

A. INTRODUCTION

This chapter describes the potential effects on natural resources during construction of the proposed project on geologic and soil resources; groundwater resources; wetland resources; the 100-year Federal Emergency Management Agency (FEMA) special flood hazard area (SFHA); surface water resources and quality; aquatic resources; endangered, threatened, and special concern species; and terrestrial resources. Specifically, conditions under the With Action Alternatives (i.e., the future with the proposed project) are compared to conditions under the No Action Alternative (i.e., the future without the proposed project) to determine the potential for effects to natural resources during construction. Mitigation measures to minimize adverse effects are identified where applicable. The analyses consider two different construction timelines: Alternatives 2, 3, and 5 are designed to accommodate a five-year construction schedule from 2020 to 2025, while the Preferred Alternative is expected to be completed in a 3.5-year time frame from 2020 to 2023. The analyses were conducted using guidance on methodologies outlined in the 2014 *City Environmental Quality Review (CEQR) Technical Manual*.

B. PRINCIPAL CONCLUSIONS**PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK**

The Preferred Alternative proposes to move the line of flood protection further into East River Park, thereby protecting both the community and the park from design storm events, as well as increased tidal inundation resulting from sea level rise. The Preferred Alternative would raise the majority of East River Park. This plan would limit the length of wall between the community and the waterfront to provide for enhanced neighborhood connectivity and integration. A shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Brown Walk would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, substantially improving the City's greenway network and north-south connectivity in the project area and reducing the potential for flooding, wave damage, and the resulting scouring and erosion.

Construction of the proposed project would be performed in accordance with all applicable rules and regulations of the U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (EPA), National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS), New York State Department of Environmental Conservation (NYSDEC), New York City Department of Environmental Protection (DEP), New York City Department of Design and Construction (DDC), and other regulatory agencies and procedures, as applicable.

Construction of the Preferred Alternative includes the following in-water elements: the use of construction barges and associated spuds, the installation of shafts and footings to support a shared-use flyover bridge, the reconstruction of sewer outfalls, the demolition of the existing

bulkhead for the installation of a new cut-off wall, and the demolition of the existing embayments and creation of new embayments, and the demolition of existing piles and formwork associated with the esplanade in these areas. These construction activities have the potential to result in temporary adverse effects to NYSDEC littoral zone tidal wetlands and USACE Waters of the United States, surface water resources, benthic resources, essential fish habitat (EFH), and threatened and endangered species. Turbidity curtains, water-tight cofferdams, and debris nets would be used as applicable to minimize the potential for these effects. Any adverse effects associated with the filling of the existing embayments and the additional fill at the outer perimeter of the proposed embayments is evaluated in Chapter 5.6, “Natural Resources.”

Although consultation with the NOAA NMFS identified both the endangered shortnose sturgeon and Atlantic sturgeon as potentially occurring within the study area, shortnose sturgeon rarely leave tidal river habitat (e.g., the Hudson River) and on the rare occasions when shortnose sturgeon have been documented migrating to other tidal rivers such as the Connecticut River, their presence in the East River would be transient (see **Appendix G**). Additionally, the East River contains no submerged aquatic vegetation and suboptimal salinity levels. Therefore, due to the transient nature of shortnose sturgeon in the East River, the lack of suitable habitat, and the sturgeon’s ability to avoid the affected area, no significant adverse effects to shortnose sturgeon from construction activities under any alternative are anticipated.

The Atlantic sturgeon is known to utilize the East River as a migratory route between spawning grounds in the Hudson River and suitable marine habitats in the New York Bight, primarily between the months of March through October. Atlantic sturgeon is uncommon in the East River (Tomechik et. al., 2015). Construction of the in-water elements associated with the Preferred Alternative would likely produce noise that has been known to affect Atlantic sturgeon. To minimize the noise effects on Atlantic sturgeon, conservation measures would be implemented that would reduce the noise or the likelihood that sturgeon would be exposed to the construction activities. These conservation measures include, to the greatest extent practicable, the use of a cushion blocks and gradually ramping up pile driving activities, the latter of which would discourage fish species including the Atlantic sturgeon from utilizing the near-shore environment in the East River. A consultation has been reinitiated with NOAA NMFS for the Preferred Alternative, and any additional conservation measures identified as a result of that consultation will be included in the Final EIS.

Upon completion of construction, the spuds, barges, turbidity curtains and debris nets would be removed, and the affected area would be allowed to naturally restore to pre-construction conditions. All adverse effects to NYSDEC and USACE regulated tidal wetlands would be subject to the regulatory permitting process and would be mitigated for in accordance with NYSDEC and USACE permit conditions. Mitigatory measures for all permanent effects to wetland resources are discussed in Chapter 5.6, “Natural Resources,” and include the creation of new embayments with improved habitat within the project area as well as the restoration of off-site tidal wetland habitat or purchase of credits from the Saw Mill Creek Wetland Mitigation Bank on Staten Island, New York.

In addition, temporary adverse effects to terrestrial resources due to the removal of trees are anticipated as a result of both construction of the proposed project and to accommodate the proposed design for the Preferred Alternative and are evaluated in Chapter 5.6, “Natural Resources.” As noted in that chapter, the project would implement a comprehensive planting program as part of a landscape restoration plan, and restoration for the tree removals would be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department

of Parks and Recreation Rules) and Local Law 3 of 2010. Therefore, no significant adverse effects to natural resources are anticipated as a result of construction of the Preferred Alternative.

