Hudson-Raritan Estuary Ecosystem Restoration Feasibility Study

Appendix G
Regulatory Agency Correspondence:
Protected Species and Rare Habitats
Fish and Wildlife Coordination Act Report

Draft Integrated Feasibility Report &
Environmental Assessment
February 2017

Prepared by the New York District, North Atlantic Division,
U.S. Army Corps of Engineers






Hudson-Raritan Estuary Ecosystem Restoration Feasibility Study
Appendix G: Regulatory Agency Correspondence

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Chapter 1: Correspondence Results

Federal and state agencies were consulted regarding the documentation of rare, threatened, and endangered species and species of special concern in the project sites and their vicinity. The United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) were contacted regarding federally listed threatened and endangered species, while the New York State Department of Environmental Conservation (NYSDEC), Division of Fish, Wildlife, and Marine Resources, and the New Jersey Department of Environmental Protection, Natural Heritage Program (NJNHP) gave comments regarding state listed species. Correspondence with the referenced agencies is presented in the following chapters.

1.1 Jamaica Bay

Numerous endangered, threatened, or rare plant and animal species exist in the boundaries of the bay. Protected species identified by USFWS IPAC review near several Jamaica Bay Ecosystem Restoration Project sites include the Piping Plover (*Charadrius melodus*), Red Knot (*Calidris canutus rufa*), Roseate Tern (*Sterna dougallii*), Sandplain gerardia (*Agalinis acuta*), Seabeach amaranth (*Amaranthus pumilus*), and Northern long-eared bat (*Myotis septentrionalis*). Additionally, a number of migratory birds were identified that could potentially be affected by activities at the project location.

Through correspondence with NYSDEC, and their review of the New York Natural Heritage Program database, the following list includes endangered, threatened, or species of special concern for any animal species that are listed federally, or are candidates for federal listings in the Jamaica Bay area:

- Short-eared Owl (*Asio flammeus*) – Endangered;
- Peregrine Falcon – Endangered;
- Northern Harrier – Threatened;
- Common Tern (*Sterna hirundo*) – Threatened;
- Black Skimmer (*Rynchops niger*) – Special Concern;
- Upland Sandpiper (*Bartramia longicauda*) – Threatened;
- Laughing Gull (*Leucophaeus atricilla*) – Protected Bird - Critically Imperiled in NYS;
- Barn Owl (*Tyto alba*) – Protected Bird – Critically Imperiled in NYS;
- White-m hairstreak (*Parrhasium m-album*) – Unlisted – Status Uncertain; and
- Red-banned hairstreak (*Calycopis cecrops*) – Unlisted – Status Uncertain.

The following list includes endangered, threatened, or species of special concern for any plant species that are listed federally, or are candidates for federal listings in the area:

- Scirpus-like rush (*Juncus scirpoides*) – Endangered – Critically Imperiled in NYS;
- Northern gamma grass (*Tripsacum dactyloides*) – Threatened – Imperiled in NYS;
- Fringed boneset (*Eupatorium torreyanum*) – Threatened – Imperiled in NYS;
- Roland's sea-blite (*Suaeda rolandii*) – Endangered – Critically Imperiled in NYS and Globally Rare;
- Narrow-leaf sea-blite (*Suaeda linearis*) – Endangered – Critically Imperiled in NYS;
- Cut-leaved evening primrose (*Oenothera laciniata*) – Endangered – Critically Imperiled in NYS;
- Willow oak (*Quercus phellos*) – Endangered - Critically Imperiled in NYS;
- Seaside bulrush (*Bolboschoenus maritimus ssp. Paludosus*) – Threatened – Imperiled in NYS; and
- Schweinitz's flatsedge (*Cyperus schweinitzii*) – Rare – Vulnerable in NYS.






In addition, NY Natural Heritage Program deems the Low Salt Marsh, present throughout Jamaica Bay to be a significant natural community from a statewide perspective. The Low Salt Marsh is an uncommon community type having a high ecological and conservation value.

Listed by the National Oceanic and Atmospheric Administration (NOAA)'s NMFS, four species of (Endangered Species Act (ESA)) sea turtles have been seasonally present in the bay, including:

- Northwest Atlantic Ocean Distinct Population Segment (DPS) of loggerhead (*Caretta caretta*) – Threatened;
- North Atlantic DPS of green (*Chelonia mydas*) – Threatened;
- Kemp's ridley (*Lepidochelys kempii*) – Endangered; and
- Leatherback sea turtle (*Dermochelys coriacea*) - Endangered.

These threatened and endangered sea turtles can be present in the Jamaica Bay area from May to mid-November. Adult and subadult Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) can be found in the Jamaica Bay Planning Area. The New York Bight, Chesapeake Bay, South Atlantic, and Carolina DPS are endangered, and the Gulf of Maine DPS is threatened in the area. Atlantic sturgeon eggs, larvae, or juvenile life stages will not be found in the waters of the Jamaica Bay Planning Area. Additionally, the shortnose sturgeons (*Acipenser brevirostrum*), of the adult and subadult life stages are also present in these waters.

1.2 Harlem River, East River, and Western Long Island Sound

The USFWS identified the threatened Piping Plover as potentially occurring along the Bronx River where site restoration may take place. The USFWS also identified the endangered Roseate Tern and the threatened Red Knot and Piping Plover as bird species and one plant (Seabeach amaranth) that could potentially be affected by construction activities at the Flushing Creek site. In addition, USFWS IPAC identified Piping Plover that may occur at project locations along the Bronx River, and a number of migratory birds with potential to occur at many of the restorations sites.

The NYSDEC does not have any recent records of rare or state-listed bird species on or within one-half mile of potential restoration sites, although historical records exist for the dragonfly Arrowhead Spiketail (*Cordulegaster obliqua)* at Bronx River Park and the Bronx Zoo. Historic records also exist for vascular plants at the Bronxville Lake, Crestwood Lake, Bronx River Park, Garth Woods/Harney Road, Stone Mill Dam and Bronx Zoo restoration sites.

According to NMFS correspondence, the endangered Atlantic sturgeon and shortnose sturgeon may be present in the East River and their adjacent bays and tributaries, which could include the Flushing Creek, Soundview Park, and Bronx River restoration sites.

1.3 Newark Bay, Passaic, and Hackensack River

While no federally-listed endangered, threatened, or rare plant and animal species exist in the vicinity of the restoration sites, several state-listed species were identified.

The NJNHP identified several rare or state-listed bird species on or within one-quarter mile of potential restoration sites. Species that may forage in or around the restoration sites include the state-endangered Bald Eagle (*Haliaeetus leucocephalus)* and Peregrine Falcon*;* the state-threatened Cattle Egret (*Bubulcus ibis*), Yellow-crowned Night-heron (*Nyctanassa violacea),* and Black-crowned Night-heron (*Nycticorax nycitorax)*; and other state species of concern. As these birds are highly mobile and

capable of avoiding construction activities, disturbance from construction activities would be short-term and localized.

Some birds are documented as nesting or breeding in or near the restoration sites. A Bald Eagle nest was documented in the vicinity of the Meadowlark Marsh site, and an urban nest for the state-endangered Peregrine Falcon was documented at the Meadowlark Marsh and Metromedia sites. Breeding and non-breeding sightings for the state-endangered Northern Harrier (*Circus cyaneus)* were documented at and around the Metromedia site and in the vicinity of the Meadowlark site. Breeding sightings were also documented at and around the Essex County Branch Brook Park for the state-threatened Red-headed Woodpecker (*Melanerpes erythrocephalus).*

1.4 Upper Bay and Lower Bay

According to NMFS correspondence, four (4) different species of protected marine turtles (Northwest Atlantic Ocean DPS of loggerhead; North Atlantic DPS of green; Kemp's ridley; and leatherback sea turtle), the endangered Atlantic sturgeon and endangered shortnose sturgeon may be present at the Bush Terminal, Governors Island or Naval Weapons Station Earle restoration sites. Additionally, the NYNHP identified the New York state-threatened Common Tern at the Governors Island oyster restoration site in Upper Bay Planning Region. Foraging habitat was also identified within the Naval Weapons Station Earle project area in Lower Bay for the Common Tern, which in New Jersey only holds special concern status.






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1.4 Upper Bay and Lower Bay

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Chapter 2: Regulatory Agency Correspondence: Jamaica Bay; Harlem River, East River, and Western Long Island Sound; Upper Bay; Lower Bay






Jamaica Bay Agency Correspondence

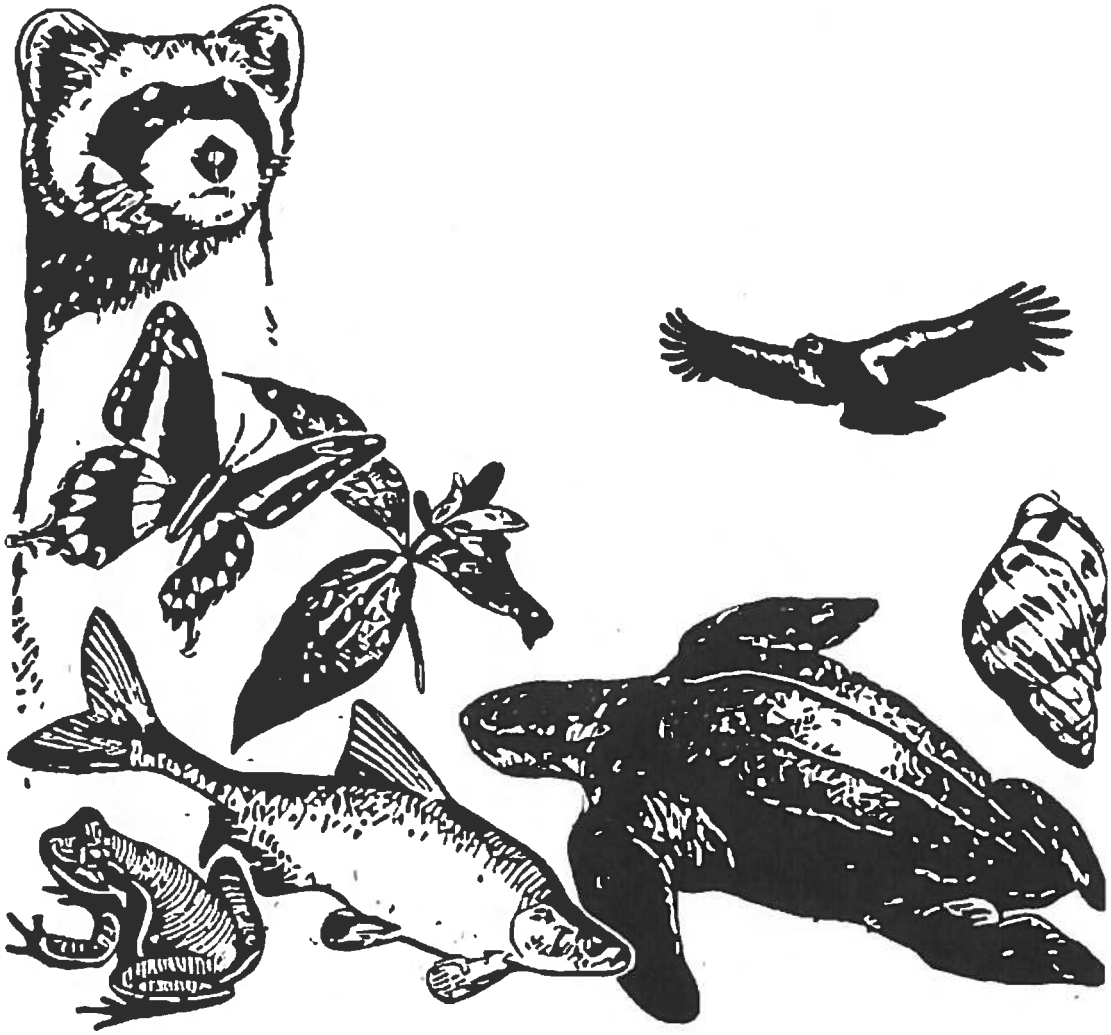
U.S. Fish & Wildlife Service

JBAY

IPaC Trust Resources Report

Generated August 22, 2016 01:10 PM MDT, IPaC v3.0.8

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

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U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

JBAY

LOCATION

Kings, Nassau and Queens counties, New York

IPAC LINK

https://ecos.fws.gov/ipac/project/4FI5N-SAL3B-HFBQK-R6LCI-VJNCQA

U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

Long Island Ecological Services Field Office
340 Smith Road
Shirley, NY 11967
(631) 286-0485

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Birds

Piping Plover Charadrius melodus — Threatened

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B079

Red Knot Calidris canutus rufa — Threatened

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DM

Roseate Tern Sterna dougallii dougallii — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B07O

Flowering Plants

Sandplain Gerardia Agalinis acuta — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q24K

Seabeach Amaranth Amaranthus pumilus — Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q2MZ

Mammals

Northern Long-eared Bat Myotis septentrionalis — Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

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1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

American Oystercatcher Haematopus palliatus — Bird of conservation concern
On Land Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G8

American Bittern Botaurus lentiginosus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F3

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
On Land Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Black Skimmer Rynchops niger — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EQ

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
On Land Season: Breeding

Canada Warbler Wilsonia canadensis — Bird of conservation concern
On Land Season: Breeding

Cerulean Warbler Dendroica cerulea — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09I

Fox Sparrow Passerella iliaca — Bird of conservation concern
On Land Season: Wintering

Gull-billed Tern Gelochelidon nilotica — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JV

Hudsonian Godwit Limosa haemastica — Bird of conservation concern
At Sea Season: Migrating

Least Bittern Ixobrychus exilis
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B092

Least Tern Sterna antillarum — Bird of conservation concern
On Land Season: Breeding

Loggerhead Shrike Lanius ludovicianus — Bird of conservation concern
On Land Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY

Marbled Godwit Limosa fedoa — Bird of conservation concern
On Land Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JL

Peregrine Falcon Falco peregrinus — Bird of conservation concern
On Land Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Pied-billed Grebe Podilymbus podiceps — Bird of conservation concern
On Land Season: Year-round

Prairie Warbler Dendroica discolor — Bird of conservation concern
On Land Season: Breeding

Purple Sandpiper Calidris maritima — Bird of conservation concern
On Land Season: Wintering

Red Knot Calidris canutus rufa — Bird of conservation concern
On Land Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DM

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
On Land Season: Wintering

Saltmarsh Sparrow Ammodramus caudacutus — Bird of conservation concern
On Land Season: Breeding

Seaside Sparrow Ammodramus maritimus — Bird of conservation concern
On Land Season: Year-round

Short-eared Owl Asio flammeus — Bird of conservation concern
On Land Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Snowy Egret Egretta thula — Bird of conservation concern
On Land Season: Breeding

Upland Sandpiper Bartramia longicauda — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HC

Willow Flycatcher Empidonax traillii — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wood Thrush Hylocichla mustelina — Bird of conservation concern
On Land Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
On Land Season: Breeding

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

Estuarine And Marine Deepwater

E1ABL
E1UBL
E1UBLx
M1UBL

Estuarine And Marine Wetland

E2EM1/5P
E2EM1N
E2EM1P
E2EM1Pd
E2EM5P
E2SS1/EM1P
E2SS1P
E2US1N
E2US2M
E2US2N
E2US2P

Freshwater Emergent Wetland

PEM1A
PEM1C
PEM1E
PEM1F
PEM1S
PEM5B
PEM5C

Freshwater Forested/shrub Wetland

PSS1/FO1C
PSS1A
PSS1C

Freshwater Pond

PUBHh
PUBHx
PUBV

Riverine

R2UBH
R5UBH

A full description for each wetland code can be found at the National Wetlands

Inventory website: http://107.20.228.18/decoders/wetlands.aspx

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

APR - 7 2016

John Rollino
AECOM
125 Broad Street
New York, New York 10004

Re: Jamaica Bay Ecosystem Restoration Project

Dear Mr. Rollino:

We received your letter on March 18, 2016, on behalf of the US Army Corps of Engineers (USACE) regarding the Jamaica Bay Ecosystem Restoration Project in Kings and Queens Counties, New York. The sites are: Bayswater Park, Brant Point, Dead Horse Bay, Dubos Point, Fresh Creek, and Hawtree Basin. In your letter, you requested information on the presence of Endangered Species Act (ESA) threatened and endangered species and critical habitat listed under the jurisdiction of NOAA's National Marine Fisheries Service (NMFS). We offer the following comments.

Endangered Species Act

Sea Turtles
Four species of ESA listed threatened or endangered sea turtles under our jurisdiction are seasonally present off the south shore of Long Island, including its bays and tributaries: the threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, the threatened North Atlantic DPS of green, and the endangered Kemp's ridley and leatherback sea turtles. Sea turtles typically occur along the New York coast from May to mid-November, with the highest concentration of sea turtles present from June through October.

Atlantic Sturgeon
Atlantic sturgeon are present in the waters of Long Island and its adjacent bays and tributaries. The New York Bight, Chesapeake Bay, South Atlantic and Carolina DPS of Atlantic sturgeon are endangered; the Gulf of Maine DPS is threatened. Adult and subadult Atlantic sturgeon originating from any of these DPS could occur in the proposed project areas. As young remain in their natal river/estuary until approximately age 2, and early life stages are not tolerant of saline waters, no eggs, larvae, or juvenile Atlantic sturgeon will occur within the waters of Long Island and its adjacent bays and tributaries.

As project details develop, we recommend you consider the following effects of the project on Atlantic sturgeon and sea turtles:

- For activities that increase levels of suspended sediment, consider the use of silt management and/or soil erosion best practices (i.e., silt curtains and/or cofferdams).

- For any impacts to habitat or conditions that temporarily render affected water bodies unsuitable for the above-mentioned species, consider the use of timing restrictions for in-water work.

- For pile driving or other activities that may affect underwater noise levels, consider the use of cushion blocks and other noise attenuating tools to avoid reaching noise levels that will cause injury or behavioral disturbance to sturgeon or sea turtles - see the table below for more information regarding noise criteria for injury/behavioral disturbance in sturgeon or sea turtles.

Organism	Injury	Behavioral Modification
Sturgeon	206 dB re 1 µPaPeak and 187 dB cSEL	150 dB re 1 µPaRMS
Sea Turtles	180 dB re 1 µPaRMS	166 dB re 1 µPaRMS

Depending on the amount and duration of work that takes place in the water, listed species of sea turtles and sturgeon may occur within the vicinity of your proposed project. The USACE will be responsible for determining whether the proposed action may affect listed species. If they determine that the proposed action may affect a listed species, they should submit their determination of effects, along with justification and a request for concurrence to the attention of the Section 7 Coordinator, NMFS, Greater Atlantic Regional Fisheries Office, Protected Resources Division, 55 Great Republic Drive, Gloucester, MA 01930. Please be aware that we have recently provided on our website guidance and tools to assist action agencies with their description of the action and analysis of effects to support their determination. See - http://www.greateratlantic.fisheries.noaa.gov/Protected/section7/index.html. After receiving a complete, accurate comprehensive request for consultation, in accordance to the guidance and instructions on our website, we would then be able to conduct a consultation under section 7 of the ESA. Should project plans change or new information become available that changes the basis for this determination, further coordination should be pursued. If you have any questions regarding these comments, please contact Ms. Ainsley Smith (978-281-9291; Ainsley.Smith@noaa.gov)

Magnuson-Stevens Fishery Conservation and Management Act

The proposed project areas may contain essential fish habitat (EFH) for a federally managed species. For a listing of EFH and further information, please go to our website at: http://www.nero.noaa.gov/habitat. If you have any questions regarding EFH, please contact Karen Greene (732-872-3023; Karen.Greene@noaa.gov).

Sincerely,

Mark Murray-Brown
Section 7 Coordinator
for Protected Resources Division

EC: Smith. Greene
File Code: Non-Fisheries\Tech Assist_States_Private Firms\2016\AECOM Jamaica Bay NY

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

APR 27 2016

John Rollino
AECOM
125 Broad Street
New York, New York 10004

Dear Mr. Rollino:

We received your letter on April 26, 2016, on behalf of the US Army Corps of Engineers (USACE) regarding technical assistance for the Hudson Raritan Estuary Ecosystem Restoration Feasibility Study (HRE Project) to restore existing degraded habitat at six sites around New York Harbor, New York. The sites are: Soundview Park (Bronx County) East River; Governors Island, New York Harbor; Bush Terminal, (Brooklyn County) New York Harbor; Head of Bay, (Queens County) Jamaica Bay; Flushing Bay (Queens County); and NWS Earle, (Monmouth County, NJ) Sandy Hook Bay. In your letter, you requested information on the presence of Endangered Species Act (ESA) threatened and endangered species under our jurisdiction. We offer the following comments.

Endangered Species Act

Sea Turtles

Four species of ESA listed threatened or endangered sea turtles under our jurisdiction are seasonally present off the south shore of Long Island, including its bays and tributaries: the threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, the threatened North Atlantic DPS of green, and the endangered Kemp's ridley and leatherback sea turtles. Sea turtles typically occur along the New York coast from May to mid-November, with the highest concentration of sea turtles present from June through October. Sea turtles could occur in the following proposed project areas: Head of Bay, (Queens County) Jamaica Bay; and NWS Earle, (Monmouth County, NJ) Sandy Hook Bay.

Atlantic Sturgeon

Atlantic sturgeon are present in the waters of the Hudson and East Rivers and their adjacent bays and tributaries. The New York Bight, Chesapeake Bay, South Atlantic and Carolina DPS of Atlantic sturgeon are endangered; the Gulf of Maine DPS is threatened. Adult and subadult Atlantic sturgeon originating from any of these DPS could occur in the proposed project areas. As young remain in their natal river/estuary until approximately age two, and early life stages are not tolerant of saline waters, no eggs, larvae, or juvenile Atlantic sturgeon will occur within the saline waters of the Hudson and East Rivers and their adjacent bays and tributaries.

Shortnose Sturgeon

Shortnose sturgeon are present in the waters of the Hudson and East Rivers and could occur in their adjacent bays and tributaries. As early life stages are not tolerant of saline waters, no eggs, larvae, or juvenile shortnose sturgeon will occur within the saline waters of the Hudson and East Rivers and their adjacent bays and tributaries.

As project details develop, we recommend you consider the following effects of the project on Atlantic sturgeon, shortnose sturgeon, and sea turtles:

- For activities that increase levels of suspended sediment, consider the use of silt management and/or soil erosion best practices (i.e., silt curtains and/or cofferdams).
- For any impacts to habitat or conditions that temporarily render affected water bodies unsuitable for the above-mentioned species, consider the use of timing restrictions for in-water work.

Depending on the amount and duration of work that takes place in the water, listed species of sea turtles and sturgeon may occur within the vicinity of your proposed project. The USACE will be responsible for determining whether the proposed action may affect listed species. If they determine that the proposed action may affect a listed species, they should submit their determination of effects, along with justification and a request for concurrence to the attention of the Section 7 Coordinator, NMFS, Greater Atlantic Regional Fisheries Office, Protected Resources Division, 55 Great Republic Drive, Gloucester, MA 01930. Please be aware that we have recently provided on our website guidance and tools to assist action agencies with their description of the action and analysis of effects to support their determination. See - http://www.greateratlantic.fisheries.noaa.gov/Protected/section7/index.html. After receiving a complete, accurate comprehensive request for consultation, in accordance to the guidance and instructions on our website, we would then be able to conduct a consultation under section 7 of the ESA. Should project plans change or new information become available that changes the basis for this determination, further coordination should be pursued. If you have any questions regarding these comments, please contact Ms. Edith Carson (978-282-8490; Edith.Carson@noaa.gov).

Magnuson-Stevens Fishery Conservation and Management Act

The project areas provide habitat for a wide variety of aquatic resources including, winter flounder, windowpane, American eel, bluefish, blue crabs, hard clams, and others. Some of the waterways are also migratory pathways and spawning, nursery and forage areas for anadromous fishes including striped bass, alewife, blueback herring and American shad. Coordination between NMFS and the federal action agency will be required pursuant to the Fish and Wildlife Coordination Act.

In addition, essential fish habitat (EFH) has been designated within the project area. Further EFH consultation by the federal action agency will be necessary. For a listing of EFH and further information, please go to our website at: http://www.greateratlantic.fisheries.noaa.gov/habitat. If you wish to discuss this further, please contact Karen Greene (732-872-3023; Karen.Greene@noaa.gov).

Sincerely,

Mark Murray-Brown
Section 7 Coordinator
for Protected Resources Division

EC: Carson, Greene
File Code: Non-Fisheries\Tech Assist_States_Private Firms\2016\AECOM hab res study NY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th Floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **Fax:** (518) 402-8925
Website: www.dec.ny.gov

April 15, 2016

John Rollino
AECOM Environment
125 Broad Street, 16th Floor
New York, NY 10004

Re: Jamaica Bay Ecosystem Restoration Project -- six sites
Town/City: City Of New York. County: Kings, Queens.

Dear John Rollino:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities that our database indicates occur on your sites or within .5 mile of your sites.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

Our database is continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, as listed at www.dec.ny.gov/about/39381.html.

Sincerely,

Andrea Chaloux

Andrea Chaloux
Environmental Review Specialist
New York Natural Heritage Program

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The following state-listed animals have been documented at your project sites or in their vicinity.

The following list includes animals that are listed by NYS as Endangered, Threatened, or Special Concern; and/or that are federally listed or are candidates for federal listing.

For information about any permit considerations for your project, contact the Permits staff at the NYSDEC Region 2 Office. For information about potential impacts of your project on these species, and how to avoid, minimize, or mitigate any impacts, contact the Wildlife Manager.

A listing of Regional Offices is at http://www.dec.ny.gov/about/558.html.

The following species have been documented at, or within .5 mile, of the indicated project sites. Potential onsite and offsite impacts from the project may need to be addressed.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Birds				
Dead Horse Bay site				
Short-eared Owl *Breeding*	*Asio flammeus*	Endangered		841
Peregrine Falcon *Breeding*	*Falco peregrinus*	Endangered		6382
Northern Harrier *Breeding*	*Circus cyaneus*	Threatened		720
Brant Bay and Dubos Bay sites				
Common Tern *Breeding*	*Sterna hirundo*	Threatened		9772
Black Skimmer *Breeding*	*Rynchops niger*	Special Concern		6266
Brant Bay, Dubos Bay, and Bayswater Park sites				
Peregrine Falcon *Breeding*	*Falco peregrinus*	Endangered		13170
Hawtree Basin site				
Upland Sandpiper *Breeding*	*Bartramia longicauda*	Threatened		10924

New York Natural Heritage Program

Report on Rare Animals, Rare Plants, and Significant Natural Communities

The following rare plants, rare animals, and significant natural communities have been documented at your project sites, or in their vicinity.

We recommend that potential onsite and offsite impacts of the proposed project on these species or communities be addressed as part of any environmental assessment or review conducted as part of the planning, permitting and approval process, such as reviews conducted under SEQR. Field surveys of the project site may be necessary to determine the status of a species at the site, particularly for sites that are currently undeveloped and may still contain suitable habitat. Final requirements of the project to avoid, minimize, or mitigate potential impacts are determined by the lead permitting agency or the government body approving the project.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*HERITAGE CONSERVATION STATUS*	
at Dubos Point, near Brant Point sites				
Vascular Plants				
Scirpus-like Rush	*Juncus scirpoides*	Endangered	Critically Imperiled in NYS	
Dubos Point, 1995-04-03: Shallow, seasonally wet depression associated with grasses and sheltered among shrub thickets.				9484
Northern Gama Grass	*Tripsacum dactyloides*	Threatened	Imperiled in NYS	
Dubos Point, 1988-su: An assemblage of habitats including old fields, brackish wetland, tidal marsh, woods and thickets and salt marsh.				1299
Fringed Boneset	*Eupatorium torreyanum*	Threatened	Imperiled in NYS	
Dubos Point, 1988-su: Brackish wetland.				4758
near Brant Point site				
Roland's Sea-blite	*Suaeda rolandii*	Endangered	Critically Imperiled in NYS and Globally Rare	4731
and				
Narrow-leaf Sea-blite	*Suaeda linearis*	Endangered	Critically Imperiled in NYS	2130
Vernam Barbadoes Peninsula, 1997-10-16: Upper edge of high salt marsh in a zone with Limonium, Solidago sempervirens, Salicornia europea, Atriplex, Suaeda maritima, and Suaeda calceolariformisi. Below is a zone of Spartina alterniflora. Shrubs above it are Myrica pensylvanica,Panicum virgatum, Parthenocissus, Prunus serotina and Rhus copallinum.				
Cut-leaved Evening Primrose	*Oenothera laciniata*	Endangered	Critically Imperiled in NYS	
Vernam Barbadoes Peninsula, 1988-su: Open disturbed ground on old fill area with nearby maritime grassland.				4246
Willow Oak	*Quercus phellos*	Endangered	Critically Imperiled in NYS	
Vernam Barbadoes Peninsula, 1995-10-19: Maritime grassland.				4776

COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	HERITAGE CONSERVATION STATUS

near Bayswater Park site

Seaside Bulrush	*Bolboschoenus maritimus* ssp. *paludosus*	Threatened	Imperiled in NYS

Motts Point, 2003-09-09: The plants are at the edge of the high salt marsh on the border of a Phragmites stand. It is an open muddy area of the marsh. 10912

near Dubos Point and Brant Point sites

Laughing Gull	*Leucophaeus atricilla*	Protected Bird	Critically Imperiled in NYS

Breeding

Silver Hole Marsh, 2000: The gulls were observed on a salt marsh, non-barrier island with vegetation covering a majority of the island. Nest substrate includes dead herbaceous/wrack material. 12535

near Dead Horse Bay site

Barn Owl	*Tyto alba*	Protected Bird	Critically Imperiled in NYS

Breeding

Floyd Bennett Field, 2004-su: Formerly an airfield, now the airfield is abandoned, and the peninsula has succeeded into a grass/early shrub seral stage, with dredge spoil added. 333

White-m Hairstreak	*Parrhasius m-album*	Unlisted	Status Uncertain

Floyd Bennett Field, 1984-07-29: The butterflies were observed nectaring on white sweet clover in the South Field. 11281

Red-banded Hairstreak	*Calycopis cecrops*	Unlisted	Status Uncertain

Floyd Bennett Field, 1989-08-09: The butterflies were observed in overgrown fields. 11280

Schweinitz's Flatsedge	*Cyperus schweinitzii*	Rare	Vulnerable in NYS

Floyd Bennett Field, 1997-11-12: Native grassland area with little bluestem, dune grass, tall red top and other wildflowers. There is some evidence of construction debris and decomposing cement runway. Many pockets are not disturbed at all. The area is also located near a wood-chipping/composting project used to cover the asphalt runways. 3200

The following significant natural communities are considered significant from a statewide perspective by the NY Natural Heritage Program. They are either occurrences of a community type that is rare in the state, or a high quality example of a more common community type. By meeting specific, documented criteria, the NY Natural Heritage Program considers these community occurrences to have high ecological and conservation value.

Low Salt Marsh -- throughout Jamica Bay, at or near all sites except Dead Horse Bay	Uncommon Community Type

Jamaica Bay: This is a very large occurrence consisting of multiple patches with few exotic plant species, located in a protected bay within a National Park Service Wildlife Refuge and Recreation area. The occurrence is unhealthy; it is degrading quickly and is converting to mudflat. The surrounding landscape is heavily developed and contributes numerous detrimental inputs to the bay. 10248

This report only includes records from the NY Natural Heritage database. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the rare animals and plants in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, from NatureServe Explorer at www.natureserve.org/explorer, and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

Information about many of the natural community types in New York, including identification, dominant and characteristic vegetation, distribution, conservation, and management, is available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org. For descriptions of all community types, go to www.dec.ny.gov/animals/97703.html for Ecological Communities of New York State.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th Floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **Fax:** (518) 402-8925
Website: www.dec.ny.gov

May 31, 2016

John Rollino
AECOM Environment
125 Broad Street, 16th Floor
New York, NY 10004

Re: Hudson Raritan Estuary Restoration Project
Town/City: City Of New York. County: New York, Queens.

Dear John Rollino:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities that our database indicates occur at the Governors Island and Jamaica Bay (Head of Bay) project areas. (We have no records for the Bush Terminal, Soundview Park, and Flushing Bay project areas.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

Our database is continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the NYS DEC Region 2 Office, Division of Environmental Permits, as listed at www.dec.ny.gov/about/39381.html.

Sincerely,

Nicholas Conrad
Information Resources Coordinator
New York Natural Heritage Program

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The following state-listed animals have been documented at the Governors Island and Jamaica Bay (Head of Bay) project areas.

The following list includes animals that are listed by NYS as Endangered, Threatened, or Special Concern; and/or that are federally listed or are candidates for federal listing.

For information about any permit considerations for your project, contact the Permits staff at the NYSDEC Region 2 Office, dep.r2@dec.ny.gov, (718) 482-4997. For information about potential impacts of your project on these species, and how to avoid, minimize, or mitigate any impacts, contact the Wildlife Manager, (718) 482-4922.

The following species have been documented at Governors Island, at the projcet area. Potential onsite and offsite impacts from the project may need to be addressed.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Birds				
Common Tern *Breeding*	*Sterna hirundo*	Threatened		13793

The following species have been documented at Kennedy Airport. Potential onsite and offsite impacts from the project may need to be addressed.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Birds				
Upland Sandpiper *Breeding*	*Bartramia longicauda*	Threatened		10924
Northern Harrier *Breeding*	*Circus cyaneus*	Threatened		1641
Short-eared Owl *Breeding*	*Asio flammeus*	Endangered		211

This report only includes records from the NY Natural Heritage database. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the listed animals in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, and from NYSDEC at www.dec.ny.gov/animals/7494.html.

The following rare plant has been documented at the Jamaica Bay (Head of Bay) project area.

We recommend that potential onsite and offsite impacts of the proposed project on these species be addressed as part of any environmental assessment or review conducted as part of the planning, permitting and approval process, such as reviews conducted under SEQR. Field surveys of the project site may be necessary to determine the status of a species at the site, particularly for sites that are currently undeveloped and may still contain suitable habitat. Final requirements of the project to avoid, minimize, or mitigate potential impacts are determined by the lead permitting agency or the government body approving the project.

The following plants are listed as Endangered or Threatened by New York State, and/or are considered rare by the New York Natural Heritage Program, and so are a vulnerable natural resource of conservation concern.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*HERITAGE CONSERVATION STATUS*
Vascular Plants			
Fringed Boneset	*Eupatorium torreyanum*	Threatened	Imperiled in NYS

JFK Airport, including along Jamaica Bay (Head of Bay) project area, 1995-08-07: Dry grassy airport margin. Plants scattered in sandy areas. 404

This report only includes records from the NY Natural Heritage database. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the rare animals and plants in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, from NatureServe Explorer at www.natureserve.org/explorer, and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

Harlem River, East River, And Western Long Island Sound Agency Correspondence

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Long Island Ecological Services Field Office
340 SMITH ROAD
SHIRLEY, NY 11967
PHONE: (631)286-0485 FAX: (631)286-4003

Consultation Code: 05E1LI00-2016-SLI-0329 July 28, 2016
Event Code: 05E1LI00-2016-E-00320
Project Name: Flushing Creek Ecosystem Restoration

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having

similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Flushing Creek Ecosystem Restoration

Official Species List

Provided by:

Long Island Ecological Services Field Office
340 SMITH ROAD
SHIRLEY, NY 11967
(631) 286-0485

Consultation Code: 05E1LI00-2016-SLI-0329
Event Code: 05E1LI00-2016-E-00320

Project Type: LAND - RESTORATION / ENHANCEMENT

Project Name: Flushing Creek Ecosystem Restoration
Project Description: Ecosystem restoration within Flushing Creek, Queens, New York. Restoration would involve the removal and eradication (i.e., excavation and grading or chemical treatment) of common reed (including the root stock), removal of fill material, re-grading to elevations suitable for inter-tidal wetlands, and planting with appropriate wetland species.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:

Project Coordinates: MULTIPOLYGON (((-73.8387680053711 40.75695310990045, -73.8411283493042 40.756002251053374, -73.84121417999268 40.75474254531295, -73.84138584136963 40.75408423797857, -73.84132146835327 40.75338528725466, -73.83814573287964 40.75452311025907, -73.83851051330566 40.755742184726685, -73.8387680053711 40.75695310990045)))

Project Counties: Queens, NY

United States Department of Interior
Fish and Wildlife Service

Project name: Flushing Creek Ecosystem Restoration

Endangered Species Act Species List

There are a total of 4 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Birds	**Status**	**Has Critical Habitat**	**Condition(s)**
Piping Plover *(Charadrius melodus)* Population: except Great Lakes watershed	Threatened	Final designated	
Red Knot *(Calidris canutus rufa)*	Threatened		
Roseate tern *(Sterna dougallii dougallii)* Population: northeast U.S. nesting pop.	Endangered		
Flowering Plants			
Seabeach amaranth *(Amaranthus pumilus)*	Threatened		

Critical habitats that lie within your project area

There are no critical habitats within your project area.

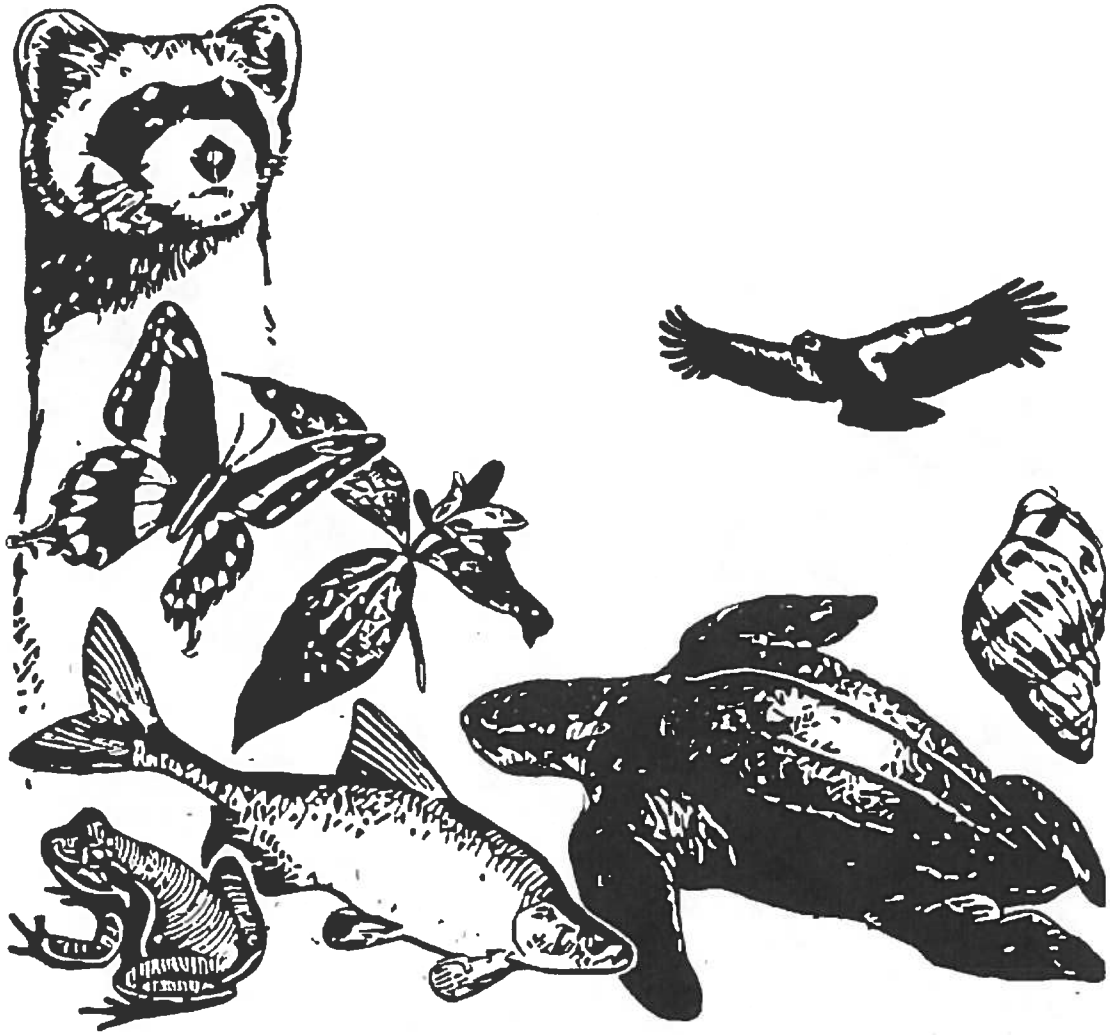
U.S. Fish & Wildlife Service

Bronx River Sites - HRE Sites

IPaC Trust Resources Report

Generated October 22, 2016 08:41 AM MDT, IPaC v3.0.9

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

Table of Contents

U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

Bronx River Sites - HRE Sites

LOCATION

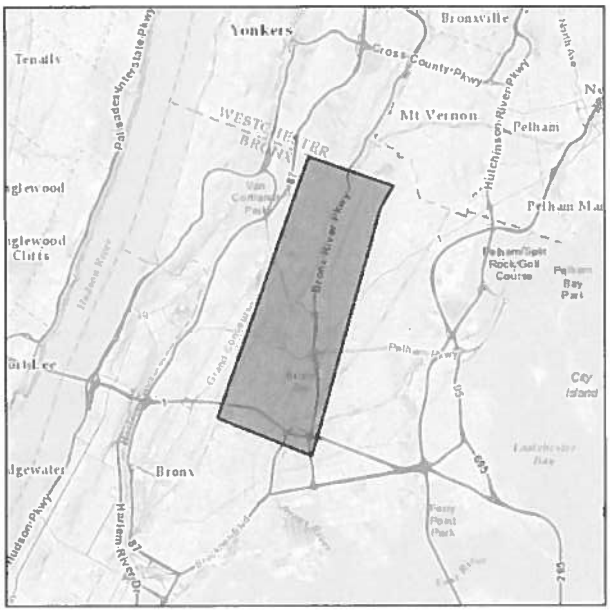
Bronx County, New York

DESCRIPTION

HRE Project - Bronx River Sites

IPAC LINK

https://ecos.fws.gov/ipac/project/EPFKB-XOO3F-HKVNK-RKIOR-S3NQ2Y



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

Long Island Ecological Services Field Office
340 Smith Road
Shirley, NY 11967
(631) 286-0485

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Birds

Piping Plover Charadrius melodus — Threatened

CRITICAL HABITAT
There is **final** critical habitat designated for this species.
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B079

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

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1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

American Oystercatcher Haematopus palliatus — Bird of conservation concern
On Land Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G8

American Bittern Botaurus lentiginosus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F3

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
On Land Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Black Skimmer Rynchops niger — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EQ

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
On Land Season: Breeding

Canada Warbler Wilsonia canadensis — Bird of conservation concern
On Land Season: Breeding

Cerulean Warbler Dendroica cerulea — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09I

Fox Sparrow Passerella iliaca — Bird of conservation concern
On Land Season: Wintering

Golden-winged Warbler Vermivora chrysoptera — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G4

Gull-billed Tern Gelochelidon nilotica — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JV

Hudsonian Godwit Limosa haemastica — Bird of conservation concern
At Sea Season: Migrating

Least Bittern Ixobrychus exilis
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B092

Least Tern Sterna antillarum — Bird of conservation concern
On Land Season: Breeding

Peregrine Falcon Falco peregrinus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Pied-billed Grebe Podilymbus podiceps — Bird of conservation concern
On Land Season: Year-round

Prairie Warbler Dendroica discolor — Bird of conservation concern
On Land Season: Breeding

Purple Sandpiper Calidris maritima — Bird of conservation concern
On Land Season: Wintering

Red Knot Calidris canutus rufa — Bird of conservation concern
On Land Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DM

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
On Land Season: Wintering

Saltmarsh Sparrow Ammodramus caudacutus — Bird of conservation concern
On Land Season: Breeding

Seaside Sparrow Ammodramus maritimus — Bird of conservation concern
On Land Season: Year-round

Short-eared Owl Asio flammeus — Bird of conservation concern
On Land Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Snowy Egret Egretta thula — Bird of conservation concern
On Land Season: Breeding

Upland Sandpiper Bartramia longicauda — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HC

Willow Flycatcher Empidonax traillii — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wood Thrush Hylocichla mustelina — Bird of conservation concern
On Land Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
On Land Season: Breeding

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

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The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Wetland data is unavailable at this time.

