APPENDIX D

ESSENTIAL FISH HABITAT

D.1 INTRODUCTION

D.1.1 Fire Island Inlet to Montauk Point EIS (Project)

This Project evaluates the reasonable alternatives that would help define a long-term solution to the risk imposed by coastal storms and their associated damage to human life and property, while maintaining, enhancing, and restoring the ecosystem integrity of coastal biodiversity. The key components to the proposed action are: Beach Restoration (Beach and Dune Fill), Sediment Management (including Inlet Modification), Groins (including Groin Modification), Breach Response Plan (BRP), Coastal Process Features, Non-Structural Methods, and Adaptive Management. This report presents the Essential Fish Habitat (EFH) assessment for the FIMP Tentative Selected (TSP). The FIMP study area is described in Section D.2.1.

D.1.2 Essential Fish Habitat Assessment Background

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MFCMA), an EFH assessment must be completed which identifies potential impacts to fishery resources and habitat that resulting from activities proposed for the Fire Island Stabilization Project. The MFCMA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104- 267), requires that regional fishery management councils and other federal agencies identify and protect important marine and anadromous fish habitat. Federal agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH. According to USDOC (1999a), the contents of an EFH assessment should include:

- A description of the proposed action;
- Analysis of the effects of the proposed action on EFH, the managed fish species, and major prey species;
- The Federal agency’s views regarding the effects of the action on EFH; and,
- Proposed mitigation, if applicable.

This EFH assessment includes:

- A description of the proposed activity.
- A description of the existing project area environment.
- A listing of EFH-designated species for the project area.
- Information relating to the habitat suitability and relative abundance of EFH-designated species and life history stages in the project area.
- A summary of the diets of EFH species (i.e., prey species) in the project area.
- A summary of available survey data for benthic prey species in the vicinity of the project area.
- An analysis of the potential impacts of project activities on EFH-designated species and species of special interest in the project area.
- An analysis of the direct, indirect, and synergistic impacts as a result of the activities in the project area.

D.2 PROJECT DESCRIPTION

D.2.1 Project Study Area

D.2.1.1 *Fire Island Inlet to Montauk Point Study Area*

The Study Area extends from Fire Island Inlet east to Montauk Point along the Atlantic Coast of Suffolk County, Long Island, New York (Figure D-1). The majority of Fire Island lies within the legislative boundaries of the Fire Island National Seashore (FIIS). The study area includes the barrier island chain from Fire Island Inlet to Southampton inclusive of the Atlantic Ocean shorelines, and adjacent back-bay areas along Great South, Moriches, and Shinnecock Bays. The study area continues to the east including the Atlantic Ocean shoreline along the mainland of Long Island extending from Southampton to Montauk Point. This area includes the entire Atlantic Coast of Suffolk County covering a shoreline length of approximately 83 miles. The study area also includes over 200 additional miles of shoreline within the estuary system. The study area includes areas on the mainland that are vulnerable to flooding, which generally extend as far landward as Montauk Highway, for an approximate area of 126 square miles.

This Study Area represents a complex mosaic of ocean fronting shorelines, barrier islands, tidal inlets, estuaries, and back bay mainland area. The study area functions as an interconnected system driven by large scale processes with respect to hydrodynamic and sediment exchange, supporting diverse biological and natural resources. Within the study area, ocean shoreline sand generally moves east to west alongshore, in response to waves, and currents during normal conditions and during storms. This alongshore movement of sand maintains the prevailing shoreline conditions. In addition to alongshore movement, sediment is also exchanged in the cross-shore direction, through erosion and accretion of the beach and dune, exchange of sand through tidal inlets, and during large storm events through the episodic transport of sand over the island through overwash or breaching.

Public lands throughout the Barrier Island Segment provide areas where natural resources are protected to the greatest extent possible. The Nation Park Service (NPS) managed FIIS is located along the Atlantic Ocean on the Fire Island barrier island, Great South Bay, and Moriches Bay shoreline. The NPS seeks, as part of its Mission Statement for FIIS, to preserve natural processes and protect ecological resources.

Along the barrier islands storm damages to developed areas are due to wave attack, erosion of the beach and dune, and tidal flooding of infrastructure on the barrier island that occurs when the beach and dune elevations are exceeded due to hurricanes and nor'easters. There is a long history of building destruction during storms. But in addition to storms impacting infrastructure on the barrier island, the barrier island itself is also vulnerable to storms which can erode the beach and dune system and create breaches (new inlets) of the barrier island. When a breach occurs, it impacts both the barrier island and back bay system not only during the storm, but for an extended period after the storm. When a breach opens, it tends to be relatively small, but if not closed quickly, will grow rapidly over time. As these breaches grow they also may migrate (move along the island) and can destroy buildings and other infrastructure on the barrier island. Breaches also impact the hydraulic stability of the existing inlets, which can result in increased sediment deposition in the inlet channels, and compromised navigability of the inlet. Of greatest impact however, is the hydrodynamic impact on the back bay. When a breach occurs, it increases flooding in the back bay environment due to water levels and storm activity, and this effect continues to increase as the breach grows.

Figure D-1. FIMP Study Area

D.2.2 Proposed Action

The key components to the proposed action are: Beach Restoration (Beach and Dune Fill), Sediment Management (including Inlet Modification), Groins (including Groin Modification), Breach Response Plan (BRP), Coastal Process Features, Non-Structural Methods, and Adaptive Management.

D.2.2.1 *Problem Identification*

The problems along the shorefront include storm damages due to erosion, wave attack, and flooding. Along the barrier island there is also the threat of barrier island overwash and breaching. Along the back bay, there is the threat of tidal flooding during no-breach conditions. Tidal flooding becomes worse when there is a breach of the barrier island, which allows for more storm surge from the ocean. These problems have occurred repeatedly in the past, resulting in damages to the built environment.

The principal problems are associated with extreme tides and waves that can cause extensive flooding and erosion both within barrier island and mainland communities. Breaching and/or inundation of the barrier islands also can lead to increased flood damages, especially along the mainland communities bordering Shinnecock, Moriches and Great South Bays. The following general conclusions can be made:

1. The greatest potential damages in the study area are along the mainland floodplain;
2. Among the mainland floodplain areas, Great South Bay is the most vulnerable to storm damages;
3. Along the mainland floodplain areas, specific measures need to be considered to address localized flooding;
4. The barrier island provides a high degree of protection to the mainland, which can be compromised by a breach. Specific measures need to be considered to address maintaining a stable barrier island;
5. Along the shorefront area, the area of greatest threat to storm damages under current conditions is Fire Island;
6. Along the shorefront, the potential for damages increases dramatically in all areas in the future;
7. It is clear from past degradation that storm damage reduction measures and coastal process features must be evaluated in conjunction to reestablish system functioning;
8. It is clear that reestablishment of longshore transport should be given priority, as feature over all other processes is contingent upon a balanced sediment transport system.

D.2.2.2 *Project Authorization*

The Fire Island Inlet to Montauk Point, New York, Combined Beach Erosion Control and Hurricane Coastal Strom Risk Management Project was originally authorized by the River and Harbor Act of 14 July 1960, and subsequently modified in accordance with Section 103 of the River and Harbor Act of 12 October 1962, Section 31 of the Water Resources Development Act (WRDA) of 1974, and Sections 103, 502, and 934 of the WRDA of 1986 (P.L. 99-662). This report is being prepared in response to Public Law (PL) 113-2 of January 29, 2013, Disaster Relief Appropriations.

D.2.2.3 *Preferred Alternative (Tentatively Selected Plan)*

Recent storm events, such as Hurricane Sandy and Hurricane Irene, have the left the dune and berm system along the south shore of Fire Island vulnerable, increasing the potential for overwash and breaching during future storm events. The proposed action has been developed to reinforce the existing dune and berm system along the island.

The key components to the proposed action are: Beach Restoration (Beach and Dune Fill), Sediment Management (including Inlet Modification), Groins (including Groin Modification), Breach Response Plan (BRP), Coastal Process Features, Non-Structural Methods, and Adaptive Management. A brief discussion of these key components follows.

Inlets: Fire Island, Moriches, Shinnecock

At Fire Island Inlet, Moriches Inlet, and Shinnecock Inlet, the TSP would authorize the continuation of current management along with ebb shoal dredging, outside the navigational channel, with downdrift placement. The deposition basin is a dredged area designed to capture sediment so that shoaling in navigable regions (e.g., the channel) would be minimized. Placement of a +13 foot dune and berm would occur in identified placement areas, as needed.

- Provides for sufficient sand bypassing across the three (3) inlets to ensure the natural longshore transport along the barrier islands.
- Continues the scheduled O&M dredging of the navigation channels at Fire Island, Moriches and Shinnecock Inlets, along with additional dredging of 73,000 to 379,000 cy from the ebb shoals of each inlet, outside of navigation channel, to obtain the required volume of sand needed for the by-passing.
- Bypassed sand is used to construct and maintain a +13 ft. NGVD dune and 90 ft. berm width in identified placement areas

Provides for monitoring to facilitate adaptive management changes in the future.

Mainland Non-Structural

The mainland non-structural plan consists of non-structural building retrofits, flood proofing, relocation, acquisition of approximately 4,400 structures (consisting of approximately 44 in Shinnecock Bay, 857 in Moriches Bay, and 3,110 in Great South Bay), and road raising in four locations totaling 5.91 miles in length, which will reduce flooding to 1,020 houses. The non-structural plan involves a 100-year level of protection for all structures inside the 10-year floodplain. Building retrofit measures are proposed, and could include limited relocation or buyouts based upon structure type and condition. The proposed TSP provides protection to each building identified as having a ground elevation below the baseline condition 10-year flood elevation. For each building identified for protection, the design flood elevation is the baseline condition 100-year flood elevation plus one foot of freeboard.

Barrier Islands

A variety of measures are proposed for the barrier islands, as described below.

Beach Restoration (Beach and Dune Fill, Berms, and/or Sand Bypassing). The TSP would include a nearly continuous beach and dune fill area along the developed shorefront areas that front Great South Bay and Moriches Bay. The minimum real estate impact baseline is proposed as the layout of TSP beachfill plan. This beach fill alignment closely follows the “natural” dune alignment and includes a realignment of the dune farther seaward in areas where multiple structures would need to be relocated or acquired in a more landward alignment. These areas include most of the developed communities in Fire Island with the exception of Cherry Grove and Water Island. Beachfill, berms, and sand bypassing are proposed as follows:

Fire Island at Developed Locations:

- +15 foot dune with berm, with post-Sandy optimized alignment;

Fire Island at Undeveloped Locations:

- @ Lighthouse (+13 foot dune and berm);
- @ Smith Point County Park East - sand bypassing;
- @ Smith Point County Park West – short-term beachfill in western, developed section;

Westhampton:

- Beachfill (+l5 foot dune with berm) fronting Moriches Bay.

Not all design subreaches are appropriate for beach fill. In areas where there is either an insignificant risk of breaching, no oceanfront structures, or relatively few structures, and/or lack of public access, beach fill was not considered. Subreaches where beach fill was not considered include Sailors Haven, Wilderness Area- West, Great Gun, Hampton Beach; and most of the shoreline between Shinnecock Inlet and Montauk Beach. The total initial fill for the TSP would be approximately 6.44 million cubic yards (see Table D-1). A 30-year commitment of Federal and non-Federal renourishment is proposed, which recognizes the potential for variable beach conditions between renourishment cycles. After 30 years, the Federal and non-Federal commitment would transition to a breach response plan for the remainder of the 50 years.

Table D-1. TSP Fill Volumes

Location	Plan	Volume (cubic yards)
Fire Island Inlet	Inlet Management	2,341,000
Moriches and Shinnecock Inlets	Inlet Management	1,061,000
Tiana Beach Area	Proactive BCP	1,326,000
Potato Road and Montauk	Sediment Management	240,000
Westhampton	Beachfill	923,000
Fire Island	Beachfill	549,000
Total		**6,440,000**

Breach Response Plan (BRP). The BRP recommends the Conditional BRP (consisting of a +9.5 foot berm only) in undeveloped areas of Fire Island. For areas along Shinnecock Bay, a Proactive and Reactive BRP (consisting of a +13 foot berm, with dune) is proposed. This plan includes restoring the template to the design condition when the shoreline is degraded to an effective width of 50 feet. This plan is created for areas where a breach is imminent.

- Proactive Breach Response is a plan where action is triggered when the breach and dune are lowered below a 25 year design level of risk reduction, and provides for restoration to the design condition (+13 ft. NGVD dune and 90 ft. berm). This plan is included on Fire Island in vicinity of the FIIS Lighthouse Tract, and in Smith Point County Park (to supplement when needed the sand bypassing), and Smith Point County Park West and also along the barrier island fronting Shinnecock Bay.

- Reactive Breach Response - is a plan where action is triggered when a breach has occurred, e.g. the condition where there is an exchange of ocean and bay water during normal tidal conditions. It will be utilized as needed when a breach occurs.

- Conditional Breach Response – is a plan that applies to the large, federally-owned tracts within Fire Island National Seashore, where the breach response team determines whether a breach should be closed. Conditional Breach closure provides for a 90 ft wide berm at elevation 9.5 ft. NGVD only.

