A. INTRODUCTION

This chapter examines the potential impacts from the Phased Redevelopment of Governors Island (the Proposed Project) on terrestrial and aquatic natural resources[1] and floodplains near the project site, which comprises 150 acres on Governors Island belonging to The Trust, located in the Upper New York Bay (see Figure 1-1).

This chapter describes:

- The regulatory programs that protect floodplains, wildlife, threatened or endangered species, aquatic resources, or other natural resources within the project site;
- The current condition of the floodplain and natural resources within the project site, including water and sediment quality, aquatic and terrestrial biota, and threatened or endangered species and species of special concern;
- The floodplain, water quality, and natural resources conditions in the future without the Proposed Project (the "No Build" condition);
- The potential impacts of the Proposed Project on the floodplain, water quality, and natural resources; and
- The measures that would be developed, as necessary, to mitigate and/or reduce any of the Proposed Project's potential significant adverse effects on natural resources, water quality, and floodplains.

PRINCIPAL CONCLUSIONS

The Proposed Project would not result in any significant adverse environmental impacts to floodplains and natural resources. The Proposed Project would provide a benefit to natural resources by improving existing open spaces and creating approximately 32 acres of new open space, which would increase the diversity and quality of habitats available on Governors Island. These higher quality habitats would benefit wildlife currently using the Island as full time and seasonal residents, and attract additional wildlife species and individuals, in particular birds during the spring and fall migration. Due to its geographic position along the Atlantic migration routes of many bird species, Governors Island has the potential to be a valuable stopover habitat for migrants passing through the metropolitan area. The integration of sustainable design principles for the proposed park and open space areas would ensure that these newly created open spaces and habitats would continue to benefit natural resources into the future. These design principals include reshaping the topography of the Island around the projected 100-year

[1] Natural resources are defined as "(1) the City's biodiversity (plants, wildlife and other organisms); (2) any aquatic or terrestrial areas capable of providing suitable habitat to sustain the life processes of plants, wildlife, and other organisms; and (3) any areas capable of functioning in support of the ecological systems that maintain the City's environmental stability."

flood elevation to maintain sufficient separation between the root zone of planted trees and projected saltwater levels, and planting vegetation tolerant of salt spray and elevated salinity levels within the wetlands created as part of the Proposed Project.

The decrease in the total amount of impervious surfaces within the project site would decrease the discharge of stormwater to the Upper New York Bay. The implementation of measures that would be part of the post-construction stormwater management measures incorporated into the Stormwater Pollution Prevention Plans (SWPPP) would further reduce discharge of stormwater to the Upper Bay and improve its quality. Incorporation of the Park Master Plan's proposed sustainable design measures, such as controlling the application of fertilizers and use of non-toxic pest and disease control for plants, could also minimize the potential for the operation of the park and open spaces to affect the quality of stormwater discharged to the Upper Bay.

PHASE 1

Construction and operation of Phase 1 of the Proposed Project would not have the potential to result in any significant adverse impacts to existing terrestrial plant and wildlife communities, floodplains, wetlands, water quality, aquatic biota in the Upper New York Bay, or threatened or endangered species. Most of the Phase 1 elements of the Proposed Project are located at an elevation above the 100-year flood elevation. With the implementation of erosion and sediment control measures that would be specified in a SWPPP, stormwater discharged during construction of Phase 1 would not result in significant adverse impacts to littoral zone tidal wetlands, or to water quality, or aquatic biota of the Upper Bay. While the rehabilitation of the seawall and reconstruction, consolidation, and abandonment of the stormwater outfalls would have the potential to result in increases in suspended sediment, these increases would be localized and temporary and would be minimized through the use of measures to contain suspended sediments. Therefore, these in-water construction activities would not result in significant adverse impacts to water quality or aquatic biota of the Upper Bay.

While the consolidation of the stormwater outfalls from 132 to 29 would generally result in an increase in the diameter of the outfall and increased flow capacity, the overall stormwater runoff peak flows from the Island would decrease because of the total decrease in impervious surfaces, which would also improve the quality of the stormwater discharged. Because stormwater runoff would discharge to a tidal body of water—Upper New York Bay—the increase in flows at each of the modified outfalls would have a negligible effect on the water quality or aquatic resources of the Bay. Additionally, the riprap installed at the toe of the rehabilitated seawall would be designed to prevent scour at the base of the seawall and dissipate the flow of stormwater discharged through the consolidated stormwater outfalls, minimizing the potential for resuspension of bottom sediment during discharge of stormwater. The implementation of measures that would be part of the post-construction stormwater management measures incorporated into the SWPPP would further reduce discharge of stormwater to the Upper Bay and improve its quality. Therefore, discharge of stormwater would not have the potential to result in significant adverse impacts to water quality or littoral zone tidal wetlands of the Upper Bay.

During some of the seawall rehabilitation and stormwater outfall reconstruction activities, removal of bottom sediment and existing riprap at the toe of the seawall would adversely affect aquatic biota through the loss of aquatic habitat and possibly some benthic invertebrate individuals. However, these adverse impacts would be minimal and would be offset through the restoration of aquatic habitat achieved through the replacement of approximately 0.7 miles of existing seawall with riprap revetment. By removing the seawall and relocating the new

headwall landward of the existing seawall location, it is anticipated that more fill material would be removed than would be placed as riprap at the toe of the seawall for scour protection and dissipation of stormwater discharged through the consolidated stormwater outfalls, resulting in a net benefit to aquatic resources. Additionally, the stone riprap would increase the diversity of aquatic habitats along the shoreline of the Island and it is expected to be quickly colonized by encrusting organisms and benthic macroinvertebrates. The construction of one or both of the two proposed 12-inch diameter water mains under Buttermilk Channel using Horizontal Directional Drilling (HDD) would not result in any in-water construction activities and would not affect aquatic resources within Buttermilk Channel. Upland disturbance associated with the construction of the water main(s) would occur within developed urban areas with limited habitat for wildlife. Therefore, temporary disturbance that would occur during the water main construction would not result in adverse impacts to natural resources.

Grading, construction, and landscaping activities associated with Phase 1 would directly impact wildlife due to loss of habitat, for those individuals unable to find suitable available habitat nearby. However, the majority of the wildlife species currently using the habitats on Governors Island are extremely common to urban areas and tolerant of disturbances and therefore Phase 1 would not result in significant adverse impacts to their populations by the loss of some individuals. In the North Island, the replacement of existing asphalt surfaces with lawn and shade trees at Soissons Landing, the South Battery, Liggett Terrace and the Battery would have the potential to result in indirect impacts to wildlife individuals such as avoidance of certain habitat areas due to increased human activity, noise, vibrations, or construction equipment during land disturbing activities. However, the species occurring in these areas are primarily limited to grey squirrels and non-native, invasive birds that are highly tolerant of urban habitats and would be unlikely to be highly disturbed by these activities. The replacement of asphalt surfaces with pervious vegetated green space would improve habitat conditions for native birds and other wildlife. The flower beds to be planted as part of Phase 1 would also provide nectar sources for butterflies and bees. The creation of Hammock Grove and Play Lawn would benefit terrestrial wildlife, particularly birds, by increasing forest cover on the Island.

LATER PHASES

Construction and operation of the full development of the Proposed Project would not have the potential to result in any significant adverse impacts to existing terrestrial plant and wildlife communities, floodplains, wetlands, water quality, or aquatic biota in the Upper New York Bay. The Later Phases-Park and Public Spaces would result in beneficial effects on plants and wildlife on and around the Island.

Portions of the park and open space elements to be developed in the South Island would be located within the current 100-year floodplain. Fill material would be added for the construction of the Later Phases-Park and Public Spaces to raise the elevation above the projected future 100-year flood elevation. The design of any new buildings within the development zones for the Later Phases-Island Redevelopment would have to be consistent with the New York City Building Code requirements for construction within the 100-year floodplain.

With the reduction in impervious cover and implementation of erosion and sediment control measures and the stormwater management measures that would be specified in the SWPPP, stormwater discharged during construction of the full development of the Proposed Project would not result in significant adverse impacts to littoral zone tidal wetlands, or to water quality, or aquatic biota of the Upper Bay.

The construction of the Great Promenade would not result in the loss of wildlife habitat but would have the potential to disturb waterfowl present offshore during fall and winter. However it is expected that these birds would be able to avoid construction areas and move into similar nearby habitats. The construction of Liberty Terrace, the Hills, and South Prow would result in the loss of disturbed areas that are of limited value for wildlife. Therefore, construction of these elements would result in minimal impact to natural resources. The construction of Liberty Terrace and the Hills would have the potential to result in indirect impacts to wildlife individuals using the open space areas created in the nearby Hammock Grove and Play Lawn (completed in Phase 1), such as avoidance of certain habitat areas due to increased human activity, noise, or construction equipment during land disturbing activities. However, because similar habitats would be available elsewhere on the Island, significant adverse impacts to wildlife would not occur as a result of construction of the Later Phases-Park and Public Spaces. The development zones on the South Island largely overlap with currently developed areas. Therefore, little existing open space habitat would be modified or lost by future construction activities within these areas with the exception of an area of intermittently mowed, occasionally overgrown lawn south of Division Road in which native birds were observed. However, loss of this small habitat dominated by non-native plant species would not result in significant adverse impacts on the populations of these species. Therefore, full development of the Proposed Project would not result in significant adverse impacts to existing terrestrial plants and wildlife.

The proposed development of the Hills would enhance the Island's native plant diversity and likely provide habitat for native wildlife, particularly migrating birds. Governors Island currently lacks suitable stopover habitat for most migratory landbird species, and the trees, understory shrubs and herbaceous ground cover planned for the Hills would likely improve stopover refueling conditions for migrants on the Island. The South Prow would create the only wetland habitat on Governors Island. This approximately 3-acre created wetland would be fed by brackish groundwater as well as stormwater and would be designed to withstand flooding. Plantings would include native wetland species tolerant of salt spray and elevated salinity levels. Despite its small size, the wetland could provide breeding habitat for some wetland-associated birds that are tolerant of human activity, which would likely be high during the peak summertime visitation period. Such species include red-winged blackbird, gray catbird, song sparrow, and common yellowthroat. The wetland may also provide a stopover site for these birds and additional species such as northern waterthrush, marsh wren, and swamp sparrow migrating through the region. The proposed wetland plantings would likely attract dragonflies, butterflies, and bees.

B. METHODOLOGY

OVERVIEW

The study area for terrestrial natural resources and floodplains includes all 172 acres of Governors Island, and the limited areas of temporary disturbance in Brooklyn for the proposed water main(s) (see Figure 1-13). The identification of threatened or endangered species was evaluated for a distance of 0.5 miles from Governors Island. The study area for water quality and aquatic resources included the overall aquatic resources within the Upper New York Bay. As described in Chapter 1, "Project Description," Phase 1 of the Proposed Project would be completed by the end of 2013, and the full development of the Proposed Project would be completed by 2030.

EXISTING CONDITIONS

Existing conditions for floodplain, and natural resources within the study area were summarized from:

- Existing information identified in literature and obtained from governmental and nongovernmental agencies, such as the New York City Department of Environmental Protection (NYCDEP) Harbor Water Quality Survey (NYCDEP 2010b); NYCDEP City-Wide Long Term CSO Control Planning Project reports; U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps and federally listed threatened or endangered species for New York County and Kings County, New York (http://ecos.fws.gov); New York State Breeding Bird Atlas, 2000-2005; New York/New Jersey Harbor Estuary Program; Federal Emergency Management Agency (FEMA) flood insurance rate maps; and U.S. Army Corps of Engineers (USACE) studies conducted as part of the New York and New Jersey Harbor Navigation Project.
- Responses to requests for information on rare, threatened, or endangered species in the vicinity of the project site from the National Marine Fisheries Service (NMFS) and the New York Natural Heritage Program (NYNHP).
- Observations made during site reconnaissance conducted within the project site on November 10, 2010 and May 9, 2011.

THE FUTURE WITHOUT THE PROPOSED PROJECT

The assessment of floodplain and terrestrial natural resources in the future without the Proposed Project (the No Build condition) considers these resources in the 2013 and 2030 analysis years without the Proposed Project. In the future without the Proposed Project, Governors Island will continue to operate much as it does today. Visitation will be dependent on the ability to access to the Island. It is expected to continue to increase in the future absent the proposed improvements to open space and development of the Island. Demolition of existing buildings on the South Island and limited buildings on the North Island, approved in 2008, will continue in the future without the Proposed Project. Other improvements that will be undertaken on the Island in the No Build condition include upgrades of existing infrastructure (e.g., storm water, electrical, and telecommunications), rehabilitation of Pier 101 and Yankee Pier, demolition of Tango Pier, and rehabilitation of the transfer bridges and fenders at Soissons Dock and the Battery Maritime Building (BMB).

THE FUTURE WITH THE PROPOSED PROJECT

PHASE 1

Potential impacts on the floodplain, wetlands, aquatic, and terrestrial resources from Phase 1 of the Proposed Project were assessed by considering the following:

- The existing water quality and natural resources of the Upper New York Bay in the vicinity of the project site for Phase 1 in 2013.
- The potential for in-water construction activities associated with the seawall rehabilitation to result in temporary impacts to water quality and aquatic organisms. These potential impacts may include:
  - Temporary increases in suspended sediment and release of contaminants during sediment disturbance; and

- Temporary loss of fish breeding, nursery, or foraging habitat, or Essential Fish Habitat (EFH).

- Beneficial effects to aquatic and tidal wetland resources resulting from the replacement of a portion of the existing seawall with riprap revetment.
- Temporary impacts on water quality and aquatic biota from the possible discharge of groundwater recovered during dewatering.
- Direct impacts to wildlife individuals due to loss of habitat for those individuals using the limited habitats available in the South Island and the minimal areas that would be disturbed as a result of the improvements within the North Island. Indirect impacts to wildlife individuals such as avoidance of certain habitat areas due to increased human activity, noise, or construction equipment during land disturbing activities.
- Potential long-term beneficial effects on plants and wildlife from the proposed landscaping within the proposed public open space areas, as well as the potential for adverse impacts to natural resources due to management of these open space areas. (e.g., pesticide application).

LATER PHASES

Potential impacts on the floodplain, wetlands, aquatic, and terrestrial resources from the full development of the Proposed Project were assessed by considering the following:

- The existing water quality and natural resources of the Upper New York Bay in the vicinity of the project site for the full development of the Proposed Project in 2030.
- Temporary impacts on water quality and aquatic biota from the possible discharge of groundwater recovered during dewatering.
- Direct impacts to wildlife individuals due to loss of habitat for those individuals using the limited habitats available in the South Island. Indirect impacts to wildlife individuals using the open space areas created during Phase 1, such as avoidance of certain habitat areas due to increased human activity, noise, or construction equipment during land disturbing activities.
- Potential long-term beneficial effects on plants and wildlife from the proposed landscaping within the proposed public open space areas developed within the project site.
- Projected sea level rise due to climate change.

C. REGULATORY CONTEXT

The following sections identify the federal and state legislation and regulatory programs that pertain to activities in coastal areas, surface waters, floodplains, wetlands, and the protection of species of special concern that would apply to the Proposed Project.

