Natural Resources

3.5.1 Introduction

The *City Environmental Quality Review (CEQR) Technical Manual* defines natural resources as New York City's "biodiversity (plants, wildlife and other organisms); any aquatic or terrestrial areas capable of providing suitable habitat to sustain the life processes of plants, wildlife, and other organisms; and any areas capable of functioning in support of the ecological systems that maintain the City's environmental stability." Under CEQR, a natural resources assessment should be prepared if natural resources are present on or near a project site and disturbance to those natural resources have the potential to occur due to a proposed project.

This chapter describes existing natural resources in the natural resources Study Area, as defined below, and evaluates the potential effects resulting from implementation of the North/West Battery Park City Resiliency Project (the Proposed Project) in accordance with the New York State Environmental Quality Review Act (SEQR) and CEQR. These natural resources include groundwater, floodplains, wetlands, aquatic resources, terrestrial resources (i.e., wildlife and ecological communities), protected species, and sensitive habitats. Chapter 3.11, "Construction," documents potential construction period impacts to natural resources.

3.5.2 Principal Conclusions

3.5.2.1 Floodplains

Once the Proposed Project is installed, it would improve the resilience of Battery Park City the upland streets and properties in the protection zone (i.e., the Protected Area) to design storm events and sea level rise. Once installed, the flood barrier system would be accredited by the Federal Emergency Management Agency (FEMA), which would remove the Protected Area landward of the flood barrier system from the current mapped flood hazard area. Therefore, the Proposed Project would not result in any significant adverse impacts to floodplains.

3.5.2.2 Groundwater

The Proposed Project would not adversely affect groundwater resources. Groundwater is not used as a potable water source in Manhattan and the Proposed Project would not involve any use or drawdown of groundwater during its operation. During a design storm event, the inundation and rise in surface water levels may result in a temporary elevation of groundwater levels, which would return to typical levels after the storm event. The flood barrier system's below-grade system of cut-off walls would provide some protection from elevated groundwater during a design storm event and would allow groundwater to follow its existing flow patterns during baseline conditions. Therefore, it is concluded that the Proposed Project would not result in any significant adverse impacts to groundwater.

3.5.2.3 Wetlands

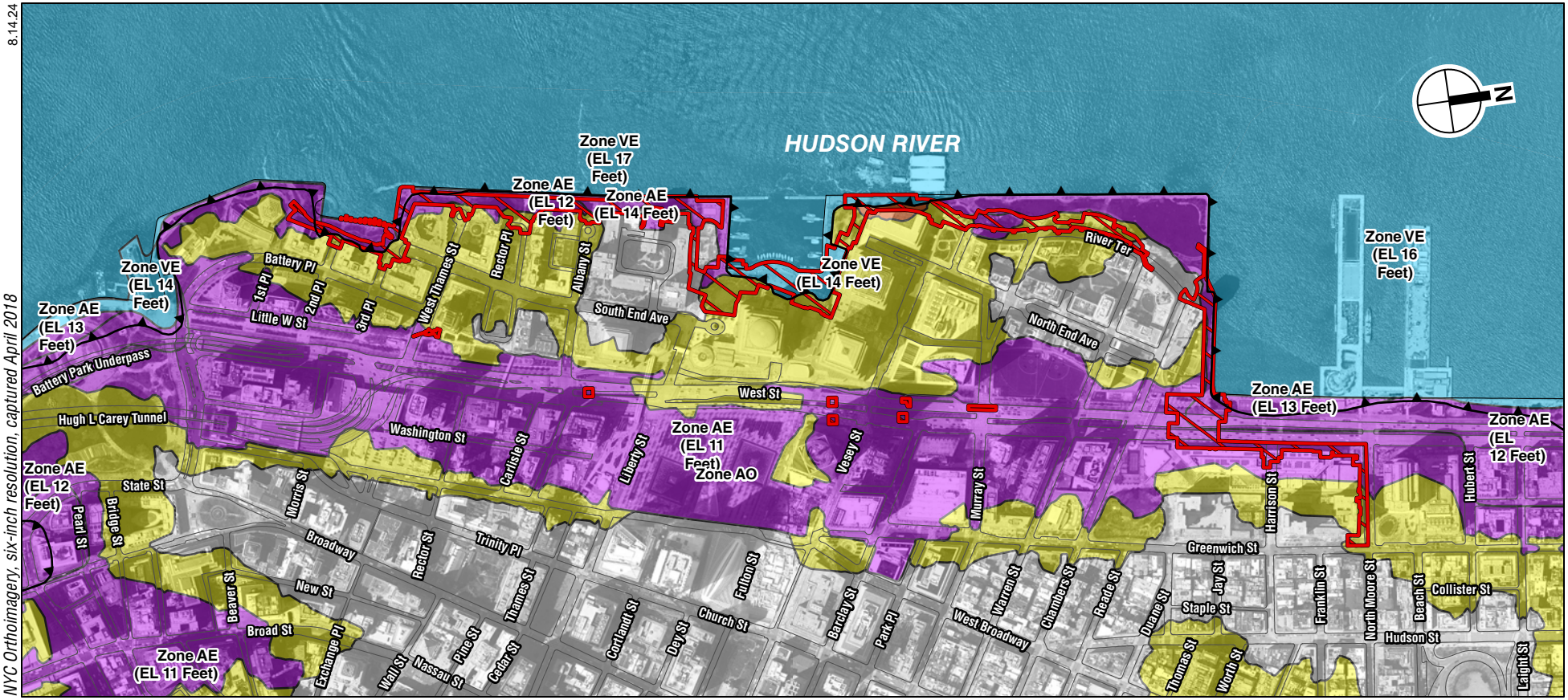
In-water elements of the Proposed Project are comprised primarily of new piles, construction of precast concrete and sheet pile seepage barriers, concrete bridging structures, and placement of low permeability clean fill as part of the flood barrier system. In total, the permanent in-water elements of the Proposed Project would result in the permanent loss of 21,504 square feet (0.5 acres) of benthic habitat and 7,892 cubic yards of water column below spring high waters (SHW) (**Figure 3.5-1**). Of these impacts, approximately 2,383 cubic yards would be within a 14,075-square foot (0.32-acre) area in waters 6 feet deep or less at mean low water (MLW) (**Figure 3.5-2**). This would result in a minimal loss of New York State Department of Environmental Conservation (NYSDEC) littoral zone tidal wetlands that would be offset using compensatory mitigation developed in coordination with NYSDEC.

Given the inability to provide onsite wetland mitigation to offset the proposed project fill, to address this impact the proposed mitigation for the Proposed Project is the purchase of tidal wetland mitigation bank credits from the Saw Mill Creek Wetland Mitigation Bank (Staten Island, New York). In addition, to the mitigation, the Proposed Project is also considering in-water ecological enhancements on bulkhead segments and a number of existing and proposed piles within Reaches 2, 6, and 7, and any such ecological enhancements would be completed prior to the completion of the Proposed Project at the end of 2030. Soil erosion and sediment control Best Management Practices during construction are also described in Chapter 3.11, "Construction."

3.5.2.4 Aquatic Resources

Improvements to stormwater management with the Proposed Project, including increased storage capacity and the implementation of green infrastructure, would minimize the potential effects of stormwater runoff on water quality and aquatic resources. As described above, the permanent loss of 21,504 square feet (0.5 acres) of benthic habitat and 7,892 cubic yards of water column below SHW (7,606 cubic yards below MHW) would result in a minimal change in foraging habitat for striped bass and other fish species when compared to the amount of similar habitat available in the lower Hudson River that would not be affected by the Proposed Project and would not result in significant adverse impacts to aquatic biota. The platform reconstruction at Reach 2 would result in an increase of 4,404 square feet (0.1 acre) in overwater coverage, which would result in a minor increase in shading when compared to the No Action condition. The 6-foot northward expansion of the Reach 2 platform aims to create an enduring and resilient structure that has additional structural capacity to provide flexibility and adaptability for future protective and resiliency measures that could be built on top of the new platform if additional wave attenuation becomes necessary due to dynamic climate and sea level conditions, without the need to replace the full platform. Given that the proposed extension in Reach 2 is only 6 feet, there is a limited potential for the incremental increase to result in shading effects on aquatic habitat. In addition, submerged aquatic vegetation (SAV) has not been observed in the Study Area, so the increase in shading would not inhibit SAV growth.

The excavation or displacement of sediment in Reach 5 required for the installation of the bridging structures over the Port Authority of New York and New Jersey (PANYNJ) PATH tunnels would not result



Data sources: FEMA, January 2015 / NYS GIS Program Office; NYC Orthoimagery, six-inch resolution, captured April 2018

8.14.24

Project Area

1% Annual Chance of Flooding - Zone AE

1% Annual Chance of Flooding - Zone AO

1% Annual Chance of Flooding - Zone VE

0.2% Annual Chance of Flooding

Limit of Moderate Wave Action

FEMA Preliminary FIRM 2015

NORTH/WEST BATTERY PARK CITY RESILIENCY

Figure 3.5-1

Data sources: U.S. Fish and Wildlife Services, December 2021; NYC Orthoimagery, six-inch resolution, captured April 2018

6.26.24

Project Area

Estuarine and Marine Deepwater (E1, M1)

NWI Wetlands

NORTH/WEST BATTERY PARK CITY RESILIENCY

Figure 3.5-2

in significant adverse impacts to benthic habitat. The bridging structures would remain open during normal conditions to allow tidal exchange between the Hudson River and the waters above the PATH tubes and would only close during a design storm event for up to 72 hours. Dissolved oxygen modeling indicates that closure of the bridging structures would not affect dissolved oxygen levels behind the structure and, therefore, would not result in significant adverse impacts to aquatic habitat or Waters of the U.S. (WOTUS) when compared to the No Action condition.

Therefore, it is concluded that the proposed project would not result in any significant adverse impacts on aquatic habitat.

3.5.2.5 Essential Fish Habitat, Significant Coastal Fish and Wildlife Habitat, and Hudson River Park Estuarine Sanctuary

Because the Proposed Project would not result in significant adverse impacts to aquatic biota, water quality, or sediment quality, it would not result in any significant adverse impacts to aquatic habitat, including those associated with designated Essential Fish Habitat (EFH), or the defining characteristics of the Lower Hudson Reach Significant Coastal Fish and Wildlife Habitat (SCFWH) or the Hudson River Park Estuarine Sanctuary.

3.5.2.6 Terrestrial Resources

The Proposed Project's landscaping plan will include a variety of native plants that are designed to enhance the diversity of ecological communities within the Project Area consistent with the Battery Park City Sustainability Plan[1] and would benefit terrestrial resources in the Study Area. Replacement and transplanted, as well as newly planted shrubs and herbaceous plants would provide habitat and foraging opportunities for wildlife and implementation of the flood barrier system would protect terrestrial resources within the Protected Area in the Study Area during future storm events when compared to the No Action condition.

As part of the design of the Proposed Project, BPCA has prepared plans that identify the trees that need to be removed and those trees that are to be protected, including trees that may possibly be pruned. The plans also identify new trees to be planted. See Chapter 1.0, "Project Description," for details on the tree removals and plantings. In total, approximately 420 trees would be removed in the Project Area, of which approximately 21 trees are street trees in Reach 1 under NYC Parks jurisdiction. Approximately 42 of the approximately 420 trees would be removed due to condition, not the project design. Approximately 17 trees are potential candidates for transplant within the Study Area. After construction, approximately 390 trees would be planted within the Project Area, of which 15 trees would be under NYC Parks jurisdiction. For the trees removed in Reach 1 that are under NYC Parks jurisdiction, Battery Park City Authority (BPCA) is proposing to replace as part of the project the trees that would be removed in a manner that is consistent with the requirements of NYC Parks and in accordance with Chapter 5 of Title 56 of the Rules

[1] Battery Park City Sustainability Plan. September 2020. Available from: https://bpca.ny.gov/nature-and-sustainability/sustainability/

of the City of New York (NYC Parks Rules) and Local Law 3 of 2010. Within the remainder of the Project Area, BPCA would replace the removed trees in a manner that would best support and enhance open space quality, biodiversity and habitat creation, and climate resilience. With these measures in place, the Proposed Project would not result in adverse impacts to terrestrial resources.