OTHER ALTERNATIVES

Construction of all With Action Alternatives would be performed in accordance with all applicable rules and regulations as stated for the Preferred Alternative. Alternatives 2 and 3 do not propose the reconstruction of the sewer outfalls, the removal of the existing bulkhead to be replaced by a new cut-off wall, or the relocation of two embayments within East River Park. The in-water construction elements are limited to the installation of the flyover bridge shafts and footings and the use of construction barging. In addition, while the number of tree removals under Alternatives 2 and 3 would be less as compared to the Preferred Alternative, East River Park would remain vulnerable to design storm events and sea level rise inundation over the long-term. Regardless, no significant adverse effects to natural resources under these alternatives are anticipated.

Alternative 5 includes all the components of the Preferred Alternative and increases the potential for temporary adverse effects to tidal wetlands (littoral zone), surface water resources, benthic and EFH and Atlantic sturgeon due to the construction of the support structure for the raised FDR Drive. This additional adverse effect to NYSDEC and USACE regulated tidal wetlands would be subject to the same regulatory permitting process and would be mitigated for in accordance with NYSDEC and USACE permit conditions.

C. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is presented in Chapter 2.0, “Project Alternatives.” The No Action Alternative (Alternative 1) assumes that no comprehensive flood protection system is constructed and, therefore, is not analyzed below.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

GEOLOGIC AND SOIL RESOURCES

The limits of disturbance associated with the Preferred Alternative span 82 acres, and construction of the Preferred Alternative would require the excavation and grading of soils in the project area wherever floodwalls, the reconstructed shared-use bike and pedestrian path, and drainage components (e.g., interceptor gates, isolation gate valve, upsizing existing sewers, and parallel conveyance) are proposed. However, as described in Chapter 5.6, “Natural Resources,” and Chapter 5.7, “Hazardous Materials,” soil resources in these areas consists of highly modified urban soils and fill and are likely contaminated as a result of historic land uses in the area. Any contaminated excavated soils would be containerized and disposed of in accordance with all applicable rules and regulations at a pre-approved NYSDEC disposal facility. Construction materials and backfill used for the Preferred Alternative, totaling approximately 600,000 cubic yards, would include clean fill from an offsite source and, as practicable, any excavated material that meets NYSDEC’s beneficial reuse criteria. Any onsite stockpiling of soils would be placed in upland areas away from the East River and would be managed via a NYSDEC approved SWPPP that utilizes Best Management Practices (BMPs) for erosion and sediment control. Specifically, any fill that is stockpiled on site would be contained using applicable BMPs, including impervious surface covers or temporary seeding for any fill that would be held on site for extended periods of time. These measures would reduce erosion or runoff potential in the event of a storm and would provide dust control in dry weather. Additionally, recently installed turf at the Track and Field Complex in East River park will be salvaged and reused in another park space. Therefore, no

significant adverse effects to geologic and soil resources from construction of the Preferred Alternative are anticipated.

GROUNDWATER RESOURCES

Groundwater levels in the project area are approximately seven feet below ground surface. Groundwater is not used for potable purposes in Manhattan. Construction of the Preferred Alternative would involve excavation to depths where groundwater would be anticipated to be present, and therefore may require temporary dewatering. During construction, temporary dewatering could result in the localized lowering of groundwater elevations in the project area. As described in Chapter 5.7, “Hazardous Materials,” the groundwater in the project area may be contaminated as a result historic land uses in the area. Any groundwater dewatering effluent would be treated prior to discharge in accordance with a NYSDEC approved SWPPP and any applicable permits and regulations. Dewatering would be temporary and would not be anticipated to significantly affect groundwater quality, levels, or movement within the project area. It is anticipated that following construction, groundwater levels would return to pre-construction levels. Therefore, no significant adverse effects to groundwater resources are anticipated from construction of the Preferred Alternative.

WETLAND RESOURCES

Construction of the Preferred Alternative would involve the following in-water elements: construction of shafts and footings for the shared use flyover bridge; construction barging; relocating and reconstructing sewer outfalls; demolition of the existing bulkhead to replace with a new cut-off wall; demolition of the existing embayments; creation of new embayments; and demolition of existing piles and formwork associated with the esplanade in the areas of existing and proposed embayments. There would be temporary effects to NYSDEC or USACE regulated tidal wetlands resulting from the construction of these elements that are evaluated in this Chapter. Permanent adverse effects to wetland resources are evaluated in Chapter 5.6, “Natural Resources.”