FEDERAL

CLEAN WATER ACT (33 USC §§ 1251 TO 1387)

The objective of the Clean Water Act, also known as the Federal Water Pollution Control 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; the discharge of dredged or fill material into navigable waters and other waters; and non-point source pollution, such as runoff from streets, agricultural fields, construction sites, and mining.

Under Section 401 of the Act, any applicant for a federal permit or license for an activity that may result in a discharge to navigable waters must provide to the federal agency issuing a permit a certificate, either from the state where the discharge would occur or from an interstate water pollution control agency, that the discharge would comply with Sections 301, 302, 303, 306, 307, and 316 (b) of the Clean Water Act. Applicants for discharges to navigable waters in New York must obtain a Water Quality Certification from NYSDEC.

Section 404 of the Act requires authorization from the Secretary of the Army, acting through USACE, for the permanent or temporary discharge of dredged or fill material into navigable waters and other waters of the United States. Waters of the United States is defined in 33 CFR 328.3 and includes wetlands, mudflats, and sandflats that meet the specified requirements, in addition to streams and rivers that meet the specified requirements. Activities authorized under Section 404 must comply with Section 401 of the Act.

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 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 mean high water line, are regulated pursuant to this Act.

MAGNUSON-STEVENS ACT (16 USC §§ 1801 TO 1883)

Section 305(b)(2)-(4) of the Magnuson-Stevens Act outlines the process for the NMFS 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 EFH. Adverse impacts 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.

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, historical, recreational, and scientific value to the nation and its people. The Act prohibits the importation, exportation, taking, possession, and other activities involving illegally taken species covered under the Act, and interstate or foreign commercial activities. The Act also provides for the protection of critical habitats on which endangered or threatened species depend for survival.

FISH AND WILDLIFE COORDINATION ACT (PL 85-624; 16 USC 661-667D)

The Fish and Wildlife Coordination Act entrusts the Secretary of the Interior 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.

NEW YORK

PROTECTION OF WATERS, ARTICLE 15, TITLE 5, ENVIRONMENTAL CONSERVATION LAW [ECL], IMPLEMENTING REGULATIONS 6 NYCRR PART 608.

NYSDEC is responsible for administering the Protection of Waters Act and regulations to govern activities on surface waters (rivers, streams, lakes, and ponds). The Protection of Waters Permit Program regulates five different categories of activities: disturbance of stream beds or banks of a protected stream or other watercourse; construction, reconstruction, or repair of dams and other impoundment structures; construction, reconstruction, or expansion of docking and mooring facilities; excavation or placement of fill in navigable waters and their adjacent and contiguous wetlands; and Water Quality Certification for placing fill or other activities that result in a discharge to waters of the United States in accordance with Section 401 of the Clean Water Act.

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES) (N.Y. ECL ARTICLE 3, TITLE 3; ARTICLE 15; ARTICLE 17, TITLES 3, 5, 7, AND 8; ARTICLE 21; ARTICLE 70, TITLE 1; ARTICLE 71, TITLE 19; IMPLEMENTING REGULATIONS 6 NYCRR ARTICLES 2 AND 3)

Title 8 of Article 17, ECL, Water Pollution Control, authorized the creation of 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 (sewage treatment plant), discharge of stormwater, and construction activities that disturb one or more acres.

TIDAL WETLANDS ACT, ARTICLE 25, ECL, IMPLEMENTING REGULATIONS 6 NYCRR PART 661.

Tidal wetlands 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 shore, 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 almost any activity that would alter wetlands or the adjacent areas (up to 300 feet inland from wetland boundary or up to 150 feet inland within New York City).

ENDANGERED AND THREATENED SPECIES OF FISH AND WILDLIFE; SPECIES OF SPECIAL CONCERN (ECL, SECTIONS 11-0535[1]-[2], 11-0536[2], [4], IMPLEMENTING REGULATIONS 6 NYCRR PART 182)

The Endangered and Threatened Species of Fish and Wildlife, Species of Special Concern 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.

D. EXISTING CONDITIONS

The 2010 *CEQR Technical Manual* defines natural resources as "(1) the City's biodiversity (plants, wildlife and other organisms); (2) any aquatic or terrestrial areas capable of providing suitable habitat to sustain the life processes of plants, wildlife, and other organisms; and (3) any areas capable of functioning in support of the ecological systems that maintain the City's environmental stability." Under CEQR, a natural resources assessment is to consider the plant, wildlife and other species in the context of the surrounding environment, habitat or ecosystem and examines a project's potential to impact those resources. Resources such as groundwater, soils and geologic features, natural and human-created habitats, and any areas used by wildlife may be considered in a natural resources analysis. Stormwater runoff may also be considered in a natural resources assessment and evaluated in the context of its impact on local ecosystem functions and on the quality of adjacent waterbodies.

In accordance with the 2010 *CEQR Technical Manual*, this section describes the following existing natural resources within the terrestrial and aquatic resource study areas on the basis of existing information and the results of the two site reconnaissance visits conducted November 2010 and May 2011: groundwater, floodplain, groundwater, wetlands, aquatic resources, EFH, terrestrial plant and wildlife, threaten or endangered species, and Significant Coastal Fish and Wildlife Habitats.

GROUNDWATER

As discussed in Chapter 11, "Hazardous Materials," approximately 100 acres of the Island, mainly the South Island was created by the placement of fill material believed to comprise excavated material from subway construction imported by the USACE in the early 1900s. Thickness of this fill material ranges from approximately 5 to 10 feet (ft) in the north to approximately 40 feet in the south. Elevations in the hilly northern portion of the Island range from 10 ft at the bulkhead rising to 40 ft at the base of Fort Jay's fortification walls. The southern portion of the Island is flat, with elevations ranging from 6 feet at the seawall to 13.5 ft. Depth to bedrock ranges from 30 to 95 feet below grade. Groundwater occurs at elevations ranging from two feet below mean sea level (MSL) to about 14 feet above MSL and is expected to flow from the center of the Island and Fort Jay (the highest point of the Island at 40 feet above MSL) to the Upper New York Harbor. It is likely brackish or saline and unsuitable for potable supply. Subsurface investigation of the Island identified subsurface contamination generally reflective of urban fill materials (e.g., elevated metal and semivolatile organic compounds (SVOCs) concentrations) in soils; the presence of pesticides and/or PCBs in soil in portions of the site, likely due to fill materials and/or historical uses; and evidence of apparent low-level residual petroleum contamination in soil and/or groundwater in portions of the project site.

FLOODPLAIN

Figure 10-1 shows the existing 100-year and 500-year floodplain boundaries (i.e., the areas with a 1 percent chance and 0.2 percent chance, respectively, of flooding each year) within the project site. On the Island, the uplands immediately adjacent to the seawall are within the 100-year floodplain. The 100-year flood elevation for this zone is at elevation 10 feet National Geodetic Vertical Datum of 1929 (NGVD29). On the North Island, landward of the 100-year floodplain is a narrow area that is also within the 500-year floodplain. The remainder of the North Island is outside the 100- and 500-year floodplains. On the South Island, with the exception of a few

Source: Digital Flood Insurance Rate Map, FEMA, 2007

7.13.11

Governors Island National Monument

100-Year Floodplain

500-Year Floodplain

0 500 1000 FEET

SCALE

PROPOSED PHASED REDEVELOPMENT OF
GOVERNORS ISLAND

FEMA Floodplain
Figure 10-1

areas of higher elevation that are outside the 100 and 500-year floodplains, the majority of the area is within the 100- and 500-year floodplain. The seawall and the in-water area immediately surrounding the wall is designated Zone AE (100-year flood elevation 10 feet NGVD 29) for much of the North Island and the southern shoreline down to Yeaton Road. From Yeaton Road around the western and northern shoreline of the Island up to and including Castle Williams (to Hay Road) the seawall and in-water area immediately surrounding the wall is designated Zone VE, indicating a coastal flood zone with velocity hazard due to wave action. The 100-year flood elevation for the VE zone is at elevation 13 feet NVGD29 from Yeaton Road around the western tip of the Island and then decreases to 12 feet NVGD29 through Castle Williams.

WETLANDS

No wetlands identified by the USFWS NWI or by the NYSDEC occur on Governors Island. The USFWS NWI classifies the Upper New York Bay surrounding Governors Island, including Buttermilk Channel as E1UBL (estuarine subtidal unconsolidated bottom). Subtidal areas are continuously submerged substrates (below extreme low water). Unconsolidated bottoms have at least 25 percent cover of particles smaller than 6 or 7 centimeters, and less than 30 percent vegetative cover. No vegetated tidal wetlands are present along the shoreline. Similarly, the NYSDEC has mapped Upper New York Bay surrounding Governors Island as littoral zone tidal wetlands—shallow waters 6 feet or less in depth at mean low water (MLW) that are not included in other NYSDEC tidal wetland categories. However, NYSDEC regulations state that actual water depths determine whether or not an area is a littoral zone. Water depths around Governors Island are generally shallow in the immediate vicinity of the shoreline and drop off rapidly (GIPEC 2010; NOAA 2010c Navigation Chart 12335). Depths on the east side of the Island at mean lower low water (MLLW) range from 2 to 4 ft near the shoreline and drop off rapidly to over 25 ft farther out into Buttermilk Channel. Along the north and west sides of the Island, shoreline depths range from 1 to 5 ft at MLLW and drop off to over 18 ft. Depths are deepest along the south side of the Island, where they range from 12 to 17 ft but drop off more gradually off the southeastern portion of the Island to over 18 ft. Maximum depths in the vicinity of Governors Island occur to the southwest, with depths reaching 65 ft in the open Harbor (NOAA 2010 Navigation Chart 12335). On the basis of these water depths, portions of the area around the Island may meet the NYSDEC definition for littoral zone tidal wetlands.

AQUATIC RESOURCES

SURFACE WATER RESOURCES

Governors Island is located within the Upper New York Bay, which is tidally influenced, and is bounded by Buttermilk Channel to the southeast. The tidal range for the Upper New York Bay is approximately 4.5 ft (1.4 meters) (NYCDEP 2007). The salinity of the Upper Bay varies daily with the tidal cycle and seasonally with the volume of freshwater entering from the Hudson River. The Upper New York Bay is partially stratified—higher salinity water toward the bottom and freshwater toward the top (USACE 1999a). It tends to be well-mixed during low flow conditions and more stratified under high flow conditions when the freshwater overrides the saltwater layer (Moran and Limburg 1986; NYCDEP 2004).

WATER QUALITY

Title 6 of the New York Code of Rules and Regulations (NYCRR) Part 703 includes surface water standards for each use class of New York surface waters. The Upper New York Bay is Use

Classification I saline surface waters. Best usages for Use Classification I waters are secondary contact recreation and fishing. Water quality should be suitable for fish propagation and survival.

The water quality of the Upper New York Bay is strongly affected by human activity and the densely populated and industrialized land uses that surround it. Historically, water quality problems included low dissolved oxygen (DO) content, high nutrient concentrations, algal blooms, excessive numbers of coliform bacteria, and the presence of floatables.

The results of Harbor Surveys conducted by NYCDEP (NYCDEP 2006, 2010b, 2010c) show that the water quality of New York Harbor, including the Upper New York Bay, has improved significantly since the 1970s as a result of measures undertaken by the City (e.g., infrastructure improvement such as major improvements to wastewater treatment plants (WWTP) and increased capture of stormwater runoff) and others (NYCDEP 2010a and b). Water quality data (2005 through 2009) from the NYCDEP Harbor Survey station just west of the Battery in Manhattan (Station N5), the station closest to Governors Island, indicate that the water quality in this part of the Upper New York Bay is good and meets the water quality standards for Use Classification I waters (see **Table 10-1**). Chlorophyll-a concentrations[1] were not indicative of high nutrient concentrations during this five-year period. Secchi transparency[2] during this 5 year period was indicative of low water clarity, likely due to high suspended solid concentrations of surface waters (NYCDEP 2010b, 2010c).

SEDIMENT QUALITY

The Upper New York Bay has a complex distribution of sediments because of variable currents and a high degree of sediment input due to natural and human actions. Sediments in the Upper New York Bay vary from coarse sands and gravels in high-energy areas to fine-grained silts and clays in low-energy areas (USACE 1999a).

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[1] High levels of nutrients can lead to excessive plant growth (a sign of eutrophication) and depletion of DO. Concentrations of the plant pigment chlorophyll-a in water can be used to estimate productivity and the abundance of phytoplankton. Chlorophyll-a concentrations greater than 20 micrograms per liter (µg/L) are considered suggestive of eutrophic conditions (NYCDEP 2010b).

[2] Secchi transparency is a measure of the clarity of surface waters. Transparency greater than 5 feet (1.5 meters) indicates relatively clear water. Decreased clarity can be caused by high suspended solid concentrations or blooms of plankton. Secchi transparencies less than 3 feet (0.9 meters) may be considered indicative of poor water quality conditions. Average Secchi readings in the Inner Harbor area have remained relatively consistent since measurement of this parameter began in 1986, ranging between approximately 3.5 and 5.5 feet (1.1 to 1.8 meters) (NYCDEP 2010b).

Table 10-1
NYCDEP Water Quality Data for the Battery Sampling Station (2005–2009)

Parameter—[*Use Class I Standard*]	Top Waters			Bottom Waters		
	Low	High	Avg	Low	High	Avg
Temperature (°C) [*No Standard*]	1.3	26.2	19.2	3.1	24.0	17.6
Salinity (psu) [*No Standard*]	2.5	25.5	16.6	15.5	29.0	25.0
Fecal coliform (colonies per 100mL) [*Monthly geometric mean less than or equal to 2,000 colonies/100 milliliters (mL) from five or more samples*]	1	801	89	N/M	N/M	N/M
Dissolved oxygen (DO)[1] (mg/L) [*Never less than 4 mg/L*]	4.1	12.4	6.7	3.6	12.6	6.0
Secchi transparency (ft) [*No Standard*]	0.5	8.0	3.6	N/A	N/A	N/A
Chlorophyll *a* (µg/L) [*No Standard*]	0.5	36.4	4.4	N/M	N/M	N/M

Notes: N/M = not measured, N/A = not applicable.
Source: NYCDEP 2010c

Typical of any urban watershed, New York Harbor Estuary sediments, including those of the Upper New York Bay, are contaminated due to a history of industrial uses in the area. Contaminants found throughout the New York Harbor Estuary include pesticides such as chlordane and DDT; metals such as mercury, cadmium, lead, and copper; PCBs, and various polycyclic aromatic hydrocarbons (Rohmann and Lilienthal 1987). The Upper New York Bay is listed on the New York State 2010 303(d) list of impaired waters for sediments contaminated with cadmium (first listed in 2002) and PCBs and other toxics (first listed in 1998). Adams et al. (1998) found the mean sediment contaminant concentration for 50 of 59 chemicals measured in sediment samples from the New York/New Jersey Harbor Estuary to be statistically higher than other coastal areas on the East Coast. Within the New York Harbor Estuary, Adams et al. (1998) ranked Newark Bay as the most degraded area on the basis of sediment chemistry, toxicity, and benthic community, followed by the Upper Harbor, Jamaica Bay, Lower Harbor, Western Long Island Sound and the New York Bight Apex. Biological effects, identified based upon the benthic invertebrate community, were found to be associated with the chemical contamination. While the sediments of the New York Harbor Estuary are contaminated, the levels of most sediment contaminants (e.g., dioxin, DDT, and mercury) have decreased on average by an order of magnitude over the past 30 years (Steinberg et al. 2002). Between 1993 and 1998, the percentage of sediment sampling locations with benthic macroinvertebrate communities considered impacted, or of degraded quality, decreased throughout the New York/New Jersey Harbor Estuary (Steinberg et al. 2004). Within the Upper Harbor, the percentage of benthic communities considered impacted decreased significantly from 75 percent in 1993 to 48 percent in 1998 (Steinberg et al. 2004).