Groin Modification Plan. Groin modification within the TSP would result in the tapering of the existing Westhampton groins and existing Ocean Beach groins, and the shortening of groins 1 through 13 in Westhampton, where 15 groins currently exist. Groins 1-8 would be shortened to 380 feet. Groins 9-13 would be shortened to 386 feet, 392 feet, 398 feet, 402 feet, and 410 feet, respectively. The shortening of 13 groins varying between 70-100 feet could release up to 2 million cubic yards of sand to be transported to the west. Therefore, this proactive plan could reduce the renourishment requirements for the shoreline downdrift of the groins.

Sediment Management Plans (including Inlet Modification Plan). Two high damaged areas, Downtown Montauk and Potato Road, were identified for a sediment management plan over a conventional beach nourishment project due to the lack of economic viability. This sediment management alternative will maintain the current coastal storm risk management and reduce conditions from getting worse by adding fill at each location every four years for 30 years. The material would be placed as advance fill on the seaward side of the berm which would serve as feeder beaches for locations farther to the west. The TSP recommended plan for inlet management includes the continuation of the authorized project at each inlet with increased sediment bypassing from the ebb shoal to offset the downdrift deficit. A long-term, monitoring and adaptive management plan, which is describe below, would allow for future changes or improvements to inlet management, over time.

Coastal Process Features. Collaborative planning supported by the IRG established specific objectives through the development of a Restoration Framework (USACE 2009). In a natural ecosystem, features such as barrier islands and dunes protect coastal lands and property, and reduce danger to human life, stemming from flooding and erosion, while establishing habitats important to coastal species. This framework called for the reestablishment of five coastal processes that are critical to the development and sustainability of the various coastal features (such as beaches, dunes, barrier islands and bluffs), which together form the natural system. The five Coastal Processes identified by the Framework as vital to maintain the natural coastal features are: Longshore Sediment Transport; Cross Island Sediment Transport; Dune Development and Evolution; Estuarine Circulation; and Bayside Shoreline Processes (USACE 2009).

Project Features that contribute to coastal storm risk management through the reestablishment of the coastal processes are included at six locations as follow:

- Sunken Forest – Reestablishes coastal protective features by reestablishing the natural conditions of dune, upper beach and bay shoreline by removing bulkhead adjacent to marina and existing boardwalk, regrading and stabilizing disturbed areas using bioengineering and shoreline.
- Reagan Property – Reestablishes coastal protective features by improving natural conditions of dune, upper beach and shoreline by burying bulkhead, regrading and stabilizing disturbed areas using bioengineering, and creating intertidal areas.

- Great Gunn – Reestablishes salt marsh features by reestablishing hydrologic connections and disturbances.
- Tiana – Reestablishes the bay shoreline natural protective features by reestablishing the dune, salt marsh, and enhancing the SAV beds.
- WOSI – Reestablishes the bay shoreline natural protective features by reestablishing the existing salt marsh.

Corneille Estates – Reestablishes bay shoreline natural storm risk management features including bayside beach habitat.

D.3 EXISTING ENVIRONMENT

The following sections provide a description of the invertebrate, finfish, bird, mammal, amphibian, and reptile species/communities that are in the same area as the proposed action.

D.3.1 Marine Offshore Ecosystem

The borrow areas are within the Marine Offshore Ecosystem. The Marine Offshore Ecosystem includes the Marine Offshore habitat, which consists of the deeper water areas of the Atlantic Ocean within the study area. With the exception of sea turtles and birds, all biota associated with the Marine Offshore habitat are exclusively aquatic. Aquatic biota that utilize the Marine Offshore habitat primarily include fish and benthic invertebrates, as well as marine mammals.

D.3.1.1 *Physical Description*

The Marine Offshore habitat is an oceanic area with water depths ranging from 10 to 30 m. The habitat is relatively homogeneous throughout the entire southern Long Island coastline from Rockaway Inlet, through FIIS and east to Montauk Point. The habitat includes pelagic and benthic zones which support different assemblages of organisms. The pelagic zone refers to the water column and organisms within it, whereas the benthic zone refers to the bottom or substrate and includes sediments and other material present on the ocean floor. The benthic zone substrate is primarily sand within the study area. Through geotechnical analyses, sand suitable for beach nourishment has been identified within the borrow areas.

D.3.1.2 *Marine Invertebrates*

Marine benthic invertebrates are bottom-dwelling species that can be grouped into two categories: infaunal (i.e., benthic invertebrates living within the substrate) and epifaunal (i.e., benthic invertebrates living on the surface of the substrate). Benthic invertebrates are found in the substrate of the borrow areas. Polychaetes (segmented worms with bristles) are an important component of the benthic infaunal community; epifaunal biota include amphipods, crabs, horseshoe crabs (*Limulus polyphemus*), echinoderms (e.g., sea stars, sand dollars), and bivalves (e.g., surf scallops [*Aequipecten sp*.], surf clams [*Spisula solidissima*]). Marine invertebrates provide an important food source for bottom feeding fish and also include species that are commercially and recreationally important. The benthic invertebrates of the Marine Offshore habitat include a variety of taxa common to generally clean, well-oxygenated, coarse sandy marine habitats.

D.3.1.3 *Finfish*

The Marine Offshore habitat supports a variety of pelagic and benthic finfish, some of which are recreationally or commercially important. The pelagic zone contains few truly resident fish populations; rather it is dominated primarily by a variety of migratory and highly mobile species including red hake (*Urophycis chuss*), scup (*Stenotomus chrysops*), Atlantic butterfish (*Peprilus triacanthus*), bluefish (*Pomatomus saltatrix*), and striped bass (*Morone saxatilis*). Similarly, benthic fish species that occur in the Marine Offshore habitat are largely mobile and migratory; important benthic species include both summer flounder (*Paralichthys dentatus*) and winter flounder (*Pseudopleuronectes americanus*).

D.3.1.4 *Marine Mammals*

The pelagic zone also provides habitat for marine mammals. The harbor seal (*Phoca vitulina*), which is listed as a protected species by New York State is the only marine mammal expected to frequent the Marine Offshore habitat within the study area. Marine mammals such as the right whale (*Eubalaena glacialis*; Federally Endangered) and pygmy-sperm whale (*Kogia breviceps*) may also use this habitat from time to time. Gray seals (*Halichoerus grypus*) may also be found in this habitat

D.3.1.5 *Reptiles*

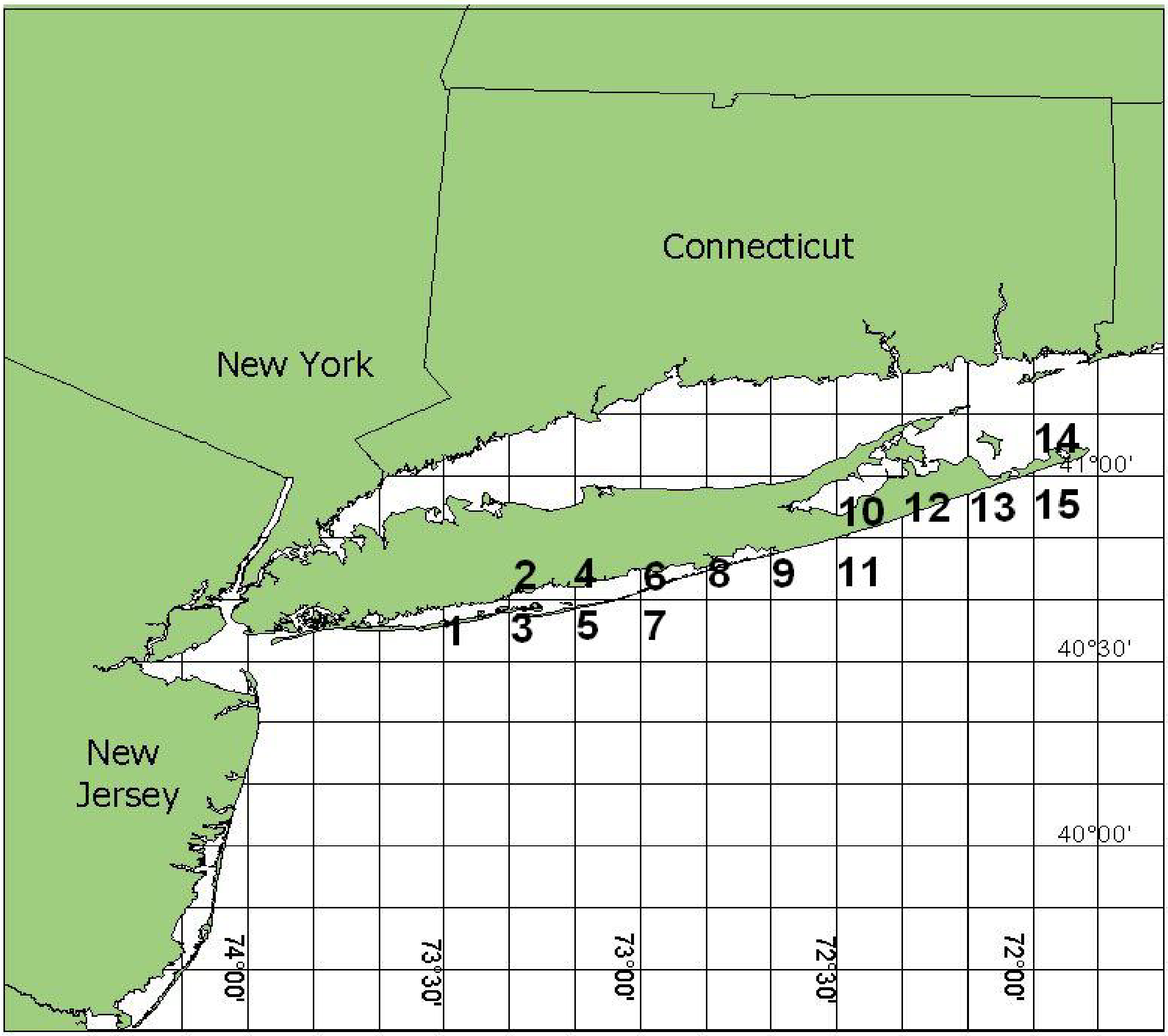
Several species of sea turtles, including Kemps Ridley turtle (*Lepidochelys kempii*, State and Federally Endangered), green sea turtle (*Chelonia mydas*; State and Federally Endangered), and loggerhead sea turtle (*Caretta caretta*; State and Federally Threatened) may also pass through the Marine Offshore habitat from time to time.

D.4 EFH SPECIES OVERVIEWS

This section describes the habitat requirements of the EFH-designated species, non-EFH designated fish and shellfish species that are important recreationally and commercially, and rare and endangered species that potentially occur within the project area. Specifically, Section D.4.1.1 provides individual species assessment of EFH-designated species.

D.4.1 EFH-Designated Species

EFH-designated species and life history stages in the project area were identified based on the lists in the NOAA Guide to EFH Designations in the Northeastern United States (NOAA 2008a) for the 10- minute by 10-minute areas of latitude and longitude (10’ by 10’ square) where project activity is proposed. The Study Area contains EFH for various life stages for up to 38 species of managed fish and protected invertebrate species. The NMFS has created a grid map overlay for areas that contain EFH within their jurisdiction, and provides species information for each species afforded EFH (NOAA 2008a). A map showing the fifteen grid squares associated with the Project study area and corresponding latitude and longitude coordinates is provided as Figure D-2. EFH descriptions for the species contained in the project area and life stages found within each grid square are provided in the below text. Species and life stages contained for each of the 15 grid squares within the project is provided as Attachment 1.



Source: NOAA 2008a

Figure D-2. Essential Fish Habitat Grids within the Project Study Area

D.4.1.1 *Bony Fishes*

Atlantic butterfish (*Peprilus triacanthus*)
Grid squares: 1-6, 8, 9, 10 All stages [Egg (E), Larvae (L), Juvenile (J), Adult (A)], 7 (E), 13 (L), 15 (J)

Primary Source: EFH Source Document by Cross et al. (1999)

All life stages are listed for Atlantic butterfish in the 10’ by 10’ squares. Butterfish are relatively small, fast-growing, short-lived, pelagic fish that form loose schools, often near the surface. Juveniles and adults are common in inshore areas, including the surf zone, as well as in sheltered bays and estuaries in the Mid-Atlantic Bight (MAB) during the summer and fall. Juveniles and adults are eurythermal and euryhaline, and are frequently found over sand, mud, and mixed substrates. Smaller juveniles often aggregate under floating objects and often live in the shelter of large jellyfish. Juvenile and adult butterfish in the MAB are typically found at depths ranging from 3 to 23 meters with water temperatures ranging from 8 to 26°C, salinities ranging from 19 to 32 ppt, and DO ranging from 3 to 10 mg/l. Butterfish eggs are buoyant and the larvae are nektonic.