Therefore, it is concluded that the proposed project would not result in any significant adverse impacts on trees.

3.5.2.7 Threatened, Endangered, and Special Concern Species

Because the post-construction landscape design would replace existing trees, shrubs, and herbaceous plants disturbed during installation of the FBS with native and adapted plants, the Proposed Project would not result in changes to the available habitat for monarch butterfly (*Danaus plexippus*; federal candidate species[2]), willow oak (*Quercus phellos*; state-listed endangered[3]) or northern long-eared bat (*Myotis septentrionalis*; federally and state-listed endangered) when compared to the No Action condition. Therefore, the Proposed Project would not have the potential to adversely affect these species. The Proposed Project would not modify any critical habitat for Atlantic sturgeon with the permanent loss of 0.5 acres of soft bottom habitat and shading of 4,404 square feet (0.1 acre) of water column, and this represents a small area relative to the thousands of acres of available foraging habitat suitable for sturgeon in the Hudson River. Additionally, the majority of the impacted area is beneath existing overwater platforms at the Project Site. The in-water elements of the Proposed Project would not add a physical barrier to passage or result in a significant loss of foraging habitat. Threatened and endangered sea turtles and sturgeon are potentially in the waters of the Project Site only as transient individuals, and the Proposed Project is unlikely to adversely affect these species.

Therefore, it is concluded that the proposed project would not result in any significant adverse impacts on protected species.

3.5.3 Regulatory Context

3.5.3.1 Federal

Clean Water Act (33 United States Code [USC] §§ 1251 to 1387)

The objective of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the waters of the United States. It regulates point sources of water pollution, such as discharges of municipal sewage, industrial wastewater, and stormwater runoff; the discharge of dredged

[2] The monarch butterfly is a candidate species for federal listing and currently does not have any protection under Section 7 of the Endangered Species Act. Consultation or conference (formal or informal) with the U.S. Fish & Wildlife Service (USFWS) is not required at this time.

[3] The willow oaks in the study area are planted trees and are not protected by Environmental Conservation Law §9-1503. No further review under 6 NYCRR 193 is required.

or fill material into navigable waters and other waters of the United States; and non-point source pollution (e.g., runoff from streets, construction sites, etc.) that enter waterbodies from sources other than the end of a pipe. Section 404 of the Act requires authorization from the Secretary of the Army, acting through the U.S. Army Corps of Engineers (USACE), for the discharge of dredged or fill material into waters of the United States.

Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act of 1899 requires authorization from the Secretary of the Army, acting through the USACE, for the construction of any structure in or over any navigable water of the United States, the excavation from or deposition of material in these waters, or any obstruction or alteration in navigable waters of the United States. The purpose of this Act is to protect navigation and navigable channels. Any structures placed in or over navigable waters, such as pilings, piers, or bridge abutments up to the MHW line, are regulated pursuant to this Act.

Magnuson-Stevens Fishery Conservation and Management Act (16 USC §§ 1801 to 1883)

Section 305(b)(2)-(4) of the Magnuson-Stevens Fishery Conservation and Management Act outlines the process for the National Oceanic and Atmospheric Administration (NOAA) Fisheries and the Regional Fishery Management Councils (in this case, the Mid-Atlantic Fishery Management Council) to comment on activities proposed by federal agencies (issuing permits or funding projects) that may adversely impact areas designated as EFH. EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 USC §1802[10]).

Adverse impacts on EFH, as defined in 50 CFR 600.910(A), include any impact that reduces the quality and/or quantity of the EFH and may include:

- Direct impacts, such as physical disruption or the release of contaminants;
- Indirect impacts, such as the loss of prey or reduction in the fecundity (number of offspring produced) of a managed species; and
- Site-specific or habitat-wide impacts that may include individual, cumulative, or synergetic consequences of a federal action.

Migratory Bird Treaty Act (16 USC §§ 703 to 712)

The Migratory Bird Treaty Act states that, unless permitted, it is unlawful to pursue, hunt, take, capture, kill, or sell any of the species listed in Code of Federal Regulations Title 50 §10.13. Over 800 species are currently protected under the Act.

Endangered Species Act of 1973 (16 USC §§ 1531 to 1544)

The Endangered Species Act of 1973 recognizes that endangered species of wildlife and plants are of aesthetic, ecological, educational, recreational, and scientific value to the nation and its people. The Act also provides for the protection of critical habitats on which endangered or threatened species depend

for survival. It prohibits the importation, exportation, taking, possession, and other activities involving illegally taken species covered under the Act, and interstate or foreign commercial activities.

Fish and Wildlife Coordination Act (PL 85-624; 16 USC 661-667D)

The Fish and Wildlife Coordination Act entrusts the Secretary of the Interior and NOAA Fisheries with providing assistance to, and cooperation with, federal, state, and public or private agencies and organizations to ensure that wildlife conservation receives equal consideration and coordination with other water-resource development programs. These programs can include the control (such as a diversion), modification (such as channel deepening), or impoundment (dam) of a body of water.

3.5.3.2 New York State

Endangered and Threatened Species of Fish and Wildlife; Species of Special Concern New York Environmental Conservation Law [ECL], Sections 11-0535[1]-[2], 11-0536[2], [4], Implementing Regulations 6 New York Code of Rules and Regulations [NYCRR] PART 182)

These regulations prohibit the taking, import, transport, possession, or selling of any endangered or threatened species of fish or wildlife, or any hide, or other part of these species as listed in 6 NYCRR § 182.6, and the adverse modification of occupied habitat of endangered or threatened species without authorization from NYSDEC.

Protection of Waters, Article 15, Title 5, ECL, Implementing Regulations 6 NYCRR Part 608

The Protection of Waters Permit Program regulates activities that affect surface waters (streams, lakes, and ponds) of New York State. Surface water and groundwater quality standards and effluent limitations in New York State are regulated pursuant to 6 NYCRR Parts 701 and 703. Part 701, Classifications–Surface Waters and Groundwater, assigns specific categories to New York waters. These standards establish the designated uses to be achieved and specify the water quality criteria necessary to protect surface waters. As a State entity, with the exception of 6 NYCRR Part 608.9 (water quality certifications), BPCA is not subject to these requirements.

State Pollutant Discharge Elimination System (SPDES) (ECL Article 3, Title 3; Article 15; Article 17, Titles 3, 5, 7, 8; Article 21; Article 70, Title 1; Article 71, Title 19; Implementing Regulations 6 NYCRR Part 750)

Title 8 of ECL Article 17 authorizes the creation of the State Pollutant Discharge Elimination System (SPDES) to regulate discharges to New York State's waters. Activities requiring a SPDES permit include point source discharges of wastewater into surface or groundwater of the State, including the intake and discharge of water for cooling purposes, constructing or operating a disposal system, discharge of stormwater runoff, and construction activities that disturb one or more acres.

Tidal Wetlands Act (ECL Article 25, 6 NYCRR Part 661)

Tidal wetland regulations apply anywhere tidal inundation occurs on a daily, monthly, or intermittent basis. In New York, tidal wetlands occur along the tidal waters of the Hudson River up to the salt line and along the saltwater shores, bays, inlets, canals, and estuaries of Long Island, New York City, and Westchester County. NYSDEC administers the tidal wetlands regulatory program and the mapping of the State's tidal wetlands. A permit is required for activities that would alter NYSDEC mapped tidal wetlands or tidal wetland adjacent area (TWAA).

Grants of Lands Under Water (Public Lands Law, Section 75)

Underwater lands, unless otherwise granted, are held in trust for the people of the State of New York and managed by the Office of General Services. Section 75 of the Public Lands Law authorizes grants, leases, easements, and lesser interests, including permits, for the use of state-owned land underwater consistent with the public interest in the use of state-owned lands underwater for purposes of navigation, commerce, fishing, bathing, and recreation; environmental protection; and access to the navigable waters of the state; with due regard for the need of affected owners of private property to safeguard their property. Permission may be required to build on these lands, including docks, boathouses, or marinas, or to install utilities over or through such lands.

3.5.3.3 Hudson River Park Estuarine Sanctuary Management Plan

The Hudson River Park Estuarine Sanctuary Management Plan, developed by Hudson River Park Trust, identifies management policies for the Hudson River Park Estuarine Sanctuary with respect to resource protection and preservation, public access and recreation, education, and research activities. The purpose of the Sanctuary Management Plan is to provide guidance on balancing the needs of these various park uses and identify procedures for monitoring and enforcing park policies, laws, and regulations to manage and protect the Hudson River and the Hudson River Park Estuarine Sanctuary. The preservation objectives focus on controlling the solid waste and water pollution that may result from waterfront activities while improving water quality, aquatics, wildlife habitat, and promoting native species and sustainable design. The Hudson River Park Estuarine Sanctuary Management Plan goals include improving waterfront access, enhancing in-water safety, and encouraging the use of the waterfront through special events and programs. Educational objectives include expanding learning opportunities within the Hudson River Park Estuarine Sanctuary through special programs and facilities and developing partnerships with local and regional educational organizations. Research goals focus on analyzing the river habitats and their relationships with biotic and abiotic sources, assessing impacts of development activities, and developing methods for habitat improvement. Reach 2 is within the portion of the sanctuary designated for use by motorized boats in the Management Plan.

3.5.3.4 New York City

Title 56 Chapter 5 of the Rules of New York City, NYC Parks

The Title 5 Chapter 56 Rules require the review and approval of tree removals and restitution for trees under the jurisdiction of NYC Parks. NYC Parks has jurisdiction over trees growing in the public right-of-way, including trees along streets and parkways, and in City parks. NYC Parks Forestry Division evaluates the trees proposed for removal and determines the restitution value. In addition to the Rules, work within 50-feet of a street or park tree requires a Tree Work Permit from NYC Parks prior to the start of construction to ensure measures such as tree protection are made to avoid unsafe or hazardous conditions that may be detrimental to any City tree. NYC Parks jurisdiction does not extend to trees lawfully maintained by other entities, including BPCA.

3.5.4 Methodology

3.5.4.1 Study Area

The Study Area for the natural resources assessment was generally determined to be the Project Area, as shown in Figure 1-1 in Chapter 1.0, "Project Description." This Study Area is primarily an urban environment with previously disturbed paved surfaces, urban buildings, landscaped gardens, and mowed and maintained parkland. The Study Area for threatened, endangered, and special concern species and significant natural communities is the Project Area and a 0.5-mile area surrounding the Project Area. The Study Area for water and sediment quality and aquatic resources includes the lower Hudson River within and adjacent to the Project Area.

