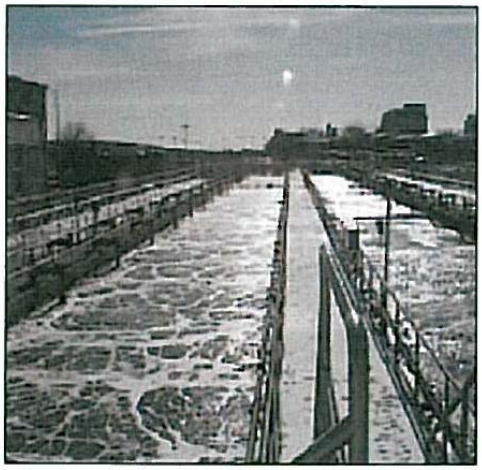
Dredging and Capping Project
Hendrix Street Canal, Brooklyn, N.Y.

ESSENTIAL FISH HABITAT ASSESSMENT

26th Ward WPCP



View of Centrate Tank at 26th Ward WPCP

Prepared by:

EEA Inc.

1239 Route 25A, Suite 1
Stony Brook, NY 11790
(631) 751-4600
www.eeaconsultants.com

For:

O'BRIEN & GERE

22 Saw Mill River Road
Third Floor
Hawthorne, NY 10532

May 2007

Appendix I - Figures & Tables
Appendix II - Agency Response Letters

List of Acronyms

CMP	Coastal Management Program
CSO	Combined Sewer Outfall
DEIS	Draft Environmental Impact Statement
DO	Dissolved Oxygen
DOS	Department of State
EFH	Essential Fish Habitat
ESA	Endangered Species Act
HAPC	Habitat Area of Particular Concern
MAFMC	Mid-Atlantic Fishery Management Council
MLW	Mean Low Water
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Association
NYCDEP	New York City Department of Environmental Protections
NYCDPR	New York City Department of Parks & Recreation
NYNHP	New York Natural Heritage Program
NYSDEC	New York State Department of Environmental Conservation
TOGS	Technical and Operational Guidance Series
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers
USDOC	United States Department of Commerce
USDOI	United States Department of the Interior
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WPCP	Ward Water Pollution Control Plant

List of Figures

List of Tables

1. Introduction

This report provides an Essential Fish Habitat (EFH) Assessment for Hendrix Street Canal, located just south of Hendrix Street, between Gateway Drive to the east and Van Siclen Avenue to the west, in Brooklyn, New York. The southern reach of the canal feeds into Jamaica Bay and is bounded to the east by Fountain Avenue Landfill and to the west by Pennsylvania Avenue Landfill. See Figure 1 for a site map of the project area. Under the Sustainable Fisheries Fishery Conservation and Management Act of 1976, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), a consultation with the National Marine Fisheries Service (NMFS) is required for federally permitted activities that may impact EFH. The objective of this assessment is to assess the potential effects of the proposed project on EFH, the managed fish species, and major prey species. This assessment includes a project description, a description of the habitat characteristics of the project area, the identification of species of concern potentially located in the project area, potential impacts to habitat and species of concern that may occur as a result of the proposed project, and measures to avoid, minimize, and mitigate the effect of the proposed project on identified EFH. A review of prior studies in the Hendrix Street Canal area, including studies in Jamaica Bay, is also provided. All figures and tables are contained in Appendix I. Agency response letter are provided in Appendix II, at the rear of this document.

2. Project Description

The dredging of Hendrix Creek Canal is necessary, as part of a larger New York City Department of Environmental Protection (NYCDEP) program to decrease Combined Sewer Overflow (CSO) discharges into Jamaica Bay via Fresh Creek. This dredging project will remove the accumulated CSO sediments which have accumulated two feet above mean low water in the Hendrix Street Canal. These accumulated sediments have resulted in the generation of intermittent nuisance odors due to hydrogen sulfide emissions from decaying material in CSO sediments. Highly enriched depositional organic material, which is presently emergent at low tide, will be dredged from the head of Hendrix Street Canal, where the CSO is located, to 100 feet upstream of the 26th Ward WPCP outfall, approximately 1440 feet down creek of the CSO. Refer to Figure 2 for an aerial view of the project site and locations of the CSO and 26th Ward WPCP outfall. This project will require the removal of approximately 20,000 cubic yards of sediment to a depth of 4 feet below mean low water (MLW) and the capping of the exposed sediment with a clean sand and gravel cap.

3. Existing Conditions

3.A. Physical Site Conditions

Hendrix Street Canal is one of the shallow northern tributaries that feeds into Jamaica Bay. It is approximately 7,000 feet long and ranges from 300 feet in width at the mouth to 150 feet at the head. The downstream 3,000 feet is approximately 15 feet deep and the upstream 4,000 feet is much shallower, ranging from zero to six feet in depth. The CSO sediment has been accumulating since approximately 1937, when the canal was last dredged. Due to the outflow of

the CSO and 26th Ward WPCP, the salinity of this canal is very low, ranging from 0.4 to 3.8 ppt.

The site is comprised of the water and underlying sediments at the head of Hendrix Street Canal, from the CSO outfall to 100 feet north of the 26th Ward WPCP outfall. The site is heavily influenced by the two discharge points that feed into Hendrix Street Canal. The western shore of the canal houses the 26th Ward WPCP and Pennsylvania Avenue Landfill. Located on the eastern shore are: the Gateway Center, the Fountain Avenue Landfill, and open space. Residential units are planned for construction in the northeastern portion of the open space along the canal.

The site is a depositional environment. Sediment depths in the upper reaches of Hendrix Street Canal have accumulated to approximately five feet above the original canal bed (O'Brien & Gere, March 2007). Accumulations are less near the 26th Ward WPCP, where constant outflow has prevented sediment accumulation.

Sediment collected within the Hendrix Street Canal, upstream of the 26th Ward WPCP outfall, ranged from a black "pudding-like" material with visible organic matter to silt and sand. This material was unconsolidated and had a high water content. Grain size analysis indicated the sediment was predominantly silt and clay with fine to medium sand. Cores collected downstream of the outfall contained black silt to brown sand in the deeper layers. This material was comprised of fine to coarse sand (Revised Final Hendrix Street Canal Dredge Material Characterization Report (O'Brien & Gere, March 2007)).

The upper layer of sediment, both above and below the 26th Ward WPCP outfall are classified as Class C sediments in accordance with the New York State's Department of Environmental Conservation (NYSDEC) Technical and Operational Guidance Series (TOGS) 5.1.9 (NYSDEC, November 2004). Class C sediments are those which have high contamination and acute toxicity to aquatic life. Constituents of concern include cadmium, DDT, chlordane, and PCBs. Sediment upstream of the 26th Ward WPCP outfall was also classified as Class C sediments below the target sediment layers, whereas those sediments below the target sediment layers downstream of the outfall did not pose toxicity to aquatic life (Class A sediments). In general, metal and organic contaminants were found in greater concentrations deeper in the sediment cores, which is a reflection on the heavy industrialization of the area paired with lower environmental standards in the past.

3.B. Habitat Characteristics of Project Area

3.B.1 Surrounding Wetlands

The vegetation on the surrounding banks of the Hendrix Street Canal consists of saltwater marsh habitat. A site visit on December 20, 2006 (O'Brien and Gere, March 2007) indicated common reed (*Phragmites australis*) flanks the eastern bank of the canal north of the 26th Ward outfall. Young cottonwood (*Populus deltoids*) and tree-of-heaven (*Alanthus altissima*) are interspersed among the reed. East of the reed is a flat, vegetated area, possibly a restoration site, that houses chestnut oak (*Quercus prinus*), willow oak (*Quercus phellos*), northern bayberry (*Myrica pensylvanica*), eastern red cedar (*Juniperus virginianai*), grasses, seaside goldenrod (*Solidago*

sempervirens), common evening primrose (*Oenothera biennis*), common plantain (*Plantago major*), and black-eyed susan (*Rudbeckia serotina*). The western bank of Hendrix Street Canal, north of the outfall, houses grasses, mullein (*Verbascum thapsus*), poison hemlock (*Conium maculatum*), beach clotbur (*Xanthium echinatum*), and common ragweed (*Ambrosia artemisiifolia*) along a break wall.

3.B.2 Wildlife

No threatened or endangered species or specially protected or regulated habitats were observed during the December 20, 2006 site visit (O'Brien & Gere, March 2007). Wildlife species observed include: ring-necked pheasant (*Phasianus colchicus*), downy woodpecker (*Dendrocopus pubescens*), American coot (*Gallinula chloropus*), brant (*Branta bernicla*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), black duck (*Anas rubripes*), hooded merganser (*Mergus merganser*), green-winged teal (*Anas carolinensis*), common crow (*Corvus brachyrhynchos*), ring-billed gull (*Larus delawarensis*), and belted kingfisher (*Megaceryle alcyon*).

3.B.3 Benthic Communities

Benthic communities in Hendrix Street Canal are primarily composed of opportunistic worms (*Capitella capitata* and *Streblospio benedicti*) and amphipods (*Ampelisca* spp.) (HydroQual, 2002, Iocco *et al.*, 2000) which are indicative of environmental degradation and organic pollution. They are also able to tolerate environments with depleted oxygen levels. Species diversity was lacking in the canal and fewer than 50 individuals per square meter of each taxa were collected (HydroQual, 2002). Only seven species were collected with a grand total of 96 individuals per square meter (HydroQual, 2002). Bacterial mats, indicative of organic loading and pollutants, were also identified in Hendrix Street Canal (Iocco *et al*., 2000).

3.B.4 Ichthyoplankton

Fish eggs collected in the mouth of Hendrix Street Canal include: Atlantic menhaden (*Brevoortia tyrannus*), bay anchovy (*Anchoa mitchilli*), sculpins, northern searobin (*Prionotus carolinus*), windowpane (*Scophthalmus aquosus*), and wrasses (*Tautoga onitis and Tautogolabrus adspersus*) (HydroQual, 2002). Larval species collected in the mouth of the canal include: American sandlance (*Ammodytes americanus*), anchovies, Atlantic menhaden, Atlantic silverside (*Menidia menidia*), sculpins, northern searobin, northern pipefish (*Syngnathus fuscus*), northern puffer (*Sphoeroides maculates*), lined seahorse (*Hippocampus erectus*), gobies, weakfish (*Cynoscion regalis*), winter flounder (*Pseudopleuronectes americanus*), and wrasses (HydroQual 2002). Although there were a variety of species collected, the abundances were low. Of these egg and larval species, windowpane was the only egg and winter flounder was the only larval species collected at the mouth of Hendrix Street Canal with an EFH designation. Note that these species were collected downstream of the project site and in waters closer to the open waters of North Channel in Jamaica Bay. The area closer to the mouth of the canal has deeper water and higher salinity ranges than the project area in the upper reaches of the canal. It is questionable whether the EFH species collected near the mouth would venture to and survive in waters farther upstream.

3.B.5 Adult Finfish

Adult finfish collected in the mouth of Hendrix Street Canal during an August 2000 and July and August 2001 trawling and gill net survey included: Atlantic menhaden, Atlantic silverside, bay anchovy, bluefish, gizzard shad, spot, striped bass, and weakfish (HydroQual 2002). All species, except for Atlantic menhaden and bluefish were only caught once during the survey. Note that these species were collected downstream of the project site and in waters closer to the open waters of North Channel in Jamaica Bay. Of these adult species collected, bluefish is the only fish with an EFH designation. Again, note that these species were collected downstream of the project site and in waters closer to the open waters of North Channel in Jamaica Bay. The area closer to the mouth of the canal has deeper water and higher salinity ranges than the project area in the upper reaches of the canal.

4. Essential Fish Habitat Assessment

4.A. Background

The Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), set forth several new mandates for the U.S. Department of Commerce (USDOC), National Oceanic and Atmospheric Administration (NOAA), NMFS, as well as regional fishery management councils and other federal agencies, to identify and protect important marine and anadromous fish habitat. Although the concept of EFH is similar to "critical habitat" under the Endangered Species Act of 1973, measures recommended to protect EFH are advisory, rather than prescriptive. In October 1996, EFH provisions were added to the Magnuson-Stevens Fishery Conservation and Management Act through an amendment entitled, The Sustainable Fisheries Act. The amended Magnuson-Stevens Act (The Sustainable Fisheries Act) requires NOAA to protect "…those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity." Additionally, associated physical, chemical, and biological properties used by fish and necessary to support a managed level of fish biomass production are required to be protected.

The Sustainable Fisheries Act requires that Federal agencies work with NMFS to minimize damage to EFH when funding or approving activities that "may adversely affect" EFH (http://www.nero.nmfs.gov/ro/doc/webintro.html). An "adverse effect" is defined as any impact that reduces the quality and/or quantity of EFH (NMFS 1997). An adverse effect can result from the following types of impacts:

- Direct: e.g. contamination or physical disruption.
- Indirect: e.g. loss of prey, reduction in fecundity.
- Individual, cumulative or synergistic.

A consultation with NMFS is required for federally permitted activities that may impact EFH. The goal of the consultation is to develop EFH Conservation Recommendations. The consultation satisfies the response requirements of sections 305(b)(4)(A) and 305(b)(4)(B) of the

amended Sustainable Fisheries Act. The end products of the consultation usually include the following:

- A description of the proposed Federal action provided by the Federal agency proposing the action and submitted to and approved by NMFS;
- Analysis of the effects of the proposed action on EFH, the managed fish species, and major prey species;
- An assessment of EFH provided to NMFS by the Federal agency proposing the action;.
- EFH Conservation Recommendations provided by NMFS. These recommendations may include measures to offset adverse effects on EFH; and the
- Response of the Federal agency proposing the action to NMFS' EFH Conservation Recommendations.

NMFS does not have the authority to veto federally regulated projects adversely affecting EFH. However, the review guides federal agencies through a mandate preventing habitat damage before an activity begins. The principal goal of the EFH assessment is to ensure a sustainable harvest of fisheries resources. In addition to EFH, Fishery Management Plans have identified Habitat Areas of Particular Concern (HAPC) (NMFS 1997). HAPC's must fulfill at least one of the following criteria:

- Provide important ecological functions;
- Be sensitive to human-induced environmental degradation;
- Be rare; and/or
- Development activities must represent a current or potential stress for the habitat.

The NMFS Mid-Atlantic Fishery Management Council (MAFMC) has identified and delineated regions of EFH in their fishery management plan. NMFS has created maps of EFH areas using a variety of sampling methods and analyses in order to determine which areas to consider as EFH for species groups. NMFS has mapped these geographic areas on a grid. Each grid cell represents a 10-foot x 10-foot square of latitude and longitude (quadrat). Each quadrat pertains to a group of species and their life stages designated as EFH by NMFS. The associated quadrat for the study area is shown in Figure 3. Note that the NMFS quadrat for Hendrix Street Canal is much larger than the project area. In order to characterize species associated with the more discrete project area, existing studies of Jamaica Bay were reviewed to best define the physical attributes of the project area and its value as habitat.

A list of the finfish species designated as EFH species by NMFS in the quadrat for Hendrix Street Canal, which includes the project area, is included in Table 1. Table 1 also lists the Commercial/Recreational species that may be found in this quadrat of Hendrix Street Canal, along with the applicable life stage for each species. Table 2 lists the management councils responsible for governing each EFH designated species.

A general classification of direct, indirect, and cumulative impacts to EFH species of concern as a result of the proposed project is provided in Section 6.

