up with you if needed. However, you do not need to provide your contact information to complete the survey.

Please complete by March 6, 2017.

Questions marked with an **asterisk are required.**

General Background

Name (Fill in--Optional)

Email (Fill in--Optional)

Zip Code (Fill in--Optional)

Organization Name (Fill in--Optional)

*** Organization Type:**

- Nonprofit
- Government
- Academic
- Community
- Other _____ **(Fill in)**

***Relationship to the Park (Check all that apply)**

- Research partner
- Independent researcher in Park
- SUBMERGE NYC Marine Science Festival exhibitor Citizen science participant
- Park Tenant (Including employed by a tenant)
- Other _____ **(Fill in)**

***Have you ever conducted or supported resource protection and/or environmental research activities within Hudson River Park (Chambers Street to 59th Street)? (Y/N)**

Relationship with the Hudson River

***Are you aware that Hudson River Park's waters are a New York State designated estuarine sanctuary? (Y/N)**

***Did you know that the Park manages two Hudson River Environmental Conditions Observing System (HRECOS) water quality monitoring stations at Pier 84 and Pier 26? (Y/N)**

***Have you used data from HRECOS Pier 84 and/or Pier 26 locations? (Y/N)**

***Please describe why you conduct/support resource protection and environmental research projects within the Park? (Check all that apply)**

- Particular characteristics of the Park's urban ecosystem
- Ease of access
- Park location provides visibility that increases public awareness
- Logistical or programming support from Park staff
- Scope of the Park's existing research and citizen science projects
- Availability of funding
- Opportunity to improve habitat conditions at this particular location
- Other _____ **(Fill in)**

***What ecological elements within the Park do you feel are top priorities to protect or restore? (Fill in)**

***The development of Hudson River Park has improved: (Likert Scale Strongly Disagree to Strongly Agree)**

- Public's ease of reaching the Hudson River
- Scientists' ease of reaching the Hudson River
- Public awareness of the Hudson River as an important habitat and resource
- Resource protection in the Hudson River
- Habitat enhancement in the Hudson River
- Quantity of environmental research projects in the Hudson River

Please elaborate on any of your above answers. (Fill in)

***What are the best ways for the Park to support resource protection and research within Park waters and the surrounding estuary? (Choose up to 3)**

- Collaborate on habitat enhancement projects
- Collaborate on research
- Collaborate on STEM programs
- Facilitate park access for research
- Host citizen science projects
- Enforce Park regulations of park land and waters
- Collaborate on grant applications for funding resource protection and research
- Accommodate research vessels in the Park
- Provide more science internships & job training in the Park
- Other _____ (Fill in)

Please explain any of your above answers. (Fill in)

*** How can the Park best showcase Hudson River Estuarine research? (Choose up to 3)**

- Public festivals like SUBMERGE NYC Marine Science Festival
- Programs highlighting research data
- Professional conferences/workshops/trainings
- Interpretative signage
- Website features
- Public lectures
- Social media
- Other _____ (Fill in)

***What key messages or content about the estuary should the Park promote? (Fill in)**

***How can the Park improve its collaboration with the resource protection and research communities? (Fill in)**

***May we follow up with you via email with additional questions? (Y/N)**

Any other questions, comments or feedback? (Fill in)

APPENDIX C

SUMMARY CHART OF PARK PIERS & PLACES

SUMMARY CHART OF PARK PIERS & PLACES				
Location	Designation in Hudson River Park Act	Completion Status	Sanctuary Features ¹	Notes
Pier 25	Park Use Only	Complete	Mooring field, town dock, pumpout facility, berths for 4 historic vessels; water taxi	
Pier 26	Park Use Only	Complete	Tide deck with salt marsh plantings and tide pools; non-motorized boathouse; 2 berths for historic and research vessels; small dock for educational and research programming; biohuts for oysters	Location for Tribeca Habitat Enhancement Project to begin installation in Summer 2021
Pier 32	Park Use Only (South finger controlled by HRPT to Port Authority's Holland Tunnel vent building)	Pile Field	Pile wraps, reef balls, textured piles planned	Location for Tribeca Habitat Enhancement Project to begin installation in Summer 2021
Pier 34 (southern finger)	Park Use Only (North finger controlled by Port Authority of New York/New Jersey)	Complete	Biohuts planned	Location for Tribeca Habitat Enhancement Project to begin installation in Summer 2021

Location	Designation in Hudson River Park Act	Completion Status	Sanctuary Features¹	Notes
Estuarium on Upland Near Pier 26 and Science Playground	Park Use Only	Incomplete	Planned environmental education and research center with live Hudson River animals; Science Playground adjacent to the planned Estuarium	Sufficient funding for the approximately \$30 million Estuarium facility is not yet available; private fundraising in progress for the playground
Tribeca Upland	Park Use Only	Complete	Tribeca native plant boardwalk	
Pier 40	Park/commercial with minimum 50% of footprint for passive and active public open space	Pier currently complies with Act; comprehensive redevelopment to secure long term future still to occur	Commercial vessels on north and west sides of pier; non-motorized boating and mooring field on south side of pier	Comprehensive redevelopment of Pier 40 will require legislative changes and more community process. In the meantime, HRPT is repairing all of the pier's piles, and also continues to make other structural repairs including to the roof, facade and life and safety systems
Pier 42	Park Use Only	Pile Field	Pile Field	
Pier 45	Park Use Only	Complete	Water taxi landing	
Pier 46	Park Use Only	Complete	Western half is pile field	
Pier 49	Park Use Only	Pile Field	Pile field	
Pier 51	Park Use Only	Complete	N/A	
Greenwich Village Upland	Park Use Only	Complete	N/A	