3.5.4.2 Existing Conditions

Existing conditions in the Study Area were determined based on information from the following databases and resources:

- NYSDEC Environmental Resource Mapper, tidal wetland maps, 2000-2005 Breeding Birds Atlas Results for Block 5750B, 2020-2024 Breeding Bird Atlas results for the Jersey City NE and CE United States Geological Survey (USGS) Quadrangles, and Herp Atlas Project results for the Jersey City USGS Quadrangle;
- NOAA Fisheries EFH Mapper and Endangered Species Act (ESA) Section 7 Mapper;
- U.S. Environmental Protection Agency (EPA) MyWaterway analysis tool;
- USFWS National Wetland Inventory (NWI) Mapper and Information for Planning and Consultation (IPaC) System list of federally endangered, threatened, proposed, and candidate species and list of migratory birds (accessed on February 19, 2024);
- FEMA preliminary Flood Insurance Rate Maps (FIRMs);
- New York City Department of Environmental Protection (NYCDEP) Harbor Survey water quality data;

- New York Natural Heritage Program (NYNHP) response to a request for information about rare, threatened, endangered, and special concern species and significant habitats within 0.5 miles of the Study Area dated November 8, 2022;
- New York State Environmental Assessment Form (EAF) Mapper for information about rare, threatened, endangered, and special concern species and significant natural communities (accessed on February 19, 2024);
- North/West Battery Park City Resiliency Project Arborist Report dated December 13, 2023;
- An underwater inspection conducted in January 2024 to establish the existing mudline and limit of tidal wetlands within the Project Site; and
- A reconnaissance investigation on May 11, 2022 to identify terrestrial resources in the Study Area.

3.5.4.3 No Action Conditions

The No Action condition considers regional changes in natural resources, including water quality conditions, that are expected as a result of ongoing local and interagency initiatives, potential benefits of water quality improvements to biological communities, and any planned or ongoing in-water construction activities in the immediate vicinity of the Study Area that are independent of the Proposed Project. Because the analysis year in this EIS is 2030, no substantive changes in natural resources conditions are expected.

3.5.4.4 Proposed Action Conditions

The Proposed Project's potential impacts to natural resources were evaluated by considering:

- Direct and indirect impacts on the Hudson River and tidal wetlands in the Study Area;
- Direct and indirect impacts on wildlife, including resident or migratory species, endangered, threatened, or rare animal species or species of special concern; and
- Direct impacts to trees and plantings due to post-construction tree replanting and landscape design.

3.5.5 Existing Conditions

3.5.5.1 Groundwater

As discussed in Chapter 3.6, "Hazardous Materials," groundwater within the upland portions of the Study Area was encountered approximately 9 to 14 feet below grade and has been found to have elevated concentrations of certain contaminants generally consistent with the placement of historic fill, but is not used as a source of potable water.

3.5.5.2 Floodplains

New York City flood conditions include local or street flooding (e.g., flooding due to short-term, high-intensity rain events coupled with inadequate drainage), fluvial flooding (e.g., rivers and streams overflowing their banks), and coastal flooding (e.g., high tides or winds that cause flooding along the City's tidal zones). In New York City, coastal flooding is the primary cause of area-wide flooding (FEMA 2013).

FEMA released preliminary FIRMs on January 30, 2015, that are subject to future adoption of final FIRMs. The preliminary FIRMs represent the best available flood hazard data. FEMA encourages communities to use the preliminary FIRMs when making decisions regarding floodplain management until final maps are completed. As shown in **Figure 3.5-3,** the majority of the Study Area is within the 100-year floodplain (Zone AE, Zone AO, and Zone VE; 1 percent annual chance flood hazard) and 500-year floodplain (Zone X; 0.2 percent annual chance flood hazard). The Base Flood Elevations (BFE) on **Figure 3.5-3** identify the elevation of flooding for the 1 percent annual chance floodplains.

Based on the 2015 FEMA preliminary FIRMs, portions of the Study Area are in Zone AE (the area of high flood risk subject to inundation by the 1 percent annual-chance flood) with BFEs ranging from +11 feet to +14 feet North American Vertical Datum of 1988 (NAVD88). The +11-foot BFE mainly includes areas along Route 9A/West Street, with higher BFEs mapped closer to the river. A small portion of the Study Area at the North Cove Marina is in Zone AO, which identifies an area with a 1 percent or greater annual chance of shallow flooding (i.e., 1 to 3 feet), usually in the form of sheet flow. Zone AO usually marks areas at risk of flooding from wave overtopping. There is no mapped BFE for Zone AO in the Study Area. In the Hudson River waterward of the bulkhead line, the Study Area is in Zone VE (the area of high flood risk subject to inundation by the 1 percent annual-chance flood with additional hazards due to storm induced velocity wave action) with a BFE of +17 feet NAVD88. Zone VE marks the area exposed to wave heights of 3 feet or more. Small sections of shoreline in the southern portion of the Study Area are also within the Coastal A Zone, which is the area between Zone AE and Zone VE that is susceptible to waves measuring 1.5 to 3 feet in height. The Limit of Moderate Wave Action, which marks the inland limit of the Coastal A Zone, closely follows the shoreline of the Study Area and moves inland from the bulkhead approximately between 1st Place and West Thames Street. The Study Area along this section of shoreline is mapped as Coastal A Zone and is within Zone AE with BFEs of +12 feet and +13 feet NAVD88.

3.5.5.3 Wetlands

NWI-mapped wetlands within the Study Area comprise the lower Hudson River, which is mapped as an estuarine subtidal wetland with an unconsolidated bottom (E1UBL) (see **Figure 3.5-4**). NYSDEC-mapped littoral zone tidal wetlands are present within the Study Area (see **Figure 3.5-5**). Littoral zone wetlands are tidal wetlands extending seaward from shore to a depth of 6 feet at MLW that are not defined by any other tidal wetland category. Through consultation with NYSDEC, it was determined that the NYSDEC-regulated tidal wetland adjacent area within the Study Area would extend to the seaward edge of the bulkheads/seawalls and riprap that were placed to form the outer boundaries of Battery Park City, which coincides with the MHW line. There is one small (<0.05 acres) vegetated wetland within the Study Area that was constructed as part of the South Cove Esplanade; this wetland would not be regulated by USACE.

Project Area

Littoral Zone

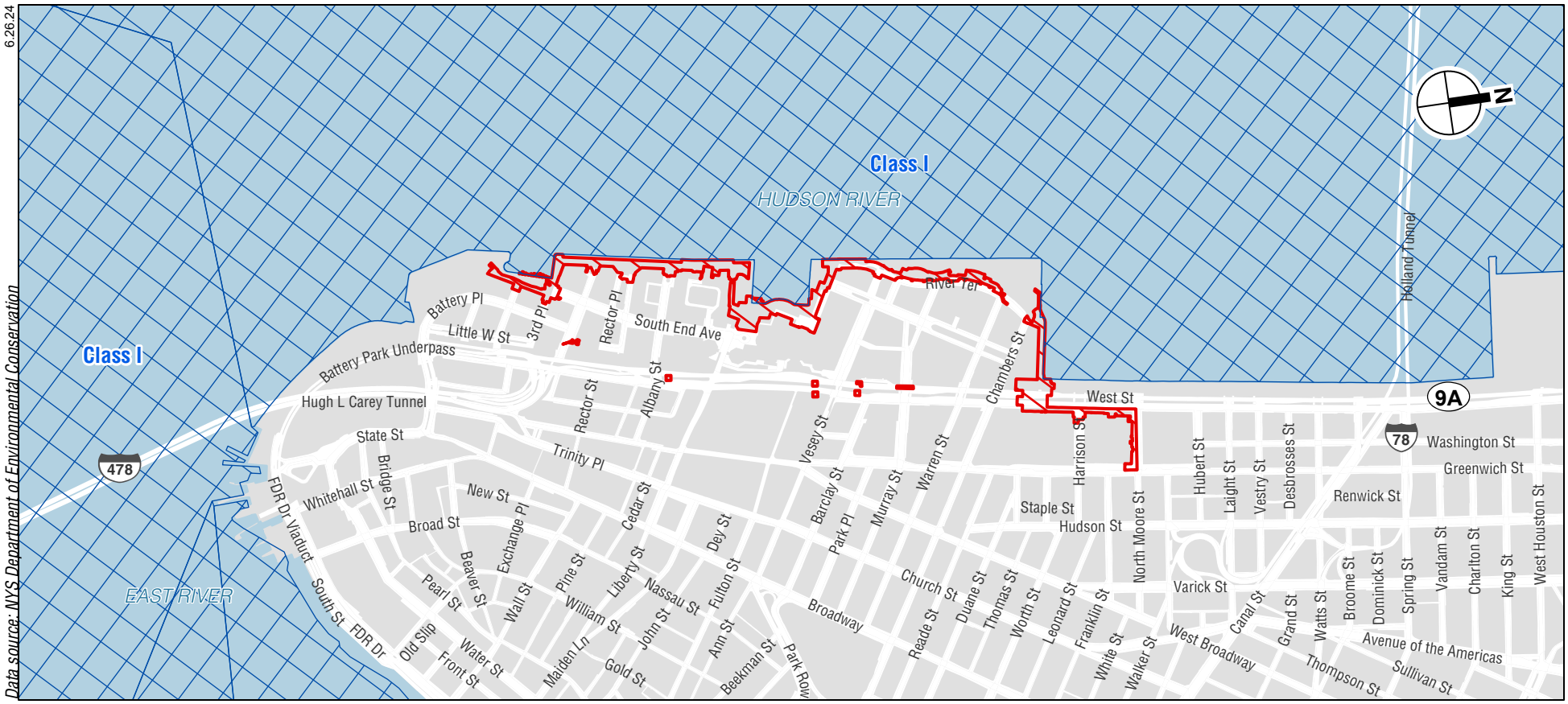
Data sources: New York State Department of Environmental Protection, 2016; NYC Orthoimagery, six-inch resolution, captured April 2018

6.26.24

NYSDEC Wetlands

NORTH/WEST BATTERY PARK CITY RESILIENCY

Figure 3.5-3



Project Area

NYSDEC Water Classification I (Saline Surface Water)

Best usage of Class I waters secondary recreation and fishing

NYSDEC Water Use Classification

NORTH/WEST BATTERY PARK CITY RESILIENCY

Figure 3.5-4

Key to Photographs

NORTH/WEST BATTERY PARK CITY RESILIENCY

Figure 3.5-5

No vegetated wetlands are present within the Study Area that would be regulated by USACE. The Hudson River would be regulated by USACE as Waters of the United States (WOTUS).

3.5.5.4 Aquatic Resources

Surface Water Resources

The Study Area is located along the eastern shore of the lower Hudson River Estuary, a tidally influenced portion of the Hudson River that is part of the New York/New Jersey Harbor Estuary, which also includes the Upper and Lower New York Bay, Arthur Kill, Kill Van Kull, East River, Raritan Bay, and Jamaica Bay. Saltwater from the Upper Bay enters the Lower Hudson River Estuary during the flood phase of the tidal cycle and lower salinity water is discharged from the Estuary to the Bay during the ebb phase, resulting in a partially stratified estuary. Tidal flows entering the lower Hudson River from the Upper Bay during the flood phase are approximately balanced by the range of freshwater flows (NYCDEP 2007). Freshwater and higher salinity waters are well mixed during low-flow conditions but are stratified under high-flow conditions when the freshwater layer overrides the saltwater layer (Moran and Limburg 1986). Ristich et al. (1977) classified the Lower Hudson River Estuary as polyhaline (18 to 30 parts per thousand [ppt]) in late summer and autumn, and mesohaline (5 to 18 ppt) in spring and early summer. The typical tidal range on the Hudson River is approximately 5 feet with average tidal currents of approximately 2 feet per second (Geyer and Chant 2006). The river is approximately 4,300 feet wide at the Project Area and water depths at MLW generally range from about 10 feet near the shoreline to 40 feet in the navigation channel.

Water Quality

NYSDEC classifies the lower Hudson River in the project area as Class I saline surface waters (see **Figure 3.5-6**). Under 6 NYCRR Part 701, suitable uses of Class I waters are secondary contact recreation, fishing, and fish propagation and survival. The Class I waters of the lower Hudson River are included on NYSDEC's 2018 303(d) list of impaired waterbodies for PCBs and other toxins which may include mercury, dioxins/furans, polycyclic aromatic hydrocarbons (PAHs), pesticides, and other heavy metals. These impairments are attributed to contaminated sediments (NYSDEC 2020). The Draft 2020-2022 Section 303(d) List of Impaired Waters proposes to list the lower Hudson River as impaired for site-specific enterococci and to delist it for PCBs and other toxics (NYSDEC 2022).