4.B. Species of Concern in Hendrix Street Canal Area

A total of 20 finfish species are listed by NMFS as important EFH species in the 10 x 10 minute quadrat area of Hendrix Street Canal (Table 1). In addition, Hendrix Street Canal and its surrounding waters may support several commercially and recreationally important finfish species. Table 1 lists eleven Commercial/Recreational species that, in addition to EFH species, may be found in the NMFS quadrat area of Hendrix Street Canal. Discussion of these Commercial/Recreational finfish species is limited to life stages of commercial and/or recreational value (see Section 4.C.2.). Note that this list of species, EFH and commercial / recreational, is a list of possible species present in the 10 x 10 minute quadrat, which includes the Hendrix Street Canal, and the following sections of this EFH Assessment will discuss the probability of each species' usage in Hendrix Street Canal based on habitat requirements.

4.B.1. Life History Characteristics

Table 3 lists all EFH and Commercial/Recreational species of concern in the Hendrix Street Canal area, along with relevant life history characteristics and habitat requirements. This table lists all species possible in the 10 x 10 minute quadrat in which Hendrix Street Canal is located. The following parameters are described for each species: life stage, water temperature, salinity, depth, season, habitat requirements, and comments on migrations and food habits. The assessment of whether species of concern may be found in the project area is based on habitat requirements. Deduction of species that are possibly found in the project area based on habitat requirements is conducted in section 4.C.

4.B.2. Habitat Requirements

The EFH and Commercial/Recreational species of concern in New York Harbor have been sorted into the following classifications according to the habitat types which they are most dependent upon: Surface Waters (SW), Pelagic Waters (PW), Oceanic (OC), Demersal Waters (DW), Coastal Waters (CW), Continental Shelf (CS), Estuaries (ES), Inlets (IN), Shoals (SH), Smooth Bottom (SB), Rough Bottom (RB), Vegetation (VG), All Bottom Substrates (AB), and Structured Habitats (ST). For the purpose of discussion, the habitat types listed above were further grouped into the following four categories, as presented in Table 4:

- ***Coastal, Nearshore Estuarine Waters (Water Column):*** Shallow water fish found in the water column and not associated with a substrate.

- ***Demersal with Bottom Habitat Rough, Smooth, Vegetated, Structured:*** Either shallow or deep water fish associated with natural or man-made structure such as, rock, gravel, sand, mud, eelgrass, pilings, reefs, etc.

- ***Pelagic Waters (Open Water):*** Fish found in the open offshore waters beyond coastal influence.

- ***Continental Shelf/Slope and Sandy Shoals:*** Fish found in waters of the Continental Shelf/Slope and Sandy Shoals/Flats outside of the nearshore region.

Table 4 classifies each of the possible EFH and Commercial/Recreational species of concern in Hendrix Street Canal into the four habitat categories identified above. The life stage and habitat type associated with each species are also identified.

Species with habitat requirements that do not match the habitat of the Hendrix Street Canal project area are not considered to be species of concern for this particular project. Those species with habitat requirements differing from the habitat in the project area are not likely to be located in the project area, and, therefore, are not expected to be affected by the proposed project.

4.C. Species of Concern in Project Area

A total of four EFH species, and seven Commercial/Recreational species of concern in the Hendrix Street Canal area have habitat requirements that match the habitat of the project area, (e.g., they utilize a habitat similar to that found in the project area). Table 5 describes each of these eleven species, along with their status on the Federal Threatened and Endangered species list, their habitat requirements, the habitat suitability of the project area, and the project activity that may affect the species of concern. Species with habitat matches may or may not utilize the project area but have the potential to be affected by the proposed project. The EFH and Commercial/ Recreational species of concern (e.g., those species with habitat matches that have the greatest potential to be affected by the project), are analyzed further in the following sections. The most limiting factor for many of the EFH species in the upper reaches of the canal in the proposed project area is the low salinity range (0.4-3.8 ppt).

A list of the EFH and Commercial/Recreational species of concern in the Hendrix Street Canal area with habitat requirements that do not match the habitat in the project area is provided in Table 6. Those species with habitat requirements found in the project area as well as those dependent on habitats not included in the project area are summarized below.

4.C.1. EFH Species

4.C.1.1. *EFH Species with Habitat Requirements Found in Project Area*

Of the twenty finfish species listed in the NMFS quadrat for Hendrix Street Canal, four are considered EFH species of concern in the project area based on habitat requirements that match the habitat in the project area, namely: summer flounder/fluke (*Paralichthys dentatus*), Atlantic butterfish (*Peprilus triacanthus*), winter flounder (*Pseudopleuronectes americanus*), and windowpane (*Scophthalmus aquosus*).

Table 7 lists both EFH and the commercial / recreational species of concern that may utilize the project area based on habitat requirements. Following is a description of the EFH species and their habitat requirements.

- Summer flounder are demersal, preferring areas with soft bottom sediments and vegetation. Consequently, this species may utilize the fine-grained, mud and sand substrate of the project area.

- Adult Atlantic butterfish prefer sandy bottom substrates. Although the project area is composed of more silty mud the species is pelagic and may utilize the water column of the entire project area. Atlantic butterfish can also tolerate a wide salinity range.

- All life stages of winter flounder prefer muddy, sandy substrates as habitat as found in some of the project area. Spawning adults, however, prefer sandy substrates. The optimal salinity for egg development is 10-30ppt, and few embryos survive, usually deformed, at salinities below 5ppt. (Buckley, 1989). The early life stages of winter flounder are non-dispersive, with the spawning and nursery grounds essentially the same (Pearcy 1962). Older larvae of winter flounder may pass through the water column of the project area.

- Windowpane prefers the project area's softer bottom sediments as habitat and their eggs and larvae may pass through the water column throughout the project area.

4.C.1.2. *EFH Species with Requirements for Habitats Not Found in Project Area*

The other sixteen finfish species listed in the NMFS quadrat for Hendrix Street Canal are unlikely to be found in the immediate project area based on habitat requirements that do not match the habitat in the project area. Three of these are shark species: dusky shark (*Carcharhinus obscurus*), sandbar shark (*Carchahrinus plumbeus*), and sand tiger shark (*Odontaspis taurus*). These shark species are considered highly migratory and are not typically encountered in the project area, as they are located in more southerly waters and outside of the immediate estuarine area, in a habitat of shallow coastal waters, submerged flats, and reefs. The distribution of these sharks is primarily influenced by temperature, and they undertake long temperature-related migrations.

In addition to the highly migratory shark species listed above, several other finfish species rarely occur in the region and will not likely be affected by the proposed project because their habitat requirements do not match the habitat in the project area. King mackerel *(Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculatus*), and cobia (*Rachycentron canadum*), are rare in the New York Bight and prefer habitat associated with coastal inlets and the more saline waters of the South Atlantic Bight. Atlantic mackerel (*Scomber scombrus*), little skate (*Leucoraja erinacea),* winter skate *(Leucoraja ocellata),* and monkfish (*Lophius americanus*) prefer the habitat of deeper offshore waters and are not likely to be found in the project area.

Six other species have habitat requirements not found in the immediate project area. Atlantic sea herring (*Clupea harengus*) spawn on rough bottom habitats consisting of gravel, sand, cobble, rocks and shell debris. Larval, juvenile, and adult sea herring prefer more pelagic open waters and are not likely to utilize the project area. Whiting (*Merlucius bilinearis*) prefer deeper more open waters and are not likely to be found in project area. Red hake (*Urophysis chuss*) utilize both smooth and rough bottom substrates as habitats. They are typically found further offshore, and are not likely to utilize the project area. Black sea bass (*Centropristis striatus*) prefer more structured habitat than the immediate project area. Juvenile and adult black sea bass require a salinity range greater than 18-20 ppt. Bluefish (*Pomatomus saltatrix*) prefer a more pelagic

environment. Juveniles and adults require a salinity ranging from upwards of 23-25 ppt. Scup (*Stenotomus chrysops*) require a salinity range greater than 15 ppt.

Generally there is a lack of suitable EFH habitat for the above listed species in the immediate project area; therefore, the anticipated effect on EFH species in the project area should be minimal

4.C.2. Commercial/Recreational Species

4.C.2.1. *Commercial/Recreational Species with Habitat Requirements Found in Project Area*

Seven of the eleven Commercial/Recreational species of concern in the Hendrix Street Canal quadrat area have habitat requirements that match the habitat in the project area and have the potential to utilize the project area during their adult life stages, namely Atlantic menhaden (*Brevoortia tyrannus*), Atlantic silverside (*Menidia menidia*), Atlantic tomcod (*Microgadus tomcod*), bay anchovy (*Anchoa mitchilli*), striped bass (*Morone saxatillis*), weakfish (*Cynoscion regalis*), and American eel (*Anguilla rostrata*) (Table 5). Several of these species have contributed significantly to commercial harvests in the area. The habitat requirements for these species, and their economic importance, are discussed below.

- Atlantic menhaden utilizes inshore and estuarine waters and could potentially be found in the project area, where these habitat characteristics exist. Atlantic menhaden is an important prey item for other economically valuable finfish species. Atlantic menhaden has a widespread occurrence, and the extensive migrations undertaken by this species make it an important link exchanging energy between the ecosystems in which it is found.

- The Atlantic silverside is widespread in shore zones such as the project area, thereby, making it an important forage fish for commercially important finfish species. The silverside is the most abundant finfish species encountered in salt marshes, estuaries, and tidal creeks, utilizing vegetated habitats and intertidal shore zones. Atlantic silverside exports biomass by serving as a trophic link between estuarine systems and offshore areas.

- Atlantic tomcod prefers muddy, vegetated habitats; and may utilize the estuarine waters of the project area for spawning. The Atlantic tomcod was commercially important in the 1800's, when it was considered a delicacy. Since then, the abundance of tomcod has declined, primarily in the 1900's. However, a winter sport fishery still exists for this species.

- Bay anchovy is widespread in estuarine waters and has the potential to be found in upper waters of the project area. Bay anchovy serves as an important food web component for sport and commercial fishes, as well as sea birds. Although the bay anchovy has no commercial value, it has economic significance as food for commercial and recreational species.

- Striped bass is found in rocky, sandy, and vegetated habitats associating with structure, and has the potential to utilize the project area. Striped bass is a major fishery resource in the mid-Atlantic region, important both recreationally and commercially. The distribution of striped bass is widespread in this region. The mid-Atlantic is a major spawning area for striped bass and, therefore, of particular importance.

- Weakfish utilize estuarine waters as spawning and nursery areas and has the potential to utilize the estuarine waters near the project area. Weakfish is abundant in nearshore marine waters. Weakfish is an important recreational fishery and is also commercially valuable.

- The American eel may be found in silty, muddy, bottom sediments found between the piers and near the shoreline.

4.D. Threatened & Endangered Species

The following agencies were contacted regarding the presence of any rare, threatened, and/or endangered species within the project area: NOAA-NMFS, U.S. Fish and Wildlife Service (USFWS), and the New York State Department of Environmental Conservation's New York Natural Heritage Program (NYNHP). Based on agency findings, there are no records of known occurrences of rare or state listed animals on the subject site. There is, however, a low salt marsh that is considered a sensitive community by the NYSDEC NHP located downstream of the project site along the west bank of the Fountain Avenue Landfill. The low salt marsh is considered unhealthy and is converting to a mudflat. It is anticipated that the project activity will not impact the low salt marsh as it is downstream of the site and protective measures, such as turbidity booms and hydraulic dredges, will be used to reduce dredging impact. The project site will also remain the receptacle for the CSO and 26th Ward WPCP outfalls, and therefore the impact to the salt marsh, as a result of the land use, will remain the same. The project location is also near a designated Significant Coastal Fish and Wildlife Habitat. This habitat is part of New York State's Coastal Management Program (CMP), which is administered by the NYS Department of State (DOS). Projects which may impact the habitat are reviewed by DOS for consistency with the CMP. Except for occasional transient individuals, no Federally-listed or proposed endangered or threatened species under the NMFS, USFWS, or NYSDEC jurisdiction are known to exist within the project impact area. While several species of listed sea turtles are seasonally present in coastal New York waters and may occasionally occur in Jamaica Bay, no listed species are known to occur in Hendrix Street Canal where the project is located. The closest known occurrence of a federally endangered finfish, the shortnose sturgeon, is in the Hudson River. (See Appendix II for agency response letters).

5. Review of Existing Literature and Relevant Studies

5.A. Existing Literature Related to Species of Hendrix Street Canal

The waters and sediments of Jamaica Bay are a highly productive and significant habitat for finfish, shellfish, and wildlife. Eighty-one species of fish were found to use Jamaica Bay in a survey conducted by the National Park Service in 1985 (NPS, 1991). Winter flounder was one of the most important commercial and recreational fish to use the bay in great numbers during all life stages. The bay is also believed to be a significant breeding area for this species. Forage fish species with high abundances, including Atlantic silverside, bay anchovy mummichog, Atlantic menhaden, and striped killifish form a prey base for other fish and birds using the area. Some other common species found in surveys and recreational landings include scup, bluefish, windowpane, tautog, black sea bass, summer flounder, and American eel. Anadromous species that use the area include blueback herring, alewife, American shad and striped bass.

5.B. Recent Studies Near the Project Area

An ecosystem study is presently taking place in Jamaica Bay. This study is focusing on the open waters of the Bay, not the tributaries, but can give an example of some of the finfish species that have been collected in Jamaica Bay's ecosystem. A total of 13 finfish species' eggs and 15 larval species were found in North Channel, off the Fountain Avenue Landfill between July 2005 and July 2006 (EEA, Inc., 2006). Of these species, the eggs of only two species that have EFH designation for the egg life stage were found in Jamaica Bay open waters, near the Hendrix Street Canal. These eggs were windowpane and scup (EEA, Inc., 2006). During that year long study, only three larval species with an EFH designation in that area were collected: summer flounder, winter flounder, and windowpane. Larval densities were very low for these EFH species. These species are all known to prefer the soft, muddy, fine grained sediments.

During the year long ecosystem study (February 2006 to January 2007), five adult finfish species with EFH listing were collected from the station in North Channel, near the mouth of Hendrix Street Canal, off the Fountain Avenue Landfill. These species were: butterfish, black sea bass, bluefish, summer flounder, and winter flounder (EEA, Inc., 2007). These species, however, were caught in low numbers. It should be noted that this reference station is in the open waters of Jamaica Bay, not the restricted head waters of Hendrix Street Canal with its low salinities, freshwater input, and organically enriched heavily polluted sediments. These species are only listed to show biological usage near the project site, but are not specifically present on the project site. They can be used, however, to eliminate certain species from the project site, especially those that are associated with open waters or hard substrates, neither of which are present on the project site.

If we use the two EEA, Inc. (2006, 2007) studies as a reference for the species using Jamaica Bay as a whole for habitat and spawning we can identify those species on the EFH list that have been present at some time during the year, and those that have never been collected in Jamaica Bay during the ecosystem survey. Species with associated EFH life stages that have not been collected during EEA, Inc.'s surveys (2006, 2007) in Jamaica Bay at all include: whiting, red hake, redfish, Atlantic sea herring, monkfish, Atlantic mackerel, king mackerel, cobia, sand tiger

shark, dusky shark, and sandbar shark. Since these species were not identified during the intense study in Jamaica Bay, we can assume that they are not utilizing the waters of Hendrix Street Canal. Those species that have been identified in the bay may possibly utilize Hendrix Street Canal, provided the habitat requirements fit their needs. Section 4.C. determines the possible site usage by species based on habitat preference.