Location	Designation in Hudson River Park Act	Completion Status	Sanctuary Features¹	Notes
Gansevoort Peninsula and Pier 52	Park Use Only	First phase of park construction has commenced; public sculpture called Day's End funded by the Whitney Museum of American Art opened Spring 2021	Plans include a salt marsh and submerged habitat features on the north side and a rocky beach with non-motorized boat access on the south side	Additional construction contracts to be awarded in 2021
Pier 53	Municipal	Complete	Water-dependent municipal use (FDNY Marine Company 1)	N/A
Upland and over-water platform area between Gansevoort to Pier 57	Park Use only	Substantially complete and open to the public	N/A	Final touches on Pier 54 arch restoration, small pavement installation areas and additional historic interpretives were complete in Spring 2021.
Pier 55 (officially known as "Little Island")	Park Use Only	Complete		Opened to the public in Spring 2021
Pier 54 and Pier 56	Park Use only	Pile Fields	Pile fields	
14th Street Park	Park Use	Complete	N/A	Inland park area east of Route 9A

Location	Designation in Hudson River Park Act	Completion Status	Sanctuary Features¹	Notes
Pier 57	N/A	Privately funded construction in progress by RXR/YoungWoo with Google as master subtenant; partial initial occupancy in 2020	Public educational classrooms and exhibit areas to be operated by Hudson River Park's River Project and focused on estuary; possible water taxi and marina	Under construction including 3.5 acres of public rooftop and perimeter esplanade space funded by developer
Pier 58		Pile Field	N/A	Regulatory permits allow piles to be removed for navigation if needed
Piers 59, 60 and 61	Park/commercial	Complete under long-term lease known as "Chelsea Piers"	Commercial marina and vessel docking	N/A
Pier 62	Park Use Only	Complete	Several berths for large vessels within Chelsea Piers leasehold	N/A
Pier 63	Park Use Only	Complete	N/A	N/A
Pier 64	Park Use Only	Complete	N/A	N/A
Chelsea Waterside	Park Use Only	Complete – Phase 2 capital restoration nearing design completion	N/A	Inland park area east of Route 9A
Pier 66a (float bridge)	Park Use Only	Complete	Historic structure also docks privately owned historic vessels	Significant structural repairs on historic structure completed in 2019
Pier 66	Park Use Only	Complete	Non-motorized boathouse with dock and associated mooring fields	N/A

Location	Designation in Hudson River Park Act	Completion Status	Sanctuary Features¹	Notes
Chelsea Upland—Pier 62 to 29 Street	Park Use Only	Complete	Includes Chelsea Habitat Garden with native plants	N/A
Chelsea Upland—29 Street to 39 Street	Park Use Only	Incomplete with temporary esplanade and heliport, including helicopter landing barge	Park and public composting hub located in this area	Design RFP for this area which includes several land use planning issues expected to be released in 2021
Pier 72		Pile Field	N/A	
South edge of Pier 76	Park Use only	Incomplete	Preliminary plans include a habitat beach	Will be designed with the area from 29 to 44 Street
Pier 76	Park/Commercial with minimum 50% of footprint for passive and active public open space	Incomplete – Interim public open space construction in progress led by New York State following removal of NYPD tow pound in January 2021	N/A	2020 NYS legislation required NYC to vacate existing uses. NYC transferred pier to NYS Parks in 2021. Pier will eventually be incorporated within the Hudson River Park leasehold area
Pier 79	Municipal	Complete	Municipal Ferry Terminal	Upland area to be improved with the area from 29 to 44 Street.
Upland area between Piers 79-84	Park Use only	Incomplete, but temporary esplanade in use	N/A	Upland area to be improved with the area from 29 to 44 Street

Location	Designation in Hudson River Park Act	Completion Status	Sanctuary Features¹	Notes
Piers 81 & 83	Park/commercial	Complete -- Piers are leased for sightseeing and dinner boat cruises and parking	Commercial vessels	N/A
Pier 84	Park Use Only	Complete	Non-motorized boathouse, water taxi floating dock; estuary classroom operated by the Park's River Project staff, pier hosts self-powered visiting vessels	N/A
Pier 86	Intrepid Museum	Complete	Historic and visiting vessels	Complete; pier is accessible to the general public without admission when the museum is open
Pier 95	Park Use Only	Complete	Get down for proximity to river	
Pier 96	Park Use Only	Complete	Non-motorized boathouse in operation	
Pier 97 and Upland between 57 to 59 Streets	Park Use Only	The Pier 97 pier structure is complete; balance of landscape and park features are incomplete; 100% Design Documents completed as of December 2020; construction to commence in 2021	One berth for one historic vessel; possible future water taxi landing	Pier expected to commence construction in 2021

Location	Designation in Hudson River Park Act	Completion Status	Sanctuary Features¹	Notes
Pier 98	Park/commercial	Complete –pier is leased to Con Edison	Water dependent use for vessels transferring fuel	
Platform between 98-99	Park Use Only	In-water portion of new pedestrian path completed; landscaping to be completed as part of Pier 97 project	N/A	Area expected to commence construction in 2021
Pier 99 (Dept. of Sanitation)	Municipal	Complete	NYC Department of Sanitation operates vessels for transferring waste	N/A

¹ The Hudson River Park Act called for the construction of numerous public park piers and authorized certain commercial and municipal uses as well. Features highlighted herein as “Sanctuary Features” are for general reference only. In actuality, the Act does not distinguish between programmatic uses linked explicitly to the Sanctuary and other recreational, cultural, commercial, municipal or other uses.

APPENDIX D

WATER USE MAP

Hudson River Park's Estuarine Sanctuary waters support a wide range of in-water activities and uses. The Trust's enabling legislation, the Hudson River Park Act, specifically authorizes Hudson River Park Trust (the Trust) to create "water surface zones ... including the establishment of sanctuary/preserve areas and areas where motorized or non-motorized vessels are or are not permitted." Accordingly, the ESMP includes a Water Use Map to promote coordinated, safe use of the Sanctuary while considering ecological habitat objectives. At the Trust's discretion, the Water Use Map may be modified from time to time based on evolving uses or needs and special circumstances.