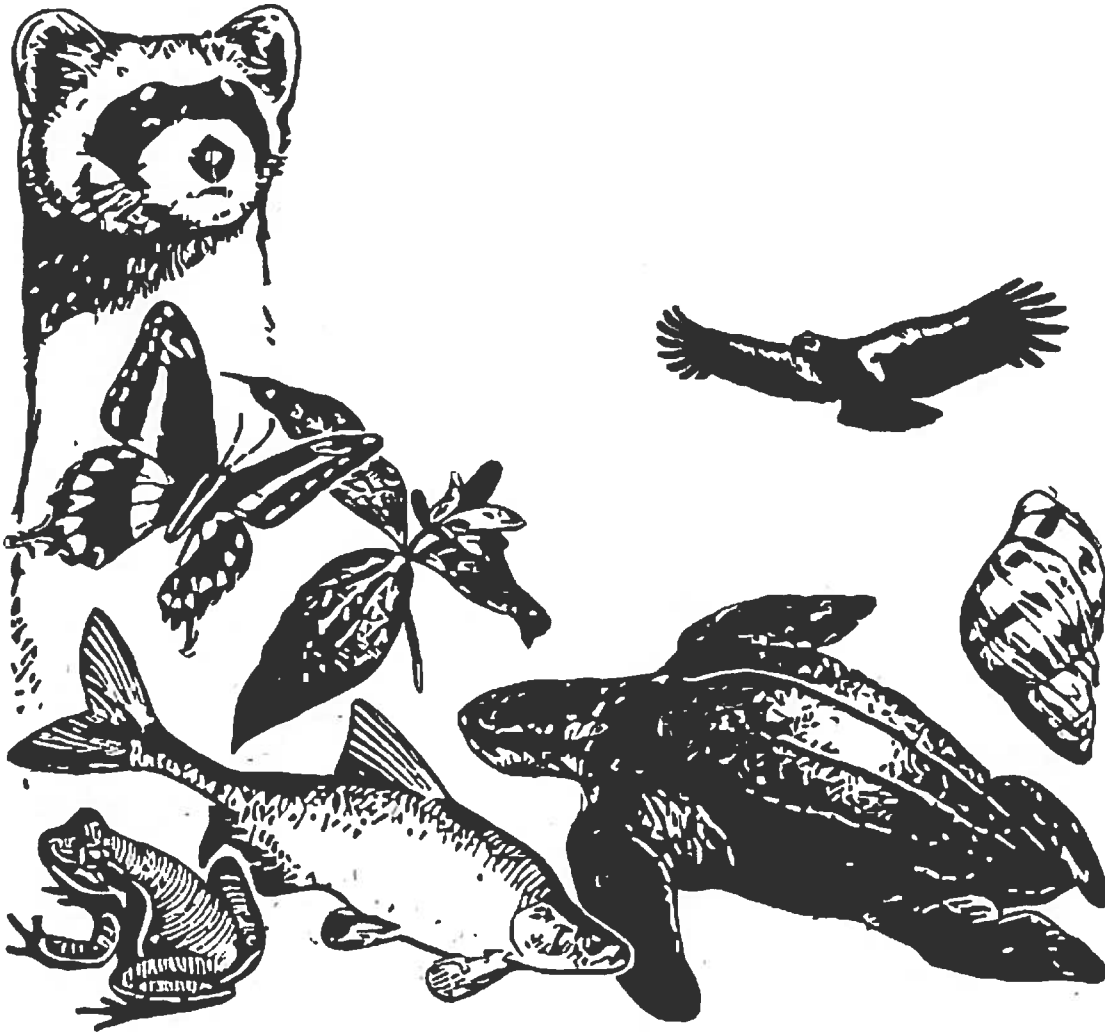
U.S. Fish & Wildlife Service

Bronxville Lake

IPaC Trust Resources Report

Generated October 22, 2016 08:58 AM MDT, IPaC v3.0.9

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

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U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

Bronxville Lake

LOCATION

Westchester County, New York

IPAC LINK

https://ecos.fws.gov/ipac/project/ZETV5-SUM3N-HY3BH-DXOLO-HKQY5A

U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

Long Island Ecological Services Field Office
340 Smith Road
Shirley, NY 11967
(631) 286-0485

New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9349
(607) 753-9334

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

There are no endangered species in this location

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

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1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

American Oystercatcher Haematopus palliatus — Bird of conservation concern
On Land Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G8

American Bittern Botaurus lentiginosus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F3

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
On Land Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Black Skimmer Rynchops niger — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EO

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
On Land Season: Breeding

Canada Warbler Wilsonia canadensis — Bird of conservation concern
On Land Season: Breeding

Cerulean Warbler Dendroica cerulea — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09I

Fox Sparrow Passerella iliaca — Bird of conservation concern
On Land Season: Wintering

Golden-winged Warbler Vermivora chrysoptera — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G4

Gull-billed Tern Gelochelidon nilotica — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JV

Hudsonian Godwit Limosa haemastica — Bird of conservation concern
At Sea Season: Migrating

Kentucky Warbler Oporornis formosus — Bird of conservation concern
On Land Season: Breeding

Least Bittern Ixobrychus exilis
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B092

Least Tern Sterna antillarum — Bird of conservation concern
On Land Season: Breeding

Peregrine Falcon Falco peregrinus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Pied-billed Grebe Podilymbus podiceps — Bird of conservation concern
On Land Season: Year-round

Prairie Warbler Dendroica discolor — Bird of conservation concern
On Land Season: Breeding

Purple Sandpiper Calidris maritima — Bird of conservation concern
On Land Season: Wintering

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
On Land Season: Wintering

Saltmarsh Sparrow Ammodramus caudacutus — Bird of conservation concern
On Land Season: Breeding

Seaside Sparrow Ammodramus maritimus — Bird of conservation concern
On Land Season: Year-round

Short-eared Owl Asio flammeus — Bird of conservation concern
On Land Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Snowy Egret Egretta thula — Bird of conservation concern
On Land Season: Breeding

Upland Sandpiper Bartramia longicauda — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HC

Willow Flycatcher Empidonax traillii — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wood Thrush Hylocichla mustelina — Bird of conservation concern
On Land Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
On Land Season: Breeding

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

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Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

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This location overlaps all or part of the following wetlands:

Freshwater Pond

PUBHh

A full description for each wetland code can be found at the National Wetlands Inventory website: http://107.20.228.18/decoders/wetlands.aspx

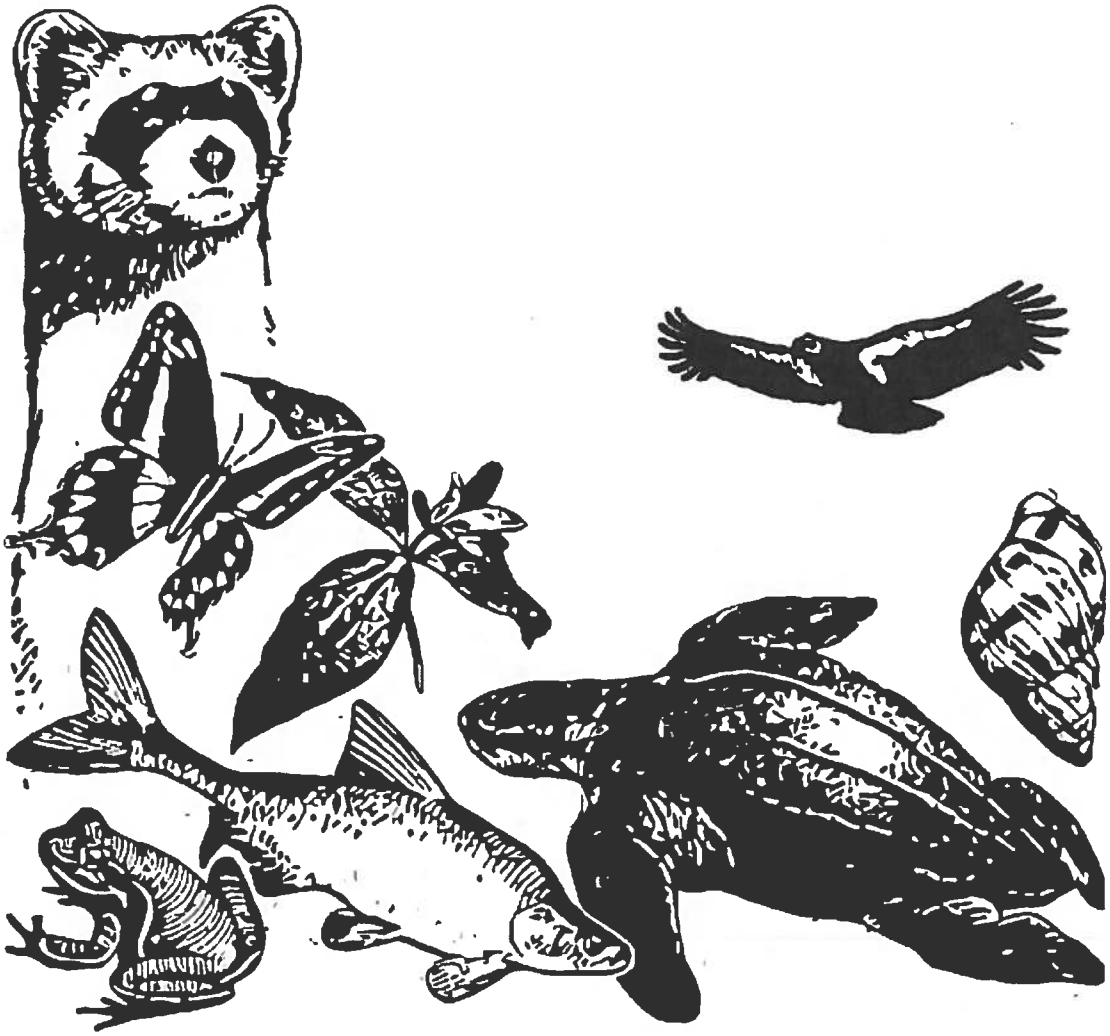
U.S. Fish & Wildlife Service

Crestwood Lake

IPaC Trust Resources Report

Generated October 22, 2016 09:02 AM MDT, IPaC v3.0.9

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

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U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

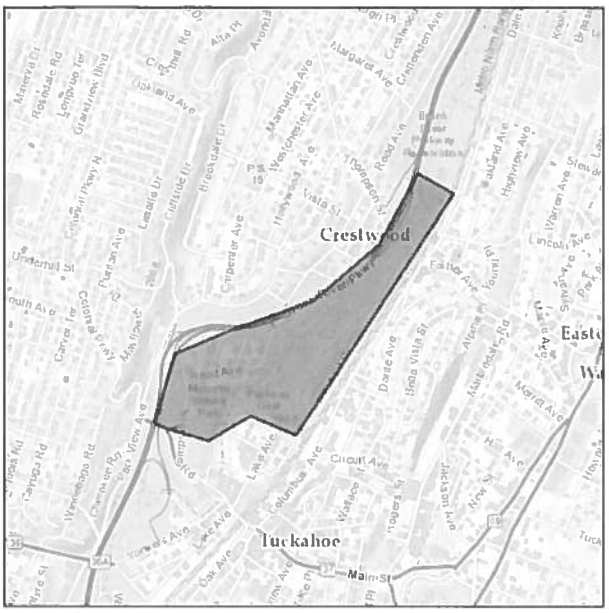
Crestwood Lake

LOCATION

Westchester County, New York

IPAC LINK

https://ecos.fws.gov/ipac/project/NTVLB-IISCV-ARLLN-6FLMG-2GZOOQ



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

Long Island Ecological Services Field Office
340 Smith Road
Shirley, NY 11967
(631) 286-0485

New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9349
(607) 753-9334

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

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Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

There are no endangered species in this location

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

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1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

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On Land Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G8

American Bittern Botaurus lentiginosus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F3

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
On Land Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Black Skimmer Rynchops niger — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EQ

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
On Land Season: Breeding

Canada Warbler Wilsonia canadensis — Bird of conservation concern
On Land Season: Breeding

Cerulean Warbler Dendroica cerulea — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09I

Fox Sparrow Passerella iliaca — Bird of conservation concern
On Land Season: Wintering

Golden-winged Warbler Vermivora chrysoptera — Bird of conservation concern
On Land Season: Breeding
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On Land Season: Breeding
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On Land Season: Breeding

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On Land Season: Breeding
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On Land Season: Breeding
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On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wood Thrush Hylocichla mustelina — Bird of conservation concern
On Land Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
On Land Season: Breeding

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

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For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

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This location overlaps all or part of the following wetlands:

Freshwater Pond

PABHh

PUBHh

A full description for each wetland code can be found at the National Wetlands Inventory website: http://107.20.228.18/decoders/wetlands.aspx

U.S. Fish & Wildlife Service

Westchester County Site

IPaC Trust Resources Report

Generated October 22, 2016 08:32 AM MDT, IPaC v3.0.9

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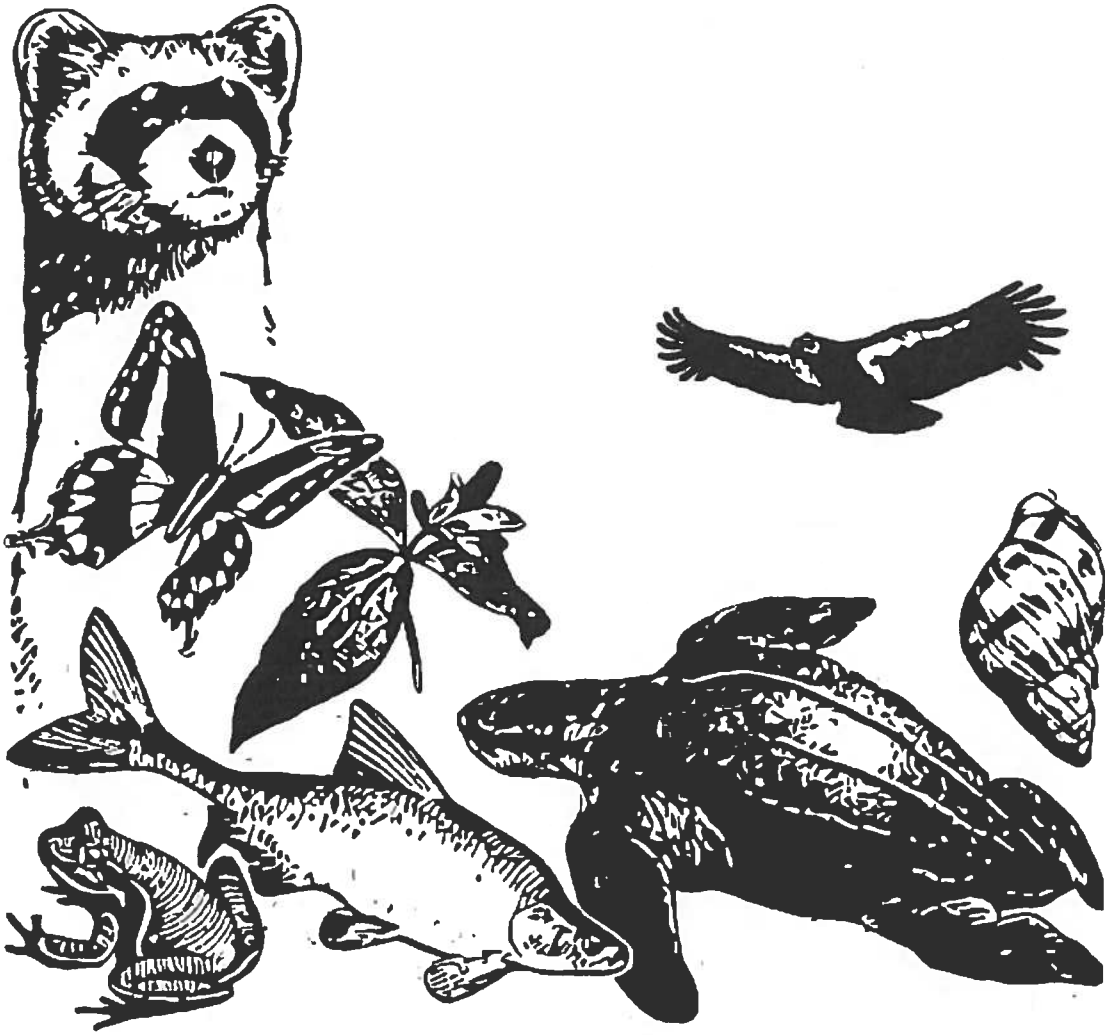

IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

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U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

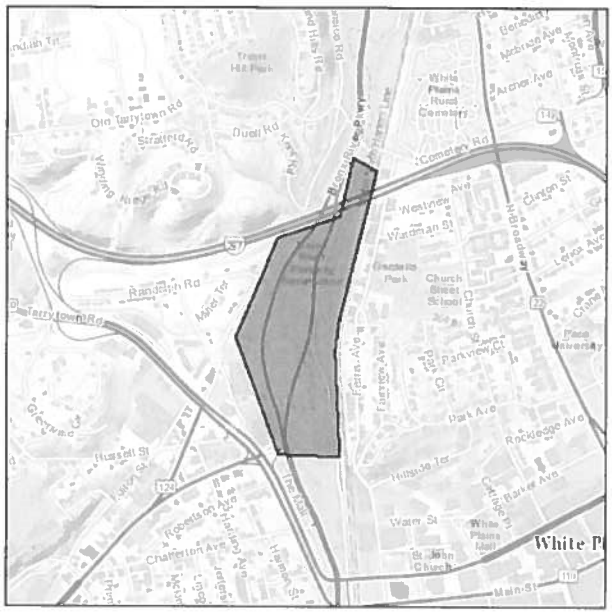
Westchester County Site

LOCATION

Westchester County, New York

IPAC LINK

https://ecos.fws.gov/ipac/project/Q2QIL-4AYPF-GTDFI-W233Z-Z6INUA



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

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340 Smith Road
Shirley, NY 11967
(631) 286-0485

New York Ecological Services Field Office
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A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

There are no endangered species in this location

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

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---

1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

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  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

American Oystercatcher Haematopus palliatus — Bird of conservation concern
On Land Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G8

American Bittern Botaurus lentiginosus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F3

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
On Land Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Black Skimmer Rynchops niger — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EO

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
On Land Season: Breeding

Canada Warbler Wilsonia canadensis — Bird of conservation concern
On Land Season: Breeding

Cerulean Warbler Dendroica cerulea — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09I

Fox Sparrow Passerella iliaca — Bird of conservation concern
On Land Season: Wintering

Golden-winged Warbler Vermivora chrysoptera — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G4

Hudsonian Godwit Limosa haemastica — Bird of conservation concern
At Sea Season: Migrating

Kentucky Warbler Oporornis formosus — Bird of conservation concern
On Land Season: Breeding

Least Bittern Ixobrychus exilis
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B092

Olive-sided Flycatcher Contopus cooperi — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0AN

Peregrine Falcon Falco peregrinus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Pied-billed Grebe Podilymbus podiceps — Bird of conservation concern
On Land Season: Year-round

Prairie Warbler Dendroica discolor — Bird of conservation concern
On Land Season: Breeding

Purple Sandpiper Calidris maritima — Bird of conservation concern
On Land Season: Wintering

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
On Land Season: Wintering

Saltmarsh Sparrow Ammodramus caudacutus — Bird of conservation concern
On Land Season: Breeding

Seaside Sparrow Ammodramus maritimus — Bird of conservation concern
On Land Season: Year-round

Short-eared Owl Asio flammeus — Bird of conservation concern
On Land Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Snowy Egret Egretta thula — Bird of conservation concern
On Land Season: Breeding

Upland Sandpiper Bartramia longicauda — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HC

Willow Flycatcher Empidonax traillii — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wood Thrush Hylocichla mustelina — Bird of conservation concern
On Land Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
On Land Season: Breeding

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

Freshwater Emergent Wetland

PEM1Ch

Freshwater Pond

PUBHh

A full description for each wetland code can be found at the National Wetlands Inventory website: http://107.20.228.18/decoders/wetlands.aspx

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

APR 27 2016

John Rollino
AECOM
125 Broad Street
New York, New York 10004

Dear Mr. Rollino:

We received your letter on April 26, 2016, on behalf of the US Army Corps of Engineers (USACE) regarding technical assistance for the Hudson Raritan Estuary Ecosystem Restoration Feasibility Study (HRE Project) to restore existing degraded habitat at six sites around New York Harbor, New York. The sites are: Soundview Park (Bronx County) East River; Governors Island, New York Harbor; Bush Terminal, (Brooklyn County) New York Harbor; Head of Bay, (Queens County) Jamaica Bay; Flushing Bay (Queens County); and NWS Earle, (Monmouth County, NJ) Sandy Hook Bay. In your letter, you requested information on the presence of Endangered Species Act (ESA) threatened and endangered species under our jurisdiction. We offer the following comments.

Endangered Species Act

Sea Turtles

Four species of ESA listed threatened or endangered sea turtles under our jurisdiction are seasonally present off the south shore of Long Island, including its bays and tributaries: the threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, the threatened North Atlantic DPS of green, and the endangered Kemp's ridley and leatherback sea turtles. Sea turtles typically occur along the New York coast from May to mid-November, with the highest concentration of sea turtles present from June through October. Sea turtles could occur in the following proposed project areas: Head of Bay, (Queens County) Jamaica Bay; and NWS Earle, (Monmouth County, NJ) Sandy Hook Bay.

Atlantic Sturgeon

Atlantic sturgeon are present in the waters of the Hudson and East Rivers and their adjacent bays and tributaries. The New York Bight, Chesapeake Bay, South Atlantic and Carolina DPS of Atlantic sturgeon are endangered; the Gulf of Maine DPS is threatened. Adult and subadult Atlantic sturgeon originating from any of these DPS could occur in the proposed project areas. As young remain in their natal river/estuary until approximately age two, and early life stages are not tolerant of saline waters, no eggs, larvae, or juvenile Atlantic sturgeon will occur within the saline waters of the Hudson and East Rivers and their adjacent bays and tributaries.

Shortnose Sturgeon

Shortnose sturgeon are present in the waters of the Hudson and East Rivers and could occur in their adjacent bays and tributaries. As early life stages are not tolerant of saline waters, no eggs, larvae, or juvenile shortnose sturgeon will occur within the saline waters of the Hudson and East Rivers and their adjacent bays and tributaries.

As project details develop, we recommend you consider the following effects of the project on Atlantic sturgeon, shortnose sturgeon, and sea turtles:

- For activities that increase levels of suspended sediment, consider the use of silt management and/or soil erosion best practices (i.e., silt curtains and/or cofferdams).
- For any impacts to habitat or conditions that temporarily render affected water bodies unsuitable for the above-mentioned species, consider the use of timing restrictions for in-water work.

Depending on the amount and duration of work that takes place in the water, listed species of sea turtles and sturgeon may occur within the vicinity of your proposed project. The USACE will be responsible for determining whether the proposed action may affect listed species. If they determine that the proposed action may affect a listed species, they should submit their determination of effects, along with justification and a request for concurrence to the attention of the Section 7 Coordinator, NMFS, Greater Atlantic Regional Fisheries Office, Protected Resources Division, 55 Great Republic Drive, Gloucester, MA 01930. Please be aware that we have recently provided on our website guidance and tools to assist action agencies with their description of the action and analysis of effects to support their determination. See - http://www.greateratlantic.fisheries.noaa.gov/Protected/section7/index.html. After receiving a complete, accurate comprehensive request for consultation, in accordance to the guidance and instructions on our website, we would then be able to conduct a consultation under section 7 of the ESA. Should project plans change or new information become available that changes the basis for this determination, further coordination should be pursued. If you have any questions regarding these comments, please contact Ms. Edith Carson (978-282-8490; Edith.Carson@noaa.gov).

Magnuson-Stevens Fishery Conservation and Management Act

The project areas provide habitat for a wide variety of aquatic resources including, winter flounder, windowpane, American eel, bluefish, blue crabs, hard clams, and others. Some of the waterways are also migratory pathways and spawning, nursery and forage areas for anadromous fishes including striped bass, alewife, blueback herring and American shad. Coordination between NMFS and the federal action agency will be required pursuant to the Fish and Wildlife Coordination Act.

In addition, essential fish habitat (EFH) has been designated within the project area. Further EFH consultation by the federal action agency will be necessary. For a listing of EFH and further information, please go to our website at: http://www.greateratlantic.fisheries.noaa.gov/habitat. If you wish to discuss this further, please contact Karen Greene (732-872-3023; Karen.Greene@noaa.gov).

Sincerely,

Mark Murray-Brown
Section 7 Coordinator
for Protected Resources Division

EC: Carson, Greene
File Code: Non-Fisheries\Tech Assist_States_Private Firms\2016\AECOM hab res study NY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th Floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **Fax:** (518) 402-8925
Website: www.dec.ny.gov

May 31, 2016

John Rollino
AECOM Environment
125 Broad Street, 16th Floor
New York, NY 10004

Re: Hudson Raritan Estuary Restoration Project
Town/City: City Of New York. County: New York, Queens.

Dear John Rollino:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities that our database indicates occur at the Governors Island and Jamaica Bay (Head of Bay) project areas. (We have no records for the Bush Terminal, Soundview Park, and Flushing Bay project areas.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

Our database is continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the NYS DEC Region 2 Office, Division of Environmental Permits, as listed at www.dec.ny.gov/about/39381.html.

Sincerely,

Nicholas Conrad
Information Resources Coordinator
New York Natural Heritage Program

608

The following state-listed animals have been documented at the Governors Island and Jamaica Bay (Head of Bay) project areas.

The following list includes animals that are listed by NYS as Endangered, Threatened, or Special Concern; and/or that are federally listed or are candidates for federal listing.

For information about any permit considerations for your project, contact the Permits staff at the NYSDEC Region 2 Office, dep.r2@dec.ny.gov, (718) 482-4997. For information about potential impacts of your project on these species, and how to avoid, minimize, or mitigate any impacts, contact the Wildlife Manager, (718) 482-4922.

The following species have been documented at Governors Island, at the projcet area. Potential onsite and offsite impacts from the project may need to be addressed.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Birds				
Common Tern *Breeding*	*Sterna hirundo*	Threatened		13793

The following species have been documented at Kennedy Airport. Potential onsite and offsite impacts from the project may need to be addressed.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Birds				
Upland Sandpiper *Breeding*	*Bartramia longicauda*	Threatened		10924
Northern Harrier *Breeding*	*Circus cyaneus*	Threatened		1641
Short-eared Owl *Breeding*	*Asio flammeus*	Endangered		211

This report only includes records from the NY Natural Heritage database. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the listed animals in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, and from NYSDEC at www.dec.ny.gov/animals/7494.html.

New York Natural Heritage Program

Report on Rare Animals, Rare Plants, and Significant Natural Communities

The following rare plant has been documented at the Jamaica Bay (Head of Bay) project area.

We recommend that potential onsite and offsite impacts of the proposed project on these species be addressed as part of any environmental assessment or review conducted as part of the planning, permitting and approval process, such as reviews conducted under SEQR. Field surveys of the project site may be necessary to determine the status of a species at the site, particularly for sites that are currently undeveloped and may still contain suitable habitat. Final requirements of the project to avoid, minimize, or mitigate potential impacts are determined by the lead permitting agency or the government body approving the project.

The following plants are listed as Endangered or Threatened by New York State, and/or are considered rare by the New York Natural Heritage Program, and so are a vulnerable natural resource of conservation concern.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*HERITAGE CONSERVATION STATUS*
Vascular Plants			
Fringed Boneset	*Eupatorium torreyanum*	Threatened	Imperiled in NYS

JFK Airport, including along Jamaica Bay (Head of Bay) project area, 1995-08-07: Dry grassy airport margin. Plants scattered in sandy areas. 404

This report only includes records from the NY Natural Heritage database. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the rare animals and plants in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, from NatureServe Explorer at www.natureserve.org/explorer, and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th Floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **Fax:** (518) 402-8925
Website: www.dec.ny.gov

Joe Martens
Commissioner

September 19, 2014

John Rollino
AECOM
20 Exchange Place
New York, NY 10005

Dear Mr. Rollino:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to proposed US ACOE ecological restoration sites along the Bronx River, in Bronx County, New York City; and in the City of Yonkers and Town of Eastchester, Westchester County.

We have no recent records of rare or state-listed animals or plants, or of significant natural communities, at these sites or in their immediate vicinity.

Our database does have historical records of rare plants and animals in the area of some of the sites. Enclosed are two reports, one listing historical records in the area of the Bronx River, Bronx Zoo, and Snuff Mill Dam sites; and the other listing historical records in the area of the sites in Westchester County.

We do not know the precise locations where these plants and animals were collected, we have no recent information on their populations, and there is uncertainty regarding their continued presence. We provide this information for your general reference. While their current status is not known, if suitable habitat for any of these species are present in the vicinity of the project sites, it is possible that they may still be found there. We recommend that any field surveys to the site include a search for these species, particularly at sites that are currently undeveloped or may still contain suitable habitat. If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about these species in New York, including habitat, biology, identification, conservation, and management, is available online in Natural Heritage's Conservation Guide at www.guides.nynhp.org.

For most sites, comprehensive field surveys have not been conducted; the above information only includes records from our databases. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities.

Sincerely,

Nick Conrad

Nicholas Conrad
Information Resources Coordinator

930ABC

The following rare plants and rare animals have historical records in the vicinity of the Bronx River, Bronx Zoo, and Snuff Mill Dam sites.

The following rare plants and animals were documented in the vicinity of the project site at one time, but have not been documented there since 1979 or earlier, and/or there is uncertainty regarding their continued presence. There is no recent information on these plants and animals in the vicinity of the project site and their current status there is unknown. In most cases the precise location of the plant or animal in this vicinity at the time it was last documented is also unknown.

If suitable habitat for these plants or animals is present in the vicinity of the project site, it is possible that they may still occur there. We recommend that any field surveys to the site include a search for these species, particularly at sites that are currently undeveloped and may still contain suitable habitat.

COMMON NAME	*SCIENTIFIC NAME*	*NYS LISTING*	*HERITAGE CONSERVATION STATUS*
Dragonflies and Damselflies			
Arrowhead Spiketail	*Cordulegaster obliqua*	Unlisted	Vulnerable in NYS
1913-pre: Bronx Park. The dragonflies were collected in Bronx Park, near a bear den that was later discovered.			12582
Vascular Plants			
Tall Flat Panic Grass	*Panicum rigidulum var. elongatum*	Endangered	Historical Records Only in NYS
1906-09-20: Bronx Park.			795
Cut-leaved Evening-primrose	*Oenothera laciniata*	Endangered	Critically Imperiled in NYS
1940-06-18: New York Botanical Garden.			2838
Yellow Giant-hyssop	*Agastache nepetoides*	Threatened	Imperiled in NYS
1901-09-26: Bronx Park.			3415
Rough Avens	*Geum virginianum*	Threatened	Imperiled in NYS
1896-06-27: Bronx Park.			2404
Slender Crabgrass	*Digitaria filiformis*	Endangered	Critically Imperiled in NYS
1896-09-03: Bronx Park.			5404
Field Beadgrass	*Paspalum laeve*	Endangered	Critically Imperiled in NYS
1962-06-25: Bronx Park. Specimen label: Along stream.			7623

COMMON NAME	*SCIENTIFIC NAME*	*NYS LISTING*	*HERITAGE CONSERVATION STATUS*
Velvet Panic Grass	*Dichanthelium scoparium*	Endangered	Critically Imperiled in NYS
1953-07-23: Bronx Park.			9907
Rattlebox	*Crotalaria sagittalis*	Endangered	Critically Imperiled in NYS
1896-08-19: Bronx Park.			8912

This report only includes records from the NY Natural Heritage databases. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the rare animals and plants in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, from NatureServe Explorer at http://www.natureserve.org/explorer, and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

The following rare plants have historical records in the vicinity of the Bronxville Lake, Crestwood Lake, and Garth Woods/ Harney Pond Road sites.

The following rare plants were documented in the vicinity of the project site at one time, but have not been documented there since 1979 or earlier, and/or there is uncertainty regarding their continued presence. There is no recent information on these plants and animals in the vicinity of the project site and their current status there is unknown. In most cases the precise location of the plant or animal in this vicinity at the time it was last documented is also unknown.

If suitable habitat for these plants is present in the vicinity of the project site, it is possible that they may still occur there. We recommend that any field surveys to the site include a search for these species, particularly at sites that are currently undeveloped and may still contain suitable habitat.

COMMON NAME	*SCIENTIFIC NAME*	*NYS LISTING*	*HERITAGE CONSERVATION STATUS*
Vascular Plants			
Smooth Tick-trefoil	*Desmodium laevigatum*	Endangered	Historical Records Only in NYS
1895-09-01: Bronxville. Woods.			2926
Rattlebox	*Crotalaria sagittalis*	Endangered	Critically Imperiled in NYS
1918-08-14: Eastchester. Sandy meadow.			7581

This report only includes records from the NY Natural Heritage databases. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the rare animals and plants in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, from NatureServe Explorer at http://www.natureserve.org/explorer, and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
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625 Broadway, 5th Floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **Fax:** (518) 402-8925
Website: www.dec.ny.gov

May 31, 2016

John Rollino
AECOM Environment
125 Broad Street, 16th Floor
New York, NY 10004

Re: Hudson Raritan Estuary Restoration Project
Town/City: City Of New York. County: New York, Queens.

Dear John Rollino:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities that our database indicates occur at the Governors Island and Jamaica Bay (Head of Bay) project areas. (We have no records for the Bush Terminal, Soundview Park, and Flushing Bay project areas.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

Our database is continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the NYS DEC Region 2 Office, Division of Environmental Permits, as listed at www.dec.ny.gov/about/39381.html.

Sincerely,

Nicholas Conrad
Information Resources Coordinator
New York Natural Heritage Program

608

The following state-listed animals have been documented at the Governors Island and Jamaica Bay (Head of Bay) project areas.

The following list includes animals that are listed by NYS as Endangered, Threatened, or Special Concern; and/or that are federally listed or are candidates for federal listing.

For information about any permit considerations for your project, contact the Permits staff at the NYSDEC Region 2 Office, dep.r2@dec.ny.gov, (718) 482-4997. For information about potential impacts of your project on these species, and how to avoid, minimize, or mitigate any impacts, contact the Wildlife Manager, (718) 482-4922.

The following species have been documented at Governors Island, at the projcet area. Potential onsite and offsite impacts from the project may need to be addressed.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Birds				
Common Tern *Breeding*	*Sterna hirundo*	Threatened		13793

The following species have been documented at Kennedy Airport. Potential onsite and offsite impacts from the project may need to be addressed.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Birds				
Upland Sandpiper *Breeding*	*Bartramia longicauda*	Threatened		10924
Northern Harrier *Breeding*	*Circus cyaneus*	Threatened		1641
Short-eared Owl *Breeding*	*Asio flammeus*	Endangered		211

This report only includes records from the NY Natural Heritage database. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the listed animals in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, and from NYSDEC at www.dec.ny.gov/animals/7494.html.

The following rare plant has been documented at the Jamaica Bay (Head of Bay) project area.

We recommend that potential onsite and offsite impacts of the proposed project on these species be addressed as part of any environmental assessment or review conducted as part of the planning, permitting and approval process, such as reviews conducted under SEQR. Field surveys of the project site may be necessary to determine the status of a species at the site, particularly for sites that are currently undeveloped and may still contain suitable habitat. Final requirements of the project to avoid, minimize, or mitigate potential impacts are determined by the lead permitting agency or the government body approving the project.

The following plants are listed as Endangered or Threatened by New York State, and/or are considered rare by the New York Natural Heritage Program, and so are a vulnerable natural resource of conservation concern.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*HERITAGE CONSERVATION STATUS*
Vascular Plants			
Fringed Boneset	*Eupatorium torreyanum*	Threatened	Imperiled in NYS

JFK Airport, including along Jamaica Bay (Head of Bay) project area, 1995-08-07: Dry grassy airport margin. Plants scattered in sandy areas. 404

This report only includes records from the NY Natural Heritage database. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the rare animals and plants in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, from NatureServe Explorer at www.natureserve.org/explorer, and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

Upper Bay Planning Region Agency Correspondence

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

APR 27 2016

John Rollino
AECOM
125 Broad Street
New York, New York 10004

Dear Mr. Rollino:

We received your letter on April 26, 2016, on behalf of the US Army Corps of Engineers (USACE) regarding technical assistance for the Hudson Raritan Estuary Ecosystem Restoration Feasibility Study (HRE Project) to restore existing degraded habitat at six sites around New York Harbor, New York. The sites are: Soundview Park (Bronx County) East River; Governors Island, New York Harbor; Bush Terminal, (Brooklyn County) New York Harbor; Head of Bay, (Queens County) Jamaica Bay; Flushing Bay (Queens County); and NWS Earle, (Monmouth County, NJ) Sandy Hook Bay. In your letter, you requested information on the presence of Endangered Species Act (ESA) threatened and endangered species under our jurisdiction. We offer the following comments.

Endangered Species Act

Sea Turtles

Four species of ESA listed threatened or endangered sea turtles under our jurisdiction are seasonally present off the south shore of Long Island, including its bays and tributaries: the threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, the threatened North Atlantic DPS of green, and the endangered Kemp's ridley and leatherback sea turtles. Sea turtles typically occur along the New York coast from May to mid-November, with the highest concentration of sea turtles present from June through October. Sea turtles could occur in the following proposed project areas: Head of Bay, (Queens County) Jamaica Bay; and NWS Earle, (Monmouth County, NJ) Sandy Hook Bay.

Atlantic Sturgeon

Atlantic sturgeon are present in the waters of the Hudson and East Rivers and their adjacent bays and tributaries. The New York Bight, Chesapeake Bay, South Atlantic and Carolina DPS of Atlantic sturgeon are endangered; the Gulf of Maine DPS is threatened. Adult and subadult Atlantic sturgeon originating from any of these DPS could occur in the proposed project areas. As young remain in their natal river/estuary until approximately age two, and early life stages are not tolerant of saline waters, no eggs, larvae, or juvenile Atlantic sturgeon will occur within the saline waters of the Hudson and East Rivers and their adjacent bays and tributaries.

Shortnose Sturgeon

Shortnose sturgeon are present in the waters of the Hudson and East Rivers and could occur in their adjacent bays and tributaries. As early life stages are not tolerant of saline waters, no eggs, larvae, or juvenile shortnose sturgeon will occur within the saline waters of the Hudson and East Rivers and their adjacent bays and tributaries.

As project details develop, we recommend you consider the following effects of the project on Atlantic sturgeon, shortnose sturgeon, and sea turtles:

- For activities that increase levels of suspended sediment, consider the use of silt management and/or soil erosion best practices (i.e., silt curtains and/or cofferdams).
- For any impacts to habitat or conditions that temporarily render affected water bodies unsuitable for the above-mentioned species, consider the use of timing restrictions for in-water work.

Depending on the amount and duration of work that takes place in the water, listed species of sea turtles and sturgeon may occur within the vicinity of your proposed project. The USACE will be responsible for determining whether the proposed action may affect listed species. If they determine that the proposed action may affect a listed species, they should submit their determination of effects, along with justification and a request for concurrence to the attention of the Section 7 Coordinator, NMFS, Greater Atlantic Regional Fisheries Office, Protected Resources Division, 55 Great Republic Drive, Gloucester, MA 01930. Please be aware that we have recently provided on our website guidance and tools to assist action agencies with their description of the action and analysis of effects to support their determination. See - http://www.greateratlantic.fisheries.noaa.gov/Protected/section7/index.html. After receiving a complete, accurate comprehensive request for consultation, in accordance to the guidance and instructions on our website, we would then be able to conduct a consultation under section 7 of the ESA. Should project plans change or new information become available that changes the basis for this determination, further coordination should be pursued. If you have any questions regarding these comments, please contact Ms. Edith Carson (978-282-8490; Edith.Carson@noaa.gov).

Magnuson-Stevens Fishery Conservation and Management Act

The project areas provide habitat for a wide variety of aquatic resources including, winter flounder, windowpane, American eel, bluefish, blue crabs, hard clams, and others. Some of the waterways are also migratory pathways and spawning, nursery and forage areas for anadromous fishes including striped bass, alewife, blueback herring and American shad. Coordination between NMFS and the federal action agency will be required pursuant to the Fish and Wildlife Coordination Act.

In addition, essential fish habitat (EFH) has been designated within the project area. Further EFH consultation by the federal action agency will be necessary. For a listing of EFH and further information, please go to our website at: http://www.greateratlantic.fisheries.noaa.gov/habitat. If you wish to discuss this further, please contact Karen Greene (732-872-3023; Karen.Greene@noaa.gov).