Construction barges may include unloading barges, transit barges (which may be employed to supplement truck deliveries) and storage barges. The anchoring of construction barges would be accomplished with spuds (vertical steel shafts) located on the barges. Monopile dolphins (a cluster of piles used as a fender for the bulkhead) could also be installed to control the transverse movements of unloading barges to ensure safe barging operations. The unloading barges, typically used to support excavators and small crawler cranes used for transferring materials from transit barges to the shoreline, would be sited along the bulkhead and moved as necessary between the Fireboat House and the north end of East River Park. Transit barges would be moored to the unloading barges from which materials would be transferred to the park for installation. Construction barges used for storage may be sited along the bulkhead in up to three other locations: between Pier 36 and Pier 42, at the northern end of East River Park, and/or along Captain Patrick J. Brown Walk (see Figure 6.0-2 in Chapter 6.0, “Construction Overview”). Upon completion of construction, any spuds and monopile dolphins would be removed and the affected area would be allowed to naturally restore to pre-construction conditions.

To install the shafts and footings associated with the flyover bridge, the current assumption includes use of land-based drill rigs positioned in East River Park, the East River Greenway path, and the Con Edison pier to install these support structures south of East 15th Street. Drilling for footings to be installed along Captain Patrick J Brown walk would be performed using barge mounted drill rigs. Shaft construction activities for the flyover bridge would involve the installation of a turbidity curtain and sinking of the pipe with a rotating cutter head to push the

pipe into the river bed. After sinking the pipe, a rebar cage is lowered prior to installing a tremie pipe. Concrete is then pumped into the tremie pipe. As the tremie pipe is filled with concrete, river water and sediment within that pipe is gradually displaced or may require pumping to remove the sediment and water. A portable sediment tank or approved equivalent would be used to treat dewatering effluent. The support shafts and footings for the flyover bridge occurring within the East River would result in approximately 650 square feet of permanent disturbance within NYSDEC and USACE regulated tidal wetlands as described in Chapter 5.6, “Natural Resources.” Once the installation of these components is complete, the tremie pipe and any turbidity curtains would be removed, and the shafts and footings would remain.

To relocate and reconstruct the 10 sewer outfalls, a watertight cofferdam would be installed adjacent to the bulkhead at each of the 10 outfall locations and the work area would be dewatered. The top of the cofferdam would be above the mean higher-high water line to isolate the work area from tidal influence. The work area would not contain standing water and approved dewatering measures would be installed, as necessary, and would discharge below the mean higher-high water line. A portable sediment tank or approved equivalent would be used to treat dewatering effluent. Approximately 1,000 square feet of temporary disturbance to regulated tidal wetlands between the cofferdams and East River bulkhead is anticipated for each sewer outfall for a total temporary disturbance area of 10,000 square feet. Existing sewer infrastructure is anticipated to be filled with concrete and abandoned in place.

Demolition of the existing bulkhead would require turbidity curtains to be installed. Demolition of the esplanade would require debris nets to minimize the amount of debris falling into the waterway. Any large debris would be retrieved and disposed of in accordance with applicable regulations and best management practices (BMPs). Following demolition, a cut-off wall would be installed in the approximate alignment of the existing bulkhead. The cut-off wall sheet piles would be pile driven. The piles would initially be vibrated down and then pile driven to final tip elevation. Where obstructions are encountered, some pre-drilling may be needed prior to installing the cut-off wall sheet piles.

The filling of the existing embayments would occur following the installation of the cut-off wall, which would serve to limit any potential adverse effects to water resources, specifically water quality, during construction. Esplanade demolition and reconstruction activities in the areas of existing and proposed embayments would generally consist of the removal of the existing esplanade’s concrete deck and support pilings at the mudline, and the installation of new girders and deck structure.

Upon completion of construction, the spuds, barges, turbidity curtains and debris nets would be removed, and the affected area would be allowed to naturally restore to pre-construction conditions. All adverse effects to NYSDEC and USACE regulated tidal wetlands would be subject to the regulatory permitting process and would be mitigated for in accordance with NYSDEC and USACE permit conditions. Mitigatory measures for all permanent adverse effects to wetland resources are discussed in Chapter 5.6, “Natural Resources,” and include the creation of new, larger embayments with improved habitat within the project area as well as off-site wetland restoration.

A detailed analysis of the proposed project’s compliance with Executive Order 11990 – Protection of Wetlands as determined by the Eight-Step Decision Making Process is located in **Appendix L**. That analysis concludes that the proposed project would be in compliance with Executive Order 11990. In addition, the adverse effects would not affect the classification of the East River; would likely not diminish the habitat for a resident or migratory endangered, threatened or rare animal

or plant species or species of special concern; would not contribute to a cumulative loss of habitat or function which diminishes the ability of littoral zone habitat to perform its primary function; would not affect a resources that is large, unusual or singular; or noticeably decrease this resource's ability to serve its various functions. Therefore, the Preferred Alternative would not result in significant adverse effects to tidal wetland resources as a result of construction.

SPECIAL FLOOD HAZARD AREA

Floodplains alleviate flooding by allowing flood waters to dissipate their energy and recharge into the ground. Floodplains include Special Flood Hazard Areas (SFHA) defined by FEMA as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year.¹ SFHA in the study area were identified using preliminary FEMA Flood Insurance Rate Maps (FIRMs) for New York City. The preliminary FIRMs are currently the Best Available Flood Hazard Data (BAFHD) for New York City. FIRMs typically show the areas of inundation anticipated for the 100-year storm, or the storm that has a 1 percent chance of occurring annually, and the areas of inundation anticipated for the 500-year storm, or the storm that has a 0.2 percent chance of occurring annually. The potential for effects to SFHA was assessed by determining if any construction activities associated with the Preferred Alternative could cause disturbance to SFHA within the study area.

