

**Appendix E**  
**Natural Resources**  
**(Part 1)**

**Appendix E-1**  
**T & E Consultations**



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

MAY 14 2015

Chad Seewagen, Ph.D.  
Senior Wildlife Biologist  
AKRF Environmental and Planning Consultants  
34 South Broadway, Suite 401  
While Plains, NY 10601

**Re: Living Breakwaters and Tottenville Dune Projects in Richmond County, New York**

Dear Dr. Seewagen:

This is in response to your letter received on May 7, 2015, requesting information on species listed or proposed to be listed under the Endangered Species Act of 1973, as amended, that may be in the vicinity of the proposed Living Breakwaters Project and Tottenville Dune Project.

The proposed project is located along the Tottenville shoreline of the South Shore of Staten Island (Richmond County) in Raritan Bay.

Several listed species of whales occur seasonally in the waters off of New Jersey and New York. Endangered North Atlantic right whales (*Eubalaena glacialis*) are found off the coasts of New Jersey and New York from September 1 to March 31. Endangered humpback whales (*Megaptera novaeangliae*) are found off the coasts of New Jersey and New York from February through April and from September through November. Fin (*Balaenoptera physalus*), sei (*Balaenoptera borealis*) and sperm (*Physeter macrocephalus*) whales are also seasonally present in waters off of New Jersey and New York, but are typically found in deeper offshore waters. Listed species of whales can be found in the offshore waters of New Jersey and New York, although due to the depths and near shore location of the project site, listed whales will not occur in the project area.

Several species of threatened and endangered sea turtles occur seasonally in New Jersey and New York waters. Sea turtles occur along the coasts of New York and New Jersey, including many bays and harbors, during the warmer months, typically from May to mid-November. The sea turtles in these waters are typically small juveniles, with the most abundant being the threatened Northwest Atlantic Distinct Population Segment (DPS) of loggerhead (*Caretta caretta*) followed by the endangered Kemp's ridley (*Lepidochelys kempi*). New Jersey waters have also been found to be warm enough to support endangered green sea turtles (*Chelonia mydas*) from June through October. While endangered leatherback sea turtles (*Dermochelys coriacea*) may be found in the waters off New York and New Jersey during the warmer months



as well, this species is less likely to occur in the action area for this project, as it is typically found in more offshore waters.

You can find more information on listed sea turtle species at:

<http://www.nmfs.noaa.gov/pr/species/turtles/>.

Populations of endangered shortnose sturgeon occur in New Jersey in the Delaware River from the lower bay upstream to at least Lambertville, New Jersey and in the Hudson River from upper New York Harbor to the Troy Dam. Raritan Bay has never supported a historical population of shortnose sturgeon and to date, no shortnose sturgeon have been observed in this system. No shortnose sturgeon will occur in the project site.

Atlantic sturgeon occur in estuarine and marine waters along the U.S. Atlantic coast and may be present in the project area. The New York Bight, Chesapeake Bay, South Atlantic, and Carolina DPSs of Atlantic sturgeon are endangered; the Gulf of Maine DPS is threatened. Individuals originating from any of these DPSs could occur in the project area. You can find more information on sturgeon species at: [http://www.nero.noaa.gov/prot\\_res/esp/index.html](http://www.nero.noaa.gov/prot_res/esp/index.html).

As listed species are likely to be present in the vicinity of the proposed project, a consultation, pursuant to Section 7 of the Endangered Species Act (ESA) of 1973, may be necessary. As project plans develop, we recommend you consider the following effects of the project on sea turtles and sturgeon:

- Effects of increased suspended sediment;
- Suspension of contaminated sediments;
- Discharge of any other pollutant;
- Loss of prey;
- Any impacts to habitat or conditions that make affected water bodies suitable for these species and,
- Effects of underwater sound pressure waves.

The federal action agency (e.g., the permitting agency) will be responsible for determining whether the proposed action is likely to affect listed species. When project plans are complete, the federal agency should submit its determination of effects, along with justification for the determination, 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. After reviewing this information, NMFS would then be able to conduct a consultation under section 7 of the ESA.