[1] DO in the water column is necessary for respiration by aquatic biota. The bacterial breakdown of high organic loads can deplete DO and result in low DO levels. Persistently low DO can degrade habitat and affect aquatic biota. Consequently, DO is one of the most universal indicators of overall water quality in aquatic systems.

AQUATIC BIOTA

The New York/New Jersey Harbor Estuary 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 provide a brief description of the aquatic biota found in the Harbor Estuary.

Primary Producers

Phytoplankton

Phytoplankton are microscopic plants whose movements within 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, with lesser contributions from dinoflagellates and green algae (Brosnan and O'Shea 1995). While nutrient concentrations in most areas of New York Harbor are very high, low light penetration has often precluded the occurrence of phytoplankton blooms.

Phytoplankton sampling in the Upper New York Bay over a ten year period between 1991 and 2000 resulted in the collection of a total of 90 taxa. The most frequently collected taxa were *Nannochloris atomus* (found in 96 percent of the samples), *Skeletonema costatum* (84 percent), *Prorccentrum redfieldii* (44 percent), and *Rhizosolenia delicatula* (39 percent) (NYCDEP 2007).

Submerged Aquatic Vegetation and Benthic Macroalgae

Submerged aquatic vegetation (SAV) are rooted aquatic plants that are often found in shallow areas of estuaries. These organisms are important because they provide nursery and refuge habitat for fish. Light penetration, turbidity and nutrient concentrations are all important factors in determining SAV and benthic algae productivity and biomass. Due to the limited light penetration observed in the Upper Harbor, as indicated by the low secchi transparency reported by the NYCDEP Harbor Surveys, the extensive development of the shorelines and swift currents, SAV habitat is limited within the New York Harbor Estuary. No SAV were observed along the shoreline of Governors Island.

Benthic macroalgae are large multicellular algae that are important primary producers in the aquatic environment. They are often seen on rocks, jetties, pilings, and sandy or muddy bottoms (Hurley 1990). Since these organisms require sunlight as their primary source of energy, the limited light penetration of New York Harbor limits their distribution to shallow areas. Common macro-algae known to occur within the Harbor Estuary include the Phaeophyte species *Fucus vesiculosus* (brown algae), and the Chlorophyte species *Ulva lactuca* (sea lettuce) (Perlmutter 1971).

Zooplankton

Zooplankton are an integral component of aquatic food webs—they are primary grazers on phytoplankton and detritus material, and are themselves used by organisms of higher trophic levels as food. The higher-level consumers of zooplankton typically include forage fish, such as bay anchovy, as well as commercially and recreationally important species, such as striped bass and white perch during their early life stages. Predacious zooplankton species can consume eggs and larvae, and can have a detrimental effect on certain fish species.

Crustacean taxa dominate the zooplankton community within the New York Harbor (copepods *Acartia tonsa*, *Acartia hudsonica*, *Eurytemora affinis*, and *Temora longicornis)*, with the dominant species changing with the season (Stepien et al. 1981, Lonsdale and Cosper 1994,

Perlmutter 1971, Lauer 1971, Hazen and Sawyer 1983). Zooplankton sampling in the Upper New York Bay over a ten year period between 1991 and 2000 resulted in the collection of a total of 19 taxa. The most frequently collected taxa were *Tintinnopsis* spp (29 percent), nauplius of copepods (26 percent), and *Eutreptia* spp (19 percent) (NYCDEP 2007).

Benthic Invertebrates

Invertebrate organisms that inhabit estuary bottom sediments as well as surfaces of submerged objects (such as rocks, pilings, or debris) are commonly referred to as benthic invertebrates. These organisms are important to an ecosystem's energy flow because they convert detrital and suspended organic material into carbon (or living material); moreover, they are also integral components of the diets of ecologically and commercially important fish and waterfowl species. Benthic invertebrates are also essential in promoting the exchange of nutrients between the sediment and water column. Substrate type (rocks, pilings, sediment grain size, etc.), salinity, and DO levels are the primary factors influencing benthic invertebrate communities; secondary factors include currents, wave action, predation, succession, and disturbance.

The major groups of benthic invertebrates collected in the estuary include aquatic earthworms (oligochaetes), segmented worms (polychaetes), snails (gastropods), bivalves, barnacles, cumaceans, amphipods, isopods, crabs, and shrimp. Dominant benthic species within the Upper New York Bay include *Streblospio beredicti*, *Mediomastus*, *Mulina lateralis*, *Sabellaria vulgaris*, and *Heteromastus filformis* (NYCDEP 2007).

Fish

New York City is located at the convergence of several major river systems, all of which connect to the New York Bight portion of the Atlantic Ocean. This convergence has resulted in a mixture of habitats in the Harbor Estuary 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 but migrate to marine waters to breed). **Table 10-2** lists fish species known to occur within the Harbor Estuary and have the potential to occur in the vicinity of Governors Island.

ESSENTIAL FISH HABITAT (EFH)

The NMFS designates EFH within 10' x 10' squares identified by latitude and longitude coordinates. Governors Island is within a portion of the New York/New Jersey Harbor Estuary EFH that is situated in the NMFS 10' x 10' square with coordinates (North) 40°50.0' N, (East) 74°00.0' W, (South) 40°40.0' N, (West) 74°10.0' W. This square includes the following waters: the Hudson River and Bay from Guttenberg, New Jersey south to Jersey City, New Jersey, including the Global Marine Terminal and the Military Ocean Terminal, Bayonne, New Jersey, Hoboken, New Jersey, Weehawken, New Jersey, Union City, New Jersey, Ellis Island, Liberty Island, Governors Island, the tip of Red Hook Point on the west tip of Brooklyn, New York, and Newark Bay. **Table 10-3** lists the species and life stages of fish identified as having EFH in the portion of the Upper New York Bay near the project site.

Table 10-2
Finfish Species With the Potential to Occur in the Vicinity of Governors Island

Common Name	Scientific Name
Alewife	*Alosa pseudoharengus*
American eel	*Anguilla rostrata*
American sand lance	*Ammodytes hexapterus*
American shad	*Alosa sapidissima*
Atlantic cod	*Gadus morhua*
Atlantic croaker	*Micropogonias undulatus*
Atlantic herring	*Clupea harengus*
Atlantic mackerel	*Scomber scombrus*
Atlantic menhaden	*Brevoortia tyrannus*
Atlantic moonfish	*Selene setapinnis*
Atlantic needlefish	*Strongylura marina*
Atlantic silverside	*Menidia menidia*
Atlantic sturgeon	*Acipenser oxyrhynchus*
Banded killifish	*Fundulus diaphanous*
Bay anchovy	*Anchoa mitchilli*
Black sea bass	*Centropristis striata*
Blackfish	*Tautoga onitis*
Blueback herring	*Alosa aestivalis*
Bluefish[(1)]	*Pomatomus saltatrix*
Butterfish	*Peprilus triacanthus*
Clearnose skate	*Raja eglanteria*
Conger eel	*Conger oceanicus*
Crevalle jack	*Caranx hippos*
Cunner	*Tautogolabrus adspersus*
Fawn cusk eel	*Lepophidium cervinum*
Feather blenny	*Hypsoblennius hentzi*
Fourbeard rockling	*Enchelypus cimbrius*
Four-spot flounder	*Paralichthys oblongus*
Gizzard shad	*Dorosoma cepedianum*
Goosefish	*Lophius americanus*
Grey snapper	*Lutjanus griseus*
Grubby	*Myoxocephalus aenaeus*
Hickory shad	*Alosa mediocris*
Hogchoker	*Trinectes maculatus*
Inshore lizardfish	*Synodus foetens*
Lined seahorse	*Hippocampus erectus*
Little skate	*Raja erinacea*
Longhorn sculpin	*Myoxocephalus octodecimspinosus*
Lookdown	*Selene vomer*
Mummichog	*Fundulus heteroclitus*
Naked goby	*Gobiosoma bosci*
Northern kingfish	*Menticirrhus saxatilis*
Northern pipefish	*Syngnathus fuscus*
Northern puffer	*Sphoeroides maculatus*

Table 10-2 (cont'd)
Finfish Species With the Potential to Occur in the Vicinity of Governors Island

Common Name	Scientific Name
Northern searobin	*Prionotus carolinus*
Oyster toadfish	*Opsanus tau*
Planehead filefish	*Monacanthus hispidus*
Pollock	*Pollachius virens*
Rainbow smelt	*Osmerus mordax*
Red hake	*Urophycis chuss*
Rock gunnel	*Pholis gunnellus*
Rough scad	*Trachurus lathami*
Scup	*Stenotomus chrysops*
Seaboard goby	*Gobiosoma ginsburgi*
Short bigeye	*Pristigenys alta*
Silver hake	*Merluccius bilinearis*
Silver perch	*Bairdiella chrysoura*
Smallmouth flounder	*Etropus microstomus*
Spot	*Leiostomus xanthurus*
Spotfin butterflyfish	*Chaetodon ocellatus*
Spotted hake	*Urophycis regia*
Striped bass	*Morone saxatilis*
Striped cuskeel	*Ophidion marginatum*
Striped killifish	*Fundulus majalis*
Striped mullet	*Mugil cephalus*
Striped searobin	*Prionotus evolans*
Summer flounder	*Paralichthys dentatus*
Tautog	*Tautoga onitis*
Threespine stickleback	*Gasterosteus aculeatus*
Tomcod	*Microgadus tomcod*
Weakfish	*Cynoscion regalis*
White hake	*Urophycis tenuis*
White mullet	*Mugil curema*
White perch	*Morone americana*
Windowpane	*Scophthalmus aquosus*
Winter flounder	*Pseudopleuronectes americanus*
Yellowtail flounder	*Limanda ferruginea*

Sources: NYCDEP 2007, Able and Studholme 1993, Woodhead 1990, AKRF 1998, LMS 2003a and 2003b

Table 10-3
Essential Fish Habitat Designated Species in the Vicinity of Governors Island

Species	Eggs	Larvae	Juveniles	Adults
Red hake (*Urophycis chuss*)		x	x	x
Winter flounder (*Pseudopleuronectes americanus*)	x	x	x	x
Windowpane flounder (*Scopthalmus aquosus*)	x	x	x	x
Atlantic herring (*Clupea harengus*)		x	x	x
Bluefish (*Pomatomus saltatrix*)			x	x
Atlantic butterfish (*Peprilus triacanthus*)		x	x	x
Atlantic mackerel (*Scomber scombrus*)			x	x
Summer flounder (*Paralicthys dentatus*)		x	x	x
Scup (*Stenotomus chrysops*)	x	x	x	
Black sea bass (*Centropristus striata*)	n/a		x	x
King mackerel (*Scomberomorus cavalla*)	x	x	x	x
Spanish mackerel (*Scomberomorus maculatus*)	x	x	x	x
Cobia (*Rachycentron canadum*)	x	x	x	x
Clearnose skate (*Raja eglanteria*)			x	x
Little skate (*Leucoraja erinacea*)			x	x
Winter skate (*Leucoraja ocellata*)			x	x
Bluefin tuna (*Thunnus thynnus*)	x	x	x	x
Smooth dogfish (*Mustelus canis*)	x	x	x	x
Sand tiger shark (*Odontaspis taurus*)		x[(1)]		
Dusky shark (*Charcharinus obscurus*)		x[(1)]		
Sandbar shark (*Charcharinus plumbeus*)		x[(1)]		x

Notes: n/a – insufficient data for this lifestage exists and no EFH designation has been made.
[(1)] Neither of these species have a free-swimming larval stage; rather they are live bearers that give birth to fully formed juveniles. For the purposes of this table, "larvae" for sand tiger and sandbar sharks refers to neonates and early juveniles.

Source: National Marine Fisheries Service. "Summary of Essential Fish Habitat (EFH) Designation" posted on the Internet at http://www.nero.noaa.gov/hcd/STATES4/new_jersey/40407400.html and http://www.nero.noaa.gov/hcd/skateefhmaps.htm
National Marine Fisheries Service EFH Mapper accessed online at http://www.habitat.noaa.gov/protection/efh/habitatmapper.html.

TERRESTRIAL RESOURCES

GOVERNORS ISLAND

Governors Island has been highly modified since it was cleared by Dutch settlers in the 1700s and later used by the U.S. military from the early 1800s until the ceasing of Coast Guard operations in 1997. Much of the Island is presently covered by buildings, roads, and parking lots. Green space is limited to lawns, sports fields, street trees, and a manicured park on the North Island. The entire shoreline of Governors Island is engineered, comprising seawall or sheet pile bulkhead, and areas of riprap at the toe of the seawall.

The wildlife, particularly birds and mammals, on Governors Island consist mostly of urban-adapted species associated with city parks (Edwards and Kelcey Engineers, Inc. 1998). Governors Island is located along the Atlantic migration routes of many bird species and is used as a stopover site during spring and autumn. The following sections describe the ecological communities and wildlife of the Island.

Ecological Communities

Governors Island has historically been, and continues to be, highly modified by human activity, including past landfilling and ongoing construction, maintenance, and/or demolition of roadways and buildings (see **Figure 10-2**). Additionally, the Island receives strong westerly winds and salt spray on the western portion of the Island resulting in damage to soil and plants in this area (Edwards and Kelcey Engineers, Inc. 1998). The ecological communities present on the Island would fall under the "Terrestrial Cultural" category in accordance with Edinger et al. (2002). This type "includes communities that are either created and maintained by human activities, or are modified by human influence to such a degree that the physical conformation of the substrate, or the biological composition of the resident community is substantially different from the character of the substrate or community as it existed prior to human influence (Edinger et al. 2002)." In general, the North Island has a greater diversity of vegetation with more mature trees. It includes manicured open fields (i.e., Parade Grounds) and mature woodland with a landscaped, open understory (i.e., Nolan Park, composed of native and non-native species). The South Island has fewer trees, and includes periodically mowed lawns, recreational fields, and disturbed areas dominated by pioneer plant species capable of colonizing poor quality habitats (see **Figures 10-3 through 10-9**). **Table 10-4** lists the plant species observed during the November 2010 and May 2011 reconnaissance.