Construction of the Preferred Alternative would occur within the 100-year FEMA designated SFHA. During construction, there would be temporary disturbance of the SFHA due to excavation, grading, and storage of construction materials and equipment. Following construction, a comprehensive planting program would be implemented as part of a landscape restoration plan and restoration for the tree removals would be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department of Parks and Recreation Rules) and Local Law 3 of 2010. No permanent residential, commercial, or industrial structures would be introduced to the SFHA and the structures proposed under the Preferred Alternative are designed to reduce the risk of flood loss; to minimize the effect of floods on human safety, health, and welfare; and to preserve the beneficial value of the existing floodplain, as determined by the Eight-Step Decision Making Process, which is consistent with Executive Order 11988 – Floodplain Management (see **Appendix L**). As concluded in that analysis, there are no practicable alternatives to locating the Preferred Alternative outside of the floodplain to address Executive Order 11988. The Preferred Alternative would protect a portion of Manhattan that lies within the existing floodplain and, thus, the flood protection system must also be sited within the floodplain. The project further includes the reconstruction of existing parkland and water and sewer infrastructure that are currently within the mapped floodplain, and it is therefore impractical to move this work out of the mapped floodplain.

Similarly, the proposed project would be consistent with the City's WRP as discussed in Chapter 5.1, "Land Use, Zoning, and Public Policy," and documented in **Appendix D**. Specifically, as documented in the WRP, physical and recreational access to the waterfront would be provided along the esplanade with stepped seating areas to offer additional locations for passive recreation and waterfront views. Improving the resiliency of the park, coupled with expanded public access, furthers the enhancement of East River Park for public access, operations, functionality, and usability during pre- and post-storm periods. The addition of resiliency measures to park amenities and facilities proposed under this alternative would reduce impacts to East River Park as a result of design storm events and sea level rise, and be consistent with the policy goals to preserve,

¹ The 1-percent annual chance flood is also referred to as the base flood or 100-year flood.

maintain, and protect existing physical and recreational access to the waterfront. As such, the Preferred Alternative would not be likely to cause, either directly or indirectly, a noticeable decrease in the SFHA's ability to serve its primary function. Therefore, construction of the Preferred Alternative would not result in significant adverse effects to the 100-year FEMA-designated SFHA.

SURFACE WATER RESOURCES

The in-water work associated with components of the Preferred Alternative as well as the temporary barging needed for transportation of materials would temporarily affect surface water resources. The in-water components include the placement of spuds to moor construction barges, construction of the support structure to accommodate a shared-use flyover bridge, relocating and reconstructing sewer outfalls, demolition of the existing bulkhead to replace with a new cut-off wall, demolition of the existing embayments, and demolition of existing piles and formwork associated with the esplanade in the areas of existing and proposed embayments.

All construction activities would be performed in accordance with NYSDEC's technical standards for erosion and sediment control, which would be implemented in accordance with an approved SWPPP to minimize potential adverse effects to surface water resources in the East River. Any fill that is stockpiled on site would be contained using applicable BMPs, including impervious surface covers or temporary seeding for any fill that would be held on site for extended periods of time. These measures would reduce erosion or runoff potential in the event of a storm and would provide dust control in dry weather. Construction of in-water components and any necessary environmental safety protocol would be implemented as described previously under "Wetland Resources." Turbidity curtains and watertight cofferdams would be used as needed to prevent sediment from entering the East River waterbody to the maximum extent practicable. All barges would be equipped with spill and erosion prevention BMPs in accordance with a Spill Prevention, Control, and Countermeasure Plan (SPCCP) following EPA Clean Water Act guidelines and any other applicable regulations or approvals to minimize the potential for spills and/or stockpiled material (e.g., soils) entering the waterway. In addition, all equipment located on the barges would be regularly inspected for leaks and any necessary repairs would be conducted immediately.

As described in Chapter 5.7, "Hazardous Materials," sediments of the East River in the area where in-water work would be constructed could be potentially contaminated due to historic land uses. Construction of the shafts associated with the flyover bridge or the relocation of embayments would require excavation or disturbance of potentially contaminated sediments. BMPs would be implemented in accordance with all applicable permits and regulations to minimize mobilization of the contaminated sediments into the water column and any excavated sediments would be disposed of at a pre-approved NYSDEC disposal facility. Upon completion of construction, any engineering controls would be removed, and the surface water environment would be expected to return to pre-construction conditions.

The water quality of the East River would be protected to the greatest extent practicable using the above mentioned BMPs. All in-water work under the Preferred Alternative would comply with conditions stipulated by USACE and NYSDEC permits. Therefore, there are no anticipated significant adverse effects to surface waters and water quality as a result of construction of the Preferred Alternative.

AQUATIC RESOURCES

Construction of in-water components of the Preferred Alternative, including the shafts and footings to accommodate the flyover bridge, placement of cofferdams to reconstruct sewer outfalls

along the bulkhead, demolition of the existing bulkhead to install a new cut-off wall, demolition of the existing embayments and existing piles and formwork associated with the esplanade in these areas, and the filling and relocation of embayments, would occur in the East River and would result in temporary disturbance to the benthic environment. During construction, the noise from shaft drilling, demolition, pile driving to install cofferdams around reconstructed outfalls, and other construction activities would be anticipated to cause any fish to avoid the area, including any EFH and FWCA species. The construction activities would temporarily displace the benthic invertebrate community.