The results of recent Harbor Surveys conducted by NYCDEP (NYCDEP 2019) show that the water quality of New York Harbor, including the lower Hudson Estuary, has generally improved since the 1970s as a result of measures undertaken by New York City (e.g., improvements wastewater treatment facilities and increased capture of stormwater runoff) and others (NYCDEP 2019). Recent water quality data (2010 to 2021) from NYCDEP Harbor Survey Station N5, which is in the Hudson River near the Project Area, indicate that the water quality in this part of the lower Hudson River generally meets the water quality standards defined under 6 NYCRR Part 703 for Class I surface waters (see **Table 3.5-1**).

Exterior buildings and outdoor garden along First Place, facing north **1**

Oasis Park pier and walkway on the Hudson River, facing northeast **2**

Representative Site Photographs

Rector Gate shoreline and seating area along Battery Park Esplanade, facing north **3**

North Cove Marina along the Hudson River, facing northeast **4**

Representative Site Photographs

Rockefeller Park walkway along Battery Park City Esplanade, facing north **5**

Battery Park Esplanade river walkway next to Stuyvesant High School, facing northeast to Tribeca **6**

North Moore Street in Tribeca, facing west to Pier 25 and Jersey City, NJ **7**

Representative Site Photographs

Table 3.5-1
NYCDEP Harbor Survey Water Quality Data for Sampling Station N5 (2010 to 2021)

Parameter [Use Class I Standard]	Surface Waters			Bottom Waters		
	Min	Max	Avg	Min	Max	Avg
Temperature (F) [*No standard*]	33.2	83.1	65.6	32	77.3	63.5
Salinity (practical salinity unit, or psu) [*No standard*]	0.6	27.9	17.8	12.2	30.3	25.8
Fecal coliform (colonies per 100 mL) [*Monthly geometric mean less than or equal to 2,000 colonies/100mL from five or more samples*]	1	22,000	249	-	-	-
Dissolved oxygen (mg/L) [*Never less than 4 mg/L*]	0.8	14.5	6.8	0.6	11.9	6.2
Secchi transparency (ft) [*No standard*]	0.5	6.5	2.8	-	-	-
Chlorophyll-*a* (µg/L) [*No standard*]	1.9	5.1	2.8	-	-	-

Notes: Compliance with the fecal coliform standard is based on a monthly geometric mean (for which the data are not available to calculate) and not on the basis of the maximum fecal coliform value presented here, which is the maximum fecal coliform value obtained during weekly sampling events.
Source: NYCDEP 2022

Water quality at Station N5 in the lower Hudson River is comparable to the New York Harbor on a whole. Surface water temperatures ranged from about 32°F to 83°F with an average of about 65°F, with cooler temperatures in bottom waters compared to surface waters. Salinity in the lower Hudson River varied widely at the sampling location, from 0.6 to 30 psu with an average of 17.8 psu at the surface and 25.8 psu at the bottom. Average dissolved oxygen levels ranged from 0.8 mg/L to 14.5 mg/L, with an average of 6.8 mg/L in surface waters and 6.2 mg/L in bottom waters. Dissolved oxygen fell below the standard in only three surface water samples and eight bottom water samples between 2010 and 2021. Average fecal coliform levels ranged from 1 to 22,000 cfu/100mL with an average of 249 cfu/100mL at Station N5. Data were not sufficient to determine compliance with the local fecal coliform standard;[4] however, NYCDEP (2019) indicates that fecal coliform levels have remained well below NYSDEC standards for recreational use throughout the Harbor since the early 1990s. Secchi transparency, a measure of surface water clarity, averaged 2.8 feet over the sampling period and is typical of estuarine waterbodies. Chlorophyll-a, an indicator of excess nutrients, averaged 2.8 µg/L over the sampling period which is well below the threshold for eutrophication of 20 µg/L.

Sediment Quality

Complex flow patterns lead to widely variable sediment characteristics in the lower Hudson River although the primary constituents are silt and clay (USACE 1999, EEA 1988). Typical of any urban watershed, New York/New Jersey Harbor Estuary sediments are contaminated due to a history of industrial uses in the

[4] NYSDEC's standard for fecal coliform requires a minimum of 5 samples per month to determine whether a site meets the monthly geometric mean designated as the standard for the appropriate water quality classification.

watershed. The sediment quality index (based on sediment toxicity, sediment contaminants, and total organic carbon) in the Hudson River near Pier 52 just north of the Study Area was rated poor by the National Estuary Program Coastal Condition Report during 2000–2001 sampling (USEPA 2007). Contaminants found throughout the New York Harbor include pesticides such as chlordane and DDT, metals such as mercury, cadmium, lead, and copper, PCBs, and PAHs (Rohmann and Lilienthal 1987). While the sediments of the lower Hudson River are likely contaminated, the levels of most sediment contaminants (e.g., dioxin, DDT, PCBs, and mercury) have decreased on average by an order of magnitude over the past several decades mainly due to control measures implemented through the Clean Water Act (Steinberg et al. 2004). Sediment samples collected from three in-water geotechnical boring locations in 2023 and 2024, one in Reach 4 and two in Reach 6, identified heavy metals exceeding the Class C sediment quality thresholds (TOGS 5.1.9), which is typical of sediments throughout the New York Harbor. No pesticides, PCBs, or SVOCs were detected in the sediment samples.

Aquatic Biota

The New York/New Jersey Harbor Estuary, including the lower Hudson River, supports a diverse and productive aquatic community of over 100 species of finfish, more than 100 invertebrate species, and a variety of phytoplankton and zooplankton. The following sections summarize the aquatic biota of the Study Area in the lower Hudson River, including within the Hudson River Park Estuarine Sanctuary.

Primary Producers

Phytoplankton

Phytoplankton are microscopic plants whose movements in the system are largely governed by prevailing tides and currents. Light penetration, turbidity, and nutrient concentrations are important factors in determining phytoplankton productivity and biomass. Diatoms such as *Skeletonema costatum* and *Thalassiosira* spp. generally dominate the phytoplankton community in the Study Area, with lesser contributions from dinoflagellates and green algae (Brosnan and O'Shea 1995). In phytoplankton sampling conducted in the lower Hudson River over a 10-year period between 1991 and 2000 *Nannochloris atomus* (found in 98 percent of the samples) and *Skeletonema costatum* (52 percent of samples) were the most frequently observed species (NYCDEP 2007). While nutrient concentrations in most areas of the lower Hudson River are relatively high, low light penetration has often precluded the occurrence of phytoplankton blooms.

Submerged Aquatic Vegetation and Benthic Macroalgae

SAV is rooted aquatic plants that are often found in shallow water zones and provide nursery and refuge habitat for fish. Limited light penetration, extensive shoreline development, and swift currents limit the growth of SAV within the Harbor Estuary, including the lower Hudson River, and SAV has not been observed in the Study Area. Benthic macroalgae are large multicellular algae that are important primary producers in the aquatic environment. Within the Study Area, macroalgae are limited to growth along pilings, riprap stone shorelines, and concrete dock structures. Because these organisms require sunlight as their primary source of energy, the limited light penetration in the Harbor limits their distribution to

shallow waters. Common species of macroalgae known to be present in the Harbor Estuary include sea lettuce (*Ulva* spp.), green fleece (*Codium fragile*), and brown algae (*Fucus* spp.) (PBS&J 1998).

Zooplankton

Zooplankton are primary grazers on phytoplankton and detritus material and are preyed upon by organisms of higher trophic levels. The higher-level consumers of zooplankton typically include forage fish, such as bay anchovy (*Anchoa mitchilli*), as well as commercially and recreationally important species, such as striped bass (*Morone saxatilis*) and white perch (*Morone americana*) during their early life stages. In zooplankton sampling conducted in the Hudson River over a 10-year period between 1991 and 2000 *Tintinnopsis* spp. (31 percent of samples) and nauplius of copepods (25 percent of samples) were the most frequently collected taxa (NYCDEP 2007).

Benthic Invertebrates

Benthic invertebrates inhabit the sediments and surfaces of submerged objects, such as rock pilings or debris, and are a food source for fish and waterfowl throughout New York Harbor. Common groups collected in the Estuary, including the lower Hudson River, include aquatic earthworms (oligochaetes), segmented worms (polychaetes), snails (gastropods), bivalves, barnacles, cumaceans, amphipods, isopods, crabs, and shrimp (EEA 1988, EA 1990, Coastal 1987, PBS&J 1998). Benthic invertebrates documented in the lower Hudson River during a 2017 species richness study include ragworms (*Hediste diversicolor*), chain tunicates (*Botrylloides violaceus*), mussels (*Mytilus* sp.), barnacles (*Amphibalanus* sp.), eastern mud snails (*Trinta obsoleta*), mud tube worms (*Streblospio benedicti*), slipper snails (*Crepidula plana*), and oyster drills (*Urosalpinx cinerea*) (Carter and Rosin 2017). Blue crab (*Callinectes sapidus*) and American lobster (*Homarus americanus*) may also be present within the Upper Bay (NMFS 2001).

Fish

New York City is located at the convergence of several major river systems, all of which connect to the New York Bight of the Atlantic Ocean. This convergence has resulted in a mixture of habitats in the Harbor Estuary and lower Hudson River that supports marine fish, estuarine fish, anadromous fish (fish that migrate up rivers from the sea to breed in freshwater), and catadromous fish (fish that live in freshwater and migrate to marine waters to breed). **Table 3.5-2** lists fish species known to occur in the lower Hudson River Estuary and have the potential to be present in the Study Area. Bain et al. (2006) collected 41 species of fish from the Hudson River Park Estuarine Sanctuary between June 2002 and June 2004. The most abundant were bay anchovy, Atlantic herring (*Clupea harengus*), striped bass, and blueback herring (*Alosa aestivalis*), all of which are found in open waters (Bain et al. 2006). The sampling station south of Gansevoort Street near 12th Street, approximately 1 mile upstream from the Project Area, had the highest fish abundance of all sites sampled (Bain et al. 2006).