Although fewer studies have been conducted in the peripheral bays and basins of the Jamaica Bay system, many studies have been conducted in the Jamaica Bay area. The sediment types are one of the major physical traits that determine species usage because they house many of the food species in the benthos and make up the structural habitat. A 1995 study to identify benthic habitat types and their distribution in order to document habitat variability of the NY/NJ Harbor (Iocco *et al*. 2000) found silty sediments with overlying *Ampelisca* spp. mats and bacterial mats at the mouth of Hendrix Street Canal, near the project area. Refer to Figures 4, 5, and 6 for the benthic maps. Franz and Harris (1988) found that two separate community types could be segregated primarily by sediment type within the Bay. One sediment type characterized sandy bottoms in the Bay and was comprised of a number of subgroups. The other community occurred in muddy fine sands and was characterized by the tube dwelling amphipods *Ampelisca abdita* and the polychaete worms *Streblospio benedict*i and *Mediomastis ambiseta*. The amphipods *Monocorophium tuberculatum* and *Unciola dissimilis* characterized channel-bottom habitats. Adam's et al. (1998) reported high abundance and species richness in Jamaica Bay benthic communities. The finfish species present on this project site are partially influenced by the sediment types and benthic species that live in the sediment. The sediment characterization and species identified indicate an agreement in community structure based on sediment / benthic community.

6. Impact Assessment of Proposed Project

This section of the report describes the potential impacts that may result from the proposed project. These impacts may include potential habitat impacts and subsequent potential impacts to species of concern that may be utilizing this habitat. The proposed project requires the dredging of Hendrix Street Canal as part of a larger New York City Department of Environmental Protection (NYCDEP) project to decrease Combined Sewer Overflow (CSO) discharges. This interim dredging project will remove the accumulated CSO sediments within Hendrix Street Canal. Highly enriched depositional organic material, which is presently emergent at low tide, will be dredged from the head of Hendrix Street Canal, where the CSO is located, to 100 feet upstream of the 26th Ward WPCP outfall, approximately 1440 feet down creek of the CSO. This will require the removal of approximately 20,000 cubic yards of sediment to a depth of 4 feet below mean low water (MLW) and the capping of the exposed sediment with clean sand and gravel. The removal of bottom sediments could impact fish and EFH through an increased, but temporary turbidity. However, it is not likely that dredging will have long term effects as communities in this area are already extremely impacted.

6.A. Long-term, Short-term, & Cumulative Impacts

The long and short term impacts of the project are expected be minimal based on the proposed project and the fact that the area is already a degraded habitat. Short-term impacts that may result from this project include a direct impact from dredging activities that cause substrate disturbance, as well as other indirect temporary construction impacts such as disturbance and displacement of fish species, loss of prey, and water quality degradation. Long-term impacts would be the same as those that are present on site now, as the site will continue to be used as a repository for CSO and WPCP outfalls. These long-term and short-term impacts are discussed in the following sections.

6.A.1. Long-Term Impacts

No long term impacts of this project are anticipated as a result of dredging and capping the floor of Hendrix Street Canal. Once the dredging is completed and the sand / gravel cap is in place, the benthic community will begin to recolonize the area and finfish that may have utilized the project area will return. It should be noted, though, that this habitat is extremely degraded and presently houses benthic organisms indicative of environmental stress. These organisms, bacterial mats, *S. benedicti*, *C. capitata*, and *Ampelisca* spp. reproduce quickly and will likely recolonize the area in 6 months to a year (USACE 2001, U.S. Department of the Interior (USDOI, 2000). Any finfish that may utilize the area will shortly follow. However, from the short list of probable EFH species, this will remain an environmentally stressed area because the use of the area as a repository for CSO and WPCP outflows will remain the same.

6.A.2. Short-Term Impacts

The short-term impacts of the project will include substrate disturbance due to dredging of the canal bottom. These activities would result in the removal of meiobenthic species on the existing canal bottom, temporary degradation of water quality (turbidity), temporary loss of fish prey, and temporary disturbance and displacement of fish species. Any associated disturbance of bottom sediments that have bound contaminants will be contained to the project site by use of a hydraulic dredge, turbidity boom, and controlled vessel traffic in the area. A sand and gravel cap will also be placed over the newly exposed sediment (Class C contamination) which will stop the exchange of contaminants from the sediment to the overlying water. The cap will be thick enough to prevent bioturbation, of a large enough grain size to withstand erosion, and will be laid by hydraulic methods to limit disturbance to the finer grained contaminated sediments beneath.

Substrate Disturbance would result in the removal and burial of benthic organisms, as well as demersal eggs of fishes and invertebrates that may be in the area. Although intertidal communities survive periodic changes related to natural erosion and accretion, subtidal communities are in a more stable environment and are less adaptable to perturbations (Hurme and Pullen 1982). Sediment removal by dredging and the addition of a sand and gravel cap will cause the loss of meiofauna in the project area, thereby temporarily eliminating the area as a feeding habitat for demersal fish, particularly the winter and summer flounder populations, if they are able to withstand the presently degraded environment. This loss will be relatively short-term and the environmentally tolerant infaunal forms are expected to re-colonize the new

sediment cap within a short time. Exact rates of re-colonization cannot be quantified because they are dependent on the recruitment times of the surrounding populations that vary from season to season. Based upon prior studies, the recovery time of the affected zone may be as short as three months or as long as one year. Once benthic recolonization has occurred, any finfish that may be able to endure the environmental conditions of this highly stressed area will return to the project site.

Turbidity, while comparatively unimportant to benthic organisms in the intertidal community, may be relatively more important to fish community structure. 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; Naqvi and Pullen 1982). Winter flounder is the only species laying demersal eggs that could potentially utilize the study area. However; the bottom sediment type in Hendrix Street Canal is not particularly suitable for winter flounder eggs presently due to its heavy contamination load. Also the salinity range in the upper reaches of the canal is not suitable for winter flounder egg survival. Future use of the cap for eggs may be possible, however, the continued use of the site as an outfall area for CSO and WPCP will continue to reduce the salinity of the site and will likely result in an organic rich fine grained material to cover the cap and therefore be less suitable for winter flounder eggs. Species that lay pelagic eggs (and most larvae) are free floating and could be carried or swept through the project area. In addition, localized turbidity plumes can have lethal and sub-lethal effects on benthos and fish, including hematological compensation for reduced gas exchange across gill surfaces, abrasion of epithelial tissue, packing of the gut with large quantities of ingested solids which may have little nutritive value, disruption of gill tissues (abrasion, clogging, increased activity of mucosa), and increased activity with a reduction of stored metabolic reserves (Profiles Research and Consulting Groups, Inc. 1980). Other effects include the possible re-suspension of contaminants and nutrients. There is a potential for fish utilizing the area to be exposed to elevated contaminant levels due to the siltation of contaminated fine material into the area.

As previously stated, the project area has been characterized as containing the necessary habitat requirements for different life stages of the following species: summer flounder, windowpane, winter flounder, Atlantic butterfish, bay anchovy, weakfish, Atlantic silverside, Atlantic tomcod, striped bass, American eel, and Atlantic menhaden. Most of these species located in the region have peak spawning during the spring and summer (with the exception of winter flounder, which may utilize the project area, has a spawning period from February to June). NMFS has previously stated that the environmentally degraded condition of this site and anticipated lack of biological activity would not require the implementation of dredging windows (meeting minutes from July 15th, 2004 at ACOE in New York City). The use of a hydraulic dredge, turbidity booms, and placement of the sediment cap using hydraulic methods will avoid most construction-related impacts.

Loss of prey species will be a temporary impact associated with project dredging. Benthic species commonly have quick recovery times and those species able to tolerate the site conditions will re-colonize the area on the order of months. Disturbance and displacement of fish will likely be minimal as a result of the fish avoiding the project area during construction, and those able to tolerate the environmental stress will return afterward, thereby inducing

minimal adverse impact.

6. A.3. Cumulative Impacts

Cumulative impacts are defined as those impacts on the environment resulting from incremental actions. Cumulative impacts can result from impacts considered minor individually, but when added over time may be collectively significant. Benthic fauna may be disturbed during construction, however, the bottom communities in this area are already heavily degraded so impacts should be minimal. Also, benthic communities have shown to rebound quickly and will begin to re-colonize once construction is complete (USACE 2001, U.S. Department of the Interior (USDOI, 2000)). There will be little or no significant cumulative impact to ichthyofauna associated with the project area. Therefore, cumulative impacts resulting from the proposed project are expected to be minimal due to the small size of the project area and present condition of the site. The use of a hydraulic dredge, turbidity booms, and hydraulic placement of the cap material will result in limited impact to the species in the area.

6.B. Summary of Impacts to Species of Concern by Habitat Type (EFH & Commercial/ Recreational) & Proposed Mitigation

Earlier sections of this EFH assessment provide detailed descriptions of the project impacts. A brief synopsis of the impacts associated with the species of concern in the 10 x 10 qaudrat of Hendrix Creek project area is provided below. As stated previously, species are classified into four habitat groups. Project impacts are discussed as they relate to the species of concern and their habitat groupings.

6. B.1. Coastal, Nearshore, Estuarine Waters (Water Column)

Potential impacts to this component of the fishery would be negligible. Although there may be a temporary degradation of water quality due to dredging, most species of concern associated with this habitat group would avoid construction areas. An increase in turbidity/ sediment loads would be minimized as measures to reduce turbidity would be employed. Turbidity booms and the hydraulic dredge will be used to reduce impacts from turbidity. There may be a temporary loss of food supply but benthos will quickly repopulate the area.

Juveniles and adult species of concern in this habitat group, which include bay anchovy and Atlantic menhaden, are highly motile and would be able to avoid the project area during construction. Eggs of species of concern in this habitat group, which include windowpane, are not likely to be abundant in the Hendrix Creek Canal area due to the degraded habitat.

6. B.2. Demersal with Bottom Habitat, Rough, Smooth, Vegetated, Structured

Most species of concern comprising this habitat group would avoid construction areas, therefore, impacts would be temporary and minor as the fish would be displaced, but any species that is able to tolerate this previously degraded environment would return once the dredging was completed and benthic food sources returned. Sedentary fishes associated with this group may

be affected by a temporary increase in sediment loads during construction. Suspended sediments can smother demersal eggs and larvae. Turbidity booms and a hydraulic dredge will be used during project construction to contain and minimize suspended sediment.

EFH species of concern associated with the demersal habitat group include the following: summer flounder, Atlantic butterfish, windowpane, and winter flounder. In addition, the following Commercial and Recreational species of concern are considered important: Atlantic silverside, Atlantic tomcod, striped bass, American eel, and weakfish.

Species of concern in this habitat group that are not estuarine-dependent and may utilize the area on a seasonal basis include windowpane and winter flounder. Estuaries are used as a forage area during summer months by juveniles and adults and as a nursery area for larvae and juveniles. As per the EFH, different life stages of all these species have been identified in the project area. However most of these species have been reported from areas outside of the Hendrix Street Canal system. Although many of these species may find their way into the Hendrix Street Canal system, they are unlikely to utilize this area in numbers that are found in Jamaica Bay proper. As adults, these species of concern will be able to avoid the project area during construction activities. However, eggs and larvae are not expected to be abundant in the proposed project area because the habitat is already degraded.

Several of the EFH species of concern in this habitat group may be in the project area as eggs and larvae, including Atlantic butterfish, windowpane, and winter flounder. These three species of concern could potentially utilize the project area during these critical life stages. However, since the Hendrix Street Canal area is a degraded habitat, it is not likely any of these species would be heavily impacted in the immediate project area. Winter flounder prefer to lay eggs on smooth, sandy, muddy sand, mud and gravel bottom substrates that do not occur in the immediate project area. While, it is not clear if winter flounder utilize the sediments within the project area; the degraded habitat and low salinity range in the immediate project area may adversely affect the success of winter flounder eggs and larvae.

6.B.3. Pelagic Waters (Open Water)

Species of concern in this habitat group include life stages of Atlantic butterfish, summer flounder, windowpane, and winter flounder. The life stage for each species that is associated with offshore pelagic waters is listed in Table 4. The species of concern in this habitat group can be found in both pelagic and estuarine waters, i.e. they are not estuarine-dependent. Most species of concern (and the associated life stage) found in this habitat group are marine pelagics and prefer more saline marine waters, with the exception of the larval stages of windowpane and winter flounder. Ocean salinities commonly range between 33 ‰ to 38 ‰ parts per thousand (PPT), with an average of about 35 ‰. Salinities in the project area are typically lower. Therefore, it is anticipated that pelagic species would not be adversely affected by the proposed project. The Hendrix Creek Canal area is known to have impaired sediment quality. Although fish eggs and larvae may be found in the project area, this environment would be a limiting factor making conditions unfavorable for egg and larval settlement in the project area. Also, adult members of these species of concern will be able to avoid the project area during periods of active dredging.

6.B.4. Continental Shelf/Slope and Sandy Shoals

The habitat requirements of the EFH species of concern in this habitat group do not match the habitat in the project area. Species associated with this habitat group are more commonly found further offshore and in more southerly waters, where the habitat is deeper and warmer than the project area. Because there is no habitat match, no adverse impacts associated with the proposed project are expected for the EFH species of concern in this habitat group.

7. Conclusions

This assessment is primarily based on sediment and water quality data on the project site and habitat and finfish studies in the Jamaica Bay system. Few of these studies have concentrated on areas within Hendrix Creek Canal. However, due to the degraded environmental conditions and verbal expectation of not anticipating the implementation of dredging windows for this project area from NMFS, a field study of this area is not believed to be necessary.

Although the greater Jamaica Bay area is a productive estuary for finfish and invertebrates, the proposed project would likely have a minimal effect on the designated EFH and Commercial/Recreational species of concern (as discussed in the previous section). This is due, in part, to the unavailability of suitable habitat within the project area. The Hendrix Street Canal system has been found to be a degraded habitat with organically enriched sediment loads, restricted tidal exchange, extremely low salinities, and toxic sediment accumulations.

Most of the impacts associated with the project are temporary and could be offset by implementing best management practices. It is anticipated that the primary effects of project dredging would result in a temporary loss of benthic communities and fish avoidance resulting from suspended particles and food source reduction. However, recovery is expected to occur quickly for most species in the affected environment. While some impacts may not be amenable to avoidance or reduction, they will be limited and are not expected to last beyond one seasonal cycle for invertebrates. No significant adverse impacts will occur for species that are either rare or located outside of the project area.

8. Bibliography

Adams, D.A., J.S. O'Conner, and S.B. Weisburg. 1998. Sediment Quality of the NY/NJ Harbor Estuary System. U.S. Environmental Protection Agency, Report No. 902-R-98-001.

AFS. 1999. Fish Habitat: Essential Fish Habitat and Rehabilitation. AFS Symposium 22. L.R. Benaka ed. 459p.

Auster, P.J. 1989. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (North Atlantic and Mid-Atlantic)-Tautog and Cunner. USFWS Biol. Rep. 82(11.105). USACE, TR EL-82-4. 13pp.

Auster, P.J. and L.L. Stewart. 1986. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (North Atlantic)-Sandlance. USFWS Biol. Rep. 82(11.66). USACE, TR EL-82-4. 11pp.

Buckley, J. 1989. Species profiles: Life histories and environmental requirements of coastal fishes and invertebrates (North Atlantic)—winter flounder. U.S. Fish Wildl. Serv. Biol. Rep 82(11.87). U.S. Army Corp of Engineers, TR EL-82-4. 12 pp.