The Trust has identified four Water Use Categories. Definitions for each water use area follow. Delineation of the different areas was based on a number of factors including adjacent uses on piers, habitat goals for particular areas, extant boating areas, planned Park improvements and construction, existing leaseholds and permitted areas, property not controlled by the Trust, safety considerations and existing conditions including but not limited to pile fields and soft edges.

It is important to note that the Water Use Map's delineation of use areas does not supersede the United States Coast Guard Navigation Rules and Regulations, specifically, the Rules of the Road. The Trust or other government vessels used for official purposes may access all areas subject to appropriate authorizations and may authorize other vessel activity in the various use areas on a case-by-case basis.

Water Recreation:

Water Recreation areas enable direct contact with the river itself through fostering low impact water-based recreation primarily for small non-motorized boats including but not limited to kayaks, stand-up paddle boards, row boats, outrigger boats, canoes and sailboats. Water Recreation areas also allow for recreational fishing, if safety can be maintained given proximities to shared uses. As delineated on the Water Use Map, Water Recreation areas have been designated adjacent to the Park's four boathouses and abutting the kayak launch area planned for the south side of the Gansevoort Peninsula. On an occasional basis and with Trust authorization, Water Recreation areas may allow small motorized vessels needed to facilitate additional Water Recreation activities, such as organized swims, sailing events and historic vessels operating infrequently under motor. In addition to organized swim events that the Trust may currently permit in this zone, in the future, if governmental agencies monitoring water quality and safety approve such use, other swimming uses could also occur in Water Recreation areas.

Motorized:

Motorized boats are small- to medium-sized vessels that normally operate under power and include but are not limited to privately owned pleasure and commercial boats; historic, research, cultural or educational vessels operating under power; and water taxis or other small to medium-sized waterborne transportation vessels. Unless expressly prohibited by sign or other navigational markings, non-motorized vessels are generally permitted in Motorized areas but should use extra caution given the potential for conflict with motorized vessels. Refer to the Water Use Map for delineation of specific Motorized use areas within the Sanctuary.

Reserve:

Areas designated as Reserve have been identified as priority locations for marine habitat preservation, enhancement, education and research. Unless expressly prohibited by sign or other navigational markings, non-motorized boating is permitted in these areas provided boaters do not disturb any features that may be deployed to enhance habitat. Refer to the attached Water Use Map for delineation of specific Reserve use areas within the Sanctuary.

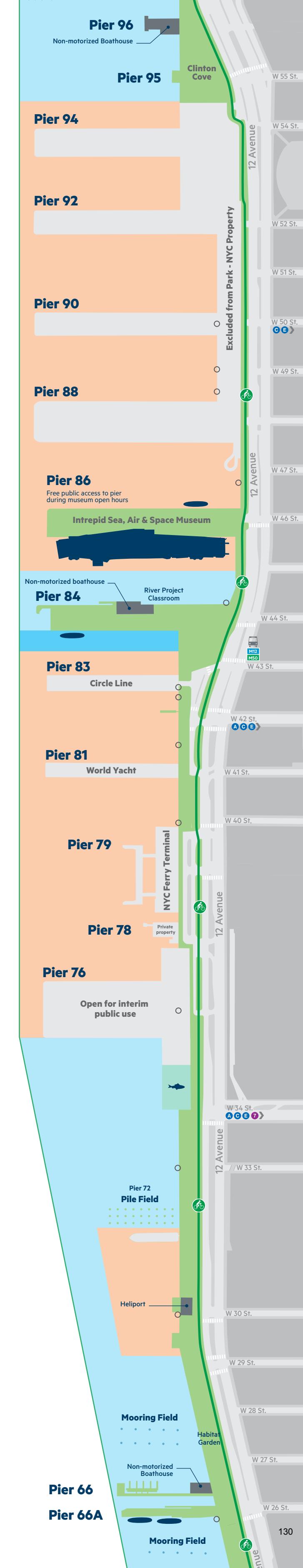
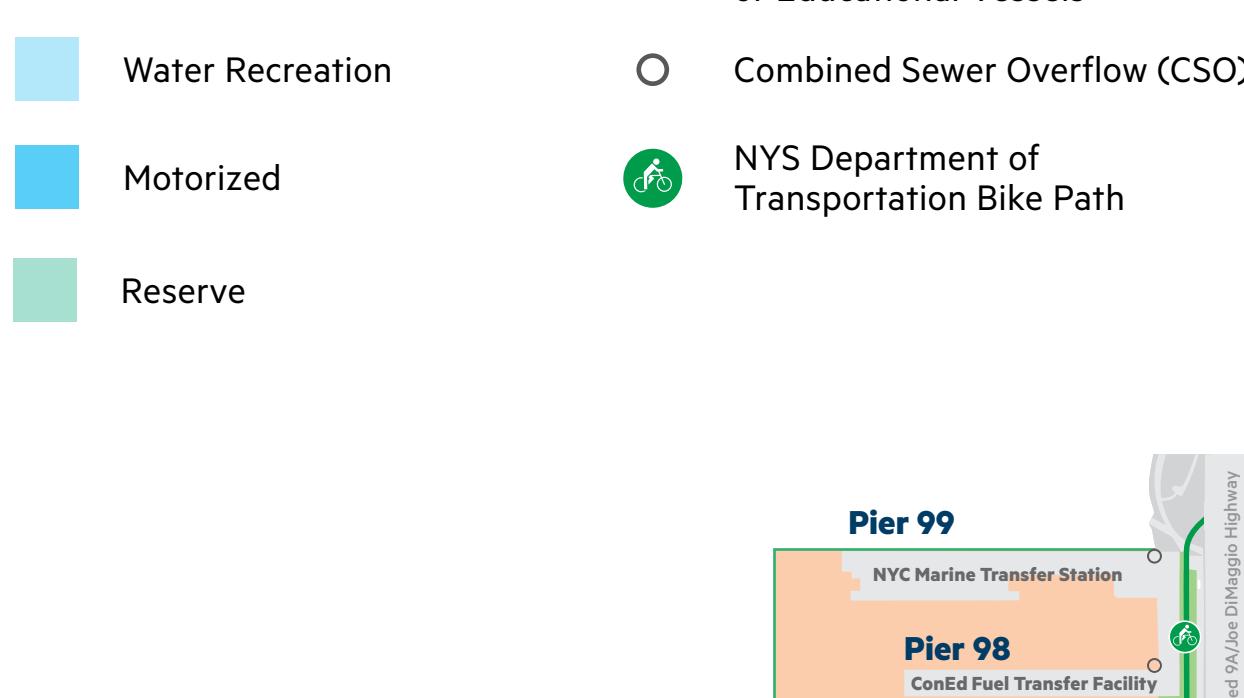
Restricted Water Dependent Commercial / Municipal:

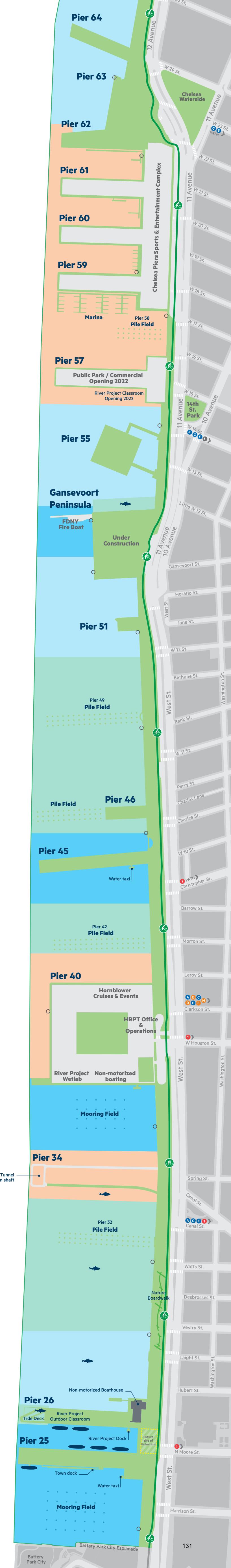
Water uses in areas with this designation are generally restricted from use by the general public for specific reasons including their exclusion from Park boundaries, safety or security concerns or active municipal or commercial uses with explicit rights to use defined water areas for designated water dependent uses with large vessels. Refer to the Water Use Map for delineation of specific Restricted use areas within the Sanctuary.

Hudson River Park

Water Use Map

September 2021





APPENDIX E

CURRENT ENVIRONMENTAL EDUCATION PROGRAMS

Hudson River Park has hosted environmental education programs for school and summer camp groups since the Park's creation. These field trips create opportunities for students to interact with the River through fun, hands-on activities that inspire the scientist within each child. The Park aims to make these programs inclusive and accessible to all and adapts lessons to reach all age groups. Field trip programs are offered year-round to visiting school and camp groups for a standard fee of \$200; however, fee waivers are awarded to Title I groups and other groups demonstrating financial need. Each year, on average, 70% of education program fees are waived to ensure programs are accessible for a diverse, city-wide audience. While programs and themes are subject to evolution and change, the following chart demonstrates the current breadth and variety of programs offered by the Park's River Project staff.

PARK EDUCATIONAL PROGRAMS FOR SCHOOLS & CAMPS		
PROGRAM	THEMES	TARGET AUDIENCE
Climate & Our Coast Examines global and local impacts of climate change by exploring the carbon cycle and constructing solutions to sea level rise.	Climate Change; Sea Level Rise; Greenhouse Gas Emissions; Sustainability	Grades 9-12
Community Conversations Students learn to devise an equitable plan for the sake of all stakeholders involved and consider the range of environmental impacts that community level decisions can have.	Environmental Justice; Community Engagement; Human Impact; Wastewater Treatment	Grades 6-12
Fish Biology Studies life in the Hudson River through activities such as catch and release fishing, interactive touch tanks and environmental DNA.	Fish Anatomy; Form and Function; Life Cycles	Grades 2-12
Fish Sampling Students learn field science techniques, collect fish from the river and identify fish species and their importance in the Hudson River ecosystem.	Fish Biology; Wildlife Survey	Grades K-12
Garden Adventures Students survey the Park's land-based plants and animals with an interactive tour of the native plant Habitat Garden or HRPK Compost Center.	Terrestrial Flora and Fauna; Migration; Compost; Ecosystem Services	Grades 2-12