Sincerely,

Mark Murray-Brown
Section 7 Coordinator
for Protected Resources Division

EC: Carson, Greene
File Code: Non-Fisheries\Tech Assist_States_Private Firms\2016\AECOM hab res study NY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th Floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **Fax:** (518) 402-8925
Website: www.dec.ny.gov

May 31, 2016

John Rollino
AECOM Environment
125 Broad Street, 16th Floor
New York, NY 10004

Re: Hudson Raritan Estuary Restoration Project
Town/City: City Of New York. County: New York, Queens.

Dear John Rollino:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities that our database indicates occur at the Governors Island and Jamaica Bay (Head of Bay) project areas. (We have no records for the Bush Terminal, Soundview Park, and Flushing Bay project areas.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

Our database is continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the NYS DEC Region 2 Office, Division of Environmental Permits, as listed at www.dec.ny.gov/about/39381.html.

Sincerely,

Nicholas Conrad
Information Resources Coordinator
New York Natural Heritage Program

608

The following state-listed animals have been documented at the Governors Island and Jamaica Bay (Head of Bay) project areas.

The following list includes animals that are listed by NYS as Endangered, Threatened, or Special Concern; and/or that are federally listed or are candidates for federal listing.

For information about any permit considerations for your project, contact the Permits staff at the NYSDEC Region 2 Office, dep.r2@dec.ny.gov, (718) 482-4997. For information about potential impacts of your project on these species, and how to avoid, minimize, or mitigate any impacts, contact the Wildlife Manager, (718) 482-4922.

The following species have been documented at Governors Island, at the projcet area. Potential onsite and offsite impacts from the project may need to be addressed.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Birds				
Common Tern *Breeding*	*Sterna hirundo*	Threatened		13793

The following species have been documented at Kennedy Airport. Potential onsite and offsite impacts from the project may need to be addressed.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Birds				
Upland Sandpiper *Breeding*	*Bartramia longicauda*	Threatened		10924
Northern Harrier *Breeding*	*Circus cyaneus*	Threatened		1641
Short-eared Owl *Breeding*	*Asio flammeus*	Endangered		211

This report only includes records from the NY Natural Heritage database. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the listed animals in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, and from NYSDEC at www.dec.ny.gov/animals/7494.html.

The following rare plant has been documented at the Jamaica Bay (Head of Bay) project area.

We recommend that potential onsite and offsite impacts of the proposed project on these species be addressed as part of any environmental assessment or review conducted as part of the planning, permitting and approval process, such as reviews conducted under SEQR. Field surveys of the project site may be necessary to determine the status of a species at the site, particularly for sites that are currently undeveloped and may still contain suitable habitat. Final requirements of the project to avoid, minimize, or mitigate potential impacts are determined by the lead permitting agency or the government body approving the project.

The following plants are listed as Endangered or Threatened by New York State, and/or are considered rare by the New York Natural Heritage Program, and so are a vulnerable natural resource of conservation concern.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*HERITAGE CONSERVATION STATUS*
Vascular Plants			
Fringed Boneset	*Eupatorium torreyanum*	Threatened	Imperiled in NYS

JFK Airport, including along Jamaica Bay (Head of Bay) project area, 1995-08-07: Dry grassy airport margin. Plants scattered in sandy areas. 404

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Lower Bay Planning Region Agency Correspondence

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

APR 27 2016

John Rollino
AECOM
125 Broad Street
New York, New York 10004

Dear Mr. Rollino:

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Endangered Species Act

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Sincerely,

Mark Murray-Brown
Section 7 Coordinator
for Protected Resources Division

EC: Carson, Greene
File Code: Non-Fisheries\Tech Assist_States_Private Firms\2016\AECOM hab res study NY

Chapter 3: Regulatory Agency Correspondence: Newark bay, Hackensack, and Passaic River






Newark Bay, Hackensack River, And Passaic River Agency Correspondence

USFWS Official Species Lists

Site 902 - Clifton Dundee Canal Green Acres Purchase and Dundee Island Preserve

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 8232
PHONE: (609)646-9310 FAX: (609)646-0352
URL: www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2015-SLI-0449 June 18, 2015
Event Code: 05E2NJ00-2015-E-00317
Project Name: Dundee Canal Green Acres Island Preserve

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species that may occur in your proposed action area and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*)

If the enclosed list indicates that any listed species may be present in your action area, please visit the New Jersey Field Office consultation web page as the next step in evaluating potential project impacts: http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

On the New Jersey Field Office consultation web page you will find:

- habitat descriptions, survey protocols, and recommended best management practices for listed species;
- recommended procedures for submitting information to this office; and
- links to other Federal and State agencies, the Section 7 Consultation Handbook, the Service's wind energy guidelines, communication tower recommendations, the National Bald Eagle Management Guidelines, and other resources and recommendations for protecting wildlife resources.

The enclosed list may change as new information about listed species becomes available. As per Federal regulations at 50 CFR 402.12(e), the enclosed list is only valid for 90 days. Please return to the ECOS-IPaC website at regular intervals during project planning and implementation to obtain an updated species list. When using ECOS-IPaC, be careful about drawing the boundary of your Project Location. Remember that your action area under the ESA

is not limited to just the footprint of the project. The action area also includes all areas that may be indirectly affected through impacts such as noise, visual disturbance, erosion, sedimentation, hydrologic change, chemical exposure, reduced availability or access to food resources, barriers to movement, increased human intrusions or access, and all areas affected by reasonably forseeable future that would not occur without ("but for") the project that is currently being proposed.

We appreciate your concern for threatened and endangered species. The Service encourages Federal and non-Federal project proponents to consider listed, proposed, and candidate species early in the planning process. Feel free to contact this office if you would like more information or assistance evaluating potential project impacts to federally listed species or other wildlife resources. Please include the Consultation Tracking Number in the header of this letter with any correspondence about your project.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Dundee Canal Green Acres Island Preserve

Official Species List

Provided by:

New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 8232
(609) 646-9310
http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2015-SLI-0449
Event Code: 05E2NJ00-2015-E-00317

Project Type: LAND - RESTORATION / ENHANCEMENT

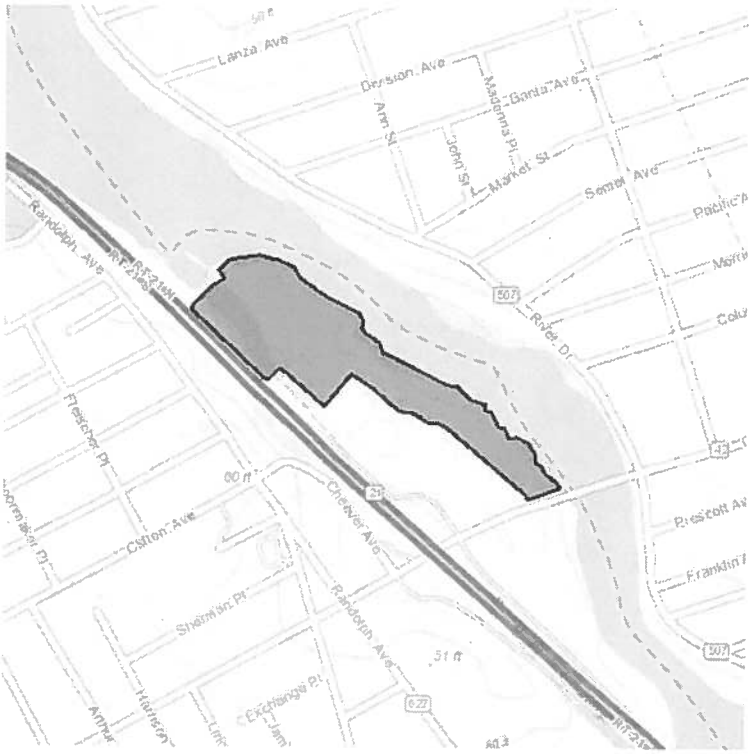
Project Name: Dundee Canal Green Acres Island Preserve
Project Description: Hudson Raritan Estuary (HRE) and HRE-Lower Passaic River Ecosystem Restoration Feasibility Study

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

United States Department of Interior
Fish and Wildlife Service

Project name: Dundee Canal Green Acres Island Preserve

Project Location Map:



Project Coordinates: The coordinates are too numerous to display here.

Project Counties: Passaic, NJ

United States Department of Interior
Fish and Wildlife Service

Project name: Dundee Canal Green Acres Island Preserve

Endangered Species Act Species List

There are a total of 0 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

There are no listed species identified for the vicinity of your project.

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Site 900 – Dundee Island Park/Pulaski Park

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 08232
PHONE: (609)646-9310 FAX: (609)646-0352
URL: www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2016-SLI-0428
Event Code: 05E2NJ00-2016-E-00321
Project Name: Dundee Island Park/Pulaski Park

March 30, 2016

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species that may occur in your proposed action area and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*)

If the enclosed list indicates that any listed species may be present in your action area, please visit the New Jersey Field Office consultation web page as the next step in evaluating potential project impacts: http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

On the New Jersey Field Office consultation web page you will find:

- habitat descriptions, survey protocols, and recommended best management practices for listed species;
- recommended procedures for submitting information to this office; and
- links to other Federal and State agencies, the Section 7 Consultation Handbook, the Service's wind energy guidelines, communication tower recommendations, the National Bald Eagle Management Guidelines, and other resources and recommendations for protecting wildlife resources.

The enclosed list may change as new information about listed species becomes available. As per Federal regulations at 50 CFR 402.12(e), the enclosed list is only valid for 90 days. Please return to the ECOS-IPaC website at regular intervals during project planning and implementation to obtain an updated species list. When using ECOS-IPaC, be careful about drawing the boundary of your Project Location. Remember that your action area under the ESA

is not limited to just the footprint of the project. The action area also includes all areas that may be indirectly affected through impacts such as noise, visual disturbance, erosion, sedimentation, hydrologic change, chemical exposure, reduced availability or access to food resources, barriers to movement, increased human intrusions or access, and all areas affected by reasonably forseeable future that would not occur without ("but for") the project that is currently being proposed.

We appreciate your concern for threatened and endangered species. The Service encourages Federal and non-Federal project proponents to consider listed, proposed, and candidate species early in the planning process. Feel free to contact this office if you would like more information or assistance evaluating potential project impacts to federally listed species or other wildlife resources. Please include the Consultation Tracking Number in the header of this letter with any correspondence about your project.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Dundee Island Park/Pulaski Park

Official Species List

Provided by:

New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 08232
(609) 646-9310
http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2016-SLI-0428
Event Code: 05E2NJ00-2016-E-00321

Project Type: LAND - RESTORATION / ENHANCEMENT

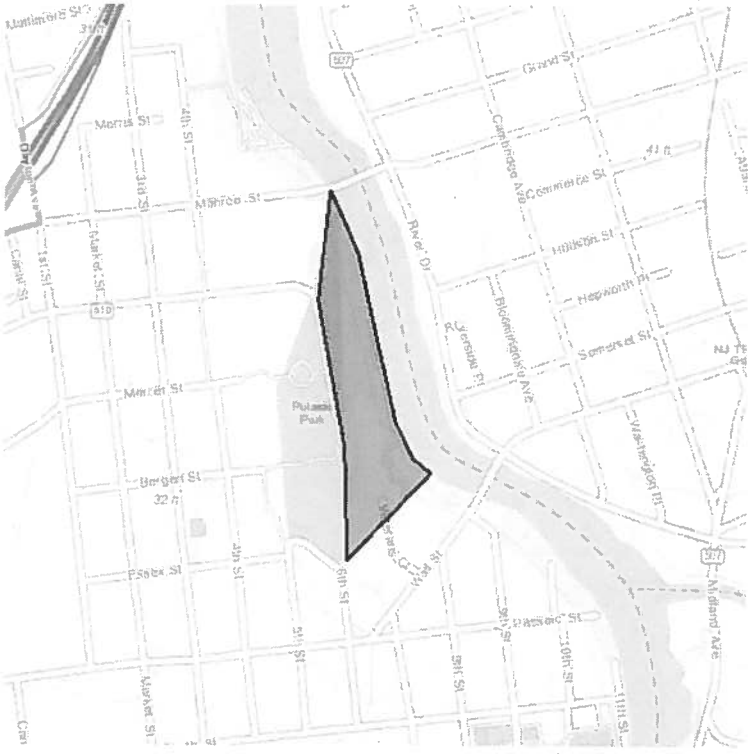
Project Name: Dundee Island Park/Pulaski Park
Project Description: Hudson Raritan Estuary (HRE) and HRE-Lower Passaic River Ecosystem Restoration Feasibility Study

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

United States Department of Interior
Fish and Wildlife Service

Project name: Dundee Island Park/Pulaski Park

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-74.11291122436523 40.86867762652326, -74.11312580108643 40.86716854167582, -74.11263227462769 40.86514014765027, -74.11258935928345 40.86359852663907, -74.11108732223511 40.864783143872174, -74.1114091873169 40.86499410088275, -74.11173105239868 40.865513376815116, -74.11239624023438 40.867801387895646, -74.11291122436523 40.86867762652326)))

Project Counties: Passaic, NJ

Endangered Species Act Species List

There are a total of 0 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

There are no listed species identified for the vicinity of your project.

United States Department of Interior
Fish and Wildlife Service

Project name: Dundee Island Park/Pulaski Park

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Site 887 – Essex County Branch Brook Park

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 08232
PHONE: (609)646-9310 FAX: (609)646-0352
URL: www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2016-SLI-0426
Event Code: 05E2NJ00-2016-E-00319
Project Name: Essex County Branch Brook Park

March 30, 2016

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species that may occur in your proposed action area and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*)

If the enclosed list indicates that any listed species may be present in your action area, please visit the New Jersey Field Office consultation web page as the next step in evaluating potential project impacts: http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

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- links to other Federal and State agencies, the Section 7 Consultation Handbook, the Service's wind energy guidelines, communication tower recommendations, the National Bald Eagle Management Guidelines, and other resources and recommendations for protecting wildlife resources.

The enclosed list may change as new information about listed species becomes available. As per Federal regulations at 50 CFR 402.12(e), the enclosed list is only valid for 90 days. Please return to the ECOS-IPaC website at regular intervals during project planning and implementation to obtain an updated species list. When using ECOS-IPaC, be careful about drawing the boundary of your Project Location. Remember that your action area under the ESA

is not limited to just the footprint of the project. The action area also includes all areas that may be indirectly affected through impacts such as noise, visual disturbance, erosion, sedimentation, hydrologic change, chemical exposure, reduced availability or access to food resources, barriers to movement, increased human intrusions or access, and all areas affected by reasonably forseeable future that would not occur without ("but for") the project that is currently being proposed.

We appreciate your concern for threatened and endangered species. The Service encourages Federal and non-Federal project proponents to consider listed, proposed, and candidate species early in the planning process. Feel free to contact this office if you would like more information or assistance evaluating potential project impacts to federally listed species or other wildlife resources. Please include the Consultation Tracking Number in the header of this letter with any correspondence about your project.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Essex County Branch Brook Park

Official Species List

Provided by:

New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 08232
(609) 646-9310
http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2016-SLI-0426
Event Code: 05E2NJ00-2016-E-00319

Project Type: LAND - RESTORATION / ENHANCEMENT

Project Name: Essex County Branch Brook Park
Project Description: Hudson Raritan Estuary (HRE) and HRE-Lower Passaic River Ecosystem Restoration Feasibility Study

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:

Project Coordinates: MULTIPOLYGON (((-74.17651176452637 40.778721618334295, -74.17900085449219 40.772871880045216, -74.18028831481932 40.76507142776426, -74.1855239868164 40.75863536531348, -74.18543815612793 40.75148345390278, -74.18140411376953 40.75011800153818, -74.17762756347656 40.76247107352298, -74.17376518249512 40.76767168026598, -74.17024612426758 40.77664177039938, -74.17651176452637 40.778721618334295)))

Project Counties: Essex, NJ

United States Department of Interior
Fish and Wildlife Service

Project name: Essex County Branch Brook Park

Endangered Species Act Species List

There are a total of 0 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

There are no listed species identified for the vicinity of your project.

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Site 865 - Kearny Point

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 8232
PHONE: (609)646-9310 FAX: (609)646-0352
URL: www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2015-SLI-0451
Event Code: 05E2NJ00-2015-E-00319
Project Name: Kearny Point

June 18, 2015

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species that may occur in your proposed action area and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*)

If the enclosed list indicates that any listed species may be present in your action area, please visit the New Jersey Field Office consultation web page as the next step in evaluating potential project impacts: http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

On the New Jersey Field Office consultation web page you will find:

- habitat descriptions, survey protocols, and recommended best management practices for listed species;
- recommended procedures for submitting information to this office; and
- links to other Federal and State agencies, the Section 7 Consultation Handbook, the Service's wind energy guidelines, communication tower recommendations, the National Bald Eagle Management Guidelines, and other resources and recommendations for protecting wildlife resources.

The enclosed list may change as new information about listed species becomes available. As per Federal regulations at 50 CFR 402.12(e), the enclosed list is only valid for 90 days. Please return to the ECOS-IPaC website at regular intervals during project planning and implementation to obtain an updated species list. When using ECOS-IPaC, be careful about drawing the boundary of your Project Location. Remember that your action area under the ESA

is not limited to just the footprint of the project. The action area also includes all areas that may be indirectly affected through impacts such as noise, visual disturbance, erosion, sedimentation, hydrologic change, chemical exposure, reduced availability or access to food resources, barriers to movement, increased human intrusions or access, and all areas affected by reasonably forseeable future that would not occur without ("but for") the project that is currently being proposed.

We appreciate your concern for threatened and endangered species. The Service encourages Federal and non-Federal project proponents to consider listed, proposed, and candidate species early in the planning process. Feel free to contact this office if you would like more information or assistance evaluating potential project impacts to federally listed species or other wildlife resources. Please include the Consultation Tracking Number in the header of this letter with any correspondence about your project.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Kearny Point

Official Species List

Provided by:

New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 8232
(609) 646-9310
http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2015-SLI-0451
Event Code: 05E2NJ00-2015-E-00319

Project Type: LAND - RESTORATION / ENHANCEMENT

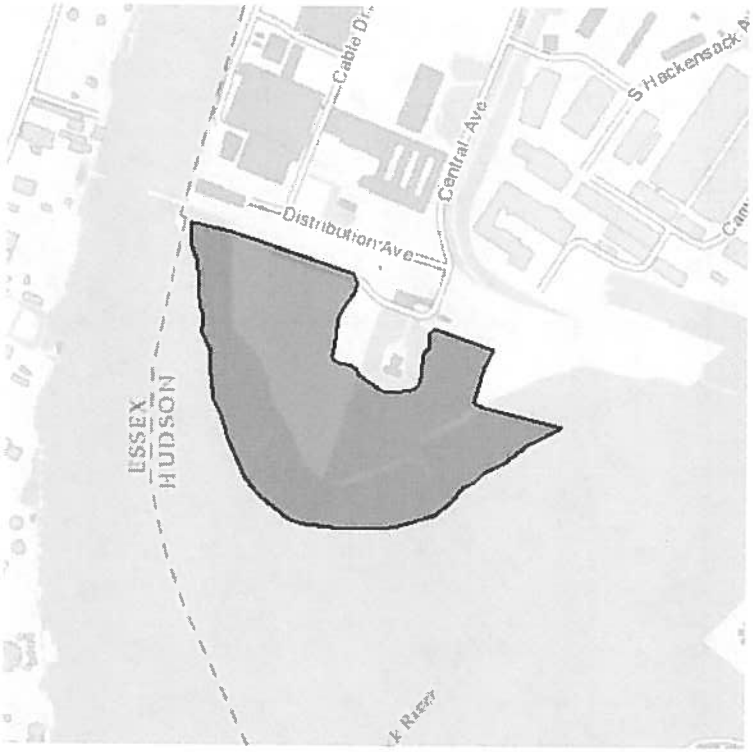
Project Name: Kearny Point
Project Description: Hudson Raritan Estuary (HRE) and HRE-Lower Passaic River Ecosystem Restoration Feasibility Study

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

United States Department of Interior
Fish and Wildlife Service

Project name: Kearny Point

Project Location Map:



Project Coordinates: The coordinates are too numerous to display here.

Project Counties: Hudson, NJ

United States Department of Interior
Fish and Wildlife Service

Project name: Kearny Point

Endangered Species Act Species List

There are a total of 0 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

There are no listed species identified for the vicinity of your project.

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Site 866 - Oak Island Yards

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 8232
PHONE: (609)646-9310 FAX: (609)646-0352
URL: www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2015-SLI-0455
Event Code: 05E2NJ00-2015-E-00323
Project Name: Oak Island Yards

June 18, 2015

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species that may occur in your proposed action area and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*)

If the enclosed list indicates that any listed species may be present in your action area, please visit the New Jersey Field Office consultation web page as the next step in evaluating potential project impacts: http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

On the New Jersey Field Office consultation web page you will find:

- habitat descriptions, survey protocols, and recommended best management practices for listed species;
- recommended procedures for submitting information to this office; and
- links to other Federal and State agencies, the Section 7 Consultation Handbook, the Service's wind energy guidelines, communication tower recommendations, the National Bald Eagle Management Guidelines, and other resources and recommendations for protecting wildlife resources.

The enclosed list may change as new information about listed species becomes available. As per Federal regulations at 50 CFR 402.12(e), the enclosed list is only valid for 90 days. Please return to the ECOS-IPaC website at regular intervals during project planning and implementation to obtain an updated species list. When using ECOS-IPaC, be careful about drawing the boundary of your Project Location. Remember that your action area under the ESA

is not limited to just the footprint of the project. The action area also includes all areas that may be indirectly affected through impacts such as noise, visual disturbance, erosion, sedimentation, hydrologic change, chemical exposure, reduced availability or access to food resources, barriers to movement, increased human intrusions or access, and all areas affected by reasonably forseeable future that would not occur without ("but for") the project that is currently being proposed.

We appreciate your concern for threatened and endangered species. The Service encourages Federal and non-Federal project proponents to consider listed, proposed, and candidate species early in the planning process. Feel free to contact this office if you would like more information or assistance evaluating potential project impacts to federally listed species or other wildlife resources. Please include the Consultation Tracking Number in the header of this letter with any correspondence about your project.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Oak Island Yards

Official Species List

Provided by:

New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 8232
(609) 646-9310
http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

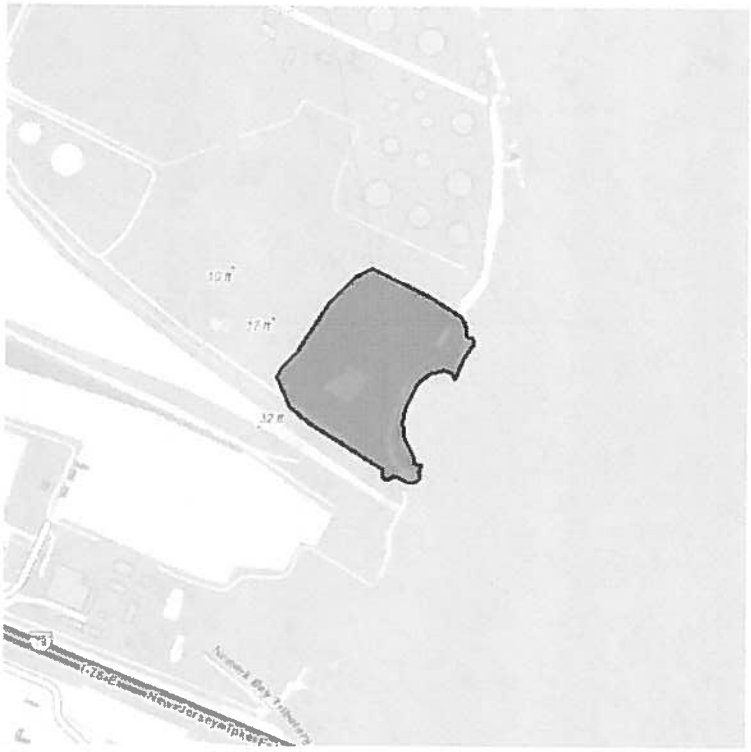
Consultation Code: 05E2NJ00-2015-SLI-0455
Event Code: 05E2NJ00-2015-E-00323

Project Type: LAND - RESTORATION / ENHANCEMENT

Project Name: Oak Island Yards
Project Description: Hudson Raritan Estuary (HRE) and HRE-Lower Passaic River Ecosystem Restoration Feasibility Study

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:



Project Coordinates: The coordinates are too numerous to display here.

Project Counties: Essex, NJ

United States Department of Interior
Fish and Wildlife Service

Project name: Oak Island Yards

Endangered Species Act Species List

There are a total of 0 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

There are no listed species identified for the vicinity of your project.

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Site 719 - Meadowlark Marsh

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 8232
PHONE: (609)646-9310 FAX: (609)646-0352
URL: www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2015-SLI-0453
Event Code: 05E2NJ00-2015-E-00321
Project Name: Meadowlark Marsh

June 18, 2015

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species that may occur in your proposed action area and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*)

If the enclosed list indicates that any listed species may be present in your action area, please visit the New Jersey Field Office consultation web page as the next step in evaluating potential project impacts: http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

On the New Jersey Field Office consultation web page you will find:

- habitat descriptions, survey protocols, and recommended best management practices for listed species;
- recommended procedures for submitting information to this office; and
- links to other Federal and State agencies, the Section 7 Consultation Handbook, the Service's wind energy guidelines, communication tower recommendations, the National Bald Eagle Management Guidelines, and other resources and recommendations for protecting wildlife resources.

The enclosed list may change as new information about listed species becomes available. As per Federal regulations at 50 CFR 402.12(e), the enclosed list is only valid for 90 days. Please return to the ECOS-IPaC website at regular intervals during project planning and implementation to obtain an updated species list. When using ECOS-IPaC, be careful about drawing the boundary of your Project Location. Remember that your action area under the ESA

is not limited to just the footprint of the project. The action area also includes all areas that may be indirectly affected through impacts such as noise, visual disturbance, erosion, sedimentation, hydrologic change, chemical exposure, reduced availability or access to food resources, barriers to movement, increased human intrusions or access, and all areas affected by reasonably forseeable future that would not occur without ("but for") the project that is currently being proposed.

We appreciate your concern for threatened and endangered species. The Service encourages Federal and non-Federal project proponents to consider listed, proposed, and candidate species early in the planning process. Feel free to contact this office if you would like more information or assistance evaluating potential project impacts to federally listed species or other wildlife resources. Please include the Consultation Tracking Number in the header of this letter with any correspondence about your project.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Meadowlark Marsh

Official Species List

Provided by:

New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 8232
(609) 646-9310
http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2015-SLI-0453
Event Code: 05E2NJ00-2015-E-00321

Project Type: LAND - RESTORATION / ENHANCEMENT

Project Name: Meadowlark Marsh
Project Description: Hudson Raritan Estuary (HRE) and HRE-Lower Passaic River Ecosystem Restoration Feasibility Study

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:

Project Coordinates: The coordinates are too numerous to display here.

Project Counties: Bergen, NJ

United States Department of Interior
Fish and Wildlife Service

Project name: Meadowlark Marsh

Endangered Species Act Species List

There are a total of 0 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

There are no listed species identified for the vicinity of your project.

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Site 721 - Metromedia Tract

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 8232
PHONE: (609)646-9310 FAX: (609)646-0352
URL: www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2015-SLI-0454
Event Code: 05E2NJ00-2015-E-00322
Project Name: Metro Media Tract

June 18, 2015

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species that may occur in your proposed action area and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*)

If the enclosed list indicates that any listed species may be present in your action area, please visit the New Jersey Field Office consultation web page as the next step in evaluating potential project impacts: http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

On the New Jersey Field Office consultation web page you will find:

- habitat descriptions, survey protocols, and recommended best management practices for listed species;
- recommended procedures for submitting information to this office; and
- links to other Federal and State agencies, the Section 7 Consultation Handbook, the Service's wind energy guidelines, communication tower recommendations, the National Bald Eagle Management Guidelines, and other resources and recommendations for protecting wildlife resources.

The enclosed list may change as new information about listed species becomes available. As per Federal regulations at 50 CFR 402.12(e), the enclosed list is only valid for 90 days. Please return to the ECOS-IPaC website at regular intervals during project planning and implementation to obtain an updated species list. When using ECOS-IPaC, be careful about drawing the boundary of your Project Location. Remember that your action area under the ESA

is not limited to just the footprint of the project. The action area also includes all areas that may be indirectly affected through impacts such as noise, visual disturbance, erosion, sedimentation, hydrologic change, chemical exposure, reduced availability or access to food resources, barriers to movement, increased human intrusions or access, and all areas affected by reasonably forseeable future that would not occur without ("but for") the project that is currently being proposed.

We appreciate your concern for threatened and endangered species. The Service encourages Federal and non-Federal project proponents to consider listed, proposed, and candidate species early in the planning process. Feel free to contact this office if you would like more information or assistance evaluating potential project impacts to federally listed species or other wildlife resources. Please include the Consultation Tracking Number in the header of this letter with any correspondence about your project.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Metro Media Tract

Official Species List

Provided by:

New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 8232
(609) 646-9310
http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2015-SLI-0454
Event Code: 05E2NJ00-2015-E-00322

Project Type: LAND - RESTORATION / ENHANCEMENT

Project Name: Metro Media Tract
Project Description: Hudson Raritan Estuary (HRE) and HRE-Lower Passaic River Ecosystem Restoration Feasibility Study

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

United States Department of Interior
Fish and Wildlife Service

Project name: Metro Media Tract

Project Location Map:

Project Coordinates: MULTIPOLYGON (((-74.03289628083866 40.8144290875324, -74.03303979015413 40.8138305959053, -74.03320586076183 40.81346189814815, -74.03331105536085 40.81304748964999, -74.03358937215177 40.81225600531047, -74.03359799844884 40.812120507155726, -74.03367119157218 40.81201906722623, -74.03367622777563 40.811880295539254, -74.03381454170767 40.811378867740586, -74.03403312462893 40.810796787841525, -74.03409748640985 40.81050487959658, -74.03429564572743 40.810162729826175, -74.03491876259079 40.80959240226758, -74.03572521254847 40.809119225771724, -74.03601564680463 40.80898040102471, -74.03673221491977 40.80883213519496, -74.03773031760005 40.80871999153442, -74.03900515606307 40.80875014040669, -74.04129915393275 40.81251201711598, -74.03615275744374 40.81412465532861, -74.03584882706167 40.814894672850926, -74.03289628083866 40.8144290875324)))

Project Counties: Bergen, NJ

United States Department of Interior
Fish and Wildlife Service

Project name: Metro Media Tract

Endangered Species Act Species List

There are a total of 0 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

There are no listed species identified for the vicinity of your project.

United States Department of Interior
Fish and Wildlife Service

Project name: Metro Media Tract

Critical habitats that lie within your project area

There are no critical habitats within your project area.

4. Fish and Wildlife Coordination Act

(USACE to ADD)

NJDEP Natural Heritage Program Reports

Site 902 - Clifton Dundee Canal Green Acres Purchase and Dundee Island Preserve

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
State Forestry Services
Mail Code 501-04
ONLM -Natural Heritage Program
P.O. Box 420
Trenton, NJ 08625-0420
Tel. #609-984-1339
Fax. #609-984-1427

BOB MARTIN
Commissioner

May 21, 2015

Tara Stewart
Louis Berger
412 Mount Kemble Avenue
Morristown, NJ 07962-1946

Re: HRE Ecosystem Restoration Feasibility - Dundee Canal Green Acres and Island Preserve

Dear Ms. Stewart:

Thank you for your data request regarding rare species information for the above referenced project site in Clifton City, Passaic County.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.1) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Request for Data into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1 and 2 (attached) to determine if any priority sites are located on or in the vicinity of the site.

A list of rare plant species and ecological communities that have been documented from the project site, referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive NJ-GeoWeb website at the following URL, http://www.state.nj.us/dep/gis/geowebsplash.htm or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

NHP File No. 15-4007481-7665

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 15-4007481-7665

Table 1: On Site Data Request Search Results (7 Possible Reports)

Report Name	Included	Number of Pages
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. On or In the Immediate Vicinity of the Project Site Based on Search of the Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
3. Natural Heritage Priority Sites On Site	No	0 pages included
4. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Species Based Patches	No	0 pages included
5. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.1	No	0 pages included
6. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Stream Habitat File	No	0 pages included
7. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	Included	Number of Pages
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.1 Species Based Patches	No	0 pages included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.1	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.1 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Site 892 - Dundee Island Park/ Pulaski Park

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Parks & Forestry
State Forestry Service
Mail Code 501-04
Office of Natural Lands Management – Natural Heritage Program
P.O. Box 420
Trenton, NJ 08625-0420
Tel. (609) 984-1339 Fax. (609) 984-1427

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

April 12, 2016

Kaitlin Garvey
Louis Berger
412 Mount Kemble Avenue
Morristown, NJ 07962-1946

Re: HRE Ecosystem Restoration Feasibility - Clifton Dundee Canal Green Acres Purchase and Dundee Island Preserve
Passaic City, Passaic County

Dear Ms. Garvey:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.1) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Natural Heritage Data Request Form into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

This report does not include information concerning known Northern Long-eared Bat hibernacula and maternity roost trees protected under the provisions of the U.S. Fish & Wildlife Service's 4(d) Rule. You must contact the U.S. Fish & Wildlife Service, New Jersey Field Office, for additional information concerning the location of these features, or visit their website at: http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1 and 2 (attached) to determine if any priority sites are located on or in the immediate vicinity of the site.

NHP File No. 16-4007471-9703

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive NJ-GeoWeb website at the following URL, http://www.state.nj.us/dep/gis/geowebsplash.htm or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 16-4007471-9703

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	Included	Number of Pages
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Species Based Patches	No	0 pages included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.1	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	Included	Number of Pages
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.1 Species Based Patches	No	0 pages included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.1	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.1 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Essex County Branch Brook Park

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Parks & Forestry
State Forestry Service
Mail Code 501-04
Office of Natural Lands Management – Natural Heritage Program
P.O. Box 420
Trenton, NJ 08625-0420
Tel. (609) 984-1339 Fax. (609) 984-1427

BOB MARTIN
Commissioner

April 12, 2016

Kaitlin Garvey
Louis Berger
412 Mount Kemble Avenue
Morristown, NJ 07962-1946

Re: HRE Ecosystem Restoration Feasibility - Essex County Branch Brook Park
Newark City, Essex County

Dear Ms. Garvey:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.1) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Natural Heritage Data Request Form into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

This report does not include information concerning known Northern Long-eared Bat hibernacula and maternity roost trees protected under the provisions of the U.S. Fish & Wildlife Service's 4(d) Rule. You must contact the U.S. Fish & Wildlife Service, New Jersey Field Office, for additional information concerning the location of these features, or visit their website at: http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1 and 2 (attached) to determine if any priority sites are located on or in the immediate vicinity of the site.

NHP File No. 16-4007472-9669

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive NJ-GeoWeb website at the following URL, http://www.state.nj.us/dep/gis/geowebsplash.htm or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 16-4007472-9669

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	Included	Number of Pages
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.1	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Red-headed Woodpecker	Melanerpes erythrocephalus	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	Included	Number of Pages
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.1 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.1	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.1 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.1 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Red-headed Woodpecker	Melanerpes erythrocephalus	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N

Site 865 - Kearny Point

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
State Forestry Services
Mail Code 501-04
ONLM -Natural Heritage Program
P.O. Box 420
Trenton, NJ 08625-0420
Tel. #609-984-1339
Fax. #609-984-1427

BOB MARTIN
Commissioner

May 21, 2015

Tara Stewart
Louis Berger
412 Mount Kemble Avenue
Morristown, NJ 07962-1946

Re: HRE Ecosystem Restoration Feasibility - Kearny Point

Dear Ms. Stewart:

Thank you for your data request regarding rare species information for the above referenced project site in Kearny Town, Hudson County.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.1) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Request for Data into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1 and 2 (attached) to determine if any priority sites are located on or in the vicinity of the site.

A list of rare plant species and ecological communities that have been documented from the project site, referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive NJ-GeoWeb website at the following URL, http://www.state.nj.us/dep/gis/geowebsplash.htm or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

NHP File No. 15-4007461-7671

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 15-4007461-7671

Table 1: On Site Data Request Search Results (7 Possible Reports)

Report Name	Included	Number of Pages
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. On or In the Immediate Vicinity of the Project Site Based on Search of the Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
3. Natural Heritage Priority Sites On Site	No	0 pages included
4. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Species Based Patches	Yes	1 page(s) included
5. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.1	No	0 pages included
6. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Stream Habitat File	No	0 pages included
7. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	Included	Number of Pages
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.1 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.1	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.1 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.1 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N

Site 866 - Oak Island Yards

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
State Forestry Services
Mail Code 501-04
ONLM -Natural Heritage Program
P.O. Box 420
Trenton, NJ 08625-0420
Tel. #609-984-1339
Fax. #609-984-1427

BOB MARTIN
Commissioner

May 21, 2015

Tara Stewart
Louis Berger
412 Mount Kemble Avenue
Morristown, NJ 07962-1946

Re: HRE Ecosystem Restoration Feasibility - Oak Island Yards

Dear Ms. Stewart:

Thank you for your data request regarding rare species information for the above referenced project site in Newark City, Essex County.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.1) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Request for Data into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1 and 2 (attached) to determine if any priority sites are located on or in the vicinity of the site.

A list of rare plant species and ecological communities that have been documented from the project site, referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive NJ-GeoWeb website at the following URL, http://www.state.nj.us/dep/gis/geowebsplash.htm or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

NHP File No. 15-4007461-7672

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 15-4007461-7672

Table 1: On Site Data Request Search Results (7 Possible Reports)

Report Name	Included	Number of Pages
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. On or In the Immediate Vicinity of the Project Site Based on Search of the Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
3. Natural Heritage Priority Sites On Site	No	0 pages included
4. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Species Based Patches	Yes	1 page(s) included
5. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.1	No	0 pages included
6. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Stream Habitat File	No	0 pages included
7. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Peregrine Falcon	Falco peregrinus	Urban Nest	4	NA	State Endangered	G4	S1B,S3N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Tricolored Heron	Egretta tricolor	Foraging	2	NA	Special Concern	G5	S3B,S3N

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	Included	Number of Pages
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.1 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.1	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.1 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.1 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Cattle Egret	Bubulcus ibis	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Peregrine Falcon	Falco peregrinus	Urban Nest	4	NA	State Endangered	G4	S1B,S3N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Tricolored Heron	Egretta tricolor	Foraging	2	NA	Special Concern	G5	S3B,S3N

Site 719 - Meadowlark Marsh

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
State Forestry Services
Mail Code 501-04
ONLM -Natural Heritage Program
P.O. Box 420
Trenton, NJ 08625-0420
Tel. #609-984-1339
Fax. #609-984-1427

BOB MARTIN
Commissioner

May 21, 2015

Tara Stewart
Louis Berger
412 Mount Kemble Avenue
Morristown, NJ 07962-1946

Re: HRE Ecosystem Restoration Feasibility - Meadowlark Marsh

Dear Ms. Stewart:

Thank you for your data request regarding rare species information for the above referenced project site in Ridgefield Borough, Bergen County.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.1) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Request for Data into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1 and 2 (attached) to determine if any priority sites are located on or in the vicinity of the site.

A list of rare plant species and ecological communities that have been documented from the project site, referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive NJ-GeoWeb website at the following URL, http://www.state.nj.us/dep/gis/geowebsplash.htm or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

NHP File No. 15-4007471-7675

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 15-4007471-7675

Table 1: On Site Data Request Search Results (7 Possible Reports)

Report Name	Included	Number of Pages
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. On or In the Immediate Vicinity of the Project Site Based on Search of the Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
3. Natural Heritage Priority Sites On Site	No	0 pages included
4. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Species Based Patches	Yes	1 page(s) included
5. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.1	No	0 pages included
6. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Stream Habitat File	No	0 pages included
7. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.1 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Cattle Egret	Bubulcus ibis	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Peregrine Falcon	Falco peregrinus	Urban Nest	4	NA	State Endangered	G4	S1B,S3N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Yellow-crowned Night-heron	Nyctanassa violacea	Foraging	3	NA	State Threatened	G5	S2B,S2N

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	Included	Number of Pages
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.1 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.1	No	0 pages included
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Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
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	Cattle Egret	Bubulcus ibis	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Northern Harrier	Circus cyaneus	Breeding Sighting	4	NA	State Endangered	G5	S1B,S3N
	Northern Harrier	Circus cyaneus	Non-breeding Sighting	2	NA	Special Concern	G5	S1B,S3N
	Peregrine Falcon	Falco peregrinus	Urban Nest	4	NA	State Endangered	G4	S1B,S3N
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Site 721 - Metromedia Tract

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
State Forestry Services
Mail Code 501-04
ONLM -Natural Heritage Program
P.O. Box 420
Trenton, NJ 08625-0420
Tel. #609-984-1339
Fax. #609-984-1427

BOB MARTIN
Commissioner

May 21, 2015

Tara Stewart
Louis Berger
412 Mount Kemble Avenue
Morristown, NJ 07962-1946

Re: HRE Ecosystem Restoration Feasibility - Metro Media Tract

Dear Ms. Stewart:

Thank you for your data request regarding rare species information for the above referenced project site in Carlstadt Borough, Bergen County.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.1) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Request for Data into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

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NHP File No. 15-4007471-7674

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

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Chapter 4: Fish and Wildlife Coordination Act






United States Department of the Interior

FISH AND WILDLIFE SERVICE
New York Field Office
3817 Luker Road
Cortland, New York 13045

2017-CPA-0109

and

New Jersey Field Office
4 East Jimmie Leeds Road, Unit 4
Galloway, New Jersey 08205

MAR 17 2017

Peter Weppler, Chief
Environmental Analysis Branch, New York District
U.S. Army Corps of Engineers
Jacob K. Javits Federal Building
New York, New York 10278-0090
Attention: Diana Kohtio

Subject: Draft Fish and Wildlife Coordination Act Report for the Hudson-Raritan Estuary Comprehensive Restoration Plan and HRE Ecosystem Restoration Feasibility Study

Dear Mr. Weppler:

The U.S. Fish and Wildlife Service (Service) has prepared this draft Fish and Wildlife Coordination Act (draft FWCA) report pursuant to the Fish and Wildlife Coordination Act of 1958 (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*) in support of the U.S. Army Corps of Engineers, New York District (Corps) *Hudson-Raritan Estuary (HRE) Comprehensive Restoration Plan* and HRE Ecosystem Restoration Feasibility Study. This report was prepared by the New Jersey, New York, and Long Island Field Offices in accordance with the fiscal year 2017 Scope of Work (SOW) transfer funding agreement dated October 17, 2016.