Project Area: Juvenile and adult butterfish are common inhabitants of the water column in shallow water over sandy substrates in the MAB in the summer and fall and are therefore likely to occupy the project area during those seasons. However, butterfish are pelagic and even juveniles are highly mobile. In addition the dredging activities would be conducted in the late fall, winter and spring when Atlantic butterfish would less likely to be present. Therefore, no more than minimal impact to butterfish EFH is expected to occur as a result of the dredging activities associated with the proposed Project.

Atlantic salmon (*Salmo salar*)
Grid squares: 1-9 (A); 10 (J, A)

Primary Source: Page and Burr (1991)

Juvenile and adult Atlantic salmon are listed in the 10’ by 10’ grid squares within the project area. This species can be found in the temperate and arctic zones of the Atlantic Ocean in northern hemisphere. In the western Atlantic, they are distributed in coastal drainages from northern Quebec, Canada, to Connecticut, USA. In the eastern Atlantic, they are found in drainages from the Baltic States to Portugal. Accounts of landlocked stocks have been documented in Russia, Finland, Sweden, Norway, and North America. Atlantic salmon typically inhabit cooler waters (< 25°) with strong to moderate flow. Young remain in freshwater for 1 to 6 years, migrate to the ocean, and reside there for 1 to 4 years before returning to the river of their origin to spawn. After spawning, they return to sea. A diurnal species, juveniles feed mainly on aquatic insects, mollusks, crustaceans and fish, and adults at sea feed mainly on squid, shrimp, and fish. Adults approaching the reproductive stage do not feed once they enter the freshwater environment.

Project Area: These life stages of Atlantic salmon prefer colder waters (< 25°) and are generally observed in pelagic areas from Long Island Sound to the Gulf of Maine, which is outside the proposed dredging/nourishment areas. Therefore, little to no impact on Atlantic salmon or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Atlantic sea herring (*Clupea harengus*)
Grid squares: 1-6, 10-13 (J, A); 3 (A), 8 (L, J), 9 (J)

Primary Source: EFH Source Document by Stevenson and Scott (2005) –

Larvae, Juvenile and Adult Atlantic sea herring are listed in the 10' by 10' grid squares within the project area. The Atlantic herring is a small, pelagic, schooling, plankton-feeding species that inhabits both sides of the North Atlantic Ocean. Adult Atlantic sea herring migrate south into southern New England and mid-Atlantic shelf waters in the winter after spawning in the Gulf of Maine, on Georges Bank, and Nantucket Shoals. Juvenile and adult herring are abundant in coastal and mid-shelf waters from southern New England to Cape Hatteras in the winter and spring. In the spring, adults return north, but juveniles do not undertake coastal migrations. Larval herring are limited almost exclusively to Georges Bank and the Gulf of Maine waters. Larvae typically metamorphose the following spring into young-of-year (YOY) juveniles.

Project Area: Atlantic herring are pelagic species. During these life stages, Atlantic herring prefer higher salinities (26–32 ppt) and juveniles and adults (including spawning adults) are typically found at depths (15–130 meters) considerably deeper than the project depth. Therefore, no more than minimal impact on Atlantic sea herring or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Atlantic Mackerel (*Scomber scombrus*)
Grid squares: 1-6, 8, 9, 10 (All stages); 11E

Primary Source: EFH Source Document by Studholme, et. al. (1999)

All life stages of Atlantic mackerel are listed in the 10' by 10' grid squares within the project area. Atlantic mackerel are a fast swimming, pelagic schooling species that are distributed over the western Atlantic ocean in primarily open water. All life stages of this species are pelagic. EFH for this species is mostly pelagic waters over the Continental Shelf with salinities of greater than 25 ppt. However, Atlantic mackerel may be found in estuarine seawater zones. Juveniles may be found at varying levels of abundance in bays and estuarine areas from New Jersey north to Canada, and juveniles and adults are common in saline waters of the Hudson-Raritan estuary in the spring and fall. Atlantic mackerel are intolerant of temperatures below 5-6^{o}C or above 15-16^{o}C and undergo substantial seasonal migrations in response to changes in seawater temperature. In the fall Atlantic mackerel migrate to deeper offshore waters and return to inshore waters in the spring. Atlantic mackerel are opportunistic feeders that either select individual prey organisms or feed by filtering planktonic prey organisms when they are abundant. Juveniles eat mostly small crustaceans such as copepods, amphipods, mysid shrimp, and decapod larvae. They also feed on small pelagic mollusks (Spiratella and Clione) when available. Adults feed on the same food as juveniles but on a wider assortment of organisms and larger prey items. For example, euphausid, pandalid, and crangonid shrimp are common prey; chaetognaths, larvaceans, pelagic polychaetes and larvae of many marine species have been identified in Atlantic mackerel stomachs. Larger prey such as squid and a variety of fishes (silver hake, sand lance, herring, hakes, and sculpins) are not uncommon, especially for large Atlantic mackerel.

Project Area: In the fall Atlantic mackerel migrate to deeper offshore waters and would most likely not be present when in the dredging activities are to be conducted. All life stages of the Atlantic mackerel are pelagic and no more than minimal impact on Atlantic mackerel EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Black sea bass (Centropristis striata)
Grid squares: 1,2,4,8 (A); 3 (L,J); 6,9,13,15 (J,A); 10, 11, 12, 14 (J)

Primary Source: EFH Source Document by Drohan et al. (2007)

Adult black sea bass are usually strongly associated with structured, sheltering habitats such as reefs and ship wrecks on the continental shelf. Their distribution changes seasonally as fish migrate from coastal areas to the outer continental shelf while water temperatures decline in the fall and from the outer shelf to inshore areas as water temperatures rise in the spring. Adult sea bass are very structure oriented, especially during their summer coastal residency. Adults only enter larger estuaries and are most abundant along the outer Atlantic coast. Larger fish tend to be found in deeper water than smaller fish. Adults on the Atlantic coast occupy waters greater than 65 feet MLW in the fall and 260 to 460 feet MLW in the winter and spring. Spawning occurs on the continental shelf, beginning in the spring off Cape Hatteras and progressing into the fall in the MAB and off southern New England. When larvae reach 10 to 16 mm total length (TL), they tend to settle and become demersal on structured inshore habitat such as sponge beds. In the MAB, recently settled juveniles move into coastal estuarine nursery areas between July and September. The estuarine nursery habitat of YOY black sea bass is relatively shallow, hard bottom with some kind of natural or man-made structure including amphipod tubes, eelgrass, sponges, and shellfish beds with salinities above 8 ppt. Black sea bass do not tolerate cold inshore winter conditions. Following an overwintering period presumably spent on the continental shelf, older juveniles return to inshore estuaries in late spring and early summer. They are uncommon in open, unvegetated, sandy intertidal flats or beaches.

Project Area: Due to the absence of three-dimensional structures in the borrow areas adult black sea bass are unlikely to occupy the borrow areas in significant numbers. Black sea bass migrate to deeper waters on the outer continental shelf in the fall and return in the spring and would likely to not be present during the time of the dredging activities. Therefore, no more than minimal impact on black sea bass or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Bluefin tuna (*Thunnus thynnus*)
Grid squares: 3,5,6-9,11-15 (J,A)

Source: Colette and Nauen (1983)

Adult and juvenile bluefin tuna are listed in the 10’ by 10’ grid squares within the project area. Juvenile bluefin tuna are a migratory pelagic species. In the western North Atlantic, bluefin tuna migrate seasonally from spring spawning grounds in the Gulf of Mexico to summer feeding grounds off the northeast U.S. coast. Bluefin tuna often occur over the continental shelf and in embayments, particularly during the summer months when they feed actively on herring, mackerel, and squids. Juveniles and adults are typically found in inshore and pelagic surface waters warmer than 12^{o}C from the Florida to Maine.

Project Area: The dredging activities are proposed during the fall, winter and spring seasons when juvenile and adult bluefin tuna would not be present in the borrow areas. Therefore, little to no impact on bluefin tuna or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Bluefish (Pomatomus saltatrix)
Grid squares: 1-3,5,6,8,10,12-15(J,A); 4,7(J); 11 (E,J,A); 9 (L,J,A)

Source: EFH Source Document by Shepherd and Packer (2006)
Eggs, juvenile and adult life stages are listed for bluefish are listed in the 10' by 10' grid squares within the project area. Bluefish are a pelagic species that travel in schools of like-sized individuals and undertake seasonal migrations, moving into the MAB during spring and south or farther offshore during fall. Within the MAB they occur in large bays and estuaries as well as across the entire continental shelf. Bluefish spawn offshore in open ocean waters. Juvenile bluefish are found in estuaries, bays, and coastal ocean waters in the MAB and South Atlantic Bight in many habitats. Typically they are found near shorelines, including the surf zone, during the day and in open waters at night. Like adults, they are active swimmers and feed on small forage fishes, which are commonly found in nearshore habitats. They remain inshore in water temperatures up to 30^{o}C and return to the continental shelf in the fall when water temperatures reach approximately 15^{o}C. Juvenile bluefish are associated mostly with sand, but are also found over silt and clay bottom substrates. They usually occur at salinities of 23 to 33 ppt, but can tolerate salinities as low as 3 ppt. Adults are generally oceanic but are found near shore as well as offshore. Adults usually prefer warm water (at least 14 to 16^{o}C) and full salinity. Juveniles and adults are present in the fall and prefer depths greater than 35 feet MLW. Eggs and larvae are present in the MAB during the summer and are more commonly found at depths greater than 100 feet MLW.

Project Area: Juvenile and adult bluefish are pelagic species and are expected to occupy the water column of the project area between the spring, summer and fall. Bluefish eggs and larvae would are not expected to occur in the project area. The dredging activities are proposed during the fall, winter and spring seasons when juvenile and adult bluefish would less likely to be present in the borrow areas. Therefore, no more than minimal impact to bluefish or EFH within the project area is expected to occur as a result of the dredging activities associated with the proposed Project.

Cobia (*Rachycentron canadum*)
Grid squares: 1-15 (All stages)

Primary Sources: Richards (1967), National Audubon Society (1983)

All life stages for cobia are listed in the 10' by 10' grid squares within the project area. Cobia is a southern species that overwinters near the Florida Keys and migrates in the spring and summer to the mid-Atlantic states to spawn. Adults are rarely found as far north as Massachusetts. EFH for this species is the South Atlantic and mid-Atlantic Bights. Cobia prefer coastal waters to the edge of the Continental Shelf and along the edge of the Gulf Stream around sandy shoals, offshore bars, high profile rock bottoms, barrier island ocean-side waters and coastal inlets. EFH for cobia has also been designated within high salinity bays, estuaries and seagrass habitat. Cobia are found in water temperatures that are greater than 20°C.

Project Area: Cobia are pelagic, warm water species and would only be found in the project area during the summer. This species is mobile, not demersal and, therefore, adults and juveniles would not subject to potential entrainment. The project area is the northern temperature limit for this species, therefore an occasional adult cobia may occur in the borrow areas during the summer, but other life history stages of this species are not likely to be found at the project area. The dredging activities are proposed during the fall, winter and spring seasons when the water temperatures are too cold for cobia to be present. Therefore, little to no impact to cobia or EFH is expected as a result of the proposed dredging activities associated with proposed Project.

Haddock (*Melanogrammus aeglefinus*)
Grid squares: 8,11,12,15 (L)

Primary Sources: EFH Source Document by Cargnelli et al. (1999d)

The larvae stage for Haddock are listed in the 10' by 10' grid squares within the project area. Larvae range in size from 2.0-4.99 mm in length. Haddock initially inhabit the upper reaches of the water column, feeding on pelagic prey (zooplankton). Larvae and early stage (pelagic) juveniles are passive foragers on less motile prey such as invertebrate eggs, copepods and phytoplankton. Juveniles undergo a transformation at age 3 to 5 months, after which they are closely associated with the bottom and feed on benthic prey. The egg and larval stages occur in the water column at depths of 10-50 m below the surface. Temperatures of 4-10^{o}C and high salinities, 34-36 ppt are preferred.

Project Area: Haddock larvae are not very mobile, and pelagic. Larvae density peaks in April and May. They may be present during with the project area; however, most of the larvae are likely to be encountered at greater depths (30-50 m). Therefore, minimal impact is expected to Haddock.

King and Spanish mackerel (*Scomberomorus cavalla and S. maculatus*)
Grid squares: 1-15 (All stages)

Primary Sources: Godcharles and Murphy (1986), Collette and Nauen (1983)

All life stages are listed for the King and Spanish mackerels are listed in the 10' by 10' grid squares within the project area. King and Spanish mackerels are highly migratory, epipelagic, neritic fish that migrate north from Florida as far as the Gulf of Maine in the summer and fall. King mackerel spawn in coastal waters of the Gulf of Mexico and off the South Atlantic coast. Thus, only a few adults of this species would be expected to inhabit MAB coastal waters. In contrast, Spanish mackerel spawn as far north as Sandy Hook and Long Island in late August to late September. King and Spanish mackerel are found in water temperatures that are greater than 20°C.