Manicured areas, such as the Parade Grounds (see Figure 10-4) and Picnic Point (shown in Figure 10-7), would be described as "Mowed lawn" in accordance with Edinger et al. (2002). This community type comprises "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 many be present, usually with less than 50 percent cover. The groundcover is maintained by mowing." Various turf grass species, in addition to invasive grasses such as crabgrass (*Digitaria Haller)* and nutgrass (*Cyperus rotundus)*, were observed within these community types. A variation of this community type is represented by the playing fields, located in the southern portion of the Island and the abandoned housing areas, shown in Figures 10-5 and 10-6. Although once manicured, these areas have become overgrown and are dominated by invasive species such as mugwort (*Artemesia vulgaris*).

As described above, areas such as Nolan Park and Colonels Row (Figure 10-8) contain both ornamental and native species such as tuliptree (*Liriodendron tulipifera*), redosier dogwood (*Cornus sericea)*, American elm *(Ulmus Americana)*, Ohio buckeye (*Aesculus glabra*), London planetree (*Platanus hybrida*), Japanese maple (*Acer palmatum*), and cherry plum (*Prunus cerasifera).* These trees form pockets of full canopy over an open understory/mowed lawn. This community type would be described as "Mowed lawn with trees" in accordance with Edinger et al. (2002) and consists of "residential, recreational, or commercial land in which the groundcover is dominated by clipped grasses and forbs[1], and it is shaded by at least 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."

[1] Any herbaceous plant that is not a grass or grasslike.

7.13.11

Project Area

Boundary of Governors Island National Monument

0 400 1000 FEET

SCALE

PROPOSED PHASED REDEVELOPMENT OF
GOVERNORS ISLAND

Aerial Photograph
Figure 10-2

1 → *Photograph View Direction and Reference Number*

0 500 1000 FEET

SCALE

PROPOSED PHASED REDEVELOPMENT OF
GOVERNORS ISLAND

Key to Photographs
Figure 10-3

View of London planetrees (Platanus hybrida) along Craig Road South, facing southeast **1**

View of Parade Ground, facing southeast **2**

Natural Resources
Photographs
Figure 10-4

View of Japanese maple and mugwort (Artemesia vulgaris) within housing area, facing east **3**

View of playing field, facing northeast **4**

Natural Resources
Photographs
Figure 10-5

View of mugwort-dominated playing field, facing east **5**

View of only common reed (Phragmites australis) observed within project area, in playing field, facing east **6**

Natural Resources Photographs

Figure 10-6

View of playing field, facing west **7**

View of garden and Picnic Point, facing north **8**

Natural Resources
Photographs
Figure 10-7

View of Nolan Park, facing south **9**

View of Colonels Row, facing northeast **10**

Natural Resources
Photographs
Figure 10-8

View of Old Fort Jay, facing west **11**

Natural Resources
Photographs
Figure 10-9

Table 10-4
Plant Species Observed During Field Visits

Common name	Scientific name
Trees and Shrubs	
sour cherry	*Prunus cerasus*
London planetree	*Platanus hybrida*
eastern red cedar	*Juniperus virginiana*
American elm	*Ulmus americana*
pin oak	*Quercus palustris*
English elm	*Ulmus procera*
Siberian elm	*Ulmus pumila*
bayberry	*Morella Spp.*
silver maple	*Acer saccharinum*
Japanese zelkova	*Zelkova serrata*
Japanese black pine	*Pinus thunbergii*
Japanese pagoda	*Styphnolobium japonicum*
black locust	*Robinia pseudoacacia*
douglas fir	*Pseudotsuga menziesii*
autumn olive	*Elaeagnus umbellata*
white poplar	*Populus alba*
mulberry species	*Morus spp.*
white spruce	*Picea glauca*
red maple	*Acer rubrum*
juniper species	*Juniperous spp.*
cherry plum	*Prunus cerasifera*
Ohio buckeye	*Aesculus glabra*
princesstree	*Paulownia tomentosa*
northern red oak	*Quercus rubra*
littleleaf linden	*Tilia cordata*
Norway maple	*Acer platanoides*
redosier dogwood	*Cornus sericea*
cotoneaster	*Cotoneaster Spp.*
eastern cottonwood	*Populus deltoides*
Norway spruce	*Picea abies*
European white birch	*Betula pendula*
tuliptree	*Liriodendron tulipifera*
Herbaceous Plants	
mugwort	*Artemesia vulgaris*
common selfheal	*Prunella vulgaris*
plantain lily	*Hosta Spp.*
common mullein	*Verbascum thapsus*
green bristlegrass	*Setaria viridis*
common globe amaranth	*Gomphrena globosa*
sleepydick	*Ornithogalum umbellatum*
buttercup species	*Ranunculus*
Crabgrass	*Digitaria Haller*
Nutgrass	*Cyperus rotundus*
black mustard	*Brassica nigra*
Queen Anne's lace	*Daucus carota*
green bristlegrass	*Setaria viridis*
narrow leaf plantain	*Plantago lanceolata*
common blue violet	*Viola sororia*

Table 10-4 (cont'd)
Plant Species Observed During Field Visits

Common name	Scientific name
Herbaceous Plants (continued)	
common reed	*Phragmites australis*
wrinkleleaf goldenrod	*Solidago rugosa*
Common dandelion	*Taraxacum officinale*
timothy	*Phleum Spp.*
common plantane	*Plantago major*
American pokeweed	*Phytolacca americana*
Vines	
Asiatic bittersweet	*Celastrus orbiculatus*
Boston ivy	*Parthenocissus tricuspidata*
English ivy	*Hedera helix*
vetch species	*Vicia Spp.*
porcelain berry	*Ampelopsis brevipedunculata*
Sources: Field reconnaissance November 10, 2010 and May 9, 2011	

Wildlife

The habitats available to terrestrial wildlife are limited, comprising primarily overgrown lawns and fields dominated by invasive plants, mowed lawns and recreational fields, single rows of mature trees, and a few clusters of deciduous and evergreen trees. Where there are clusters of mature trees, such as in Nolan Park in the North Island, woody understory is absent and herbaceous cover generally consists of grass. No standing or fallen dead trees were observed on the Island that would have provided nesting and foraging habitat for birds and bats. Abandoned buildings that are in ruins may provide artificial roost sites for bats, and nesting or denning locations for other mammals such as raccoons (*Procyon lotor*), Norway rats (*Rattus norvegicus*), and eastern grey squirrels (*Sciurus carolinensis*), the same mammalian wildlife common to urban areas that are expected to use the vegetated areas. Piers and docks extending from the Island's edge provide artificial basking and resting platforms for common waterbirds such as double-crested and great cormorants (*Phalacrocorax auritus* and *P. carbo*) and Canada geese (*Branta canadensis*). Migratory waterfowl, such as American black duck (*Anas rubripes*), American wigeon (*Anas americana)*, bufflehead (*Bucephala albeola*), canvasback (*Aythya valisineria*), goldeneye (*Bucephala clangula)*, greater scaup (*Aythya marila)*, green-winged teal (*Anas crecca*), hooded merganser (*Lophodytes cucullatus)*, lesser scaup (*Aythya affinis)*, mallard (*Anas platyrhynchos*), northern shoveler (*Anas clypeata)*, red-breasted merganser (*Mergus serrator)*, and ruddy duck (*Oxyura jamaicensis*) (NOAA 2001), occur in the offshore waters in late fall and throughout the winter.

The Island's breeding bird community is characterized by mostly common, disturbance-tolerant species typically found in urban areas. Observations from the 2000-2005 NYS Breeding Bird Atlas identified the following species as potential, probable, or confirmed breeders on Governors Island (Block 5750D): Canada goose, gadwall (*Anas strepera*), American black duck, mallard, red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), peregrine falcon (*Falco perigrinus*), killdeer (*Charadrius vociferous*), rock pigeon (*Columbia livia*), mourning dove (*Zenaida macroura*), monk parakeet (*Myiopsitta monachus*), black-billed cuckoo (*Coccyzus erythropthalmus*), chimney swift (*Chaetura pelagica)*, downy woodpecker (*Picoides pubescens)*, northern flicker (*Colaptes auratus)*, willow flycatcher (*Empidonax traillii*), eastern kingbird (*Tyrannus tyrannus)*, white-eyed vireo (*Vireo griseus*), warbling vireo (*Vireo gilvus*),

blue jay (*Cyanocitta cristata)*, tree swallow (*Tachycineta bicolor*), barn swallow (*Hirundo rustica)*, black-capped chickadee (*Poecile atricapillus)*, tufted titmouse (*Baeolophus bicolor*), Carolina wren (*Thryothorus ludovicianus*), American robin (*Turdus migratorius*), gray catbird (*Dumetella carolinensis*), northern mockingbird (*Mimus polyglottos*), brown thrasher (*Toxostoma rufum)*, European starling (*Sturnus vulgaris)*, cedar waxwing (*Bombycilla cedrorum*), yellow warbler (*Dendroica petechia*), common yellowthroat (*Geothlypis trichas*), eastern towhee (*Pipilo erythrophthalmus*), field sparrow (*Spizella pusilla*), song sparrow (*Melospiza melodia)*, swamp sparrow (*Melospiza georgiana*), northern cardinal (*Cardinalis cardinalis)*, red-winged blackbird (*Agelaius phoeniceus)*, brown-headed cowbird (*Molothrus ater*), Baltimore oriole (*Icterus galbula*), American goldfinch (*Spinus tristis*), and house sparrow (*Passer domesticus*). Although the relatively uncommon black-billed cuckoo is included in the atlas, it is unlikely that this species nests on Governors Island, considering its scarcity throughout New York City during the breeding season (Fowle and Kerlinger 2001) and the lack of appropriate breeding habitat on the Island. The observation of this species in the atlas occurred before the end of the spring migration period for most Neotropical species in the New York City region, and thus it is likely the individual observed was a migrant using the Island as a stopover site on its way to breeding grounds elsewhere.

The following species were observed overwintering on Governors Island or using the Island as a stopover site towards the end of their autumn migration during the November 2010 site reconnaissance: Canada goose, American black duck, mallard, bufflehead, red-breasted merganser, horned grebe (*Podiceps auritus*), double-crested cormorant, great cormorant, great blue heron (*Ardea Herodias*), sharp-shinned hawk (*Accipiter striatus*), American kestrel (*Falco sparverius*), killdeer, ring-billed gull (*Larus delawarensis*), herring gull (*Larus argentatus*), great black-backed gull (*Larus marinus*), rock dove, yellow-bellied sapsucker (*Sphyrapicus varius*), downy woodpecker, northern flicker, blue jay, American crow (*Corvus brachyrhynchos*), fish crow (*Corvus ossifragus*), Carolina wren, golden-crowned kinglet (*Regulus satrapa*), ruby-crowned kinglet (*Regulus calendula*), brown creeper (*Certhia Americana*), hermit thrush (*Catharus guttatus*), American robin, gray catbird, northern mockingbird, European starling, cedar waxwing, pine warbler (*Dendroica pinus*), palm warbler (*Dendroica palmarum*), yellow-rumped warbler (*Dendroica coronate*), common yellowthroat, dark-eyed junco (*Junco hyemalis*), chipping sparrow (*Spizella passerina*), field sparrow, song sparrow, swamp sparrow, northern cardinal, vesper sparrow (*Pooecetes gramineus*), white-throated sparrow (*Zonotrichia albicolis*), white-crowned sparrow (*Zonotrichia leucophrys*), red-winged blackbird, common grackle (*Quiscalus quiscala*), house finch (*Carpodacus mexicanus*), American goldfinch, and house sparrow. Atlantic brant (*Branta bernicla*) and common loons (*Gavia immer*) were observed in the offshore waters around the Island, and a peregrine falcon (*Falco peregrinus*) was seen flying over the Island.

The following year-round resident species and spring migrants were observed on the Island or in the offshore waters during the May 2011 site reconnaissance: double crested cormorant, common tern (*Sterna hirundo*), greater scaup (*Aythya marila*), mallard, Atlantic brant, Canada goose, killdeer, herring gull, black-backed gull, mourning dove, Northern flicker, red-bellied woodpecker (*Melanerpes carolinus*), American crow, American robin, northern mockingbird, European starling, northern rough-winged swallow (*Stelgidopteryx serripennis*), barn swallow (*Hirundo rustica*), eastern phoebe (*Sayornis phoebe*), northern parula (*Parula Americana*), black-throated green warbler (*Dendroica virens*), common yellowthroat, savannah sparrow (*Passerculus sandwichensis*), white-throated sparrow, song sparrow, indigo bunting (*Passerina*

cyanea), Baltimore oriole, red-winged blackbird, common grackle, brown-headed cowbird (*Molothrus ater*), American goldfinch, house finch, and house sparrow.

OFF-ISLAND AREAS

The northern alignment for the proposed water main would enter Brooklyn at the Red Hook Container Terminal (on New York City-owned property) and would connect with NYCDEP vaults in Brooklyn on Sackett Street, Union Street, or President Street. The actual tie-in locations would be contingent upon access agreements and rights-of-way. The southern alignment would enter Brooklyn at Sullivan Street, tying in from Sullivan Street to an exiting 20-inch water main along Conover Street. For the southern alignment, the water main in Brooklyn would be developed entirely within New York City Department of Transportation (NYCDOT) right-of-way. The proposed locations for the entrance of the proposed water main(s) in Brooklyn as well as the tie-ins are completely developed, covered with impervious surfaces, and provide limited habitat for wildlife other than those species capable of using urban structure exterior habitats, whose impervious structures and surfaces support little-to-no vegetation and offer minimal habitat (e.g., rooftops and other exterior surfaces and cracks in paved areas where plants can grow).

RARE, SPECIAL CONCERN, THREATENED OR ENDANGERED SPECIES

NYNHP (2010) identified no state-listed animals or plants, significant natural communities, or other significant habitats on or in the immediate vicinity of the project site. USFWS (2011) and NMFS (NOAA 2010d) identified the federally endangered shortnose sturgeon (*Acipenser brevirostrum*) as occurring in the Hudson River within New York County, and NMFS noted the potential occurrence of Atlantic sturgeon (*Acipenser oxyrhynchus*), marine mammals, and marine turtles in the vicinity of Governors Island. These species are discussed below.

Terrestrial wildlife species listed as Species of Special Concern, Threatened, or Endangered that were observed on or in the vicinity of Governors Island during site reconnaissance include the peregrine falcon (NYS Endangered), common tern (NYS Threatened), vesper sparrow (NYS Special Concern), sharp-shinned hawk (NYS Special Concern), and common loon (NYS Special Concern). These species are also discussed below.

FEDERALLY LISTED SPECIES

Shortnose Sturgeon

The federally-listed and state-listed endangered shortnose sturgeon is an anadromous bottom-feeding fish that can be found throughout the Hudson River system from New York Harbor up through Troy Dam. These fish spawn, develop, and overwinter in the upper Hudson River, and prefer colder, deeper waters for all lifestages. Governors Island is at the southern limit of this population. Shortnose sturgeon may be present near the project site at least during the winter, but their presence is reduced due to high salinity levels (NOAA 2010d), preferring to concentrate in waters with salinities below 3 ppt (Dadswell et al. 1984). Individuals are only expected to occur near Governors Island as transient individuals while traveling to or from Hudson River spawning, nursery, and overwintering areas (NOAA 2010d).