Table 3.5-2
Finfish Species with the Potential to Occur in the Study Area

Common Name	Scientific Name
Alewife[(1)]	*Alosa pseudoharengus*
American eel[(1)]	*Anguilla rostrata*
American sand lance	*Ammodytes hexapterus*

Table 3.5-2
Finfish Species with the Potential to Occur in the Study Area

Common Name	Scientific Name
American shad[(1)]	*Alosa sapidissima*
Atlantic cod	*Gadus morhua*
Atlantic croaker[(1)]	*Micropogonias undulatus*
Atlantic herring[(1)]	*Clupea harengus*
Atlantic mackerel	*Scomber scombrus*
Atlantic menhaden[(1)]	*Brevoortia tyrannus*
Atlantic moonfish	*Selene setapinnis*
Atlantic needlefish	*Strongylura marina*
Atlantic seasnail	*Liparis atlanticus*
Atlantic silverside[(1)]	*Menidia menidia*
Atlantic sturgeon	*Acipenser oxyrhynchus*
Banded killifish	*Fundulus diaphanous*
Bay anchovy[(1)]	*Anchoa mitchilli*
Black sea bass	*Centropristis striata*
Blackfish	*Tautoga onitis*
Blueback herring[(1)]	*Alosa aestivalis*
Bluefish[(1)]	*Pomatomus saltatrix*
Butterfish[(1)]	*Peprilus triacanthus*
Clearnose skate	*Raja eglanteria*
Conger eel	*Conger oceanicus*
Crevalle jack	*Caranx hippos*
Cunner[(1)]	*Tautogolabrus adspersus*
Fawn cusk eel	*Lepophidium cervinum*
Feather blenny[(1)]	*Hypsoblennius hentzi*
Fourbeard rockling	*Enchelypus cimbrius*
Foureye butterflyfish	*Chaetodon capistratus*
Four-spot flounder	*Paralichthys oblongus*
Gizzard shad[(1)]	*Dorosoma cepedianum*
Goosefish[(1)]	*Lophius americanus*
Grey snapper	*Lutjanus griseus*
Grubby[(1)]	*Myoxocephalus aenaeus*
Gulf Stream flounder[(1)]	*Citharichthys arctifrons*
Hickory shad[(1)]	*Alosa mediocris*
Hogchoker[(1)]	*Trinectes maculatus*
Inshore lizardfish	*Synodus foetens*
Lined seahorse[(1)]	*Hippocampus erectus*
Little skate	*Raja erinacea*
Longhorn sculpin	*Myoxocephalus octodecimspinosus*
Lookdown[(1)]	*Selene vomer*
Mummichog	*Fundulus heteroclitus*
Naked goby	*Gobiosoma bosci*
Northern stargazer[(1)]	*Astroscopus guttatus*
Northern kingfish[(1)]	*Menticirrhus saxatilis*
Northern pipefish[(1)]	*Syngnathus fuscus*
Northern puffer	*Sphoeroides maculatus*
Northern searobin[(1)]	*Prionotus carolinus*
Orange filefish	*Aluterus schoepfi*
Oyster toadfish	*Opsanus tau*
Planehead filefish	*Monacanthus hispidus*
Pollock	*Pollachius virens*
Rainbow smelt	*Osmerus mordax*

Table 3.5-2
Finfish Species with the Potential to Occur in the Study Area

Common Name	Scientific Name
Red hake[(1)]	*Urophycis chuss*
Rock gunnel	*Pholis gunnellus*
Rock sea bass[(1)]	*Centropristis philadelphica*
Rough scad	*Trachurus lathami*
Scup[(1)]	*Stenotomus chrysops*
Seaboard goby[(1)]	*Gobiosoma ginsburgi*
Sheepshead	*Archosargus probatocephalus*
Short bigeye	*Pristigenys alta*
Silver hake[(1)]	*Merluccius bilinearis*
Silver perch	*Bairdiella chrysoura*
Smallmouth flounder	*Etropus microstomus*
Spot[(1)]	*Leiostomus xanthurus*
Spotfin butterflyfish	*Chaetodon ocellatus*
Spotted hake[(1)]	*Urophycis regia*
Striped anchovy[(1)]	*Anchoa hepsetus*
Striped bass[(1)]	*Morone saxatilis*
Striped burrfish	*Chilomycterus schoepfi*
Striped cuskeel	*Ophidion marginatum*
Striped killifish	*Fundulus majalis*
Striped mullet	*Mugil cephalus*
Striped searobin[(1)]	*Prionotus evolans*
Summer flounder[(1)]	*Paralichthys dentatus*
Tautog	*Tautoga onitis*
Threespine stickleback	*Gasterosteus aculeatus*
Tomcod[(1)]	*Microgadus tomcod*
Weakfish[(1)]	*Cynoscion regalis*
White hake	*Urophycis tenuis*
White mullet	*Mugil curema*
White perch[(1)]	*Morone americana*
Windowpane[(1)]	*Scophthalmus aquosus*
Winter flounder[(1)]	*Pseudopleuronectes americanus*
Yellowtail flounder	*Limanda ferruginea*

Note: [(1)] Collected within Hudson River Park by Bain et al. (2006) from June 2002 through June 2004.
Sources: Bain et al. 2006; Woodhead 1990; EEA 1988; EA Engineering, Science & Technology 1990; LMS 2003; Able et al. 1995

3.5.5.5 Essential Fish Habitat

NOAA Fisheries defines EFH as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. **Table 3.5-3** lists the species and life stages of fish NOAA Fisheries has identified as having EFH in the lower Hudson River within the Study Area.

Table 3.5-3
Essential Fish Habitat Designated Species in the Study Area

Species	Eggs	Larvae	Juveniles	Adults
Winter flounder (*Pleuronectes americanus*)	X	X	X	X
Little skate (*Leucoraja erinacea*)			X	X
Atlantic herring (*Clupea harengus*)		X	X	X
Red hake (*Urophycis chuss*)	X	X	X	X
Windowpane flounder (*Scophthalmus aquosus*)	X	X	X	X
Winter skate (*Leucoraja ocellata*)			X	X
Clearnose skate (*Raja eglanteria*)			X	X
Longfin inshore squid (*Doryteuthis pealeii)*	X			
Bluefish (*Pomatomus saltatrix*)			X	X
Atlantic butterfish (*Peprilus triacanthus*)		X		
Summer flounder (*Paralicthys dentatus*)		X	X	X
Source: NOAA Fisheries Essential Fish Habitat Mapper at https://www.habitat.noaa.gov/apps/efhmapper/?page=page_3				

3.5.5.6 Terrestrial Resources

Ecological Communities

Ecological communities in the Study Area are limited to previously modified communities common to urban settings including paved roads and paths, planted gardens, and mowed and maintained parkland with small shrubs and trees. The ecological communities in the Study Area are best described by Edinger et al. (2014) as flower/herb garden,[5] paved road/path,[6] and mowed lawn,[7] with some examples of urban structure exterior[8] present. These ecological communities are common to urban and suburban settings and typically provide habitat for disturbance-tolerant wildlife species. **Appendix E** includes a list of vegetation observed during site reconnaissance. A tree inventory conducted in the Study Area between July and August 2023 identified 1,181 trees comprising 69 species. Abundant tree species in the Study Area

[5] Edinger et al. 2014 define the flower/herb garden ecological community as "residential, commercial, or horticultural land cultivated for the production of ornamental herbs and shrubs. This community includes gardens cultivated for the production of culinary herbs."

6 Edinger et al. 2014 define the paved road/path ecological community as "a road or pathway that is paved with asphalt, concrete, brick, stone, etc. There may be sparse vegetation rooted in cracks in the paved surface.

7 Edinger et al. 2014 define the mowed lawn ecological community as "residential, recreational, or commercial land, or unpaved airport runways in which the groundcover is dominated by clipped grasses and there is less than 30 percent cover of trees. Ornamental and/or native shrubs may be present, usually with less than 50 percent cover. The groundcover is maintained by mowing and broadleaf herbicide application."

8 Edinger et al. 2014 define the urban structure exterior ecological community as "the exterior surfaces of metal, wood, or concrete structures (such as commercial buildings, apartment buildings, houses, bridges) or any structural surface composed of inorganic materials (glass, plastics, etc.) in an urban or densely populated suburban area. These sites may be sparsely vegetated with lichens, mosses, and terrestrial algae; occasionally vascular plants may grow in cracks. Nooks and crannies may provide nesting habitat for birds and insects, and roosting sites for bats.

include but are not limited to silver maple (*Acer saccharinum*), American basswood (*Tilia americana*), Japanese zelkova (*Zelkova serrata*), honey locust (*Gleditsia triacanthos*), Japanese pagoda tree (*Styphnolobium japonicum*), willow oak (state-listed endangered), English oak (*Quercus robar*), silver linden (*Tilia tomentosa*), London planetree (*Platanus acerifolia*), ginkgo (*Ginkgo biloba*), and white oak (*Quercus alba*), and Japanese flowering cherry (*Prunus serrolata*). Flowering plants observed in the maintained garden communities include Solomon's seal (*Polygonatum* spp.), daffodil (*Narcissus* spp.), bluebell (*Hyacinthoides non-scripta*), and columbine (*Aquilegia* spp.), while common shrubs included dogwood (*Cornus* sp.), northern bayberry (*Myrica pensylvanica*), winter creeper (*Eyonymus fortune*), and various examples of viburnum (*Viburnum* spp.). **Figures 3.5-5 and 3.5-6** present photographs of the ecological communities in the Study Area.

Wildlife

Birds

The New York State Breeding Bird Atlas is a periodic census of the distribution of breeding birds across New York State. The most recently completed census was conducted from 2000 to 2005, which documented two species as confirmed, possible, or probable breeding birds in Block 5750B, which contains the Study Area: American kestrel (*Falco sparverius*) and peregrine falcon (*Falco peregrinus*; state-listed endangered). Potential nesting and migratory habitat for American kestrel and peregrine falcon is present in the Study Area, as both species are known to nest or roost on buildings or other human-built structures. Neither species was observed during the May 11, 2022 reconnaissance investigation. The ongoing 2020-2024 census listed 107 bird species as confirmed, probable, or possible breeders within the Jersey City CE and Jersey NE Blocks that cover the Study Area. **Appendix E, Table E-2** lists the species identified in both censuses as of February 23, 2024. The survey blocks, which are significantly larger than the Study Area, comprise diverse habitat types and contain larger, less disturbed areas with sufficient habitat to support these species. Bird species considered most likely to use the limited habitat available within the Study Area for breeding purposes include European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*) and rock dove (*Columba livia*).

According to the USFWS IPaC System, 37 species protected under the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act have the potential to be present in the Study Area (see **Appendix E, Table E-3**). None of these species were observed during the May 11, 2022 reconnaissance investigation. The waters along the bulkhead may provide limited habitat for waterbirds passing through the area, but the Study Area does not provide suitable nesting or breeding habitat for these species. Species observed during the May 11, 2022 reconnaissance investigation were disturbance tolerant species, including house sparrow (*Passer domesticus*), rock dove (*Columbia livia*), grey catbird (*Dumetella carolinensis*), mourning dove (*Zenaida macroura*), European starling (*Sturnus vulgaris*), mallard duck (*Anas platyrhynchos*), grackle (*Quiscalus quiscula*), and herring gull (*Larus argentatus*).

Reptiles and Amphibians

The NYSDEC Amphibian and Reptile Atlas (Herp Atlas) Project, a survey conducted from 1990 to 1999 to document the geographic distribution of reptiles and amphibians in New York State, recorded four species

in the census block (Jersey City USGS Quadrangle) where the Study Area is located including: bullfrog (*Rana catesbeiana*), northern redback salamander (*Plethodon c. cinereus*), northern two-lined salamander (*Eurycea bislineata*), and red-eared slider (*Trachemys scripta elegans*; non-native). The Study Area does not provide suitable habitat for these species, and they are not likely to occur within the Study Area.

Mammals

Mammals with the potential to be present in the Study Area are limited to urban-adapted generalist species with a high tolerance for developed environments and human activity. Species likely to be present include Norway rat (*Rattus norvegicus*), eastern gray squirrel (*Sciurus carolinensis*), domestic cat (*Felis catus*), and raccoon (*Procyon lotor*). Eastern gray squirrels were observed during the May 11, 2022 reconnaissance investigation.

3.5.5.7 Threatened, Endangered, and Special Concern Species

The USFWS IPaC database identifies monarch butterfly (*Danaus plexippus*; candidate species for federal listing[9]) and northern long-eared bat (*Myotis septentrionalis;* federally and state-listed endangered) as having the potential to be present in the Study Area.

A response to request for information from NYNHP (dated November 8, 2022) and a review of the EAF Mapper, which compiles NYNHP data (dated February 19, 2024), identified the potential for peregrine falcon (state-listed endangered), Atlantic sturgeon (*Acipenser oxyrinchus;* federally listed endangered, New York State high priority Species of Greatest Conservation Need [SGCN][10]), and shortnose sturgeon (*Acipenser oxyrinchus*; federally and state-listed endangered) to be present within the Study Area. Additional correspondence with NYNHP dated February 12, 2024, indicates that peregrine falcons have been documented nesting within 0.5 mile of the Project Site. In addition, willow oak was identified within the Study Area during the tree inventory and May 11, 2022 reconnaissance investigation.