Project Area: Due to the migratory and epipelagic nature of the Spanish and king mackerels and their regional distribution pattern, it is unlikely that adult Spanish and king mackerels will pass through the project area, and occurrences of early life stages of these species would be rare in the project area. The dredging activities are proposed during the fall, winter and spring seasons when the water temperatures are too cold for king and Spanish mackerel to be present. Therefore, little to no impact to king and Spanish mackerel or EFH is expected as a result of the proposed dredging activities associated with proposed Project.

Monkfish (*Lophius americanus*)
Grid squares: 1-15 (E,L)

Primary Source: EFH Source Document by Steimle et al. (1999a)

The egg and larvae life stages of the monkfish (also known as goosefish) are listed in the 10' by 10' grid squares within the project area. Monkfish are solitary fish that make seasonal onshore–offshore migrations in response to water temperature and can be found over a variety of substrates. Spawning locations are not well known but are thought to be on inshore shoals and in offshore SNE, MAB, and Gulf of Maine shelf waters. Monkfish eggs are contained in long mucus veils that float at or near the surface between March and September and are found in waters ranging from 15 to 1000 m deep. They are rarely collected in surveys but have been reported in open coastal bays and sounds (e.g., Long Island Sound) in low numbers. Monkfish larvae are a common component of the ichthyoplankton community in the MAB and southern New England (SNE) areas. Larvae have been collected in offshore waters in the MAB during March and April and are most often observed in water depths between 25 and 1000 m. Larvae have been found off southern New Jersey, south of Long Island, in the MAB at depths of 30 to 300 feet MLW, and off SNE.

Project Area: Based on their range of habitat utilization, and that these life stages are not typically found in waters of depths < 15 meter. The dredging activities are proposed during the fall, winter and spring seasons when the likelihood of monkfish eggs and larvae occurring in the borrow areas is minimal. Therefore, no more than minimal impact on monkfish or EFH is anticipated as a result of the proposed dredging activities associated with proposed Project.

Ocean pout (*Macrozoarces americanus*)
Grid squares: 1-3,5,7-13,15 (E,L)

Primary Source: EFH Source Document by Steimle et al. (1999d)

Eggs and larvae of Ocean pout are listed in the 10' by 10' grid squares within the project area. Ocean pout is a bottom-dwelling species that occurs in cool waters (< 10^{o}C) across the continental shelf from Labrador to Cape Hatteras It is non-migratory, but it will move seasonally to remain at preferred temperatures. The eggs are demersal and laid in gelatinous masses in a sheltered place on the bottom, such as rocky crevices, where they are guarded either by one or both parents until hatching. Egg development is about 2-3 months, but incubation time is temperature dependent and is shorter in the warmer MAB. Most of the population spawns in the fall and hatching occurs by mid-winter. The larvae are about 30 mm long at hatching and are relatively advanced in development. Adult ocean pout remain demersal and are not known to form schools or aggregations. In the Middle Atlantic Bight, ocean pout uses rocky habitats during some seasons. Adult ocean pout feed on a variety of benthic invertebrates, including polychaetes, mollusks, crustaceans, and echinoderms. Although ocean pout moves seasonally among habitats within a region, this species is considered nonmigratory.

Project Area: Ocean pout eggs and larvae would be found in the project area. Because the eggs and larvae are demersal, it is likely that they would be impacted by dredging operations.

Pollock (*Pollachius virens*)
Grid squares: 1-6,10 (J)

Primary Source: EFH Source Document by Cargnelli et al. (1999b)

Juvenile pollock are listed in the 10' by 10' grid squares within the project area. EFH for this species includes the waters from the Gulf of Maine south to New Jersey. This demersal species prefers colder (<18°C) pelagic waters and are observed from surface depths to 365 meters. Individuals normally spend their first two years in nearshore coastal waters and then migrate out to deeper waters. Juvenile pollock are found over a variety of bottom habitats with aquatic vegetation or a substrate of sand, mud or rocks. Juveniles feed primarily on crustaceans with nematodes, fish and annelids also making up a portion of their diet.

Project Area: Juvenile pollock will likely occupy the project area when water temperatures are less than 18°C. The dredging activities are proposed during the fall, winter and spring seasons when juvenile pollock are likely to be present. This species is heavily fished commercially and has demonstrated ongoing resilience therefore, no more than minimal impact on pollock or EFH is anticipated to occur within the proposed project area.

Red hake (*Urophycis chuss*)
Grid squares: 1,3,5,8-11,13,15 (E,L,J); 7(E,L); 6(J)

Primary Source: EFH Source Document by Steimle et al. (1999b)

Red hake eggs, larvae and juveniles are listed in the 10' by 10' squares for grid squares within the project area. Red hake occur in continental waters from the Gulf of St. Lawrence to the mid-Atlantic States. Red hake spawn offshore in the MAB in the summer, primarily in southern New England. The distribution of eggs is unknown because they cannot be distinguished from other hakes. However, EFH for eggs is defined as surface temperatures less than 10°C and salinity less than 25 ppt. Hake eggs are buoyant and are common in the upper water column of the MAB from May to November with peaks in June and July. Red hake larvae are a dominant species in the ichthyoplankton in the middle to outer continental shelf of the MAB during the summer at temperatures of 8 to 23°C and depths between 10 and 200 m. After larvae metamorphose into juveniles they are pelagic for about two months before settling to the bottom. Demersal settlement generally occurs between September and December with peaks in October to November. Juveniles are found in bottom environments and are commonly associated with scallops, surf clam shells, and seabed depressions where they seek shelter. Red hake juveniles are typically found in water temperatures below 16° C, depths less than 100 meters and a salinity range from 31 to 33 ppt. Adults prefer depths from 100 to 425 feet and temperatures between 2 to 22°C. Adults are typically associated with sand-mud bottom in holes and depressions. Both juveniles and adults make seasonal migrations in response to changes in water temperatures.

Project Area: Although red hake eggs (including eggs of other hake species) are found in the project area from May to November they are buoyant and would therefore not be present on the bottom where the dredging activities would take place. Red hake larvae are pelagic and would also not be present on the bottom where the dredging activities would take place. Juvenile red hake would be present in the bottom habitats during the time of year when the dredging activities are proposed and could therefore be impacted by the dredging activities.

Scup (*Stenotomus chrysops*)
Grid squares: 1-9, 11-15(J,A); 10(All stages)

Source: EFH Source Document by Steimle et al. (1999c)
The juvenile and adult life stages for scup are listed in the 10' by 10' grid squares within the project area. Scup spawn along the inner continental shelf from Delaware Bay to SNE between May and August, mainly in bays and sounds in and near SNE. YOY juveniles are commonly found from the intertidal zone to depths of about 30 m in portions of bays and estuaries where salinities are above 15 ppt. Juvenile scup appear to use a variety of coastal intertidal and subtidal sedimentary habitats during their seasonal inshore residency, including sand, mud, mussel beds, and eelgrass beds. Adult scup are common residents in the MAB from spring to fall and are generally found in schools on a variety of habitats, from open sandy bottom to structured habitats such as mussel beds, reefs or rough bottom. Larger adults are found in deeper waters while smaller sized adults are typically found in bays and estuaries. Adults move inshore during early May and June between Long Island and Delaware Bay. As inshore water temperatures decline to < 8 to 9^{o}C adult and juvenile scup leave inshore waters and move to warmer waters on the outer continental shelf south of the Hudson Canyon off New Jersey and along the coast from south of Long Island to North Carolina in depths ranging from 75- 185 m. Both juvenile and adults are demersal but have also been observed at the water surface.

Project Area: Adult and juvenile scup would be found in the borrow areas during the warmer seasons but migrate offshore to deeper waters when the water temperature falls. The dredging activities are proposed during the fall, winter and spring seasons when juvenile and adult scup are less likely to be present. Therefore, no more than minimal impact on scup or EFH is anticipated as a result of the proposed project.

Skipjack tuna (*Katsuwonus pelamis*)
Grid squares: 1,3-13,15(A)

Source: Colette and Nauen (1983)

Adult skipjack tuna are listed in the 10' by 10' grid squares within the project area. Skipjack tuna are a highly migratory, circumglobal pelagic fish that inhabit tropical and warm-temperate waters and are generally limited by the 15°C isotherm. Skipjack tuna are often found in mixed schools with bluefin tuna of the same size. Like bluefin tuna, skipjack tuna often occur over the continental shelf and in embayments, particularly during the summer months when they feed actively on herring, mackerel, and squid. In the MAB, adults typically occur in pelagic waters where water temperatures range from 20 to 31°C.

Project Area: Skipjack tuna are highly migratory and pelagic, and may be present in the project area during the warmer summer months when the water temperature is above 20°C. The dredging activities are proposed during the fall, winter and spring seasons when adult skipjack tuna are not likely to be present. Therefore no impact on skipjack tuna or EFH is anticipated as a result of the proposed project.

Summer flounder (*Paralichthys dentatus*)
Grid squares: 1-4,11,14 (J,A); 7,12,13,15 (A); 5,10 (L,J,A); 6,8,9 (All stages)

Primary Source: EFH Source Document by Packer et al. (1999)
Larvae, juvenile and adult summer flounder are listed in the grid squares within the project area. Summer flounder exhibit strong inshore–offshore movements with adult and juveniles normally inhabiting shallow coastal and estuarine waters during the warmer months of the year and moving offshore during the fall and winter. Summer flounder eggs are planktonic and buoyant. Summer flounder eggs were collected in the highest numbers from fall to early winter. Planktonic larvae and post-larvae derived from offshore fall and winter spawning migrate inshore, entering coastal and estuarine nursery areas to complete transformation. Juveniles are distributed inshore and occupy many estuaries during spring, summer, and fall. Some juveniles remain inshore for an entire year before migrating offshore, while others move offshore in the fall and return the following spring. Juvenile summer flounder utilize several different estuarine habitats such as marsh creeks, seagrass beds, mud flats, and open bay areas. As long as other conditions are favorable, substrate preferences and prey availability are the most important factors affecting distribution. Some studies indicate that juveniles prefer mixed or sandy substrates, others show that mud and vegetated habitats are used. Adults are reported to prefer sandy habitats, but can be found in a variety of habitats with both mud and sand substrates. Habitat areas of particular concern (HAPC) for summer flounder include, “All native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH is HAPC. If native species of SAV are eliminated then exotic species should be protected because of functional value, however, all efforts should be made to reestablish native species.”

Project Area: Given their association with sandy substrates and the fact that they feed on a variety of bottom-dwelling invertebrates and fish species that occupy the project area, juvenile and adult summer flounder are expected to occupy the project area during the late spring, summer and fall. Early stage juveniles may be present year round. Older juveniles and adults are wary and very capable of high degrees of mobility and would likely avoid the dredge by swimming away. Small juveniles tend to seek protection in structure or by “hiding in plain sight” via cryptic coloration. Juveniles in the path of the dredge might be impacted. Because the project area does not offer SAV or other types of cover large numbers of early stage juveniles are not expected. Therefore, no more than minimal impact on summer flounder or EFH is anticipated as a result of the proposed dredging activities associated with proposed Project.

Whiting (*Merluccius bilinearis*)
Grid squares: 1,3,5-9,11,13-15(E,L,J); 10 (All stages); 12 (E,L)

Primary Source: EFH Source Document by Lock and Packer (2004)

Egg, larval and juvenile life stages for whiting are listed for the 10’ by 10’ grid squares within the project area. Whiting, or silver hake, spawn on the outer continental shelf where eggs and larvae are primarily found in surface waters. Primary spawning grounds apparently occur between Cape Cod and Montauk Point, New York, on the southeastern slope of Georges Bank, and in Massachusetts Bay. Significant egg production occurs during May to October, with a peak in August. Whiting eggs are pelagic and hatch in about two days. Juveniles are common during spring and summer in relatively shallow waters in SNE and south of Long Island. Coastal waters off New Jersey, Long Island, and Rhode Island are centers of abundance in the fall. During spring and summer, whiting move into nearshore waters in the Gulf of Maine, to the northern edge of Georges Bank, and northward in the Middle Atlantic Bight. Juvenile and adult whiting migrate to deeper waters of the continental shelf as water temperatures decline in the autumn and return to shallow waters in spring and summer to spawn. The pattern for juveniles is similar to adults in general distribution and movements, except that the centers of juvenile abundance occur in shallower waters. Generally, the following conditions exist where most whiting juveniles are found: water temperatures below 21° C, depths between 20 and 270 meters and salinities greater than 20‰. Juveniles as well as adults utilize bottom habitats of all substrate types.

Project Area: Eggs and larvae are typically dispersed in deeper water, and therefore are not likely to occur in the project area in significant numbers. Based on their range of habitat utilization, juvenile whiting can be expected to occupy the bottom habitats in project area in the spring and summer. The dredging activities are proposed during the fall, winter and spring seasons when juvenile whiting would be less likely to be present in the project area. Therefore, no more than minimal impact on whiting or EFH is anticipated as a result of the dredging activities associated with proposed Project.