PROGRAM	THEMES	TARGET AUDIENCE
INCLUDES Internship Program High school research intensive with a field-based research project, emphasizing basic data analysis work and a culminating poster presentation. A unique facet of the program is the tiered mentoring model, which features undergraduate college mentors, early-career scientists and leading researchers that facilitate the research.	Sanctuary Research; CSOs; Water Quality; Plastics; Data Analysis; STEM Leadership; STEM Communication Skills	High School Students; College Students
Junior Explorers Budding scientists observe various Park animals with scientific inquiry, nature-inspired crafts and activities.	Wildlife; Habitat; Species Anatomy; Life Cycles	Grades K-2
Maritime Voyage Discovers NYC's rich waterfront history by touring a historic vessel, investigating maritime artifacts and practicing nautical skills such as knot tying.	New York City's Maritime and Waterfront History; Navigation; Knots; Boat Design	Grades 2-12
Native Aquarium Tour Behind the scenes tour of the Wetlab's aquarium system design, NYC's only flow-through native fish aquarium.	Aquarium Design; Fish, Biodiversity; Stewardship	Grades 9-12
Oyster Ecology Builds field science skills monitoring live oysters, testing estuary health and understanding the value of oysters in the Hudson River.	Hudson River Estuary; Oysters; Water Quality; Human Impact on the Hudson River	Grades 9-12
Plankton Ecology Discusses the important role that plankton, tiny aquatic organisms, play in the ecosystem and examine various species using microscopes.	Plankton; Taxonomy; Adaptations; Food Web; Design and Engineering	Grades 2-12
Pollution Solutions Explains how wastewater is treated in NYC and students engineer solutions to water pollution by designing and testing a water filter.	CSOs; Water Quality; Plastics; Sustainability	Grades 3-8
Wetlab Tour Tour of the River Project Wetlab to meet Hudson River wildlife up close.	Fish; Wildlife Survey; Biodiversity; Hudson River Estuary Ecosystem	Grades K-12

In addition to field trips, Hudson River Park offers free and low-cost drop-in programs for the general public from June through September every year. These programs are designed to reach a wider audience than our field trip programs, and—beyond education—have the additional goal of promoting community stewardship of the Sanctuary environment. Public programs typically incorporate interactive activities that make science accessible for Park visitors of all backgrounds, ages and levels of expertise. The following chart summarizes current programs.

While Park programs have always prioritized being hands-on and in-person, the COVID pandemic has required the Park to reimagine alternative ways of serving the public through educational programming. Some public programs were able to be adapted for virtual audiences. For example, staff created the “live from the field” program offered once a week on the Trust’s social media feed as a safe alternative to the Wetlab Look-ins described below. While the Trust certainly looks forward to returning to predominantly in-person, hands-on programming, the success of some of 2020’s virtual programs at reaching an even broader and more diverse audience has inspired a plan to continue some of them even after pandemic restrictions cease.

PARK EDUCATIONAL PUBLIC PROGRAMS		
PROGRAM	THEMES	TARGET AUDIENCE
Ask a Scientist Local STEM experts and HRPK staff present current research on our local waters followed by a live Q&A session.	Hudson River Estuary Ecology; Local Research; Marine Biology	Ages 8+
Big City Fishing Adults and kids learn how to fish while engaging with Park educators about River science topics.	Catch and Release Fishing; Hudson River Estuary Ecology	Ages 5+
Community EcoPaddle Individuals support oyster research followed by an evening paddle on the Hudson River.	Oysters; Filter Feeders; Oyster Monitoring; Waterfront Recreation	Ages 8+
Diversity Digest Showcase of wildlife observations made within Hudson River Park on the iNaturalist app. Features photos submitted by community members and students.	Hudson River Estuary Ecology; Terrestrial Wildlife; Hudson River Park Ecosystem; Local Biodiversity	Ages 8+

PROGRAM	THEMES	TARGET AUDIENCE
Hudson History Walks Dynamic walking tour to discover NYC's waterfront history led by local historians.	NYC Waterfront and Maritime History; History of the Urban Environment	All Ages
Hudson River Nature Walks Guided nature walks along the Park's esplanade led by knowledgeable naturalists.	Terrestrial Wildlife; Hudson River Park Ecosystem	All Ages
Live from the Field Behind the scenes look at science in Hudson River Park. Participants tune in as Park scientists conduct research on environmental DNA, microplastics, fish populations and more.	Hudson River Estuary Ecology; Local Research; Marine Biology; Human Impact on the Hudson River	All Ages
Meet the Fishes Kickoff event of the season in the Wetlab to welcome our newest fish residents. Activities for all ages including touch tanks, catch and release fishing and more.	Fish Biology; Filter Feeders; Wildlife Survey; Life Cycles	All Ages
Open Field Lab Participatory field labs to explore current scientific research and monitoring efforts.	Water Quality; Human Impact on the Hudson River; CSOs; Plastic Reduction; Sustainability	Ages 8+
Pumpkin Smash Fall festival and family-friendly pumpkin smash to dispose of pumpkins the fun and sustainable way.	Compost; Sustainability	All Ages
Release of the Fishes Celebration at the end of the Wetlab season. Attendees help release fish, crabs, snails and other animals back into the River.	Fish Biology; Filter Feeders; Wildlife Survey; Life Cycles	All Ages
Roving River Tricycle exhibit of live Hudson River wildlife that travels through the Park.	Fish; Wildlife; Fish Anatomy; Biodiversity	All Ages
Science Saturdays Family-friendly event with catch and release fishing, microscopic investigations, science entertainment, River-inspired crafts and more.	Catch and Release Fishing; Wildlife; Hudson River Estuary Ecology; Sustainability	All Ages

PROGRAM	THEMES	TARGET AUDIENCE
Shell-ebrate Oysters Families learn the incredible history of oysters and their ecological importance while working alongside Park staff to support oyster research efforts.	NYC Waterfront History; Oyster Monitoring; Filter Feeders; Human Impact on the Hudson River	Ages 8+
SUBMERGE Marine Science Festival Daylong festival that celebrates NYC's coastal waters, brings marine science to life and makes STEM accessible and engaging for everyone.	Wildlife; Catch and Release Fishing; Plankton; Ecology; Sustainability; Marine Biology; Environmental Conservation; Waterfront Recreation; Engineering; STEM; etc.	All Ages
Sustainability Workshops Accessible workshops that bring the whole family together to learn about Hudson River Park's sustainability initiatives with interactive activities.	Compost; Recycling; Plastic Reduction	All Ages
Wetlab Look-Ins Tour of the River Project Wetlab to meet Hudson River wildlife up close.	Fish; Wildlife Survey; Hudson River Biodiversity; Water Quality	All Ages

APPENDIX F

SUMMARY CHART OF RELEVANT RESEARCH PROJECTS & STUDIES

Hudson River Park is committed to supporting and conducting research that enhances scientific knowledge of the Lower Hudson River Estuary and provides insight into best practices for habitat enhancement and wildlife preservation. Through consistent monitoring of water quality, pollution indicators and estuarine wildlife, the Park is increasing the amount and availability of valuable data that used to track the health of the Sanctuary's dynamic ecosystem. The Park also continues to partner with local researchers and institutions to expand the study of our environment. The following chart outlines current research endeavors.