A NOAA NMFS consultation has been reinitiated for EFH for one or more lifestages of winter flounder, windowpane flounder, summer flounder, Atlantic herring, scup, and black sea bass, clearnose skate, little skate, and winter skate. Several species listed (cobia, Spanish mackerel, king mackerel, Atlantic mackerel, bluefish, Atlantic butterfish) as potentially occurring in the study area are either at the extreme limit of their known range or are highly migratory and are therefore anticipated to occur in the East River only as uncommon or transient individuals (see **Appendix G**). The remaining species evaluated (red hake) would not be anticipated to be found in the East River due to unsuitable environmental conditions, unsuitable depths, and unsuitable substrates or other habitat features.

The flounders and skates are bottom-dwelling species that have the potential to be affected by the Preferred Alternative. Atlantic herring and scup are pelagic species that could potentially utilize the East River as well. Due to the preference of black sea bass for structured habitats, they are not uncommonly found underneath man-made structures such as docks and piers. Therefore, it is likely that black sea bass juvenile and adults are present in the study area.

While some temporary construction related effects to EFH could occur, no significant adverse effects to EFH for any lifestage of these species are anticipated as a result of the Preferred Alternative (see **Table 6.5-1**). The temporary effects to the benthic environment represent a small percentage (<0.1 percent) of the overall benthic habitat and EFH in the New York Harbor Estuary. The majority of the East River shoreline would still be available to provide habitat for these species. Additionally, the construction of the footings for the flyover bridge would occur underneath the East River Bikeway where there are already numerous other support structures and would therefore not significantly alter the biological character of this area of the East River and, in the case of black sea bass, would provide habitat.

All noise and construction related effects to aquatic resources would be temporary and impact avoidance measures described above would be implemented. Upon completion of the construction of the Preferred Alternative, benthic invertebrates and fish would be anticipated to re-populate this area over time. In addition, the installation of new embayments may constitute not only a replacement in kind within the study area, but an improvement over the existing embayments. The proposed embayments would be of comparable or larger size with improved habitat conditions, including the elimination of bridges that shade aquatic habitat, which can reduce benthic organism productivity and biomass. Moreover, the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park is also being explored as design advances. Therefore, no significant adverse effects to aquatic resources are anticipated from construction of the Preferred Alternative (see **Appendix G**).

As described in Chapter 5.6, “Natural Resources,” NOAA NMFS has also identified FWCA species of particular importance including the following forage species: *Alewife (Alosa pseudoharengus)*, Blueback herring (*Alosa aestivalis*), Silversides (*Menidia spp.*), Killifish (*Fundulus spp.*), Menhaden (*Brevoortia tyrannus*), Anchovies (*Anchoa spp.*) as well as estuarine-

dependent commercially and recreationally important species such as summer flounder, winter flounder, bluefish, American eel (*Anguilla rostrata*), striped bass (*Morone saxatilis*), tautog (*Tautoga onitis*), and weakfish (*Cynoscion regalis*). The identified FWCA species are predominantly pelagic species that could potentially utilize the East River. An analysis of potential effects to these species is presented in **Table 6.5-1** and indicates the potential for effects and, where applicable, whether the potential for effects would be considered substantial (i.e., rise to the level of significant adverse effects).

For EFH and FWCA species, noise from pile driving and pile drilling associated with the Preferred Alternative could potentially have minimal adverse effects on these species and their prey or prey species habitat in the immediate vicinity of the pile installation and could prevent these species from utilizing that area for the duration of construction. Disturbance of substrate and the water column due to activities associated with barging, construction of the combined sewer outfalls, and construction of the shared use flyover bridge support structures could potentially cause a temporary increase in turbidity and result in temporary effects to these species. In addition, temporary shading from barges may adversely affect some habitat. Construction BMPs such as turbidity curtains would be utilized to limit turbidity and potential effects to these species. Conservation measures to limit the noise of the pile driving and drilling to the greatest extent practicable would be implemented. These include using a cushion block to dampen the adverse effect of the pile hammer, ramping up pile driving gradually to give fish opportunities to vacate the construction area, and a bubble curtain would be implemented, as practicable, for installation of the flyover bridge support shafts. While some temporary construction related effects to EFH and FWCA species could occur, no significant adverse effects to any habitat or lifestage of these species are anticipated as a result of the Preferred Alternative. Overall, the area to be affected represents a small fraction of available habitat in the New York Harbor Estuary waters (<0.1%) and the Preferred Alternative, pending confirmation from NOAA NMFS would not significantly adversely affect any regional populations or fisheries of these species.