As per the SOW, the draft FWCA report will be sent to the New Jersey Department of Environmental Protection (NJDEP), New York State Department of Environmental Conservation (NYSDEC), and the National Oceanic and Atmospheric Administration (NOAA) for their review and comments. A courtesy copy is also being mailed to New York City Department of Parks and Recreation (NYCDPR) for comments as many of the proposed restoration projects identified in the HRE Feasibility Study are on New York City (NYC)-owned lands. In addition, we are seeking additional comments from the NYCDPR on the Service's native landscape recommendations; specifically the need to develop a long-term management plan that ensures a sufficient supply of genetically diverse plants on NYC public lands. Upon receipt of comments from the Corps, NOAA, NJDEP, NYSDEC, and NYCDPR, the Service will finalize the draft FWCA report.

Thank you for your continued cooperation and leadership in addressing landscape-level restoration efforts throughout the HRE. The Service continues to look forward to working cooperatively with the Corps to maximize benefits to our Nation's fish and wildlife resources from the proposed project. Please contact Steve Mars at 609-382-5267 should you have any question regarding this draft FWCA for activities that occur in New Jersey. Please contact Steve Papa or Kerri Dikun at 631-286-0485 extensions 2120 and 2116, respectively, should you have any question regarding activities that may occur in New York.

Sincerely,

for David A. Stilwell
Field Supervisor
New York Field Office

Eric Schrading
Field Supervisor
New Jersey Field Office

cf: USACE, New York, NY (D. Kohtio)
NMFS (Greene, Mehran, Rosman)
NJDEP (Davis, Motter, Hamill)
NYSDEC, Long Island City, NY (Maresca)
NYCDPR, New York, NY (Larson, Toth [Greenbelt Native Plant Center])

Draft Fish and Wildlife Coordination Act

SECTION 2(b) REPORT

U.S. Army Corps of Engineers
Hudson Raritan Estuary Comprehensive Restoration Plan
HRE Ecosystem Restoration Feasibility Study

Prepared by:

Department of the Interior
U.S. Fish and Wildlife Service
Long Island Field Office, New York Field Office
and
New Jersey Field Office

Prepared for:
U.S. Army Corps of Engineers
New York District
New York, New York

March 2017

EXECUTIVE SUMMARY

The draft Fish and Wildlife Coordination Act (draft FWCA) was prepared by the U.S. Fish and Wildlife Service (Service) to support the U.S. Army Corps of Engineers, New York District's (Corps) *"Hudson-Raritan Estuary (HRE) Comprehensive Restoration Plan* (CRP)" and HRE Ecosystem Restoration Feasibility Study (HRE Feasibility Study).

The draft FWCA discusses the current environmental conditions of the study area, details Federal trust resource issues (endangered species, migratory birds, migratory fish, and species of greatest conservation need), and offers a series of recommendations that will maximize the habitat benefits of each of the proposed restoration projects identified in the CRP and HRE Feasibility Study on fish and wildlife resources.

The study area consists of one of the largest estuaries on the east coast of the United States and includes parts of Western Long Island Sound, the Bronx, Passaic, Hackensack and Hudson Rivers, and Raritan and Jamaica Bay. It provides valuable habitat for nearly 400 species of plants and animals, including trust resources of the Service, numerous Federal and State listed species, and migratory birds and fish.

The study area is also home to more than 20 million people and the Ports of New York and New Jersey, collectively one of the largest ports in the U.S., employing millions of people. It is also where the American Industrial Revolution began in the 18th Century, involving the manufacturing and shipping of commercial goods that continue to this day. Along with over two hundred years of supporting business, employment, housing and commerce, the HRE changed dramatically from its pre-colonial days. Nearly all of its freshwater and tidal wetlands and hundreds of acres of open waters were filled, dredged or dumped into to accommodate human expansion in the area. Many businesses and municipalities disposed of solid and liquid waste and numerous chemicals, all at the detriment of a once healthy and thriving ecosystem. Today, many toxic compounds can be found in uplands and estuary sediments, posing a threat to the human environment, including fish and wildlife resources and their habitats.

The Service identifies a number of fish and wildlife resource concerns and planning objectives in the draft FWCA document and a series of planning and mitigation recommendations that if implemented, will meet the goals of the HRE CRP.

The draft FWCA identifies the development history of the HRE (*i.e.*, habitat loss and degradation, extirpation of native species, significant stream and coastal fortification, urbanization, and industrialization) and the single greatest challenge to planning and implementing a habitat restoration initiative in the HRE - the presence of legacy contaminants. The Service identifies numerous academic and Government research that highlight biotic contaminant exposure in the HRE. The Service also makes recommendations with many of the individual projects identified by the Corps, including added project features to avoid or minimize chemical exposure on the human environment.

In addition, the Service recommends that to achieve a level of "permanence" for many of the proposed restoration projects, the Corps and their project sponsors should commit to monitoring and managing each of the restoration sites for a minimum of five years in order to evaluate project success and implement adaptive measures, if necessary.

The Service is confident that should the Corps and its project sponsors implement the recommendations contained in the draft FWCA report, the overall goals of the HRE CRP Feasibility Study of restoring habitats; improving coastal resilience; remediating environmental contaminants; controlling invasive species; and protecting fish and wildlife and their habitats will have a greater probability of success. The Service is committed to moving us closer to a more natural and nature-based solution that protects the coastline of the HRE.

Questions, comments and suggestions related to this document are encouraged and should be directed to:

David A. Stilwell, Field Supervisor
New York Field Office
3817 Luker Road
Cortland, New York 13045
Phone: (607) 753-9334

and

Eric Schrading, Field Supervisor
New Jersey Field Office
4 East Jimmie Leeds Road
Galloway, New Jersey 08205
Phone: (609) 646-9310

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I. INTRODUCTION

This draft Fish and Wildlife Coordination Act (FWCA) report was prepared pursuant to the Fish and Wildlife Coordination Act of 1958, as amended (48 Stat. 401, as amended 661 *et seq*.) and provides updated conservation and planning assistance to the U.S. Army Corps of Engineers, New York District (Corps) *Hudson-Raritan Estuary (HRE) Comprehensive Restoration Plan (CRP)* (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). The CRP is an outgrowth of the HRE Ecosystem Restoration Feasibility Study (HRE Feasibility Study) which was authorized by House of Representatives' Committee on Transportation and Infrastructure Resolution, dated April 15, 1999, Docket Number 2596. Through these efforts, the Corps is currently proposing habitat restoration at 33 sites across five planning regions identified in the CRP.

Specifically, the draft FWCA report contains updated information on wildlife resources (including threatened and endangered species), an assessment of project impacts, recommendations to avoid and minimize project-related impacts, and recommendations for additional monitoring and investigations over the life of the proposed restoration projects. It is based on information the Corps provided to the Service on July 8, 2016; several site visits conducted by the Service; updated studies, academic research, field notes, site photographs, and maps; and analysis of Geographic Information Systems (GIS) data sets.

Upon agreement by the Corps and the project sponsors on the final restoration plans, additional review by the Service may be necessary under a separate transfer of funding agreement pursuant to the FWCA, with further involvement of the National Oceanic and Atmospheric Administration (NOAA), the New Jersey Department of Environmental Protection (NJDEP), the New York State Department of Environmental Conservation (NYSDEC), and the City of New York (NYC), as necessary.

As per the scope of work (SOW) between the Corps and Service dated October 17, 2016, the draft FWCA report will be sent to the NOAA, NJDEP, and the NYSDEC for their review and comments. A courtesy copy is also being mailed to New York City Department of Parks and Recreation (NYCDPR) for comments as many of the proposed restoration projects identified in the HRE Feasibility Study are on New York City-owned lands. In addition, we are seeking additional comments from the NYCDPR on our native landscape recommendations; specifically the need to develop a long-term management plan that ensures a sufficient supply of genetically diverse plants on NYC public lands. Upon receipt of comments from the Corps, NOAA, NJDEP, NYSDEC, and NYCDPR, the Service will finalize the draft FWCA report.

II. PURPOSE, SCOPE, AND AUTHORITY

The purpose of the Corps' current update to the HRE Feasibility Study is to identify water resource issues, discuss existing environmental conditions, and highlight factors contributing to environmental degradation in the HRE. The HRE Feasibility Study also strives to contribute to ecosystem restoration, by building upon existing restoration and Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344 *et seq*.) mitigation efforts.

The CRP serves as the Corps' strategic plan for ecological restoration program by using Target Ecosystem Characteristics (TEC) developed by the region's stakeholders, including Federal, State, and local agencies and interested public. The CRP's goal is to develop a mosaic of habitats that provide an important ecosystem property or feature that is of ecological and/or societal value including restoration of coastal wetlands, shellfish/oyster reefs; eelgrass beds; water bird islands; public access; maritime forest; tributary connections; shorelines and shallow habitat; fish, crab, and lobster habitat; reduction of contaminated sediments; and improvement of enclosed and confined waters.

The CRP includes a total of eight 'Planning Regions' that are geographically located within an approximately 25 mile (mi) radius around the Statue of Liberty, in the States of New Jersey (NJ) and New York (NY)(U.S. Army Corps of Engineers 2016a). These include:

1) Newark Bay/Lower Passaic/Hackensack River, NJ;
2) Kill Van Kull and Arthur Kill, NY and NJ;
3) Lower Bay, NY and NJ;
4) Lower Raritan River, NJ;
5) Upper Bay, NY and NJ;
6) East River/Harlem River/Western Long Island Sound (includes Bronx River), NY;
7) Lower Hudson River, NY and NJ; and
8) Jamaica Bay, NY.

A total of 33 proposed restoration sites were identified by the Corps (U.S. Army Corps of Engineers 2016a), and fall within five of these Planning Regions, including numbers 1, 3, 5, 6, and 8, listed above. These are discussed in more detail in the following sections and in Appendix A.

The HRE Feasibility Study was authorized by House of Representatives' Committee on Transportation and Infrastructure Resolution dated April 15, 1999, Docket Number 2596. For projects authorized under Water Resource Development Act (33 U.S.C. 2201 *et seq*.), the Endangered Species Act (ESA) (87 Stat. 884, as amended; (16 U.S.C. 15.31 *et seq*.) and the FWCA represent the primary authorities for the Service's coordination with the Corps. Under the FWCA, the Corps and the Service coordinate during project planning to conserve, protect, and enhance fish, wildlife, and plants and their habitats. The final FWCA report will constitute the report of the Secretary of the Interior as required by Section 2(b) of the FWCA, which establishes fish and wildlife conservation as a co-equal purpose or objective of federally funded or permitted water resource development projects. The FWCA allows for reports and recommendations from the Service and State to be integrated into Corps' reports seeking authorization for the Federal action, and it grants the Corps the authority to include fish and wildlife conservation measures within these projects.

This report does not preclude separate review and comments by the Service pursuant to the December 22, 1993, Memorandum of Agreement (MOA) among the U.S. Environmental Protection Agency (USEPA), NJDEP, and the Service, if project implementation requires a permit from the NJDEP pursuant to the New Jersey Freshwater Wetlands Protection Act (N.J.S.A. 13:9B *et seq*.); nor do they preclude comments or recommendations on any documents

prepared pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (83 Stat. 852; as amended, 42 U.S.C. 4321 *et seq*.).

Additional laws relevant to natural resource protection and the HRE Feasibility Study under the which the Service has provided comments include the ESA, NEPA, the Migratory Bird Treaty Act (MBTA) (40 Stat. 755; 16 U.S.C. 703 *et seq*), and the Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250 as amended; 16 U.S.C. 668-668d).

The ESA establishes specific consultation, evaluation, and reporting requirements for both the action agency and the Service. The ESA requires that each Federal agency shall, in consultation with the Secretary of the Interior, ensure that any action authorized by such agency is not likely to jeopardize the continued existence of listed species or their critical habitats. Subject to such guidelines as the Secretary may establish, Federal agencies are to consult on any prospective agency actions that may affect such species or habitats. Action agencies should determine the listed species that may occur in a project area; whether or not such species are present and, if so, whether or not they are "likely to be affected" by the proposed action; and enter into formal consultation where a "likely to be adversely affected" determination is made.

Finally, this report also provides comments in support of the 2003 MOA between the Corps, Service, the Federal Aviation Administration (FAA), and others regarding Aircraft-Wildlife Strikes and the circular entitled, *"Advisory Circular Subject: Hazardous Wildlife Attractants on or Near Airports (150/5200-33B)*."

The Service understands that the draft FWCA Report and/or findings and recommendations will be incorporated into a Corps' draft environmental assessment (EA) for the HRE Feasibility Study.

III. RELEVANT STUDIES AND REPORTS

Over the years, the Corps has conducted numerous feasibility studies for civil works and restoration projects within the HRE and coordinated with the Service under the FWCA to produce Planning Aid or FWCA reports.

The following provides a summary of previous Corps and Service reports relevant to ecosystem restoration in the HRE. A full list of studies and reports is on file at the Service's New York, New Jersey, and Long Island Field Offices. These reports should be used in conjunction with the information and recommendations in this report to determine the effects of the HRE Feasibility Study projects; identify fish and wildlife resource concerns and opportunities, and identify potential mitigation measures to address construction and maintenance of the proposed restoration activities.

A. NEWARK BAY/HACKENSACK RIVER/PASSAIC RIVER PLANNING REGION

Several reports and letters were prepared by the New Jersey Field Office that are relevant to the CRP's and HRE Feasibility Study's Lower Bay and Newark Bay/Hackensack River/Passaic River Planning Regions, including:

Planning Aid Report for the Corps' Hackensack Meadowlands Ecosystem Restoration Project. Bergen and Hudson Counties, NJ. March 2004 (United States Fish and Wildlife Service 2004).

Planning Aid Report for the Corps' Lower Passaic River Remediation and Ecosystem Restoration. Project Bergen, Essex, Hudson, and Passaic Counties, NJ. Biological Resources Overview and Restoration Opportunities. October 2005 (United States Fish and Wildlife Service 2005a).

Planning Aid Report for the Corps' Hackensack Meadowlands Ecosystem Restoration Project. Bergen and Hudson Counties, NJ - Environmental Contaminants Issues for Restoration. November 2005 (United States Fish and Wildlife Service 2005b).

Service's letter on Corps' October 2006 draft Meadowlands Comprehensive Restoration Implementation Plan (MCRIP). January 24, 2007. (United States Fish and Wildlife Service 2007a).

The Hackensack Meadowlands Initiative, Preliminary Conservation Planning. March 2007 (United States Fish and Wildlife Service 2007b).

Planning Aid Letter for the CRP on Corps' draft Target Ecosystem Characteristics. September 14, 2007. (United States Fish and Wildlife Service 2007c).

Planning Aid Letter on Corps' draft Meadowlands Comprehensive Restoration Implementation Plan (MCRIP). March 17, 2008. (United States Fish and Wildlife Service 2008a).

Draft Planning Aid Letter for the Joseph G. Minish Passaic River Waterfront Park and Historic Area, City of Newark, Essex County, NJ. February 19, 2016. (United States Fish and Wildlife Service 2016a).

Final Planning Aid Letter for the Joseph G. Minish Passaic River Waterfront Park and Historic Area, City of Newark, Essex County, NJ. April 22, 2016. (United States Fish and Wildlife Service 2016b).

B. HARLEM RIVER/EAST RIVER/WESTERN LONG ISLAND SOUND PLANNING REGION

The Corps' Bronx River Basin Ecosystem Restoration Feasibility Report (2009b) made recommendations for ecosystem restoration at two sites within the Bronx River Basin and requested programmatic authority for the remainder of the opportunities within the watershed.

The Corps' Soundview Ecosystem Restoration Project (see http://www.nan.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/487636/fact-sheet-soundview-park-bronx-new-york/) restored aquatic ecosystem resources and adjacent upland habitat in southern Soundview Park, and contributed to improved water quality by increasing the area of functional salt marsh that removes nutrients from the water column, traps sediment and provides habitat for wetland dependent fish and wildlife. Approximately 3.7 acres (ac) in Soundview Park immediately north of the park's lagoon area were converted to a vegetated tidal wetland from what was a common reed (*Phragmites sp.*) and debris dominated area.

C. JAMAICA BAY PLANNING REGION

The Corps' Jamaica Bay, Marine Beach, and Plumb Beach Ecosystem Restoration Feasibility Study (U.S. Army Corps of Engineers 2013a) determined the feasibility of improvements for beach erosion control, hurricane protection and environmental improvements at seven sites within Jamaica Bay, including Brant Point, Spring Creek, Bayswater Park, Dubos Point, Hawtree Point, Fresh Creek, and Dead Horse Bay.

Between 2006-2014, under the Corps' Continuing Authorities Program (CAP), the Corps, in partnership with the Port Authority of New York and New Jersey (PANYNJ), the NYSDEC, the New York City Department of Environmental Protection (NYCDEP), and the National Park Service (NPS), restored marshes at Elders Point East and West, Yellow Bar Hassock, Black Wall, and Rulers Bar using dredged material from the Corps' New York Harbor Deepening Project.

The Jamaica Bay Self-Sustaining Oyster Population project is a NYCDEP project that was funded on June 16, 2014 by a Department of the Interior (DOI) Sandy Coastal Resiliency grant administered by National Fish and Wildlife Foundation (NFWF). In an effort to restore eastern oysters (*Crassostrea virginica*) to Jamaica Bay, the NYCDEP proposes to develop several donor and receiver oyster beds across half an acre in the northeastern end of Jamaica Bay at the Head of Bay. Successful establishment of a self-sustaining oyster population in Jamaica Bay would dovetail with fulfilling the goals set in the CRP for oyster restoration.

The Corps' Gerritsen Creek - Marine Park Ecosystem Restoration Project (see http://www.nan.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/487245/fact-sheet-gerritsen-creekmarine-park-ny/) improved the aquatic and coastal grassland habitats located in the northeastern section of Marine Park, Brooklyn, New York. The project restored 31 acres of salt marsh and 23 acres of rare coastal grassland habitat.

IV. DESCRIPTION OF THE STUDY AREA

An overview of the study area, planning regions, and the 33 potential restoration projects, which are the focus of this draft FWCA report is shown on Figure 1. The sites are grouped according to their Planning Regions as set forth in the Corps and PANYNJ (2016), and described below. More detailed descriptions of each of the proposed restoration projects are given in Appendix A.

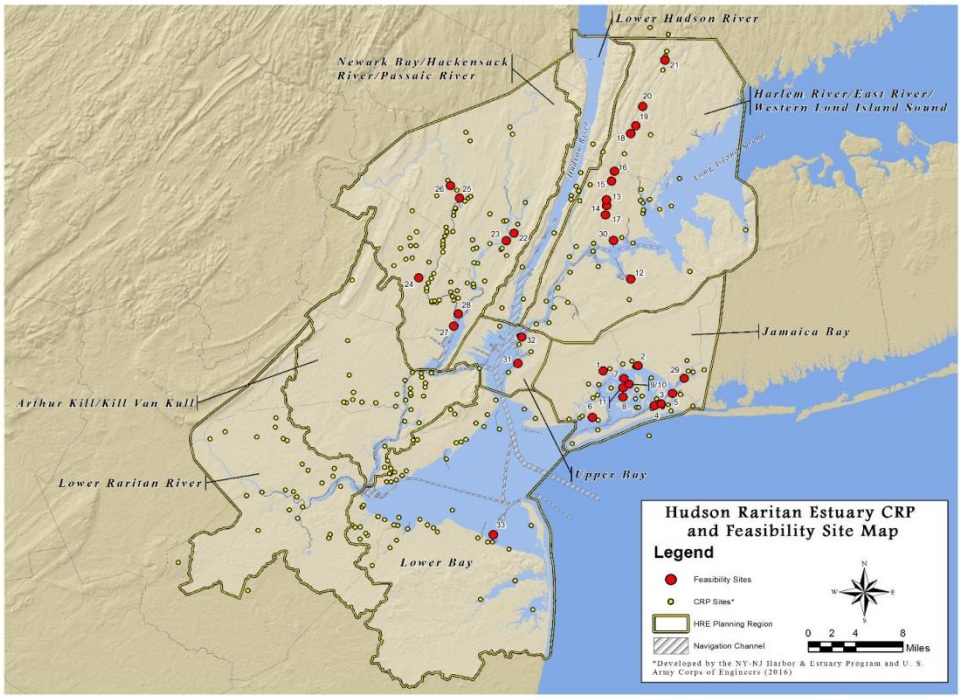

Figure 1. HRE Comprehensive Restoration Plan and Feasibility Site Map (U.S Army Corps of Engineers 2009a)

A. NEWARK BAY/HACKENSACK RIVER/PASSAIC RIVER PLANNING REGION

The Hackensack and Passaic River basins create the upper boundary of this Planning Region, with the lower boundary defined by Newark Bay and its ports (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). The Corps identified seven sites for consideration in this planning region, including Meadowlark Tract, Metromedia Marsh, Essex County Branch Brook Park, Dundee Island Park, Clifton Dundee Canal Green Acres, Lower Passaic River "Deferred" Site- Oak Island Yards, and Lower Passaic River "Deferred Site"- Kearny Point. Predominant land uses in this Planning Region include commercial, industrial, and residential development (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). The Hackensack Meadowlands is a dominant feature within this region, measuring approximately 19,730 acres. The lower 1.7 miles of the Lower Passaic River is dominated by petroleum commercial facilities currently utilizing the river (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016).

B. ARTHUR KILL /KILL VAN KULL REGIONAL PLANNING AREA, NJ

There are no projects identified in the Arthur Kill/ Kill Van Kull Regional Planning Area.

C. LOWER BAY PLANNING REGION, NY AND NJ

The proposed restoration site in this planning region is the Naval Weapons Station Earle. Overall, the Lower Bay Planning Region contains an expanse of both deep and shallow open water habitats, including Lower New York Bay, Raritan Bay, and Sandy Hook Bay. This planning region is bounded on the north by Staten Island and Brooklyn and on the south by Monmouth County, NJ, and on the ocean side by a transect between Sandy Hook, NJ and Rockaway Point, NY. The Lower Bay Planning Region is predominantly developed with industrial, commercial and residential land uses. Sandy Hook's shoreline is interspersed with public and private marinas, sandy beaches, and riprapped shorelines (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016).

D. LOWER RARITAN RIVER REGIONAL PLANNING AREA, NJ

There are no projects identified in the Lower Raritan River Planning Area.

E. UPPER BAY PLANNING REGION

Governors Island and Bush Terminal restoration sites are located in New York Harbor's Upper Bay Planning Region. Governors Island is a 176 acre island west of Brooklyn (separated by the Buttermilk Channel) and less than 1,000 yards South of Battery Park on the southern tip of Manhattan. Bush Terminal sits on the waterfront of Upper Bay in the Sunset Park neighborhood of Brooklyn. Upper Bay is considered a Class I waterbody by the NYSDEC due to the presence of Polychlorinated biphenyls (PCBs) and other contaminants of concern, including heavy metals, and is best suited for secondary contact including fishing and boating (New York State Department of Environmental Conservation 2016a, 6 NYCRR Part 701.13). Despite the influences of heavy urbanization surrounding Upper New York Bay, the waterbody supports a diverse aquatic ecosystem (National Park Service 2008).

F. HARLEM RIVER/EAST RIVER/WESTERN LONG ISLAND SOUND PLANNING REGION

1. Bronx River

A total of 10 restoration sites are located along or at the mouth of the Bronx River in the Harlem River/East River/Western Long Island Sound Planning Region. Four projects are located in Westchester County, including Westchester County Center, Garth Woods/Harney Road, Crestwood Lake, and Bronxville Lake. The remaining six sites are in Bronx County, including Muskrat Cove, Shoelace Park, Stone Mill Dam, Bronx Zoo and Dam, River Park/West Farm Rapids Park, and Soundview Park.

The Bronx River serves as a tributary of the Long Island Sound and the HRE. Originating near the Kensico Reservoir in Valhalla, New York, its watershed covers 56 square miles, as it flows for 23 miles before it enters into the East River, between the Soundview and Hunts Point neighborhoods. Fifteen miles of the river occur in Westchester County and the remaining eight

miles flow through Bronx County. The Bronx River is a highly modified and urbanized water course, and, as a result, water quality has been degraded from runoff due to the conversion of forested lands to development and impervious surfaces. Pollution enters the Bronx River from nonpoint and point sources, which include discharges from sewage outfalls (Center for Watershed Protection, Inc. 2010). Additionally, there are dams and rock weirs on the river that create barriers to fish passage. The lowest dam on the river at 182nd Street was modified by NYCDPR by constructing a fish ladder in 2014.

A fish passage feasibility study by NYCDPR (Larson *et al*. 2004) determined that the Bronx River has suitable levels of dissolved oxygen, salinity, temperature, suspended sediment, flow, and channel habitat to support river herring. However, in certain areas of the river or at certain times (*e.g*. after storms or in particular seasons) some of these parameters may exceed threshold values suitable for river herring and/or other native fish species (Larson *et al.* 2004; Crimmens and Larson 2006). Spawning and refuge habitats are present for river herring and other native species, but they are not abundant (Larson *et al.* 2004; Crimmens and Larson 2006).

Due to low dissolved oxygen and/or pathogens, all sections of the Bronx River are listed on NYSDEC's Proposed Final 2016 Section 303(d) list of priority waterbodies (New York State Department of Environmental Conservation 2016a). The uppermost reach within Westchester County (NY-1702-0107) is classified by NYSDEC as Class C. New York State lists Class C waters as best suited for fishing (6 NYCRR Part 701.8). The middle portion of the Bronx River (NY-1702-0106) is classified as Class B. New York State lists that the best uses of Class B waters are primary and secondary contact recreation and fishing (6 NYCRR Part 701.7). The lower tidal portion of the river (Section 1702-0006) is designated as Class I. The best usages of Class I waters are secondary contact recreation and fishing (6 NYCRR Part 701.13).

2. Flushing Creek

Flushing Creek is located in northern Queens and empties into Flushing Bay, which is adjacent to LaGuardia Airport. The Flushing Creek watershed is approximately 10,000 acres. The watershed is primarily residential, but also includes commercial, industrial, institutional, and open/recreational spaces. The land directly surrounding Flushing Creek is industrial, commercial, vacant, or used in support of transportation-related features. Flushing Meadows-Corona Park is a notable open space/recreation area that comprises about 20 percent of the watershed. The water quality of Flushing Creek and Bay is negatively influenced by sewer systems, filled wetlands, and shoreline hardening (AECOM USA, Inc. 2014).

G. LOWER HUDSON RIVER REGIONAL PLANNING AREA

There are no projects identified in the Lower Hudson River Planning Area.

H. JAMAICA BAY PLANNING REGION

There are twelve proposed restoration sites in the Jamaica Bay Planning Region including Dead Horse Bay, Fresh Creek, Hawtree Point, Brant Point, Dubos Point, Bayswater State Park, Head

of Bay, Elders Center Marsh Island, Duck Point Marsh Island, Pumpkin Patch East Marsh Island, Pumpkin Patch West Marsh Island, and Stony Point Marsh Island. The Dead Horse Bay restoration site is furthest west and is located on the north shore of Rockaway Inlet adjacent to the NPS's Floyd Bennett Field. The Fresh Creek and Hawtree Point restoration sites are located on the northern shore of Jamaica Bay. Immediately adjacent to John F. Kennedy International Airport (JFK Airport), Head of Bay is a basin in the easternmost section of Jamaica Bay. Three sites are located on the eastern portion of the bayside of the Rockaway Peninsula, including Brant Point, Dubos Point, and Bayswater State Park. Lastly, the Jamaica Bay Marsh Islands, including Elders Center Marsh Island, Duck Point Marsh Island, Pumpkin Patch East Marsh Island, Pumpkin Patch West Marsh Island, and Stony Point Marsh Island, are centrally located within the bay, just west of Cross Bay Boulevard.

Jamaica Bay is an approximately 20,000 acres saline to brackish bay that lies between the Rockaway Peninsula and the mainland shorelines of southern Brooklyn and Queens. The bay is comprised of marshes, open water, maritime shrub and scrub, and shorelines, with a mean depth of approximately 13 feet. It connects to Lower New York Bay and the Atlantic Ocean through Rockaway Inlet.

Heavily urbanized areas of NY, Queens, Kings, and Nassau Counties surround the bay. As a result, the bay's bottom and shorelines have been modified over time and its ecological functions and values have been significantly altered by human activity. About 12,000 of the original 16,000 acres of wetlands in the bay, mostly around the perimeter of the bay, have been filled. Extensive areas of the bay have been dredged for navigation channels and to provide fill for the airports and other construction projects, and there have been extensive modifications to the freshwater and brackish creeks. Specifically, an estimated 125 million cubic yards of material was removed from the bay and substantial modifications to the tidal inlet connections with Atlantic Ocean (New York City Department of Environmental Protection 2007) were made. The majority of the bay's freshwater inputs are now from the sewage treatment facilities which contribute between 259 and 287 million gallons of treated effluent per day (New York City Department of Environmental Protection 2007; Waldman 2008).

The bay experiences annual algal blooms, depressed dissolved oxygen levels in select areas, and increased nutrient levels. Water quality sampling and modeling show that Jamaica Bay is a eutrophic system but, in spite of this, water quality indicators (*i.e.*, dissolved oxygen and fecal colliform) suggest water quality of the bay is improving, although high levels of nitrogen and chlorophyll-*a* continue to persist and prove problematic in the estuary (New York City Department of Environmental Protection 2007).

The primary sediments found within the eastern and northern portions of the bay are characterized as muddy fine sand while the southern and western portions of the bay are characterized as fine to medium sands (U.S. Fish and Wildlife Service 1997). As discussed in more detail in the following sections, Jamaica Bay contains large quantities of chemicals, including heavy metals, pesticides, PCB, dichlorodiphenyltrichloroethane (DDT), and 2,3,7,8,-tetrachlordibenzo-*p*-dioxin (2,3,7,8-TCDD) (U.S. Army Corps of Engineers 2016b).

Concentrations of many of these contaminants exceed State regulatory thresholds throughout the bay (Steinberg *et al.* 2004. New York State Department of Environmental Conservation 2014a).

Despite the negative influences of the surrounding urbanization, Jamaica Bay provides habitat to various fish and wildlife species and has received special designations from multiple agencies and organizations. For example, Jamaica Bay is recognized as a New York State Department of State (NYSDOS) Significant Coastal Fish and Wildlife Habitat, an Audubon Important Bird Area, and is a component of the Jamaica Bay and Breezy Point Significant Habitat Complex designated by the Service (New York City Department of Environmental Protection 2007; U.S. Fish and Wildlife Service 1997; Burger and Liner 2005; and New York State Department of State 1992). In addition, a portion of the bay is within the NPS Gateway National Recreation Area's 9,100 acre Jamaica Bay National Wildlife Refuge.

V. FISH AND WILDLIFE RESOURCE CONCERNS AND PLANNING OBJECTIVES

The purpose of coordination between the Corps and the Service under the FWCA is to ensure equal consideration of fish and wildlife resources in the planning of water resource development projects. The Service's emphasis for the HRE Feasibility Study restoration projects is to ensure beneficial outcomes by identifying means and measures to mitigate the potential adverse impacts during construction activities, to recommend additional monitoring and investigations over the life of the restoration projects, and to make positive contributions in the recovery of fish and wildlife resources and their respective habitats.

The term "wildlife resources" as used herein includes birds, fish, mammals, and all other classes of native animals and all types of aquatic and land vegetation upon which fish and wildlife are dependent, pursuant to the FWCA. Aquatic habitats, marsh grasslands, bay bottoms, and stream riparian corridors are of primary importance to the Service because these habitats are limited in availability, rich in species, and support some of the rarest species in the New York and New Jersey urban areas. However, all fish and wildlife resources were considered in this report.

A. FISH AND WILDLIFE RESOURCE CONCERNS

The Service has several fish and wildlife resource concerns, as identified in this section. Recommendations to address these concerns are found in the draft FWCA (Section XII, *"Service Planning and Mitigation Recommendations"*).

1. Habitat Loss and Degradation

The history of shoreline disturbance and development has significantly contributed towards a reduction in the amount of suitable shoreline habitat available for use by wildlife. Diminishment of the natural vegetative communities has fragmented habitat and limited food, cover, and nesting for fish and wildlife in the five Planning Regions. The armoring of river banks and shorelines is an ongoing threat as communities attempt to increase protection from erosion, storms, and sea level rise.

2. Invasive Species

Invasive plants can be problematic as they can have negative impacts on native species and ecosystems. Invasive plant species may lower plant diversity by outcompeting native species (Hejda *et al.* 2009; Charles and Dukes 2007). The presence of invasive species may also lower wildlife diversity and species composition can be different in areas of high densities of invasive plants than in areas with native plants (Benoit and Askins 1999; Herrera and Dudley 2003; and Burghardt *et al.* 2009). Invasive plants may have other ecosystem effects such as: alterations of energy, nutrient, and hydrological cycles; changes to disturbance regimes; alterations to physical habitat; and impacts on climate and atmospheric composition (Charles and Dukes 2007). Numerous species of invasive plants can be found within the study area and are problematic at many of the proposed restoration sites.

3. Wildlife and Habitat Management Related to FAA MOA

Wildlife management is a significant issue, particularly near JFK and LaGuardia Airports. Currently, U.S. Department of Agriculture (USDA) Wildlife Services undertakes gull and geese population control measures within the Jamaica Bay Wildlife Refuge near JFK Airport and gull and coyote control near LaGuardia Airport.

4. Environmental Contaminants

Many of the waterways within the HRE (*i.e*., the Arthur Kill, Kill Van Kull, Passaic River, Hackensack River, Newark Bay, Jamaica Bay, and parts of the Hudson River) were historically, and continue to be, heavily industrialized. Contaminants that have been identified in these water bodies include, but are not limited to, metals, polycyclic aromatic hydrocarbons (PAH), pesticides, chlorinated dioxins and furans, PCBs, solvents, and wastewater-related pharmaceuticals and healthcare products, derived from point and non-point sources. The presence of legacy contaminants in these sediments poses a significant challenge in performing habitat restoration (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016).

Further, a considerable number of studies have specifically evaluated the biological effects of contamination within the HRE; a brief summary of this research is presented in Appendix D. (Note that this review does not include the vast amount of information from the USEPA's remedial investigative studies and independent researchers that document tissue concentrations in HRE's biota exceeding literature-based effects thresholds). Most of these studies have not teased out the specific compound responsible for observed effects. Indeed, contaminant impacts are often additive, or even synergistic (*i.e.*, the combined effects are greater than the separate effects added together), making it difficult to discern the relative contribution of various compounds on an overall biological response. Thus, although some of the studies focused on impairment caused by a specific contaminant, it is important to recognize that the overall potential for contaminant impacts within the HRE is a function of the mixture of various compounds that are present and which together may have very different, and often more detrimental, effects than they each would individually.

The CWA mandates that States submit biennial reports to the USEPA, describing the quality of their waters. The biennial Statewide Water Quality Inventory Report or "305(b) Report" must include the status of principal waters in terms of overall water quality and support of designated uses, as well as strategies to maintain and improve water quality. The 305(b) reports are used by Congress and USEPA to establish program priorities and funding for Federal and State water resource management programs. The biennial List of Water Quality Limited Waters or "303(d) List" identifies waters that are not attaining designated uses because they do not meet surface water quality standards despite the implementation of technology-based effluent limits. Nearly all of the projects proposed in the CRP lie in waters reported by NJDEP and NYSDEC as "impaired" (New Jersey Department of Environmental Protection 2012). Impairments in these waterways are due to low dissolved oxygen, the presence of pathogens, and the exceedances of PCB, DDT, dieldrin, benzo(a)pyrene, chlordane, mercury and other heavy metals, dioxins/furans, PAHs, pesticides, volatile organic compounds (VOCs), and increased floatables (U.S. Environmental Protection Agency 2014a; New Jersey Department of Environmental Protection 2014).

The NJDEP utilizes the USEPA's Rapid Bioassessment Protocols (RBPs) to help monitor the health of streams and watersheds. One protocol, termed Ambient Biological Monitoring Network (AMNET), examines dynamics of benthic macroinvertebrate populations to determine taxa present. Ratings of the stream condition are based on the biodiversity of the system and the level of pollution tolerance of the families collected, the ratio of pollution tolerant to pollution intolerant families such as members the insect orders Ephemoptera (mayflies), Plectoptera (stoneflies), and Trichoptera (caddisflies), often referred to as EPTs. The AMNET scoring system rates stream conditions as either "excellent," "good," "fair," or "poor." Invertebrate sampling by NJDEP in 1993 rated most of the waters they sampled in the HRE (Lower Raritan River, Arthur Kill/Kill Van Kull, and Newark Bay/Hackensack River, Passaic River Planning Regions) as "severely" (13.3 percent), moderately (57.9 percent) or non-impaired (31.9 percent) (New Jersey Department of Environmental Protection 1994). In a similar AMNET effort in 2008, the NJDEP found similar results of degraded macroinvertebrate communities for the Northeast Water Region (Passaic and Hackensack River Watershed); with 6.9 percent rated as "excellent", 18.6 percent exhibiting "good", 51 percent"fair", and 23.5 percent "poor" (New Jersey Department of Environmental Protection 2012).

The NYSDEC identified contaminants in the middle and lower portions of the Bronx River; however the levels encountered were "not likely to cause chronic toxicity to sediment-dwelling organisms, but cadmium, lead, and PAHs (*e.g.*, pyrene) were found at elevated levels" (New York State Department of Environmental Conservation 2011). In addition, "…Macroinvertebrate (crayfish) tissue collected at this site and chemically analyzed showed chromium, lead and titanium to be elevated and should continue to be monitored." Finally, the NYSDEC considered the water quality of this portion of the Bronx River to be poor and aquatic life not fully supported in the stream" (New York State Department of Environmental Conservation 2011).

In Flushing Creek, contaminant risk appears minimal in this area of the Harlem River/East River/Western Long Island Sound Planning Region. In addition, parts of the Lower Bay Planning Region (Sandy Hook, and Shrewsbury and Navesink Rivers) also exhibit minimum contaminant risk as these sites are not in close proximity to sources of chemical pollution.

In Jamaica Bay, chemicals from modern sources (*i.e.*, wastewater treatment plants discharges, combined sewer overflows, non-point source discharges, and chemical and oil spills) are also known to adversely affect bottom sediments (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). A study by Benotti and Brownawell (2007) also identified fifteen pharmaceutical compounds in Jamaica Bay at least once, including 12 that were identified in most, or all, of the 24 sites which were surveyed. These compounds included: caffeine, cotinine, nicotine, paraxanthine, acetaminophen, carbamazepine, cimetidine, codeine, diltiazem, ketoprofen, metformin, ranitidine, and salbutamol.

The Upper Bay Planning Region is considered a Class I waterbody by the NYSDEC due to the presence of PCBs and other contaminants of concern including heavy metals (New York State Department of Environmental Conservation 2016a, 6 NYCRR Part 701.13).

The HRE's geographic boundary includes numerous Superfund and state-designated hazardous waste sites. The CRP indicated that habitat restoration in contaminated habitats may result in the creation of "attractive nuisance issues" whereby "…the restoration site has the potential to release contamination into the food chain (wildlife or human)," highlighting the challenges of planning habitat restoration in contaminated areas. In the report entitled, *"The Hackensack Meadowlands Initiative*" (U.S. Fish and Wildlife 2007), the Service also highlighted concerns that contaminants may have created sink habitats for certain invertebrates and fishes in the Hackensack Meadowlands. A sink habitat is a habitat in which species cannot persist due to elevated mortality rates, without immigration into the habitat. Many of the contaminants encountered in the Hackensack Meadowlands are found throughout the study area. Academic research suggests that similar processes of contamination and risk to aquatic biota are occurring elsewhere in the HRE.

Remedial investigations and/or Ecological Risk Assessments of environmental contaminants associated with the Diamond Alkali, United Oil Products, Ventron/Velsicol, and Scientific Chemical Processing Superfund Sites (Louis Berger Group *et al.* 2014; Berry's Creek Study Area Cooperating PRP Group 2016; CH2M Hill Engineers, Inc. 2016) have identified the following compounds that may present ecological risk to fish and wildlife:

- 2,3,7,8-TCDD;
- total PCBs;
- PAHs;
- TCDD Toxic Equivalents (TEQs, including all dioxin-like compounds);
- total DDx (*i.e.*, DDT and its isomers); and
- mercury.

Additionally, there is a large body of peer-reviewed science, documenting that measured concentrations of several of these contaminants in HRE sediments are at levels harmful to a variety of species that form the food base of trust species under the Service's jurisdiction (*e.g.*, see Long *et al.* 1995 and Beckert and Ginn 2008, which provide literature reviews for the Effects Range-Low [ER-L] and Effects Range-Median [ER-M] thresholds). Moreover, some of these contaminants biomagnify up the food chain to higher trophic-level organisms, including humans,

where they may exert a variety of toxicological effects (see reviews by Eisler 1987a and 1987b; Boening 1998; Herbert *et al.* 1999; New Jersey Mercury Task Force 2002; Scheuhammer *et al.* 2007; Ottinger *et al.* 2009).

The Corps mapped predicted concentrations of PCBs and 2,3,7,8-TCDD in the top 10 cm of sediment throughout the HRE (U.S. Army Corps of Engineers, Port Authority of New York/New Jersey 2016). Approximately 62 percent of the HRE had sediment concentrations exceeding a remediation goal for 2,3,7,8-TCDD of 3.17 parts per trillion (ppt), a value calculated by the Service (Kubiak *et al.* 2007), using an effects concentration for successful oyster reproduction and oyster lipid content reported by Wintermyer and Cooper (2003), in conjunction with measured organic carbon contents of sediment in the HRE (Contaminant Assessment and Reduction Project [CARP], 1999-2000). The Corps (2009a) also mapped predicted concentrations of total PCBs in sediment and compared those concentrations to the ER-L and ER-M values reported by Long *et al.* (1995). Approximately 90 percent of the HRE had expected sediment PCB concentrations exceeding the ER-M, while 99 percent had sediment PCB concentrations exceeding the ER-L. These evaluations reveal the difficulties in finding potential restoration sites without environmental contaminant issues within in the HRE. However, the difficulty may actually be even greater, given that a similar exercise has not been conducted for mercury.

The Service has previously objected to the Corps issuing Section 404 Permits under the CWA for tidal restoration/mitigation projects proposed in areas of the HRE that pose a significant threat to fish and wildlife resources due to contaminant risk (*e.g.*, U.S. Fish and Wildlife Service 2015). These mitigation projects included the Evergreen Hackensack River Mitigation Bank, Kane Mitigation Bank, Evergreen MRI-3 Mitigation Bank, Global Terminal, Evergreen Mill Creek Mitigation Bank, the Tremley Point Connector Road, Piles Creek Mitigation Bank, the Borough of Carteret, Constable Hook, Losen Slote, and the Saw Mill Creek Mitigation Banks.