No habitat designated or proposed as “critical habitat” in accordance with provisions of the Endangered Species Act (ESA) is listed as occurring in New York County.

Atlantic Sturgeon

As of October 6, 2010, NMFS proposed to list the distinct population segment of Atlantic sturgeon living within the New York Bight as endangered under the ESA. Within the New York

Bight, Atlantic sturgeon has been documented in the Hudson River and the surrounding coastal waters (NOAA 2010b and 2010d).

The Atlantic sturgeon is the largest sturgeon found in New York, occasionally weighing over 200 pounds and measuring 6 to 8 feet long (Stegemann 1999). This anadromous species occurs within the New York Harbor Estuary (Woodhead 1990), and the Hudson River Estuary. In the Hudson River, Atlantic sturgeon are found in the deeper portions and do not occur further upstream than Hudson, New York. Atlantic sturgeon migrate from the ocean upriver to spawn above the salt front from April to early July (Smith 1985, Stegemann 1999). Female sturgeon move out of the river following spawning but the males may remain in the river until October or November.

Marine Mammals

Marine mammals use the waters of the New York Bight and occasionally come into New York Harbor. The harbor seal (*Phoca vitulina*) is the most commonly observed marine mammal in the Bight. It winters in the Harbor and hauls out onto islands in Jamaica Bay, Sandy Hook, Staten Island, and the Westchester and Connecticut shorelines of Long Island Sound. The grey seal (*Halichoerus grypus*) is a less frequent visitor to the Harbor but occurs in similar locations to the harbor seal. Harp seals (*Pagophilus groenlandicus*) are occasionally observed in the Hudson River (http://www.dec.ny.gov/lands/63649.html). The occasional sightings of cetaceans (e.g., dolphins and whales) in the Harbor are generally of individuals that are likely to be unhealthy and/or lost. Historic records indicate the harbor porpoise (*Phocoena phocoena*) may have once been a regular visitor to the Harbor (USFWS 1997).

Marine Turtles

Four species of marine turtles—loggerhead (*Caretta caretta*), green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), and leatherback (*Dermochelys coriacea)*—all state and federally listed (NYSDEC 2010; USFWS 2010), occur seasonally in the New York waters and are known to be present in the New York Harbor (NOAA 2010d). Federally endangered juvenile Kemp's ridley, and federally threatened large loggerhead turtles enter the New York Harbor and bays in the warmer months each year. Loggerhead, Kemp's ridley, and green turtles move into harbors and estuarine waters. Leatherback turtles tend to remain along the coast and rarely move into embayments (USACE 2001). In general, however, these four turtle species mostly inhabit Long Island Sound and Peconic and Southern Bays. They neither nest in the New York Harbor Estuary, nor reside there year-round (Morreale and Standora 1993). These turtles generally leave New York waters by mid-October and head southward (USACE 2001). Although marine turtles are likely to occur within the vicinity of Governors Island, they would not likely be present in large numbers (NOAA 2010d).

NEW YORK STATE LISTED SPECIES

Peregrine Falcon

The peregrine falcon is a state listed endangered species. An individual of this species was observed flying over Governors Island during the November 2010 field reconnaissance. Peregrine falcons on or flying past Governors Island are likely to be either migrants passing through the region or individuals from nests elsewhere in the city. Governors Island does not offer suitable nesting sites for peregrine falcons—high cliff ledges and tall artificial structures such as city buildings and bridge towers. Within the vicinity of the project site, peregrine falcons have nested on 55 Water Street in Manhattan (approximately 1 mile away) and on the

Williamsburg Bridge (approximately 2.5 miles away) in recent years. Individuals from these nests, as well as migrants passing through the area, possibly hunt for pigeons and other prey on Governors Island.

Sharp-Shinned Hawk

The sharp-shinned hawk is a small, migratory raptor that is common and widely distributed across North America (Bildstein and Meyer 2000), but listed as a Species of Special Concern in New York State. New York City is at the southern extreme of the species' breeding range in the Northeast and lacks suitable nesting habitat. Sharp-shinned hawks nest in large, dense stands of deciduous, coniferous, and mixed pine-hardwood forests and pine plantations (Bildstein and Meyer 2000). They are most commonly observed within New York City during fall migration, and rarely seen at other times of year (Fowle and Kerlinger 2001). The individual observed on Governors Island during the November 2010 bird survey was most likely a migrant headed to southern wintering grounds.

Common Tern

The common tern is a state threatened species. Several individuals were observed diving for fish in the waters off the southern and northern ends of Governors Island and following ferry boats off the Island's northern end during the May 2011 site reconnaissance. In New York, common terns primarily nest on Long Island and along the Great Lakes (NYSDEC 2011). Within New York City, a few pairs of common terns have recently nested in the Jamaica Bay Wildlife Refuge in Queens (Bernick 2007). Common terns nest in New York in late May (NYSDEC 2011) and the individuals observed on Governors Island were likely headed to nesting areas on Long Island or further north along the Atlantic coast or the Great Lake region.

Vesper Sparrow

The vesper sparrow is a New York State Species of Special Concern and was observed during the November 2010 site reconnaissance. Governors Island is outside of this species' wintering range and lacks appropriate breeding habitats, such as grasslands, prairies, and meadows (Jones and Cornely 2002). The occurrence of this species anywhere in New York City during the breeding season is extremely rare (Fowle and Kerlinger 2001), and the individual observed was most likely using the island as a stopover site during its fall migration.

Common Loon

Five common loons, a New York State Species of Special Concern, were observed off the western edge of Governors Island during the November 2010 site reconnaissance. Common loons breed on freshwater lakes in forests throughout the northern United States and Canada, and spend the winter primarily along North America's coastlines, near shore (McIntyre and Barr 1997). Migrating common loons regularly occur during late fall in the rivers and coastal waters surrounding New York City, and occasionally remain for the winter (Fowle and Kerlinger 2001, Bochnick 2011). The occurrence of five individuals in close proximity suggests they are overwintering in the area. During the winter, loons commonly feed in individual territories during the day and then come together to form rafts for the night (McIntyre 1978). Loons feed on fish captured during underwater dives, and likely stopover during migration or overwinter in New York City's coastal areas to take advantage of the rich productivity of these waters.

SIGNIFICANT COASTAL FISH AND WILDLIFE HABITAT

Governors Island is not within a Significant Coastal Fish and Wildlife Habitat. The closest Significant Coastal Fish and Wildlife Habitat to Governors Island is the Lower Hudson Reach,

approximately 2,500 ft north of Governors Island (NYSDOS 2010). The Lower Hudson Reach is the portion of the Hudson River starting from Battery Park at the tip of Manhattan and extending north to Yonkers in the vicinity of Glenwood. This area runs for 19 miles and includes deepwater, shallows, piers, and interpier basins. It was designated a Significant Coastal Fish and Wildlife Habitat because it provides an important wintering habitat for young-of-the-year, yearling, and older striped bass. Significant numbers of other fish species and waterfowl also use the Lower Hudson Reach (NYSDOS 1992).

E. THE FUTURE WITHOUT THE PROPOSED PROJECT

In the future without the Proposed Project, Governors Island will continue to operate in 2013 and 2030 much as it does today. Visitation is expected to increase and will be dependent on the ability to access to the Island. Demolition of existing buildings on the South Island and limited demolition on the North Island, previously approved in 2008, would continue in the future without the Proposed Project. Planned upgrades and repairs to some existing infrastructure, such as storm water and communications systems, would not result in significant adverse impacts to the natural resources or floodplain of Governors Island. Pier 101 and Yankee Pier will be rehabilitated, Tango Pier will be demolished, and the transfer bridges and fenders at Soissons Dock and the BMB will be rehabilitated.

GROUNDWATER

Groundwater resources would not be affected in the future without the Proposed Project in 2013 and 2030. On the basis of existing studies, subsurface contamination and hazardous materials in buildings (e.g., asbestos-containing materials and lead-based paint) may be present. Demolition and excavation activities have the potential to disturb these hazardous materials. However, legal requirements (including NYSDEC regulations) would be followed to minimize the potential for adverse impacts to the environment. For demolition activities, these requirements would include those related to maintenance of petroleum storage tanks and handling of asbestos-containing materials, lead-based paint, and potential PCB-containing equipment. For excavation activities, these requirements would include those related to underground tanks and removal of any associated soil or groundwater contamination, proper handling and disposal of all excavated soil and fill materials, implementation of procedures relating to potential unexploded ordnance, and discharging groundwater recovered during dewatering operations in accordance with NYSDEC SPDES permitting requirements.

FLOODPLAIN

The entire shoreline of Governors Island lies within the 100-year floodplain. The western and southern sides of Governors Island, designated Zone VE, experience strong wave action with waves washing over the seawall causing some erosion and sinkholes. In the future without the Proposed Project, projected rise in sea level would have the potential to increase the portion of the South Island with a 1 percent chance of flooding in a given year. The increase in the area of the North Island subject to a 1 percent chance of flooding in a given year would be minimal because of the higher elevation of this portion of the Island.

WETLANDS AND WATER QUALITY

As discussed previously, the entire shoreline area surrounding Governors Island has been designated NYSDEC littoral zone tidal wetlands and the existing water depths adjacent to the Island suggest the potential for these areas to be regulated as such by the NYSDEC. Therefore, the planned rehabilitation of Pier 101 and Yankee Pier, demolition of Tango Pier, and

rehabilitation of the transfer bridges and fenders at Soissons Dock have the potential to result in temporary disturbance of NYSDEC littoral zone tidal wetlands and water quality of the Upper Bay due to sediment disturbance. Sediment disturbance associated with the in-water activities listed above has the potential to result in minor, short-term increases in suspended sediment and, as a consequence, resuspension and redeposition of sediment-associated contaminants. These temporary effects would be localized and confined to the immediate vicinity of sediment disturbing activities. These in-water activities would require authorization from the USACE under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, and from the NYSDEC under Articles 25 and 15 of the Environmental Conservation Law, and Section 401 Water Quality Certification. During these in-water construction activities, appropriate measures such as the use of a floating boom and turbidity curtain to capture floating debris and to contain sediment resuspended during bottom disturbing construction activities, would be implemented in accordance with permitting conditions to minimize increases of suspended sediment. The implementation of these measures would minimize the potential for increased suspended sediment as a result of the in-water rehabilitation and demolition projects in the future without the Proposed Project.

AQUATIC BIOTA

In-water activities associated with the planned in-water rehabilitation activities described above under *Wetlands and Water Quality* would have the potential to result in temporary increases in suspended sediment. However, increases in suspended sediment would be localized and temporary and would not result in significant adverse impacts to water quality or aquatic biota of the Upper Harbor. While the localized increase in suspended sediment and noise associated with in-water activities may cause fish to temporarily avoid the area where bottom-disturbing activities are occurring, the affected area is expected to be small. Similar suitable habitats would be available for use by fish to avoid the area being disturbed. Demolition of Tango Pier would decrease the amount of aquatic habitat affected by shading from overwater structures, benefiting aquatic biota.

ESSENTIAL FISH HABITAT (EFH)

In-water activities conducted during the rehabilitation activities described above and the demolition of Tango Pier would not result in significant adverse impacts to EFH identified within the vicinity of Governors Island. Any increases in suspended sediment would be temporary and localized and would be minimized through the implementation of appropriate measures to contain sediment resuspended during bottom disturbing construction activities in accordance with permitting conditions. Temporary avoidance of the small area of in-water activity by fish would not result in significant adverse impacts to fish species designated as having EFH within the vicinity of Governors Island due to the small area of disturbance and availability of similar habitat for fish to use to avoid the area being disturbed. The removal of Tango Pier would eliminate shading of aquatic habitat, benefiting EFH.

TERRESTRIAL RESOURCES

GOVERNORS ISLAND

The Island’s natural resources are expected to remain largely unchanged, especially on the North Island where activities in the future without the Proposed Project would be limited. The bird species that occur on the Island during spring and autumn migration stopovers are expected to continue to occur as transients within the project site, and the breeding bird community currently

on the Island is also not expected to change in the future without the Proposed Project. Similarly, any other wildlife currently on the Island is expected to remain generally unchanged. The projected gradual changes to the South Island associated with continued deterioration of abandoned buildings and building demolition would result in further proliferation of disturbed areas dominated by pioneer plant species capable of colonizing poor quality habitats and old field habitat on the Island. The loss of the abandoned buildings as habitat would adversely affect some wildlife individuals currently using these structures. However, the wildlife species expected to occur within this portion of Governors Island are common to urban areas and the loss of some individuals would not result in a significant adverse impact on the bird and wildlife community of the New York City region. As noted above, demolition of existing buildings on the South Island and limited demolition on the North Island was previously approved in 2008.

OFF-ISLAND AREAS

The urban character and impervious cover of the locations for the proposed water main(s) in Brooklyn as well as the tie-ins are expected to be unchanged in the future without the Proposed Project and would continue to provide limited habitat for wildlife.

RARE, SPECIAL CONCERN, THREATENED OR ENDANGERED SPECIES

PEREGRINE FALCON

Hunting opportunities for peregrine falcons on Governors Island would remain the same in the future without the Proposed Project. Urban peregrine falcons primarily eat rock pigeons (DeMent et al. 1986, Rejt 2001), whose abundance is not expected to change under the No Build condition. Urban peregrine falcons also consume small songbirds that are on spring and autumn migration (Rejt 2001, DeCandido and Allen 2008), the numbers of which are also expected to remain similar in the future without the Proposed Project.

COMMON TERN

Fishing opportunities for common terns in the waters off Governors Island are not expected to change in the future without the Proposed Project. Governors Island is expected to continue to lack suitable nesting sites for common terns in the No Build condition.

VESPER SPARROW

The habitat available to vesper sparrows on Governors Island is not expected to significantly change in the future without the Proposed Project. As lawns and fields in the abandoned portion of the South Island become further overgrown in the future, it is possible that they will more closely resemble the grasslands, meadows, and prairies typically inhabited by vesper sparrows than at present. However, these overgrown areas are expected to be dominated by weedy, non-native invasive plants that are generally of little value to native wildlife.

SHARP-SHINNED HAWK

Sharp-shinned hawks prey upon various small birds and small mammals (Bildstein and Meyer 2000). The abundance of this prey is not expected to change in the future without the Proposed Project. Governors Island would continue to lack appropriate nesting habitat for sharp-shinned hawks (dense stands of mixed deciduous/coniferous forest) in the No Build condition.

COMMON LOON

Common loons almost exclusively occur in the water during the non-breeding seasons, rarely ever coming on land. Any changes to the landscape on Governors Island in the future without the Proposed Project are not expected to have any positive or negative effects on common loons utilizing the offshore waters during migration or winter. The continued usage of the waters surrounding Governors Island by common loons will be directly tied to the abundance of their prey, which would not be expected to change in the No Build condition.