The NOAA Fisheries Section 7 ESA Mapper identified the following federally listed aquatic species with the potential to be present within the waters of the Study Area include: adult and subadult shortnose sturgeon (federally listed endangered), Atlantic sturgeon (federally listed endangered), green sea turtle (*Chelonia mydas*; federally listed endangered), Kemp's ridley sea turtle (*Lepidochelys kempii*; federally listed endangered), leatherback sea turtle (*Dermochelys coriacea*; federally listed endangered), and loggerhead sea turtle (*Caretta caretta*; federally listed threatened).

[9] The monarch butterfly is listed as a candidate species, and it currently does not have any protection under Section 7 of the ESA. Consultation or conference (formal or informal) with USFWS is not required at this time.

[10] The NYSDEC State Wildlife Action Plan (September 2015) identified high priority SGCN within New York State. High priority SGCN species are experiencing population decline or may be subject to identified threats that could lead to population decline. NYSDEC determined that timely management intervention is needed for high priority SGCN species or they are likely to reach critical population levels in New York.

Monarch Butterfly

Monarch butterflies in North America migrate in the fall to Mexico or southern California, sometimes traveling thousands of miles to overwinter with a reverse migration in the spring, with adult monarch butterflies spreading across the United States and Canada, where they feed and breed. Monarch butterflies are important pollinators, as the adults feed on nectar from a variety of plants. Larvae, however, are dependent on milkweed (primarily *Asclepias* species). Adult breeding monarch butterflies and larvae use a variety of habitat types that provide access to larval host plants, including agricultural fields, prairies, pastures, gardens, roadsides, and urban/suburban areas. Even though no milkweed was identified during the May 2022 site reconnaissance, potential habitat for monarch butterflies is present within the flower/herb gardens present within the Study Area. Therefore, monarch butterflies have the potential to occur within the Study Area.

Northern Long-eared Bat

The northern long-eared bat is a temperate, insectivorous bat that hibernates in caves or mines during winter and then emerges in early spring, with males dispersing and remaining solitary until mating season at the end of the summer, and pregnant females forming maternity colonies in which to rear young. Outside of the winter hibernation period, northern long-eared bats generally inhabit mature, closed-canopy, deciduous or mixed forest within heavily forested landscapes (Owen et al. 2003, Carter and Feldhammer 2005, Ford et al. 2005), usually within 60 miles of their hibernaculum (Caceres and Barclay 2000, USFWS 2014). Mature forest is the most important foraging habitat for the northern long-eared bat (USFWS 2013, 2014). The northern long-eared bat is considered a forest-dependent species that is sensitive to fragmentation and urbanization and requires interior forest for both foraging and breeding (Foster and Kurta 1999, Broders et al. 2006, Henderson et al. 2008). The Study Area lacks forested habitat with mature trees that would be suitable habitat for northern long-eared bats. Trees in highly developed urban areas are considered by the USFWS (2014) to represent unsuitable northern long-eared bat habitat, and unlike some other North American bats (e.g., little brown bat and big brown bat) northern long-eared bats are not known to inhabit urban environments. The NYNHP and NYSDEC have no records of the northern long-eared bat from any of the City's five boroughs (NYNHP 2014, NYSDEC 2014), and no nuisance bats ever collected from New York City and submitted to the New York State Department of Health for rabies testing have included a northern long-eared bat (NYSDEC 2014). Therefore, northern long-eared bats are not expected to be present within the Study Area.

Peregrine Falcon

Peregrine falcons commonly nest on buildings and bridges in urban areas, including New York City, demonstrating a tolerance of human disturbance and an ability to exploit resources in human-modified environments (Cade et al. 1996, White et al. 2002). Peregrine falcons are aerial hunters, and in urban settings primarily feed on rock doves (DeMent et al. 1986, Rejt 2001). Peregrine falcons associated with established nest sites throughout southern Manhattan have the potential to pass briefly through the Study Area on occasion in pursuit of rock doves or other prey.

Willow Oak

Willow oak is considered critically imperiled ("S1") by NYNHP. Willow oak is a commonly planted tree in New York City, with over 3,000 willow oaks planted as street trees within the five boroughs according to the New York City Street Tree Map (NYC Parks 2022). For naturally occurring trees, the "S1" rank indicates that they are critically imperiled in the state because of extreme rarity (i.e., five or fewer sites or very few remaining individuals) (NYNHP 2022). However, according to the *New York City, New York Municipal Forest Resource Analysis* (Peper et al. 2007), planted willow oak trees do not constitute one of the five or fewer sites or very few remaining individuals of this species in New York State as is intended by the NYNHP "S1" rank. Thus, the willow oak individuals in the Study Area are not considered part of a critically imperiled population. Habitat for this species is mostly on the coastal plain in moist soils or swamps (Gleason and Cronquist 1963). Except as planted trees, this species would not be expected within the Study Area. There were 71 planted willow oaks documented within the Study Area during the tree inventory. Because the willow oaks in the Study Area are planted trees, they are not protected by Environmental Conservation Law §9-1503 and no further review under 6 NYCRR 193 is required.

Shortnose Sturgeon

According to the NOAA Fisheries Section 7 Mapper, juvenile and adult shortnose sturgeon have the potential to be present in the lower Hudson River in the Study Area for migration and foraging behaviors. Juvenile shortnose sturgeon may also overwinter in the lower Hudson River. The shortnose sturgeon is an anadromous bottom-feeding fish that can be found in the Hudson River from lower Manhattan to the Federal Dam at Troy. Shortnose sturgeon may occasionally occur in the lower Hudson River downstream of the George Washington Bridge (river mile 12); however, spawning, nursery, and overwintering areas are located well upstream (Bain et al. 2007). Shortnose sturgeon eggs, larvae, and young-of-year life stages require low salinity waters and do not occur in the Study Area. Long-term Hudson River monitoring data, collected by the New York Utilities and others since the 1970s, have indicated that shortnose sturgeon inhabit deepwater habitats and are in greatest abundance north of the Tappan Zee Bridge. Shortnose sturgeon typically use the lower Hudson River as a migratory corridor to and from spawning habitats upstream of the Study Area and prefer deep waters like those in the federal navigation channel offshore from the Project Site.

Atlantic Sturgeon

According to the NOAA Fisheries Section 7 Mapper, juvenile, subadult, and adult Atlantic sturgeon have the potential to be present in the lower Hudson River in the Study Area for migration and foraging behaviors. In the Hudson River, Atlantic sturgeon migrate from the ocean to spawn upriver from the salt front from April to early July (Smith 1985, Stegemann 1999). Female sturgeon migrate from the river back to ocean waters after spawning, while male sturgeon remain in the river until October or November. Atlantic sturgeon may be present in the Study Area as they migrate upriver to freshwater habitat, or downriver back to coastal waters. Any Atlantic sturgeon in the lower Hudson River would be migratory individuals and likely remain in the deeper waters of the navigation channel. Non-spawning Atlantic sturgeon prefer deeper, open marine waters and do not overwinter or otherwise spend prolonged periods of time in the lower Hudson River.

Critical habitat for Atlantic sturgeon has been designated for the length of the tidal Hudson River from Lower Manhattan to the Federal Dam at Troy,[11] which includes the Study Area. The physical or biological features of critical habitat that are essential to the conservation of the species include:

- Hard bottom substrate (e.g., rock, cobble, gravel, limestone, boulder, etc.) in low salinity waters (0 to 0.5 ppt) for settlement of fertilized eggs, refuge, growth, and development of early life stages;
- Aquatic habitat with a gradual downstream salinity gradient of 0.5 to 30 ppt and soft substrate downstream of spawning sites for juvenile foraging and physiological development;
- Water of appropriate depth to support: unimpeded movement of adults to/from spawning sites, seasonal movement of juveniles, and staging/resting/holding of subadults or spawning condition adults. Water depths greater than or equal to 1.2 meters (3.9 feet) in the main river channel; and
- Water, especially in the bottom meter of the water column, with temperature, salinity, and oxygen values that support: spawning, annual and interannual survival, and growth, development, and recruitment.

Sea Turtles

New York and New Jersey waters may be warm enough to support loggerhead and Kemp's ridley turtles from May through mid-November, and green sea turtles from June through October; those that may be present in these waters are typically small juveniles. Leatherback sea turtles may be found in the waters off New York and New Jersey during the warmer months, but this species generally prefers deep, pelagic waters over shallow, nearshore waters, and would not be expected in the vicinity of the Study Area. The New York-New Jersey Harbor, including the lower Hudson River, is considered marginal or lower quality sea turtle habitat, and observations of these species are infrequent (Ruben and Morreale 1999, USACE 2001). Overall, sea turtles have the potential to occur in the Study Area on rare occasions, and only as transient individuals, rather than for long-term occupation for breeding, wintering, or growth and development.

3.5.5.8 Significant Coastal Fish and Wildlife Habitat

The New York State Department of State (NYSDOS) has designated 15 Significant Coastal Fish and Wildlife Habitats (SCFWHs) within New York City. The Lower Hudson Reach SCFWH comprises the 19-mile stretch of the Hudson River from Battery Park north to Yonkers, which includes the Study Area. It includes areas of deepwater habitat, shallow habitat, piers, and interpier basins. NYSDOS designated the Lower Hudson Reach as a SCFWH in part because it provides an important wintering habitat for young-of-year, yearling, and older striped bass. Striped bass was one of the four most abundant species collected in Hudson River Park upriver from the Project Area from June 2002 through June 2004 (Bain et al. 2006). From summer through late winter, adult striped bass can be found in the nearshore coastal waters of the Atlantic Ocean, however, some striped bass adults remain in the Hudson River year-round and do not migrate. During winter, these resident adults (ages 4 and older) are joined by migratory adults returning to the estuary to

[11] 82 Federal Register 39160; August 17, 2017

spawn. Adults aggregate near the mouths of their natal rivers and begin moving upstream to spawn as water temperatures rise in the spring. The spawning area for striped bass in the Hudson River is in freshwater habitat upriver from the Study Area.

3.5.5.9 The Lower Hudson Reach

SCFWH is one of the few large tidal river mouth habitats in the northeastern United States and is part of the greater Hudson River Estuary system that supports a diverse and historically highly productive ecosystem of fish and invertebrate species (Briggs and Waldman 2002, NYSDOS 1992). Significant numbers of other fish species also use the Lower Hudson Reach, including winter flounder, summer flounder, white perch, Atlantic tomcod, Atlantic silversides, bay anchovy, hogchoker, and American eel. The Lower Hudson Reach is potentially important for bluefish and weakfish young-of-year, American shad, blue crab, Atlantic sturgeon, and shortnose sturgeon. Planktonic and benthic organisms that provide an important food source are also present, including copepods, rotifers, mysid shrimp, nematodes, oligochaetes, polychaetes, and amphipods. The Lower Hudson Reach also provides overwintering habitat for a diverse community of waterfowl, including canvasback, scaup, mergansers, mallards, and Canada geese (NYSDOS 1992).

3.5.5.10 Hudson River Park Estuarine Sanctuary

The Study Area is located within the Hudson River Park Estuarine Sanctuary. The Hudson River Park Estuarine Sanctuary Management Plan identifies management policies for the Hudson River Park Estuarine Sanctuary with respect to resource protection and preservation, public access and recreation, education, and research activities. One of the preservation objectives focuses on controlling the solid waste and water pollution that may result from waterfront activities while improving water quality, aquatics, wildlife habitat, and promoting native species and sustainable design. Existing conditions within the sanctuary are the same as those described above for aquatic and terrestrial resources.