Post-construction monitoring for contaminant risk was required for three mitigation projects authorized by the Corps, including Kane Mitigation Bank, Evergreen MRI-3 Mitigation Bank, and Global Terminal Mitigation Bank. However, remediated and restored tidal wetlands that are in close proximity to significantly degraded sediments (*i.e.,* pollution sources) are still at risk of being recontaminated. For example, despite the Kane, MRI-3 and Global project sites being properly remediated, post construction monitoring has revealed a general trend of recontamination, with contaminant concentrations rising and, in some cases, exceeding levels known to cause harm to aquatic organisms, as documented in their respective project monitoring reports and referenced by the Service (2015). Therefore, if measures are not in place to address recontamination, should it occur, the cycle of exposing fish and wildlife resources to toxic substances will likely continue.

5. Genetic Resistance/Tolerance

In addition to the large body of literature documenting the effects of contaminants on biota in multiple planning regions of the HRE, a variety of studies have demonstrated that organisms in the estuary have evolved genetic resistance, or tolerance, to contamination. Mummichog

(*Fundulus heteroclitus),* Atlantic tomcod (*Microgadus tomcod*), fiddler crabs (*Uca* sp.) , and grass shrimp (*Palaemonetes pugio)* in the HRE have all been shown to have evolved resistance to toxicity of various compounds including PCBs (Yuan *et al.* 2006), 2,3,7,8-TCDD (Prince and Cooper 1995a and 1995b), and methylmercury (Kraus and Weis 1988; Kraus *et al.* 1988; Weis and Weis 1989; and Weis 2002). Organisms collected in the HRE and exposed to contaminants in the laboratory showed resistance to (*i.e.*, a lower frequency of) contaminant impacts including lesions, cardiac and skeletal defects, teratogenic effects, and reduced survival, depending on the contaminant and organism, in comparison to those collected in reference locations. While this may seem to be protective of organisms living in a highly contaminated environment, there appears to be corresponding biological costs to this chemical resistance, such as reduced life span, fecundity, and growth rate, or adaptability to changing conditions; increased susceptibility to other stressors; and reduced fitness in the presence of contaminants (Bush and Weis 1983; Toppin *et al.* 1987; Meyer *et al.* 2000; Meyer and Di Giulio 2003; and Wirgin and Waldman 2004). Biological resistance also raises concerns about the possibility of an increased potential for the bioaccumulation of contaminants to higher trophic levels through the evolution of toxicity-resistant prey species (Wirgin and Waldman 2004).

6. Fish/Shellfish Consumption Advisories and Guidance

Due to measured levels of TCDD TEQ, total PCBs, and methylmercury in the fish and crabs in the Passaic, Hackensack and Hudson Rivers, NJDEP (2016a and 2016b) maintains a complete "do not eat or harvest" fish and shellfish (including crab) advisory for all tidal portions of the Passaic River and Newark Bay. The advisories are the result of calculated cancer risks to the general public from eating fish and shellfish from these affected waterways. In addition, partial advisories are in place for the Newark Bay complex (including the tidal Hackensack River, Arthur Kill, Kill van Kull, and tidal tributaries), the Hudson River (from the upper New York/New Jersey border to Bayonne in Upper New York Harbor), and the Raritan Bay complex in the lower New York Harbor (including Raritan Bay, the tidal Raritan River, and the tidal portions of all tributaries). These advisories recommend that the general public limit consumption of fish and shellfish including: blue crab (*Callinectes sapidus),* American eel (*Anguilla rostrata*), white perch (*Morone americana*), white catfish (*Ameiurus catus*), striped bass (*Morone saxatilis*), winter flounder (*Pseudopleuronectes americanus*), summer flounder (*Paralichthys dentatus*), American lobster (*Homarus americanus*), weakfish (*Cynoscion regalis*), porgy (*Sparidae* spp.), and channel catfish (*Ictalurus punctatus*). Recommendations are more restrictive for high-risk categories of human populations including pregnant women and children.

The New York State Department of Health (2016) maintains similar fish consumption advisories for the area encompassing the five boroughs of New York City, where a majority of the HRE restoration projects are proposed. These advisories include a complete ban on consumption of all fish and shellfish from Jamaica Bay; a ban on consumption of American eel, gizzard shad (*Dorosoma cepedianum*), white perch, and striped bass from the Arthur Kill, Kill van Kull, Raritan Bay, and Upper New York Bay; a ban on consumption of channel catfish, gizzard shad, and white catfish from the East River and Harlem River, and various restrictions on the consumption of other fish species, including rainbow smelt (*Osmerus mordax*), Atlantic needlefish (*Strongylura marina*), and carp (*Cyprinidae* spp.). The principal identified toxic

compounds include PCBs, dioxin, and cadmium. In addition, NYC waters are closed to shellfishing (*i.e*., harvesting of clams, mussels, oysters and scallops).

The U.S. Food and Drug Administration (USFDA) also has measures in place to protect human health by requiring that food containing certain hazardous substances in excess of identified levels be removed from commerce. Current USFDA tolerances, action levels, or guidance values for PCBs, DDTs, and methylmercury are 2.0, 5.0, and 1.0 parts per million (ppm), respectively, in edible fish and shellfish tissue (U.S. Food and Drug Administration 2001). The USFDA does not have a uniform guidance value for dioxin or dioxin TEQs; however, in response to an incident involving contamination of animal feed by dioxin, USFDA scientists established a "level of concern" of 1 ppt in edible tissues of fish, eggs, meat, poultry, and other food products (Food Safety Inspection Service 1997). Tissues containing higher concentrations were deemed adulterated and unfit as food (U.S. General Accounting Office 1998).

The USEPA has developed guidance regarding fish consumption limits (U.S. Environmental Protection Agency 2000). The recommended maximum fish tissue concentrations of methylmercury, DDT, PAHs, PCBs, and dioxin/furan TEQs to allow for unrestricted consumption (*i.e*., more than sixteen meals per month) are 0.029 ppm, 0.0086 ppm, 0.0004 ppm, 0.00015 ppm, and 0.019 ppm, respectively.

Tissue concentrations in a variety of fish and shellfish species have been found to exceed USEPA's and/or USFDA's action, tolerance, or guidance levels (U.S. Department of Commerce *et al.* 2007). More recently, Candelmo *et al.* (2010) reported that laboratory bluefish (*Pomatomus saltatrix)* fed prey fish from the Hackensack River for a period of four months accumulated mercury and PCBs to levels exceeding the USEPA's and/or USFDA's action levels. (Note that these regulatory advisories are human-health based, and are unlikely to be fully protective of fish and wildlife resources.)

7. Coastal Resiliency Projects

The East Rockaway to Rockaway Inlet and Jamaica Bay Reformulation Study (Reformulation Study) includes various coastal storm risk reduction features in or around Jamaica Bay. Based on the information provided to the Service, it appears the Reformulation Study would likely affect the function and permanence of the proposed HRE restoration projects. However, the degree to which this may occur is unknown. In addition, it also appears that Dead Horse Bay, Pumpkin Patch Island, Elders Island, Duck Point, Hawtree Point, and Bayswater State Park are listed as potential mitigation sites in the HRE and/or residual risk features in the East Rockaway to Rockaway Inlet and Jamaica Bay Reformulation Studies. It is unclear how these two projects will be integrated.

8. Supply of Genetic Stock of Native Plantings

There is a shortfall of local genetic and diverse plant material available to meet the landscaping needs of the proposed projects. Contracting for native plant material under the current paradigm (*e.g.*, at the time of construction award) delays the initiation of procurement and production of

plants and results in compromised material selection, variety, and source. In restoring natural systems, plant materials must be carefully sourced to avoid the negative genetic consequences of introducing maladapted genotypes into local plant populations. Founder effects, genetic swamping, and outbreeding depression are all well-established, negative consequences of translocating maladapted non-local genetic plant materials into restoration sites (Hufford and Mazer 2003).

Numerous coastal resiliency projects are proposed in the Tri-state area over the next decade for construction by the Corps, Federal Emergency Management Agency, Housing and Urban Development, New York State Governor's Office of Storm Recovery, and other federal, state, and municipal agencies. The cumulative effect of these projects will likely further exacerbate the current shortage of locally sourced and genetically diverse plants for the study area.

The needs for acquiring appropriate plant material over the next ten years cannot be met without the Corps' involvement in assembling a regional team to collect, store, and produce sufficient quantities of genetically diverse plant material – similar to what the Bureau of Land Management (BLM) is undertaking with numerous stakeholders, seed collectors, farmers, and commercial growers (see *Plant Genetic Tolerance and Supply* section later in this report). The problem of native plant procurement for these post-hurricane Sandy projects has recently been further identified by the Rockefeller Foundation in the just-released study entitled, *"Challenges in Supplying Native Plants for Resilience (for the NYC Region)"* by Taedoki B.V. and The Rockefeller Foundation (2016).

B. PLANNING OBJECTIVES

From the Service's perspective, a desired output for each of the 33 projects identified is consistent with the Corps; to achieve long-term ecological integrity and fully functioning restored habitats.

The following objectives have been identified by the Service:

1) Reduce the historic impacts of shoreline degradation, habitat fragmentation, and the spread of invasive species on fish and wildlife populations and their habitats;
2) Implement a scientifically robust adaptive management (ADM) program with clearly identified decision points, alternative actions, and costs. The ADM program should ensure achievement of each objective.
3) Develop a strategy for restoration that is sensitive to issues of existing environmental contamination and potential re-contamination of restored habitats;
4) Ensure restoration site planning does not conflict with other habitat management efforts in the HRE; and
5) Restoration projects should support the recovery of fish and wildlife resources and their respective habitats, including listed species (ESA), birds of conservation concern and other declining flora and fauna.

VI. EVALUATION METHODOLOGY

The Corps' planning schedule and funding limitations precluded the Service from conducting field surveys and investigations for the Service's trust resources in the proposed project areas. Therefore, descriptions of natural resources are based on previous studies for this and similar projects, relevant grey and peer-reviewed literature, local, state, and federal fish and wildlife reports and plans, and personal communications with knowledgeable biologists, planners, coastal geologists, and engineers. Further investigations by the Service will be necessary upon the Corps selection of any of the proposed 33 restoration projects.

As discussed in more detail in the following section, this report discusses fish and wildlife resources focused on four ecological systems (riverine, estuarine, palustrine, and terrestrial) found in the HRE Feasibility Study Area.

VII. FISH AND WILDLIFE RESOURCES

A. ENDANGERED SPECIES AND SPECIES UNDER REVIEW FOR ESA LISTING

1. Endangered Species

Since the Corps began studying the HRE in 1996, several species of fauna have been de-listed and listed by the Service under the ESA. Species which were delisted include the peregrine falcon (*Falco peregrinus*) in 1999 and the bald eagle (*Haliaeetus leucocephalus*) in 2007. The peregrine falcon remains listed as endangered by New York and New Jersey. The bald eagle remains listed as threatened (non-breeding) and endangered (breeding) in New Jersey. In New York, the bald eagle is listed as threatened by the NYSDEC. The Indiana bat (*Myotis sodalis;* endangered), the northern long-eared bat (*Myotis septentrionalis;* threatened), red knot (*Calidris canutus rufa*; threatened), and rusty patched bumble bee (*Bombus affinis*; endangered)(effective date March 21, 2017) have been added to the list pursuant to the ESA.

Pursuant to Section 7 of the ESA, the Corps is required to make a determination as to whether the proposed restoration projects "may affect" listed species and seek the concurrence from the Service. The Service's Information, Planning, and Conservation System (IPaC) at https://ecos.fws.gov/ipac/ contains information on listed species and should be used in the Corps' determination process along with consultation with the Service.

The Indiana bat was listed as endangered in 1967. It is also listed as endangered in New York and New Jersey. In the summer, bats live in wooded or semi-wooded areas. Groups of female Indiana bats form maternity colonies to bear their offspring in crevices of trees or under loose tree bark. Dead trees are preferred roost sites, and trees standing in sunny openings are attractive because the air spaces and crevices under the bark are warm. Typical roosts are beneath the bark and in crevices of dead trees and beneath loose bark of living trees. Roost trees are likely to be exposed to direct sunlight throughout the day, and are as likely to be in upland habitats as in floodplain forests. Indiana bats are also known to roost in human-made structures such as bridges, sheds, houses and abandoned churches.

The northern long-eared bat was listed as threatened by the Service on April 2, 2015. Potential summer habitat for the northern long-eared bat is present within the geographic area of the HRE. The northern long-eared bat has a similar life history as the closely related Indiana bat, roosting in trees and foraging on flying insects. In areas of potential habitat for northern long-eared bat, seasonal restrictions for tree removal are recommended from April 1 through September 30. For more information, please refer to the enclosed narrative (Appendix H) on the biology and threats to the northern long-eared bat.

The red knot was listed as threatened under the ESA on January 12, 2015. Red knots are also federally protected under the MBTA, and are listed as endangered in New Jersey. Within Jamaica Bay, red knots may occur in the intertidal habitats (*e.g*., mudflats and beaches) during their spring (May 1 thru June 7) and fall (July 7 to November 30) migration periods. These species are highly sensitive to disturbance during this critical period in their life cycle to and from their breeding and wintering habitats.

The final rule listing the rusty patched bumble bee as endangered appears in the January 11, 2017, *Federal Register* and takes effect on March 21, 2017. The rusty patched bumble bee, once widespread, is now found in scattered, small populations in 12 states and one Canadian province. Historically, this bumble bee was abundant and widespread, with hundreds of populations located throughout the east and upper Midwest of the United States and throughout most of southern Canada (Xerces Society 2017). The geographic area of the HRE Feasibility Study Area likely served as habitat. Since the late 1990s, however, the rusty patched bumble bee abundance and distribution declined by about 91 percent. The percent decline may actually be higher because many of the populations that we considered current for our listing assessment have not been reconfirmed since the early 2000s and may no longer persist.

Threats to the rusty patched bumble bee causing the recent dramatic decline include: disease, pesticides, climate change, habitat loss, and small population dynamics. It appears that no one single factor is causing the decline, but the cumulative threats have likely caused the decline. Bumble bees are important pollinators of wildflowers and are the chief pollinator of many economically important crops. Even in crops that can be self-pollinated (*e.g.*, some tomatoes), the plant produces more and bigger fruits with the aid of bumblebees for pollination. In natural areas, bumble bees pollinate plants that provide food for other wildlife. By conserving this species, other species of pollinators simultaneously benefit.

2. Species under Review for Federal Listing

The Service is evaluating the little brown bat (*Myotis lucifugus*), tri-colored bat (*Perimyotis subflavus*) (NYSDEC species of concern), the monarch butterfly (*Danaus plexippus*) and the yellow-banded bumble bee (*Bombus terricola*) to determine if listing under the ESA is warranted. These four species may be present in the study area. Species being evaluated for listing do not receive any substantive or procedural protection under the ESA, and the Service has not yet determined if listing of any of these three species is warranted. However, the Corps should be aware that these species are being evaluated for possible listing and may wish to include them in field surveys and/or impact assessments, particularly for projects with long-term

planning horizons and/or long operational lives. Despite the current status of these species (*i.e.*, non-listed) each of these species is in decline range-wide for the East Coast.

The Service recently reevaluated the American eel, which is also present in the study area; however, on October 2015, the Service determined that listing the American eel was not warranted.

The Service noted in our final FWCA report for the Joseph G. Minish Passaic River Waterfront Park and Historic Area (Minish) dated April 22, 2016, that there were three bridges that spanned the Passaic River that were in the Corps' Minish project boundary. Bridges have been documented as important roosting habitat for 24 species of bats (Keeley and Tuttle 1999). In the final FWCA report, the Corps agreed to investigate bat use of the Minish project site to ensure that it would not affect a federally-listed species.

We note that some of the proposed restoration projects would be constructed in the marine environment. Principal responsibility for threatened and endangered marine species is vested with NMFS. The proposed projects includes several waterways that provide habitat for the federally listed shortnose sturgeon (*Acipenser brevirostrum*; endangered) and the Atlantic sturgeon (*A. sturio*; endangered*)* necessitating consultation with the NMFS in accordance with the ESA. The appropriate contact is provided below.

Ms. Mary Colligan
Assistant Regional Administrator
Protected Resources Division
National Marine Fisheries Service
One Blackburn Drive
Gloucester, Massachusetts 19030-2298
(978) 291-9300, ext. 6530

In addition, the Corps should continue coordinating with the NMFS regarding potential effects of the potential restoration sites designated as Essential Fish Habitat (EFH), pursuant to Section 305 (b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265).

B. NY AND NJ SPECIES OF GREATEST CONSERVATION NEED

Since 2001, the Service has awarded State Wildlife Grants (SWG) for "the development and implementation of programs for the benefit of wildlife and their habitat, including species that are not hunted or fished…" To participate in the SWG program, as directed by Congress, the fish and wildlife agencies of each State, Commonwealth, territory, and the District of Columbia developed a Comprehensive Wildlife Conservation Plan (later referred to as a State Wildlife Action Plan or SWAP) for review and approval by the Service. All the SWAPs were submitted to the Service and approved by early 2006. These plans identify and describe species of greatest conservation need and include many species which have experienced significant population declines.

The Service recognizes that the States of New York and New Jersey have identified species of greatest conservation need as part of their respective SWAPs. Many of those identified species overlap with species that are discussed in the following sections of this report. We seek recommendations from NYSDEC and NJDEP on those particular species of greatest conservation need that they prefer addressed in the final FWCA Report.

C. BALD AND GOLDEN EAGLE PROTECTION ACT

The bald eagle is protected under BGEPA, the MBTA, New Jersey Endangered and Nongame Species Conservation Act (N.J.S.A. 23:2A-1), and five sections of New York State's Environmental Conservation Law (ECL). As noted above, bald eagles are listed as a New York State threatened species (ECL Article 11-0535); both the species and their occupied habitat are protected. Eagles are also protected by ECL Article 11-0537. In addition, bald eagles are defined as wild birds and, therefore, are considered protected wildlife under ECL Article 11-0103. ECL Article 11-0107 provides protection by making it illegal to take protected wildlife except as permitted by the Fish and Wildlife Law. Finally, ECL 03-0301(1)(c), provides for the propagation, protection, and management of fish and other aquatic life and wildlife and the preservation of endangered species.

While the bald eagle population is increasing in New York and New Jersey and its population status will likely continue to expand in the HRE Feasibility Study Area, there are known occurrences of the bald eagle in proximity to some of the proposed restoration sites. There has been an active eagle nest on Overpeck Creek, a tributary of the Hackensack River (located in the Newark Bay/Lower Passaic River/Hackensack River Planning Region) since 2014.

D. AVIAN SPECIES

Migratory birds are a Federal trust resource responsibility of the Service. Many species of migratory birds have experienced population declines in recent decades, largely due to direct and indirect destruction and fragmentation of their habitats (Dunne 1989). The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the DOI. Unlike the ESA, neither the MBTA nor its implementing regulations at 50 CFR Part 21 provide for permitting of "incidental take" of migratory birds. However, a 1995 amendment to the MBTA included a list of migratory nongame birds of management concern in the U.S. to stimulate a coordinated effort by Federal, State, and private entities to develop and implement comprehensive and integrated approaches for management of these selected species.

Further, the FWCA requires the Secretary of the Interior, through the Service, to identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA. *Birds of Conservation Concern 2008* (U.S. Fish and Wildlife Service 2008b) is the most recent effort to carry out this mandate. The overall goal of that report is to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent our highest conservation priorities. A resource assessment by the Service's IPaC

identified a total of 32 Birds of Conservation Concern to occur seasonally or year-round within the HRE Feasibility Study Area (U.S. Fish and Wildlife Service 2016c). These are listed in Table 1, below.

Table 1. Birds of Conservation Concern in the HRE (U.S. Fish and Wildlife Service 2016c).

Common Name	**Scientific Name**	**Season Found at Location**
American Bittern	*Botarus lentiginosus*	Breeding
American Oystercatcher	*Haematopus palliatus*	Year-round
Bald Eagle	*Haliaeetus leucocephalus*	Breeding
Black-billed Cuckoo	*Coccyzus erythopththalmus*	Breeding
Black Skimmer	*Rynchops niger*	Breeding
Blue-winged Warbler	*Vermivora pinus*	Breeding
Canada Warbler	*Wilsonia canadensis*	Breeding
Cerulean Warbler	*Dendroica cerulea*	Breeding
Common Tern	*Sterna hirundo*	Breeding
Fox Sparrow	*Passerella iliaca*	Wintering
Golden-winged Warbler	*Vermivora chrysoptera*	Breeding
Gull-billed Tern	*Gelochelidon nilotica*	Breeding
Horned Grebe	*Podiceps auritus*	Migrating
Hudsonian Godwit	*Limosa haemastica*	Migrating
Kentucky Warbler	*Oporomis formosus*	Breeding
Least Tern	*Sterna antillarum*	Breeding
Loggerhead Shrike	*Lanius ludovicianus*	Year-round
Marbled Godwit	*Limosa fedoa*	Wintering
Peregrine Falcon	*Falco peregrinus*	Wintering
Pied-billed Grebe	*Podilymbus podiceps*	Year-round

Prairie Warbler	*Dendroica discolor*	Breeding
Purple Sandpiper	*Calidris maritima*	Wintering
Red-throated Loon	*Gavia stellata*	Migrating
Rusty Blackbird	*Euphagus carolinus*	Wintering
Saltmarsh Sparrow	*Ammodramus caudacutus*	Breeding
Seaside Sparrow	*Ammodramus maritimus*	Year-round
Short-eared Owl	*Asio flammeus*	Wintering
Snowy Egret	*Egretta thula*	Breeding
Upland Sandpiper	*Bartramia longicauda*	Breeding
Willow Flycatcher	*Empidonax traillii*	Breeding
Wood Thrush	*Hylocichla mustelina*	Breeding
Worm Eating Warbler	*Helmitheros vermivorum*	Breeding

Niles *et al*. (2001), and an ongoing census study conducted at the Rutgers University Newark Campus (http://ebird.org/ebird/nj/hotspot/L657485), which is within 0.6 miles of the Passaic River, identified over 140 species of breeding/nesting or transient migratory bird species for the Passaic River area. New Jersey Sports and Exposition Authority (NJSEA), (formally the New Jersey Meadowlands Commission) has conducted numerous bird census efforts in the Hackensack Meadowlands, including the Hackensack River area (New Jersey Meadowlands Commission 2007). From 2005 to 2006, and along with the New Jersey Audubon Society, they recorded 200 species of birds, including 29 State endangered and threatened species or species of concern (New Jersey Meadowlands Commission 2007). Another survey effort involved the use by avian species after a large marsh (Harrier Meadow) was restored. In that study 91 species of birds were identified utilizing the restored marsh (Seigel *et al.* 2005). The Niles *et al*. (2001), Rutgers University and NJSEA surveys were conducted in the Newark Bay and Passaic and Hackensack River Planning Regions.

The NYCDPR has conducted numerous breeding bird surveys for many of their parks located throughout the City's five boroughs. NYCDPR also coordinated with the Bronx River Alliance to lead a Bronx River Bioblitz in 2005 during which bird species were surveyed. A Bronx River bird species list (Appendix B, Table 2) has been compiled from data from these survey efforts (New York City Department of Parks and Recreation and Bronx River Alliance 2005; New York City Department of Parks and Recreation 2017). The Bronx River corridor primarily supports a suite of bird species that is typical of urban/suburban areas and/or disturbed wetlands (Anzelone *et al.* 2007). A study of breeding birds within the Bronx River Forest included, but is not limited

to, the following species: American robin (*Turdus migratorius),* gray catbird (*Dumetella carolinensis*), Baltimore oriole (*Icterus galbula*), red-winged blackbird (*Agelaius phoeniceus*), yellow warbler (*Setophaga petechia*), warbling vireo (*Vireo gilvus*), and common grackle (*Quiscalus quiscula*) (Anzelone *et al.* 2007). Migratory birds, particularly neotropical songbirds, are also known to stop over at sites along the Bronx River during migration. A study by the Wildlife Conservation Society at the Bronx Zoo, determined that neotropical migrants caught within the site had ample fat reserves - providing evidence that sites on the Bronx River provide necessary food resources for migrants (Crimmens and Larson 2006). The estuarine area of the lower Bronx River supports wintering waterfowl including: canvasback (*Aythya valisineria),* ruddy duck (*Oxyura jamaicensis),* and scaup species (Crimmens and Larson 2006). A more complete list of birds found in the Bronx River can be found in Appendix B.

The National Park Service (NPS) conducted numerous bird surveys in Jamaica Bay (National Park Service 2014). Over the course of the NPS surveys from 1994 to 2014, 320 species of birds were identified using the Jamaica Bay Wildlife Refuge. Many of these accounts include rare observances (only identified once or twice during the 20-year survey period); however 27 species, including, but not limited to obligate salt marsh bird species and wading bird colonies, have been found breeding or utilizing the marsh habitat of Jamaica Bay on a yearly basis. Many of these species are recognized by the Service (U.S. Fish and Wildlife Service 2008), NYSDEC (New York State Department of Environmental Conservation 2015) and/or the draft Eastern Saltmarsh Bird Business Plan (Partners in Flight 2014) as species of conservation concern.

Numerous migratory shorebirds also pass through Jamaica Bay. Most notably, New York's largest concentrations of migratory red knots are found in Jamaica Bay. Significant flocks of semipalmated sandpiper (*Calidris pusilla*) and sanderling (*C. alba*) have also been documented (New York City Audubon unpublished data). Significant concentrations of wintering waterfowl can also be found in Jamaica Bay. Large numbers of greater scaup (*Aythya marila),* canvasback, American black duck (*Anas rubripes*), brant (*Branta bernicla*), Canada goose (*B. canadensis*), bufflehead (*Bucephala albeola*), mallard (*Anas platyrhynchos*), ruddy duck, red-breasted merganser (*Mergus serrator*), snow goose (*Chen caerulescens*), and American wigeon (*A. americana*) have been documented since the late 1970's (NYSDOS 1992; U.S. Fish and Wildlife Service 1997; Waldman 2008). Other species documented within the bay include horned grebe (*Podiceps auritus*), green-winged teal (*A. crecca*), gadwall (*A. strepera*), northern shoveler (*A. clypeata*), and common goldeneye (*Bucephala clangula*) (U.S. Fish and Wildlife Service 1997).

1. Neotropical Migrants

Neotropical migrants are those bird species that breed in the U.S. and Canada, and migrate south to overwinter in the neotropics. Declines in neotropical migrants have been recognized for decades. For example, Robbins *et al.* (1989) analyzed breeding bird survey data from 1966 through 1987 and detected declines in neotropical migrants throughout Eastern North America. Analyses of breeding bird survey data from 1966-2013 also indicate declines in nearly fifty-percent of neotropical migrant species (Sauer *et al.* 2014). Neotropical migrants suffer mortality during all phases of their annual life cycle, however the greatest mortality for some species may

occur during migratory periods (Holmes 2007). Numerous species of migratory neotropical bird species fulfill many of their life stages (*i.e.*, breeding and migration) within the study area.

The following neotropical bird species are recognized by the Service as species of concern (U.S. Fish and Wildlife Service 2008) and may be found within the HRE Feasibility Study Area: cerulean warbler (*Dendroica cerulea*), golden-winged warbler (*Vermivora chrysoptera*), Canada warbler (*Wilsonia canadensis*), wood thrush (*Hylocichla mustelina*), prairie warbler (*Dendroica discolor*), black-billed cuckoo (*Coccyzus erythopththalmus*), willow flycatcher (*Empidonax traillii*), Kentucky warbler (*Oporomis formosus*), blue-winged warbler (*Vermivora pinus*), and worm-eating warbler (*Helmitheros vermivorum*) (U.S. Fish and Wildlife Service 2016a).

2. Saltmarsh Birds

Many bird species rely on salt marsh habitat for foraging and/or nesting. Certain species such as saltmarsh sparrows (*Ammodramus caudacutus caudacutus*) and clapper rails (*Rallus crepitans)* are obligate salt marsh nesting species, meaning that they nest exclusively in salt marsh habitat and are particularly vulnerable to marsh loss or degradation. These and other species are found breeding or utilizing the many habitats that are found in the study area.

Saltmarshes have historically suffered losses due to human alterations such as draining and filling to make room for development, and continue to suffer from degradation and losses today due to causes such as sea level rise and contamination. Because of saltmarsh loss and the impacts of sea level rise, species such as the saltmarsh sparrow are recognized as species of conservation concern (New York State Department of Environmental Conservation 2015; U.S. Fish and Wildlife Service 2008; and International Union for Conservation of Nature 2016). Sea level rise poses a threat to saltmarsh birds as it reduces available saltmarsh habitat and may lead to an increased frequency of nest flooding - a major cause of nest loss for marsh-nesting species (Gjerdrum *et al.* 2008; Shriver *et al.* 2007; and Bayard and Elphick 2011).

New York and New Jersey, through their own environmental laws, have a high level of responsibility for the recovery of a number of saltmarsh nesting birds including saltmarsh sparrows, seaside sparrows (*Ammodramus maritimus*), and willets (*Tringa semipalmata*), as well as other species. These states, either alone or combined, support a high proportion of the northeast regional population of a number of salt marsh birds (Saltmarsh Habitat and Avian Research Program 2015a and 2015b).

3. Shorebirds

Many species of shorebirds in the U.S. are suffering from declines in populations. The *Atlantic Flyway Shorebird Business Strategy* (Winn *et al.* 2013) identifies the following as some of the main threats to shorebirds: hunting, predation, human disturbance, habitat loss, and change. A number of species are recognized by the Atlantic Flyway Shorebird Business Plan and by the Service as species of conservation concern and occur in the study area.

4. Waterfowl

The HRE Feasibility Study Area falls within the region of the Atlantic Coast Joint Venture (ACJV). Much of the HRE Feasibility Study Area including Jamaica Bay, Western Long Island Sound, New York Harbor, and the barrier coastal lagoons and salt marshes of New Jersey are recognized as a focal area by the ACJV *Waterfowl Implementation Plan* (Atlantic Coast Joint Venture 2005). The sheltered open water, fringing marshes, and mudflats in these areas provide habitat for wintering sea, bay, and dabbling ducks (Atlantic Coast Joint Venture 2005). Mid-winter survey data from 1970-2003 indicated that various waterfowl species including the American black duck and long-tailed duck (*Clangula hyemalis)* (which are found in the HRE), have suffered population declines (Atlantic Coast Joint Venture 2005). Furthermore, the status of many sea duck populations is largely unknown, and there is concern for these species. Five sea duck species, some of which occur in the HRE, are designated as high priority species by the Sea Duck Joint Venture Management Board Management Board (SDJV). Recent and ongoing efforts are being made to better understand these populations and the threats they may face (Sea Duck Joint Venture Management Board 2014). The main threats to waterfowl are: habitat loss, fragmentation and degradation; contaminants; disease; invasive species; predation and harvest; human population and disturbance; and global climate change (Atlantic Coast Joint Venture 2005).

E. AQUATIC RESOURCES

1. Tidal Wetlands

Coastal marshes are considered by the Service to be aquatic resources of national importance due to their increasing scarcity and high habitat value for fish and wildlife within Federal trusteeship (*i.e*., migratory waterfowl, wading birds, other migratory birds, threatened and endangered species, and interjurisdictional fisheries). They perform a variety of important functions that benefit both fish and wildlife resources such as spawning and nesting habitat for fish and wildlife and human needs such as storm protection for human infrastructure. The loss of wetlands in the HRE is significant. Only 20 percent of the historic wetlands that predated American colonial settlement remain in the HRE (New York City 2009).

More than 70 percent of the total wetlands in the Hackensack Meadowlands were destroyed by human activities (U.S. Fish and Wildlife Service 2007). New York City has only one percent of its historic freshwater wetlands and 10 percent of its historic tidal wetlands. These remaining wetlands are concentrated in Brooklyn (principally tidal wetlands around Jamaica Bay), Queens (principally tidal), and Staten Island (both tidal and freshwater) (New York City 2009). The majority of salt marsh habitat within the study area occurs in Jamaica Bay. Like many salt marshes along the east coast, Jamaica Bay wetlands have experienced declines in acreage. There are various factors that may have contributed to this decline, including: sediment deprivation, channel deepening, eutrophication, stabilization of the Rockaway Inlet, growth of the Rockaway peninsula, and sea level rise.

The study area provides an opportunity to restore marsh acres to Jamaica Bay, however threats to both natural and restored marshes still exist. Water quality, particularly increased nitrogen levels

and eutrophication, may complicate salt marsh restoration efforts and make salt marshes more vulnerable to sea level rise by weakening root systems and through loss of organic biomass (due to increased microbial decomposition) resulting in marsh elevation loss (Turner *et al.* 2009, New York State Department of Environmental Conservation 2014b). Recontamination from area sediments is another threat to salt marsh restoration which is discussed at greater length in the Section V(A)(4), *Environmental Contaminants*, above.

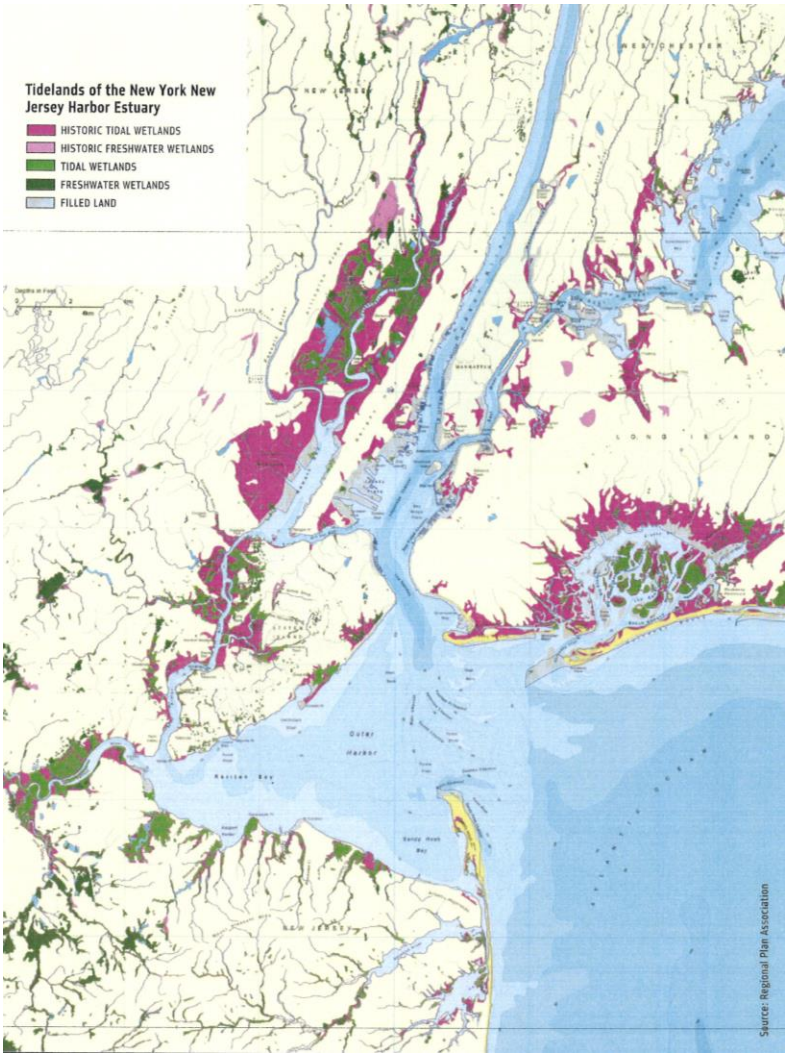

Figure 2. Historic Wetland Losses in the HRE (NYC 2009)

2. Freshwater Wetlands

Like tidal marshes, freshwater wetlands provide habitat for a variety of fish and wildlife resources while also providing ecological services for people. Historically, the study area contained more freshwater wetland habitat. However, due to conversion of wetlands to agricultural, industrial, or residential uses, many wetlands were lost. Only one percent of those freshwater wetlands that existed in NYC pre-colonial era remain (New York City 2009). The

CRP proposes freshwater wetland restoration efforts in New York (Westchester County Center, Harney Road and Garth Woods, Bronxville Lake, Crestwood Lake, Shoelace Park, Bronx Zoo and Dam, and River Park/West Farm Rapids Parks on the Bronx River) and New Jersey (Essex County Bound Brook).

3. Riparian Areas

Although definitions vary, riparian areas can generally be described as rivers, streams, creeks, and other waterbodies and the adjacent areas that are influenced by those water courses. Riparian areas are an ecotone where aquatic and terrestrial habitats meet. These areas tend to support diverse plant species and provide valuable habitat for a number of aquatic and terrestrial animal species including migratory birds (Gregory *et al.* 1991, Pennington *et al.* 2008; Naiman *et al.* 1993; and Pennington and Gorchov 2010). In addition to providing habitat for wildlife, riparian areas also serve other important functions including: buffering sediment and nutrient runoff, dispersing aquatic organisms and plant propagules, acting as wildlife corridors, and connecting adjacent natural areas (Naiman and Décamps 1997; Naiman *et al.* 1993). Many of the riparian areas within the study area have been degraded due to alterations such as human development, channel modifications, bank stabilization and hardening, increased thermal and sediment inputs, and invasive species.

F. FINFISH

Louis Berger Group, Inc., *et al.* (2014) identified 38 finfish species within an eight-mile length of the Passaic River. Predominant fish caught during four sampling events in 2010 and 2011 included winter flounder, Atlantic silverside (*Menidia menidia*), striped bass, three-spine stickleback (*Gasterosteus aculeatus*), scup (*Stenotomus chrysops*), bay anchovy (*Engraulidae sp*.), weakfish, summer flounder, northern pipefish (*Syngnathus fuscus*), northern puffer (*Sphoeroides maculates*), and bluefish. Sampling effort by the Jacques Whitford Company in 2001 (TAMS 2004) performed at the confluence of the Passaic River and Newark Bay also revealed a species list similar to that found in the Louis Berger Group, Inc. *et al.* (2014). New Jersey Meadowlands Commission (2005) conducted a two-year finfish study of the Hackensack Meadowlands watershed, identifying 33 species of fish. To date, the NJSEA has identified over 50 species of finfish utilizing habitat in the Hackensack Meadowlands (New Jersey Sports and Exposition Authority 2017). A complete list of species from each of these studies can be found in Appendix C, Table 1.

The Corps (2013b) identified 58 species of fish in the Arthur Kill/Kill Van Kull, Newark Bay, Upper New York Bay, and Lower New York Bay Planning Regions (see Appendix C, Table 2 for a list of species identified).

The fish community of the Bronx River (Appendix C, Table 3) is dominated by pollution tolerant species. While not all historic fish populations exist in the river, the fish community is reportedly largely intact (Crimmens and Larson 2006). The Bronx River Ecological and Watershed Management Plan included the findings of fish surveys conducted in the New York City portion of the Bronx River by Dr. Joseph Rachlin of Lehman College's Laboratory for Marine and

Estuarine Research (Rachlin 2003). The most widely distributed freshwater species found in the river in 2002-2003 were mummichog, fourspine stickleback (*Apeltes quadracus*), and tessellated darter (*Ethoestoma olmstedi*). Surveys conducted in the northern portion of Bronx County within the Bronx River identified, from most to least abundant: white sucker, fourspine stickleback, mummichog, tesselated darter, and blacknose dace (*Rhinichthys atratulus*). White sucker, fourspine stickleback, and mummichog accounted for 72 percent of all individuals caught (Crimmens and Larson 2006). Typical fish species encountered by NYSDEC in surveys between East Gun Hill Road in the Bronx and Tuckahoe Station in Westchester, include: redbreast sunfish, white sucker (*Catastomus commersoni*), yellow bullhead (*Ameiurus natalis*), blacknose dace, and tesselated darter (Cohen 2016). Additional information on freshwater fish utilizing the Bronx River can be found in U.S. Army Corps of Engineers (2009b), which is incorporated by reference into this report. The Bronx River also supports diadromous fish including blueback herring (*Alosa aestivalis*) and American eel. Blueback herring have been documented in the mouth of the river and unidentified herring eggs and larvae have been found in the mouth of the river and up to 1.5 miles upstream, indicating that river herring may be spawning in the Bronx River (Larson *et al.* 2004).

Jamaica Bay provides important spawning, foraging, and nursery habitat for many finfish and shellfish species. Species documented in the bay include: winter flounder, summer flounder, windowpane flounder (*Scophthalmus aquosus*), weakfish, bluefish, scup, blueback herring, Atlantic cod (*Gadus morhua*), black sea bass (*Centropristis striata*), northern kingfish (*Menticirrhus saxatilis*), tautog (*Tautoga onitis*), Atlantic silversides, mummichog, striped killifish (*Fundulus majalis*), Atlantic menhaden (*Brevoortia tyrannus*), bay anchovy, northern pipefish, American shad (*Alosa sapidissima*), Atlantic sturgeon, sea robin (*Prionotus carolinus*), striped bass, banded killifish (*Fundulus diaphanus*), cunner (*Tautogolabrus adspersus*), inland silversides (*Menidia berylinna*), striped sea robin (*Prionotus evolans*), white mullet (*Mugil curema*), and white perch (National Park Service 2007; U.S. Fish and Wildlife Service 1997; and New York State Department of State 1992).

G. MARINE AND ESTUARINE INVERTEBRATES

As demonstrated in numerous studies undertaken in the Lower Passaic River, high concentrations of toxic, persistent, and bioaccumulative contaminants are widespread in the sediments of the Passaic River. This has affected the crustacean, bivalve, and benthic communities of the study area. In Louis Berger, Inc. *et al.* (2014), surveys resulted in consistent results of biotic communities known for pollution tolerance. The dominant benthic macroinvertebrate taxon was either a polychaete (*Leitoscoloplos* or *Marenzellaria viridis*), oligochaete (*Tubificoides heterochaetus* or *Limnodrilus hoffmeisteri*) or a crustacean (*Cyathura polita*). Blue crab was the dominant invertebrate, followed by grass shrimp and mud crab (unspecified), while in the Mollusc family the blue mussel (*Mytilus edulis*) and a unidentified snail was found in the project vicinity. Blue crab was also the dominant invertebrate identified in the Corps (2013) finfish surveys of the Lower New York Harbor. These species are heavily influenced by the urban setting of the study area.