Facey, D.E. and M.J. Van Den Avyle. 1987. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (North Atlantic)-American Eel. USFWS Biol. Rep. 82(11). USACE, TR EL-82-4. 28pp.

Fay, C.W., R.J. Neves and G.B. Pardue. 1983. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic)-Atlantic Silverside. USFWS Division of Biological Services, FWS/OBS-82/11.10. USACE, TR EL-82-4. 15pp.

Fay, C.W., R.J. Neves and G.B. Pardue. 1983. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic)-Striped Bass. USFWS Division of Biological Services, FWS/OBS-82/11.8. USACE, TR EL-82-4. 36pp.

Franz, D.R. and W.H. Harris. 1998. Seasonal and spatial variability in macrobenthos communities in Jamaica Bay, New York- an urban estuary. Estuaries 11(1):15-28

Hurme, A.K. and E.J. Pullen. 1988. Biological Effects of Marine Sand Mining and Fill Placement for Beach Replenishment. Marine Mining (7): 123-136.

Hill, J., J.W. Evans and M.J. Van Den Avyle. 1989. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (South Atlantic)-Striped Bass.

USFWS Biol. Rep. 82(11.11)8. USACE, TR EL-82-4. 35pp.

http://www.csc.noaa.gov/lcr/nyharbor/html/gallery/sgmercen.html

http://www.nero.nmfs.gov/ro/doc/webintro.html

http://www.nero.noaa.gov/ro/STATES4/conn_li_ny/40307350.html

http://www.nero.noaa.gov/hcd/STATES4/ConnNYNJ.htm

http://www.nero.noaa.gov/hcd/efhtables.pdf

http://www.csc.noaa.gov/lcr/nyharbor/html/backgrnd/intro.html

http://www.csc.noaa.gov/lcr/nyharbor/html/habitats/jamaio95.jpg

http://www.csc.noaa.gov/lcr/nyharbor/html/habitats/jamaij95.jpg

http://www.csc.noaa.gov/lcr/nyharbor/html/mapatlas/jbatlas.html

http://www.nmfs.noaa.gov/habitat/efh/Consultation/3_0.html

http://www.nmfs.noaa.gov/habitat/habitatprotection/Final_EFH_%20Assessment.htm

http://www.nrdc.org/water/oceans/priority/recpowe.asp

http://www.odot.state.or.us

http://www.state.nj.us/dep/fgw/pdf/fishfact/amereel.pdf

http://training.fws.gov/library/pubs5/web_link/text/jb_form.htm

HydroQual. April 2002. "Use and standards Attainment Project. Harbor-Wide Government Steering Committee. Interim Data Review Meeting.

HydroQual Environmental Engineers & Scientists, P.C. 2000 Paerdegat Basin Field Sampling and Analysis Program- Years 2000-2001 Component 1: Waterbody Biology. Prepared for the City of New York Department of Environmental Protection, Bureau of Environmental Engineering.

HydroQual Environmental Engineers & Scientists, P.C. 2000. Jamaica Bay Field Sampling and Analysis Program Years 2000-2001. Component 1: Waterbody Biology. Prepared for the City of New York Department of Environmental Protection, Bureau of Environmental Engineering.

Iocco L.E, P. Wilber, R.J. Diaz, D.G. Larke and R. J. Will, 2000. Benthic Habitats of New York/New Jersey Harbor: 1995 Survey of Jamaica, Upper, Newark, Bowery and Flushing Bays.

Mercer, L.P. 1989. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic)-Weakfish. USFWS Biol. Rep. 82(11.109). USACE, TR EL-82-4. 17pp.

Morton, T. 1989. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic)-Bay Anchovy. USFWS Biol. Rep. 82(11.97). USACE, TR EL-82-4. 13pp.

Murdy, E.O., R.S. Birdsong and J.A. Musick. 1997. Fishes of Chesapeake Bay. Smithsonian Institute. 324pp.

Naqvi, S.M. and E.J. Pullen. 1982. Biological Effects of Marine Sand Mining and Fill Placement for Beach Replenishment. Marine Mining, 7:123-136.

NMFS. 1999. Tautog (Tautoga onitis) Life History and Habitat Requirements. NOAA Tech. Memo. NMFS-NE-118.

NMFS. 1997. EFH Interim Final Rules. NMFS Consultation Guidance. 50 CFR Part 600.

NMFS. 1997. Report to Congress: Status of the Fisheries of the United States. September 1997.

NOAA. 2007. Letter correspondence from M.Colligan.

NYS Department of Environmental Conservation 2007. Letter of correspondence from Betty Ketcham

New York State Department of State, Division of Coastal Resources and Waterfront Revitalization. 1992. Significant coastal fish and wildlife habitats program, Jamaica Bay habitat narrative, Breezy Point habitat narrative.

New York State Department of Environmental Conservation. Division of Water. November 2004. "Technical & Operational Guidance Series (TOGS) 5.1.9. In-Water and Riparian Management of Sediment and Dredged Material.

O'Brien and Gere Engineers. March 2007. "Hendrix Street canal Dredge Material Characterization." For the City of New York Department of Environmental Protection. New York, NY.

O'Brien and Gere Engineers, Inc. Jamaica Bay Eutrophication Study: Field Analytical Work Plan. New York City Department of Environmental Protection. Division of Water Quality Improvement. Final, May 1995

O'Connor, J.M., D.A. Neumann, and J.A. Sherk, Jr. 1976. Lethal effects of suspended sediments on estuarine fish. TP 76-20. U.S. Army Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, VA.

Pearcy, William G. 1962. Ecology of an estuarine population of winter flounder, Pseudoplueronectes americanus (Waldbaum)-Parts I-IV. Bulletin of the Bingham Oceanographic Collection, Peabody Museum of Natural History, Yale University. Volume 18:39-78 Article 1, August 1962.

Profiles and Research Consulting Groups, Inc. 1980. Seasonal Restrictions on Dredging Projects by NMFS in the Northeast. Volume 1. Prepared for the National Marine Fisheries Service under Contract SB 1408(a) -79-C-169.

Rogers, S.G. and M.J. Van Den Avyle. 1983. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (South Atlantic)-Atlantic menhaden. USFWS Division of Biological Services, FWS/OBS-82/11.11. USACE, TR EL-82-4. 20pp.
Schubel, J.R. and D.P. Wang. 1973. The effects of suspended sediment in northern Chesapeake Bay. Powder Technology, 6:9-16.

Stewart, L.L. and P.J. Auster. 1987. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (North Atlantic)-Atlantic Tomcod. USFWS Biol. Rep. 82(11.76). USACE, TR EL-82-4. 8pp.

USACE. 2001. The New York District's Biological Monitoring Program for the Atlantic Coast of New Jersey, Asbury Park to Manasquan Section Beach Erosion Control Project. Final Report

U.S. Department of Interior. 1991. Jamaica Bay fisheries survey, 1985-1989. National Park Service, Gateway National Recreation Area, Brooklyn, NY..

USDOI. Minerals Management Service. 2000. Environmental Survey of Potential Sand Resource Sites: Offshore New Jersey. Prepared by Applied by Coastal Research and Engineering, Inc., Continental Shelf Associates, Inc., Barry A. Vittor & Associates, Inc., and Aubrey Consulting, Inc.

Weinbert, J. Ocean Quahog. "http://www.nefsc.noaa.gov/sos/spsyn/iv/quahog/"

Wilbur, A. 2004. The Relative Abundance, Distribution, Composition, and Life History Characteristics of Fishes in Gloucester Harbor. Chapter 4. Massachusetts Office of Coastal Zone Management. Boston, MA.