Table 6.5-1
Potential Construction Related Effects to EFH and FWCA
under the Preferred Alternative

Common Name	Scientific Name	Potential for Occurrence within Study Area	Analysis of Potential Effect	Conclusion of Potential Effects*
EFH Species				
Red hake	<i>Urophycis chuss</i>	Transient	High-quality EFH for larval and juvenile red hake is not found in the East River.	No effect
Winter flounder	<i>Pseudopleuronectes americanus</i>	Bottom-dwelling species with potential to occur	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Windowpane flounder	<i>Scophthalmus aquosus</i>	Bottom-dwelling species with potential to occur; DO in East River in summer months can be reduced to unacceptable levels	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Atlantic herring	<i>Clupea harengus</i>	The East River does not contain suitable depth or salinity for Atlantic herring larvae, and is on the low end of the preferred salinity for juvenile and adult Atlantic herring	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Bluefish	<i>Pomatomus saltatrix</i>	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	No effect
Atlantic butterfish	<i>Peprilus triacanthus</i>	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	No effect
Summer flounder	<i>Paralichthys dentatus</i>	Bottom-dwelling species with potential to occur	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Black sea bass	<i>Centropristis striata</i>	Likely to occur under docks, piers	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
King mackerel	<i>Scomberomorus cavalla</i>	Rare and transient	Generally, favors deeper and warmer waters than are typically found in the East River	No effect

Table 6.5-1 (cont'd)
Potential Construction Related Effects to EFH and FWCA
under the Preferred Alternative

Common Name	Scientific Name	Potential for Occurrence within Study Area	Analysis of Potential Effect	Conclusion of Potential Effects*
EFH Species (cont'd)				
Spanish mackerel	<i>Scomberomorus maculatus</i>	Rare and transient	Limited EFH within study area; generally, favors higher salinities and warmer waters than found in the East River	No effect
Cobia	<i>Rachycentron canadum</i>	Rare and transient	No cobia lifestages documented within East River; limited EFH within study area	No effect
Atlantic mackerel	<i>Scomber scombrus</i>	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Scup	<i>Stenotomus chrysops</i>	Bottom-dwelling species with potential to occur	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Little skate	<i>Leucoraja erinacea</i>	Bottom-dwelling species with potential to occur	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Clearnose skate	<i>Raja eglanteria</i>	Bottom-dwelling species with potential to occur	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Winter skate	<i>Leucoraja ocellata</i>	Bottom-dwelling species with potential to occur	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
FWCA Species				
Alewife	<i>Alosa pseudoharengus</i>	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Blueback herring	<i>Alosa aestivalis</i>	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Silversides	<i>Menidia spp.</i>	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial

Table 6.5-1 (cont'd)
Potential Construction Related Effects to EFH and FWCA
under the Preferred Alternative

Common Name	Scientific Name	Potential for Occurrence within Study Area	Analysis of Potential Effect	Conclusion of Potential Effects*
Killifish	<i>Fundulus spp</i>	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Menhaden	<i>Brevoortia tyrannus</i>	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Anchovies	<i>Anchoa spp</i>	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
American eel	<i>Anguilla rostrate</i>	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Striped bass	<i>Morone saxatilis</i>	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Tautog	<i>Tautoga onitis</i>	Likely to occur under docks, piers	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Weakfish	<i>Cynoscion regalis</i>	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Note: *Conservation measures identified as part of ongoing consultation with NOAA NMFS will be identified in Final EIS.				

ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES

As discussed in Chapter 5.6, “Natural Resources,” three endangered, threatened, and special concern species have been identified as having the potential to occur within or adjacent to the project area: shortnose sturgeon (*Acipenser brevirostrum*), Atlantic sturgeon (*Acipenser oxyrinchus*), and peregrine falcon (*Falco peregrinus*). A list of 58 migratory birds that could potentially occur in the project area was also provided by the United States Fish and Wildlife Service (USFWS). This list includes birds that are on the USFWS Birds of Conservation Concern (BCC) or warrant special attention to the project location.

Shortnose sturgeon rarely leave tidal river habitat (e.g., the Hudson River) and on the rare occasions when shortnose sturgeon have been documented migrating to other tidal rivers such as the Connecticut River, their presence in the East River would be transient. Additionally, the East River contains no submerged aquatic vegetation and suboptimal salinity levels. Therefore, due to the transient nature of shortnose sturgeon in the East River, the lack of suitable habitat, and the sturgeon's ability to avoid the affected area, no significant adverse effects to shortnose sturgeon from construction activities under any alternative are anticipated.

The Atlantic sturgeon is known to utilize the East River as a migratory route between spawning grounds in the Hudson River and suitable marine habitats in the New York Bight, primarily between the months of March through October. Atlantic sturgeon is uncommon in the East River (Tomechik et. al., 2015). When present, Atlantic sturgeon may forage opportunistically thus their presence would primarily be transient. The potentially affected area represents a small portion of overall habitat available in the East River.

Construction of the in-water elements associated with the Preferred Alternative produces noise that has been known to affect Atlantic sturgeon. To minimize the noise effects on Atlantic sturgeon, conservation measures would be implemented that would reduce the noise or the likelihood that sturgeon would be exposed to the construction activities. These conservation measures include, to the greatest extent practicable, the use of bubble curtains, cushion blocks, and gradually ramping up pile driving activities. With these conservation measures in place, Atlantic sturgeon may be discouraged from utilizing the near-shore environment in the East River. Therefore, the Preferred Alternative would not be anticipated to significantly adversely affect the Atlantic sturgeon population. An updated consultation with NOAA NMFS has been reinitiated for the Preferred Alternative (see **Appendix G**). Any conservation measures identified as a result of completion of the consultation will be included in the Final EIS.