Windowpane flounder (*Scophthalmus aquosus*)
Grid squares: 1-12,15 (All stages); 13 (E,J,A); 14 (J,A)

Primary Source: EFH Source Document by Chang et al. (1999)

All life stages for windowpane flounder are listed in the 10' by 10' grid squares within the project area. Windowpane flounder are a shallow water mid- and inner-shelf species found primarily between Georges Bank and Cape Hatteras on bottom habitats with a substrate of mud or fine grained sand. Spawning occurs on inner shelf waters, including many coastal bays and sounds, and on Georges Bank. Windowpane flounder eggs and larvae are often observed in the MAB from February to November with peaks in May and October. Windowpane eggs are buoyant and are found in surface waters. Larvae are initially planktonic then settle to the bottom. Juveniles and adults are similarly distributed. They are found in most bays and estuaries south of Cape Cod throughout the year at depths less than 100 meters, bottom temperatures (3 to 12°C in the spring and 9 to 12°C in the fall), and salinities (5.5 to 36 ppt). Juveniles that settle in shallow inshore waters move to deeper offshore waters as they grow. Adults occur primarily on sand substrates off SNE and MAB. Juveniles and adults are common in the MAB throughout the year. YOY and older juveniles are common within 100 feet of shore.

Project Area: Juvenile and adult windowpane are commonly found on shallow, sandy substrates and are expected to occupy the project area throughout the year. Since this species spawns in inner shelf and nearshore waters, eggs and larvae are expected be found in the project area at all time of the year except during the winter. Smaller, YOY juveniles prefer shallow water, and therefore are less likely to occupy the project area than adults and older juveniles. No more than minimal impact to windowpane or EFH within the project area is expected to occur as a result of the dredging activities associated with the proposed Project.

Winter flounder (*Pseudopleuronectes americanus*)
Grid squares: 1-15 (All stages)

Primary Source: EFH Source Document by Pereira et al. (1999)

All life stages for winter flounder are listed in the 10’ by 10’ grid squares within the project area. Winter flounder are a small-mouthed, right-eyed flounder that is a valuable commercial and recreational species. They are found in the northwest Atlantic coast from Labrador to Georgia. Winter flounder spawning occurs from late winter through early spring, peaking south of Cape Cod in February and March. The eggs of the winter flounder are typically found at depths of less than five meters in bottom habitats in a broad range of salinity (10–30 ppt), with seasonal abundance from January to May. Eggs are adhesive and demersal and are deposited on a variety of substrates, but sand is the most common; they have been found attached to vegetation and on mud and gravel. The larvae of the winter flounder are typically found at depths of less than six meters in pelagic and bottom waters in a broad range of salinity (10–30 ppt), with seasonal abundance from March to July. Larvae are negatively buoyant and nondispersive; they sink when they stop swimming. Thus, recently settled YOY juveniles are found close to spawning grounds and in high concentrations in depositional areas with low current speeds. YOY juveniles migrate very little in the first summer, move to deeper water in the fall, and remain in deeper cooler water for much of the following year. Habitat utilization by YOY is not consistent across habitat types and is highly variable among systems and from year to year. Several field and lab studies suggest a “preference” for muddy/fine sediment substrates where they are most likely to have been deposited by currents. Adult winter flounder prefer temperatures of 12 to 15° C; DO concentrations greater than 2.9 mg/l, and salinities above 22 ppt, although they have been shown to survive at salinities as low as 15 ppt. Mature adults are found in very shallow waters during the spawning season.

Project Area: The sandy habitat of the borrow areas may provide suitable spawning habitat for this species. In addition, winter flounder would also spawn on the neighboring shoal areas. Due to their range of habitat utilization, juveniles may also be found in the borrow areas throughout the year. Adults are expected to occupy the borrow areas during the fall, winter, and spring, and migrate offshore during the summer. Winter flounder would be expected to be present on the bottom habitats while dredging activities are proposed to take place. Adults and larger juveniles may be able to avoid the hydraulic dredge by swimming away. However, if present, eggs and larvae would most likely be entrained by the hydraulic dredge.

Witch flounder (*Glyptocephalus cynoglossus*)
Grid squares: 11,12,15 (L); 8,9(E)

Primary Source: EFH Source Document by Cargnelli et. al. (1999e)
Eggs and larvae life stages of witch flounder are listed in the 10' by 10' grid squares within the project area. Spawning occurs at or near the bottom, however the buoyant eggs rise into the water column where subsequent egg and larval development occurs. In the MAB spawning occurs from April to August, peaking in May or June and the most important spawning grounds are off Long Island. The main food items in the witch flounder diet are polychaetes and crustaceans, although mollusks and echinoderms are also important. The witch flounder is a deep water fish inhabiting depths down to approximately 1500 m. The egg and larval stages are pelagic, generally over deep water, at temperatures ranging from about 4 to 13oC. When metamorphosis is complete, juveniles settle to the bottom. Juveniles and adults are found at temperatures ranging from about 0 to 15ºC. They are found over mud, clay, silt, or muddy sand substrates at depths ranging from 20 to 1565 m. This close association with soft substrate may be the result of their preference for polychaete prey.

Project Area: Although eggs and larvae life stages of Witch flounder may be found within the project area, eggs are pelagic and larvae are pelagic until eye development occurs and they become demersal. Because of their preference for muddy bottoms, they would not likely be found in the clean sand areas that would be used for dredging. Thus, the witch flounder would not likely be impacted by dredging operations.

Yellowtail flounder (*Limanda ferruginea*)
Grid squares: 5,7,13 (E,A); 12 (E,L); 3 (E); 9,11,15 (All stages); 8 (E,L)

Primary Source: EFH Source Document by Johnson et al. (1999)

All life stages for yellowtail flounder are listed in the grid squares within the project area. The yellowtail flounder is a small- mouthed, thin bodied fish that inhabits waters along the Atlantic coast of North America from the Gulf of St. Lawrence, Labrador, and Newfoundland to the Chesapeake Bay. Yellowtail flounder occupy continental shelf bottom environment on the Atlantic coast between depths typically being from 20 to 50 meters. Adults prefer sand or sand–mud sediments. Spawning takes place from March through August, but occurs during March to May in the MAB. Generally, the following conditions exist where yellowtail eggs are found: sea surface temperatures below 15° C, water depths from 30 to 90 meters and a salinity range from 32.4 to 33.5 ppt. Yellowtail flounder eggs are most often observed during the months from mid-March to July, with peaks in April to June in southern New England. Eggs are buoyant, spherical and are pelagic. Larvae are initially pelagic then become benthic.

Project Area: Based on their range of habitat utilization, all life stages for yellowtail flounder can occur in the project areas. Yellowtail flounder would be expected to be present on the bottom habitats while dredging activities are proposed to take place. Adults and larger juveniles may be able to avoid the hydraulic dredge by swimming away. However, if present, eggs and larvae would most likely be entrained by the hydraulic dredge.

Yellowfin Tuna (*Thunnus albacares*)
Grid squares: 15 (J,A)
Source: USDOC (1999b)

Juvenile and adult yellowfin tuna are listed in the 10' by 10' grid squares within the project area. Atlantic yellowfin tuna are circumglobal in tropical and temperate waters. In the west Atlantic they range from 45° N to 40° S. Yellowfin tuna is an epipelagic, oceanic species, found in water temperatures between 18° and 31° C. It is a schooling species, with juveniles found in schools at the surface, Larger fish are found in deeper water and also extend their ranges into higher latitudes. Atlantic yellowfin tuna are opportunistic feeders. Stomachs have been found to contain a wide variety of fish and invertebrates Yellowfin tuna are believed to feed primarily in surface waters down to a depth of 100 m.

Project area: Yellowfin Tuna are highly migratory and epipelagic, and may be present in the project area. No impact on yellowfin tuna or EFH is anticipated as a result of the proposed project.

D.4.1.2 *Cartilaginous Fishes*

Basking shark (*Cetorhinus maximus*)
Grid squares: 13, 15 (J)
Source: USDOC (1999b)

Late juvenile life stages for the basking shark are listed in the 10' by 10' grid squares within the project area. The basking shark is the second largest fish in the world, and is a filter-feeding plankton eater. It is a migratory species of the subpolar and cold temperate seas throughout the world, spending the summer in high latitudes and moving into warmer water in winter. In spite of its size and local abundance in summer, its habits are very poorly known. Late juvenile basking sharks are found offshore the mid-Atlantic United States south of Nantucket Shoals at 70° W to the north edge of Cape Hatteras, NC at 35.5° N in waters 50 to 200 m deep; associated with boundary conditions created by the western edge of the Gulf Stream.

Project Area: EFH is designated within the project grid for basking shark late juveniles. Basking sharks are a cosmopolitan migratory, slow-moving pelagic species and will most likely be able to avoid the hydraulic dredge. Therefore, little to no impact to basking shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Blue shark (*Prionace glauca*)
Grid squares: 3,5,7,9,11,13,14,15 (L,J,A); 1,2,4,10,12(A); 6,8 (L,A)

Source: USDOC (1999b) and Compagno (1984)

Early juvenile, late juvenile and adult life stages for the blue shark are listed in the 10' by 10' grid squares within the project area. Blue shark is an oceanic–epipelagic, fringe–littoral, cosmopolitan species, occurring throughout the tropical, subtropical, and temperate open waters. Atlantic blue sharks are highly migratory with a regular clockwise trans-Atlantic migration route following the warm Gulf Stream waters. The general range of blue shark is from Argentina to Newfoundland in the western Atlantic. The temperature preference of blue shark is between 7 to 18°C.

Project Area: EFH is designated within the project grid for blue shark early juveniles, late juveniles, and adults. Blue sharks are a pelagic, highly mobile species and will most likely be able to avoid the hydraulic dredge. Therefore, little to no impact to blue shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Common Thresher Shark (*Alopias vulpinus*)
Grid squares: 3,5,7,9,11,13,15 (L,J,A)

Source: USDOC (1999b)

Early juvenile, late juvenile and adult life stages for the common thresher shark are listed in the 10' by 10' grid squares within the project area. The common thresher shark is cosmopolitan in warm and temperate waters. It is found in both coastal and oceanic waters. It is a large shark that uses its tremendously large tail to hit and stun the small schooling fishes upon which it feeds. Common thresher shark is found Offshore Long Island, NY and southern New England in the northeastern United States, in pelagic waters deeper than 50 m, between 70° W and 73.5° W, south to 40° N.

Project Area: EFH is designated within the project grid for common thresher shark early juveniles, late juveniles, and adults. Common thresher sharks are a pelagic, highly mobile species and will most likely be able to avoid the hydraulic dredge. Additionally, they are typically encountered at greater depths than where dredging will occur. Therefore, little to no impact to common thresher shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Dusky Shark (*Carcharhinus obscurus*)
Grid squares: 1,3,5-9, 11,12,14,15 (L,J); 2,4,10,13 (L)

Source: USDOC (1999b) and Compagno (1984)

Early juvenile and late juvenile life stages for the dusky shark are listed in the 10' by 10' grid squares within the project area. The dusky shark is a large, highly migratory species that is common in warm and temperate continental waters throughout the world. Although nursery areas are in coastal waters, dusky sharks do not prefer areas with reduced salinities and tend to avoid estuaries. Dusky sharks are viviparous. Females move inshore to drop their young and then return to deeper water.

Project Area: Although migratory and pelagic, dusky sharks spawn in nearshore waters, and therefore juveniles may occur in the project area. Juvenile dusky sharks are a mobile species and will most likely be able to avoid the hydraulic dredge. No more than minimal impact to dusky shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Sand tiger shark (*Carcharias taurus*)
Grid squares: 1-15(L)

Source: Compagno (1984) and USDOC (1999b)

The early juvenile life stage for the sand tiger shark is listed in the 10' by 10' squares for both borrow areas. Sand tiger sharks are commonly found in coastal embayments and nearshore waters from the surf zone to the outer continental shelves from the surface to a minimum of 600 feet. This species exhibits a preference for near-bottom habitats but often occurs in midwater or surface zones. Sand tiger sharks typically feed on bony fishes, small sharks, rays, squids, crabs, and lobsters. EFH for early juveniles (≤125 cm) is shallow coastal waters to 25 meters deep from Barnegat Inlet, NJ south to Cape Canaveral, FL.

Project Area: Early juvenile sand tiger sharks can be present in the near-bottom habitats as well as other parts of the water column in the location of the three borrow areas. Early juvenile sand tiger sharks are a mobile species and will most likely be able to avoid the hydraulic dredge. No more than minimal impact to sand tiger shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Sandbar shark (*Carcharinus plumbeus*)
Grid squares: 1-15 (L,J,A)

Source: Compagno (1984) and USDOC (1999b)

Early juvenile, late juvenile and adult life stages for the sandbar shark are listed in the 10' by 10' grid squares within the project area. The sandbar shark is an abundant, coastal–pelagic shark of temperate and tropical waters that occurs inshore and offshore. It is found on continental and insular shelves and is common at bay mouths, in harbors, inside shallow muddy or sandy bays, and at river mouths, but tends to avoid sandy beaches and the surf zone. Sandbar sharks migrate north and south along the Atlantic coast, reaching as far north as Massachusetts in the summer. Sandbar sharks bear live young in shallow Atlantic coastal waters between Great Bay, New Jersey, and Cape Canaveral, Florida. The young inhabit shallow coastal nursery grounds during the summer and move offshore into deeper, warmer water in winter. Late juveniles and adults occupy coastal waters as far north as southern New England and Long Island.