SUMMARY CHART OF HUDSON RIVER PARK RESEARCH PROJECTS			
PROJECT SCOPE	DURATION / FREQUENCY	PROJECT LEADS	REPORTS & DATA
eDNA The Park samples water at three pier locations to extract and amplify latent DNA in the environment (eDNA) to gain insight into fish presence and diversity.	Samples collected 2x monthly, year-round 2019 to present	Dr. Bruce Nash, Cold Spring Harbor Lab Hudson River Park Trust	Analysis underway
Fish Ecology Survey Killie and crab traps are monitored year-round at multiple locations to survey fish population dynamics.	Traps monitored weekly, year-round 1988 to present	Hudson River Park Trust	https://hudsonriverpark.org/the-park/parks-river-project/current-research/fish-ecology-study/
HRECOS The Park maintains two continuous monitoring stations that gather hydrological and meteorological data every 15 minutes as part of the Hudson River Environmental Conditions Observation System (HRECOS) network.	Data logged every 15 minutes, year-round 2013 to present	USGS and NYSDEC Hudson River Park Trust	https://ny.water.usgs.gov/maps/hrecos/

PROJECT SCOPE	DURATION / FREQUENCY	PROJECT LEADS	REPORTS & DATA
Marine Debris With the help of volunteers, the Park counts, categorizes and removes trash from soft shorelines to examine the distribution, concentration, identity and variability of large debris in the Park's waters.	Debris collected monthly, April-October 2015 to present	Dr. Brett Branco, Brooklyn College NOAA Marine Debris Program RiverKeeper Hudson River Park Trust	https://hudsonriverpark.org/the-park/parks-river-project/current-research/marine-plastics/
Microplastics In association with Brooklyn College, the Park samples for surface microplastics at various locations to determine the baseline presence of microplastics in the water, and to examine how environmental factors and point sources of contamination affect concentration and distribution.	Trawls conducted monthly, June-October 2016 to present	Dr. Brett Branco, Brooklyn College Dr. Ashok Desphande, NOAA at Sandy Hook, NJ Hudson River Park Trust	https://hudsonriverpark.org/the-park/parks-river-project/current-research/microplastics/
Oyster Wraps Using oyster wraps fastened to piles at Pier 32, the Park is investigating the suitability of pile fields and the mesh wraps as sustainable oyster habitat by tracking growth, mortality and recruitment over time.	Oyster monitored monthly, May-October 2017 to present	Downtown Boathouse Manhattan Kayak Company Hudson River Park Trust	https://hudsonriverpark.org/the-park/parks-river-project/current-research/oysters/
Pathogens (CWQT) The Citizens' Water Quality Testing program (CWQT) initiated by the New York City Water Trails Association relies on volunteers to collect weekly water samples at 70+ sites all over the NYC metro area which are tested for fecal indicator bacteria (Enterococcus).	Water sampled weekly, May-October 2012 to present	Rob Buchanan & Nancy Brous, NYC Water Trails Association Riverkeeper Hudson River Park Trust	https://www.nycwatertrail.org/water_quality.html https://hudsonriverpark.org/the-park/parks-river-project/current-research/enterococcus-monitoring/

PROJECT SCOPE	DURATION / FREQUENCY	PROJECT LEADS	REPORTS & DATA
Pile Biodiversity In collaboration with Dr. Alison Fitzgerald of New Jersey City University, the Park monitored the biodiversity of invertebrate colonizers at six key piers.	Project commissioned May 2019 & November 2020	Dr. Alison Fitzgerald, New Jersey City University Moffat & Nichol Hudson River Park Trust	https://hudsonriverpark.org/app/uploads/2020/07/Fitzgerald_2020_HRP_Piles_Colonizing_Organisms_Report.pdf
Tide Deck Pier 26's ecological Tide Deck, an engineered wetland, is being monitored for growth of vegetation, soil and water quality and sessile invertebrate presence in transects.	2020 to present	Chris Grgenti & Jackie Wu, Randall's Island Park Alliance Hudson River Park Trust	
Tree Survey In 2016, all trees in Hudson River Park were surveyed to determine species diversity and measure ecosystem services such as stormwater mitigation and CO ₂ sequestration. This survey will be administered every five years.	2016 to present	Hudson River Park Trust	

ADDITIONAL RELEVANT RESEARCH PROJECTS & STUDIES

Hudson River Park Trust has benefited from partnerships with a number of experts and organizations who have conducted relevant research in or advanced scientific understanding about the Sanctuary. The following is a select index of relevant studies that has informed the Park's understanding of the Sanctuary, its habitat and the health of its organisms.

See Hudson River Foundation for additional [literature](#) and visit the Park's [website](#) for PDFs of the below references.

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APPENDIX G

ESMP ALIGNMENT WITH REGIONAL PLANS

Hudson River Park's Estuarine Sanctuary Management Plan (ESMP) is a powerful management tool that guides Park staff and its partners in operating and maintaining Hudson River Park. While the ESMP serves as an essential resource, it is nevertheless important to recognize that the Sanctuary area it encompasses—the open waters within Hudson River Park—is but a relatively small subset piece of the entire Hudson River, New York Harbor and surrounding watershed. Other agencies and organizations have been charged with developing management plans for these larger waterways.