Should you have any questions about these comments or about the section 7 consultation process in general, please contact Jennifer Goebel at (978)281-9373 or by email ([Jennifer.Goebel@noaa.gov](mailto:Jennifer.Goebel@noaa.gov)).

**Fish and Wildlife Coordination Act**

Raritan Bay and the Arthur Kill provide habitat for a wide variety of NOAA trust resources including resident, migratory, benthic, and forage species such as striped bass, bluefish, winter flounder, summer flounder, windowpane flounder, alewife, blueback herring, weakfish, striped bass, American shad, blue crabs, hard clams, bay anchovy, and silversides. Blue crabs overwinter in the channels of the bays and winter flounder spawns throughout. To minimize impacts to some of these species, seasonal restrictions on in-water work may be necessary depending upon the scope and nature of the work proposed.

**Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat**

The waterways within the project area have been designated as Essential Fish Habitat (EFH) for one or more species. Further EFH consultation by the federal action agency will be required as part of the federal permit process. Should project plans change that would change the basis for determination, or if new species or EFH are designated, the federal action agency should reinitiate consultation. For a listing of EFH and further information, please go to our website at <http://www.nero.noaa.gov/hcd>. If you wish to discuss this further, please call Melissa Alvarez at 732-872-3116 or email at [melissa.alvarez@noaa.gov](mailto:melissa.alvarez@noaa.gov).

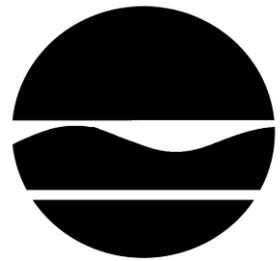
Sincerely,



Mark Murray-Brown  
Section 7 Coordinator  
for Protected Resources Division



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



Joe Martens  
Commissioner

May 29, 2015

Chad Seewagen  
AKRF Environmental and Planning Consultants  
34 South Broadway, Suite 401  
White Plains, NY 10601

Re: Living Breakwaters and Tottenville Dune Project, Staten Island, NY  
Town/City: New York. County: Richmond.

Dear Chad Seewagen :

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, or may occur, on your site or in the immediate vicinity of your site.

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](http://www.dec.ny.gov/about/39381.html).

Sincerely,

A handwritten signature in black ink that reads "Andrea Chaloux". The signature is written in a cursive, flowing style.

Andrea Chaloux  
Environmental Review Specialist  
New York Natural Heritage Program



**The following rare plants, rare animals, and significant natural communities have been documented at your project site or in its 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.

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
<b>Vascular Plants</b>			
<b>Sweetbay Magnolia</b>	<i>Magnolia virginiana</i>	Endangered	Critically Imperiled in NYS
<p>[REDACTED] 1995-03-22: This area is a wetland that was formerly part of the woods to the south. It has been dissected by streets and house yards and is presently being bulldozed for more homes. The house lots extend far back from the street and the back portions of the yards are still wooded. This is where the magnolias are. Other trees here are <i>Quercus phellos</i>, <i>Quercus bicolor</i>, <i>Quercus montana</i>, <i>Quercus rubra</i> and sweetgum. <i>Dicentra eximia</i> was seen in the herbaceous layer. In 1949 this area was described as a swamp.</p>			2217
<b>Northern Gama Grass</b>	<i>Tripsacum dactyloides</i>	Threatened	Imperiled in NYS
<p>[REDACTED], 1998-09-16: Weedy opening between quiet dead end street and dry hybrid oak woods. Soil moist to dry sand. Roadside dominated by mugwort and <i>Panicum</i> grass. Woodland a thick canopy of oak species, beech and red maple above an almost impenetrable layer of green brier.</p>			3372
<b>Willow Oak</b>	<i>Quercus phellos</i>	Endangered	Critically Imperiled in NYS
<p>Aesop Park, 2006-09-12: This a tree that had a schoolyard built around it.</p>			12382
<b>Willow Oak</b>	<i>Quercus phellos</i>	Endangered	Critically Imperiled in NYS
<p>[REDACTED] 1995-03-22: Relatively mature mesic woodland more characteristic of southern states. Trees on high sandy soil with clay. Seasonally wet degraded habitat. <i>Smilax rotundifolia</i> is the predominant understory plant. The community is most like successional maritime oak forest and red maple-hardwood swamp. The soil is gray sandy clay.</p>			4504
<b>Wild Potato-vine</b>	<i>Ipomoea pandurata</i>	Endangered	Critically Imperiled in NYS
<p>[REDACTED] 2006-09-12: The plant is in a small shrub border next to the fence of a schoolyard in an area that is not mowed.</p>			12381
<b>Yellow Giant-hyssop</b>	<i>Agastache nepetoides</i>	Threatened	Imperiled in NYS
<p>[REDACTED] 1998-09-15: Regrowth after severe bulldozing. Weedy trees and ragweed. Disturbed moist woods.</p>			4923