SHORTNOSE AND ATLANTIC STURGEON

As discussed in Section D, "Existing Conditions," the preference of shortnose and Atlantic sturgeon for deep water habitat suggests that it is unlikely that individuals of these species would occur within the vicinity of Governors Island except as transients. Water quality impacts associated with rehabilitation and demolition of docks and piers would be localized and outside the deep channel habitat preferred by these species while in transit to and from spawning and nursery habitat. Therefore, activities that would occur on Governors Island in the future without the Proposed Project would not result in significant adverse impacts to shortnose and Atlantic sturgeon.

MARINE TURTLES

The four species of marine turtle (loggerhead, green, Kemp's ridley, and leatherback) would not be expected to occur within the vicinity of Governors Island except as transient individuals during the warmer months. Because they neither nest, nor reside in the area year-round, they would not be expected to be impacted by any activities occurring in the future without the Proposed Project.

MARINE MAMMALS

Water quality impacts associated with rehabilitation and demolition of docks and piers would be localized; therefore, the activities that would occur on Governors Island in the future without the Proposed Project would not result in significant adverse impacts to marine mammals that occasionally come into New York Harbor.

SIGNIFICANT COASTAL FISH AND WILDLIFE HABITAT

Temporary impacts from in-water activities conducted in the future without the Proposed Project would be limited to the immediate vicinity of the dock and pier structures and would not have the potential to adversely affect the closest Significant Coastal Fish and Wildlife Habitat closest to Governors Island, the Lower Hudson Reach.

F. PROBABLE IMPACTS OF THE PROPOSED PROJECT

PHASE 1

Phase 1 of the Proposed Project (see Figure 1-15) would include park and public space improvements, construction of one or both of the new water mains, and rehabilitation of the seawall. Within the North Island, improvements would be made within the Historic District, including Soissons Landing, the South Battery, Liggett Terrace, and the Parade Ground. At Soissons Landing existing asphalt roads would be replaced with a public plaza with lawn and trees (see Figure 1-4). For the South Battery, located towards the southern portion of the Historic District, the approximately 10,100-square-foot asphalt surface would be replaced with lawn, trees and shrubs (see Figure 1-6). East of Liberty Terrace, practicable materials from the demolition of buildings

and parking lots currently on the site, in addition to other clean fill material, would be used to add topography to an otherwise flat area. At Liggett Terrace, the existing parking lot would be removed and converted into a public plaza with flower beds, labyrinthine hedges, fountains, seating and children's play area (see Figure 1-7). The 12-acre Parade Ground, an existing lawn area currently used for picnics, recreational activities, and occasional concerts would be improved to better support these existing uses and active recreational activities through the creation of two flat recreational fields for field sports (see Figure 1-6). Within the South Island, improvements would be made to the center area for the construction of approximately 22 acres of open space comprising the Hammock Grove (10-acre area developed within an existing grassy area, comprise about 300 trees between which would be hung hammocks, see Figure 1-8) and the Play Lawn (12-acre grass field, developed within an existing parking lot and lawn for active recreation, see Figure 1-9).

Infrastructure improvements that would be implemented as part of Phase 1 would include construction of one or both of the two 12-inch water mains between the Island and Brooklyn (see Figure 1-13), rehabilitation of the seawall, and modification of the existing storm sewers which would result in an overall reduction in the total number of stormwater outfalls as described in detail in Chapter 12, "Water and Sewer Infrastructure." There are currently 132 existing stormwater outfalls serving the island. Many of these outfalls serve small catchment areas less than 1 acre. The proposed work includes reconstruction of 28 outfalls, construction of one new outfall and abandoning and sealing the remaining seawall outfall penetrations. This improvement, which would be undertaken as part of the seawall rehabilitation, described in Chapter 1, "Project Description" and below would reduce the total number of outfalls from 132 to 29. At the locations where the seawall is being rebuilt, rehabilitated or repointed, the abandonment of the outfalls, described in detail in Chapter 12, "Water and Sewer Infrastructure," would include capping the outfalls at the face of the seawall and the storm sewer inlet structures, filling the conveyance pipes with concrete and abandoning in place. Where the seawall would be replaced by riprap revetment, the stormwater outfalls to be abandoned would be cut back to the proposed new cast-in-place concrete headwall and capped at the face of the wall and at the storm sewer inlet. The conveyance pipe would then be grouted, filled with concrete, and abandoned in place. For those outfalls to be abandoned where the condition of the conveyance pipe would not allow filling with concrete, the sections of the pipe that cannot be filled with concrete would be excavated and removed. The remaining portions of the conveyance pipe suitable for filling with concrete would be filled and abandoned in place. The stormwater conveyance network and contributing drainage areas would be modified to address the capped stormwater outfalls. In most cases the modified outfall contributing drainage area will increase in size, therefore the stormwater outfall diameter will increase in most instances. While there would be an increase in flow at these consolidated outfalls, there would be an overall decrease in the stormwater runoff volume due to the net decrease in impervious surfaces. Please see Table 12-6 in Chapter 12, "Water and Sewer Infrastructure," for a detailed discussion of the proposed outfall consolidation.

The water main(s) would be constructed under Buttermilk Channel using HDD and thus would not result in any in-water disturbance of Buttermilk Channel. HDD is typically performed by using flexible drilling equipment capable of being maneuvered horizontally and vertically, while drilling to direct the path of the crossing along a selected alignment. Construction of the water main(s) using HDD would include the following:

- Drilling the pilot hole—a steerable drill would drill a small (4 to 5-inch-diameter) pilot hole. The area of disturbance to drill a pilot hole, including space for equipment, supplies, "mud pit," and storage of drill stems is typically at least 8 feet by 120 feet.

- Enlarging the pilot hole to the required diameter—Once the pilot hole is completed, a larger cutting tool is used to enlarge the hole until the borehole is large enough to pull the pipeline back through. For the proposed 12-inch-diameter pipelines, this would require a reamed hole of approximately 18 inches that would be maintained open by pressurized slurry. The pressurized slurry is also used to transport the cuttings back to the surface. The area excavated for the pilot hole and enlargement of the hole would be approximately 15 feet by 20 feet at a 7.5-foot depth.
- The materials used to hold the bore hole open would be either a slurry of bentonite (a type of naturally occurring clay) or a polymer. The drilling fluids with the rock cuttings would be discharged into a pit or a holding tank. The drilling fluids go a through a cleaning process, which removes the cuttings, sand, and collected materials, and then the drilling fluid is reused. The cuttings and other materials are disposed of in a licensed landfill.
- Pipe pullback—once the bore hole is complete, the preassembled pipe is pulled back through the hole.

Because of the active land uses where the proposed water mains would enter Brooklyn (i.e., Red Hook Marine Terminal), it is assumed that the pipeline assembly and pullback would occur on Governors Island. The pipeline would be assembled and tested on Governors Island prior to placement in the hole. An area of approximately 50 feet by 100 feet would be required for a staging area at the Red Hook Terminal and at Sullivan Street, with the area excavated for the HDD being approximately 15 feet by 20 feet at a depth of about 7.5 feet at each entrance location in Brooklyn. The duration of disturbance at each entrance and exit point for the two proposed alignments would be about 2 weeks. As discussed previously, the two pipeline alignments would enter Brooklyn within areas completely developed with urban land uses, the Red Hook Marine Terminal and the developed area within and adjacent to Sullivan Street. From the Red Hook Terminal, the pipeline would tie-in at an existing 20-inch water main that extends along Van Brunt Street between DeGraw Street and Hamilton. The southern alignment would tie into an existing 20-inch main at Conover Street. An approximately 6-foot-wide and 7.5-foot-deep trench would be dug to connect the 12-inch water mains from Governors Island to the NYCDEP water mains. Similar trenches (between 300 and 400 feet long) would be required on Governors Island to connect the two 12-inch water mains to the existing water mains on the Island.

As described in detail in Chapter 1, "Project Description," the Island's existing 2.2 miles of seawall would undergo rehabilitation (see Figure 1-14), which would be complete by the end of 2013. Most of the rehabilitation work would be repair or replacement in kind and within the footprint of the existing seawall structure. A small portion of the seawall near Castle Williams would undergo full replacement using an augmented design within the existing footprint. Along the east and north sides of the Island the seawall rehabilitation would comprise repointing (filling voids in the existing joints of the seawall), minor rehabilitation (replacement of missing or dislodged stones and addition of riprap at the toe of the seawall for scour protection), or rebuilding (replacement of stones, filling voids in uplands behind the wall, installation of dowels). Selected corners would be rebuilt with in-kind block or precast concrete blocks. On the South Island, the seawall would be rebuilt around new stormwater outfall locations and patched where outfalls would be removed. Approximately 0.7 miles of the seawall along the west and

south sides of the Island, about 32 percent of the seawall length, would be replaced with a riprap revetment[1] with a concrete headwall located landward of the existing seawall location.

LATER PHASES

As described in detail in Chapter 1, Project Description," the Later Phases of the Proposed Project would involve the completion of the remaining 32 acres of park and public spaces on the South Island, reuse of existing historic buildings on the North Island, and development and construction of new buildings in the two future development zones occupying approximately 33 acres on the South Island (see Figure 1-16).

The park and public spaces to be created on the South Island for the Later Phases-Park and Public Spaces include the Great Promenade, Liberty Terrace, the Hills, the South Prow, and Yankee Landing. Because the Island would continue to receive strong westerly winds and salt spray on the western portion of the Island, the plant species selection for the South Island would be based on the environmental challenges of the site. Native plants selected for planting would be based on compatibility to different parts of the site. Tolerance to wind, varying soil chemistry and moisture will also weigh heavily in the selection. The Great Promenade would be 2.2-mile-long path lined with shade trees that would follow the perimeter of the southern end of the Island and replace the existing waterfront road. The promenade would be dual level in two locations. Liberty Terrace would create a public plaza containing lawns, scattered shade trees, seating, and concessions. There would be open, grassy hillsides as well as forested hillsides with understory shrubs and herbaceous ground cover. The South Prow would replace existing lawn on the Island's southern tip with picnic areas and a 3-acre emergent wetland. Yankee Landing would create a new open-air structure at Yankee Pier to provide a waiting area for Brooklyn ferry passengers.

The future uses of the proposed development zones on the eastern and western sides of the southern half of the Island have not been determined or defined. Potential uses that would be in alignment with existing land use and historic resource covenants contained in the transfer deed include academic research and housing space, cultural institution offices and visitor centers, and a conference center/hotel. In the future, when the specific uses for the Later Phases-Island Redevelopment are identified and designed, it is anticipated that additional environmental review will be require.

The following sections assess the potential impacts to natural resources and floodplains from Phase 1 and the full development of the Proposed Project.

GROUNDWATER

PHASE 1

Construction

During Phase 1, ground disturbing activities associated with park and public space improvements, creation of the Hammock Grove and Play Lawn, and excavation associated with

[1] A revetment is a slope covered with protective materials such as riprap. A revetment typically comprises an armor layer sufficient to protect the slope, filter layer(s) to assure drainage and retention of underlying soil, and toe protection to prevent undermining at the bottom of the revetment (US Army Corps of Engineers. 1995. Design of Coastal Revetments, Seawalls, and Bulkheads, CECW-EH-D Engineer Manual 1110-2-1614).

the construction of one or both of the new water mains has the potential to disturb areas of subsurface contamination. However, legal requirements (including NYSDEC regulations) would be followed to minimize the potential for adverse impacts to the environment, including those related to underground tanks and removal of any associated soil or groundwater contamination, proper handling and disposal of all excavated soil and fill materials, implementation of procedures relating to potential unexploded ordnance, and discharging groundwater recovered during dewatering operations in accordance with NYSDEC SPDES permitting requirements. With the implementation of these measures, significant adverse impacts to groundwater resources would not occur as a result of Phase 1 of the Proposed Project. Because groundwater is not used as a potable water supply on Governors Island, the Proposed Project would not have the potential to affect drinking water supplies.

Operation

Removal of asphalt in several areas on the Island, including near Soissons Dock, in the southern end of the Historic District, south of Liggett Hall, and south of Hammock Grove, would result in a decrease in the amount of impervious surface on the Island, allow for increased groundwater recharge in these areas, and a decrease in the total amount of stormwater runoff generated within these portions of the Island. Over 8 acres of paved parking areas and roadways will be converted to planted areas (The Trust 2010). Incorporation of the Park Master Plan's proposed sustainable design measures, such as controlling the application of fertilizers and use of non-toxic pest and disease control for plants, could also minimize the potential for the operation of the park and open spaces to affect groundwater.

LATER PHASES

Construction

As discussed for Phase 1, ground disturbing activities associated with the Later Phases would also have the potential to disturb areas of subsurface contamination. These activities would not be expected to result in significant adverse impacts to groundwater, which is not used as a potable water supply, with the implementation of legal requirements identified for Phase 1 that would also be followed for construction of the full development of the Proposed Project to minimize the potential for adverse impacts to the environment.

Operation

Continued conversion of impervious to pervious surface as a result of park and open space development would increase the potential for groundwater recharge. In addition, the sustainable maintenance practices identified in the Park Master Plan, if incorporated into park operations, could minimize the potential for adverse impacts to groundwater quality associated with the operation of the park areas.

FLOODPLAIN

PHASE 1

Most of the Phase 1 elements of the Proposed Project are located at an elevation above the 100-year flood elevation but within the 500-year flood elevation. Those portions of Phase 1 that would occur in the 100-year floodplain consist of passive recreation areas such as the walking paths, picnic areas, sport fields, and newly created landscaped areas. For the elements located in the South Island (i.e., Play Lawn and Hammock Grove) some fill material would be added in the development of these elements such that the finished elevation would place the tree roots above

saltwater levels that would occur in the future during severe storms (i.e., an elevation 2 feet above future elevation for a 1 percent probability of flooding in a given year). Construction and operation of Phase 1 would not increase the potential for public and private losses due to flood damage, or increase the exposure of public utilities to flood hazards.

LATER PHASES

For the full development of the Proposed Project, portions of the park and open space elements to be developed in the South Island for the Later Phases-Park and Public Spaces would be located within the current 100-year floodplain (i.e., the Hills, Liberty Terrace, and South Prow). As with the Phase 1 elements, fill material would be used to raise the elevation above the projected future elevation for a 1 percent probability of flooding in a given year (i.e., 100 year floodplain) such that tree roots would be above possible saltwater levels during severe storms. The construction of the park elements in the Later Phases-Park and Public Spaces would not increase the potential for public and private losses due to flood damage, or increase the exposure of public utilities to flood hazards.

The design of the development within the future development zones for the Later Phases-Island Redevelopment is unknown at this time but would have to be consistent with the New York City Building Code requirements for construction within the 100-year floodplain as specified in Appendix G: "Flood Resistant Construction," of the New York City Building Code (http://home2. nyc.gov/html/dob/ downloads/pdf/cc_appendix_g.pdf), for the applicable building category (see Table 1604.5 of the *New York City Building Code* or Table 1-1 of Appendix G to the *New York City Building Code*), and any subsequent revisions to these requirements. Compliance with these requirements would reduce the potential for public and private loses due to flood damage under current and projected flood conditions. Therefore, the full development of the Proposed Project would not result in significant adverse impacts to the floodplain.