APPENDIX I

FIGURES AND TABLES

FIGURE 1
Hendrix Street Canal Site Location

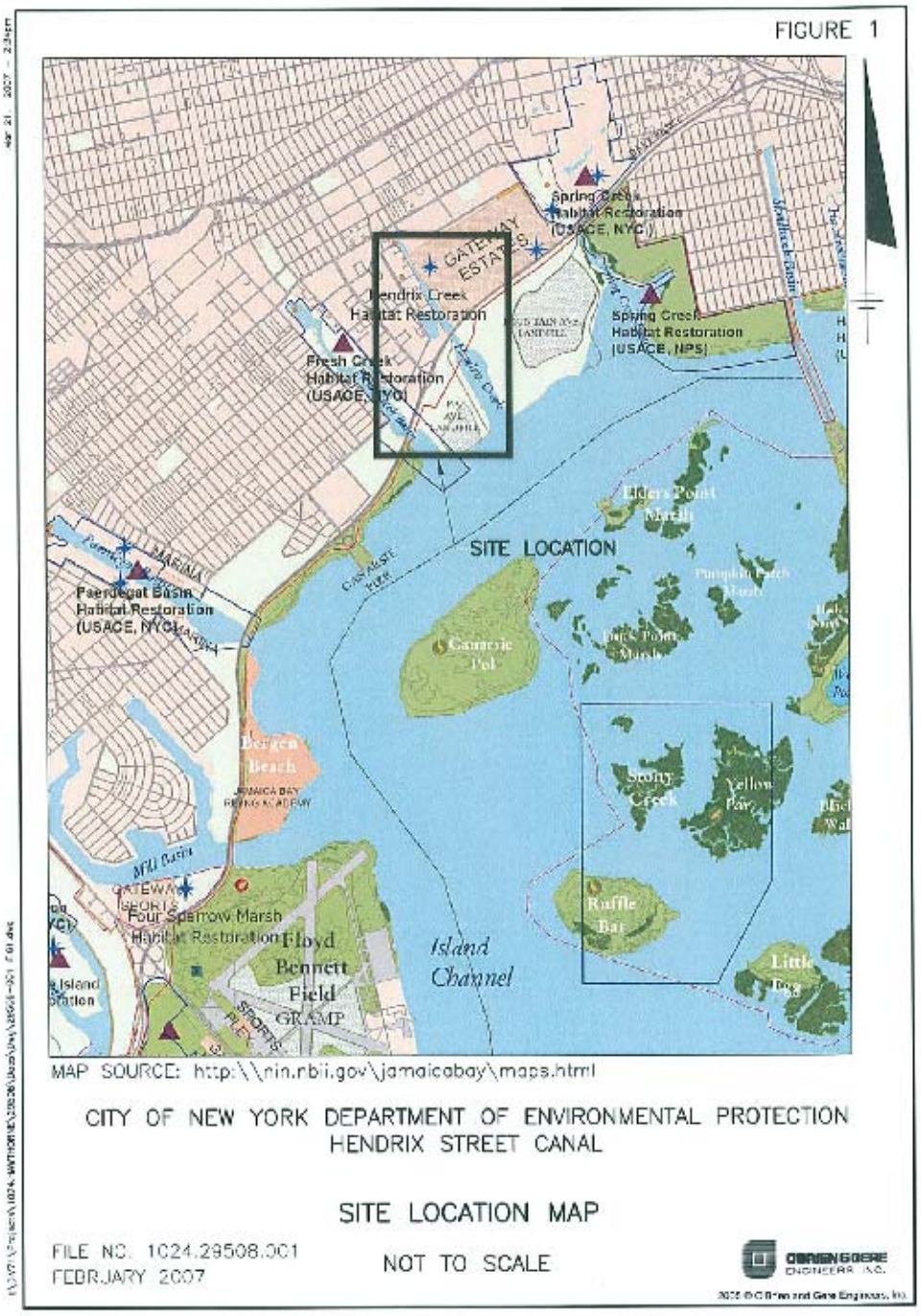


FIGURE 2
Aerial View of Hendrix Street Canal

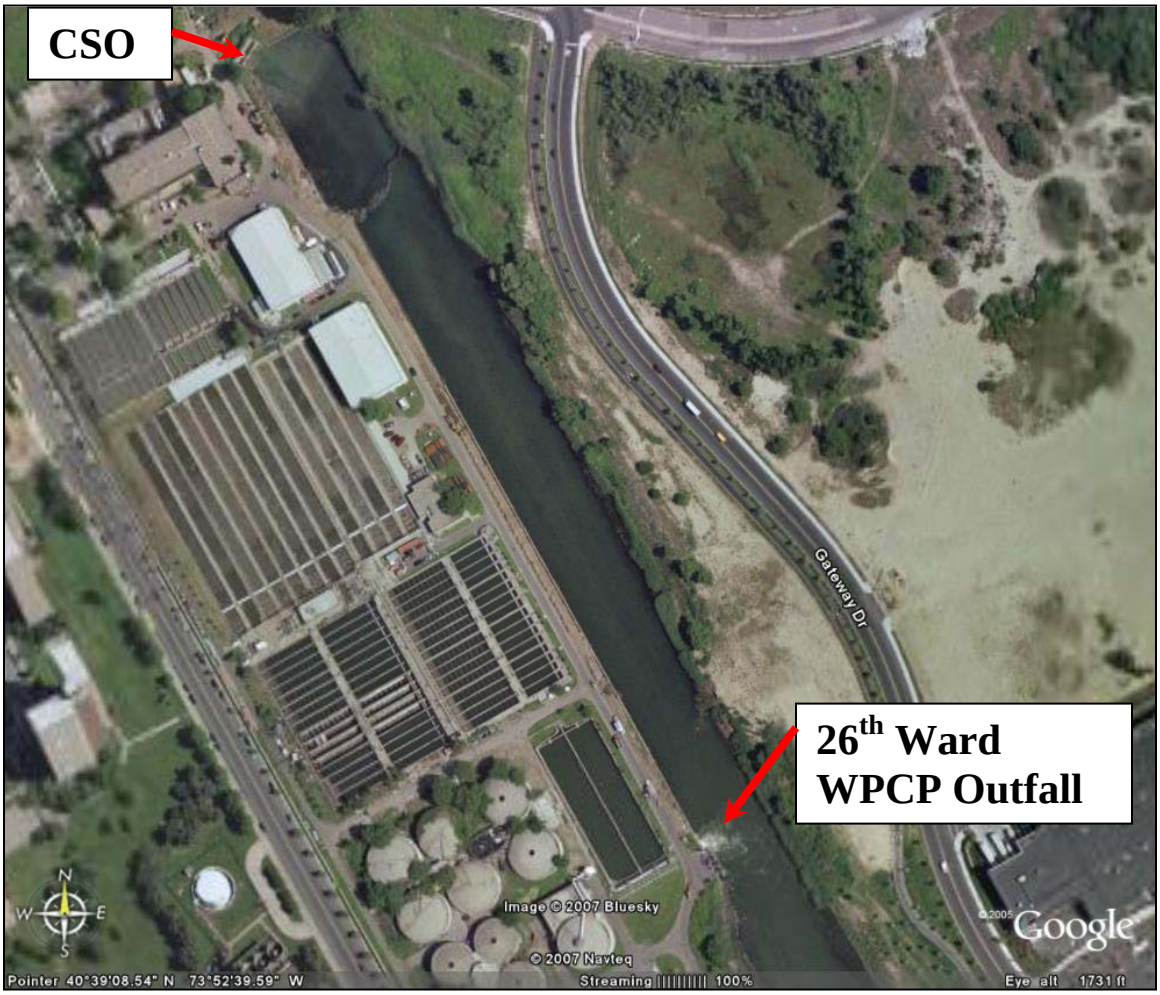


FIGURE 3
Essential Fish Habitat Grid Map for Project Study Area

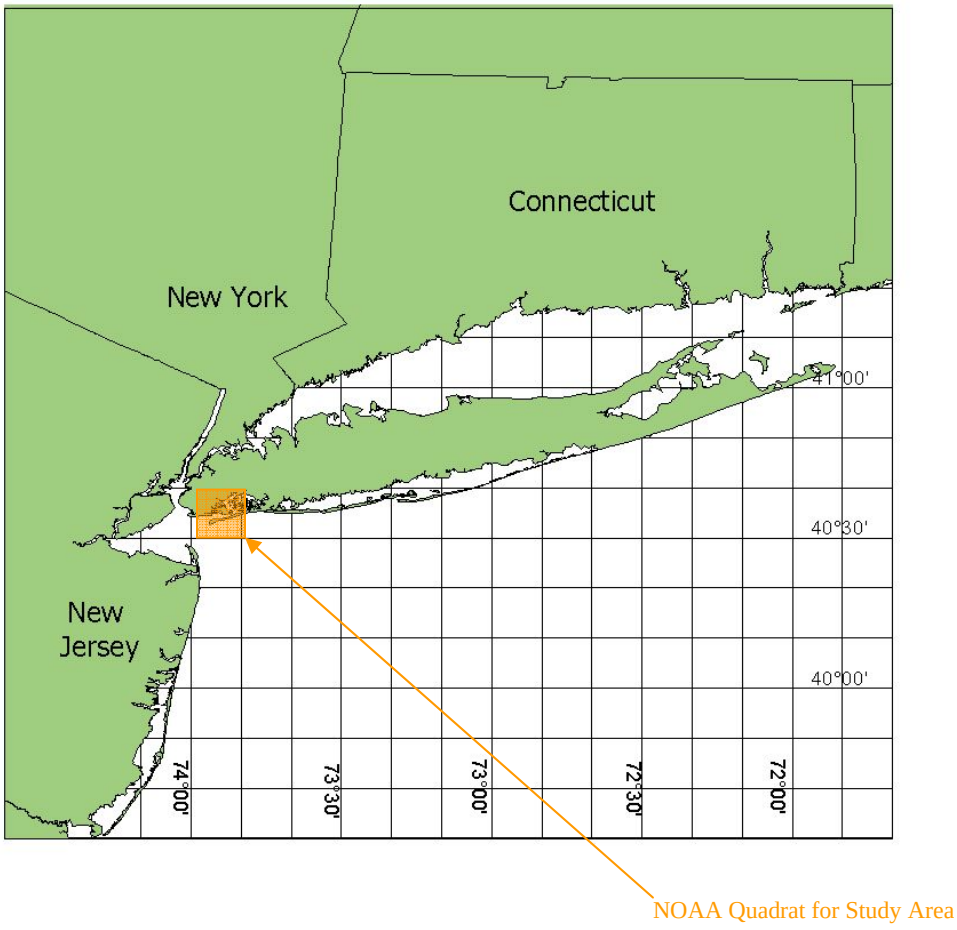


FIGURE 4
Jamaica Bay Habitats, June 1995

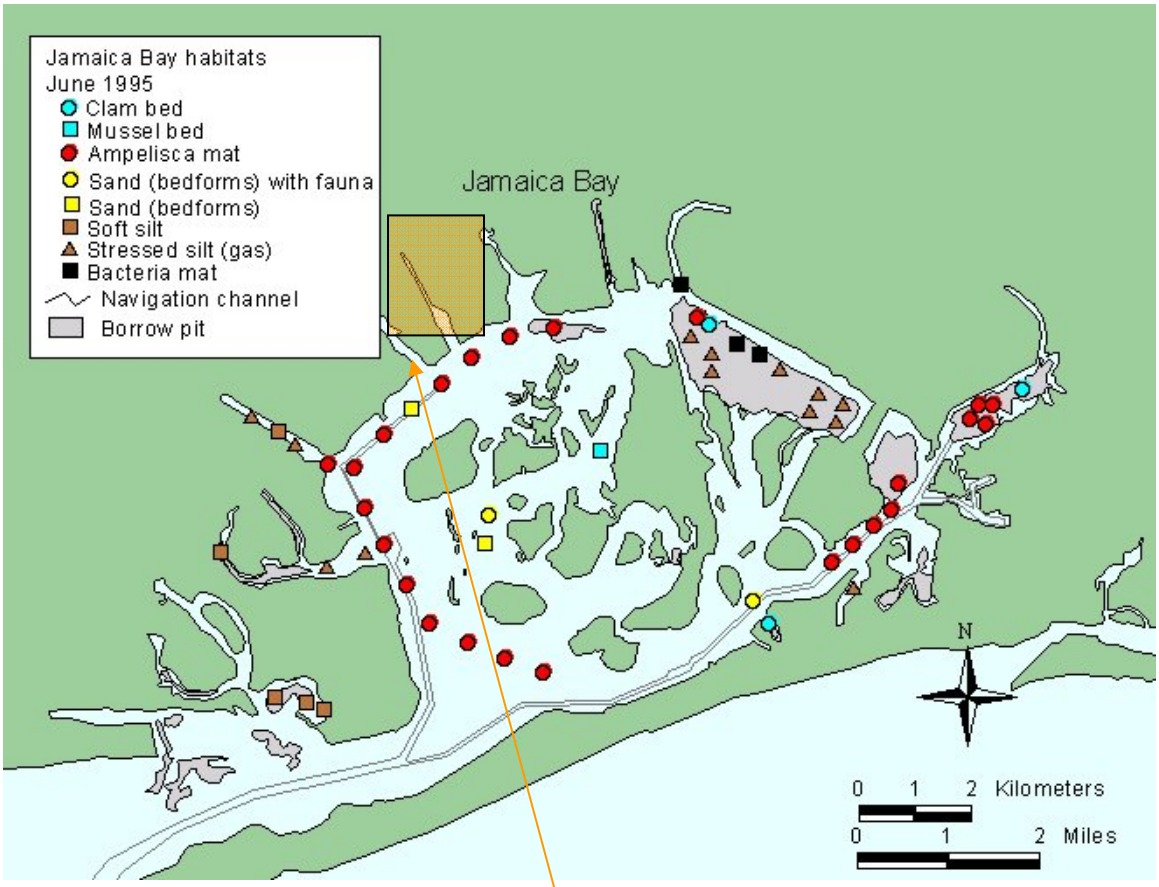


FIGURE 5
Jamaica Bay Habitats, October, 1995

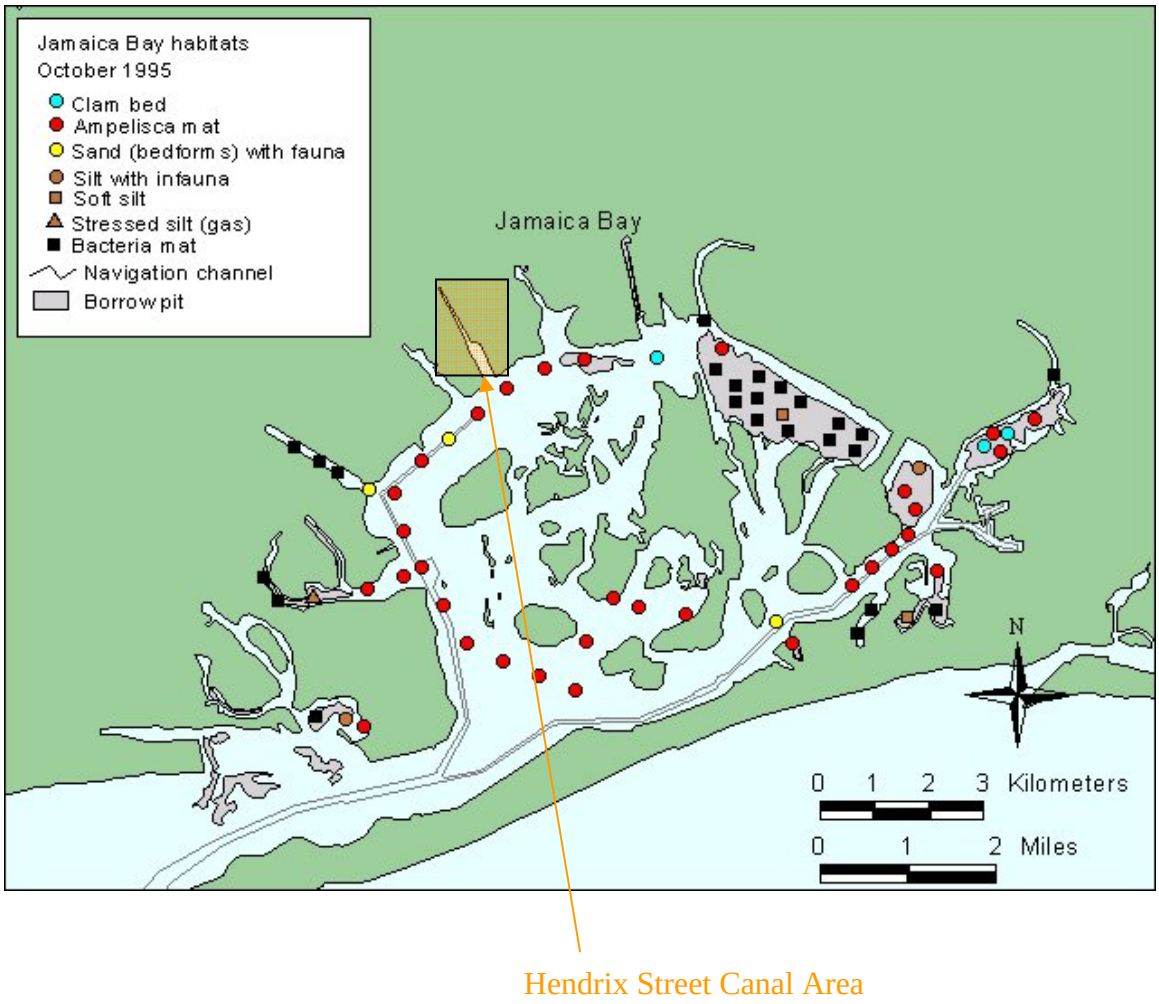


FIGURE 6
Jamaica Bay Habitats, 1995

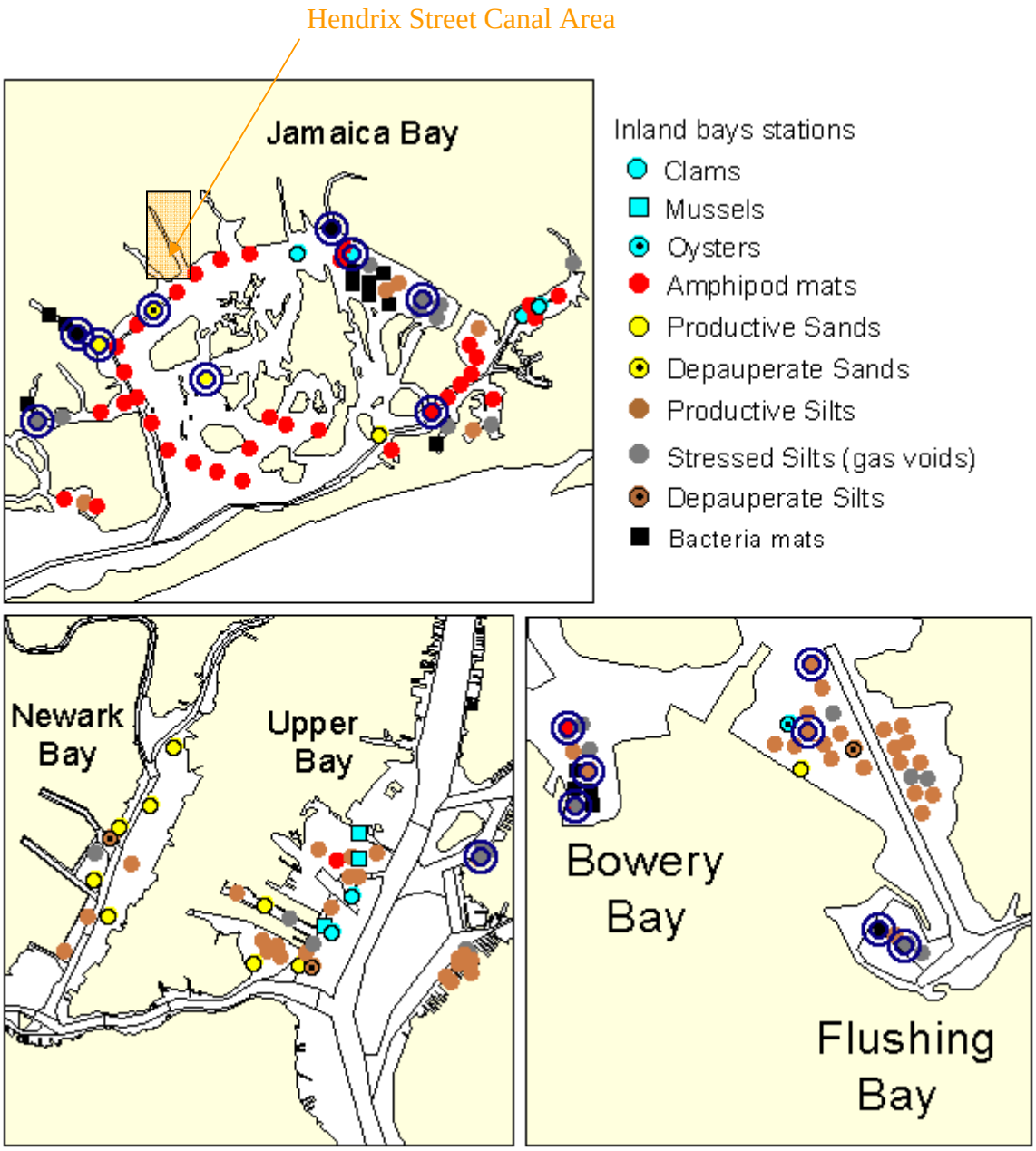


TABLE 1

Essential Fish Habitat Species

Scientific Name	Common Name	Life Stage
Finfish		
Carcharinus obscurus	Dusky Shark	L
Carcharinus plumbeus	Sandbar Shark	L,J,A
Centropristes striata	Black Sea Bass	E-n/a; J,A
Clupea harengus	Atlantic Sea Herring	J,A
Leucoraja erinacea	Little Skate	J,A
Leucoraja ocellata	Winter Skate	J,A
Lophius americanus	Monkfish	E,L
Merluccius bilinearis	Whiting	E,L,J
Odontaspis taurus	Sand Tiger Shark	L
Paralichthys dentatus	Summer Flounder	L,J,A
Peprilus triacanthus	Atlantic Butterfish	L,J,A
Pomatomus saltatrix	Bluefish	J,A
Pseudopleuronectes americanus	Winter Flounder	E,L,J,A
Rachycentron canadum	Cobia	E,L,J,A
Scomber scombrus	Atlantic Mackerel	J,A
Scomberomorus cavalla	King Mackerel	E,L,J,A
Scomberomorus maculatus	Spanish Mackerel	E,L,J,A
Scophthalmus aquosus	Windowpane	E,L,J,A
Stenotomus chrysops	Scup	E,L,J,A
Urophycis chuss	Red Hake	E,L,J,A

Commercial and Recreational Species

Scientific Name	Common Name	Life Stage
Finfish		
Ammodytes americanus	American Sandlance	A
Anchoa mitchilli	Bay Anchovy	A
Anguilla rostrata	American Eel	A
Brevoortia tyrannus	Atlantic Menhaden	A
Cynoscion regalis	Weakfish	A
Menidia menidia	Atlantic Silverside	A
Microgadus tomcod	Atlantic Tomcod	A
Morone saxatilis	Striped Bass	A
Tautoga onitis	Blackfish	A
Tautogolabrus adspersus	Cunner	A
Urophycis regia	Spotted Hake	A

E= Eggs
L= Larvae
J= Juveniles
A= Adults
n/a-denotes information not available for that life stage.