<b>White-bracted Boneset</b>	<i>Eupatorium leucolepis</i> var. <i>leucolepis</i>	Endangered	Critically Imperiled in NYS	
	[REDACTED] 1990-09-30: Old roadway next to <i>Celtis</i> forest.			5108
<b>Persimmon</b>	<i>Diospyros virginiana</i>	Threatened	Imperiled in NYS	
	[REDACTED] 1998-09-15: Slightly disturbed oak forest with a thick understory layer of <i>Smilax rotundifolia</i> .			8845
<b>Dune Sandspur</b>	<i>Cenchrus tribuloides</i>	Threatened	Imperiled in NYS	
	[REDACTED] 1998-09-15: A small unmanaged maritime beach between the mouth of the Arthur Kill and a steep sandy hill. No homes are visible from the largest portion of the beach, but there are a few present along the southeast side. This gives the beach a relatively secluded feeling, leading to many night time gatherings. This is evidenced by fire rings, bottles, cans, and other littered articles. Wild cats were observed wandering in the brush and tall grass, and dog excrement is common. The area appears somewhat weedy.			2348

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](http://www.guides.nynhp.org), from NatureServe Explorer at [www.natureserve.org/explorer](http://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](http://www.guides.nynhp.org). For descriptions of all community types, go to [www.dec.ny.gov/animals/97703.html](http://www.dec.ny.gov/animals/97703.html) for Ecological Communities of New York State.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



**The following rare plants and rare animals have  
historical records  
at your project site, or in its vicinity.**

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.

<i>COMMON NAME</i>	<i>SCIENTIFIC NAME</i>	<i>NYS LISTING</i>	<i>HERITAGE CONSERVATION STATUS</i>
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Vascular Plants - The following plants were documented in Tottenville in the mid-1800s to mid-1900s.

<b>Wild Potato-vine</b>	<i>Ipomoea pandurata</i>	Endangered	Critically Imperiled in NYS 11
<b>Smooth Tick-trefoil</b>	<i>Desmodium laevigatum</i>	Endangered	Historical Records Only in NYS 300
<b>Round-leaf Boneset</b>	<i>Eupatorium rotundifolium</i>	Endangered	Historical Records Only in NYS 778
<b>Scirpus-like Rush</b>	<i>Juncus scirpoides</i>	Endangered	Critically Imperiled in NYS 1729
<b>Slender Spikegrass</b>	<i>Chasmanthium laxum</i>	Endangered	Critically Imperiled in NYS 3041
<b>Little-leaf Tick-trefoil</b>	<i>Desmodium ciliare</i>	Threatened	Imperiled in NYS 3680
<b>Retorse Flatsedge</b>	<i>Cyperus retrorsus var. retrorsus</i>	Endangered	Critically Imperiled in NYS 5723
<b>White Milkweed</b>	<i>Asclepias variegata</i>	Endangered	Critically Imperiled in NYS 6349
<b>Tiny Blue-curls</b>	<i>Trichostema setaceum</i>	Endangered	Critically Imperiled in NYS 7519
<b>Pink Wild Bean</b>	<i>Strophostyles umbellata</i>	Endangered	Critically Imperiled in NYS 6847
<b>Flax-leaf Whitetop</b>	<i>Sericocarpus linifolius</i>	Threatened	Imperiled in NYS 6870