Project Area: Habitat preference and distribution of this species make it possible that adults and juveniles may occur at the project site. Sandbar sharks are a mobile species and will most likely be able to avoid the hydraulic dredge. No more than minimal impact to sandbar shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Shortfin mako shark (*Isurus oxyrichus*)
Grid squares: 1,12,14(J); 3,5,7,11,15 (L,J,A); 8,9,13 (L,J)

Sources: Compagno (1984) and USDOC (1999b)

Early juvenile, late juvenile and adult life stages for the shortfin mako shark are listed in the grid squares within the project area. Shortfin mako shark is a common, extremely active, offshore littoral and epipelagic species found in tropical and warm temperate waters that is seldom found in waters below 16°C. In the extreme northern and southern parts of its range, this species migrates with warm water masses in the summer. Very little is known about the life history of this species, but nursery areas are believed to be located in deep tropical waters.

Project Area: Habitat preference and distribution of this species make it possible that adults and juveniles may occur at the project site. Shortfin mako sharks are a mobile species and will most likely be able to avoid the hydraulic dredge. No more than minimal impact to shortfin mako shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Spiny dogfish (*Squalus acanthias*)
Grid squares: 14 (J,A); 15(J)

Source: Stehlik 2007

Birth occurs offshore in fall or winter. The pups at birth range from 20-33 cm in total length, with the majority at 26-27 cm. Spiny dogfish feed on squid and fish throughout life. They tend to eat small size classes or young fish, and as they grow they eat larger individuals of the same species. Squid are a major part of the diet in all geographical areas except for the Mid-Atlantic. Worldwide, spiny dogfish favor the temperature range of 7-15°C . Migrations may be over great distances in order to seek out preferred conditions. The mean salinity in locations where they are caught is 33.5 ppt. Large females are abundant on the nearshore shelf and in lower salinities, perhaps to allow maximal growth of their embryos in warmer coastal waters. Juveniles are mainly pelagic and oceanic. Adults are demersal and pelagic, and spawning adults are pelagic or demersal on the outer continental shelf.

Project Area: Juvenile and adult Spiny dogfish may be present if the project area. However, they are mobile and would not likely be impacted by dredging operations.

Tiger shark (*Galeocerdo cuvieri*)
Grid squares: 3,5,6-9,11-13,15 (L,J); 10 (J); 1 (L)

Sources: Compagno (1984) and USDOC (1999b)

Early juvenile and late juvenile life stages for the tiger shark are listed in the 10’ by 10’ grid squares within the project area. Tiger sharks typically inhabit tropical and sub-tropical waters on or adjacent to the continental and insular shelves and makes seasonal migrations into warm temperate waters. This species occupies different marine habitats, but seems to prefer turbid waters. The nurseries for this species appear to be in offshore areas, but have not been described.

Project Area: Habitat preference and distribution of this species make it possible that juvenile tiger shark may occur at the project site. Tiger sharks are a mobile species and will most likely be able to avoid the hydraulic dredge. No more than minimal impact to tiger shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

White shark (*Carcharodon carcharias*)
Grid squares: 3,5-13,15(J)

Sources: Compagno (1984) and USDOC (1999b)

The late juvenile life stage for the white shark is listed in the 10' by 10' grid squares within the project area. EFH for these large, apex predators includes pelagic northern New Jersey and Long Island waters of depths between 25 and 100 meters. The white shark is a cosmopolitan, non-schooling species that is primarily a coastal and offshore inhabitant of continental and insular shelves. This species is often found close inshore to the surf line but may also occur off oceanic islands. White sharks typically feed on bony fishes, other sharks, rays, seals, dolphins and porpoises, sea birds, carrion, cephalopods, crabs and whales.

Project Area: Habitat preference and distribution of this species make it possible that late juvenile white shark may occur at the project site. White sharks are a highly mobile species and will most likely be able to avoid the hydraulic dredge. Therefore, no impact to white shark or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

D.4.1.3 *Invertebrate Species*

Atlantic surf clam (*Spisula solidissima*)
Grid squares: 1,3,5,7,13,15 (J,A); 9,11 (A)

Primary Source: EFH Source Document by Cargnelli et al. (1999b)

Juvenile and adult life stages for the Atlantic surf clam are listed in the 10' by 10' grid squares within the project area. Surf clams are the largest bivalve in the mid-Atlantic Bight and are found from the Gulf of Maine to Cape Hatteras, North Carolina. Water currents are responsible the distribution and settlement of juvenile clams. Surf clams generally occur from the beach zone to a depth of about 200 feet, but beyond about 125 feet abundance is low. Surf clams are mostly oceanic and their distribution is limited by salinity. They prefer turbulent waters at the edge of the breaker zone but can be found in some estuarine areas. Juvenile clams prefer medium- to fine-grained sands that contain low levels of organics. Adults prefer medium- to coarse-grained sand and gravel and bury themselves just below the sediment surface. Surf clams are filter feeders and feed on plankton during all life stages. They have two temperature- dependent spawning periods; the first occurs in mid-July and continues through early August, and the second begins in mid-October and lasts through early November, and these periods are believed to be synchronous across an entire bed.

Project Area: Juvenile and adult surf clams occur in the project area. Where present in the borrow areas during dredging most will be lost. The "seeding" mechanisms of the surf clam are at work continuously and will establish populations regularly and will be reestablished after the dredging activities are completed. Therefore, no more than minimal impact to Atlantic surf clam or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

Longfin inshore squid (*Loligo pealeii*)
Grid squares: 6,7,11-13,15 (J,A); 1,3,9,10,14(J)

Primary Source: EFH Source Document by Jacobson (2005)

Pre-recruit and recruit life stages for the longfin squid are listed in the 10' by 10' grid squares within the project area. Pre-recruits and recruits are stock assessment terms used by the Northeast Fisheries Science Center (NEFSC) and correspond roughly to the life history stages juveniles and adults, respectively. Longfin squid pre-recruits are less than or equal to 8 cm and recruits are greater than 8 cm. Longfin inshore squid are a pelagic schooling species that can be found in continental shelf and slope waters from Newfoundland to the Gulf of Venezuela. Juveniles inhabit the upper 10 m of the water column over water 50 to 150 meters deep on continental shelf. Juveniles are typically found in coastal inshore waters in spring/fall while migrating to offshore waters in winter. Juveniles have a temperature preference of 10 to 26°C and salinities of 31.5 to 34.0 ppt. Adult longfin inshore squid inhabit the continental shelf and upper continental shelf slope to depths of 400 m. Adults are typically found over mud or sandy mud bottoms, and have been found at surface temperatures ranging from 9 to 21°C and bottom temperatures ranging from 8 to 16°C.

Project Area: Based on their range of habitat utilization longfin squid may be expected to seasonally occur in the project area. This species is mobile and it is unlikely that it will be subjected to potential entrainment in the dredge or burial during dredging operations. Given the spatial distribution pattern and habits of this species little to no impact on longfin squid or EFH is anticipated to result from the proposed Project.

Shortfin squid (*Illex illecebrosus*)
Grid squares: 15 (J)

Primary Source: EFH Document by Hendrickson and Holmes (2004)

Pre-recruit and recruit life stages for the shortfin squid are listed in the 10' by 10' grid squares within the project area. Generally, pre-recruit and recruit shortfin squid are collected from shore to 200 meters and temperatures between 2°C and 23°C. Like many squid species shortfin squid live for less than one year, has a high natural mortality rate, and exhibits a protracted spawning season whereby overlapping "microcohorts" enter the population throughout the year and exhibit variable growth rates. During spring, squid migrate onto the continental shelf between Newfoundland and Cape Hatteras. During late autumn, squid migrate off the continental shelf, presumably to a winter spawning site.

Project Area: Based on their range of habitat utilization shortfin squid may be expected to seasonally occur within the project area. This species is mobile and it is unlikely that it will be subjected to potential entrainment in the dredge or burial during dredging operations. Given the spatial distribution pattern and habits of this species little to no impact on shortfin squid or EFH is anticipated to result from the proposed Project.

Ocean quahog (*Arctica islandica*)

Grid squares: 3,7,9,11,13,15 (J,A); 5(A)

Primary Source: EFH Source Document by Cargnelli et al. (1999c)

Juvenile and adult life stages for the ocean quahog are listed in the grid squares within the project area. Ocean quahogs are extremely slow-growing and long-lived marine bivalves. Distribution in the western Atlantic ranges in depths from 10 meters to about 250 meters. Ocean quahogs are rarely found where bottom water temperatures exceed 16°C, and occur progressively further offshore between Cape Cod and Cape Hatteras. Adults are usually found in dense beds in medium- to fine-grained sand, sandy– mud, and silty sand. Spawning is protracted, lasting from spring to fall. It has been reported to last from September to November, and sometimes until January, off New Jersey.

Project Area: Juvenile and adult ocean quahogs are likely to occur in the project area. Where present in the borrow areas during dredging most will be lost. The “seeding” mechanisms of the ocean quahog are at work continuously and will establish populations regularly and will be reestablished after the dredging activities are completed. Therefore, no more than minimal impact to ocean quahog or EFH is anticipated as a result of the dredging activities associated with the proposed Project.

D.5 IMPACTS

This section identifies the potential direct and indirect impacts of the proposed sand dredging and placement on the relevant life history stages of EFH-designated species and their habitats. Significant impacts are not anticipated for the majority of species and life history stages. Table D-2 identifies potential direct and indirect impacts for each EFH-designated species. There will be temporary impacts to the habitat and associated prey species for the duration of the construction phase of the Project. However, since the project area is a small portion of this type of habitat in the region, the overall impact on the effected species will be minimal relative to the region.

D.5.1 Habitat Impacts

The proposed dredging activities at the offshore borrow areas are described in Section D.2.2.3. The Marine Offshore ecosystem where the borrow areas are located is described in Section D.3. The proposed dredging activities associated with the project initial construction would be conducted in the offshore borrow sites. In these locations the circulation, flushing rates, and dissolved oxygen levels are relatively high. The beach nourishment or dredge material (comprised primarily of clean, coarse-grained sand and gravel) would be hydraulically dredged and pumped to down drift beaches on the Atlantic coast of the Fire Island barrier island. The borrow area sand consists almost entirely of clean, coarse-grained sand and gravel with a small percentage of fines. Most of the fine material that would be suspended by the activities in the Atlantic Ocean water column would settle out in nearby Atlantic Ocean waters and would not adversely affect the designated habitat areas. Sediment taken from the borrow areas would be extracted to a depth no greater than 20 feet below the existing bottom, in order to minimize impacts on existing coastal processes and avoid anoxic conditions. The existing benthic invertebrate community would be removed as a result of the dredging. However, once the dredging is complete the ocean bottom would be colonized with invertebrates from the nearby benthic habitats.

D.5.2 Direct Impacts

The following subsections provide a general impact assessment for EFH-designated species (Table D-2). For all species, the impacts during dredging would be temporary and non-significant for the following reasons:

- Turbidity plumes generated at the dredged site are not expected to be significant given that the type of dredge proposed is designed to minimize turbidity. Additionally, the sediment being mined is coarse-grained sand, which contains only trace amounts of fine-grained material. Also, the project site is under the direct influence of the inlet currents which are very powerful throughout most of each tidal cycle. These currents will quickly disperse any turbidity generated by the project operation. There are not expected to be any long lasting impacts to the water quality in or adjacent to the project area. Additionally, bottom sediments are predominantly sand without any significant amount of organic matter, therefore no significant release of nutrients or contaminants or lowering of oxygen concentrations (biological oxygen demand) is expected.

- Entrainment of demersal species may occur, however, hydraulic dredging equipment generally digs below the bottom substrate, gives noticeable warning of their approach (e.g., vibrations, etc.), and covers relatively small widths of the bottom at a time.

- Due to the dominance of sand in the borrow areas, sedimentation and turbidity resulting from the proposed Project are expected to settle quickly out of the water column or be dispersed by currents at the project area, and therefore would have a minimal impact on fish and invertebrate species (gill damage/suffocation or inhibition of sight feeding predators)

- The relatively small change in depth and the small size of the project foot print with a regional area with abundant similar resources result in minimal impacts to EFH-designated species. Direct impacts to EFH habitat is also expected to be minimal, especially since the bottom habitat is a dynamic area known to change by both small and large increments.

Table D-2. Potential Impacts for EFH-Designated Species and Life History Stages in the Project Site

EFH-Designated Species	Life Stage	Potential Impacts
Bony Fish Species		
Atlantic butterfish	E/L	Not likely to occur in the project area. No significant impact
	J/A	Pelagic, zooplankton-feeding species. No significant impact.