The horseshoe crab (*Limulus polyphemus*) can be found in many of the tidal waters of the HRE. Their eggs provide an important food source for migrating shorebirds. Horseshoe crabs are also important to medical research and pharmaceutical companies and are harvested by commercial fishermen to be used as bait in eel and conch fisheries. Coast-wide management of horseshoe crabs is essential to maintain healthy populations. The status of horseshoe crab populations along the Atlantic coast is poorly understood, but horseshoe crabs continue to be harvested while their populations decline. Although horseshoe crab eggs are suspected to be superabundant, a decline in the horseshoe crab population could severely impact migrating shorebird populations that depend on the eggs for survival. The survival of this species is linked to the survival of the threatened red knot, as horseshoe crab eggs are an important food source for migratory red knots. Horseshoe crabs are known to spawn within the study area, primarily within Jamaica Bay and the Raritan Bay.

Beach nourishment is a regular practice in Delaware Bay and can affect spawning habitat for horseshoe crabs. Although beach nourishment generally preserves horseshoe habitat better than hard stabilization structures, nourishment can enhance, maintain, or decrease habitat value depending on beach geometry and sediment matrix (Smith *et al.* 2002a). In a field study in 2001 and 2002, Smith *et al.* (2002a) found a stable or increasing amount of spawning activity at beaches that were recently nourished while spawning activity at control beaches declined. These authors also found that beach characteristics affect horseshoe crab egg development and viability. Beach nourishment can alter both the beach foreshore (sediment size distribution, slope, and width) and low tide terrace (sediment size distribution, elevation, and width) (Smith *et al.* 2002b). Avissar (2006) modeled nourished versus control beaches and found that nourishment may compromise egg development and viability. Although nourishment is generally considered to be environmentally compatible, the effect of nourishment on horseshoe crab spawning, egg development, and survival of juveniles is understudied (Smith *et al.* 2002b). Evaluating the impacts of beach nourishment projects on horseshoe crab populations and beach fidelity has been identified as a high research priority by Atlantic States Marine Fisheries Commission (ASMFC) (2013 and 2015). Despite possible drawbacks, beach nourishment is often successfully used to restore and maintain horseshoe crab spawning habitat on both sides of Delaware Bay.

H. DIAMONDBACK TERRAPINS

Diamondback terrapins (*Malaclemys terrapin*) inhabit coastal marshes, tidal creeks, estuaries, bays, and coves where they forage and breed. Breeding and nesting typically occurs in May, June, and July. Nest locations are commonly found on uplands adjacent to estuarine habitats and include dunes, grasslands, shrublands, beaches, and sand/gravel trails (Feinberg and Burke 2004). Terrapin populations are declining across their range - Atlantic and Gulf Coasts of the United States. Major threats to terrapins include: road mortality, predators, mortality due to fishing gear, harvesting, and habitat destruction. Terrapins are known to nest within the HRE Feasibility Study Area.

VIII. OTHER ENVIRONMENTAL CONDITIONS

A. CLIMATE CHANGE AND SEA LEVEL RISE

The term "climate change" refers to a change in the mean or variability of one or more measures of climate (*e.g.*, temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (Intergovernmental Panel on Climate Change 2007). Extensive analyses of global average surface air temperature, the most widely used measure of change, clearly indicate that warming of the global climate system has occurred over the past several decades (Intergovernmental Panel on Climate Change 2013). One very likely outcome of climate change is an accelerated rise in sea level. Measurements of global mean sea level indicate sea level has risen at an average rate of 1.7 mm per year from 1901 to 2010; at a faster rate of 3.2 mm per year from 1993 to 2010; and will exceed that rate during the 21st Century (International Panel on Climate Change 2013). Sea level rise will likely have implications for restoration activities planned or underway in the HRE Study Area. Sea level rise will affect the types of natural communities found in the HRE Study Area. Additional tidal flow from modest sea level rise may have both beneficial and adverse impacts on restoration that are difficult to predict without additional information (e.g., precise elevations of restoration sites, site-specific sedimentation/erosion rates, predicted future current velocities) (U.S. Fish and Wildlife Service 2007). Recently, sea level rise in a 1,000 km reach of the Atlantic Coast from Cape Hatteras, North Carolina to Cape Cod, Massachusetts (which includes the HRE Feasibility Study Area) experienced three to four times higher sea level rates than the global average (Sallenger *et al.* 2012). Many models of climate change project a shift to more intense individual storms and fewer weak storms in the North Atlantic Basin. Long-term effects of climate change may impact coastal communities such as the New Jersey Highlands and result in adverse effects to marine wetlands in the HRE Feasibility Study Area.

B. PLANT POLLINATORS

It is anticipated that each project would include the development of a native landscaping plan for all post construction activities. Pollinators contribute substantially to the economy of the United States and are vital in maintaining healthy ecosystems, yet severe losses to pollinator species from the environment, including honey bees, native bees, bats, and butterflies, have been observed over the past few decades. Honey bee (*Apis mellifera L.*) pollination alone adds more than $15 billion in value to agricultural crops each year in the U.S. (U.S. Department of Agriculture 2015) (USDA). The number of honey bee colonies declined about 50 percent from 1940s levels; and since the 2008 emergence of Colony Collapse Disorder (CCD - a phenomenon that occurs when the majority of worker bees in a colony disappear), annual losses of honey bee colonies averaged about 30.5 percent (U.S. Environmental Protection Agency 2014b). CCD was first observed in the winter of 2006/2007 when large-scale losses of managed honey bee colonies in the U.S. were observed (vanEngelsdorp *et. al* 2009). Another pollinator species experiencing steep population decline is the monarch butterfly. The number of migrating monarch butterflies reached an all-time low in 2013-2014, reduced by 97 percent from the 1996-1997 high and by 90 percent from the 20-year average (Rendón-Salinas and Tavera-Alonso 2014).

With the potential listing of the monarch butterfly for protection under the ESA, the Service has a mandate to work in collaboration with the Monarch Joint Venture (a partnership of Federal and State agencies, non-governmental organizations, and academic programs) to increase monarch butterfly habitat (milkweed and foraging food sources). In an effort to ensure the sustainability of food production systems, avoid additional economic impact on the agricultural sector, and protect the health of the environment, President Obama established the Pollinator Health Task Force to expand Federal efforts to reverse pollinator losses and help restore populations to healthy levels. In a June 20, 2014, memorandum, the President called on Federal agencies, including the Service, the Corps, and the USDA to "develop... plans to enhance pollinator habitat, and subsequently implement, as appropriate, such plans on their managed lands and facilities, consistent with their missions and public safety;... ." (The White House Office of Press Secretary 2014).

IX. FISH AND WILDLIFE RESOURCES - FUTURE WITHOUT THE PROJECT

The No Action Alternative represents the foreseeable future if no action is taken. Specifically, under the No Action Alternative, no habitat restoration would occur in the planning region, and, as a result, invasive species, degraded water quality, and degraded terrestrial habitats would persist in the project sites. Based on current trends, it is estimated that declining conditions will continue to exert negative impacts to fish and wildlife populations that utilize these habitats into the foreseeable future.

X. DESCRIPTION OF THE SELECTED ALTERNATIVE

The proposed restoration activities include 33 sites within five Planning Regions of the HRE Study Area. Information obtained from the Corps concerning details of the proposed activities at each site were provided in an electronic correspondence to the Service on July 8, 2016 and are summarized below. More detailed information on each of the project sites can be found in Appendix A.

A. NEW YORK HRE PROJECT SITES

1. East River/Harlem River/ Western Long Island Sound (includes the Bronx River) Planning Region

Of the eleven projects that occur in the East River/Harlem River/Western Long Island Sound (includes the Bronx River) Planning Region, ten of them occur on the Bronx River. The main components of all but one of the ten Bronx River restoration projects focus on stream restoration, including bank stabilization, bank softening, channel modification, bed material replacement, improved public access, invasive species and debris removal, native plantings, and wetland creation. The Bronx Zoo, Stone Mill Dam, Bronxville Lake, Crestwood Lake, and Harney Road/Garth Woods projects have a fish passage component, which involves creating upstream passage via the construction of a fish ladder or by modifying migration barriers. Some projects also include the installation of stormwater basins and/or rain gardens to reduce sediment runoff into the river. The HRE project at Soundview Park's main component is oyster restoration. The

main focus of the Flushing Creek project is to restore an intertidal marsh and a coastal maritime forest and the inclusion of several stormwater infiltration features to collect runoff from non-permeable surfaces.

2. Jamaica Bay Planning Region

The proposed restoration projects in the Jamaica Bay Planning Region include wetland restoration, invasive species removal, beach fill and dune creation, and native plantings of coastal grassland, coastal shrub, and coastal maritime forest communities. Some projects also have proposed a hardened shoreline component, including rip-rap, soldier piles, boulder placement or the installation of geo-tubes (Dubos Point, Brant Point, and Bayswater State Park) One project, Head of Bay, is an oyster restoration project.

3. Upper Bay Planning Region

The main element of Governors Island proposal includes oyster reef restoration via the use of gabion blocks, triangular structures, and hanging trays. The main components of the Bush Terminal restoration project include oyster spat on shell; gabion blocks and oyster condos; and hanging trays/super trays to grow out oysters.

B. NEW JERSEY HRE PROJECT SITES

1. Newark Bay/Hackensack River and Passaic River Planning Region

The principle focus of the two Hackensack River proposals (Meadowlark Marsh and Metromedia Tract) within the Newark Bay/Hackensack River and Passaic River Planning Region is to improve site hydrology, wetland restoration, removal of contaminated sediment, invasive species control, and the planting of coastal maritime and scrub shrub habitat.

For the non-tidal restoration project in Essex County Branch Brook Park, the Corps proposes to remove invasive species and debris, perform channel dredging and modifications, stabilize the creek's shorelines, and plant native emergent and forested scrub shrub communities along the creek banks.

The Corps is proposing several restoration projects along the banks of the tidally influenced Passaic River at Dundee Island Park/Pulaski Park and Clifton Dundee Canal. The focus on restoration for these two park sites is debris removal, excavation of upland material, invasive species control, improving public access, and the planting of native trees and shrubs.

For Newark Bay, the Corps is proposing two tidal wetland restoration projects that are in a deferred status as the projects are in the boundary of the Lower Passaic River Superfund Study Area (Oak Island Yard and Kearny Point). Both projects include the removal of contaminated sediments, improving site hydrology, invasive species control, and the planting of native wetland and upland coastal maritime plant communities.

2. Lower Bay Planning Region

The Corps is proposing to expand on previous work performed by the New York/New Jersey Baykeeper (see http://nynjbaykeeper.org/). The proposal includes the installation of spat on shell, gabion blocks, and reef balls to improve habitat for the oyster. The project is located within and adjacent to the piers that serve the Naval Weapons Station at Earle, NJ.

XI. PROJECT IMPACTS

The following impacts to fish and wildlife and their habitats may occur if any of the proposed restoration projects are constructed. As these are proposed restoration projects, the objective is to restore natural functions that were formerly provided by wetlands and other coastal habitats, such as maritime forest and coastal scrub/shrub habitat. The long-term success of the restoration activities will likely depend on concerted efforts to address continuing impacts to the coastal and riverine systems which necessitated the restoration activities, such as nutrient overloading, invasive species, dumping, and the effects of climate change.

A. TURBIDITY

Turbidity in the water column, excavation, and burial can be detrimental to both mobile and sessile organisms and is likely to occur during construction of the restoration projects. Suspended solids in water can affect fish populations by delaying hatching time of fish eggs (Schubel and Wang 1973), killing fish by coating their gills, and by creating anoxic conditions (O'Connor *et al.* 1976). Sherk *et al.* (1974) found that demersal fish are more tolerant of suspended solids than filter-feeding fish, resulting in an advantage to demersal fish and a disadvantage to filter feeders. Dredging may result in the release of nutrients and anoxic sediments high in organics and sulfides into the water column. Fish tolerance to suspended solids varies from species to species and by age. However, the increase in turbidity should be short-term, and the project will likely increase habitat quality for fish and reduce sediment in the aquatic system.

Sessile animals, or those species/life stages with limited mobility, are likely to suffer direct mortality during excavation and indirect mortality from turbidity/sedimentation. For invertebrate species, mortality may be reduced and recolonization rates increased through the implementation of best management practices, such as erosion control measures. Impacts to sessile invertebrates are expected to be temporary and mobile organisms will likely be deterred from utilizing the site. Time of year restrictions (TOY) and/or other best management practice (BMPs) recommendations are offered at the end of this report to avoid or minimize impacts to fish and wildlife resources.

B. DISTURBANCE

During the construction of the proposed restoration projects, disturbance to fish and wildlife resources will likely occur. Forest, grassland, marine and coastal birds are common in the area and could utilize the sites within the five Planning Regions for foraging, nesting, roosting, or stopovers during migration. Nesting birds typically occupy the area between April and August.

Migrants are typically present from March through late May and early September through mid-October. Resident species are present year-round. As a result, construction of the restoration projects will likely temporarily disrupt resident birds and breeding migrants. Significant short-term impacts to nesting, foraging, and roosting behavior could occur. However, it is anticipated that potential long-term beneficial impacts to birds would occur from the improved habitat conditions of the restored marshes and streambanks.

Birds could be displaced during sediment dredging and placement. The noise and activity of dredging and placement operations would likely deter birds from using areas in the immediate vicinity of equipment during active periods. In addition, the benthic macroinvertebrate community, a source of forage for many shorebirds, would be adversely affected in the areas of sand placement and disposal for an undetermined amount of time.

Should bald eagles be detected in the proximity to the restoration sites, they may respond in a variety of ways when they are disturbed by human activities. For example, during the nest building period, eagles may inadequately construct or repair their nest, or may abandon the nest, both of which can lead to failed nesting attempts. During the incubation and hatching period, human activities may startle adults or cause them to flush from the nest. Startling can damage eggs or injure young when the adults abruptly leave the nest.

Prolonged absences of adults from their nests can jeopardize eggs or young. Depending on weather conditions, eggs may overheat or cool and fail to hatch. Young nestlings rely on their parents to provide warmth or shade, and may die from hypothermia or heat stress if adults are forced away from the nest for an extended period of time. Eggs and juveniles are subject to greater predation risk while they are unattended.

The implementation of the Service's mitigation recommendations found later in this report, regarding construction time-of-year restrictions or other best management practices would avoid or minimize impacts to these resources.

C. HABITAT MODIFICATION

The proposed restoration projects will result in habitat modifications that may impact fish and wildlife species. Most of the modifications should have beneficial impacts once the projects are completed; however converting one habitat type to another (*i.e.*, replacing *Phragmites* with *Spartina sp*.) may alter some species compositions. For example, *Phragmites* supports a different suite of bird species than native saltmarsh plants (Benoit and Askins 1999). Lewis and Casagrande (1997) describe the following suite of species using *Phragmites*: red-winged blackbird, American goldfinch (*Spinus tristis)*, yellow warbler , black-crowned night-heron (*Nycticorax nycticorax)* common yellowthroat (*Geothypis trichas*), and swamp sparrow (*Melospiza georgiana*). It is possible that removing stands of *Phragmites* may impact these species, however, their abundance may not be impacted if there are other suitable habitats available to them nearby (Yasukawa and Searcy 1995). Furthermore, other bird species, such as saltmarsh and seaside sparrows, are more likely to use native salt marsh plants (Benoit and Askins 1999), and might benefit from the conversion. Marsh size and distance from other

marshes have been found to influence species richness, with richness decreasing with greater distance from other marshes and when marsh size is less than 12 acres (Brown and Dinsmore 1986). Different species also have different thresholds for minimum marsh size in which they will be found. The impacts of habitat modification, therefore, may vary by species and among the project sites as the size of each restored marsh will vary.

For the proposed Bronx River and the Essex County Branch Brook restoration projects, the Service anticipates that temporary habitat loss will occur during construction as a result of dewatering of riverine areas, excavation of bed material, channel modification, and removal of vegetation. However, with the replacement of bed material, improved channel conditions, addition of instream habitat features, and introduction of native vegetation, we expect that habitat losses will be of short duration and offset by long-term habitat enhancement. The planting and seeding of native species will improve habitat conditions, thereby increasing ecosystem diversity and storm damage protection. The planting of native woody vegetation on the river banks may also increase the amount of shade, and potentially reduce the temperature of the stream/river channel, increase dissolved oxygen solubility, and improve aquatic (fish/amphibians/reptiles) species habitat suitability (Federal Interagency Stream Restoration Working Group 1998). A vegetated river bank would also provide forage, cover, and breeding habitat for songbirds, wading birds, and waterfowl. Removing or modifying barriers on the Bronx River can increase fish passage and reproduction of diadromous fishes. Herring eggs and larvae have been found in the lower reaches of the Bronx River and the installation of fish ladders or the removal of fish blockages could improve herring production in the river.

Within the proposed Bronx River and Branch Brook restoration sites, the use of bioengineering techniques in stabilizing river bank or softening pre-existing hard armored banks can reduce turbidity/suspended solids in the river while also providing edge habitat, decreasing flow velocities, and increasing the capacity of the river to accumulate/store/filter materials, sediment, and energy (Federal Interagency Stream Restoration Working Group 1998). However, a few restoration sites on the Bronx River incorporate hard armoring of the shoreline. Armoring of the river shoreline has numerous potential impacts to this habitat, including, but not limited to, decreased infiltration of surface runoff, increased flow velocities, decreased opportunity for habitat development, and loss of edge habitat (Federal Interagency Stream Restoration Working Group 1998).

For the proposed Jamaica Bay and Passaic and Hackensack River restoration sites, the Service anticipates temporary habitat loss will occur during construction as a result of the currently vegetated areas being converted to bare soil until herbaceous plantings become established. With establishment of vegetation, we expect that habitat losses will be of short duration and offset by habitat enhancement. Following restoration and the attainment of pre-determined physical and biological performance measures, fish and wildlife habitat quality is likely to increase in the restoration areas. The reductions or elimination of areas currently dominated by invasive/exotic plant species to native vegetated wetlands or forests will benefit fish and wildlife species. The conversion or creation of native habitats will also offset habitats that have been lost due to human alteration or the effects of sea level rise. Upland habitats will be enhanced to improve habitat for terrestrial species. Invasive/exotic plant species displace native vegetation

communities with monotypic/depauperate stands. The diversity of forage and cover available for wildlife is also reduced. Some species, such as tree-of-heaven (*Ailanthus altissima*), produce allelopathic compounds that inhibit the establishment of other species (Mergen 1959). In saltmarshes where common reed stands have displaced high marsh, numerous studies have found lower species diversity and/or density of birds and mammals in common reed stands relative to low marsh communities (Howe *et al*. 1978; Roman *et al*. 1984; Lapin and Randall 1993; Warren and Fell 1995; Benoit and Askins 1999; Chamber *et al*. 1999). The relative value of these common reed stands to invertebrates is unclear and is being investigated (Niedowski 2000).

Numerous species may benefit from the proposed project, including marsh invertebrates, fish species adapted to shallow tidal and intertidal habitats; wading birds, and shorebirds. The reduction in elevation and resulting increase in tidal flushing will provide feeding and nursery areas within the intertidal zone for species such as fiddler crab, banded killifish, and silversides. Avifauna such as saltmarsh sharp-tailed sparrow and seaside sparrow will likely benefit from the construction of high marsh habitat, which would provide nesting habitat. Diamondback terrapins, a unique saltmarsh species that is present in portions of Jamaica Bay, may benefit from the creation of low marsh and tidal creeks.

The principal impact of oyster restoration projects in Jamaica Bay, Governor's Island, and the Naval Weapons Station at Earle will be the conversion of soft-bottom habitat to hard bottom habitat. This will likely change the species composition in the area of the restoration, however pilot studies from sites within the HRE Feasibility Study Area have indicated that the addition of oysters increases species richness (Grizzle *et al.* 2012; Lodge *et al.* 2015). Oysters will likely have other beneficial impacts including localized benefits to water quality and storm attenuation.

D. PLANT GENETIC TOLERANCE AND SUPPLY

Many commercially-produced native plant products do not safeguard against the consequences of founder effects, genetic sampling and outbreeding depression and much government-developed material utilized by commercial growers is sourced too narrowly. Reliance on these monocultures leaves restored populations vulnerable to disease and pests. For example, virtually all restored foredune habitat from Massachusetts to North Carolina utilize American beach grass (*Ammophila breviligulata*) sourced from USDA-Natural Resources Conservation Service stock originating in Cape Cod prior to 1970. Recent studies reveal that *Ammophila* populations exhibit significant genetic variation over very short distances and are more diverse than expected given the plant's' reproductive strategy, and that USDA-sourced stock, which is easily distinguished from the native populations, is monotypic (Fant *et al.* 2008).

Seed collection in advance of projects allows for the necessary lead time to locate appropriate source populations and bank seed in preparation for plant production. Depending on the type and quantity of species, as well as environmental conditions, up to five years of seed collection may be necessary to secure sufficient quantity. In addition, restoration species may be slow growing and some may take three to five years to reach sufficient size before being available for planting. Lastly, for those projects requiring bulk seed for seeding operations, as opposed to planting with live plants, development of bulk seed is a multi-staged process that requires three to five years of

development, and in some instances up to seven years before becoming readily available in sufficient quantity (*e.g.*, from initial wild seed collection to large-scale commercial production).

The BLM, in conjunction with many stakeholder partners, has developed a National seed strategy for the rehabilitation and restoration of land holdings across the Nation. They have partnered with numerous stakeholders to implement a National plan which identified four primary goals centered on building a "seed industry" for rehabilitation and restoration. One of the four principal BLM goals is to identify seed needs and ensure the reliable availability of genetically appropriate seed across several eco-regional programs of the Nation (Bureau of Land Management 2015, see: https://www.blm.gov/wo/st/en/prog/more/fish__wildlife_and/plants/seedstrategy.html).

E. ENVIRONMENTAL CONTAMINANTS

Dredging sediments can resuspend contaminants, making them more bioavailable (Knott *et al*. 2009). Adverse effects can begin at the base of the food chain, accounting for toxicity to phytoplankton and autotrophic bacteria (Nayer *et al.* 2004). Dredging can also result in sediment resuspension which can enhance the growth of water column bacteria and protozoa through release of nutrients. This establishes a pathway for organic contaminants to be accumulated by microorganisms and higher trophic animals (*i.e.*, filter feeding organisms) (Latimer *et al.* 1999; Zarull *et al.* 1999). The degree of contaminant bioavailability is determined by *'the reactivity of each contaminant with the biological interface, the presence of other chemicals that may antagonise or stimulate uptake, and external factors such as temperature that affect the rate of biological or chemical reactions'* (Luoma 1983 as quoted in Eggleton and Thomas (2004).

The use of cap material may also pose issues related to recontamination. For example, caps that do not include geotextile or armored barriers, can allow burrowing organisms to bring the contaminants to the surface where other organisms can be exposed (Rohr *et al.* 2016). Klerks *et al*. (2007) demonstrated that ghost shrimp (*Sergio trilobata* and *Lepidophthalmus louisianensis*) burrowing has been shown to move buried metals to the sediment surface in Tampa Bay, Florida. The planting of vegetation can also mobilize buried metals into the leaf litter (Mertens *et al.* 2007 in Rohr *et al.* 2016).

These academic studies and others referenced in the draft FWCA highlight the challenges of performing environmental restoration in a polluted environment, especially, given the risk these pollutants may have on fish and wildlife resources, through biomagnification and bioaccumulation.

XII. SERVICE PLANNING AND MITIGATION RECOMMENDATIONS

The Service provides the following planning and mitigation recommendations to facilitate the HRE Feasibility Study. They include avoidance and minimization measures and recommendations to address resource concerns, planning objectives, and project impacts identified in earlier sections of this report.

The planning recommendations given below are provided as measures related to the formulation and design of the proposed restoration projects. As ecosystem restoration projects advance in the Corps planning and construction process, the Service considers this draft FWCA report as an opportunity to integrate fish and wildlife conservation into the planning process.

The mitigation recommendations contained herein also addresses:

- The Service's National Mitigation Policy (see https://www.gpo.gov/fdsys/pkg/FR-2016-11-21/pdf/2016-27751.pdf);
- The Service's Endangered and Threatened Wildlife and Plants; Endangered Species Act Compensatory Mitigation Policy (see https://www.gpo.gov/fdsys/pkg/FR-2016-12-27/pdf/2016-30929.pdf);
- The Service's Interim Guidance on Implementing the Final Endangered Species Act Compensatory Mitigation Policy (see https://www.fws.gov/endangered/improving_ESA/pdf/Interim_Guidance_for_Implementing_the_Endangered%20Species%20Act%20Jan%202017.pdf);
- The *Presidential memorandum -- Mitigating Impacts on Natural Resources from Development and Encouraging Related Private Investment. November 3, 2015* (The White House Office of the Press Secretary. 2015).

The Service has jurisdiction over a broad range of fish and wildlife resources. Service authorities are codified under multiple statutes that address management and conservation of natural resources from many perspectives, including, but not limited to, the effects of land, water, and energy development on fish, wildlife, plants, and their habitats. The types of resources for which the Service is authorized to recommend mitigation also include those that contribute broadly to ecological functions that sustain species. Section 404 of the CWA (33 CFR 320.4) codifies the significance of wetlands and other waters of the United States as important public resources for their habitat value, among other functions.

Mitigation planning often presents practicable opportunities to implement mitigation measures in a manner that outweighs impacts to affected resources. When resource enhancement is also consistent with the mission, authorities, and/or responsibilities of action proponents, the Service will encourage proponents to develop measures that result in a net gain toward achieving conservation objectives for the resources affected by their actions.

Objectives identified by the Service in providing recommendations on this feasibility study are to protect and conserve fish and wildlife resources in each of the proposed restoration project areas, while assuring that a net gain in ecological benefits are delivered. This includes developing recommendations to make the project more environmentally compatible and to further conserve and enhance the diversity and abundance of fish and wildlife resources and their habitats in each proposed project area and on a landscape level throughout the HRE.

The outcome of consultation under Section 7 of the ESA or future consultations under the FWCA, could affect the recommendations herein. In addition, the Service provides conservation

measures intended to facilitate the recovery of listed species, sensitive habitats, and other fish and wildlife resources.

A. PLANNING RECOMMENDATIONS

1. Habitat Loss and Degradation

Hard structures should be avoided in project design, NOAA provides the following ecological modifications to reduce impacts to aquatic resources. The Service recommends that the Corps consider these methods in the design of any HRE restoration projects that are in high energy environments warranting hard armoring:

- Incorporate oyster or clam shell bags or marine-safe concrete that encourages shellfish to attach or settle;
- Establish living structures, like corals and oysters, and design systems to function as closely to natural systems as possible;
- Incorporate native and genetically diverse low and high marsh vegetation augmented by regionally specific coastal plants;
- Incorporate native seagrass;
- Incorporate sandy or cobble beach, mudflats, or other natural shoreline features;
- Maintain wetlands and/or upland riparian buffers adjacent to a structure;
- Add fish habitat enhancement structures to bulkheads; and
- Incorporate breaks or openings in any hard structural elements (excluding bulkheads and seawalls) to facilitate natural water flushing and allow aquatic organisms to access nearshore and shoreline habitat (*e.g.,* fish and turtles and horseshoe crabs for nesting) (National Oceanic and Atmospheric Administration Living Shorelines Workgroup 2015).

2. Invasive Species

As discussed above, the Corps and its project stakeholders should commit to a long-term effort at managing each restored site to prevent the recolonization of invasive species. This will be especially true in the non-tidal HRE proposed projects as most adjoining properties will likely be a source of invasive species colonization. This commitment will ensure a high level of "permanence" in the restoration work performed.

3. Wildlife Management

In accordance with the 2003 MOA, *"Aircraft-Wildlife Strikes"* and subsequent 2007 circular entitled *"Hazardous Wildlife Attractants on or Near Airports"* the Corps should commence coordination with the Service and the FAA for activities in close proximity to Newark, LaGuardia, and JFK Airports

4. Environmental Contaminants

- Baseline conditions, defined by historical characteristics or best available data, should be determined before initiating restoration activities (see Rohr *et al.* 2016) so as to measure restoration success. Knowledge of existing concentrations and distribution patterns of contaminants in the river will help guide the selection of the most cost-effective and environmentally beneficial river restoration strategies (Breault and Cooke 2004).

- The following list of essential biodiversity variables was evaluated by Periera *et al*. (2013) to address biodiversity loss: *"1) genetic composition of selected populations, 2) individual fitness, 3) population abundance of species, 4) species traits, 5) evolutionary diversity, 6) community structure and composition, 7) ecosystem function, 8) resistance and resilience, and 9) ecosystem services*." The Corps should work with the HRE stakeholders to develop the appropriate monitoring matrices to ensure success of the project.

- Due to the presence of sediment contamination, and the potential for these sediments to contribute to contaminant risk to biota in the HRE Study Area, the Service recommends that the Corps develop a matrix that evaluates contaminant/re-contaminant risk of each of the 33 project sites, relative to established ERM concentrations for PCBs, mercury, and dioxin and furans. This will aid in identifying which projects can move ahead quickly to construction (little to no contaminant risk) versus which ones would require additional review and/or modification (due to heightened contaminant risk).

- The Service recommends giving priority to projects that do not adjoin contaminated waterways to avoid the risk of recontamination. It is therefore recommended that if the Corps selects a restoration project in close proximity to a known pollution source, it selects a high marsh construction alternative. The advantage of high marsh projects is that they are not inundated with each daily tide, and, therefore, will be less likely to be re-contaminated by nearby polluted sediments. This will not eliminate, but will reduce the rate of contamination. Over time and if local conditions permit for landward expansion, there may be a conversion of high marsh to low marsh due to sea level rise (depending on accretion rates). During the lengthy conversion process, there is hope that major pollution sources in the HRE will be remediated.

5. Coastal Resiliency Projects

We noted above that the Corps' coastal resiliency project for Jamaica Bay (proceeding under separate Congressional authority) may include alternatives that appear very similar to some of the proposed HRE restoration projects. Therefore, we recommend Corps clarification on the relationship, if any, between the HRE Feasibility Study and that of other similar related projects in the Jamaica Bay area (i.e., East Rockaway to Rockaway Inlet and Jamaica Bay Reformulation Study, Dead Horse Bay, Pumpkin Patch Island, Elders Island, Duck Point, Hawtree Point, and Bayswater State Park).

6. Supply of Genetic Stock of Native Plantings

- The Corps should obtain sufficient future quantities of plant material for each of the proposed restoration project sites. The plant material selected must be of sufficient local genetic diversity to meet this recommendation. This will aid in the recovery of our dwindling (and sometimes listed) pollinator species that may be found in the HRE Feasibility Study Area geographic boundary. This effort can include the incorporation of site specific native seed banks, if available.

- The Corps should undertake a seed collection effort (as the BLM has begun) to begin fulfilling their planting needs for the HRE Feasibility Study Area. This collection effort will comply with Title 18 Chapter 1 of the Administrative Code of the City of New York (Native biodiversity planting practices) which requires "…greater native biodiversity … in public landscapes." (many of the HRE restoration projects are located on New York City-owned public lands).

- The Corps should develop plant palettes in advance of the final design details. Enclosed is an Excel Spreadsheet (Appendix H) of estimated habitat types and subsequent plant material needs (by species) for the proposed restoration sites. Based on the total acreage of the 33 projects identified by the Corps, the Service estimates the amount of plant material could include upwards of 550,000 trees, 1.1 million shrubs, 21 million plugs, and potentially several tons of pollinator-friendly forbs and graminoids seeds. The amount of plant material and species selected for each of the 33 proposals will likely change as project plans become more fully developed.

- In addition to the recommendations discussed above, additional recommendations for native landscaping will be necessary once details are known on soil types, soil and erosion control measures, BMPs to control compaction of soils, invasive species and herbivory control measures, and establishing performance measures to ensure success of each restoration project's stated goal (*i.e.,* percent plant cover, hydrologic flow, and invasive species monitoring and management).

The Service stands ready to assist the Corps in developing a strategy that will meet the needs for providing sufficient quantities of genetically diverse native plant material for the HRE Feasibility Study Area and for other Corps' related resilience and coastal protection projects in New York and New Jersey.

7. Endangered Species

- Continue to informally consult with the Service and the NOAA pursuant to Section 7 of the ESA, to address federally listed species and their habitats; and projects whose habitats are designated as EFH; and

- Consult with the NYSDEC and NJDEP regarding potential impacts to State-listed threatened and endangered species.

8. Planning Objectives

- The Corps should develop target species and habitat list for monitoring and evaluation of restoration success. As project planning advances, the Service recommends developing a transfer funding agreement with the Service to address this recommendation.

- The Corps should develop an adaptive management and monitoring program, including funding for implementation by the local cost-sharing partner, to evaluate the effectiveness of the restoration efforts and pre-established project goals. The management and monitoring plan should be implemented for a minimum of five years after project construction. Objectives should be developed which are unambiguous, and include specific metrics and specific target conditions. Objectives should contain elements that can be readily measured (*i.e.*, percent aerial coverage of all plantings, hydrologic performance and biota use of the restored sites, including documenting fish passage) so as to promote the evaluation of management actions and recognize their contributions to successful management. Objectives should also be based on the capacities of the natural resource system being managed and the political or social system within which management occurs (long-term maintenance by the local sponsor), as well as results oriented and time-fixed (Williams and Brown 2012).

Further detailed planning of project features (*e.g.*, Design Documentation Report, Engineering Documentation Report, Plans and Specifications, or other similar documents) should be coordinated with the Service under a new transfer of funding agreement.

An annual report documenting the status of implementation, maintenance and adaptive management measures should be prepared for a minimum of five years after project construction by the managing agency and provided to the Service, NMFS, USEPA, and State wildlife agencies. That report should also describe future management activities, and identify any proposed changes to the existing management plan or corrective measures taken to ensure project success.

Fish habitat enhancement, such as the addition of pools or boulders or the installation of anchored large wood, should also be considered and incorporated where possible to provide fish spawning and refuge habitat. A need for these habitat components was identified for the Bronx River (Crimmens and Larson 2006, Larson *et al.* 2004).

Floatables and sediments are also identified as a problem for the waterbodies within the HRE Feasibility Study Area (Crimmens and Larson 2006, Larson *et al.* 2004, New York State Department of Environmental Conservation 2016a, AECOM USA, Inc. 2014). Reducing the input of floatables and sediments into these systems where possible is also recommended.

B. MITIGATION RECOMMENDATIONS

1. Marine and Estuarine Invertebrates

- Horseshoe crabs are identified as a priority species and suitable habitats at the project sites should be identified prior to project implementation and pre-and post-construction monitoring for this species should be undertaken. Implement TOY restrictions in coastal waters for any in-water construction activities from May 1 through July 1 of any given year to protect breeding horseshoe crabs.

2. Avian Species

- According to the New Jersey Division of Fish and Wildlife Guidance Manual for the Protection of Fish and Wildlife Resources dated July 2008 (NJDFW Guidance), the general timing restriction to protect nesting migratory birds from tree or shrub/scrub removal is March 15 to July 31. Failure to do so may result in the illegal destruction of nests with eggs or unfledged chicks. According to the NJDFW Guidance, this recommended TOY restriction should be expanded to March 1 for nesting raptors and to August 15 for all nesting migratory birds and August 31 for the common tern. This TOY restriction should also apply for all HRE projects proposed in NY.

- To minimize disturbance to nesting colonial waterbirds and wading birds (*i.e.*, herons, egrets, night-herons, glossy ibis, and/or cormorants), all HRE activities occurring within 1,000 feet of a rookery should be restricted from March 15 through August 15.

- To avoid impacts to any roosting bats or nesting birds, it is recommended that the Corps implement a monitoring plan of bridges located in close proximity to any of the HRE project sites. All HRE activities should be restricted if impacts are observed until roosting or nesting is completed.

- To protect bald eagles, coordinate with the Service, the NJDFW Endangered and Nongame Species Program (ENSP) and NYSDEC-Region II to determine if any TOY restrictions or buffer zones are warranted.

3. Finfish Species

- The Corps should consult with the NMFS, NJDFW, and NYSDEC to determine if time-of-year construction windows are warranted for any aspect of the proposed restoration projects, including in-water work, to protect migrating fish species.

4. Plant Pollinators

- All revegetation efforts should include native and genetically diverse plants into project landscaping designs, when practicable, that support pollinators.

- The Corps should examine if any native seed banks are present at any of the identified project sites, if appropriate.

- The Corps should use the technical guidance (Appendix H) in the development of a pollinator friendly native landscape plan (*i.e.*, Conservation Cover (327) for pollinators; Mowing: Best Practices for Monarchs; Pollinator-Friendly Best Management Practices for Federal Lands; Pollinators in Natural Areas; and Supporting the Health of Monarchs and other Pollinators).

- It is recommended that the Corps includes native pollinator plants in all of their final landscaping plans, when practicable, to comply with the President's pollinator initiative.

5. Turbidity and Soil Erosion

- To minimize short-term increases in turbidity, work should begin from the landward side before "breaking out" into open water areas. Silt fence should be properly installed between disturbed areas and adjacent wetlands. All soil and erosion measures proposed should be coordinated with the Service to ensure they are sufficiently protective of Service Trust Resources prior to approval by the local Soil Erosion Conservation District. At least 6 inches (15 cm) of the toe of the silt fence should be buried parallel to the ground surface on the upslope side of the fence. The silt fence should be inspected following installation and after significant storm events to ensure that it is functioning properly. Silt fence is preferable to hay or straw bales as the bales represent a potential undesirable seed source in maritime shrubland or grassland habitats.

- The use of soil erosion control measures, as approved by the local Soil Erosion Control District, should be installed prior to the grading of any proposed HRE Feasibility Study Area projects. The use of jute matting or other biodegradable natural material is recommended for stabilizing all project construction areas. The matting should be maintained until the site has recovered sufficiently to avoid any soil movement within or off the proposed project site(s). The matting will also aid in improved stabilization of any planted materials.

- Temporary access routes and staging areas for all construction activities be restricted from sensitive habitat areas, including wetlands and riparian zones. The use of low ground pressure vehicles for all work proposed in marshes and open waters, when necessary, should be implemented.

6. Tidal Marshes

Broome (1990) and Niedowski (2000) provide detailed information on establishing various saltmarsh communities. We have summarized their recommendations below and recommend these be considered in project planning.

For low marsh areas, saltmarsh cordgrass (*Spartina alterniflora*) can be propagated by bare root seedlings, plugs, or seedlings in peat pots (Broome 1990). Direct seeding is generally less reliable and there have been incidences when low seed viability reduced successful establishment of this species. Bare root seedlings or plugs are generally less expensive than potted seedlings. Most low saltmarsh planting plans involve planting plugs on 24-inch or 36-inch centers (60 to 90 cm). The Service recommends that saltmarsh cordgrass plugs be planted on a minimum 18-inch (45 cm) center along the newly created creek banks and areas subject to wave action. The closer spacing will reduce the time to establish dense cover and will reduce opportunities for erosion. Wider spacing would be appropriate for other sites and is likely to be less expensive. If Canada geese or brant are abundant in the project area following planting, they may pose a risk to the successful establishment of dense stands of vegetation. Fencing or other measures (*i.e.*, hazing) may be necessary to prevent browsing of the freshly-planted marsh areas.

For high marsh areas, saltmeadow hay (*Spartina patens*) and spikegrass (*Distichlis spicata*) can be propagated by bare root seedlings and plugs. The Corps should seek local sources of genetically viable and native stock for all of their planting needs. Seeding is not as effective for this species and would require the collection of mature seed and cold stratification of the seed over the winter and spring months. Fertilization may also be necessary, but the greater interval between tidal flushes allows the use of standard (as opposed to slow-release) fertilizers (Broome 1990). We recommend planting at 18-inch (45cm) centers to quickly establish a dense cover of vegetation to reduce the opportunity for common reed to become established. Geese and brant may need to be discouraged (*i.e.*, fencing or hazing) from using the site until the vegetation becomes established. Any woody planting should be properly centered according to individual species requirements and staked (large containerized specimens) until root systems become well established.

7. Maritime Grassland

Establishment of native warm season grasses is a more complicated process than the use of standard conservation mixes of introduced cool season grasses. Warm season grasses allocate resources to root systems before significant shoot growth is observed, so most of the aboveground growth does not occur until the second growing season. Because of this root system development, they are well adapted to well-drained soils and dry conditions. The Service supports the Corps' proposal to ensure that at least 18 inches (45 cm) of suitable topsoil (free of weed seed and predominantly mineral in composition) is spread on the grassland restoration sites prior to seeding if needed at a project site.

Various seed mixes are available for grassland establishment. The Corps should seek local sources of genetically viable and native stock for all of their planting needs. Typical species adapted to the Low Coastal Plain Physiographic Zone and available commercially include big bluestem (*Andropogon gerardii*), sweet vernal grass (*Anthoxanthium odoratum*), little bluestem (*Schizacrium scoparium*), and indiangrass (*Sorghastrum nutans*). Detailed information on warm season grass establishment and management can be found in Dickerson *et al*. (1998). As stated above, measures may have to be

implemented to reduce grazing by geese or brant until the vegetation is established and is of sufficient height and vigor.

8. Transition Zones

Marsh elder (*Iva frutescens*) and groundsel tree (*Baccharis halimifolia*) are two species well adapted to transition zones between low marsh and adjacent uplands. These species are tolerant of saline conditions and infrequent tidal inundation. Peat pots or bareroot seedlings should be planted on 3-foot (90 cm) centers. To stabilize slopes, the Service recommends a conservation mix containing annual rye (*Lolium* spp.) for quick cover and slope stabilization, and a native grass such as switchgrass (*Panicum virgatum*) that will increase habitat diversity and help prevent common reed colonization.

9. Upland Enhancement

Upland enhancement consisting of the establishment of woody plant species to improve habitat diversity and aesthetics is proposed for a portion of the proposed project area. The Long Island Shore Species seedling mix produced by NYSDEC's Saratoga Tree Nursery may be a suitable mix of species for well-drained portions of the proposed disposal area. Portions of the disposal area with finer-grained sediments and those that are somewhat poorly drained could be planted with other species such as pin oak (*Quercus palustris*), sweetgum (*Liquidambar styraciflua*), red mulberry (*Marus rubra*), and sassafras (*Sassafras albidium*). Interspersed with the woody plantings should be a conservation seed mix containing annual rye for quick cover establishment. The soil conditions in the enhancement areas should be examined and soil fertility should be tested to determine the appropriate species and needs for fertilizer application.

10. Native Landscaping

If necessary, imported soil should be free of chemical or foreign seed contamination. Chemically contaminated soils or the presence of foreign/invasive seeds will likely jeopardize project stated goals and potentially prove very costly should post construction contaminant remediation or if invasive species management be necessary. The Corps should take the necessary steps (*e.g.*, washing of vehicles) to avoid the importation of foreign seed material for any construction equipment entering the project sites.