The Williamsburg Bridge has been identified as potential peregrine falcon habitat and this bird of prey has been recorded utilizing the highpoints of the bridge for roosting and nesting. The area surrounding the Williamsburg Bridge is a heavily utilized and loud urban environment. Due to existing noise levels on the Williamsburg Bridge from different modes of transportation (e.g., traffic, helicopter, subway, boats), it is not anticipated that construction of the Preferred Alternative near the bridge footings would significantly alter existing noise conditions at the highpoints of the bridge or otherwise affect the suitability of the Williamsburg Bridge for peregrine falcon roosting or nesting.

Migratory birds may experience a temporary loss of habitat along the East River during construction, however, it is anticipated that the birds would relocate elsewhere during this time period. The overall habitat being disturbed represents a small fraction of the available habitat for the migratory birds listed as potentially occurring within the study area. Therefore, no significant adverse effects to endangered, threatened, or special concern species are anticipated from construction of the Preferred Alternative.

TERRESTRIAL RESOURCES

Terrestrial resources that would be affected by the construction of the Preferred Alternative include urban wildlife, lawn and landscaped areas, and trees. During construction, terrestrial habitat used by typical urban wildlife, as described in Chapter 5.6, "Natural Resources," would be temporarily disturbed. This wildlife would be anticipated to relocate to other suitable areas, including other parks and neighborhoods adjacent to the project area. Upon completion of the

construction of the Preferred Alternative, affected habitat would be restored and urban wildlife would be anticipated to return.

Construction of the Preferred Alternative would temporarily disturb lawn and landscaped areas within East River Park, Stuyvesant Cove Park, including the National Wildlife Federation (NWF)-designated “Certified Wildlife Habitat” and the Monarch Watch designated “Monarch Waystation,” and other upland spaces such as Murphy Brothers Playground and Asser Levy Playground. These disturbed areas would be restored in accordance with a pre-approved NYC Parks landscape restoration plan, which would include plantings that would support typical urban wildlife upon completion of construction.

As described in Chapter 5.6, “Natural Resources,” construction of the Preferred Alternative has the potential to remove 981 trees with implementation of the project. Trees provide habitat for urban wildlife. The habitat functions provided by trees, especially mature trees, include providing resting, roosting, and nesting locations for birds and squirrels. Trees also provide foraging habitat for urban wildlife due to the many invertebrates that live in trees and the variety of fruiting structures produced by trees. Trees also provide a variety of ecological services including air filtration and sequestration of carbon. Mature trees are also aesthetically important aspects of city parkland and provide shade in the summer months.

Effects to terrestrial resources due to construction related activities would be temporary in nature. All temporary disturbances to these terrestrial resources would be restored or mitigated for upon completion of construction of the Preferred Alternative. Construction of the proposed project under the Preferred Alternative would result in the removal of 981 trees, however, restoration of trees in the project area as a result of the Preferred Alternative would be conducted in accordance with a pre-approved NYC Parks landscape restoration plan. This landscape restoration plan includes over 50 different species, reflecting research around the benefits of diversifying species to increase resilience and adaptive capacity in a plant ecosystem and also pays special attention to species that can handle salt spray, strong winds, and extreme weather events. The design also focuses on creating a more layered planting approach, allowing for informal planting areas that layer plant communities together to express ecological richness. A more diverse native plants palette has the ability to better adapt to climate change stressors. Once planted and established, the new landscape would represent an improvement in ecological sustainability, habitat creation, and adaptability in the face of a changing climate. The landscape restoration plan would ultimately result in a net increase of 399 total trees within the project area. While these trees would not be as mature as some existing trees, over time, the new tree canopy would fill in and represent an improved habitat over the existing conditions, which is largely dominated by London plane trees, known for their poor response to salt-water inundation.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

Effects to groundwater resources and the SFHA would be same under Alternative 2 as discussed above for the Preferred Alternative, therefore those analyses are not repeated here.

GEOLOGIC AND SOIL RESOURCES

The spatial extent of project implementation for Alternative 2 would be approximately 8 acres. Excavation and grading for Alternative 2 would be less than the Preferred Alternative. As described in Chapter 5.6, “Natural Resources,” soil resources in these areas consists of highly modified urban soils and fill and as described in Chapter 5.7, “Hazardous Materials,” these soils and fill are likely contaminated as a result of historic land uses in the area. All NYSDEC applicable

rules and regulations would be utilized to prevent the spread of contaminated material as described above for the Preferred Alternative. Therefore, no significant adverse effects to geologic and soil resources from construction activities under Alternative 2 are anticipated.

WETLAND RESOURCES

Under Alternative 2, only the barging elements and flyover bridge support shafts and footings would necessitate in-water construction activities, which would temporarily affect wetland resources. All construction activities would be subject to and performed in accordance with NYSDEC's technical standards for erosion and sediment control, which would be implemented in accordance with a SWPPP to minimize potential adverse effects to water quality and aquatic biota of the East River. Therefore, no significant adverse effects to tidal wetland resources are anticipated from construction activities for Alternative 2.