The four plans referenced below include Hudson River Park's Sanctuary waters within their wider geographic jurisdictional areas. One of the goals for the 2021–2030 ESMP Action Agenda is to ensure alignment between the ESMP and these regional plans where appropriate and feasible. Accordingly, ESMP goals and actions have been formulated to build upon the outlined objectives in these regional plans.

Hudson-Raritan Estuary Comprehensive Restoration Plan

In 1999, the US Army Corps of Engineers and The Port Authority of New York and New Jersey and its partners developed the Comprehensive Restoration Plan (CRP). The plan sets forth a framework to protect existing habitats and restore habitats that have been lost over decades and even centuries of development. Following a draft version circulated in 2009, the final CRP was released in 2016. The study area for this plan covers the Hudson-Raritan Estuary and includes all of the tidally influenced portions of rivers flowing into New York and New Jersey Harbor including the Hudson, Raritan, Hackensack, Passaic, Shrewsbury and Navesink Rivers. The CRP references Hudson River Park as a restoration opportunity site within its Lower Hudson River Planning Region and references that there are opportunities within the Park's boundaries for habitat creation and enhancement. The 2021–2030 ESMP Action Agenda's Habitat Enhancement Goals (2.1–2.4) align most directly with these CRP enhancement goals.

New York-New Jersey Harbor & Estuary Program

The geographic scope of the NY-NJ Harbor & Estuary Program (HEP) includes the Harbor Estuary and extends to the watersheds of the Hudson-Raritan Estuary. The 2017–2022 HEP Action Agenda identifies 5 long-term goals, 17 objectives and 40 specific actions that will help enable people and wildlife to benefit from the fishable and swimmable waters called for by the Clean Water Act. As outlined in the chart below, there are many areas where the 2021–2030 EMSP Action Agenda aligns with and helps to further the HEP plan for this region

NYSDEC Hudson River Estuary Action Agenda 2015-2020

The geographical reach of this management plan focuses on the 5,200 square miles of the Hudson River Estuary from the Verrazano Narrows below Manhattan Island to the head of tide at the federal dam in Troy. The document is divided into six benefit areas, each of which includes long-range vision statements and priority targets, as well as measurable outcomes and a selection of actions to be pursued. As outlined in the chart below, the 2021–2030 ESMP Action Agenda intersections with NYSDEC's overarching Hudson River Estuary Action Agenda in numerous respects.

Vision 2020 NYC Comprehensive Waterfront Plan

In March 2011, NYC published Vision 2020: New York City Comprehensive Waterfront Plan. This plan set forth a city-wide, 10-year vision for the future of the city's 520 miles of shoreline. It includes a summary of plans for finishing planned piers and places within Hudson River Park in alignment with the Hudson River Park Act.

Summary Chart:

The following chart was prepared in consultation with staff from HEP and NYSDEC's Hudson River Estuary Program to highlight areas where ESMP goals and objectives for the 2021–2030 Action Agenda relate to similar objectives for these other planning documents.

ENVIRONMENTAL EDUCATION

ESMP	HEP	HREP
Goal 1: Use the Sanctuary as the inspiration and setting for high quality environmental education programs and resources that serve the broadest spectrum of Park audiences.	Objective CE-C-2: Support educational programs, including the sharing of best practices among providers.	Benefit: An Informed and Engaged Public Strategy 1: Engaging local communities and visitors Strategy 2: Educating students and young people Strategy 4: Building education capacity and excellence
Goal 2: Expand Park educational venues to increase the range and reach of both spontaneous and structured learning opportunities.	Objective CE-C-2: Support educational programs, including the sharing of best practices among providers.	Benefit: An Informed and Engaged Public Strategy 1: Engaging local communities and visitors Strategy 2: Educating students and young people Strategy 4: Building education capacity and excellence

ESMP	HEP	HREP
Goal 3: Foster community science and cultivate partnerships to empower current and future Hudson River stewards.	Objective CE-A-2: Publicize and otherwise support means of connecting volunteers with opportunities to participate in Citizen Science efforts. Objective PA-C-2: Encourage and support public participation in water-based activities.	Benefit: An Informed and Engaged Public Strategy 1: Engaging local communities and visitors Strategy 2: Educating students and young people Strategy 4: Building education capacity and excellence
Goal 4: Promote sustainability and offer programs that build positive environmental behaviors in the Park and beyond.	Objective CE-C-2: Support educational programs, including the sharing of best practices among providers. Objective WQ-B-5: Reduce sources and develop solutions for trash and floatables in both CSO and MS4 areas.	Benefit: An Informed and Engaged Public Strategy 1: Engaging local communities and visitors

RESEARCH & HABITAT ENHANCEMENT

ESMP	HEP	HREP
Goal 1: Significantly increase knowledge of Estuarine Sanctuary baseline conditions and trends through continuous monitoring and targeted research of biological and geophysical conditions.	Objective H-B-2: Assess and interpret shoreline and shallow-water habitat condition and value. Objective WQ-C-1: Design an intensive pathogen monitoring and notification plan in select near-shore areas. Objective 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.	Benefit: Robust River Habitats Strategy 1: Assess and prioritize management options and restoration opportunities Benefit: Clean Hudson River Water Strategy 1: Measure and monitor pollutants of concern Strategy 3: Assess and prioritize water quality project and wastewater needs