11. Climate Change and Sea Level Rise

Given the long lifespan of all of the proposed projects identified in the HRE Feasibility Study, the Corps should consider the possible long-term effects of climate change and sea level rise on project design, with an emphasis on ensuring permanence of project features and components.

12. Environmental Contaminants

- The Service recommends that predicted sediment mercury concentrations be mapped, and that the maps for 2,3,7,8-TCDD, total PCBs, and mercury be overlaid to reveal areas with acceptable concentrations of all three contaminants. Restoration actions should be implemented first in these areas.

- The Service recommends that the Corps perform additional testing (see sediment testing recommendations below) of sediments at the four proposed oyster project sites to determine if the presence of contaminants will impede attainment of the stated project goals, or if project modifications (*i.e.*, sediment remediation or project relocation) are necessary to ensure successful restoration of oyster populations.

- The Service recommends that the Corps place a two-foot cap of clean material over all underlying areas with contamination exceeding acceptable thresholds. The purpose of a thick cap of clean material is to prevent burrowing aquatic organisms from accessing any underlying un-remediated sediments, protect against disturbance via perturbation, and limit transport of contamination through the cap's interstitial water. The Corps and USEPA developed a formula to isolate underlying contaminated sediments from burrowing marine aquatic organisms (U.S. Army Corps of Engineers 1997). This formula was implemented by the Federal government for the construction of the Newark Bay Confined Disposal Facility (CDF), which is located in the HRE Feasibility Study Area. That formula recommended a three-foot cap of clean material for the CDF. In another project faced with similar bioturbation concerns, the Corps, in concert with the Service, NMFS, and the NJDEP, required two-feet of material be placed over all areas with underlying contamination within the 42 acre Lincoln Park tidal wetland restoration project, which is also located in the HRE Feasibility Study Area. A clean cap design of one-foot is acceptable for all non-tidal wetland applications when underlying sediments are contaminated.

- In conjunction with the HRE Feasibility Study Area, the Service recommends that the Corps implement pre-construction sampling, remediation (if necessary), and post-construction sampling, as described below, to further evaluate and enhance the potential for successful restoration of tidal wetlands where contaminated sediments are prevalent.

    - Pre-Construction Sampling. Restoration should not proceed at any site within the HRE without prior screening for contaminants. If concentrations of contaminants in sediment exceed acceptable thresholds, biological testing and/or remediation may be necessary. The Service has prepared pre-construction sampling recommendations for sediment and biota (Appendix E) to evaluate contamination at project sites. This sampling protocol is currently being utilized for proposed mitigation projects within the HRE Feasibility Study Area that are pending Corps' approval. However, it should be noted that NY and NJ have different recommendations for site characterization and remediation. Consequently, the appropriate state agency and other stakeholders (see Interagency Coordination,

below) should be consulted to develop a pre-construction sampling plan, and to evaluate the results of that sampling, at each site prior to construction.

- Remediation. The Service recommends that areas with contamination exceeding acceptable thresholds at project depth be excavated or capped (or excavated and capped, depending on desired final elevation) with two ` of clean material.

- Post-Construction Baseline Characterization Assessment and Monitoring. For each site requiring remediation, the Service recommends that post-construction sampling and monitoring plans be developed for stakeholder (Service, Corps, NOAA, NJDEP, and NYSDEC) approval prior to project implementation. Biota should be included in the post-construction sampling. The Service's recommendations for post-construction sampling are presented in Appendices F (Post-Construction Baseline Assessment) and G (Post-Construction Monitoring). As was the case for pre-construction sampling, recommendations may be different for different project sites, depending upon the location, potential for recontamination, results of the pre-construction contaminant assessment, and remedial approach.

- Monitoring Reports. To ensure a level of permanence of restoration work completed, the applicant should submit a post construction monitoring report by November of each year. The monitoring report should incorporate the results of testing for contaminants in tissue and sediment per the recommendations above. This monitoring should be conducted in conjunction with any other performance criteria required by any State permit to ensure vegetative or hydrologic success. The post-construction monitoring report should also address on-site conditions and any corrections taken to ensure project success (see below long-term maintenance performance measures).

- Long-term maintenance. Upon project completion, the Corps, the local cost-sharing sponsor, and the holder of title to the land that was restored should develop a long-term management plan for the life of the project. The Corps and the USEPA promulgated a mitigation rule in 2008 entitled, *"Compensatory Mitigation for Losses of Aquatic Resources"* (2008 Rule) (see http://www.epa.gov/wetlandsmitigation/). The 2008 Rule addressed the need for project sponsors to conduct long-term maintenance and stewardship of selected sites in order to ensure perpetual project success. To that end, the Service recommends that the Corps and its cost-sharing sponsors and the holders of the public lands where the projects are proposed enter into an agreement to maintain the restored HRE sites in perpetuity.

  The monitoring efforts discussed throughout the draft FWCA should incorporate the goals established in the Water Resources Development Act of 2016 (33 U.S.C. Section 2283, Fish and Wildlife Mitigation) for developing a matrix that measures the ecological success of each project site and the entity responsible for

conducting the requisite monitoring (until the project sufficiently demonstrates that it has met its ecological success criteria). The Service can assist the Corps in conducting monitoring efforts through a separate Transfer Funding Agreement, if applicable.

The agreement should include provisions for eradication of any invasive species that exceeds five percent of any restored area, (uplands or wetlands); the use of herbivory control (*i.e.,* fencing) to minimize deer and other animal browsing; develop a public access plan, if any; collect or remove trash; repair vandalized or damaged structures; rectify trespass use (*i.e.*, all-terrain vehicles); and prepare an annual report (see above) of project conditions and management activities conducted in order to ensure project success.

- Interagency Coordination - The following offices should be coordinated with when seeking joint concurrence of any sampling plan:

  USFWS

  Amy Roe
  New York Field Office
  3817 Luker Road
  Cortland, New York 13045
  Amy_Roe@fws.gov
  (607) 753-9334 x610

  Melissa Foster
  New Jersey Field Office
  Melissa_foster@fws.gov
  (609) 382-5262 (office)
  (609) 703-9199 (cell)

  NOAA

  Reyhan Mehran
  NOAA Ocean Service
  Office of Response and Restoration
  290 Broadway, 18th Floor
  New York, NY 10007
  (212) 637-3257
  reyhan.mehran@noaa.gov

  Lisa Rosman
  NOAA Ocean Service
  Office of Response and Restoration
  290 Broadway, 18th Floor
  New York, NY 10007

(212) 637-3259
lisa.rosman@noaa.gov

Karen Greene
NOAA/National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
Habitat Conservation Division
James J. Howard Marine Sciences Laboratory
74 Magruder Rd.
Highlands, NJ 07732
(732) 872-3023 (office)
karen_greene@noaa.gov

NYSDEC

Susan Maresca
New York State Department of Environmental Conservation
47-40 21st Street
Long Island City, NY 11101
(718) 482-6461
susan.maresca@dec.ny.gov

NJDEP

Susan D. Lockwood
DEP Division of Land Use Regulation
Mail Code 501-02A, P.O. Box 420
Trenton, NJ 08625-0420
(609) 984-0580
Susan.Lockwood@dep.nj.gov

C. SPECIFIC RECOMMENDATIONS FOR INDIVIDUAL SITES

In addition to the recommendations cited above, the following site-specific recommendations are provided. Recommendations from previous Planning Aid Letters or FWCA reports are incorporated by reference. Each of the restoration projects and sites are also identified by their CRP identification number (if applicable).

1. Newark Bay/Lower Passaic/Hackensack River Regional Planning Area, NJ

a. Meadowlark Tract (CRP ID 719)

The project site is located on Bellman's Creek, which is tidally influenced by the Hackensack River. Bellman's Creek is known to contain numerous contaminants in sediments at levels

demonstrated to be harmful to fish and wildlife resources. Although contaminant data for this portion of Bellman's Creek is somewhat limited, surface sediment samples collected as part of the USEPA Berry's Creek Study Area Remedial Investigation show exceedances of ER-Ms for mercury (26 of 29 samples); sum of PCBs (29 of 29 samples), and 2,3,7,8-TCDD (6 of 8 samples) (data accessed via Query Manager; National Oceanic and Atmospheric Administration 2017).

As discussed in the Environmental Contaminant Section of this report, the Corps should further characterize the project site to determine the extent, if any, of environmental contamination. Should the site contain contaminants at levels that pose an ecological risk, the Corps should either postpone the project until the source of contamination is remediated and the risk of recontamination is ameliorated, or design the project with a focus on maximizing the number of high marsh acres and reducing the number of acres of intertidal marsh.

b. Metromedia Marsh (CRP ID 721)

This project site adjoins the Hackensack River, which, as indicated above, is known to contain numerous contaminants in sediments at levels demonstrated to be harmful to fish and wildlife resources. Hackensack River sediments are known to be contaminated with 2,3,7,8 TCDD, mercury, PCBs, VOC's, PAHs, and other compounds. The USEPA has been petitioned by the Hackensack Riverkeeper to designate 22 miles of the Hackensack River, which includes the geographic boundary of Metromedia Marsh, as a Superfund site (http://www.hackensackriverkeeper.org/category/news/press-releases/). The Metromedia Marsh project site also adjoins several mitigation sites (Kane Mitigation Bank, MRI-3, and Global Terminal Projects) whose monitoring efforts thus far show a trend towards recontamination, despite each of these sites having been fully remediated at the time of construction. Aa a result, the Service recommends that the Corps defer a decision on this site until after the USEPA has determined if the Hackensack River whether or not it will be designated a Superfund site. Further, additional sediment characterization of the project site will be necessary, should the Corps proceed with construction of the project. Depending upon the levels of contamination in sediment, the Corps could design the project, to the maximum extent practicable, as a high marsh system to minimize recontamination risk.

c. Essex County Branch Brook Park (CRP ID 887)

The project site has the potential for restoration of 26.3 acres of freshwater wetland habitat, including 4,200 feet of Branch Brook. It is recommended that the Corps conduct sediment characterization at project grade to evaluate the presence of legacy contaminants, with a goal of fully remediating the site if contaminants occur above acceptable thresholds. The Service also recommends the incorporation of an interpretive trail in the project's final design. In addition, the general recommendations for landscaping presented above should be incorporated into the project design. (*i.e.,* ensuring local genetic diversity for all plant materials). This project should receive priority status as the site has less potential of recontamination than those located in the tidal portions of the HRE Feasibility Study Area.

d. Dundee Island Park (CRP ID 900)

This project site was evaluated during the Service's review of potential mitigation sites for the Joseph G. Minish Passaic River Waterfront Park and Historic Area (final Planning Aid Letter [PAL] dated April 22, 2016) (U.S. Fish and Wildlife Service 2016b). In the Service's PAL, the site was rejected due to its close proximity to the Passaic River, which has been heavily polluted with 2,3,7,8 TCDD and is part of a USEPA Superfund Site. However, if the proposed restoration project will not be influenced by the Passaic River (*e.g.,* a riparian or upland park) the site may present little risk to fish and wildlife resources and should further be considered and evaluated. Since the project site contains an abandoned rail line, further characterization of the property should occur, especially at project grade, to determine if there are any contaminant concerns that need to be addressed.

e. Clifton Dundee Canal Green Acres (CRP ID 902)

At this site, the Corps proposes to reconnect floodplains and riparian buffers to the river and improve habitat quality for aquatic organisms. The site adjoins the Passaic River, a known Superfund Study Area, and is currently under fish consumption advisories due to the effects of 2,3,7,8-TCDD, found in the Passaic River. It is currently vegetated with mature trees and would offer little revegetation opportunities at the project site.

This project site was evaluated during the Service's review of potential mitigation sites for the Joseph G. Minish Passaic River Waterfront Park and Historic Area (final Planning Aid Letter dated April 22, 2016) (U.S. Fish and Wildlife Service 2016). The Service is concerned that any new hydrologic connection to the river may pose an unacceptable risk to aquatic organisms (*i.e.,* contaminants sink) and recommends further investigation of the scope of this hydrologic connection and the potential for contaminant risk on fish and wildlife resources.

f. Lower Passaic River "Deferred" Site - Oak Islands Yards (CRP ID 866)

The project site is located on Newark Bay, a waterbody known to contain numerous contaminants in sediments at levels demonstrated to be harmful to fish and wildlife resources. The project site has, in the past, been considered as a potential mitigation site pursuant to the Corps' Section 404 of the CWA program. However, due to the presence of contaminants and the expected recontamination risk from adjacent sources, it was not used as a mitigation site. Newark Bay is also influenced by the Passaic River, the Arthur Kill, and the Hackensack River - waterways known to be contaminated by numerous other Superfund and State hazardous waste sites (*e.g.,*Linden Chemical Processing, Occidental Chemical Corporation, Standard Chlorine Chemical Company, Ventron/Velsicol, United Oil Products, Diamond Head Oil Refinery, Riverside Industrial Park, Syncon Resins, and Scientific Chemical Processing).

In consideration of the above, the Service recommends that no further restoration work be considered for this project site until after the remediation of Newark Bay, the Hackensack River watershed , and the Passaic River are complete, ensuring that the risk of recontamination from these contaminated water bodies is sufficiently ameliorated.

The Service notes that the Oak Island Yard project was also subject to a grant from the NFWF as part of their post-hurricane Sandy coastal resilience grant program. The grant was awarded to the City of Newark for the construction of tidal marshes, coastal maritime and scrub shrub wetlands, shoreline stabilization and invasive species control (nearly identical to that being proposed by the Corps). The City of Newark is proceeding to undertake only the upland portions of the resilience project due to the amount of contaminants contained in the existing marsh plain and also due to the ongoing investigation by USEPA, which is developing a potential remedial action of Newark Bay.

g. Lower Passaic River "Deferred" Site - Kearny Point (CRP ID 865)

This project site is in close proximity to the Oak Islands Yards project site, described above. Due to the risk of contamination and recontamination from the surrounding water bodies, as discussed previously for the Oak Island Yards project, we recommend that restoration at this site be postponed until after remediation of contamination in Newark Bay, the Berry's Creek watershed, and the Hackensack and Passaic River watersheds is complete and the risk of recontamination is sufficiently addressed. In addition, the Service is aware that the project site is presently zoned "heavy industrial" and that the current landowner is considering developing the site under the State of New Jersey's brownfield program. As such, unless the Corps acquires the project site in the immediate future, the ability to undertake restoration efforts at this site appears unlikely.

2. Arthur Kill /Kill Van Kull Regional Planning Area, NJ

There are no projects identified in the Arthur Kill/ Kill Van Kull Regional Planning Area.

3. Lower Bay Regional Planning Area, NY and NJ

Naval Weapons Station Earle (Oyster Restoration, no CRP number)

The Service supports oyster restoration projects in the HRE where conditions are suitable for oyster survival and successful recruitment. In the Appendix D, the Service described research demonstrating that 2,3,7,8-TCDD impaired gonadal development in, and egg viability and larval production of, oysters in the Arthur Kill (*e.g.*, Wintermyer and Cooper 2003). Based on the prevailing science, the Service calculated a recommended sediment threshold of 0.0032 nanograms per gram (ng/g) 2,3,7,8-TCDD (Kubiak *et al.* 2007) for siting potential oyster restoration projects in the HRE. The CRP adopted the Service's recommendation.

The New York/New Jersey Baykeeper oyster restoration project being carried out at the Naval Weapons Station Earle appears to be located in an area with sediment concentrations of 2,3,7,8-TCDD that are likely to exceed the Service's calculated safe threshold (USACE, Port Authority of New York/New Jersey, and New York/New Jersey Hudson-Raritan Estuary Program 2016). While the oysters at Naval Weapons Station Earle thus far appear to be surviving and growing, to our knowledge the potential occurrence of reproductive impairments in these oysters, such as those observed by Wintermyer and Cooper (2003), has not been evaluated. Thus, the placement

of oysters at this location may be counter-productive to the stated goals of the project (*i.e.*, to promote and enhance recovery of the eastern oyster). In fact, it appears that approximately 62 percent of the sediment within the geographic boundary of the HRE is predicted to have 2,3,7,8-TCDD concentrations in sediment that exceed the threshold of 0.0032 ng/g, including the other four sites where oyster recovery projects have been proposed (Governors Island, Soundview Park, Jamaica Bay, and Bush Terminal Projects).

To address the concerns about potential impacts of 2,3,7,8-TCDD on oyster restoration projects in the HRE, the Service recommends that the Corps initiate a study similar to that performed by Wintermyer and Cooper (2003) be undertaken at existing or proposed oyster recovery projects, if not done so already. This includes projects being undertaken by the New York/New Jersey Baykeeper (including Naval Weapons Station Earle and Soundview Park), the Oyster Restoration Research Partnership Program, and the NYCDEP NFWF-funded oyster restoration project for Jamaica Bay. If such studies indicate that the oysters are not negatively impacted by the presence of 2,3,7,8-TCDD in project sediments, and the risk of bioaccumulation is low, then the projects should be prioritized for future construction.

In addition, the Service recommends the Corps consider the placement of an oyster restoration project at the U.S. Coast Guard's Search and Rescue Station at Sandy Hook. This area has the same shellfish classification as Naval Weapons Station Earle (NWSE) (New Jersey Department of Environmental Protection 2016b) and is patrolled by both Coast Guard and NPS personnel. Therefore, public access is restricted (similar to that at NWSE) and compliance with current restrictions imposed by the USFDA and NJDEP can be assured. The Service also requests the Corps consider additional oyster restoration projects in the Navesink and Shrewsbury Rivers, both waterways of the HRE Study Area, which are open to shellfishing and appear to have fewer contaminant issues than other areas of the HRE.

4. Lower Raritan River Regional Planning Area, NJ

There are no projects identified in the Lower Raritan River Planning Area.

5. Upper Bay Regional Planning Area, NY and NJ

Bush Terminal (Oyster Restoration) and Governors Island (Oyster Restoration, no CRP numbers assigned by the Corps).

As discussed above with the proposed oyster restoration project at Navy Weapons Station Earle, the sediments at the restoration sites should be characterized to ensure that contaminant levels are below the recommended 2,3,7,8 TCDD level for oyster body burden level.

If sediment contaminant loads of 2,3,7,8 TCDD exceed the 0.0032 ng/g threshold, then the Service recommends that restoration at this site should be postponed until the site is adequately remediated, or a different site is chosen for oyster restoration. If the contaminant loads for 2,3,7,8 TCDD and other analytes are compatible for oyster restoration, the Service recommends that the

Corps coordinate with the sponsors of already existing oyster restoration projects in these locations to further the HRE oyster restoration projects.

Common terns nest on abandoned Yankee, Lima, and Tango piers on Governors Island. To prevent disturbance to nesting terns, oyster restoration work should not occur within 1,000 feet of these piers between April 1 and September 1.

6. Lower Hudson River Regional Planning Area

There are no projects identified in the Lower Hudson River Planning Area.

7. East River/Harlem River/Western Long Island Sound Regional Planning Area (includes Bronx River), NY

The Service recommends that the Corps characterize the sediments at the proposed restoration sites within this planning region to ensure that restoration efforts at the site are compatible with contaminant loads and/or to prevent the resuspension of contaminants into the water column.

If sites are too contaminated for the proposed projects, then the Service recommends that restoration activities should not go forward. If contaminants are not problematic and projects proceed, then the Service recommends incorporating bio-engineering practices to create "softer" streambanks and to provide habitat for fish and wildlife species.

Long-term monitoring and management should occur at these sites for a minimum of 5 years after project construction, particularly for invasive species. Many of the proposed restoration sites within this planning region were included in New York City Parks' Bronx River Riparian Invasive Plant Management Plan (Yau *et al.* 2012), the Corps should coordinate with New York City Parks and use this document in the development of project plans to remove and monitor invasive species at these sites.

a. Flushing Creek (CRP ID 188)

The Corps should ensure that plans for this site are compatible with and/or enhance the goals of the NYDEP's Combined Sewer Overflow Long Term Control Plan for Flushing Creek (AECOM USA, Inc. 2014).

b. Bronx Zoo and Dam (CRP ID 944)

NYCDPR has created designs for fish ladders at this site (Tobing 2014). The Corps should coordinate with NYCDPR to implement these designs.

c. Stone Mill Dam (CRP ID 945)

NYCDPR has created designs for fish ladders at this site (Tobing 2014). The Corps should coordinate with NYCDPR to implement these designs.

d. Shoelace Park (CRP ID 113)

The Center for Watershed Protection, Inc. (2010) recommended the installation of in-stream cover (*i.e.,* anchored large wood or placed boulders) at this site. The Service supports this recommendation and its inclusion in this proposed restoration project.

e. Muskrat Cove (CRP ID 862)

Crimmens and Larson (2006) recommended that the outer bank armor at this site be replaced with large wood, boulders and vegetation to provide fish and wildlife cover, habitat value, and stability. The Service recommends these measures be incorporated into this proposed restoration project.

f. River Park/West Farm Rapids Park (CRP ID 860)

The Center for Watershed Protection, Inc. (2010) recommended the installation of in-stream cover (*i.e.*, anchored large wood or placed boulders) at this site. The Service supports this recommendation and inclusion into this proposed restoration project.

g. Bronxville Lake (CRP ID 857)

The Corps should design fish passage that allows for river herring and American eel at this site.

h. Crestwood Lake (CRP ID 852)

The Corps should design fish passage that allows for river herring and American eel at this site.

i. Garth Woods/Harney Road (CRP ID 942)

The Corps should design fish passage that allows for river herring and American eel at this site.

j. Westchester County Center (CRP ID 854)

No additional recommendations.

k. Soundview Park (Oyster Restoration, no CRP number)

As discussed above the sediments at the oyster restoration sites should be characterized to ensure that contaminant levels are below the recommended 2,3,7,8 TCDD level for oyster body burden level. If sediment contaminant loads of 2,3,7,8 TCDD exceed the 0.0032 ng/g threshold, then restoration at this site should be postponed until the site is adequately remediated, or a different site is chosen for oyster restoration. If the contaminant loads for 2,3,7,8 TCDD and other analytes are compatible for oyster restoration, then the Service recommends that the Corps coordinate with the sponsors of already existing oyster restoration projects in these locations to further the HRE oyster restoration projects.

8. Lower Hudson River Regional Planning Area, NY and NJ

There are no projects identified in the Lower Hudson River Planning Area.

9. Jamaica Bay Regional Planning Area, NY

The Service recommends that the Corps characterize the sediments at the proposed restoration sites within this sub-planning area to ensure that restoration efforts at the sites are compatible with contaminant loads and/or to prevent the resuspension of contaminants into the water column. If sediment at the proposed restoration sites have concentrations of contaminants that exceed the New York State Screening Values (add citation), then restoration activities should not go forward or should be relocated to areas without contaminant risk.

If sediments are within the New York State Screening Values and the project proceeds, then the Service also recommends that the Corps ensure that all project features are in compliance with the 2003 MOA between the Corps, Service, and the FAA regarding Aircraft-Wildlife Strikes and the *"Advisory Circular Subject: Hazardous Wildlife Attractants on or Near Airports (150/5200-33B)."*

Furthermore, marsh restoration should be focused on high marsh ecotypes as contaminant risk is likely lower over the short-term on fish and wildlife resources and because high marshes are less attractive to large-bodied bird species that are hazardous to aircraft. Also, the highly imperiled saltmarsh sparrow prefers high marsh habitat. The use of bio-engineering and/or living shoreline techniques should be incorporated into project plans wherever possible in order to enhance fish and wildlife habitat and to reduce the use of hardened shorelines (bulkheads, revetments, breakwaters). More information about living shorelines can be found in ARCADIS U.S., Inc. (2014), National Oceanic and Atmospheric Administration Living Shorelines Workgroup (2015), and New York State Department of Environmental Conservation (2016b). Finally, long- term monitoring and management should occur at these sites for a minimum of five years after protection to ensure project success and the management of invasive species.

a. Fresh Creek (CRP ID 730)

The Service recommends that the Corps coordinate with New York City Parks in the salt marsh restoration efforts at this site as they have assessed and/or restored salt marshes at parks within the Jamaica Bay area. Consideration should also be given to the proximity of the site to the landfill to ensure that leachate does not negatively impact the goals of the restoration and/or negatively impact fish and wildlife resources at the site. The NYCDEP has conducted ribbed mussel research at this site, the Corps should coordinate with NYCDEP to enhance this project and/or to ensure that it is not negatively impacted by HRE restoration efforts.

b. Hawtree Point (CRP ID 161)

No additional recommendations.

c. Dubos Point (CRP ID 149)

Red knots, saltmarsh-nesting birds, horseshoe crabs, and diamondback terrapins have been documented at this site. We recommend that project plans reduce impacts to, and where appropriate, maximize habitat for these species. The Corps should coordinate with NYCDEP to ensure that project plans do not interfere with oyster restoration efforts at this site, and to design the project to be complementary to these efforts, if possible.

d. Brant Point (CRP ID 172)

Red knots, saltmarsh-nesting birds, and horseshoe crabs have been documented at this site. Project plans should reduce impacts to, and where appropriate, maximize habitat for these species. The Corps should coordinate with NYCDEP to ensure that project plans do not interfere with oyster restoration efforts at this site, and to design the project to be complementary to these efforts if possible.

e. Bayswater State Park (CRP ID 148)

Saltmarsh-nesting birds and horseshoe crabs have been documented at this site. We recommend that project plans reduce impacts to, and where appropriate, maximize habitat for, these species.

f. Dead Horse Bay (CRP ID 732)

Red knots, saltmarsh-nesting birds, and horseshoe crabs have been documented at this site. We recommend that project plans reduce impacts to, and where appropriate, maximize habitat for these species. The importation of any beach fill should be comparable (texture and size) to that of the existing beach areas that provide for spawning horseshoe crabs. Consideration should also be given to the proximity of the site to the landfill to ensure that leachate does not negatively impact the goals of the restoration and/or negatively impact fish and wildlife resources at the site.

g. Elders Center Marsh Island (CRP ID 939)

Elders Point East supports spawning horseshoe crabs as well as a colony of nesting egrets and herons. Saltmarsh nesting bird species and diamondback terrapins have also been documented at this site. To minimize disturbance to wading bird colonies, project activities should not occur within 1,000 feet of a rookery between March 1 and September 1. In addition, we recommend that on-site contract personnel be informed of the need to identify colonial nesting birds and their nests, and should avoid affecting them during the breeding season. The spawning season for horseshoe crabs would be protected by this TOY restriction. Additionally, the importation of any beach fill should be comparable (texture and size) to that of the existing beach areas that provide for spawning horseshoe crabs.

h. Duck Point Marsh Island (CRP ID 935)

No additional Service recommendations.

i. Pumpkin Patch - East Marsh Island (CRP ID 936)

No additional Service recommendations.

j. Pumpkin Patch - West Marsh Island (CRP ID 936)

No additional Service recommendations.

k. Stony Point Marsh Island (CRP ID 937)

No additional Service recommendations.

l. Jamaica Bay - Head of Bay (Oyster Restoration, no CRP number assigned)

As discussed above, the sediments at oyster restoration sites should be characterized to ensure that contaminant levels are below the recommended 2,3,7,8 TCDD level for oyster body burden level. If sediment contaminant loads of 2,3,7,8 TCDD exceed the 0.0032 ng/g threshold, then restoration at this site should be postponed until the site is adequately remediated, or a different site is chosen where the compound 2,3,7,8 TCDD is not an issue. If the contaminant loads for 2,3,7,8 TCDD and other analytes are compatible for oyster restoration, the Service recommends that the Corps coordinate with the sponsors of already existing oyster restoration projects in these locations to further the HRE oyster projects.

XIII. SERVICE CONCLUSIONS AND RECOMMENDATIONS

The controlling ecological factor for ensuring success of any of the restoration projects is the risk of exposing aquatic biota to the numerous contaminated sediments found in the HRE Feasibility Study Area. The Corps has identified this threat as an "attractive nuisance" whereby the restoration of habitat "... has the potential to release contamination into the food chain (wildlife or human)." (U.S Army Corps of Engineers 2010). The Corps continues to acknowledge risk from contaminant exposure to "human health or ecological health" in their 2016 HRE CRP. Early sediment characterization efforts by the Corps has shown that every Planning Region in the HRE is degraded due to contamination and that until remedial actions in the Hudson River, Hackensack River and the Lower Passaic River (including Newark Bay) are completed, these waterways will continue to influence area sediments in a negative way.

It is the Service's position that it is inappropriate to undertake intertidal marsh restoration projects in areas that may pose a contaminant risk to biota that may utilize newly restored habitats. While the removal of contaminated material from any individual HRE Feasibility Study restoration project site is a positive action, it is unlikely that an intertidal marsh restoration project in close proximity to known pollution sources will maintain acceptable contaminant levels long-term, or "in permanence." The Service recognizes that it may take decades for appropriate remedies to be developed and implemented in many areas of the HRE; however, there are numerous Federal and state authorities that are working today to reduce contamination

and revitalize areas of the HRE, including many USEPA Superfund and State hazardous waste sites. Until such time as the contamination threat is properly ameliorated, the Service recommends that the Corps examine areas across the HRE landscape that are demonstrated to be below effects thresholds to fulfill its immediate project purpose/need, or modify such projects to reduce the threat of contaminant risk (*i.e.*, high marsh design). The Service is available to further assist in the development of pre- and post-construction monitoring plans to evaluate contamination in abiotic and biotic media, as well as trophic transfer into fish and wildlife resources.

The Service requests that the Corps convene a meeting with all of the regulatory stakeholders (*i.e.*, Service, USEPA, NPS, NOAA, NJDEP, NYSDEC, NYC, and the PANY/NJ) to develop a strategy to discuss the contaminant risk that any of these projects pose and to develop a project selection strategy that advances the goals of the HRE Feasibility Study while being sufficiently protective of fish and wildlife resources.

XIV. REFERENCES

6 NYCRR Part 701.7. New York Codes, Rules, and Regulations: 6 NYCRR, Chapter X - Division of Water, Article 2 - Classes and Standards of Quality and Purity, Part 701- Classifications of Surface Waters and Groundwaters. s 701.7 - Class B Fresh Surface Waters.

6 NYCRR Part 701.8. New York Codes, Rules, and Regulations: 6 NYCRR, Chapter X - Division of Water, Article 2 - Classes and Standards of Quality and Purity, Part 701- Classifications of Surface Waters and Groundwaters. s 701.8 - Class C Fresh Surface Waters.

6 NYCRR Part 701.13. New York Codes, Rules, and Regulations: 6 NYCRR, Chapter X - Division of Water, Article 2 - Classes and Standards of Quality and Purity, Part 701- Classifications of Surface Waters and Groundwaters. s 701.13 Class I Saline Surface Waters.

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XV. LIST OF ABBREVIATIONS, ACRONYMS, FOREIGN EXPRESSIONS, AND UNITS OF MEASURE

A. ABBREVIATIONS AND ACRONYMS

2,3,7,8 TCDD	2,3,7,8-tetrachloro-dibenzo-*p*-dioxin
ACJV	Atlantic Coast Joint Venture
ASMFC	Atlantic States Marine Fisheries Commission
AM	Adaptive Management
AMNET	Ambient Biological Monitoring Network
ATV	All-Terrain Vehicle
BEERA/ETRA	Bureau of Environmental Evaluation and Risk Assessment/Environmental Toxicology and Risk Assessment
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BSAF	Biota-sediment Accumulation Factor
CAP	Continuing Authorities Program
CARP	Contaminant Assessment and Reduction Project
CBR	Critical Body Residue
CCD	Colony Collapse Disorder
CDF	Confined Disposal Facility
CFR	Code of Federal Regulations
Corps	United States Army Corps of Engineers
CRP	Hudson Raritan Estuary Comprehensive Restoration Plan
CWA	Clean Water Act
DDT	dichloro-diphenyl-trichloroethane
DF	Dredging Factors
DOI	Department of the Interior

EA	Environmental Assessment
ECL	Environmental Conservation Law
EE	Ecological Evaluation
EETG	Ecological Evaluation Technical Guidance
EFH	Essential Fish Habitat
ENSP	Endangered and Nongame Species Program
EPT	Ephemoptera, Plectoptera, Trichoptera
ERA	Ecological Risk Assessment
ER-L	Effects Range-low
ER-M	Effects Range-medium
ESA	Endangered Species Act
ESC	Ecological Screening Criteria
ESNR	Environmentally Sensitive Area
FAA	Federal Aviation Administration
FSPM	Field Sampling Procedures Manual
FWCA	Fish and Wildlife Coordination Act
GAO	Government Accounting Office
GIS	Geographic Information Systems
HRE	Hudson Raritan Estuary
HUD	Housing and Urban Development
IB	Indiana Bat
ID	Identification
Inc.	Incorporated
IPaC	Information, Planning, and Conservation System
ISM	Incremental Sampling Methodology
JFK	John F. Kennedy

LCP	Linden Chemical Processing
MBTA	Migratory Bird Treaty Act
MCRIP	Meadowlands Comprehensive Restoration Implementation Plan
MOA	Memorandum of Agreement
NEPA	National Environmental Policy Act
NFWF	National Fish and Wildlife Foundation
NJ	New Jersey
NJDFW	New Jersey Division of Fish and Wildlife
NJSEA	New Jersey Sports and Exposition Authority
NLEB	Northern Long-eared Bat
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRC	National Research Council
NY	New York
NYC	New York City
NYCDPR	New York City Department of Parks and Recreation
NYSDEC	New York State Department of Environmental Conservation
NYSDOS	New York State Department of State
NYSGOSR	New York State Governor’s Office of Storm Recovery
PAH	Polycyclic Aromatic Hydrocarbons
PANYNJ	Port Authority of New York and New Jersey
PCB	Polychlorinate biphenyl
PHA	phytohemagglutinin
QA/QC	Quality Assurance/Quality Control
RBP	Rapid Bioassessment Protocol

Service	U.S. Fish and Wildlife Service
Soil-SI,RI,RA TG	Technical Guidance for Site Investigation of Soil, Remedial Investigation of Soil, and Remedial Action Verification Sampling for Soil
SOW	Scope of Work
Sp.	Species
SRP	Site Remediation Program
SWAP	State Wildlife Action Plan
SWG	State Wildlife Grant
TAL	Target Analyte List
TCL	Target Compound List
TEC	Target Ecosystem Characteristic
TEQ	Toxic Equivalents
UCL	Upper Confidence Interval
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFDA	United States Food and Drug Administration
VOC	Volatile Organic Compound
WDA	Wetland Disturbance Area

B. ABBREVIATIONS AND MEANINGS OF FOREIGN EXPRESSIONS

e.g.	*exempli gratia*	for example
et al.	*et alia*	and others
et seq.	*et sequentia*	and the following things
i.e.	*id est*	that is

C. SYMBOLS AND UNITS OF MEASURE

cm	centimeter
cy	cubic yards
ft	feet (=0.30 m)
g	gram (=0.0001kg, =0.0353 ounces)
mm	millimeter
ng	nanogram
pH	potential of hydrogen
ppb	parts per billion
ppt	parts per trillion

APPENDIX B

Avian Resources of the HRE Study Area

Table 1. Migratory Birds of the Passaic River Area.

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* is a State listed species and ! indicates a State species of concern

Accipiter cooperii	Cooper's hawk
Accipiter striatus	Sharp-shinned hawk (!)
Actitis macularius	Spotted sandpiper (!)
Agelaius phoeniceus	Red-winged blackbird
Aix sponsa	Wood duck
Ammodramus savannarum	Grasshopper sparrow (*)
Anas platytrhyncos	Mallard
Archilochus colubris	Ruby-throat hummingbird
Ardea Herodias	Great blue heron (!)
Baelophus bicolor	Tufted titmouse
Bombycilla cedrorum	Cedar waxwing
Branta bernicla	Brant
Branta canadensis	Canada goose
Bubo virginianus	Great horned owl
Buteo jamaicensis	Red-tailed hawk
Buteo lineatus	Red-shouldered hawk
Buteo platypterus	Broad-winged hawk (!)
Butorides virescens	Green heron
Caprimulgus carolinensis	Chuck-will's-widow
Caprimulgus vociferous	Whip-poor-will (!)
Cardinalis cardinalis	Northern cardinal
Carpodacus purpureus	Purple finch
Carduelis pinus	Pine siskin
Cathartes aura	Turkey vulture
Catharus fuscescens	Veery (!)
Catharus guttatus	Hermit thrush
Catharus minimus	Gray-cheeked thrush
Catharus ustulatus	Swainson's thrush
Certhia americana	Brown creeper
Chaetura pelagica	Chimney swift
Charadrius vociferous	Killdeer
Chen caerulescens	Snow goose
Chondestes grammacus	Lark sparrow
Chordeiles minor	Common nighthawk (!)
Circus cyaneus	Northern harrier (*)
Cistothorus palustris	Marsh wren
Coccyzus americanus	Yellow-billed cuckoo
Colaptes auratus	Northern flicker

Columba livia	Rock dove
Contopus virens	Eastern wood pewee
Coragyps atratus	Black vulture
Corvus brachyrhynchos	American crow
Corvus corax	Common raven
Corvus ossifragus	Fish crow
Cyanocitta cristata	Blue jay
Cygnus olor	Mute swan
Dendroica caerulescens	Black-throated blue warbler (!)
Dendroica castanea	Bay-breasted warbler
Dendroica cerulea	Cerulean warbler (!)
Dendroica discolor	Prairie warbler
Dendroica dominica	Yellow-throated warbler
Dendroica fusca	Blackburnian warbler (!)
Dendroica magnolia	Magnolia warbler
Dendroica pensylvanica	Chestnut-sided warbler
Dendroica petechia	Yellow warbler
Dendroica striata	Blackpoll warbler
Dendroica tigina	Cape May warbler
Dendroica virens	Black-throated green warbler (!)
Dimetella carolinensis	Gray catbird
Dryocopus pileatus	Pileated woodpecker
Empidonax minimus	Least flycatcher (!)
Empidonax trailii	Willow flycatcher
Empidonax virescens	Acadian flycatcher
Falco columbarius	Merlin
Falco peregrinus	Peregrine falcon (*)
Falco sparverius	American kestrel (!)
Gavia immer	Common loon
Geothypis trichas	Common yellowthroat
Haemorhous mexicanus	House finch
Haliaeetus leucocephalus	Bald eagle (*)
Helmitheros vermivora	Worm-eating warbler (!)
Hirundo rustica	Barn swallow
Hylocichla mustelina	Wood thrush (!)
Icteria virens	Yellow-breasted chat
Icterus galbula	Northern oriole
Icterus spurius	Orchard oriole
Junco hyemalis	Dark-eyed junco
Larus delawarensis	Ring-billed gull
Larus argentatus	Herring gull
Larus marinus	Great Black-backed gull
Megaceryle alcyon	Belted kingfisher
Melanerpes carolinus	Red-bellied woodpecker
Melospiza georgiana	Swamp sparrow
Melospiza lincolnii	Lincoln sparrow

Melospiza melodia	Song sparrow
Mergus merganser	Common merganser
Mimus polyglottos	Northern mockingbird
Mniotilta varia	Black-and-white warbler
Molothrus ater	Brown-headed cowbird
Myiarchus crinitus	Great-crested flycatcher
Oporornis formosus	Kentucky warbler (!)
Oporornis agilis	Connecticut warbler
Oporornis philadelphia	Mourning warbler
Otus asio	Eastern screech-owl
Pandion haliaetus	Osprey
Parkesia motacilla	Louisiana waterthrush
Parula americana	Northern parula
Passer domesticus	House sparrow
Passerculus sandwichensis	Savannah sparrow
Passerella iliaca	Fox sparrow
Passerina cyanea	Indigo bunting
Petrochelidon pyrrhonota	Cliff swallow
Phalacrocorax auritus	Double-breasted cormorant
Pheucticus ludovicianus	Rose-breasted grosbeak
Picoides pubescens	Downy woodpecker
Picoides villosus	Hairy woodpecker
Pipilo erythrophthalmus	Rufous-sided (Eastern) towhee
Piranga olivacea	Scarlet tanager
Piranga rubra	Summer tanager
Poecile atricapillus	Black-capped chickadee
Polioptila caerulea	Blue-gray gnatcatcher
Progne subis	Purple martin
Quiscalus quiscula	Common grackle
Regulus calendula	Ruby-crowned kinglet
Regulus satrapa	Golden-crowned kinglet
Sayornis phoebe	Eastern phoebe
Seiurus motacilla	Louisiana waterthrush
Seiurus noveboracensis	Northern waterthrush
Scolopax minor	American woodcock
Setophaga ruticilla	American redstart
Seiurus aurocapilla	Ovenbird
Sialia sialis	Eastern bluebird
Sitta Canadensis	Red-breasted nuthatch
Sitta carolinensis	White-breasted nuthatch
Sphyrapicus varius	Yellow-bellied sapsucker
Spinus tristis	American goldfinch
Spiza Americana	Dickcissel
Spizella arborea	American tree sparrow
Spizella pallida	Clay-colored sparrow
Spizella passerina	Chipping sparrow

Spizella pussilla	Field sparrow
Stelgidopteryx serripennis	Northern rough-winged swallow
Sturnella magna	Eastern meadowlark
Sturnus vulgaris	European Starling
Tachycineta bicolor	Tree swallow
Thryothurua ludovicianus	Carolina wren
Toxostoma rufum	Brown thrasher (!)
Tringa flavipes	Lesser yellowlegs
Troglodytes aedon	House wren
Troglodytes troglodytes	Winter wren (!)
Turdus migratorius	American robin
Tyrannus tyrannus	Eastern kingbird
Vermivora cyanoptera	Blue-winged warbler
Vermivora ruficapilla	Nashville warbler (!)
Vermivora peregrina	Tennessee warbler
Vireo flavifrons	Yellow-throated vireo
Vireo gilvus	Warbling vireo
Vireo griseus	White-eyed vireo
Vireo olivaceus	Red-eyed vireo
Vireo solitaries	Blue-headed vireo (!)
Wilsonia canadensis	Canada warbler (!)
Wilsonia pusilla	Wilson's warbler
Zenaida macroura	Mourning dove
Zonotrichia albicollis	White-throated sparrow
Zonotrichia leucophrys	White-crowned sparrow

Many of the above species were found in the Meadowlands Area, as surveyed by the New Jersey Audubon Society on behalf of the New Jersey Sport and Exposition Authority (formerly the New Jersey Meadowlands Commission, New Jersey Meadowlands Commission 2007).