EFH-Designated Species	Life Stage	Potential Impacts
Atlantic mackerel	E/L/J/ A	All life stages are pelagic. No significant impact.
Atlantic salmon	J/A	Not likely to occur in the project area. No significant impact
Atlantic sea herring	L/J/A	Pelagic, zooplankton-feeding species. No significant impact.
Black sea bass	J	Loss of benthic infaunal prey organisms would have minimal impact because fish feed primarily on more mobile benthic epifaunal species and small fish.
	L/A	
Bluefin tuna	J/A	Not likely to occur in the project area. No significant impact
Bluefish	E, L	Probably rare in the project area. No significant impact.
	J	Temporary displacement of fish and their prey (forage fish). No significant impact.
	A	Temporary displacement of fish and their prey (forage fish). No significant impact.
Cobia	E/L/J/ A	Transient pelagic species. Not likely to occur in the project area. No significant impact.
Haddock	L	Pelagic, may occur in the project area. No signifcant impact.
King and Spanish mackerel	E/L/J/ A	Transient pelagic species. Not likely to occur in the project area. No significant impact.
Monkfish	E/L	Not likely to occur in the project area. No significant impact.
Ocean pout	E/L	Eggs and larvae are demersal, potential to be impacted by dredging operations.
Pollock	J	Not likely to occur in the project area. No significant impact.
Red hake		Not expected to occur in great densities but may be adversely impacted by dredging/placement activities. No significant impact.
	E	
	L/J	Not likely to occur in the project area. No significant impact.
Scup	E/L	Not likely to occur in the project area. No significant impact.
	J/A	Loss of benthic infaunal prey organisms would have minimal impact because fish also feed on pelagic prey organisms.
Skipjack tuna	A	Probably rare in the project area. No significant impact.
Summer flounder	E/L	Not likely to occur in the project area. No significant impact.

EFH-Designated Species	Life Stage	Potential Impacts
	J/A	Loss of benthic infaunal prey organisms would have minimal impact because fish also feed on pelagic prey organisms and larger, more mobile benthic epifauna (e.g., crabs).
Windowpane flounder	E/L	May be adversely impacted by dredging/placement activities.
	J	Smaller YOY juveniles vulnerable to mortality from dredge. No significant impact from loss of benthic infaunal species because primary prey are more mobile epifaunal species.
	A	No significant impact from loss of benthic infaunal species because primary prey are more mobile epifaunal species.
Winter flounder	E	Dredge would cause mortality of demersal eggs during January-April spawning season.
	L	Dredge would cause mortality of recently-hatched larvae near the bottom, but have no significant impact on larvae in surface waters.
	J	Loss of benthic infaunal prey organisms would cause larger juveniles to relocate to nearby, unaffected areas; smaller YOY juveniles are less able to relocate and vulnerable to mortality from dredge.
	A	Loss of benthic infaunal prey organisms would cause adults to relocate to nearby, unaffected areas to feed; dredging during spawning season would cause females to move to nearby, unaffected areas to spawn, but should have no significant impact on egg production.
Whiting	E/L/J	
Witch flounder	L	Not likely to occur in the project area. No significant impact.
Yellowtail flounder	E/L	Probably rare in the project area. No significant impact.
Cartilaginous Fish Species		
Blue shark	EJ/LJ/ A	Not likely to occur in the project area. No significant impact.

EFH-Designated Species	Life Stage	Potential Impacts
Common thresher shark	EJ/LJ/ A	Not likely to occur in the project area. No significant impact.
Dusky shark	EJ/LJ	Dredging activities would not affect most prey species.
Sand tiger shark	EJ	Not likely to occur in the project area. No significant impact.
Sandbar shark	EJ	Probably rare in the project area. No significant impact.
	LJ/A	Dredging would not affect most prey species and adults would move out of affected area; no significant impact.
Shortfin mako shark	EJ/LJ/A	Not likely to occur in the project area. No significant impact.
Spiny dogfish	J/A	May occur in the the project area. No significant impact.
Tiger shark	EJ/LJ	Not likely to occur in the project area. No significant impact.
White shark	LJ	Not likely to occur in the project area. No significant impact.
Invertebrate Species		
Atlantic surf clam	J/A	May occur at sand placement site but would suffer minimal impact from sand placement activities.
Longfin inshore squid	J/A	No significant impact from loss of benthic infaunal species because primary prey are fish and mobile epifaunal species.
Shortfin squid	J	No significant impact from loss of benthic infaunal species because primary prey are fish and mobile epifaunal species.
Ocean quahog	J/A	Not likely to occur in the project area. No significant impact.
Key: E = eggs, L = larvae, J = juveniles, A = adults, EJ = early juveniles, LJ = late juveniles		

D.5.3 Indirect Impacts

The most significant impact of sand dredging on EFH in the project area would be the indirect trophic effects caused by the removal of benthic infaunal prey organisms, and some epifaunal prey organisms, for bottom-feeding EFH-designated species. Any benthic organism that lives in the sand (infauna) and the smaller, less motile organisms that live on the bottom (epifauna) and are not capable of avoiding the suction effect of the dredge, would become entrained. Most of these organisms would be invertebrates, but burrowing fish would also be drawn into the dredge.

The negative effects of prey removal would be temporary, lasting only as long as it takes for benthic invertebrates to re-colonize the bottom once the project is complete. Studies conducted on offshore sand borrow areas off the outer New Jersey coast indicate that benthic communities were re-established within 8 to 9 months (USACE 1999a). Re-colonization of the infaunal species will be stimulated by neighboring adult populations that inhabit similar environments adjacent to the project area. However, because the project area is under the direct influence of inlet currents carrying eggs, larvae and instar forms of many invertebrate species the project area may recover much faster than these other areas. Nevertheless, some parts the project area will remain in a semi-disturbed state throughout the lifespan of the project. This represents a loss of some prey resources to some bottom feeding EFH-designated species. The degree to which sand extraction from the project area impacts benthic prey resources depends a great deal on how large of an area is selected for removal. Because bottom-feeding fish and crustaceans consume epifaunal organisms living on the bottom and infaunal organisms in the top several inches of the sediment, removal of surficial sediments over a large area would have a much greater impact on EFH than removal of the same volume of sand dredging a smaller area to a relatively greater depth. The project area represents a very small percentage of foraging grounds within the bay thus the overall indirect impact of the sand mining to EFH species will be minimal.

The temporary loss of benthic prey resources caused by dredging would not have any serious adverse effects on EFH for any species that feeds primarily on more motile epifaunal organisms (e.g., crabs, mysids, sand shrimp) or fish, since these organisms would re-occupy the dredged area almost immediately after sand was removed. For this reason, most of the EFH species in the project area would probably continue to feed there even after the dredge passed through.

The activities in the project area may have short-term benefits to some EFH-designated. Brinkhuis (1980) conducted a literature assessment on the biological effects of sand and gravel mining in the Lower Bay of New York Harbor and found that during dredging, and immediately after an area has been dredged, fish are attracted to the area to feed on infaunal organisms that are dislodged from the bottom. Due to the composition of the benthic infaunal organisms, bottom feeding fish species would be the primary benefactors as a result of the disturbance and certain opportunistic species such as striped bass would also benefit. Types of species attracted to the Project activity would be limited to highly mobile juveniles and adults, which presumably would be capable of avoiding entrainment.

Species that feed primarily on benthic infaunal organisms are most likely to be affected during the entire life of the Project. However, both benthic and pelagic foragers would likely expand their forage parameters until a sufficient prey patch is located, which in this case would mean re-locating to adjacent unaffected areas of similar habitat. Additionally, mobile foragers could resume feeding in the same location as soon as the dredge activities cease.

D.6 CONCLUSION

This assessment concludes that the overall potential adverse impacts to EFH-designated species and EFH in the project area will be minimal. Most EFH-designated species feed on more motile epifaunal organisms or on small forage fish and would not be seriously affected. For any bottom-feeding EFH species, the impact of dredging on local forage habitat area would be temporary, lasting only until the dredged area is re-colonized by new benthic organisms. There is also available data showing that disturbance to the sediments due to dredging can be short term benefit to many species of various life stages due to redistribution of prey items and detritus. The majority of dredging operations are expected to occur during the time period when most species are not active in the project area. For these reasons, it is concluded that the dredging of the offshore borrow areas and subsequent placement of dredged material on beaches will not cause adverse effects to

EFH-designated species or EFH. The New York District will continue coordination with NOAA to get to a mutual understanding agreement on this policy.

D.7 REFERENCES

Brinkhuis 1980	Brinkhuis, B.H. 1980. Biological effects of sand and gravel mining in the Lower Bay of New York Harbor: an assessment from the literature. Marine Science Research Center, State University of New York at Stony Brook, Special Report 34, Reference No. 80-1. 138 pp.
Cargnelli et. al. 1999a	Cargnelli, L.M., S.J. Griesbach, D.B. Packer, P.L. Berrien, D.L. Johnson, and W.W. Morse. 1999a. Essential fish habitat source document: pollack, Pollachius virens, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-131. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 38 pp.
Cargnelli et. al. 1999b	Cargnelli, L.M., S.J. Griesbach, D.B. Packer, and E. Weissberger. 1999b. Essential fish habitat source document: Atlantic surf clam, Spisula solidissima, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-142. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 22 pp.
Cargnelli et. al. 1999c	Cargnelli, L.M., S.J. Griesbach, D.B. Packer, and E. Weissberger. 1999c. Essential fish habitat source document: ocean quahog, Arctica islandica, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-148. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 11 pp.
Cargnelli et. al. 1999d	Cargnelli, L.M., S.J. Griesbach, D.B. Packer, and P. Berrien. 1999d. Essential fish habitat source document: haddock, Melanogrammus aeglefinus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-128. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 40 pp.
Cargnelli et. al. 1999e	Cargnelli, L.M., S.J. Griesbach, D.B. Packer, and P. Berrien. 1999e. Essential fish habitat source document: Witch Flounder, Glyptocephalus cynoglossus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-139. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 38 pp.

Chang et. al. 1999	Chang S., P.L. Berrien, D.L. Johnson, and W.W. Morse. 1999. Essential fish habitat source document: windowpane, Scophthalmus aquosus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-137. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA: 32 pp.
Collette and Nauen 1983	Collette, B.B. and C.E. Nauen. 1983. FAO species catalogue. Vol. 2. Scombrids of the world. An annotated and illustrated catalogue of tunas, mackerels, bonitos and related species known to date. FAO Fish. Synopsis, (125) Vol. 2:137 p.
Compagno 1984	Compagno, L.J.V. 1984. FAO species catalogue. Sharks of the world. An annotated and illustrated catalogue of shark species known to date. FAO Fisheries Synopsis No. 125, Vol. 4, Part 1 (Hexanchiformes to Lamniformes) and Part 2 (Carchariniformes). United Nations Fisheries and Agriculture Organization, Rome, Italy. 655 pp.
Cross et. al. 1999	Cross, J.N., C.A. Zetlin, P.L. Berrien, D.L. Johnson, and C. McBride. 1999. Essential Fish Habitat Source Document: Butterfish, Peprilus triacanthus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-145. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA: 42 pp.
Drohan et. al. 2007	Drohan AF, Manderson JP, Packer DB. 2007. Essential fish habitat source document: Black sea bass, Centropristis striata, life history and habitat characteristics, 2nd edition. NOAA Tech Memo NMFS NE 200; 68 p.
Godcharles and Murphy 1986	Godcharles, M.F. and M.D. Murphy. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (south Florida) – king mackerel and Spanish mackerel. U.S. Fish and Wildlife Service, Biological Report 82(11.58). U.S. Army Corps of Engineers, TR EL-82-4, Waterways Experiment Station, Vicksburg, MS. 18 pp.
Hendrickson and Holmes 2004	Hendrickson, L.C. and Holmes, E.M. 2004. Essential fish habitat source document (2nd edition): northern shortfin squid, Illex illecebrosus, life history and habitat characteristics. NOAA Technical Memorandum MNFS-NE-191. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine

Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 46 pp.

Jacobson 2005 Jacobson, L.D. 2005. Essential fish habitat source document (2nd edition): longfin inshore squid, Loligo pealei, life history and habitat characteristics. NOAA Technical Memorandum MNFS-NE-193. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 52 pp.

Johnson et. al. 1999 Johnson, D.L., W.W. Morse, P.L. Berrien, and J.J. Vitaliano. 1999. Essential fish habitat source document: yellowtail flounder, Limanda ferruginea, life history and habitat characteristics. NOAA Technical Memorandum MNFS-NE-140.

Lock 2004 Lock MC, Packer PB. 2004. Essential fish habitat source document: Silver hake, Merluccius bilinearis, life history and habitat characteristiscs, 2nd edition. NOAA Tech Memo NMFS NE 186; 68 p.

Luca et. al. 1999 Luca, M.C., S.J. Griesbach, D.B. Packer, P.L. Berrien, W.W. Morse, and D.L. Johnson. 1999. Essential fish habitat source document: witch flounder, Glyptocephalus cynoglossus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-139. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 29 pp.

NOAA 2008a NOAA 2008a National Oceanic and Atmospheric Administration (NOAA). 2008. Guide to Essential Fish Habitat Designations in the Northeastern United States. Accessed at: http://www.greateratlantic.fisheries.noaa.gov/hcd/STATES4/ConnNYNJ.htm on October 1, 2008.