SURFACE WATER RESOURCES

The in-water work associated with the flyover bridge components of Alternative 2 as well as the temporary barging needed for transportation of materials would temporarily affect surface water resources. The water quality of the East River would be protected to the greatest extent practicable using the same BMPs discussed for the Preferred Alternative. The in-water work associated with the construction of the flyover bridge shafts and footings would comply with conditions stipulated by USACE and NYSDEC permits. Therefore, there are no anticipated significant adverse effects to surface waters and water quality as a result of construction of Alternative 2.

AQUATIC RESOURCES

In-water construction under Alternative 2 would be limited to the installation of spuds and/or monopile dolphins to support construction barging and construction of shafts and footings for the shared-use flyover bridge. It is expected that minor noise effects and habitat loss would be similar in nature as described under the Preferred Alternative, but noise levels, duration of in-water construction activities, and square footage of temporary disturbance would be lessened due to the limited in-water elements proposed for Alternative 2. The temporary loss of this small area of aquatic habitat would not significantly affect phytoplankton, zooplankton, benthic invertebrates, fish, and EFH. Upon completion, fish would be able to utilize the temporarily affected habitat. Therefore, no significant adverse effects to aquatic resources in the East River from construction activities under Alternative 2 are anticipated.

ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES

The in-water construction elements of Alternative 2 would cause the same temporary disturbances to endangered, threatened, and special concern species as described for the Preferred Alternative, but the spatial extent, noise levels, and duration of construction activities would be reduced due to the fewer number of in-water construction elements. The same mitigatory measures as described above would be utilized. Therefore, there are no anticipated significant adverse effects to Atlantic and shortnose sturgeon.

The effects to peregrine falcons and migratory birds would be the same as described for the Preferred Alternative and would not result in significant adverse effects to these species.

TERRESTRIAL RESOURCES

Effects to terrestrial resources due to construction related activities would be temporary in nature. All temporary disturbances to these terrestrial resources would be restored upon completion of construction of the proposed project. The removal of 265 trees would require the restoration of

trees in the project area and would be conducted in accordance with a pre-approved NYC Parks landscape restoration plan.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

Under Alternative 3, effects to natural resources due to construction would be similar in nature to those discussed for Alternative 2. Adverse effects to terrestrial resources in the project area from construction would be more extensive due to the larger construction footprint (approximately 76 acres) associated with the more extensive park programming, levees, enhanced recreational facilities, and neighborhood connectivity improvements. This is particularly evident in the increased number of trees that would be removed under Alternative 3. Construction of the proposed project under Alternative 3 has the potential to affect 776 trees (see Chapter 5.6, “Natural Resources”).

With the inclusion of the removal of 776 trees with project implementation, effects to terrestrial resources due to construction related activities would be temporary in nature. All temporary disturbances to these terrestrial resources would be restored upon completion of construction of the proposed project. The restoration of trees in and around the project area would be conducted in accordance with a pre-approved NYC Parks landscape restoration plan.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

Alternative 5 differs from the Preferred Alternative only in Project Area Two between East 13th Street and Avenue C. This alternative would raise the northbound lanes of the FDR Drive in this area by approximately six feet to meet the design flood elevation then connect to closure structures at the south end of Stuyvesant Cove Park. As discussed in Chapter 6.0, “Construction Overview,” the raised FDR Drive platform would require drilled or pile driven support shafts under the FDR Drive, placement of a precast pre-stressed box structure/raised platform on piers supported by shafts, a new paved roadway on top of the box structure, and installation of a floodwall along the east side of the elevated roadway.

Effects to natural resources due to construction of Alternative 5 would be similar to those described for the Preferred Alternative with disturbances to groundwater resources, wetland resources, and surface water resources slightly increased due to the construction of the support structure for the raised FDR Drive. Construction methods would be the same as previously discussed, and all work would be done in accordance with all applicable NYSDEC and USACE permits, standards, and regulations. No significant adverse effects to natural resources would be anticipated due to the construction of Alternative 5.

D. MITIGATION

Mitigation associated with installation of permanent features, such as the installation of shafts and footings for the flyover bridge is discussed in detail in Chapter 5.6, “Natural Resources.” Wetland mitigation for adverse effects associated with these features includes a combination of on- and off-site wetland habitat restoration. The proposed restoration for tree loss associated with the Preferred Alternative would be conducted in accordance with a pre-approved NYC Parks landscape restoration plan, as described in Chapter 5.6, “Natural Resources.” All in-water work under the Preferred Alternative would comply with conditions stipulated by USACE and NYSDEC permits, including tidal wetland compensatory mitigation requirements. All construction activities would be subject to and performed in accordance with NYSDEC’s technical

standards for erosion and sediment control, which would be implemented in accordance with an approved SWPPP to minimize potential adverse effects to water quality and aquatic biota. An EPA Spill Prevention, Control, and Countermeasure (SPCC) Plan would also be implemented, and all construction performed in accordance with the SPCC. During construction, erosion control BMPs would be used to prevent sediment, trash, and debris from entering the waterway. Any surplus excavated soils would be disposed of in accordance with all applicable rules and regulations at a pre-approved NYSDEC disposal facility. *