TABLE 2

List of Management Councils that Govern EFH Species

Mid-Atlantic Fishery Management Council (MAFMC)

Scientific Name	Common Name
Centropristis striata	black sea bass
Paralichthys dentatus	summer flounder
Peprilus triacanthus	Atlantic butterfish
Pomatomus saltatrix	bluefish
Scomber scombrus	Atlantic mackerel
Stenotomus chrysops	scup

Atlantic States & Gulf Coast

Scientific Name	Common Name
*Carcharinus obscurus**	dusky shark
*Carcharinus plumbeus**	sandbar shark
*Odontaspis taurus**	sand tiger shark

New England Fishery Management Council (NEFMC)

Scientific Name	Common Name
Clupea harengus	Atlantic sea herring
Leucoraja erinacea	little skate
Leucoraja ocellata	winter skate
Lophius americanus	monkfish
Merluccius bilinearis	whiting
Pseudopleuronectes americanus	winter flounder
Scophthalmus aquosus	windowpane
Urophycis chuss	red hake

South Atlantic Fishery Management Council

Scientific Name	Common Name
Rachycentron canadum	cobia
*Scomberomorus cavalla**	king mackerel
*Scomberomorus aculates**	Spanish mackerel

*Indicates species also managed by NMFS.

TABLE 3

Life History Characteristics and Habitat Requirements for Species of Concern in Hendrix Street Canal

Species	Life Stage	Temp. °C	Salinity °/oo	Depth m	Seasonal Occurrence	Habitat	Comments
EFH Finfish							
Carcharinus obscurus (dusky shark)	Larvae	Warm, Temperate	--	0-25	--	Inlets, estuaries and shallow coastal waters.	Highly migratory. Prey- small schooling fish.
Carcharinus plumbeus (sandbar shark)	Larvae Adults	--	--	0-25	--	Shallow, coastal waters; submerged flats (1-4m).	Highly migratory.
Centropristis striata (black sea bass)	Larvae	--	--	0-51	Jun to Nov	Pelagic, then become demersal.	Not much known.
	Juveniles	>6	>18	<10	Apr to Dec – peak Jun to Nov – coastal Winter – offshore south of NJ Summer/Spring – estuaries	Rough bottom, shellfish, eelgrass beds; man-made structures-sandy-shelly areas, offshore clam beds, shell patches-wintering.	YOY use salt marsh edges, channels-high habitat fidelity.
	Adults	>6	>20	10-20	May to Oct – inshore, estuaries Winter – offshore south of NY	Structured habitats (natural & man-made); sand & shell preferred.	Spawn in coastal bays, change sex to males with growth. Prey: benthic, near-bottom inverts, squid, small fish.
Clupea harengus (Atlantic sea herring)	Larvae	22-24	1.4-60; Prefer 10-20	Surface	Year round – peaks in fall Oct to Dec	May associate with vegetation.	Major prey: copepod nauplii and copepodites. Diurnal vertical migrations to move into estuaries.
	Juveniles	<10	26-32	15-135	--	Pelagic waters & bottom habitats.	School, negative response to light, feed on zooplankton.
	Adults	<10	>28	20-130	--	Pelagic waters & bottom habitats.	Selective feeding on zooplankton.
	Spawning Adults	<15	32-33	20-80	Jul to Nov	Bottom habitats-gravel, sand, cobble and shell. Also on aquatic macrophytes.	Overwinter after spawning.
Leucoraja erinacea (little skate)	Adults and Juveniles	Range 1-21, prefer 2-15.	Mean 32, found 15-20 in Delaware Bay.	0-137,m most <91 Spring-shallow. Winter-deep.	Adults spawn year-round. Most common late Oct to Jan, Jun to Jul. Not common Hudson-Raritan.	Sand, gravel, mud bottoms. Bury during day, active at night. Spring and fall mostly on transitional and sand bottoms.	Opportunisitic predator. Prefer decapods, polychaetes and fish. Epifauna.

TABLE 3 *(Continued)*

Life History Characteristics and Habitat Requirements for Species of Concern in Hendrix Street Canal

Species	Life Stage	Temp. °C	Salinity ‰	Depth m	Seasonal Occurrence	Habitat	Comments
Leucoraja ocellata (winter skate)	Adults and Juveniles	Range - 1.2-19. Prefer ~10.	Range 30-36, most ~32-33.	0-371m, most <111, Fall-inshore, Summer-offshore	Most abundant summer, fall. Probably year-round. Not common Hudson-Raritan.	Demersal, sand, gravel, mud bottoms. Sand most common. Bury during day, active at night.	Opportunistic, predator. Prefer polychaetes, fish and crustaceans. Infauna
Lophius americanus (monkfish)	Eggs	<18		15-1000	March to September	Surface waters	Eggs contained in long mucus veils that float near or at the sfc
	Larvae	15		25-1000	March to September	Pelagic waters	
Merluccius bilinearis (whiting)	Eggs	<20		50-150	All year peaks June to October	Surface waters	
	Larvae	<20		50-130	All year peaks July to September	Surface waters	
	Juveniles	<21	>20	20-270		Bottom habitats of all substrate types	
Odontaspis taurus (sand tiger shark)	Larvae	--	--	--	--	Shallow coastal waters, bottom or demersal. Sandy coastal waters, shallow bays, estuaries and rocky or tropical reefs	Highly migratory. Feeds on fish, small sharks, rays, squid, crustaceans.
Paralichthys dentatus (summer flounder/fluke)	Larvae	9-12	23-33 fresh in Hudson, Raritan	1-70	Sep to Feb (MAB)	Pelagic Waters-larvae mostly 19-83km offshore.	High use of tidal creeks and creek mouths.
	Juveniles	>11	10-30	1-70; 0.5-5 in estuary	--	Demersal Waters, muddy substrate but prefer sand; lower estuary flats, channels, slat marsh creeks and eelgrass.	HAPC-macroalgae, seagrasses, fw & tidal macrophytes-any size bed & loose aggregations, within adult & juv. EFH. Major prey: mysid, shrimp.
	Adults	--	--	1-360	Warmer months – shallow coast & estuarine, offshore in colder months	Demersal waters and estuaries.	HAPC-macroalgae, seagrasses, fw & tidal macrophytes-any size bed & loose aggregations, within adult & juv. EFH. Major prey: fish, shrimp, squid, polychaetes.

TABLE 3 *(Continued)*

Life History Characteristics and Habitat Requirements for Species of Concern in Hendrix Street Canal

Species	Life Stage	Temp. °C	Salinity °/oo	Depth m	Seasonal Occurrence	Habitat	Comments
Peprilus triacnathus (Atlantic butterfish)	Larvae	9-19	6.4-37	10-1829	Summer and Fall	Pelagic Waters	--
	Juveniles	3-28	3-37	10-365 (most <120)	Winter – shelf Summer to Fall – estuaries	Pelagic Waters. Larger fish-sandy, muddy substrates.	-- --
	Adults	3-28	4-26	10-365 (most <120)	Winter-shelf Summer to Fall-estuaries	Pelagic Waters (schools over sandy, sandy-silt, muddy substrates).	
Pomatomus saltatrix (bluefish)	Juveniles	19-24	23-26	--	May-Oct	Pelagic waters, ubiquitous in mixing and seawater zones. Seldom found beyond Continental Shelf. Shallow nearshore habitats. Estuaries as nursery.	Highly migratory, major prey fish. Visual feeders on polychaetes, crustaceans, fish. Can change depths rapidly-secretes gas into swim bladder fastest rate known.
	Adults	14-16	>25	--	Apr-Oct		
Pseudopleuronectes americanus (winter flounder)	Eggs	<10: spawn at 3	10-32	Inshore 0.3-4.5	Feb to Jun	Bottom habitats, substrate of sand, mud, gravel, algae.	Demersal, adhesive eggs.
	Larvae	<15; most 2-15	3.2-30	Inshore 1-4.5	Mar to Jul	Pelagic and bottom waters. Fine sand, gravel.	Feed on copepods and phytoplankton.
	Juveniles (YOY)	2-29.4; prefer 19.5	5-33	Inshore 0.5-12	Yearly, abundant summer and fall	Benthic substrate near shallow natal waters. Mud, sand with shell/leaf litter. Ulva, eelgrass.	Feed on copepods nauplii, polychaetes, nemerteans, ostracods.
	Juveniles (Age 1+)	10-25	10-30	<200; LIS: 18-27	Yearly, abundant spring, winter and fall	Bottom habitats, substrate of mud, fine-grained sand, silt, shell.	Major prey: amphipods, copepods, polychaetes, bivalve siphons.
	Adults	0.6-23; prefer 12-15	15-33	1-100	Yearly, abundant spring, winter and fall	Inshore waters, estuaries. Bottom habitats of mud.	Major prey: annelids, cnidarians and mollusks.
	Spawning Adults	<25	5.5-36; most 31-32.5	Inshore 1-30	Feb to Jun	Inshore waters, estuaries. Bottom habitats of mud, sand, gravel, cobble, rock.	--

TABLE 3 *(Continued)*

Life History Characteristics and Habitat Requirements for Species of Concern in Hendrix Street Canal

Species	Life Stage	Temp. °C	Salinity °/oo	Depth m	Seasonal Occurrence	Habitat	Comments
Rachycentron canadum (cobia)	Eggs Larvae Juveniles Adults	>20	>25	--	--	Sandy shoals of capes, offshore bars; high profile rock bottoms, barrier island oceanside waters from surf to shelf from Gulfstream shoreward; high salinity bays, estuaries, seagrass habitats.	All coastal inlets. Life stages not separated.
Scomber scombrus (Atlantic mackerel)	Eggs	5-23; most 7-16	18-30; prefer >25	10-325; most 30-70	Apr to Aug Highest – May to Jun	Pelagic, surface waters above thermocline. Bays and estuaries.	--
	Larvae	6-22; most 8-13	Most >30	10-130; most >50	May to Aug	Offshore, some in bays and estuaries.	Feed on copepods, fish larvae.
	Juveniles	4-22; most 10.	>25	0-320	Year round	Pelagic Waters	--
	Adults	4-16	>25	0-380	Year round	One group overwinters in deep shelf waters. Spring move inshore, summer shelf edge.	Opportunistic feeders-filter or select prey. Major prey: crustaceans, pelagic mollusks, polychaetes, squid, fish.
Scomberomorus cavalla (king mackerel)	Eggs Larvae Juveniles Adults	>20	>30	--	--	Sandy shoals of capes, offshore bars; high profile rock bottoms, barrier island oceanside waters from surf to shelf from Gulfstream shoreward; high salinity bays, estuaries, seagrass habitats.	All coastal inlets. Life stages not separated.
Scomberomorus maculatus (Spanish mackerel)	Eggs Larvae Juveniles Adults	>20	>30	Through-out water column, outer estuary.	--	Sandy shoals of capes, offshore bars; high profile rock bottoms, barrier island oceanside waters from surf to shelf from Gulfstream shoreward; high salinity bays, estuaries, seagrass habitats.	All coastal inlets. Life stages not separated.

TABLE 3 *(Continued)*
Life History Characteristics and Habitat Requirements for Species of Concern in Hendrix Street Canal

Species	Life Stage	Temp. °C	Salinity °/₀₀	Depth m	Seasonal Occurrence	Habitat	Comments
Scophthalmus aquosus (windowpane)	Eggs	<20	--	<70	Feb to Nov Peaks May & Oct (MAB)	Surface Waters	--
	Larvae	<20	--	<70	Feb to Nov Peaks May & Oct (MAB)	Pelagic Waters	--
	Juveniles	<25	5.5-36	1-100	--	Bottom habitats-mud, fine-grained sand.	--
	Adults	<25	5.5-36	1-75	--	Demersal waters; inshore sands, mud, mussel & eelgrass substrates.	--
	Spawning Adults	<21	5.5-36	1-75	Feb to Dec Peak in May (MAB)	Demersal waters, inshore estuaries on various substrates.	--
Stenotomus chrysops (scup)	Eggs	13-23	>15	<30	May to August	Pelagic waters in estuaries	--
	Larvae	13-23	>15	<20	May to Sept.	Pelagic waters in estuaries	--
	Juveniles	>7	>15	0-38	Spring, Summer Estuaries and bays	Demersal waters; inshore sands, mud mussel & eelgrass substrates	--
	Adults	>7	>15	2-185	Adults winter offshore south of NY	Dermersal waters, inshore estuaries on various substrates	Spawn <30m during inshore migration May-Aug. Prey: small benthic invertebrates

TABLE 3 *(Continued)*
Life History Characteristics and Habitat Requirements for Species of Concern in Hendrix Street Canal

Species	Life Stage	Temp. °C	Salinity °/₀₀	Depth m	Seasonal Occurrence	Habitat	Comments
Urophycis Chuss (red hake)	Larvae	<19	>0.5	<200	May to Dec Peaks Sept/Oct.	Surface Waters	--
	Juveniles	2-22; most 3-16	>22; most 31-33	<100	Year round	Bottom habitats w/shell Substrate, incl. areas w/many Live scallops. Estuaries, outer shelf.	Feed on crustaceans, polychetes, amphipods
	Adults	<13	31-34	50-350	--	Bottom habitats with a substrate of silt, mud or hard bottom	--
	Spawning Adults	<13	31-34	50-350	April to Aug.	Bottom habitats with a substrate of silt, mud or hard bottom	Spawning occurs between Oct to Jan Fertilization delayed until Feb. to Apr.

TABLE 3 *(Continued)*

Life History Characteristics and Habitat Requirements for Species of Concern in Hendrix Street Canal

Species	Life Stage	Temp. °C	Salinity °/oo	Depth m	Seasonal Occurrence	Habitat	Comments
Commercial/Recreational Finfish							
Anguilla rostrata (American eel)	Juveniles & Adults	Range 6-30, prefer ~17.	Fresh to brackish waters.	<120	Winter spawning at sea	Brackish and freshwater tributaries. Silty, muddy bottoms. Winter buried in mud.	Catadromous-reproduce in ocean. Omnivorous, prey on fishes and invertebrates. Adults die after spawning.
Ammodytes americanus (American sandlance)	Adults	Range –2 to 11, prefer 3-6.	26 tp 36	Most abundant inner half of Continental Shelf.	Spawn Nov to Mar	Sandy substrates. Burrows into sand for rest and escape.	Important prey for commercial species and mammals. Bait fish for anglers. Feed on phytoplankton, invertebrate eggs and copepod nauplii. Heterotypic schooling. Burrow in sand.
Brevoortia tyrannus (Atlantic menhaden)	Adults	Range 0 to 25, prefer 16-19.	15 to 40, prefer low salinity.	1 to 200m. Coastal waters. Age 0 inshore estuaries.	Spawn year round, concentrated from Dec to Feb	Estuarine and nearshore waters.	Juveniles and adults filter-feed. Require food-rich waters to grow.
Menidia menidia (Atlantic silverside)	Adults	Range3-32 prefer15 .Avoid-ance 11 to 14	Freshwater to 37.8 Juveniles prefer 7-8	Shore-zone salt marshes, estuaries, tidal creeks	Major spawning March to June	Vegetated habitats. Spawn in intertidal zone. Eggs adhere to submerged vegetation	Spawning related to lunar cycle. Bait fishery. Forage for predatory game fish. Feed as opportunistic omnivores in schools.