COMMON NAME	SCIENTIFIC NAME	NYS LISTING	HERITAGE CONSERVATION STATUS
<b>Nuttall's Tick-trefoil</b>	<i>Desmodium nuttallii</i>	Endangered	Historical Records Only in NYS 8353
<b>Dwarf Hawthorn</b>	<i>Crataegus uniflora</i>	Endangered	Critically Imperiled in NYS 6729
<b>American Ipecac</b>	<i>Euphorbia ipecacuanhae</i>	Endangered	Critically Imperiled in NYS 9253
<b>Bead Pinweed</b>	<i>Lechea pulchella</i> var. <i>moniliformis</i>	Endangered	Critically Imperiled in NYS 9590
<b>Saltmarsh Aster</b>	<i>Symphotrichum subulatum</i> var. <i>subulatum</i>	Threatened	Imperiled in NYS 7901
<b>Persimmon</b>	<i>Diospyros virginiana</i>	Threatened	Imperiled in NYS 8372
<b>Sand Blackberry</b>	<i>Rubus cuneifolius</i>	Endangered	Historical Records Only in NYS 784

**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.

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# GOSR Living Breakwaters

## *IPaC Trust Resources Report*

Generated May 25, 2016 07:53 AM MDT, IPaC v3.0.7

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.



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U.S. Fish & Wildlife Service

# IPaC Trust Resources Report



NAME

GOSR Living Breakwaters

LOCATION

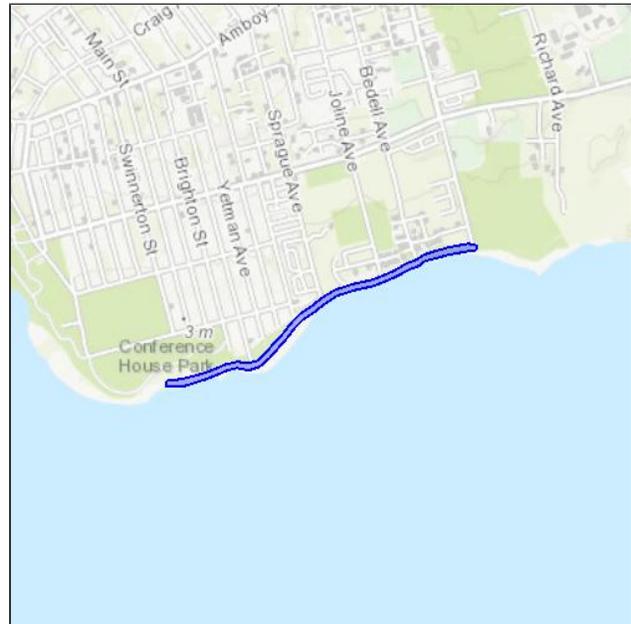
Richmond County, New York

DESCRIPTION

Wave attenuation with habitat and dune creation

IPAC LINK

<https://ecos.fws.gov/ipac/project/4WWMN-SSUCZ-HGHBN-ZSIPX-5RL7P4>



## 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](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B079)

**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](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B07O)

### 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.<sup>[1]</sup> 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:

<b>Black-billed Cuckoo</b> <i>Coccyzus erythrophthalmus</i>	Bird of conservation concern
Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0HI">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0HI</a>	
<b>Canada Warbler</b> <i>Wilsonia canadensis</i>	Bird of conservation concern
Season: Breeding	
<b>Fox Sparrow</b> <i>Passerella iliaca</i>	Bird of conservation concern
Season: Wintering	
<b>Gull-billed Tern</b> <i>Gelochelidon nilotica</i>	Bird of conservation concern
Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0JV">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0JV</a>	
<b>Horned Grebe</b> <i>Podiceps auritus</i>	Bird of conservation concern
Season: Wintering	