WETLANDS AND WATER QUALITY

PHASE 1

Construction

As discussed in Chapter 12, "Water and Sewer Infrastructure," soil disturbing activities associated with Phase 1 activities would be conducted in accordance with the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001), and temporary erosion and sediment control measures would be specified in the SWPPP. With the implementation of these measures, stormwater discharged during construction of Phase 1 would not result in significant adverse impacts to NYSDEC littoral zone tidal wetlands along the shoreline of Governors Island or to the water quality of the Upper Bay. Groundwater recovered during dewatering operations that may be required as part of Phase 1 construction activities would be discharged to the Upper Bay in accordance with NYSDEC SPDES permitting requirements and would not have the potential to result in significant adverse impacts to water quality or NYSDEC littoral zone tidal wetlands.

While the completely armored shoreline of the Island eliminates the potential for vegetated tidal wetlands, the entire shoreline of Governors Island is mapped as NYSDEC littoral zone tidal wetlands. Therefore, the seawall rehabilitation activities that would take place during Phase 1 would have the potential to adversely affect areas of littoral zone tidal wetland within the area of disturbance for these activities. Because the majority of the seawall rehabilitation work would consist of repair or replacement maintaining the existing footprint, the area of disturbance of

tidal wetlands associated with these activities would be limited. Additionally, the replacement of the seawall with riprap revetment proposed along the west and south sides of the Island would result in a net benefit to tidal wetland and aquatic resources by removing more fill material (seawall and upland fill material) than what would be placed in-water for the riprap revetment as well as the new riprap installed at the base of the rehabilitated seawall for scour protection and dissipation of stormwater discharged through the 28 reconstructed and one new stormwater outfall.

As discussed for the in-water activities that would occur in the No Build condition, the proposed seawall rehabilitation and stormwater outfall reconstruction, consolidation, and abandonment activities would have the potential to produce sediment disturbance, resulting in minor, short-term increases in suspended sediment and, as a consequence, redeposition of sediment-associated contaminants. These temporary effects would be localized and confined to the immediate vicinity of sediment disturbing activities. The seawall rehabilitation and stormwater outfall reconstruction activities would require authorization from the USACE under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, and from the NYSDEC under Articles 25 and 15 of the Environmental Conservation Law, and Section 401 Water Quality Certification. During these in-water construction activities, appropriate measures such as the use of a floating boom and turbidity curtain to capture floating debris and to contain resuspended sediment would be implemented in accordance with permitting conditions to minimize increases of suspended sediment. With the implementation of these measures and designing the rehabilitation to maintain or reduce the footprint of the shoreline engineering around the Island, construction of Phase 1 of the Proposed Project would not result in significant adverse impacts to NYSDEC littoral zone tidal wetlands or to water quality of the Upper Bay.

The water main(s) would be constructed using HDD and therefore, would not result in any in-water disturbance with the potential to adversely affect littoral zone tidal wetlands, water quality, or aquatic resources.

Operation

The operation of Phase 1 of the Proposed Project would not result in water quality conditions within the Upper Harbor that fail to meet Class I standards. As discussed in Chapter 12, “Water and Sewer Infrastructure,” the elements developed as part of Phase 1 of the Proposed Project would result in a decrease in the amount of impervious surface on the Island, and a decrease in the discharge of stormwater to NYSDEC littoral zone tidal wetlands and the Upper Bay adjacent to the Island. There are currently 132 existing stormwater outfalls serving the island. Many of these outfalls serve small catchment areas less than 1 acre. The proposed work includes reconstruction of 28 outfalls, construction of one new outfall and abandoning and sealing the remaining seawall outfall penetrations. This improvement, which would be undertaken as part of the seawall rehabilitation, would reduce the total number of outfalls from 132 to 29. As discussed in Chapter 12, Water and Sewer Infrastructure,” the size of the stormwater outfall diameters would generally increase to accommodate the change in the contributory drainage areas. This increase in outfall diameter would result in an increase in capacity. However, although the flow capacity at each outfall may increase, the overall stormwater runoff peak flows from the Island would decrease because of the total decrease in impervious surfaces which would also improve the quality of the stormwater discharged. Because stormwater runoff would discharge to a tidal body of water—Upper New York Bay—the increase in flows at each of the modified outfalls would have a negligible effect on the water quality or aquatic resources of the Bay. Additionally, the riprap installed at the toe of the rehabilitated seawall would be designed

to prevent scour at the base of the seawall and dissipate the flow of stormwater discharged through the 29 consolidated stormwater outfalls. Therefore, discharge of stormwater would not have the potential to result in significant adverse impacts to water quality or littoral zone tidal wetlands of the Upper bay due to resuspension of bottom sediment.

The implementation of measures that would be part of the post-construction stormwater management measures incorporated into the SWPPP would further reduce discharge of stormwater to the Upper Bay and improve its quality. Incorporation of the Park Master Plan's proposed sustainable design measures, such as controlling the application of fertilizers and use of non-toxic pest and disease control for plants could also minimize the potential for the operation of the park and open spaces to affect the quality of stormwater discharged to the Upper Bay and NYSDEC littoral zone tidal wetlands. The implementation of sustainable design features and other measures implemented as part of the post-construction stormwater management measures that would be incorporated in the SWPPP, would further reduce discharge of stormwater to the Upper Bay and NYSDEC littoral zone tidal wetlands. Sustainable maintenance practices such as prohibiting the application of fertilizers for use on annuals, shrubs, perennials or trees, restricting fertilization of lawn areas to once per year, and the use of non-toxic pest and disease control for plants would minimize the potential for operation of the park to adversely affect the quality of stormwater discharged to the Upper Bay and NYSDEC littoral zone tidal wetlands. Therefore, the operation of Phase 1 of the Proposed Project would not result in significant adverse impacts to NYSDEC littoral zone tidal wetlands or to the water quality of the Upper Bay.

LATER PHASES:

Construction

Soil disturbing activities associated with the Later Phases of the Proposed Project would be conducted in accordance with the SPDES General Permit for Stormwater Discharges from Construction Activity in effect at the time of those activities, and the temporary erosion and sediment control measures that would be specified in the SWPPP. With the implementation of these measures, stormwater discharged during construction of the full development of the Proposed Project would not result in significant adverse impacts to NYSDEC littoral zone tidal wetlands along the shoreline of Governors Island or to the water quality of the Upper Bay.

Operation

Operation of the Later Phases would result in a decrease in the total amount of impervious surfaces on the Island from 52 to 41 percent of the 150-acre portion of Island under control of The Trust (see Chapter 12, "Water and Sewer Infrastructure"). This reduction in impervious surface, the previously described sustainable design features, and the use stormwater as a source of water for the proposed Wetlands Gardens that would be developed as part of the South Prow, and post-construction stormwater management measures implemented as part of the SWPPP, would decrease the discharge of stormwater runoff to the Upper Harbor and NYSDEC littoral zone tidal wetlands. Additionally, sustainable maintenance practices would minimize the potential for operation of the park to adversely affect the quality of stormwater discharged to the Upper Bay and NYSDEC littoral zone tidal wetlands. Therefore, the operation of the Later Phases-Park and Public Spaces would not result in significant adverse impacts to water quality of the Upper Bay or to NYSDEC littoral zone tidal wetlands adjacent to the Island.

The three-acre Wetland Gardens proposed to be developed from uplands within the South Prow area of the South Island would increase wetland resources at the Island. This created wetland

would be fed by brackish groundwater as well as stormwater and would be designed to withstand flooding (GIPEC 2010). Plantings would include wetland species tolerant of salt spray and elevated salinity levels.

As discussed in detail in Chapter 12, "Water and Sewer Infrastructure," in the future, when the specific uses for the Later Phases-Island Redevelopment are identified and designed, it is anticipated that additional environmental review will be required. At that time, it is anticipated that, in coordination with NYCDEP, a Best Management Practices (BMP) Concept Plan will be required to identify potential BMPs that would achieve an overall stormwater release rate of 0.25 cubic feet per second, or 10 percent of the allowable flow rate (whichever is greater). With the implementation of these approved BMPs, stormwater discharges would not be expected to result in significant adverse impacts to water quality of the Upper Bay or to NYSDEC littoral zone tidal wetlands.

AQUATIC BIOTA

PHASE 1

Construction

Implementation of the SWPPP would minimize potential adverse impacts to aquatic biota from the discharge of stormwater during construction of the upland project elements during Phase 1. As described above under "Wetlands and Water Quality," the rehabilitation of the seawall and reconstruction of the stormwater outfalls would have the potential to result in resuspension of bottom sediment. Increases in suspended sediment have the potential to result in temporary adverse impacts to fish and macroinvertebrates. However, increases in suspended sediment would be localized and temporary and would be minimized through the use of measures (e.g., floating booms and turbidity curtain) to contain resuspended sediment. Therefore, rehabilitation of the seawall and reconstruction of the stormwater outfalls would not result in significant adverse impacts to aquatic biota of the Upper Bay. While sediments of the Harbor Estuary have been found to contain contaminants at concentrations that may pose a risk to some benthic macroinvertebrates, the resuspended sediments are expected to be widely dissipated such that redeposition within or outside the study area is not expected to adversely affect benthic macroinvertebrates or bottom fish.

Life stages of estuarine-dependent and anadromous fish species, bivalves, and other macroinvertebrates are fairly tolerant of elevated suspended sediment concentrations and have developed behavioral and physiological mechanisms for dealing with variable concentrations of suspended sediment (Birtwell et al. 1987, Dunford 1975, Levy and Northcote 1982 and Gregory 1990 in Nightingale and Simenstad 2001, LaSalle et al. 1991). Fish are mobile and generally avoid unsuitable conditions in the field, such as increases in suspended sediment and noise (Clarke and Wilber 2000). While the localized increase in suspended sediment may cause fish to temporarily avoid the area where bottom-disturbing activities associated with the seawall rehabilitation are occurring, the affected area is expected to be small. Similar suitable habitats would be available for use by fish to avoid the area being disturbed. Therefore, temporary increases in suspended sediment resulting from in-water construction activities during seawall rehabilitation are not expected to result in significant adverse impacts to fish and mobile benthic macroinvertebrates.

During some of the seawall rehabilitation stormwater reconstruction activities, removal of bottom sediment and existing riprap at the toe of the seawall would adversely affect aquatic biota through the loss of aquatic habitat and possibly some benthic invertebrate individuals.

However, these adverse impacts would be minimal and would be offset through the restoration of aquatic habitat achieved through the replacement of approximately 0.7 miles of the existing seawall with a riprap revetment that would be developed by installing a new headwall structure landward of the existing seawall. Although the designs have not been finalized, it is expected that the volume of any new in-water riprap placed for scour protection and dissipation of stormwater discharged through the 29 consolidated outfalls would be less than the volume of fill removed due to the new landward location of the headwall, resulting in a net benefit for aquatic resources. The temporary loss of aquatic habitat within the areas of disturbance for the seawall rehabilitation, and the possible loss of some benthic macroinvertebrates within the area of disturbance for the seawall rehabilitation and stormwater outfall reconstruction, would not be expected to result in significant adverse impacts to populations of aquatic species within the Upper Bay.

Operation

The operation of Phase 1 of the Proposed Project would not result in water quality conditions within the Upper Harbor that fail to meet Class I standards. As discussed under "Wetlands and Water Quality," potential impacts to aquatic biota from the discharge of stormwater would be minimized due to the decrease in impervious area, placement of riprap at the toe of the seawall rehabilitation to serve as scour protection and dissipation of stormwater discharged through the 29 consolidated stormwater outfalls, and other measures implemented as part of the post-construction stormwater management measures that would be incorporated in the SWPPP would minimize the potential for operation of the park to adversely affect the quality of stormwater discharged to the Upper Bay. Because Phase 1 would not be expected to materially affect visitation to the Island, it would not result in any incremental increase in discharge of sanitary sewage as compared with No Build conditions. Therefore, Phase 1 would not have the potential to adversely affect sanitary and stormwater drainage and management within the Red Hook section of Brooklyn, and would not result in adverse impacts to water quality and aquatic biota of the Upper Bay.

The replacement of existing armored seawall with riprap as part of the seawall rehabilitation, and placement of additional riprap material at the toe of the rehabilitated seawall for scour and dissipation of stormwater discharged through the 29 consolidated stormwater outfalls would not be expected to result in significant adverse impacts to aquatic biota. Encrusting organisms and benthic macroinvertebrates would be expected to quickly colonize the newly placed stone material. The proposed stone riprap may benefit aquatic resources by increasing the diversity of aquatic habitat for benthic macroinvertebrates and fish available within the vicinity of the seawall. In general, the greater the physical complexity, the better the aquatic habitat. In-water structures such as riprap have rough surfaces with many interstitial spaces and a high surface area to volume ratio (USACE 1993) that provide more surface area for invertebrates that attach to surfaces (fouling community), and habitat (foraging and refuge) for fish (Heiser and Finn in Chmura and Ross 1978).

LATER PHASES

Construction

Implementation of the SWPPP would minimize potential adverse impacts to aquatic biota from the discharge of stormwater during construction of the full development of the Proposed Project may also result in limited in-water construction activity for in-water activities associated with use of the existing piers. As with the seawall rehabilitation activities, measures to minimize the

resuspension of bottom sediment would be implemented during any in-water construction activities to minimize the potential for adverse impacts to water quality and aquatic biota.

Operation

At this time, the uses associated with the Later Phases-Island Redevelopment are not specifically proposed, defined, or designed and their operations have not yet been planned. Potential impacts to aquatic biota from the discharge of stormwater would be minimized with the implementation of stormwater BMPs developed for the redevelopment area in consultation with NYCDEP, As discussed in Chapter 12, "Water and Sewer Infrastructure," the Later Phases-Park and Public Spaces would generate 108,450 gallons per day (gpd) of sanitary sewage and the Mixed Use Option for the Later Phases-Island Redevelopment (i.e., the reasonable worst case development scenario) would generate 641,140 gpd. The total sewage generation for the full development of the Proposed Project would be 749,590 gpd. The incremental sewage generation, when compared with the No Build condition, would be 616,074 gpd. This incremental increase in sanitary sewage generated by the full development of the Proposed Project would represent only about 2 percent of the average daily flow of 28 million gpd at the Red Hook Waste WWTP and would not be expected to adversely affect compliance of the Red Hook WWTP effluent with the SPDES permit limits. Therefore, the projected increased sewage generation from the full development of the Proposed Project would not result in significant adverse impacts to the water quality of the Upper Bay or contribute to violations of Use Class I water quality standards due to discharges from the Red Hook WWTP. However, calculations from the NYCDEP Flow Volume Matrix suggest that full development of the Proposed Project, as a result of the Later Phases-Island Redevelopment component, would have the potential to result in appreciable increases in sanitary flows to the combined sewer system, resulting in potential impacts on sanitary and stormwater drainage and management, and subsequently to water quality and aquatic biota should current conditions related to CSOs be exacerbated.