3.5.6 No Action Conditions

In the future without the Proposed Project, portions of the Study Area within the 1-percent annual chance floodplain, including the ecological communities and the wildlife habitat they provide, will continue to be vulnerable to losses due to flooding, saltwater inundation, and wave damage during 1-percent annual chance storms. During storm events in which storm surge occurs, the inundation and rise in water levels may result in a temporary elevation of groundwater levels, which returns to typical levels after the storm event.

In the future without the Proposed Project, water quality in the lower Hudson River and Upper Bay is anticipated to continue gradually improving because of several citywide initiatives. Examples include the Citywide Long Term Control Plan to address combined sewer overflow (CSO) discharges, Vision 2020, the NYC Green Infrastructure Plan, and PlaNYC. The Vision 2020: New York City Comprehensive Waterfront Plan was developed by New York City Department of City Planning to establish goals for the New York City waterfront, with the intention of promoting various ecological objectives and enhancing sustainability and climate resilience planning through the incorporation of climate change considerations, among other

goals. The plan seeks to make improvements to water quality and aquatic resources through measures such as nitrogen reduction at wastewater treatment plants, reduction in CSOs with the increased capture of stormwater runoff through implementation of the NYC Green Infrastructure Plan, improved flushing of constrained waterbodies, and optimization of existing sewer systems through improvements to drainage, interceptors, and tide gates. In addition to reduction of nitrogen discharges from treatment plants, PlaNYC goals that will result in improvements to water quality and aquatic resources include construction of grey infrastructure projects to reduce the discharge of untreated water in New York City waterways and the reintroduction of oysters and eel grass. OneNYC, an update to PlaNYC, focuses on growth, equity, sustainability, and resiliency, and includes similar initiatives to improve water quality through wastewater treatment and stormwater management, as well as initiatives focusing on the resiliency and adaptability of the City's infrastructure. Water quality is expected to continue to improve living conditions for aquatic biota and potentially allow more pollution-intolerant species to occur in the river because of these and other initiatives. Overall, however, the aquatic community will be largely composed of the same species as under the current conditions.

Terrestrial plant resources within the Study Area are expected to be maintained by Battery Park City and, other than regular tree, shrub, and herbaceous plant management and replacement consistent with the Battery Park City Sustainability Plan but are not anticipated to change in the future without the Proposed Project. Similarly, wildlife using the terrestrial plant communities are not expected to change in the future without the Proposed Project.

3.5.7 Proposed Action Conditions

3.5.7.1 Groundwater

As under the No Action condition, during storm events with storm surge, the inundation and rise in water levels may result in a temporary elevation of groundwater levels, which would return to typical levels after the storm event. The below grade elements of the flood barrier system cutoff walls would extend approximately 20 feet below the ground surface or river bottom; however, groundwater would still be able to flow around and/or under these structures to the Hudson River. This proposed system would provide protection against adverse impacts from elevated groundwater during the design storm and would also maintain groundwater flows under these sheet pile structures to the Hudson River during the baseline geohydrologic condition thereby avoiding upgradient hydrologic impacts.

As discussed in Chapter 3.7, "Water and Sewer Infrastructure," the Proposed Project includes a combination of stormwater storage and green infrastructure measures, including vegetated practices, such as standard and high-performance rain gardens and porous pavement, to reduce imperviousness in the project area and promote groundwater infiltration. As discussed under "Existing Conditions," groundwater is not used as a potable water source in Manhattan. Therefore, operation of the Proposed Project would not have the potential to result in significant adverse impacts to groundwater resources.

3.5.7.2 Floodplains

The Proposed Project is designed to reduce the risk of loss from flooding; to minimize the effect of floods on human safety, health, and welfare; and to preserve the beneficial value of the existing floodplain. As part of the flood barrier system, waterfront structures at Reaches 2, 4, 5, 6, and 7 would be raised to meet the design criteria for a projected 2050s 1-percent annual chance storm event. The Proposed Project would protect Battery Park City and certain inland properties, or the Protected Area (see Figure 1-5 in Chapter 1.0, "Project Description"), from future storm events and inundation from sea level rise, reducing the risk of flood loss compared to the No Action condition. Once the flood barrier system is installed, BPCA will seek to have the system accredited by FEMA which would remove the protected uplands of the Study Area from the current flood zone. Waterfront structures in Reach 3 would not be altered with the Proposed Project, which would result in continued risk of flooding from storm events and sea level rise to that portion of Reach 3 waterward of the flood barrier system. However, the Proposed Project does include a passive retaining wall structure with deployable flood gates along the upland portions of Rockefeller Park in Reach 3 to provide the proposed flood protection. . Additionally, the flood barrier system alignment through Reach 3 would not preclude the future addition of resiliency measures within this area, if required. In either case, BPCA is committed to the restoration of all its open spaces in the event they are impacted by a storm, whether these spaces are within or outside the Project Site or Protected Area. Physical and recreational access to the waterfront would be maintained and enhanced along the Esplanade within all reaches with the Proposed Project. The addition of resiliency measures to park amenities and facilities would reduce adverse impacts to Battery Park City resulting from design storm events which is consistent with project design goals to preserve, maintain, and protect existing physical and recreational access to the waterfront. Therefore, it is concluded that the Proposed Project would not result in significant adverse impacts related to floodplains.

3.5.7.3 Wetlands

There are NWI-mapped wetlands and NYSDEC regulated littoral zone tidal wetlands in the Study Area (see **Figures 3.5-4 and 3.5-5**). Based on the available wetland resource mapping and the Proposed Project design, activities at Reaches 2, 4, 5, 6, and 7 would result in the placement of approximately 2,383 cubic yards of fill over 14,075 square feet (0.32 acres) of littoral zone tidal wetlands (see **Table 3.5-4** and **Figure 3.5-1**). This loss of NYSDEC littoral zone tidal wetlands would be small when considered in context with the available similar tidal wetland habitat in the lower Hudson River. No vegetated wetlands would be impacted by the Proposed Project.

Because onsite wetland mitigation is not available to offset the impacts of the Proposed Project due to limited space and difficulty removing existing fill material, the preferred mitigation approach for the Proposed Project is to purchase tidal wetland mitigation bank credits from the Saw Mill Creek Wetland Mitigation Bank located in Staten Island, New York. Based on the latest available information from the Regulatory In-lieu Fee Banking Information Tracking System (RIBITS) there is currently a sufficient number of credits available (1.0573) at the Saw Mill Creek Mitigation Bank.

In addition to this mitigaton, , in-water ecological enhancements are being considered in Reaches 2, 6, and 7 which may include enhancements on the concrete bulkhead face and pile encasements on a number of existing and proposed piles.

Therefore, with the implementation of these measures, it is concluded that the Proposed Project would not result in any significant unmitigated adverse impacts to wetlands.

3.5.7.4 Aquatic Resources

The Proposed Project would result in permanent impacts to aquatic resources in Reaches 2, 4, 5, 6, and 7 resulting from the replacement or partial reconstruction of existing relieving platforms and the additional piles and the in-water elements of the flood barrier system that include seawalls, seepage barrier and backfill, and bridging structures. The potential impacts of the activities being conducted at these reaches on aquatic resources are discussed in the subsections below.

Water and Sediment Quality

Butterfly valves in the bridging structures over the north and south PANYNJ PATH tunnels would remain open in normal conditions to allow tidal flow within the channels above the tunnels and would only be closed to prevent storm surge inflow to the tunnels during storm events. Closure of the butterfly valves in the bridging structures would temporarily prevent tidal exchange beneath the waterfront plaza in Reach 5 for up to 72 hours only during these storm events. Dissolved oxygen modeling conducted for this condition to evaluate the potential for the Proposed Project's bridging structures and their operation to affect dissolved oxygen under the platform indicated that temporarily closing the butterfly valves at the bridging structures would not result in significant adverse effects to dissolved oxygen levels (see **Appendix E**). Based on the findings of underwater inspections, the proposed installation of the bridging structures at Reach 5 in would require dredging to elevation -17 NAVD88 from the existing mudline, resulting in the removal of approximately 4,994 cubic yards of sediment over a 29,460 square foot area (0.68 acres). Sediment removed from the Project Area would be transported offsite for upland disposal at a licensed facility. This removal of sediment would not result in any significant adverse effects to the habitat beneath the waterfront plaza compared to the No Action condition. The Proposed Project would not result in changes to the use or general operation of the Project Site, including the World Trade Center and 300 Vesey Street cooling water intakes, and would not have the potential to affect water or sediment quality compared to the No Action condition when construction is complete. As described in Chapter 3.7, "Water and Sewer Infrastructure," the Proposed Project would not increase the amount of impervious surface or stormwater runoff contributions to the existing sewer system, and therefore, stormwater runoff from the Proposed Project would not result in changes to water or sediment quality compared to the No Action condition. The stormwater storage and green infrastructure measures implemented as part of the Proposed Project would improve stormwater management, provide the opportunity for increased infiltration, and provide some improvement in quality of runoff discharged to the Hudson River.

Aquatic Biota

In total, the in-water components of the Proposed Project (e.g., piles, seawalls, seepage barrier with backfill, and bridging structures) would result in the permanent loss of 21,504 square feet (0.5 acres) of benthic habitat (see **Figure 3.5-2**) and 7,892 cubic yards of water column below SHW under existing overwater platform, of which 7,606 cubic yards would be below MHW. [12] This includes the 0.32 acres and 2,383 cubic yards of fill that would be within NYSDEC littoral zone tidal wetlands, as described above. The platform reconstruction at Reach 2 would also result in an increase of 4,404 square feet (0.1 acre) in overwater coverage. **Table 3.5-4** summarizes these impacts by Reach.

Table 3.5-4
Summary of Impacts to Aquatic Resources

Project Reach	Overwater Coverage (sf)	Footprint (sf)	Volume below SHW (CY)	Volume below MHW (CY)
Reach 1	*No in-water activities*			
Reach 2	4,404	5,204	913	859
Reach 3	*No in-water activities*			
Reach 4	0	6,530	1,718	1,653
Reach 5	0	5,827	3,441	3,339
Reach 6	0	3,940	1,819	1,754
Reach 7	0	3	1	1
Total in Waters of the U.S.	**4,404**	**21,504**	**7,892**	**7,606**
Portion of Total within Littoral Zone Tidal Wetlands	*N/A*	*14,075*	*N/A*	*2,383*

The loss of 0.5 acres of benthic habitat and non-motile benthic macroinvertebrates in the footprint of the Proposed Project represents a negligible reduction in the amount of similar habitat and benthic organisms in the lower Hudson River. The piles and other in-water project components would be distributed along the full length of the Project Site such that the 0.5-acre footprint would not be concentrated in one location. The minimal occupation of the river bottom by the project components would result in a minimal change in foraging habitat for striped bass and other fish species and would not adversely affect the suitability of this portion of the Hudson River as winter flounder spawning habitat. Waters beneath the platforms would continue to be open to fish passage, and the bridging structures at Reach 5 would remain open to fish and benthic invertebrates except for brief periods during storm events.

Reconstruction of the relieving platform with an expanded deck in Reach 2 would result in an increase of 4,404 square feet (0.1 acre) in overwater coverage, which represents a minimal increase in shading. In general, NYSDEC considers aquatic habitat under an overwater structure to be shade-impacted beyond 15 feet inward from the structure's edges. This is consistent with studies that found shading from piers in the Hudson River to affect the behavior and abundance of fishes under the pier approximately 15 feet or more from the nearest pier edge (Able and Grothues 2011, Able et al. 2013). The pile-supported relieving platform would be extended approximately 6 feet into the water. Given these dimensions, there would

[12] For WOTUS, the upland boundary for NYSDEC jurisdiction is MHW and the upland boundary for USACE jurisdiction is SHW. USACE also has jurisdiction over certain vegetated wetlands that are considered WOTUS.

be minimal potential for the incremental increase in shading to have adverse effects on aquatic habitat compared to the No Action condition. SAV has not been observed in the Study Area and, therefore, the increase in shading along the northern edge of the platform at Reach 2 would not inhibit SAV growth. With the 6-foot northward extension, the Reach 2 platform is designed to create an enduring and resilient structure that has additional structural capacity to provide flexibility and adaptability for future protective and resiliency measures that could be built on top of the new platform if additional wave attenuation becomes necessary due to dynamic climate and sea level conditions, without the need to replace the full platform.