TABLE 3 *(Continued)*
Life History Characteristics and Habitat Requirements for Species of Concern in Hendrix Street Canal

Species	Life Stage	Temp. °C	Salinity °/oo	Depth m	Seasonal Occurrence	Habitat	Comments
Microgadus tomcod (Atlantic tomcod)	Adults	Range 6-26. Found at –1.2	Range 1- 0, prefer 4-9.	Max depth of 6m nearshore.	Spawn – Nov to Feb Peak in Jan	Estuarine spawning. High tide mark of salt marshes, mudflats, eelgrass. Max. depth of 6m in estuaries, bays, coastal waters within 1.6km of shore. Ascend rivers.	Major prey: copepods, amphipods. Selectively preyed on by striped bass.
Anchoa mitchilli (bay anchovy)	Adults	Range 2 -27, Spawn 9-31. Found >32.	Freshwater, brackish, hypersaline.	Shallow water.	Spawn May to Sep at night	Spawn <20m in Long Island, estuarine waters.	Important as prey for commercial species and sea birds. Extremely abundant.
Tautogolabrus adspersus (cunner)	Adults	Range 8-32,	Brackish.	Nearshore.	Spawn – May to Aug Peak – May to Jun Year-round residents	Structured habitat-SAV, shellfish beds, rocks & boulders, reefs, pilings, jetties, groins.	Prey heavily on benthos. Hibernate at low temps.
Urophycis regia (spotted hake)	Adults	n/a	n/a	Estuaries, bays, offshore as temperature increases.	Late summer to winter spawning	Associated with objects on the bottom.	Preys on crustaceans, fish and squid.
Morone saxatilis (striped bass)	Adults	Range 0 to 30.	Range 0 to 33.7.	Shallow, Coastal, riverine and estuarine waters.	Spawn peak May to Jun	Rock, boulder, gravel, sand detritus, grass, moss, mussel beds.	Anadromous. Opportunistic carnivore. Ontogenetic shift in feeding.
Tautoga onitis (blackfish)	Adults	Prefer 10-20; adults migrate offshore <11.	Brackish.	Shallow. Usually less than 18m.	Spawn – May to Aug Peak – Jun Year-round residents	Structured habitat-SAV, shellfish beds, rocks & boulders, reefs, pilings, jetties, groins.	Prey heavily on benthos. Hibernate at low temps.

TABLE 3 *(Continued)*

Life History Characteristics and Habitat Requirements for Species of Concern in Hendrix Street Canal

Species	Life Stage	Temp. °C	Salinity °/oo	Depth m	Seasonal Occurrence	Habitat	Comments
Cynoscion regalis (weakfish)	Adults	Range 9 to 31, prefer 18-24.	Euryhaline, 6.6 to 32.3.	Nearshore, estuarine coast.	Spawn – May to Jul, Peak – mid-May and Jun	Estuaries important for feeding, spawning, nursery.	Prey on decapods and fishes.

Sources of Information: www.nmfs.noaa.gov
www.nefsc.noaa.gov
Series of papers from: USFWS. 1983-19_.
Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates.
USFWS Biol. Rep. 82(11). USACE, TR EL-82-4.

n/a = no information available
--- = no information available
YOY = young of the year
HAPC = habitat areas of particular concern
EEZ = economic exclusive zone

TABLE 4
Habitat Groupings for Species of Concern in Hendrix Street Canal

Coastal, Nearshore Estuarine Waters (Water Column)

Scientific Name	Common Name	Life Stage	Status	Habitat Type
Carcharinus obscurus	Dusky Shark	Larvae	EFH	IN, ES, CW
Carcharinus plumbeus	Sandbar Shark	Larvae, Adults	EFH	CW
Pomatomus saltatrix	Bluefish	Juveniles, Adults	EFH	PW
Scomber scombrus	Atlantic Mackerel	Eggs, Larvae	EFH	PW
*Scophthalmus aquosus**	Windowpane	Eggs	EFH	SW, PW, SB
Stenotomus chrysops	Scup	Eggs, Larvae	EFH	PW, ES, AB
*Anchoa mitchilli**	Bay Anchovy	Adults	Comm/Rec	SW, CW, PW, ES
*Brevoortia tyrannus**	Atlantic Menhaden	Adults	Comm/Rec	SW, CW, ES

Demersal with Bottom Habitat Rough, Smooth, Vegetated, Structured

Scientific Name	Common Name	Life Stage	Status	Habitat Type
Centropristes striata	Black Sea Bass	Juveniles, Adults	EFH	ES, AB, ST
Clupea harengus	Atlantic Sea Herring	Larvae, Juveniles, Adults	EFH	PW, AB, VG
Odontaspis taurus	Sand Tiger Shark	Larvae	EFH	CW, ES, SB, RB
Leucoraja erinacea	Little Skate	Juveniles, Adults	EFH	DW, ES, SB, RB
Leucoraja ocellatus	Winter Skate	Juveniles, Adults	EFH	DW, ES, SB, RB
*Paralichthys dentatus**	Summer Flounder	Juveniles, Adults	EFH	PW, ES, SB, VG
*Peprilus triacanthus**	Atlantic Butterfish	Juveniles, Adults	EFH	PS, SB
*Pseudopleuronectes americanus**	Winter Flounder	Eggs, Larvae, Juveniles, Adults	EFH	PW, ES, AB
Rachycentron canadum	Cobia	Eggs, Larvae, Juveniles, Adults	EFH	SH, RB, OC, ES, VG
Scomberomorus cavalla	King Mackerel	Eggs, Larvae, Juveniles, Adults	EFH	SH, RB, OC, ES, VG
Scomberomorus maculatus	Spanish Mackerel	Eggs, Larvae, Juveniles, Adults	EFH	SH, RB, OC, ES, VG
*Scophthalmus aquosus**	Windowpane	Juveniles, Adults	EFH	SW, PW, SB
Stenotomus chrysops	Scup	Juveniles, Adults	EFH	PW, ES, AB
Urophycis chuss	Red Hake	Juveniles, Adults	EFH	SW, SB, RB
Ammodytes americanus	American Sandlance	Adults	Comm/Rec	CS, SB
*Antuilla rostrata**	American Eel	Juveniles, Adults	Comm/Rec	PW, ES, SB
*Cynoscion regalis**	Weakfish	Adults	Comm/Rec	SW, CW, ES
*Menidia menidia**	Atlantic Silverside	Adults	Comm/Rec	SW, CW, ES, VG
*Microgadus tomcod**	Atlantic Tomcod	Adults	Comm/Rec	CW, ES, SB, VG
*Morone saxatilis**	Striped Bass	Adults	Comm/Rec	CW, ES, AB
Tautoga onitis	Blackfish	Adults	Comm/Rec	CW, ES, AB
*Tautogolabrus adspersus**	Cunner	Adults	Comm/Rec	CW, ES, AB

SW=Surface Waters
PW=Pelagic Waters
DW=Demersal Waters
CW=Coastal Waters
OC=Oceanic Waters
CS=Continental Shelf
ES=Estuaries
IN=Inlets
SH=Shoals
SB=Smooth Bottom
RB=Rough Bottom
AB=All Bottom Substrates
ST=Structured Habitats

*Urophycis regia**	Spotted Hake	Adults	Comm/Rec	ES, CS, DW, ST

Pelagic Offshore Waters (Open Water)

Scientific Name	Common Name	Life Stage	Status	Habitat Type
*Centropristes striata**	Black Sea Bass	Larvae	EFH	ES, AB, ST
*Clupea harengus**	Atlantic Sea Herring	Juveniles, Adults	EFH	PW, AB, VG
*Paralichthys dentatus**	Summer Flounder	Larvae	EFH	PW, ES, SB, VG
*Peprilus triacanthus**	Atlantic Butterfish	Larvae, Juveniles	EFH	PW, SB
*Pomatomus saltatrix**	Bluefish	Juveniles, Adults	EFH	PW
*Pseudopleuronectes americanus**	Winter Flounder	Larvae	EFH	PW, ES, AB
Scomber scombrus	Atlantic Mackerel	Eggs, Larvae, Juveniles, Adults	EFH	PW
*Scophthalmus aquosus**	Windowpane	Larvae	EFH	SW, PW, SB
*Urophycis chuss**	Red Hake	Larvae	EFH	SW, SB, RB

Continental Shelf/Slope and Sandy Shoals

Scientific Name	Common Name	Life Stage	Status	Habitat Type
Rachycentron canadum	Cobia	Eggs, Larvae, Juveniles, Adults	EFH	SH, RB, OC, ES, VG
Scomberomorus cavalla	King Mackerel	Eggs, Larvae, Juveniles, Adults	EFH	SH, RB, OC, ES, VG
Scomberomorus maculatus	Spanish Mackerel	Eggs, Larvae, Juveniles, Adults	EFH	SH, RB, OC, ES, VG

*Note: Fish denoted with an asterisk have habitat requirements that match the project area (see Table 5).

TABLE 5

Habitat Requirements for Species of Concern in Hendrix Street Canal: Species with Requirements for Habitats found in the Project Area*

Species	Life Stage	Threatened/ Endangered	Habitat Requirements	Habitat Suitability of Project Area**	Project Activity that may Affect Species
Paralichthys dentatus (summer flounder/fluke)	Larvae	No	Pelagic Waters-larvae mostly 19-83km offshore. Depth= 1-70m.	Not likely to utilize creek system. More likely to be found in more open estuarine area.	None
	Juveniles	No	Demersal Waters, muddy substrate but prefer sand; lower estuary flats, channels, salt marsh creeks and eelgrass. Depth= 1-70m, 0-0.5 m in estuaries.	Potential to utilize bottom waters	Temporary displacement during project construction.
	Adults	No	Demersal waters and estuaries. Depth= 1-360m.	Potential to utilize bottom waters	Temporary displacement during project construction.
Peprilus triacanthus (Atlantic butterfish)	Larvae	No	Pelagic Waters. Depth= 10-1829m.	May utilize project area, but more likely to be found in more open estuary system of Jamaica Bay	Temporary displacement during project construction
	Juveniles	No	Pelagic Waters. Larger fish-sandy, muddy substrates. Depth= 10-365m (most< 120m).	May utilize project area but more likely found in more open areas of Jamaica Bay	Temporary displacement during project construction
	Adults	No	Pelagic Waters (schools over sandy, sandy-silt, muddy substrates). Depth= 10-365m (most <120m).	May utilize project area but more likely to be found in more open areas of Jamaica Bay.	Temporary displacement during project construction.

TABLE 5 *(Continued)*

Habitat Requirements for Species of Concern in Hendrix Street Canal: Species with Requirements for Habitats found in the Project Area*

Species	Life Stage	Threatened/ Endangered	Habitat Requirements	Habitat Suitability of Project Area**	Project Activity that may Affect Species
Pseudopleuronectes americanus (winter flounder)	Eggs	No	Bottom habitats, substrate of sand, mud, gravel, algae. Depth= inshore, 0.3-4.5m.	Demersal, adhesive eggs. Prefers sand, mud and gravel bottom. Salinity range in Hendrix Creek too low for egg survival	No impact.
	Larvae	No	Pelagic and bottom waters. Fine sand, gravel. Depth= inshore, 1-4.5m.	Spawning and nursery grounds the same. Very young larvae not likely to be in area. More advanced larvae may be in water column.	Temporary displacement of more advanced larvae..
	Juveniles (YOY)	No	Benthic substrate near shallow natal waters. Mud, sand with shell/leaf litter. Ulva, eelgrass. Depth= inshore, 0.5-12m.	Potential to utilize soft bottoms of project area	Temporary displacement during project construction.
	Juveniles (Age 1+)	No	Bottom habitats, substrate of mud, fine-grained sand, silt, shell. Depth <200m, in LIS 18-27m.	Potential to utilize soft bottom of project areas.	Temporary displacement during project construction.
	Adults	No	Inshore waters, estuaries. Bottom habitats of mud. Depth= 1-100m.	Potential to utilize soft bottoms of project area, however salinity range not suitable	Temporary displacement during project construction.
	Spawning Adults	No	Inshore waters, estuaries. Bottom habitats of mud, sand, gravel, cobble, rock. Depth= inshore, 1-30m.	Potential to utilize soft bottom of project area but salinity range too low for egg survival.	Temporary displacement during project
Scophthalmus aquosus (windowpane)	Eggs	No	Surface waters. Depth <70m.	Potential to be found in the water column of project area.	Temporary displacement during project construction.
	Larvae	No	Pelagic waters. Depth <70m.	Potential to be found in the water column of project area.	Temporary displacement during project construction.
	Juveniles	No	Bottom habitats-mud, fine-grained sand. Depth 1-100m, adults <75m.	Potential to be in project area, however not likely to utilize such a stressed environment	Temporary displacement during project construction .
	Adults	No			
	Spawning Adults	No			

TABLE 5 *(Continued)*

Habitat Requirements for Species of Concern in Hendrix Street Canal: Species with Requirements for Habitats found in the Project Area*

Species	Life Stage	Threatened/ Endangered	Habitat Requirements	Habitat Suitability of Project Area**	Project Activity that may Affect Species
Commercial and Recreational Finfish					
Menidia menidia (Atlantic silverside)	Adults	No	Vegetated habitats. Spawn in intertidal zone. Eggs adhere to submerged vegetation. Depth= shore zone, salt marshes, estuaries, tidal creeks.	Potential to be found in project area. Prefers vegetated habitat.	Temporary displacement during project construction..
Microgadus tomcod (Atlantic tomcod)	Adults	No	Estuarine spawning. High tide mark of salt marshes, mudflats, eelgrass. Max. depth of 6m in estuaries, bays, coastal waters within 1.6km of shore. Ascend rivers.	Potential to be found in project area, prefers muddy, vegetated habitats.	Temporary displacement during project construction
Anchoa mitchilli (bay anchovy)	Adults	No	Spawn <20m in Long Island, estuarine waters. Depth= shallow water.	Potential to be in project area	Temporary displacement during project construction.
Morone saxatilis (striped bass)	Adults	No	Rock, boulder, gravel, sand detritus, grass, moss, mussel beds. Depth= shallow, coastal, riverine & estuarine waters.	Potential to be found in project area.	Temporary displacement during project construction.
Cynoscion regalis (weakfish)	Adults	No	Estuaries important for feeding, spawning, nursery. Depth= nearshore, estuarine coast.	Potential to be found in project area, salinity range borderline.	Temporary displacement during project construction
Anguilla rostrata (American eel)	Juveniles & Adults	No	Brackish and freshwater tributaries. Silty, muddy bottoms. Winter buried in mud. Depth <120m.	Potential to be found in project area	Temporary displacement during project construction.
Brevoortia tyrannus (Atlantic menhaden)	Adults	No	Estuarine and nearshore waters. Depth= coastal waters, 1-200m. Age 0 found inshore, estuaries.	Potential to be found in project area	Temporary displacement during project construction.