ESMP	HEP	HREP
Goal 1 Cont'd: Significantly increase knowledge of Estuarine Sanctuary baseline conditions and trends through continuous monitoring and targeted research of biological and geophysical conditions.	<p>Objective WQ-E-1: Support and share research to assess climate change impacts on water quality and hydrology.</p> <p>Objective 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.</p> <p>Objective H-C-1: Increase support for monitoring and consistency among metrics.</p> <p>Objective MA-A-1: Map current sediment quality conditions in the Estuary and identify changes over the last 15 years.</p> <p>Objective PA-C-1: Increase understanding of the safety and risks associated with direct contact with the water.</p>	<p>Benefit: Sustainable Estuarine Fisheries</p> <p>Strategy 1: Continue cutting-edge fisheries science and research to inform adaptive management decisions and test new data collection techniques to reduce uncertainty</p>
Goal 2: Develop and implement a phased and adaptive program of physical habitat enhancements targeted at improving water quality and species productivity.	<p>Objective H-A-1: Increase investment in conservation and restoration projects.</p> <p>Objective H-B-2: Assess and interpret shoreline and shallow-water habitat condition and value.</p>	<p>Benefit: Robust River Habitats</p> <p>Strategy 1: Assess and prioritize management options and restoration opportunities</p> <p>Strategy 2: Build capacity in the resource management community</p> <p>Strategy 3: Plan and implement projects to improve, restore and build resiliency</p> <p>Benefit: Clean Hudson River Water</p> <p>Strategy 4: Implement water quality improvements</p> <p>Benefit: Conserved Natural Areas for wildlife, source water, climate resilience, and scenery</p> <p>Strategy 1: Scientific study and research</p>

ESMP	HEP	HREP
Goal 3: Collect, synthesize and share data gained from habitat enhancement monitoring and research to inform future Sanctuary enhancement and management practices and public understanding of its value.	<p>Objective CE-A-1: Identify, create and/or publicize shared protocols for habitat and water quality monitoring by civic organizations.</p> <p>Objective H-C-2: Synthesize existing monitoring data to better understand and communicate trends.</p> <p>Objective H-B-1: Share research and best practice among partners.</p> <p>Objective WQ-B-3: Synthesize information on LTCP/CSO controls and MS4 permit implementation to determine the effects on shared waters.</p>	<p>Benefit: An Informed and Engaged Public Strategy 1: Engaging local communities and visitors Strategy 4: Building education capacity and excellence</p> <p>Benefit: Conserved Natural Areas for wildlife, source water, climate resilience, and scenery Strategy 1: Scientific study and research</p>

PUBLIC ACCESS & RESOURCE MANAGEMENT

ESMP	HEP	HREP
Goal 1: Complete public open space portions of Hudson River Park to provide access to the Sanctuary.	Objective PA-A-1: Advance opportunities for increasing public access, particularly in areas of higher need.	<p>Benefit: An Accessible Hudson River for People of All Ages and Abilities Strategy 3: Implement Construction/Site Improvements</p> <p>Benefit: Robust River Habitats Strategy 3: Plan and implement projects to improve, restore, and build resiliency</p>

ESMP	HEP	HREP
Goal 2: Implement new sustainability measures to protect the integrity of the Sanctuary and to increase public stewardship of natural resources.	<p>Objective WQ-B-5: Reduce sources and develop solutions for trash and floatables in both CSO and MS4 areas.</p> <p>Objective PA-B-1: Identify and support strategies for increasing public stewardship in higher need areas.</p> <p>Objective WQ-B-2: Support implementation of green infrastructure opportunities in CSO and MS4 communities.</p> <p>Objective H-D-1: Ensure incorporation of sea level rise into restoration and management practices.</p>	<p>Benefit: An Accessible Hudson River for People of All Ages and Abilities Strategy 2: Best management practices (BMPs), technical assistance and capacity building</p> <p>Benefit: Resilient Waterfront Communities Strategy 3: Help advance federal, state, and local policy to promote resilient communities and nature-based approaches</p>
Goal 3: Manage the Sanctuary to support a wide range of water-dependent activities while preserving habitat and minimizing in-water conflicts.	<p>Objective PA-A-2: Assess prospects and refine goals for increasing direct access for boating, swimming, and wading, incorporating associated water quality considerations.</p>	<p>Benefit: Clean Hudson River Water Strategy 3: Assess and prioritize water quality project and wastewater needs Strategy 4: Implement water quality improvements</p> <p>Benefit: Robust River Habitats Strategy 2: Build capacity in the resource management community</p>
Goal 4: Seek ways to increase access and enhance safety for Sanctuary visitors.	<p>Objective PA-C-1: Increase understanding of the safety and risks associated with direct contact with the water.</p> <p>Objective PA-C-2: Encourage and support public participation in water-based activities.</p> <p>Objective PA-A-1: Advance opportunities for increasing public access, particularly in areas of higher need.</p>	<p>Benefit: An Accessible Hudson River for People of All Ages and Abilities Strategy 3: Implement Construction/Site Improvements</p> <p>Benefit: An Accessible Hudson River for People of All Ages and Abilities Strategy 2: Best management practices (BMPs), technical assistance and capacity building</p>
Goal 5: Offer a diverse range of activities and programs that are welcoming to all visitors and invite access to the Sanctuary by leveraging partnerships.	<p>Objective PA-C-2: Encourage and support public participation in water-based activities.</p> <p>Objective PA-A-1: Advance</p>	<p>Benefit: An Informed and Engaged Public Strategy 4: Building education capacity and excellence</p>

ESMP	HEP	HREP
Goal 5 Cont'd: Offer a diverse range of activities and programs that are welcoming to all visitors and invite access to the Sanctuary by leveraging partnerships.	opportunities for increasing public access, particularly in areas of higher need.	
Goal 6: Continue to seek ways to fund Sanctuary goals and initiatives	Objective H-A-1: Increase investment in conservation and restoration projects.	Benefit: An Accessible Hudson River for People of All Ages and Abilities Strategy 3: Implement Construction/Site Improvements Strategy 5: Integrate agency programs to maximize resources