ESSENTIAL FISH HABITAT (EFH)

PHASE 1

Construction

Implementation of the SWPPP would minimize potential adverse impacts to EFH from the discharge of stormwater during construction of the upland project elements during Phase 1. As discussed under "Aquatic Biota," in-water construction activities associated with the rehabilitation of the seawall and stormwater outfall reconstruction have the potential to result in sediment disturbance, resulting in increases in suspended sediment. However, increases in suspended sediment would be localized and temporary and would not result in significant adverse impacts to water quality or aquatic biota of the Upper Bay and would not adversely affect EFH. The construction of the water main(s) would use HDD, minimizing the potential for adverse impacts to water quality and aquatic biota.

The permanent loss of benthic macroinvertebrates within the areas of disturbance for the seawall rehabilitation and stormwater outfall reconstruction would not significantly impact the food supply for fish foraging in the area.

Operation

Operation of Phase 1 of the Proposed Project would not result in any significant adverse impacts on water or sediment quality, nor would it result in adverse impacts to aquatic biota. Therefore,

operation of Phase 1 the Proposed Project would not result in significant adverse impacts to EFH.

LATER PHASES

Construction

Implementation of the SWPPP would minimize potential adverse impacts to EFH from the discharge of stormwater during construction of the Later Phases.

Operation

The operation of the full development of the Proposed Project would not result in water quality conditions within the Upper Harbor that fail to meet Class I standards and therefore, would not result in significant adverse impacts to EFH.

TERRESTRIAL RESOURCES

GOVERNORS ISLAND

Due to Governors Island's long history of human activity, terrestrial resources are extremely limited, and no native, undisturbed habitats remain. Grading, construction, and landscaping activities that would be required to implement the Proposed Project would have the potential to result in direct impacts to birds and other wildlife currently inhabiting Governors Island due to loss of habitat and indirect impacts due to avoidance of certain areas due to project-related activities. However, the majority of these species are extremely common to urban areas and tolerant of disturbances, and the proposed construction activities would not result in a significant adverse impact on their populations. Overall, no significant adverse impacts to the Island's terrestrial resources would be anticipated as a result of the Proposed Project.

The Proposed Project has the potential to benefit the Island's terrestrial resources, particularly birds, by replacing existing buildings, lawns, streets, and parking lots with more natural areas. There are 1,700 trees currently on the Island, and the Proposed Project would add more. Impervious surfaces would be replaced with green space, including woodland and wetland habitat. Due to its geographic position along the Atlantic migration routes of many bird species, Governors Island has the potential to be a valuable stopover habitat for migrants passing through the metropolitan area. Urban habitats can be high quality stopover sites for migratory birds (e.g., Seewagen and Slayton 2008, Seewagen et al. 2011), but the resources currently available to migrants on Governors Island are likely very poor. The Proposed Project would likely substantially improve the quality of Governors Island as a migratory bird stopover site by increasing total canopy cover, increasing native plant diversity, and enhancing structural heterogeneity of the natural areas.

Phase 1

Construction

In the North Island, the replacement of existing asphalt surfaces with lawn and shade trees at Soissons Landing, the South Battery, Liggett Terrace, and at the Battery would have the potential to result in direct impacts to wildlife individuals such as avoidance of certain habitat areas due to increased human activity, noise, vibrations, or construction equipment during land disturbing activities. However, the species occurring in these areas are primarily limited to grey squirrels and non-native, invasive birds that are highly tolerant of urban habitats, such as house sparrows, European starlings, and rock pigeons. Native bird species that were observed in the vicinity of these areas during the site reconnaissance surveys such as American robin, blue jay,

and northern mockingbird, are also common to noisy, urban environments and unlikely to be highly disturbed by these activities.

The proposed water main(s) connecting Governors Island to Brooklyn have yet to be designed in detail, but trenches would be required on the Island to lay 300 to 400 feet of new pipe per water main over the course of approximately two weeks. Additionally, a small area 15 by 20 feet at a 7.5-foot depth would be excavated for the pilot hole and enlargement of the hole. Because the habitat on Governors Island is so heavily disturbed and of such poor quality to native species, trenching activities and locations are unlikely to have significant adverse impacts on terrestrial resources. The terrestrial wildlife community on the Island is largely limited to birds, which for most of the year are limited to urban-adapted species that are extremely abundant throughout the city and the region. The new water main(s) would connect with the existing infrastructure and water distribution system on the Island through building 85 on the northern end and near building 691 on the southeastern end. Both buildings are on the edge of the Island, in heavily developed areas with mostly impervious surface. Activities at these locations, estimated to last approximately two weeks, would not have any impact on terrestrial resources other than potential temporary displacement of common, mostly non-native bird species.

Operation

The replacement of asphalt surfaces with pervious green space in these areas is likely to reduce runoff and heat island effects, and the planted trees and shrubs would improve habitat conditions for native birds and other wildlife in the area. Flower beds planted as part of Phase 1 would provide nectar sources for butterflies and bees. Planting native species of flowering trees would likely benefit native wildlife more so than non-native ornamental species (e.g., Burghardt et al. 2009).

Hammock Grove would be planted to represent a native oak-hickory forest and feature 55 tree species including oaks, birches, hornbeams, beeches, serviceberry, as well as flowering understory shrubs. Creation of Hammock Grove would benefit terrestrial wildlife, particularly birds, by increasing forest cover on the Island and by replacing an existing lawn of little value with groups of trees (e.g., oaks) that are excellent hosts for native invertebrates, and in turn, excellent food sources for a variety of wildlife (Tallamy 2009).

The parking lot south of Liggett Hall and north of the proposed Hammock Grove site would be replaced with an 11 acre recreational lawn. Although manicured lawns hold little direct value to native wildlife, the replacement of the asphalt lot with pervious surface would reduce runoff and solar heat absorption.

Later Phases

Construction

The Great Promenade would replace an existing waterfront road, and therefore result in no loss of wildlife habitat. Promenade construction activities along the Island's perimeter could potentially disturb waterfowl present in the offshore waters during fall and winter, but it is expected that these birds would be able to avoid construction areas and move into similar available habitat nearby. Additionally, most of the waterbirds observed around Governors Island during the November 2010 field reconnaissance were species that are common to urban waterways, where levels of human activity and disturbance are consistently high, such as Canada goose, bufflehead, double-crested cormorant, red-breasted merganser, and mallard. As such, construction of the Great Promenade is not expected to have any significant impacts to waterbirds occurring off of the Governors Island shoreline.

The construction of Liberty Terrace, the Hills, and South Prow would result in the loss of disturbed areas that are primarily ruderal habitat, field and grass that are of limited value to wildlife. Therefore, construction of these elements would result in minimal impact to natural resources. Likewise, the construction of Liberty Terrace and the Hills would have the potential to result in indirect impacts to wildlife individuals using the nearby open space areas created in the Play Lawn and Hammock Grove (as part of Phase 1 activities) such as avoidance of certain habitat areas due to increased human activity, noise, or construction equipment during land disturbing activities. However because individuals using these areas would already have been acclimated to human activity, and because similar habitats would be available elsewhere on the Island, significant adverse impacts to wildlife would not occur as a result of construction of the Later Phases on the South Island.

The proposed development zones on the South Island largely overlap with currently developed areas, and therefore little existing open space would be lost by future construction activities within these areas. One exception is an overgrown field south of Division Road that would be lost in the eastern development zone. The native birds observed in this area during the November 2010 and May 2011 field reconnaissance were those commonly found in old fields, grasslands, and early successional habitats, including chipping sparrow, savannah sparrow, dark-eyed junco, northern cardinal, and northern mockingbird. Construction within this portion of the development zone would adversely impact individuals currently using this area. However, the field is small and dominated by non-native invasive weeds, and therefore likely represents poor quality habitat for these and similar species. Loss of this field would have no significant impact on the populations of these species that are common to New York City and the region. A sharp-shinned hawk, a New York State Species of Special Concern, was observed during the November 2010 reconnaissance perched on a backstop near this field, and later perched on the roof of nearby Liggett Hall. The hawk was observed eating an unidentified rodent while perched on the backstop, suggesting that the field may serve as a hunting area. It is unlikely, however, that the proposed development of the field would significantly diminish the prey base for sharp-shinned hawks on Governors Island or negatively impact local populations of the species. Therefore, construction activities for the full development of the Proposed Project would not result in significant adverse impacts to terrestrial resources.

Operation

The proposed development of the Hills would enhance the Island's native plant diversity and likely provide useful habitat for a suite of native wildlife, particularly migrating birds. Governors Island currently lacks suitable stopover habitat for most migratory landbird species, and the trees, understory shrubs, and herbaceous ground cover planned for the Hills would likely improve stopover refueling conditions for migrants on the Island.

The South Prow would create the only wetland habitat on Governors Island. The proposed features of the approximately 3-acre wetland include various native plants that are tolerant of brackish conditions, and the wetland would receive storm water captured on the island. Despite its small size, the wetland could potentially provide breeding habitat for some wetland-associated birds that are tolerant of human activity, which would likely be high during the peak summertime visitation period. Such species include red-winged blackbird, gray catbird, song sparrow, and common yellowthroat. The wetland may also provide a stopover site for these birds and additional species such as northern waterthrush (*Parkesia noveboracensis*), marsh wren (*Cistothorus palustris*), and swamp sparrow migrating through the region. The proposed wetland plantings would likely attract dragonflies, butterflies, and bees.

While the uses associated with the Later Phases-Island Redevelopment are not specifically proposed, defined, or designed at this time, these developments would be expected to include landscaped areas and stormwater management BMPs such as rain gardens, that would be expected to provide some habitat for wildlife, including beneficial insects such as butterflies and bees.

OFF-ISLAND AREAS

The urban character and impervious cover of the locations for the entrance of the proposed water mains in Brooklyn as well as the tie-ins provide limited habitat to wildlife. The disturbance of two small areas (15 by 20 feet) associated with the entrance of the water mains in Brooklyn, as well as the area of disturbance due to construction of the trenches necessary to connect the two new 12-inch water mains to the existing NYCDEP water mains, would result in minimal impact to natural resources.

RARE, SPECIAL CONCERN, THREATENED OR ENDANGERED SPECIES

PEREGRINE FALCON

Urban peregrine falcons primarily eat rock pigeons, the abundance of which may be reduced as a result of the full development of the Proposed Project, as developed sections of the Island that are attractive to pigeons are replaced with more natural habitats. However, rock pigeons are expected to remain abundant in many areas of the Island, such as the Historic District and the proposed development zones, providing ample hunting opportunities for peregrine falcons. Peregrine falcons also commonly hunt small, native birds, such as migratory songbirds (Rejt 2001, DeCandido and Allen 2008), whose abundance on Governors Island during spring and autumn would likely increase with the full development of the Proposed Project as a result of the improved stopover habitat conditions. Overall, the Proposed Project would not result in significant adverse impacts to the peregrine falcon.

COMMON TERN

Governors Island currently lacks suitable nesting sites for common terns, and as such, no nesting habitat would be lost or impacted by the construction of Phase 1 or the Later Phases of the Proposed Project. Construction activities in the water associated with seawall rehabilitation could potentially interrupt migrating common terns fishing in the waters off of Governors Island. However, common terns do not appear to be sensitive to such activity, as many terns were observed flying alongside ferry boats and diving in areas with heavy boat traffic during field reconnaissance. Further, common terns in the vicinity of the Governors Island would be expected to easily distance themselves from any project activities that were a disturbance to them and move to nearby areas with ample food availability.

VESPER SPARROW

In the future with the Proposed Project, Governors Island would continue to lack appropriate nesting habitat for vesper sparrows. Stopover habitat availability on Governors Island would be slightly reduced by construction of Phase 1. The full development of the Proposed Project would result in the loss of overgrown weedy fields that may presently suffice as surrogate habitat for this grassland species are replaced with manicured lawn, forest, wetland or buildings. However, the loss of these overgrown fields, which are dominated by invasive plants and likely of poor quality, is not expected to have any significant impact to vesper sparrows at the individual or population level as they migrate through New York City.

SHARP-SHINNED HAWK

Sharp-shinned hawks prey upon small birds and small mammals (Bildstein and Meyer 2000). The Proposed Project is not expected to reduce the species' prey base or result in the loss of any appropriate nesting habitat. As a forest bird that frequents urban areas during winter (Bildstein and Meyer 2000), the Proposed Project, particularly the Hills and Hammock Grove, may improve winter habitat conditions for sharp-shinned hawks on Governors Island.

COMMON LOON

In-water construction activities associated with the development of the seawall could potentially interrupt common loons feeding in the waters around Governors Island. Common loons in the vicinity of the Governors Island would be expected to easily avoid any project activities that were a disturbance to them and move to nearby areas with ample food availability.

SHORTNOSE AND ATLANTIC STURGEON

As discussed in Section D, "Existing Conditions," the preference of shortnose and Atlantic sturgeon for deep water habitat suggests that it is unlikely that individuals of either species would occur within the project area except as transients. Therefore, the in-water construction activities associated with the seawall rehabilitation would not be expected to result in significant adverse impacts to sturgeon. Because neither Phase 1 nor the full development of the Proposed Project would result in adverse impacts to water quality during construction or operation, the Proposed Project would not result in significant adverse impacts to water quality or to the potential habitat for sturgeon.

MARINE TURTLES

The four species of marine turtle (loggerhead, green, Kemp's ridley, and leatherback) would only occur within the project area in warmer months and then only as transient individuals. Because they neither nest, nor reside in the area year-round, and are only rarely observed in this portion of the estuary, the Proposed Project would not result in significant adverse impacts to marine turtles.

MARINE MAMMALS

The construction or operation of Phase 1 of the Proposed Project would not be expected to result in significant adverse impacts to the marine mammals occasionally entering New York Harbor (predominantly the harbor seal). However, increased ferry activity associated with the full development of the Proposed Project could have the potential to result in an increased threat of vessel strikes along the ferry routes.

SIGNIFICANT COASTAL FISH AND WILDLIFE HABITAT

PHASE 1

Construction

Implementation of the SWPPP would minimize potential adverse impacts to water quality of the Upper Bay due to discharge of stormwater during construction of the upland project elements during Phase 1. Temporary impacts from the seawall rehabilitation and stormwater outfall reconstruction activities would be limited to the immediate vicinity in-water area of activity would not have the potential to adversely affect the closest Significant Coastal Fish and Wildlife Habitat to Governors Island, the Lower Hudson Reach.

Operation

Operation of Phase 1 would not result in any significant adverse impacts on water or sediment quality, and would not have the potential to result in significant adverse impacts to the Lower Hudson Reach Significant Coastal Fish and Wildlife Habitat.

LATER PHASES

Construction

Implementation of the SWPPP would minimize potential adverse impacts to the Lower Hudson Reach Significant Coastal Fish and Wildlife Habitat from the discharge of stormwater during construction of Later Phases.

Operation

The operation of full development of the Proposed Project would not result in water quality conditions within the Upper Harbor that fail to meet Class I standards and therefore, would not result in significant adverse impacts to the Lower Hudson Reach Significant Coastal Fish and Wildlife Habitat.

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