<b>Hudsonian Godwit</b> <i>Limosa haemastica</i> Season: Migrating	Bird of conservation concern
<b>Kentucky Warbler</b> <i>Oporornis formosus</i> Season: Breeding	Bird of conservation concern
<b>Least Tern</b> <i>Sterna antillarum</i> Season: Breeding	Bird of conservation concern
<b>Loggerhead Shrike</b> <i>Lanius ludovicianus</i> Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0FY">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0FY</a>	Bird of conservation concern
<b>Peregrine Falcon</b> <i>Falco peregrinus</i> Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0FU">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0FU</a>	Bird of conservation concern
<b>Purple Sandpiper</b> <i>Calidris maritima</i> Season: Wintering	Bird of conservation concern
<b>Red Knot</b> <i>Calidris canutus rufa</i> Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0DM">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0DM</a>	Bird of conservation concern
<b>Saltmarsh Sparrow</b> <i>Ammodramus caudacutus</i> Season: Breeding	Bird of conservation concern
<b>Seaside Sparrow</b> <i>Ammodramus maritimus</i> Year-round	Bird of conservation concern
<b>Short-eared Owl</b> <i>Asio flammeus</i> Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0HD">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0HD</a>	Bird of conservation concern
<b>Snowy Egret</b> <i>Egretta thula</i> Season: Breeding	Bird of conservation concern
<b>Upland Sandpiper</b> <i>Bartramia longicauda</i> Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0HC">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0HC</a>	Bird of conservation concern

## Wildlife refuges and fish hatcheries

Refuge and fish hatchery data is unavailable at this time.

# 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 tubercid 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.

**Appendix E-2**  
**Summary of Aquatic Sampling Programs**

## A. BENTHIC MACROINVERTEBRATE STUDY

### GRAB, SEDIMENT, AND WATER QUALITY SAMPLING

The benthic macroinvertebrate study program included sampling for benthic macrofauna, sediment characteristics (grain size and total organic carbon), and water quality sampling at the bottom and surface at 60 sampling locations (**Figures 9-2a and 9-2b**). Sampling was conducted in June and September at the same time fish were sampled. Separate grab samples for benthic macrofauna and sediment characteristics were collected using a 0.04-m<sup>2</sup> (0.43 sf) Young-modified van Veen grab and photographed prior to processing. Macrofauna samples were washed through a 0.5-mm (0.2-inch) mesh sieve, preserved in buffered formalin, and stained with rose bengal. Grain size and total organic carbon analyses were performed by ALS Environmental on 60 grab samples during both the June and September surveys.

In-situ water quality data were also collected at each benthic sampling location during the June and September surveys. A secchi disc was deployed to record depth, and temperature, dissolved oxygen, pH, and salinity were recorded with a YSI Pro instrument at the surface and bottom of the water column. Surface grab samples were collected for total nitrogen and fecal coliform analysis, which was completed in a laboratory by ALS Environmental.

### HARD-BOTTOM DESTRUCTIVE AND PHOTOGRAPH SURVEYS

Benthic communities found on five target locations of hard substrate in shallow nearshore areas of Raritan Bay were surveyed by destructive sampling in July and September of 2015 (**Figures 9-3a and 9-3b**). A 100-ft line transect was set at each site and was centered on the hard-bottom feature parallel to its longest dimension. At each sampling location, divers collected at least two destructive samples (1/16 m<sup>2</sup>) via scraping, photographic still images for 25 quadrats (1 m<sup>2</sup>, approximately 11 square feet), and underwater video footage, if conditions allowed. Destructive samples were preserved using 6% buffered formalin. The number of samples collected at each site depended on the size of the hard-bottom area. Destructive sampling provided data to quantify algal biomass and invertebrate population densities. Photographic quadrats provided estimates of percent cover for both macroalgae and epibenthic macroinvertebrates. Composite photographic still images were used to quantify (as percent present) hard-bottom macroalgae and epibenthic fauna at 4 of the 5 stations in July and September of 2015 (all stations but the western-most stations in each month). Divers used a 0.5 x 0.5 meter quadrat frame for each image. Four photos were taken at each location to provide one square meter of imagery for analysis.