Table 2. Birds of the Bronx River (New York City Department of Parks and Recreation and Bronx River Alliance 2005; New York City Department of Parks and Recreation 2017)

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* is a State listed species, ! is a State species of greatest conservation need, and + is a State species of conservation concern

Actitis macularia	Spotted Sandpiper
Agelaius phoeniceus	Red-winged Blackbird
Aix sponsa	Wood Duck
Anas platyrhynchos	Mallard
Anas rubripes	American Black Duck (!)
Ardea alba	Great Egret (!)
Ardea herdoias	Great Blue Heron
Aythya marila	Greater Scaup (!)

Bombycilla cedrorum	Cedar Waxwing
Branta canadensis	Canada Goose
Bucephala albeola	Bufflehead
Buteo jamaicensis	Red-tailed Hawk
Buteo platypterus	Broad-winged Hawk
Cardinalis cardinalis	Northern Cardinal
Carduelis tristis	American Goldfinch
Carpodacus mexicanus	House Finch
Catharus fuscescens	Veery
Ceryle alcyon	Belted Kingfisher
Chaetura pelagica	Chimney Swift
Chroicocephalus philadelphia	Bonaparte's Gull (!)
Colaptes auratus	Northern Flicker
Columbia livia	Rock Pigeon
Contopus virens	Eastern Wood-pewee
Corvus brachyrhynchos	American Crow
Corvus ossifragus	Fish Crow
Cyanocitta cristata	Blue Jay
Cygnus olor	Mute Swan
Dendroica coronata	Yellow-rumped Warbler
Dendroica discolor	Prairie Warbler (!)
Dendroica fusca	Blackburnian Warbler
Dendroica magnolia	Magnolia Warbler
Dendroica pensylvanica	Chestnut-sided Warbler
Dendroica petechia	Yellow Warbler
Dendroica striata	Blackpoll Warbler
Dendroica virens	Black-throated Green Warbler
Dumetella carolinensis	Gray Catbird
Egretta thula	Snowy Egret (!)
Empidonax traillii	Willow Flycatcher
Geothlypis trichas	Common Yellowthroat
Hirundo rustica	Barn Swallow
Hylocichia mustelina	Wood Thrush (!)
Icterus galbula	Baltimore Oriole
Larus argentatus	Herring Gull
Larus atricilla	Laughing Gull (!)
Larus marinus	Great Black-backed Gull
Melanerpes carolinus	Red-bellied Woodpecker
Meleagris gallopavo	Wild Turkey
Melospiza melodia	Song Sparrow
Mergus serrator	Red-breasted Merganser
Mimus polyglottos	Northern Mockingbird

Mnioltilta varia	Black and White Warbler
Molothrus ater	Brown-headed Cowbird
Myiarchus crinitus	Great crested flycatcher
Nyctanassa violacea	Yellow-crowned Night-Heron (!)
Nycticorax nycticorax	Black-crowned Night-Heron (!)
Otus asio	Eastern Screech Owl
Oxyura jamaicensis	Ruddy Duck (!)
Pandion haliaetus	Osprey (+)
Parula american	Northern Parula
Parus bicolor	Tufted Titmouse
Passer domesticus	House Sparrow
Phalacrocorax auritus	Double-crested Cormorant
Phasianus colchicus	Ring-necked Pheasant
Picoides pubescens	Downy Woodpecker
Picoides villosus	Hairy Woodpecker
Piranga olivacea	Scarlet Tanager (!)
Plegadis falcinellus	Glossy Ibis (!)
Pluvialis dominica	American Golden Plover
Poecile atricapillus	Black-capped Chickadee
Quiscalus quiscula	Common Grackle
Regulus satrapa	Golden-crowned Kinglet
Seiurus aurocapillus	Ovenbird
Setophaga castanea	Bay-breasted Warbler (!)
Setophaga ruticilla	American Redstart
Setophaga tigrina	Cape May Warbler (!)
Sitta carolinensis	White-breasted Nuthatch
Spizella passerina	Chipping Sparrow
Stelgidopteryx serripennis	Northern Rough-winged Swallow
Sterna hirundo	Common Tern (*, !)
Sturnus vulgaris	European Starling
Tachycineta bicolor	Tree Swallow
Thryothours ludovicianus	Carolina Wren
Tringa flavipes	Lesser Yellowlegs
Tringa melanoleuca	Greater Yellowlegs
Troglodytes aedon	House Wren
Turdus migratorius	American Robin
Vireo gilvus	Warbling Vireo
Vireo griseus	White-eyed Vireo
Vireo olivaceus	Red-eyed Vireo
Wilsonia canadensis	Canada Warbler (!)
Zenaida macroura	Mourning Dove
Zonotrichia albicollis	White-throated Sparrow

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APPENDIX C

Fish of the HRE Feasibility Study Area

Table 1. Fish of the Passaic and Hackensack Rivers (Louis Berger Group, Inc. 2014; TAMS 2004; and New Jersey Meadowlands Commission 2005).

Scientific Name	Common Name
Alosa aestivalis	Blueback Herring
Alosa pseudoharengus	Alewife
Alosa sapidissima	American Shad
Ameiurus nebulosus	Brown bullhead
Anchoa mitchilli	Bay anchovy
Anguilla rostrata	American eel
Bairdiella chrysoura	Silver perch
Brevoortia tyrannus	Atlantic menhaden
Caranx hippos	Crevalle jack
Catastomus commersoni	White sucker
Cynoscion regalis	Weakfish
Cyprinus carpio	Common carp
Dorosoma cepedianum	Gizzard shad
Ethoestoma olmstedi	Tessellated darter
Fundulus diaphanus	Banded killifish
Fundulus heteroclitus	Mummichog
Fundulus majalis	Striped killifish
Gasterosteus aculeatus	Threespine stickleback
Gobiosoma bosci	Naked goby
Gobionellas shufeldti	Freshwater goby
Leiostomus xantharus	Spot
Lepomis auritus	Redbreast sunfish
Lepomis gibbosus	Pumpkinseed
Lepomis macrochirus	Bluegill
Meirus catus	White catfish
Menidia beryllina	Inland (Tidewater) silverside
Menidia menidia	Atlantic silverside
Micropterus salmoides	Largemouth bass
Microgadus tomcod	Atlantic tomcod
Micropogonias undulatus	Atlantic croaker
Micropterus dolomieu	Smallmouth bass
Morone americana	White perch
Morone saxatilis	Striped bass
Mugil cephalus	Striped mullet
Notropis hudsonius	Spottail shiner
Obsanus tau	Oyster Toadfish
Paralichthys dentatus	Summer flounder

Perca flavescens	Yellow Perch
Prionotus carolinus	Northern searobin
Pomatomus saltatrix	Bluefish
Pomoxis nigromaculatus	Black crappie
Pseudopleuronectes americanus	Winter flounder
Selene setapinnis	Atlantic Moonfish
Syngnathus fuscus	Northern pipefish
Trinectes maculatus	Hogchoker

Table 2. Fish of the Arthur Kill/Kill Van Kull, Newark Bay, Upper New York Bay, and Lower New York Bay (U. S. Army Corps of Engineers 2013).

Scientific Name	Common Name
Alosa aestivalis	Blueback Herring
Alosa pseudoharengus	Alewife
Ammodytes americanus	American sandlance
Anchoa hepsetus	Striped anchovy
Anchoa mitchilli	Bay anchovy
Anguilla rostrata	American eel
Astroscopus guttatus	Northern stargazer
Bairdiella chrysoura	Silver perch
Brevoortia tyrannus	Atlantic menhaden
Caranx hippos	Crevalle jack
Caranx crysos	Blue runner
Catastomus commersoni	White sucker
Centropristis striata	Black sea bass
Clupea harengus harengus	Atlantic herring
Conger oceanicus	Conger eel
Cynoscion regalis	Weakfish
Dorosoma cepedianum	Gizzard shad
Enchelyopsus cimbrius	Fourbeard rockling
Ethoestoma olmstedi	Tessellated darter
Etropus microstomus	Smallmouth flounder
Fundulus diaphanus	Banded killifish
Fundulus heteroclitus	Mummichog
Fundulus majalis	Striped killifish
Gasterosteus aculeatus	Threespine stickleback
Gobiesox strumosus	Skilletfish
Gobiosoma bosci	Naked goby
Gobionellas shufeldti	Freshwater goby
Leiostomus xantharus	Spot
Gasterosteus aculeatus	Threespine stickleback
Gobiosoma bosci	Naked goby
Gobionellas shufeldti	Freshwater goby

Hippocampus erectus	Lined seahorse
Hypsoblennius hentz	Feather blenny
Lagodon rhomboides	Pinfish
Leiostomus xantharus	Spot
Menidia beryllina	Inland (Tidewater) silverside
Menidia menidia	Atlantic silverside
Merluccius bilinearis	Silver hake
Microgadus tomcod	Atlantic tomcod
Micropogonias undulatus	Atlantic croaker
Morone americana	White perch
Morone saxatilis	Striped bass
Mugil cephalus	Striped mullet
Mugil curema	White mullet
Myoxocephalus aenaeus	Grubby
Notropis hudsonius	Spottail shiner
Obsanus tau	Oyster Toadfish
Ophidion marginatum	Striped cusk-eel
Opisthonema oglinum	Atlantic thread herring
Ostraciidae sp.	Boxfish
Paralichthys dentatus	Summer flounder
Peprilus triacanthus	Butterfish
Prionotus carolinus	Northern searobin
Prionotus evolams	Striped searobin
Pomatomus saltatrix	Bluefish
Pollachius virens	Pollock
Pseudopleuronectes americanus	Winter flounder
Scomberomorus maculatus	Spanish mackerel
Scophthalmus aquosus	Windowpane
Selene setapinnis	Atlantic moonfish
Selene vomer	Lookdown
Sphoeroides maculatus	Northern puffer
Stenotomus chrysops	Scup
Syngnathus fuscus	Northern pipefish
Trichiurus lepturus	Atlantic cutlassfish
Trinectes maculatus	Hogchoker
Urophycis chuss	Red hake
Urophycis regia	Spotted hake

Table 3. Bronx River (Including Estuarine Portions) Fish (Crimmens and Larson 2006; U.S. Army Corps of Engineers 2006).

Scientific Name	Common Name
Alosa mediocris	Hickory Shad
Alsoa aestivalis	Blueback Herring

Anchoa mitchelli	Bay Anchovy
Anguilla rostrada	American Eel
Apeltes quadracus	Fourspine Stickleback
Brevoortia tyrannus	Atlantic Menhaden
Carassius auratus	Goldfish
Catostomus commersoni	White Sucker
Clupea harengus	Atlantic Herring
Cynoscion regalis	Weakfish
Cyprinus carpio	Common Carp
Dorosoma cepedianum	Gizzard Shad
Esox americanus	Grass or Redfin Pickerel
Etheostoma olmstedi	Tesselated Darter
Fundulus diaphanous	Banded Killifish
Fundulus heteroclitus	Mummichog
Fundulus majalis	Striped Killifish
Gobiosoma bosci	Naked Goby
Gobiosoma ginsburgi	Seaboard Goby
Ictalurus nebulosus	Brown Bullhead Catfish
Lepomis auritus	Redbreast Sunfish
Lepomis gibbosus	Pumpkinseed
Lepomis macrochirus	Bluegill Sunfish
Luxilus cornutus	Common Shiner
Menidia menidia	Atlantic Silverside
Microgadus tomcod	Atlantic Tomcod
Micropterus salmoides	Largemouth Bass
Morone americana	White Perch
Morone saxatilis	Striped Bass
Myoxocephalus scorpius	Shorthorn Sculpin
Notemigonus crysoleucas	Golden Shiner
Notropis hudsonius	Spottail Shiner
Peprilus triacanthus	Butterfish
Pomatomus saltatrix	Bluefish
Prionotus carolinus	Northern Searobin
Pseudopleuronectes americanus	Winter Flounder
Rhinichthys atratulus	Black-Nosed Dace
Rhodeus sericeus	Bitterling
Semotilus atromaculatus	Creek Chub
Stenotomus chrysops	Scup
Synathus fuscus	Northern Pipefish
Tautogolabrus adspersus	Cunner
Urophycis regia	Spotted Hake

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APPENDIX D

Supporting Studies on Contaminants Impacts to HRE Biota

Grass shrimp collected from a variety of sites surrounding Staten Island, New York (within the Arthur Kill/Kill Van Kull and Lower Bay planning regions) were found to exhibit differences in prey capture ability, with those from Richmond Creek (adjacent to a landfill) exhibiting lower rates of prey capture than those from nearby Nassau Creek (impacted by historic smelting activities) (Perez and Wallace 2004). Grass shrimp from both Staten Island creeks had lower rates of prey capture than did those from Great Kills Harbor, a relatively clean area on the eastern shore of Staten Island. Previously healthy shrimp became impaired following exposure to sediments collected from Richmond Creek. Behavioral analyses showed that shrimp collected from Richmond Creek relied on less active prey capture strategies and were generally less effective predators as compared to shrimp from Great Kills Harbor.

Adult blue crabs from the Hackensack Meadowlands (within the Newark Bay/Hackensack River/Passaic River planning region) had reduced ability to capture juvenile blue crabs and adult mummichogs (both active prey) compared to crabs from a reference site in Tuckerton, NJ (Reichmuth *et al.* 2009). Other less active prey, including ribbed mussels (*Geukensia demissa*) and fiddler crabs (*Uca pugilator*), were eaten at equivalent frequencies by crabs from the two locations. Additionally, the stomachs of crabs from the Hackensack Meadowlands contained much more algae, plant material, detritus, and sediment, and much less crab, fish, and other live food, than did the stomachs of crabs from the reference site (although this could reflect reduced availability of live food in the HRE). When control crabs were placed in cages within the Hackensack Meadowlands, or fed food from the Hackensack Meadowlands in the laboratory, their ability to capture prey declined significantly, indicating that the effects were the result of environmental factors rather than population differences. Conversely, crabs collected in the Hackensack Meadowlands and caged at a reference site showed significant improvements in their ability to capture prey.

A variety of studies have demonstrated that organisms including mummichog, grass shrimp, fiddler crabs, blue crabs, and bluefish from Piles Creek, NJ (within the Arthur Kill/Kill Van Kull planning region) have impaired feeding abilities and are more vulnerable to predation relative to organisms from reference locations (eastern Long Island; Tuckerton, NJ) (see reviews by Weis *et al.* 2001; Weis *et al.* 2011; Weis and Candelmo 2012). Organisms captured from Piles Creek were less active, less able to capture prey, and more vulnerable to predation (Smith and Weis 1997). Fish from Piles Creek displayed altered neurotransmitter levels and thyroid function and histopathology (Zhou, John-Alder, et al., 1999; Zhou, Rademacher, et al., 1999), which may underlie the altered behaviors (Smith *et al.* 1995). Further, Toppin *et al.* (1987) found that mummichogs from Piles Creek had reduced growth and a shorter life span in comparison to fish from reference areas. Correspondingly, Bass *et al.* (2001) found that grass shrimp from Piles Creek are larger than those from a reference area, and demonstrated through controlled laboratory studies that the observed size differences appear related to lower rates of predation on grass shrimp in Piles Creek, rather than to genetic or environmental factors within the grass shrimp population.

Goto and Wallace (2011) evaluated the effects of legacy contamination on the trophic ecology of the mummichog in five creeks of Staten Island, including Piles Creek, NJ (within the Arthur Kill/Kill Van Kull and Lower Bay planning regions). The authors examined the effects of mercury-contaminated sediments on mummichog prey and concluded that chronic pollution in Arthur Kill tributaries appears to directly (through chemical bioaccummulation) and indirectly (through reduced benthic prey availability) alter feeding habits and strategies of mummichogs in these highly urbanized tidal marshes. Correspondingly, Goto (2009) reported that mercury-laden sediments of the Arthur Kill and adjacent marshes were strongly associated with reduced abundance, biomass, and diversity of the benthic macroinfaunal assemblage.

Multiple adverse reproductive impacts were observed in mummichog collected from Newark Bay (within the Newark Bay/Hackensack River/Passaic River planning region) (Bugel *et al.* 2010 and 2011). Females had decreased gonadal weight and inhibited gonadal development, while males had decreased gonadal weight and altered testis development. Both sexes also displayed a variety of molecular and morphological changes indicative of impaired reproductive health and endocrine disruption (Bugel *et al.* 2010). In addition, females collected from Newark Bay produced fewer eggs, and their hatched embryos suffered significantly greater mortality, as compared to females collected at a reference area in Tuckerton, NJ (Bugel *et al.* 2011). Dosing studies with 17β-estradiol revealed that the observed impacts resulted from a combination of altered regulation of vitellogenin and 17β-estradiol deficiency, which the authors speculated may have been due to the presence of aryl hydrocarbon receptor (AhR) agonists such as dioxins and PCBs (Bugel *et al.* 2010).

Laboratory populations of bluefish were fed common prey fish (menhaden [*Brevoortia tyrannus*] and mummichog) collected in either the Hackensack River (within the Newark Bay/Hackensack River/Passaic River Planning Region) or a reference area in Tuckerton, NJ (Candelmo *et al.* 2010). Bluefish fed prey fish from the Hackensack River had elevated tissue concentrations of PCBs, pesticides, and total mercury, and after four months displayed reduced feeding rates, activity, and growth compared to fish fed prey fish from the reference area. They also displayed irregular swimming behavior and disrupted schooling patterns. Bluefish captured in the Hackensack River also had elevated concentrations of PCBs, DDTs, and mercury, and the young-of-the-year were significantly smaller, compared to fish from reference locations, indicating that contaminant uptake and reduced feeding and/or growth also occurs in the field. Additionally, a relatively low percentage of bluefish caught in the Hackensack River contained food in their guts, as compared to bluefish from other locations (see, for example, Juanes and Conover 1994; Buckel *et al.* 1999; Gartland *et al.* 2006), providing further evidence of a reduced feeding rate by bluefish in the HRE. Bluefish from the HRE also displayed disrupted swimming patterns and schooling behavior, potentially increasing predation risk. Candelmo *et al.* (2010) speculated that consumption of prey fish with elevated contaminant concentrations may cause detrimental effects on migration, overwinter survival, and recruitment in bluefish populations.

Atlantic tomcod from the HRE (Lower Hudson River Planning Region) had higher incidences of neoplastic and preneoplastic lesions in livers than did tomcod from reference locations in Maine, Rhode Island, and Connecticut (Dey *et al.* 1993). External liver lesions were found in 59 percent of one-year-old fish from the HRE, while 93 percent of the two-year-old fish showed gross liver

abnormalities. These conditions were not seen in fish from the reference locations. Chemical analysis of liver tissue from HRE tomcod revealed high levels of PCBs and the presence of several pesticides (DDx, chlordane, and dieldrin) and heavy metals. The authors suggested that chemical contamination in nursery areas in the lower estuary, combined with high-temperature stresses of summer, may contribute to the observed high prevalence of hepatic lesions. In addition, Wirgin *et al.* (1989) found that tomcod from the HRE had an extremely high incidence (55-90 percent) of histologically defined hepatocellular carcinomas, whereas tomcod from control sites in Maine rarely exhibited this condition.

Grasman *et al.* (2013) evaluated associations between immune function, pre-fledgling survival, and contaminants in herring gull (*Larus argentatus*) and black-crowned night-heron in Swinburne and Hoffman Islands in lower New York Harbor (within the Lower Bay planning region). T-cell function (as measured by the phytohemagglutinin [PHA] skin response), lymphocyte proliferation, and pre-fledgling survival were all reduced relative to reference locations. Highly significant correlations between measures of the PHA response and dioxins and PCBs provided strong evidence that these chemicals contributed to immunosuppression in the study population, and likely indicates significant impacts on disease resistance and survival (Grasman *et al.* 2013).

Although no studies evaluating the biological effects of mercury on birds in the HRE have been published, mercury concentrations in feathers and eggs of marsh wrens (*Cistothorus palustris*) in the Hackensack Meadowlands (within the Newark Bay/Hackensack River/Passaic River planning region) have been found to exceed effects concentrations for nesting success in Carolina wrens, presented in Jackson *et al.* (2011). Tsipoura *et al.* (2008) collected eggs, feathers, and blood from red-winged blackbirds, marsh wrens, and tree swallows in three different marshes (Kearny Marsh, Marsh Resources, and Riverbend) within the Hackensack Meadowlands. Average concentrations of mercury in marsh wrens eggs collected at Marsh Resources, Secaucus, New Jersey, and concentrations of mercury in feathers of marsh wrens from all three sampling locations (adjusted to wet weight concentrations using a feather moisture content of 16 percent; Kock 2006), were approximately at levels demonstrated by Jackson *et al.* (2011) to induce a 20 percent reduction in nesting success in Carolina wren.

Wintermyer and Cooper (2003) studied the effects of dioxin and dioxin-like compounds on egg development and fertilization of the eastern oyster and evaluated the potential for restoring oyster populations in the New York/New Jersey Harbor area. The two study sites were located in Newark Bay and the Arthur Kill (within the Newark Bay/Hackensack River/Passaic River and the Arthur Kill/Kill Van Kull planning regions). The study found that despite some recent improvements of water quality in the HRE, dioxins, furans, and PCBs were still bioavailable in Newark Bay and that 2,3,7,8-TCDD impaired gonadal development, egg viability, and larval production in oysters transplanted into the Arthur Kill. The authors concluded that due to the documented adverse effects of these compounds on the oyster, restoration efforts in Newark Bay and the Arthur Kill were unlikely to result in successful recruitment of oysters in these areas.

Particularly relevant to this study is that the Corps has identified four potential oyster restoration projects in the HRE (Bush Terminal, Governor's Island, Soundview Park, and the mouth of

Jamaica Bay). In the Mitigation Recommendation Section of this report we have provided recommendations regarding contaminants testing to address this concern.

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APPENDIX E

Pre-Construction Site Characterization

Sediment/Soil

- For all proposed projects (tidal and non-tidal) within the HRE, the Corps should conduct a screening-level characterization of sediment or soil (hereinafter referred to as "sediment") in what will be the top 0-30 centimeters (cm) of the final project grade. Samples should be collected from all habitat types, including tidal creeks, intertidal marsh side-slopes, and marsh plains, within each wetland disturbance area (WDA), to be identified in consultation with the stakeholder agencies (Service, Corps, NOAA, NJDEP and NYSDEC). Sediment or soil cores from the top 0-30 cm of the final project grade should be split into what will be the top 0-15 cm and 15-30 cm horizons of the final project grade for separate laboratory analysis. Additionally, the Corps should collect sediment cores from the top 0-15 cm of the existing tidal and non-tidal creeks (*i.e.*, those not part of project construction) within, and in the vicinity of, the project site. The samples collected for pre-construction characterization will be used to determine whether contaminated material below the proposed final project grade and /or existing creek sediments should be removed and /or capped prior to grading.

- Within each WDA and the tidal creeks requiring characterization, the number and location of samples to be collected and analyzed should be in accordance with a final sampling plan submitted to and approved by the Service, NOAA, and each respective State agency.

- Appropriate numbers and types of quality assurance/quality control (QA/QC) samples should be collected and analyzed, including duplicates, blanks, and standards. Field duplicates should be collected at a rate of one per sampling category, or one per every 20 samples, whichever is greater. Field blanks should be collected at a rate of 10 percent of the total number of samples, with minimum of one. Laboratory duplicates should be included at a minimum rate of one for every 20 samples.

- The Corps should seek concurrence from the Service, NOAA, NJDEP, and NYSDEC prior to any sampling plan being implemented at a specific site.

The Service recommends that the Corps choose one of the two recommended sampling methodologies in their sediment characterization investigation.

<u>Sediment Sampling Methodologies</u>

1. Discrete Sampling

For HRE restoration projects located in New York, the Service recommends using the formula cited in Appendix F of the NYSDEC Screening and Assessment of Contaminated Sediment

Guidance found in New York State Department of Environmental Conservation (2014) to determine the number of samples to be collected pre- and post-construction.
New York State assigns different dredging factors (DF) to guide development of a sampling plan. Dredging factors range from a value of one-half to three and are determined on a site-specific basis. Habitats potentially associated with a DF of one, where there is no previous data and there is no suspected likelihood of appreciable contamination (see New York State Department of Environmental Conservation 2014), within the HRE in New York may include western Long Island Sound, parts of the Bronx, and the South Shore of Staten Island. The highest DF (three) should be applied in contaminated areas, such as the Arthur Kill, Kill Van Kull, and the Gowanus Canal. The higher DFs will increase the number of samples per acre within an individual project site, relative to lower DFs.

DF should equal 3 for sites:

- with documented contamination from past sediment data; or
- in areas of established fish consumption advisories or a history of spills or site-specific contaminant concerns (*e.g.*, copper, mirex, dioxin, and PCBs) in the drainage basin; or
- where there is a likelihood of contamination and dredging has not occurred in the last five years (New York State Department of Environmental Conservation 2014).

For projects in New Jersey, the Service recommends following the Ecological Evaluation Technical Guidance "EETG;" (New Jersey Department of Environmental Protection 2015a), developed by the NJDEP Site Remediation Program (SRP) under the Site Remediation Reform Act (N.J.S.A. 58:10C-1 et seq.) (New Jersey Department of Environmental Protection 2012). The EETG includes information on how to conduct an Ecological Evaluation (EE) to investigate for the co-occurrence of environmentally sensitive natural resources (ESNRs), contaminants of potential ecological concern (COPECs), and contaminant migration pathways from a source area to the ESNRs. The results of the EE will indicate whether or not additional ecological evaluation (*i.e.*, an ecological risk assessment or ERA) is warranted at a project site. The EETG includes recommendations for sampling and analytical methods, including detection limits; Ecological Screening Criteria (ESC; New Jersey Department of Environmental Protection 2009) to use in determining whether there is potential for contaminants to impact ESNRs; and procedures for the derivation of site-specific ecological risk-based remediation goals.

With regard to the number and location of samples for marsh plains, the NJDEP's *"Technical Guidance for Site Investigation of Soil, Remedial Investigation of Soil, and Remedial Action Verification Sampling for Soil"* (Soil-SI, RI, RA TG) (New Jersey Department of Environmental Protection 2015b), section 3.6.11 should be followed. Collection of soil samples should be biased toward suspected areas of the greatest contamination. If there is no basis for biasing, then random sampling of these areas is recommended as follows:

- Grid the area to be sampled and give each grid node an identification number.
- Base the grid nodes chosen for sampling on the numbers selected from a random number chart.
- Sample areas of less than 10 ac at a rate of at least one sample for every two acres.
- For areas greater than 10 ac, a reduced frequency may be appropriate.

For tidal and non-tidal creeks associated with each WDA, NJDEP does not prescribe an exact sample number or location of samples; however the EETG, section 5.3.2.2 should be followed and depositional areas should be targeted. The NJDEP routinely recommends a sample transect approach, with spacing between transects generally ranging between 50 and 200 ft apart, depending on creek length.

Additional information for field sampling plan design, implementation, and field QA/QC procedures can be found in NJDEP's *"Field Sampling Procedures Manual"* ("FSPM"; New Jersey Department of Environmental Protection 2005).

2. Incremental Sampling Methodology

An alternative to using the above discrete sampling methodologies is the Incremental Sampling Methodology (ISM), which was developed by USEPA for use in their Superfund Program (Interstate Technology and Regulatory Council 2012; U.S. Environmental Protection Agency 2011). The ISM is "…a structured composite sampling and processing protocol that reduces data variability and provides a reasonably unbiased estimate of mean contaminant concentrations in a volume of soil targeted for sampling." By using a recommended number of sampling increments and combining and subsampling them in a prescribed manner, more consistent and reproducible results can be obtained, yielding more defensible decisions with a smaller analytical investment. Note that NJDEP SRP and NYSDEC guidance documents do not incorporate ISM for the purposes of risk characterization; therefore, it is important that the decision to use the ISM to characterize a project site be made in consultation with the appropriate stakeholder agencies.

<u>Sediment Sample Analysis</u>

Sediment samples collected at all proposed HRE project sites should be analyzed for the following compounds using the methods indicated below. Appropriate numbers and types of QA/QC samples should also be collected and analyzed, including blanks, duplicates, and standards, as indicated above. Additional guidance is available in New Jersey Department of Environmental Protection (2014) and New York State Department of Environmental Conservation (2014).

- Target Analyte List (TAL) Metals: USEPA Method 6010/6020
- Mercury: USEPA Method 7471A
- Target Compound List (TCL) volatile organics: USEPA Method 8260
- TCL semi-volatile organics: USEPA Method 8270D
- Organochlorine pesticides: USEPA Method 8081
- PCBs, as congeners: USEPA Method 1668A
- 2,3,7,8-chloro substituted dioxins and furans (17 congeners): USEPA Method 1613
- Grain Size Distribution
- Percent Moisture
- Total organic carbon
- pH

Sample Detection Limits and Sediment Evaluation - HRE projects in New York

- Analyte-specific detection limits should be below Class A sediment classification concentrations as set forth in New York State Department of Environmental Conservation (2014), with the exception that detection limits for individual PCBs and dioxin and furan congeners should be below 1 ppt. No construction can proceed until these data are obtained and reviewed by the appropriate stakeholders for their adequacy in assessing existing environmental conditions.

- Contaminant concentrations should be demonstrated to be within or below the Class B sediment classification concentrations as set forth in New York State Department of Environmental Conservation (2014), with the exception of total PCBs (sum of congeners), for which a threshold value of 20 parts per billion (ppb) should be used.

- Sediment exceeding Class B sediment classification concentrations should be removed to a depth such that the Class B concentrations are achieved in each of the top 0-15 cm and 15-30 cm horizons of sediment at the final project grade. Alternatively, areas with exceedances at project depth can be capped (or excavated and capped, depending on desired final elevation) with two feet of clean material, in which case post-excavation sampling to document clean conditions is not required.

Sample Detection Limits and Sediment Evaluation - HRE projects in NJ

- Analyte-specific detection limits for sampling conducted as part of the EE should be below the ESCs identified in New Jersey Department of Environmental Protection (2009). Notwithstanding the EETG recommendation for PCB congener and dioxin/furan analyses on a subset of samples, for HRE projects in New Jersey, PCB congener and dioxin/furan analyses should be completed for all samples, pursuant to recommendations by the Bureau of Environmental Evaluation and Risk Assessment, Environmental Toxicology and Risk Assessment Unit (BEERA/ETRA) for NJDEP, Land Use Regulation-lead wetland mitigation/restoration projects. Contaminant concentrations should be determined to be below the ESCs. If ESCs are exceeded, the procedures outlined in the EETG should be followed to determine whether further ecological evaluation and/or sediment removal is appropriate. A remedial action to achieve the ESC or background contaminant levels may be implemented in lieu of performing an ERA, in accordance with the EETG. However, no construction can proceed until data used to evaluate a site are obtained and reviewed by the stakeholders for their adequacy in assessing existing environmental conditions.

- If a project site passes the screening-level characterization (*i.e.*, is determined to have levels of contamination below risk thresholds), additional evaluation or remediation is not necessary, although the Corps should provide a pre-construction assessment report as indicated in the "Reporting" section, below. If, however, contamination exceeds acceptable thresholds, the Corps should remove sediment as necessary to attain clean conditions within the top 30 cm of the final project grade, and document such in

accordance with the terms of the "Post-Construction Baseline Assessment" section below. Alternatively, areas with exceedances at project depth can be capped (or excavated and capped, depending on desired final elevation) with two feet of clean material, in which case post-excavation sampling to document clean conditions is not required. Project sites requiring remediation will also be subject to pre- and post-construction biological sampling, described below.

Biota

- If the pre-construction site characterization indicates that sediment within the top 0-30 cm of the final project grade requires remediation, then the Corps should develop a biological sampling plan, in consultation with the Stakeholder agencies, to be implemented prior to undertaking remediation. The biological sampling will establish baseline (pre-construction) conditions and, together with post-construction monitoring data, be used to evaluate the potential impact of recontamination, should it occur, on biota. All biota should be collected during the time period from May through August. Biological sampling is not necessary if sediment does not require remediation.

- Within each previously-characterized WDA in both New York and New Jersey, the Corps should collect a minimum of fifteen mummichog, fifteen fiddler crabs, and sufficient lycosid and tetragnathid spiders and amphipods to form five composite samples of each taxon. These samples should be chemically characterized using the analytical methodologies and detection limits listed for sediments, above. For non-tidal wetland or brackish water projects, additional or different species may be identified for collection, should sufficient numbers of the above species not be available. Biological and sediment samples should be collocated, to the extent possible.

- Because of the demonstrated usefulness of mussels in tidal environments as sentinel organisms both to evaluate the rate of biological uptake and to establish biota-sediment accumulation factors (BSAFs) generally (see, for example, Kimbrough *et al.* 2008; Burkhard 2009; and ASTM International 2013), the Service requests that caged mussel bioaccumulation studies be used to evaluate recontamination and bioaccumulation for tidal wetland projects in close proximity to contaminated sediments. The protocols for mussel monitoring should be consistent with those presented in ASTM International method E2122 (ASTM International 2013). The Corps should place sufficient caged mussels within each previously-characterized WDA and reference location(s) to provide a minimum of fifteen individual mussels for tissue analysis three months after placement. Note that the recommendation to conduct mussel monitoring only applies to tidal wetland restoration projects.

- Three months after placement of mussel cages, fifteen mussels should be collected and composited to form five samples from each WDA/reference location(s) to be chemically characterized using the analytical methodologies listed below.

- As previously described for sediment sampling, appropriate numbers and types of QA/QC samples, including duplicates, blanks, and standards, should be collected and

analyzed along with biological samples. Field duplicates should be collected at a rate of one per sampling category, or one per every 20 samples, whichever is greater. Field blanks should be collected at a rate of 10 percent of the total number of samples, with a minimum of one. Laboratory duplicates should be included at a minimum rate of one for every 20 samples.

- Generally speaking, tissue samples should be analyzed for the following compounds using the methods indicated below, although this list may be modified based on the pre-construction site characterization contaminant results, in consultation with the stakeholder agencies.

    - TAL metals: USEPA Method 6010
    - Mercury: USEPA Method 7471A
    - Organochlorine pesticides: USEPA Method 8081
    - PCBs, as congeners: USEPA Method 1668A
    - 2,3,7,8-chloro substituted dioxins and furans (17 congeners): USEPA Method 1613
    - Total Lipid Content (percent)
    - Percent Moisture

- Analyte-specific detection limits should be the same as those identified for sediment, above, unless otherwise indicated by the Service. Tissue concentrations should be compared to critical body residues (CBRs) identified for the 2014 Focused Feasibility Study for the Lower Eight Miles of the Lower Passaic River (Appendix B in Louis Berger Group *et al.* 2014).

Reporting

- For each project, a report should be provided presenting the results of the pre-construction site assessment, including sediment sampling methodologies and sample depths. Reports should include a figure or figures depicting sampling locations, along with comprehensive analytical data in tabular format, including units, detection limits, summary statistics (*i.e.*, mean, 95 percent upper confidence level [UCL], *etc*.) and comparisons to the appropriate screening levels and CBRs, as described above. Results from any quality assurance samples analyzed should be included as well. The report should be forwarded to the list of contacts provided above.

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APPENDIX F

Post-Construction Baseline Assessment

The following recommendations are applicable to a majority of the proposed HRE projects involving tidal wetlands and should be followed for project sites that require sediment remediation or capping. For non-tidal wetland projects, many of these recommendations will still apply; however, the biological species evaluated will likely change. Prior to the Corps undertaking any post-construction sampling in either tidal or non-tidal wetlands, further coordination with the identified stakeholder agencies will be necessary.

Sediment

- If the pre-construction characterization results in contaminated sediment being removed, the Corps should collect sample cores separated into horizons corresponding to the top 0-1 cm, 1-15 cm, and 15-30 cm below the final project grade surface in the waterways, side-slopes, and marsh plain surfaces within each previously-characterized WDA. The 0-1 cm samples will be used to establish baseline conditions for evaluating recontamination post-construction, while the 1-15 and 15-30 cm horizons will be used to document successful remediation of site sediments (Note that if contaminated sediments are protected by a two-foot cap, sampling and analysis of the 1-15 and 15-30 cm horizons to document clean conditions will not be required.). Sampling regimes and laboratory methods used to collect and characterize these samples should follow the recommendations described under Appendix E, above.

- The Service recommends that sediment at nearby off-site (background) locations be sampled simultaneously with project sites post-construction to aid in establishing regional conditions and evaluating post-remediation contaminant trends. Sampling and analytical procedures should be the same at both background and project sites.

- As described in Appendix E, appropriate numbers and types of QA/QC samples should be collected and analyzed. Field duplicates should be collected at a rate of one per sampling category, or one per every 20 samples, whichever is greater. Field blanks should be collected at a rate of 10 percent of the total number of samples, with minimum of one. Laboratory duplicates should be included at a minimum rate of one for every 20 samples.

Biota

- It is anticipated that construction activities (*i.e.*, removal of soil or sediment, sediment placement of cap or the mechanical removal of vegetation) will have a negative impact on biota. Therefore, biological sampling is not recommended as part of the post-construction baseline assessment. However, the Service recommends that at the completion of construction, the Corps place caged mussels within remediated tidal wetland project sites to establish study populations that will be left in place for the duration of the post-construction monitoring period (see Appendix G, below). Sufficient

numbers of mussels should be placed to provide a minimum of fifteen individuals for tissue analysis within each previously-characterized WDA and the reference location(s) at the end of the life of the monitoring period (*e.g.*, five years). Note that this recommendation only applies to tidal wetland restoration projects.

Reporting

- For each project, a report should be provided presenting the results of the post-construction baseline assessment, including sampling methodologies and sample depth. Reports should also provide a figure or figures depicting sampling locations, along with comprehensive analytical data in tabular format, including units, detection limits, summary statistics (*i.e.*, mean, UCL, *etc*.) and comparisons to the pre-construction baseline assessment data and to the appropriate screening levels, as described above. Results from any QA/QC samples analyzed should be included as well.

APPENDIX G

Post-Construction Monitoring

Post-construction monitoring should be undertaken at sites that have undergone sediment remediation (*i.e.*, removal or capping). This monitoring should include sediment and biological sampling and contaminant testing, and be conducted on an annual basis for the life of the monitoring period (for a minimum of five years after project completion).

Sediment

- The Corps should collect sediment samples from the top 0-1 cm below the final project surface in waterways, side-slopes, and the marsh surface of the tidal restoration projects and at background locations. The sampling regime (*i.e.*, ISM or discrete sampling) should be the same as was used for the site's post-construction characterization. Laboratory methods should follow those described in Appendix E, above.

- If project construction incorporates placement of a cap, the integrity (*i.e.*, thickness) of the cap should be assessed to ensure that settlement and compaction and/or erosion are not compromising the ability of the cap to protect against exposure of biota to underlying contamination. If the integrity of the cap appears to be compromised, additional monitoring of pore water contaminant concentrations and/or benthic macroinvertebrate bioaccumulation evaluations may be recommended.

- Sediment samples collected for post-construction monitoring should be analyzed and evaluated using the same methods, detection limits, and threshold concentrations used for the pre-construction site characterization and post-construction baseline assessment (see Appendices E and F). Sediment and biological samples should be co-located to the extent possible.

Biota

- The Corps should collect biological samples (mummichog, fiddler crab, amphipods, and lycosid and tetragnathid spiders) within each previously-characterized WDA using the same sampling procedures, sample sizes, and analytical methods identified in Appendix E. All biota should be collected during the time period from May through August.

- For all tidal restoration projects, the Corps should place sufficient numbers of caged mussels to provide a minimum of fifteen individuals from each previously-characterized WDA and the reference location(s), to be analyzed as five composited samples per location three months after placement (*i.e.*, five samples per WDA/reference location, with each sample consisting of three composited individuals). Protocols for mussel monitoring should be consistent with those presented in ASTM method E2122 (ASTM International 2013). In addition, at the end of the life of the monitoring period, a minimum of fifteen individual mussels from each WDA and the reference location(s) should be collected from those placed at the completion of construction. These mussels

should also be composited into five samples per WDA/reference location and analyzed in accordance with the recommendations presented in the Appendix E.

- Biological samples collected for post-construction monitoring should be analyzed and evaluated using the same methods, detection limits, and threshold concentrations provided for the pre-construction site characterization and post-grading baseline assessment, presented in Appendices E and F, respectively.

- As described in the Appendices E and F, appropriate numbers and types of QA/QC samples should collected and analyzed as part of both the sediment and biological assessments. Field duplicates should be collected at a rate of one per sampling category, or one per every 20 samples, whichever is greater. Field blanks should be collected at a rate of one per every 10 samples, with a minimum of one. Laboratory duplicates should be included at a minimum rate of one for every 20 samples.

Reporting

- Annual reports should be provided that summarize the results of each year's monitoring activities. Reports should include sampling methodologies, a figure or figures depicting sampling locations, and comprehensive data in tabular format, including units, detection limits, summary statistics (*i.e*., mean, UCL, *etc*.) and comparisons to the pre-construction and post-construction baseline assessment data and to the appropriate screening levels, as described above. Results from any quality assurance samples analyzed should be included, as well.

- In addition, a final report should be provided that synthesizes the results from separate annual reports. The final report should evaluate data trends over the life of the project.

REFERENCES

ASTM, International. 2013. *Standard Guide for Conducting In-situ Field Bioassays With Caged Bivalves*. E2122-02. ASTM International, West Conshohocken, PA, 2013. Available online at: http://www.astm.org.

APPENDIX H

Plant and Animal Technical Guidance

Pollinators:

Increasing and Improving Pollinator Habitat through Landscaping:
https://www.doi.gov/sites/doi.gov/files/uploads/increasing-and-improving-pollinator-habitat-through-landscaping.pdf

Pollinator-friendly Best Management Practices for Federal Lands:
https://www.fs.fed.us/wildflowers/pollinators/BMPs/documents/PollinatorFriendlyBMPsFederalLands05152015.pdf

Supporting the Health of Honey Bees and Other Pollinators:
https://www.fws.gov/southwest/es/Documents/R2ES/Pollinators/6-Supporting_the_Health_of_Honey_Bees_and_Other_Pollinators_Oct2014.pdf

Monarch Joint Venture – Mowing: Best Practices for Monarchs:
http://monarchjointventure.org/images/uploads/documents/MowingForMonarchs.pdf

Pollinators in Natural Areas: A Primer on Habitat Management:
http://monarchjointventure.org/images/uploads/documents/pollinators_in_natural_areas_xerces_society.pdf

Conservation Cover (327) for Pollinators:
https://efotg.sc.egov.usda.gov/references/public/NJ/InstallGuideJobSheet_NewJersey_CnsrvCvr.pdf

Bats:

Indiana Bat Summer Survey Guidance:
https://www.fws.gov/Midwest/endangered/mammals/inba/inbasummersurveyguidance.html