3.5.7.5 Essential Fish Habitat

Because the Proposed Project would not result in any significant adverse impacts to water or sediment quality, aquatic habitat, or aquatic biota, the Proposed Project would not result in any significant adverse impacts to EFH. While the permanent increase in shading would alter existing aquatic habitat, areas along the platform edges would have limited shading and the increased overwater coverage would not result in significant adverse impacts on fish or invertebrates when considering the amount of unaffected habitat in the lower Hudson River. Therefore, it is concluded that the Proposed Project would not result in any significant adverse impacts to EFH in the Study Area.

3.5.7.6 Terrestrial Resources

Ecological Communities

Project designs include replacing landscaping affected by construction. These replacement landscapes are to be comprised of a variety of native plants that are designed to increase the diversity of ecological communities along in the Project Area consistent with the *Battery Park City Sustainability Plan*.[13] Replaced and transplanted trees, as well as newly planted shrubs, and herbaceous plants would provide ecological functions and values (e.g., carbon sequestration, biodiversity, wildlife habitat and forage, .) while also attenuating the heat island effect. The proposed planting design would be consistent with the goal of maintaining and enhancing Battery Park City's rich biodiversity and enhancing and expanding habitats. Multiple existing mature trees would remain in-place in BPC waterfront open spaces that are unprotected by the flood barrier system (i.e., on the flood side). Strategies such as 'flushing' these trees and other planted areas with fresh water after saltwater inundation have had positive effect in the past (e.g. after Hurricane Sandy), subject to the location and condition of the trees. Similar strategies will be considered as part of the Proposed Project's landscape and maintenance and operations recommendations.

In total, approximately 420 trees are proposed to be removed in the Project Area, of which approximately 21 trees are street trees in Reach 1 under NYC Parks jurisdiction. Based on the current designs, approximately 370 of the 420 removed trees are proposed to be removed due to project design. Approximately 42 of the proposed trees to be removed would be due to condition, not project design.

[13] *Battery Park City Sustainability Plan.* September 2020. Available from: https://bpca.ny.gov/nature-and-sustainability/sustainability/

Approximately 17 of the impacted trees are potential candidates for transplant elsewhere within the Project Area. As part of the proposed project, approximately 390 trees are proposed to be planted in the Project Area, of which approximately 15 trees would be under NYC Parks jurisdiction. Within project areas that are under NYC Parks jurisdiction (i.e., street trees), BPCA intends to replace all removed trees in a manner that is consistent with the requirements of NYC Parks as specified in NYC Parks Rules and Local Law 3 of 2010. Within project areas that are not under NYC Parks jurisdiction, it is the intent of BPCA to replace all removed trees in a manner that best supports and enhances open space quality, biodiversity and habitat creation, and climate resilience. All tree removal and protection measures for street trees within NYC Parks jurisdiction would be in accordance with Chapter 5 of Title 56 of the NYC Parks Rules and Local Law 3 of 2010.

Implementation of the post-construction planting would include a variety of native plants and habitat types with the goal of enhancing the diversity of ecological communities in the project area. When compared to the No Action condition, operation of the flood barrier system would protect trees and ecological communities throughout most of the Study Area from flooding during storm events and the subsequent saltwater inundation that is harmful to terrestrial ecological communities and vegetation within the Study Area. As noted above, BPCA is committed to the restoration of all its open spaces in the event they are impacted by a storm, including restoration of terrestrial habitats. With these measures in place, it is concluded that the Proposed Project would not result in any significant adverse impacts to terrestrial ecological communities, including trees.

Wildlife

Birds

The transplanted and replacement trees, as well as newly planted shrubs, and herbaceous native plants proposed as part of the post-construction planting would provide habitat and foraging opportunities for migratory and resident bird species in the Study Area. The proposed planting design is consistent with the Battery Park City Sustainability Plan and its goal to maintain and enhance Battery Park City's rich biodiversity and habitats. Human activity and noise would not increase with the Proposed Project when compared to the No Action condition. Therefore, it is concluded that the Proposed Project would result in any significant adverse impacts to migratory or resident bird species that may use the project site or are present in the within the Study Area.

Reptiles and Amphibians

There is no suitable habitat for amphibian and reptile species in the Study Area. Therefore, it is concluded that the Proposed Project would not result in any significant adverse impacts to reptiles or amphibians.

Mammals

Terrestrial mammals inhabiting the Study Area are urban-adapted disturbance-tolerant species. Noise and human activity associated with the Proposed Project would be similar to the No Action condition. In addition, the implementation of post-construction planting would restore and improve any potential habitat temporarily disturbed by the Proposed Project, consistent with the goals of the *Battery Park City*

Sustainability Plan. Therefore, it is concluded that the Proposed Project would result in any significant adverse impacts to mammals.

3.5.7.7 Threatened, Endangered, and Special Concern Species

Monarch Butterfly

There is no essential breeding habitat for monarch butterfly (i.e., milkweed plants) in the Study Area, and any monarch butterflies that may be present are expected to be occasional migratory individuals rather than breeding populations. Post-construction planting would also include a variety of urban-tolerant native wildflowers and perennials that would restore and improve any potential butterfly and pollinator habitat impacted by the Proposed Project. Therefore, it is concluded that the Proposed Project would not result in any potential significant adverse impacts to monarch butterflies.

Peregrine Falcon

Peregrine falcons nesting in New York City are likely to range over large portions of Manhattan, Queens, and Brooklyn daily, as the species' home ranges typically span more than 50 square kilometers (Enderson and Craig 1997, Jenkins and Benn 1998). Peregrine falcons have the potential to briefly perch in a tree, on a lamppost, or other such structure within the study area, as they do anywhere within their large home range. The Proposed Project would not affect any existing or potential nesting habitat. There would be no change in the likelihood that peregrine falcons would continue to nest at existing sites throughout lower Manhattan, and no change in the condition, survival, or reproductive potential of falcons passing through the Study Area. Therefore, the Proposed Project would not have the potential to result in significant adverse impacts to peregrine falcons.

Shortnose and Atlantic Sturgeon

Because Atlantic and shortnose sturgeon are more likely to be present in the navigation channel during migration to and from upriver foraging, overwintering, and/or spawning grounds, it is unlikely that individuals of either species would be present in the Study Area except as occasional transients. Migration of sturgeon upriver during spring and migration downriver in the summer and early fall would not be obstructed by the project components, which would be installed entirely along the shoreline where there are existing in-water structures. The Project Area is located along the shoreline in relatively shallow waters less suitable for foraging compared to the deep waters of the navigation channel. The permanent loss of 0.5 acres of soft bottom habitat and shading of 4,404 square feet (0.1 acre) of water column would modify potential foraging habitat for shortnose and Atlantic sturgeon. However, this represents a small area relative to similar habitat available in the Hudson River that would be unaffected by the Proposed Project, and such a small loss of habitat would not result in significant adverse effects on either species.

The loss of 0.5 acres of soft bottom habitat in the footprint of the in-water components would modify designated critical habitat for Atlantic sturgeon. However, this is a small area of effect relative to the thousands of acres of available foraging habitat suitable for Atlantic sturgeon within designated critical habitat in the Hudson River. Given the location of the Study Area along the shoreline in the lower Hudson River, there are no project activities in the vicinity of hard bottom substrate in low salinity waters, and the

new piles and shoreline structures would not result in the loss of any soft substrate used for juvenile foraging and physiological development. Similarly, these structures would not result in any changes to water depth, water flow, dissolved oxygen levels, salinity, temperature, or the ability for Atlantic sturgeon to migrate in the vicinity of the Proposed Project. Finally, the replacement or partial replacement of the relieving platforms would not add a physical barrier to passage between the river mouth and spawning sites necessary to support unimpeded movement of adults to and from spawning sites, seasonal movement of juveniles, and staging, resting, or holding of subadults or spawning condition adults. Therefore, it is concldued that the Proposed Project would not result in any significant adverse impacts on Atlantic sturgeon critical habitat.

Sea Turtles

Sea turtles have the potential to be present in the Study Area only on rare occasions and then as transient individuals not for long-term occupation, r breeding, overwintering, or growth and development. The loss of 0.5 acres of bottom habitat and shading of 4,404 square feet (0.1 acre) in the footprint of the Proposed Project is a minimal loss of potential foraging habitat for sea turtles when compared to the No Action condition. Similar habitat in the New York Harbor and more suitable habitat in the southern bays of Long Island would also continue to be available for sea turtles. Therefore, it is concluded that the Proposed Project would not result in any significant adverse impacts on sea turtles.

3.5.7.8 Significant Coastal Fish and Wildlife Habitat

The Lower Hudson Reach was designated as a SCFWH primarily due to its use as wintering habitat by large numbers of juvenile striped bass. Adult striped bass enter the Hudson River to spawn during spring and summer, but spend most of their time in coastal waters, not the Study Area habitat. Spawning is in fresh water far upstream from the Study Area and would not be adversely affected by the Proposed Project. Because striped bass spawning takes place well upriver of the Project Site, most larval striped bass are also located upstream from the Study Area. While juvenile striped bass are distributed throughout the Hudson River, the highest abundance of juveniles is also found upstream in lower salinity waters.

The loss of 0.5 acres of soft bottom habitat and shading of 4,404 square feet (0.1 acre) in the footprint of the Proposed Project would result in a minimal change in foraging habitat for fish and other biota, including striped bass, but would not result in significant adverse effects to the suitability of this portion of the Lower Hudson Reach SCFWH as aquatic habitat. As described above, the Proposed Project would not adversely impact water or sediment and would not significantly affect habitat for aquatic biota. While the permanent increase in shading from the platform extension in Reach 2 would alter existing aquatic habitat, areas along the platform edges would have limited shading and the slight increase in overwater coverage would not have a significant adverse effect on fish or invertebrates considering the habitat available in the lower Hudson River. Therefore, it is concluded that the Proposed Project would not result in significant adverse effects to the Lower Hudson Reach SCFWH.

3.5.7.9 Hudson River Park Estuarine Sanctuary

The designation of the Hudson River Park as an Estuarine Sanctuary acknowledged the importance of the Hudson River ecosystem as well as the need to allow public access and management opportunities within the Park boundaries in a manner that promotes and preserves aquatic resources with the goal of ensuring that the needs of various park uses are balanced. The Park is meant 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 Hudson River. The Proposed Project would be protective of aquatic resources and would be consistent with the intended uses of the Hudson River Park Estuarine Sanctuary, including the use designation of the waters within Reach 2 for motorized boats.

While the Proposed Project would result in permanent impacts to aquatic resources in Reaches 2, 4, 5, 6, and 7 associated with the in-water elements of the flood barrier system, the permanent footprint of these components would be minimal, and the flood barrier system would ultimately improve the resiliency of the public recreational spaces along the waterfront. The post-construction planting designed to maintain and enhance Battery Park City's rich biodiversity and terrestrial habitats, which would support the Hudson River Park Estuarine Sanctuary Management Plan objective of improving wildlife habitat and promoting native species and sustainable design. As described in Section 3.11.1, “Construction Overview,” the proposed project would also require a temporary disruption in the marine recreation use, but would restore those uses once project construction is completed. Therefore, it is concluded that the Proposed Project is consistent with the goals of the Hudson River Park Estuarine Sanctuary Management Plan and would not result in significant adverse impacts or conflicts with the plan.