### HARD CLAM AND SEDIMENT CHEMISTRY

Paired samples for hard clams (*Mercenaria mercenaria*) and sediment were collected at 30 of the benthic macroinvertebrate sampling locations during the September survey for purpose of

tissue analysis (**Figure 9-4**). Hard clams were collected using a combination of to ensure sufficient samples for tissue analysis which included hand collection by divers, van Veen grab, and clam rake during both the hard and soft bottom benthic surveys. Each clam was counted and measured, and a wet-weight total biomass of clams per sample was collected in the field. Some hard clams were packaged and refrigerated for tissue chemistry. Dry weight and ash free dry weight were estimated in the laboratory using clams other than those sampled for chemistry. Clam tissue was analyzed for dioxins/furans, metals, PAHs, PCBs, pesticides, lipids, organic chlorides, and SVOCs.

Sediment samples were collected at clam sampling locations using a Young-modified van Veen grab sampler mounted near the center of each towed clam dredge sample, placed in sample containers. Sediments were analyzed for metals, cyanide, pesticides, PCBs, SVOCs, and VOCs.

### B. HORSESHOE CRAB SURVEY

A horseshoe crab egg survey was conducted on the beach within Conference House Park on June 9, 2015 to investigate horseshoe crab breeding activity in the area (**Figure 9-5**). The methodology of the survey was adapted from Sclafani et al. (2009)<sup>1</sup> and Botton et al. (2006)<sup>2</sup>. Specifically, three sand cores (2 cm x 20 cm) (0.79 inch by 7.9 inch) were taken with a PVC pipe along each of 8 transects oriented perpendicular to the waterline at low tide for a total of 24 samples. Of the 3 sampling locations along each transect, the uppermost location was at the high tide line, and the second and third locations were 10 and 20 m (32.8 and 65.6 feet), respectively, towards the water, in the intertidal zone. The 8 transects were spaced approximately evenly from east to west, roughly between Swinnerton Street and Page Avenue. Sand cores were transferred to Ziplock bags and refrigerated for 1 week until analysis. The samples were examined for horseshoe crab eggs using a series of 4 mm (0.16 inch), 2 mm (0.08 inch), 1 mm (0.04 inch), and 500 µm (0.002 inch) sieves, as described by Sclafani et al. (2009).

Cornell University also conducts regular horseshoe crab monitoring during spawning season in locations throughout the New York City area, including Conference House Park. At the Conference House Park monitoring site, total count and distance from shore data are collected for adult males and females.

### C. FISH STUDY

Fish were sampled in June, July, and September of 2015; June and September samples took place in conjunction with benthic sampling (**see Figures 9-6a through 9-6c**). The sampling used a combination of paired baited sea bass traps, otter trawl, and beam trawl to characterize the fish community in the study area. Twenty 3-foot (ft) sea bass traps were set at 10 randomly selected sites. The 3.2-centimeter (cm, 1.3-inch) mesh otter trawl and 2-meter (m, 6.6-ft) beam trawl

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<sup>1</sup> Sclafani, M., L. Brousseau, K. McKown, J. Maniscalco, and D.R. Smith. 2009. Horseshoe Crab Spawning Activity Survey- Final Report. Cornell University Cooperative Extension of Suffolk County. Available from: <http://www.nyhorseshoecrab.org/>

<sup>2</sup> Botton, M.L., R.E. Loveland, J.T. Tanacredi, and T. Itow. 2006. Horseshoe crabs (*Limulus polyphemus*) in an urban estuary (Jamaica Bay, New York) and the potential for ecological restoration. *Estuaries and Coasts* 29:820-830.

## **Appendix E-2 Summary of Aquatic Sampling Program**

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were towed on parallel tracks at 10 additional randomly selected sites; tows were performed at a rate of approximately 1.5-meters per second (4.9 feet per second (fps)) over a duration of 10 minutes per station. The beam trawl was equipped with a calibrated flowmeter to estimate sample volumes. Beach seine sampling was conducted at 20 randomly selected sites using a 30-meter x 2.4-meter (98 ft by 8 ft) deep beach seine towed counterclockwise along each selected beach. All collected fish were identified and counted; 20 individuals of each species were measured to the nearest millimeter. \*