TABLE 6

Habitat Requirements for Species of Concern in Hendrix Street Canal: Species with Requirements for Habitats Not Found in the Project Area*

Species	Life Stage	Threatened/ Endangered	Habitat Requirements	Habitat Suitability of Project Area**	Project Activity that may Affect Species
EFH Finfish					
Carcharinus obscurus (dusky shark)	Larvae	No	Inlets, estuaries and shallow coastal waters. Depth= 0-25m.	Required habitat not present. Species is highly migratory, prefers coastal offshore waters, and is rarely found in estuaries.	No impact
Carcharinus plumbeus (sandbar shark)	Larvae Adults	No	Shallow, coastal waters; submerged flats (1-4m). Depth= 0-25m.	Required habitat not present. Species is highly migratory, prefers coastal offshore waters, and is rarely found in estuaries.	No impact
Centropristis striata (black sea bass)	Larvae	No	Pelagic, then become demersal. Depth= 0-51m.	Required habitat not present. Salinity range not suitable	No impact
	Juveniles	No	Rough bottom, shellfish, eelgrass beds; man-made structures-sandy-shelly areas, offshore clam beds, shell patches-wintering. Depth <10m.	Juveniles associate with structure. Salinity range not suitable.	No impact
	Adults	No	Structured habitats (natural & man-made); sand & shell preferred. Depth= 10-20m.	Adults associate with structure. Salinity range not suitable	No impact
Pomatomus saltatrix (bluefish)	Juveniles	No	Pelagic waters, ubiquitous in mixing and seawater zones. Seldom found beyond Continental Shelf. Shallow nearshore habitats. Estuaries as nursery. Depth= unknown.	Required habitat not present. Salinity range not suitable.	No impact
Odontaspis taurus (sand tiger shark)	Larvae	No	Shallow coastal waters, bottom or demersal. Sandy coastal waters, shallow bays, estuaries and rocky or tropical reefs. Depth unknown.	Required habitat not present. Species is highly migratory, prefers coastal offshore waters, and is rarely found in estuaries.	No impact

**Based on all or part of the species' life stage requirements.*
***Habitat requirements match the habitat in the project area, either partially or completely.*

TABLE 6 *(Continued)*

Habitat Requirements for Species of Concern in Hendrix Street Canal: Species with Requirements for Habitats Not Found in the Project Area*

Species	Life Stage	Threatened/ Endangered	Habitat Requirements	Habitat Suitability of Project Area**	Project Activity that may Affect Species
EFH Finfish					
Rachycentron canadum (cobia)	Eggs Larvae Juveniles Adults	No	Sandy shoals of capes, offshore bars; high profile rock bottoms, barrier island oceanside waters from surf to shelf from Gulfstream shoreward; high salinity bays, estuaries, seagrass habitats. Depth unknown.	Required habitat not present. Species prefers coastal inlets and is typically found in more saline waters and further south than project area.	No impact
Scomber scombrus (Atlantic mackerel)	Eggs	No	Pelagic, surface waters above thermocline. Bays and estuaries. Depth= 10-325m (most 30-70m).	Required habitat not present. Species prefers deeper, offshore waters outside of project area.	No impact
	Larvae	No	Offshore, some in bays and estuaries. Depth= 10-130m (most >50m).	Required habitat not present. Species prefers deeper, offshore waters outside of project area.	No impact
	Juveniles	No	Pelagic waters. Depth 0-320m.	Required habitat not present. Species prefers deeper, offshore waters outside of project area.	No impact
	Adults	No	One group overwinters in deep shelf waters. Spring move inshore, summer shelf edge. Depth= 0-380m.	Required habitat not present. Species prefers deeper, offshore waters outside of project area.	No impact
Scomberomorus cavalla (king mackerel)	Eggs Larvae Juveniles Adults	No	Sandy shoals of capes, offshore bars; high profile rock bottoms, barrier island oceanside waters from surf to shelf from Gulfstream shoreward; high salinity bays, estuaries, seagrass habitats. Depth= unknown.	Required habitat not present. Species prefers coastal inlets and is typically found in more saline waters and further south than project area.	No impact
Lophius americanus (monkfish)	Eggs	No	Surface waters, depths of 15-1000m	Required habitat not present. Species spawn in more open waters with higher salinities	No impact
	Larvae	No	Pelagic waters, depths of 25-1000m	Required habitat not present . Species prefers more open waters.	No impact

.

TABLE 6 *(Continued)*

Habitat Requirements for Species of Concern in Hendrix Street Canal: Species with Requirements for Habitats Not Found in the Project Area*

Species	Life Stage	Threatened/ Endangered	Habitat Requirements	Habitat Suitability of Project Area**	Project Activity that may Affect Species
EFH Finfish					
Scomberomorus maculatus (Spanish mackerel)	Eggs Larvae Juveniles Adults	No	Sandy shoals of capes, offshore bars; high profile rock bottoms, barrier island oceanside waters from surf to shelf from Gulfstream shoreward; high salinity bays, estuaries, seagrass habitats. Depth throughout water column, outer estuary.	Required habitat not present. Species prefers coastal inlets and is typically found in more saline waters and further south than project area.	No impact
Stenotomus chrysops (scup)	Eggs	No	Pelagic waters in estuaries. Depth <30m.	Required habitat not present. Salinity range not suitable.	No impact
	Larvae	No	Pelagic waters in estuaries. Depth <20m.	Required habitat not present. Salinity range not suitable.	No impact
	Juveniles	No	Demersal waters; inshore sands, mud, mussel & eelgrass substrates. Depth 0-38m.	Required habitat not present. Salinity range not suitable.	No impact
	Adults	No	Demersal waters, inshore estuaries on various substrates. Depth 2-185m.	Required habitat not present. Salinity range not suitable..	Notimpact
Merlucius bilinearis (whiting)	Eggs	No	Surface waters, temps below 20◦C Depth= 50-150m	Not likely to be found in project area, prefers deeper more open waters.	No impact.
	Larvae	No	Surface waters, temps below 20◦C Depth= 50-150m	Not likely to be found in project area, prefers deeper more open waters.	No impact.
	Juveniles	No	Surface waters, temps below 21◦C Depth= 20-270m	Not likely to be found in project area, prefers deeper more open waters.	No impact

TABLE 6 *(Continued)*

Habitat Requirements for Species of Concern in Hendrix Street Canal: Species with Requirements for Habitats Not Found in the Project Area*

Species	Life Stage	Threatened/ Endangered	Habitat Requirements	Habitat Suitability of Project Area**	Project Activity that may Affect Species
EFH Finfish					
Leucoraja ocellata (winter skate)	Juveniles & Adults	No	Demersal, sand, gravel, mud bottoms. Sand most common. Bury during day, active at night. Depth= 0-371m (most <111m). Fall=inshore, Summer= offshore.	Required habitat not present. Species prefers offshore waters outside of project area**.**	No impact
Leucoraja erinacea (little skate)	Juveniles & Adults	No	Sand, gravel, mud bottoms. Bury during day, active at night. Spring and fall mostly on transitional and sand bottoms. Depth= 0-137m (most <91m). Spring=shallow, Winter=deep.	Required habitat not present. Species prefers offshore waters outside of project area.	No impact
Clupea harengus (Atlantic sea herring)	Larvae	No	May associate with vegetation. Depth= surface.	Not in project area..	No impact
	Juveniles	No	Pelagic waters & bottom habitats. Depth= 15-135m.	Prefers more pelagic open water and higher salinity..	No impact
	Adults	No	Pelagic waters & bottom habitats. Depth= 20-130m.	Prefers more open pelagic waters and higher salinity	No impact
	Spawning Adults	No	Bottom habitats-gravel, sand, cobble and shell. Also on aquatic macrophytes. Depth= 20-80m.	Spawning adults not likely to utilize project area.	No impact
Urophycis chuss (red hake)	Larvae	No	Surface waters. Depth <200m.	. Typically found further offshore.	No impact
	Juveniles	No	Bottom habitats w/ shell substrate, incl. areas with many live scallops. Estuaries, outer shelf. Depth <100m.	. Typically found further offshore.	No impact
	Adults	No	Bottom habitats with a substrate of silt, mud or hard bottom. Depth 50-350m.	. Typically found further offshore.	No impact
	Spawning Adults	No	Bottom habitats with substrate of silt, mud or hard bottom. Depth 50-350m.	Typically found further offshore.	No impact.

TABLE 6 *(Continued)*

Habitat Requirements for Species of Concern in Hendrix Street Canal: Species with Requirements for Habitats Not Found in the Project Area*

Species	Life Stage	Threatened/ Endangered	Habitat Requirements	Habitat Suitability of Project Area**	Project Activity that may Affect Species
Commercial/Recreational Finfish					
Tautoga onitis (blackfish)	Adults	No	Structured habitat-SAV, shellfish beds, rocks & boulders, reefs, pilings, jetties, groins. Depth= shallow, usually <18m.	Not likely to utilize project area. Prefers structured habitat not present in area	No impact
Tautogolabrus adspersus (cunner)	Adults	No	Structured habitat-SAV, shellfish beds, rocks & boulders, reefs, pilings, jetties, groins. Depth= nearshore.	Not likely to utilize project area. Prefers structured habitat not present in area	No impact
Urophycis regia (spotted hake)	Adults	No	Associated with objects on the bottom. Depth= estuaries & bays, move offshore with increasing temperatures.	Not likely to utilize stressed environment of project area. Typically found further offshore.	No impact
Ammodytes americanus (American sandlance)	Adults	No	Sandy substrates. Burrows into sand for rest and escape. Depth= most abundant inner half of Continental Shelf.	Not likely to utilize project area. Bottom sediments too silty and muddy. Salinity range not suitable.	No impact

n/a = No information available.
*Based on the species' life stage requirements.
**Habitat requirements do not match the habitat in the project area

TABLE 7
Species of Concern in Project Area Based on Habitat Requirements

Essential Fish Habitat Species

Scientific Name	Common Name	Life Stage
Finfish		
Paralichthys dentatus	Summer Flounder/Fluke	J,A
Peprilus triacanthus	Atlantic Butterfish	A
Pseudopleuronectes americanus	Winter Flounder	E,L,J,A
Scophthalmus aquosus	Windowpane	E,L,J,A
Invertebrate		

Commercial and Recreational Species

Scientific Name	Common Name	Life Stage
Finfish		
Anchoa mitchilli	Bay Anchovy	A
Brevoortia tyrannus	Atlantic Menhaden	A
Cynoscion regalis	Weakfish	A
Menidia menidia	Atlantic Silverside	A
Microgadus tomcod	Atlantic Tomcod	A
Morone saxatilis	Striped Bass	A
Anguilla rostrata	American Eel	J,A

E= Eggs
L= Larvae
J= Juveniles
A= Adults

APPENDIX II

AGENCY RESPONSES

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

APR 25 2007

Mary Beth Billerman
EEA Inc.
1239 Route 25A, Suite 1
Stony Brook, New York 11790

Re: Hendrix Street Canal

Dear Ms. Billerman,

This responds to a letter dated April 18, 2007 regarding the proposed removal of sediments and placement of a clean sand cap at the Hendrix Street Canal in Brooklyn, New York. The project is located in the upper section of the Canal extending from the head of the Canal downstream approximately 1440 feet to approximately 100 feet upstream of the outfall of the 26th Ward Water Pollution Control Plant.

While several species of listed sea turtles are known to be seasonally present in New York waters and a population of the federally endangered shortnose sturgeon (*Acipenser brevirostrum*) is known to exist in the Hudson River, no listed species are likely to occur in the Hendrix Street Canal where the project is located. As such, no further coordination with the Protected Resources Division of NOAA's National Marine Fisheries Service (NMFS) is required. If you have any questions regarding these comments, please contact Julie Crocker at (978)281-9328 x6530.

Sincerely,

Mary A. Colligan
Assistant Regional Administrator
for Protected Resources

Cc: Rusanowsky, F/NER4

File Code: Sec 7 – NSP New York

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, Albany, New York 12233-4757
Phone: (518) 402-8935 • **FAX:** (518) 402-8925
Website: www.dec.state.ny.us

Alexander B. Grannis
Commissioner

April 27, 2007

Mary Beth Billerman
EEA, Inc
1239 Rte 25A, Suite 1
Stony Brook, NY 11790

Dear Ms. Billerman:

In response to your recent request, we have reviewed the New York Natural Heritage Program databases with respect to an Environmental Assessment for the proposed Dredging and Capping for Hendrix Street Canal, area as indicated on the map you provided, located in Brooklyn.

Enclosed is a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. The information contained in this report is considered sensitive and should not be released to the public without permission from the New York Natural Heritage Program.

This project location is adjacent to a designated Significant Coastal Fish and Wildlife Habitat. This habitat is part of New York State's Coastal Management Program (CMP), which is administered by the NYS Department of State (DOS). Projects which may impact the habitat are reviewed by DOS for consistency with the CMP. For more information regarding this designated habitat and applicable consistency review requirements, please contact:

Jeff Zappieri or Vance Barr - (518) 474-6000
NYS Department of State
Division of Coastal Resources and Waterfront Revitalization
41 State Street, Albany, NY 12231

The presence of rare species may result in your project requiring additional permits, permit conditions, or review. 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, at the enclosed address.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our databases. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. This information should NOT be substituted for on-site surveys that may be required for environmental impact assessment.

Our databases are 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.

Sincerely,

Tara Seaone

Tara Seaone
Information Services
NY Natural Heritage Program

Encs.

cc: Reg. 2, Wildlife Manager
Reg. 2, Fisheries Manager

Natural Heritage Report on Rare Species and Ecological Communities

NY Natural Heritage Program, NYS DEC, 625 Broadway, 5th Floor, Albany, NY
12233-4757
(518) 402-8935

-This report contains **SENSITIVE** information that should not be released to the public without permission from the NY Natural Heritage Program.
-Refer to the User's Guide for explanations of codes, ranks and fields.
-Location maps for certain species and communities may not be provided 1) if the species is vulnerable to disturbance, 2) if the location and/or extent is not precisely known, 3) if the location and/or extent is too large to display, and/or 4) if the animal is listed as Endangered or Threatened by New York State.

Natural Heritage Report on Rare Species and Ecological Communities

COMMUNITIES

Low salt marsh

This occurrence of Low Salt Marsh is considered significant from a statewide perspective by the NY Natural Heritage Program. It is either an occurrence 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 significance criteria, the NY Natural Heritage Program considers this occurrence to have high ecological and conservation value.

Office Use 10248

NY Legal Status: Unprotected
NYS Rank: S3S4
Federal Listing:
Global Rank: G4
Last Report: 2003-07-18
EO Rank:
County: Queens, Nassau, Kings
Town: City Of New York, Hempstead, City Of New York
Location: Jamaica Bay

General Quality and Habitat: 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. A smooth cordgrass-dominated community located in the waters of Jamaica Bay, which is part of the Gateway National Recreation Area. Sections of the marsh that are positioned along the coastline adjoin heavy development or disturbance, including John F. Kennedy International Airport, solid waste landfills, and dredge spoil islands. The bay's hydrological regime has been altered significantly; although the tidal regime is intact, natural freshwater flow into Jamaica Bay has been greatly diminished due to urbanization. Four sewage treatment plants function as the largest source of fresh water to the bay; additional inputs include sewer overflows, stormwater runoff, leaching from adjacent landfills, particulate aircraft and vehicular emmissions, jet fuel, ethylene glycol from aircraft deicing, and trash. Other natural communities in Jamaica Bay include tidal creek, marine intertidal mudflats, and marine eelgrass meadow in deeper waters.

1 Record Processed