Packer et. al. 1999 Packer, D.B., S.J. Griesbach, P.L. Berrien, C.A. Zetlin, D.L. Johnson, and W.W. Morse. 1999. Essential fish habitat source document: summer flounder, Paralichthys dentatus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-151. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 88 pp.

Packer et. al. 2003a Packer, D.B., C.A. Zetlin, and J.J. Vitaliano. 2003a. Essential fish habitat source document: little skate, Leucoraja erinacea, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-175. U.S. Department of Commerce, National Oceanic and

Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 76 pp.

Packer et. al. 2003b — Packer, D.B., C.A. Zetlin, and J.J. Vitaliano. 2003b. Essential fish habitat source document: winter skate, Leucoraja ocellata, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-179. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 68 pp.

Pereira et. al. 1999 — Pereira, J.J., R. Goldberg, J.J. Ziskowski, P.L. Berrien, W.W. Morse, and D.L. Johnson. 1999. Essential fish habitat source document: winter flounder, Pseudopleuronectes americanus, life listory and habitat characteristics. NOAA Technical Memorandum NMFS-NE-138. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 39 pp.

Richards 1967 — Richards, C.E. 1967. Age, growth and fecundity of the cobia, Rachycentron canadum, from the Chesapeake Bay and adjacent Mid-Atlantic waters. Trans. Amer. Fish. Soc. 96:343-350.

Shepherd and Packer 2005 — Shepherd GR, Packer DB. 2005. Essential fish habitat source document: Bluefish, Pomatomus saltatrix, life history and habitat characteristics (2nd Edition). NOAA Tech Memo NMFS NE 198; 89 p.

Stehlik 2007 — Stehlik, L. 2007, Essential fish habitat source document: Spiny Dogfish, Squalus acanthias, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-203. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 52 pp.

Steimle et. al. 1999a — Steimle, F.W., W.W. Morse, and D.L. Johnson. 1999a. Essential fish habitat source document: goosefish, Lophius americanus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-127. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 31 pp.

Steimle et. al. 1999b — Steimle, F.W., W.W. Morse, P.L. Berrien, and D.L. Johnson. 1999b. Essential fish habitat source document: red hake, Urophycis chuss, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-133. U.S. Department of Commerce, National Oceanic and

	Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 34 pp.
Steimle et. al. 1999c	Steimle, F.W., C.A. Zetlin, P.L. Berrien, D.L. Johnson, and S. Chang. 1999c. Essential fish habitat source document: scup, Stenotomus chrysops, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-149. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 39 pp.
Steimle et. al. 1999d	Steimle, F.W., W.W. Morse, P.L. Berrien, D.L. Johnson, and C. Zetlin. 1999d. Essential fish habitat source document: Ocean Pout, Macrozoarces americanus, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-129. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. 34 pp.
Stevenson and Scott 2005	Stevenson DK, Scott ML. 2005. Essential fish habitat source document: Atlantic herring, Clupea harengus, life history and habitat characteristics (2nd edition). NOAA Tech Memo NMFS NE 192; 84 p.
USACE 2001	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. Army Engineer District, New York and U.S. Army Engineer Research and Development Center, Waterways Experiment Station.
USACE 2009	USACE 2009. West of Shinnecock Inlet and "Bypass Area" shore protection projects: post-construction monitoring - final finfish/epibenthic invertebrate data report (2004-2008). 205 pp.
USDOC 1999a	United States Department of Commerce (USDOC). 1999a. Guide to essential fish habitat designations in the Northeastern United States. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Regional Office, Gloucester, MA. Internet accessible at: www.nero.nmfs.gov/ro/doc.
USDOC 1999b	United States Department of Commerce (USDOC). 1999b. Final Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks. Vol. II, Chapter 6: Highly Migratory Species (HMS) Essential Fish Habitat (EFH) Provisions. U.S. Department of Commerce, National

Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Sustainable Fisheries, Silver Spring, MD. 302 pp

ATTACHMENT 1

SPECIES AND LIFE STAGES FOR THE 15 GRID SQUARES

Grid 1 (40° 30.0’ N, 73° 20.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square affecting the following: south of Amityville, NY, Lindenhurst, NY, Copiague, NY, Seaford, NY, Massapequa, NY, Biltmore Shores, NY, and Nassau Shores, NY, Seaford Creek and Amityville Creek. These waters are also within Great South Bay affecting the following: Jones Beach Island, Toby Beach, and Cedar Island from the western half of Cedar Island Beach to Jones Beach State Park. Also, these waters affect Zachs Bay, eastern Hempstead Bay and southern Oyster Bay, and around the following Islands: South Line, North Line, Goose, and Gilgo.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Pollock (Pollachius virens)			x	
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)			x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a			x
Surf Clam (Spisula solidissima)	n/a	n/a	x	x
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)				x
Dusky Shark (Charcharinus obscurus)		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Shortfin Mako Shark *(Isurus oxyrhyncus)*			x	
Tiger Shark (Galeocerdo cuvieri)		x		
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008

Notes: Boundary coordinates: North: 40° 40.0’ N, East: 73° 20.0’ W, South: 40° 30.0’ N, West: 73° 30.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 2 (40° 40.0’ N, 73° 10.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Great South Bay, south of East Islip, NY, Islip, NY, Bay Shore, NY, Great Cove, and Babylon, NY, from west of Nicoll Pt. to Bergen Pt.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Pollock (Pollachius virens)			x	
Redfish (Sebastes fasciatus)	n/a			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a		
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)			x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a			x
Surf Clam (Spisula solidissima)	n/a	n/a		
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)				x
Dusky Shark (Charcharinus obscurus)		x		
Sandbar Shark (Charcharinus plumbeus)		x	x	x

Source: NOAA 2008

Notes: Boundary coordinates: North: 40° 50.0’ N, East: 73° 10.0’ W, South: 40° 40.0’ N, West: 73° 20.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 3 (40° 30.0’ N, 73° 10.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): The waters within the square within the Atlantic Ocean and within Great South Bay estuary affecting the following: East and West Fire Island, Saltaire, NY and Democrat Pt. on Fire Island. Captree I., Sexton I., Oak I., Cedar Island Beach, Oak Beach, and the Fire Island Inlet.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Pollock (Pollachius virens)			x	
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x			
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*				x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)			x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a	x	x	x
Surf Clam (Spisula solidissima)	n/a	n/a	x	x
Ocean Quahog (Artica islandica)	n/a	n/a	x	x
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Common Thresher Shark *(Alopias vulpinus)*		x	x	x
Blue Shark (Prionace glauca)		x	x	x
White Shark (Charcharadon carcharias)			x	
Tiger Shark (Galeocerdo cuvieri)		x	x	
Dusky Shark (Charcharinus obscurus)		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	x
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008
Notes: Boundary coordinates: North: 40° 40.0’ N, East: 73° 10.0’ W, South: 40° 30.0’ N, West: 73° 20.0’ W.
n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 4 (40° 40.0’ N, 73° 00.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square and within Great South Bay, north of Ocean Beach, and south of Sayville, NY and Boheamia, NY, from Patchogue, NY and western Patchogue Bay to just west of Nicoll Pt. on Nicoll Bay, southeast of Great River, NY, and the Connetquot River.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Pollock (Pollachius virens)			x	
Redfish (Sebastes fasciatus)	n/a			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a		
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)			x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a			x
Surf Clam (Spisula solidissima)	n/a	n/a		
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)				x
Dusky Shark (Charcharinus obscurus)		x		
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008

Notes: Boundary coordinates: North: 40° 50.0’ N, East: 73° 00.0’ W, South: 40° 40.0’ N, West: 73° 10.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 5 (40° 30.0' N, 73° 00.0' W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Great South Bay estuary south and north of Ocean Beach, NY on Fire Island.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Pollock (Pollachius virens)			x	
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Redfish (Sebastes fasciatus)	n/a			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x			x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)		x	x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a	x		x
Surf Clam (Spisula solidissima)	n/a	n/a	x	x
Ocean Quahog (Artica islandica)	n/a	n/a		x
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Common Thresher Shark *(Alopias vulpinus)*		x	x	x
Blue Shark (Prionace glauca)		x	x	x
White Shark (Charcharadon carcharias)			x	
Tiger Shark (Galeocerdo cuvieri)		x	x	
Dusky Shark (Charcharinus obscurus)		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	x
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008
Notes: Boundary coordinates: North: 40° 40.0' N, East: 73° 00.0' W, South: 40° 30.0' N, West: 73° 10.0' W.
n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 6 (40° 40.0' N, 72° 50.0' W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Great South Bay estuary affecting the following: south of Great South Beach on Fire Island, within western Narrow Bay and Bellport Bay, from Mastic Beach, NY, to the Swan River in East Patchogue, NY. Also affected are eastern Patchogue Bay, and south of Bellport, NY, North Bellport, NY, Brookhaven, NY, Mastic, NY, and East Patchogue, NY.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Pollock (Pollachius virens)			x	
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)			x	
Redfish (Sebastes fasciatus)	n/a			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)	x	x	x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a		x	x
Surf Clam (Spisula solidissima)	n/a	n/a		
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)		x		x
White Shark (Charcharadon carcharias)			x	
Dusky Shark (Charcharinus obscurus)		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Tiger Shark (Galeocerdo cuvieri)		x	x	
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008

Notes: Boundary coordinates: North: 40° 50.0' N, East: 72° 50.0' W, South: 40° 40.0' N, West: 73° 00.0' W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 7 (40° 30.0' N, 72° 50.0' W)

Square Description (i.e. habitat, landmarks, coastline markers): The waters within the square within the Atlantic Ocean one square south of the square affecting Great South Beach on Fire Island, and Mastic Beach, NY, East Patchogue, NY, Bellport, NY, North Bellport, NY, Brookhaven, NY, Mastic, NY, and East Patchogue, NY.

Species	Eggs	Larvae	Juveniles	Adults
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x		
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x			x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	x
Atlantic Butterfish (Peprilus triacanthus)	x			
Summer Flounder (Paralicthys dentatus)				x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a			x
Surf Clam (Spisula solidissima)	n/a	n/a	x	x
Ocean Quahog (Artica islandica)	n/a	n/a	x	x
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Common Thresher Shark *(Alopias vulpinus)*		x	x	x
Blue Shark (Prionace glauca)		x	x	x
White Shark (Charcharadon carcharias)			x	
Tiger Shark (Galeocerdo cuvieri)		x	x	
Dusky Shark (Charcharinus obscurus)		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	x
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008

Notes: Boundary coordinates: North: 40° 40.0' N, East: 72° 50.0' W, South: 40° 30.0' N, West: 73° 00.0' W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 8 (40° 40.0’ N, 72° 40.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): The waters within the square within the Atlantic Ocean and within Great South Bay estuary affecting the following: south of Tanner Neck, NY, East Moriches, NY, Center Moriches, NY, and within Moriches Bay and Moriches Bay Inlet, south of Eastport, NY, Speonk, NY, and Remsenberg, NY, from Apaucuck Pt. to Mastic Beach, NY, along with waters within eastern Narrow Bay.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Haddock (Melanogrammus aeglefinus)		x		
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Witch Flounder (Glyptocephalus cynoglossus)	x			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x	x		
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*		x	x	
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a		
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)	x	x	x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a			x
Surf Clam (Spisula solidissima)	n/a	n/a		
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)		x		x
White Shark (Charcharadon carcharias)			x	
Dusky Shark (Charcharinus obscurus)		x	x	
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Tiger Shark (Galeocerdo cuvieri)		x	x	
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008

Notes: Boundary coordinates: North: 40° 50.0’ N, East: 72° 40.0’ W, South: 40° 40.0’ N, West: 72° 50.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 9 (40° 40.0’ N, 72° 30.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): The waters within the square within the Atlantic Ocean and within the Great South Bay estuary affecting the following: south of Westhampton, NY, Quiogue, NY, Quogue, NY, and Tiana Beach, and within Quantuck Bay and the eastern tip of Moriches Bay.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*				x
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Witch Flounder (Glyptocephalus cynoglossus)	x			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*			x	
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)		x	x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)	x	x	x	x
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)	x	x	x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a		x	x
Surf Clam (Spisula solidissima)	n/a	n/a		x
Ocean Quahog (Artica islandica)	n/a	n/a	x	x
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Common Thresher Shark *(Alopias vulpinus)*		x	x	x
Blue Shark (Prionace glauca)		x	x	x
White Shark (Charcharadon carcharias)			x	
Dusky Shark (Charcharinus obscurus)		x	x	
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	
Tiger Shark (Galeocerdo cuvieri)		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008

Notes: Boundary coordinates: North: 40° 50.0’ N, East: 72° 30.0’ W, South: 40° 40.0’ N, West: 72° 40.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 10 (40° 50.0’ N, 72° 20.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Gardiners Bay, western Little Peconic Bay and eastern Great Peconic Bay affecting the following: southwest of New Suffolk, NY, Cutchogue, NY, southern Nassau Pt., Robins I., along with and north of North Sea, NY, Sebonac Neck, NY, Southampton , NY, and Shinecock Hills, NY, from Shinecock Canal to south of Jessup Neck. Also, within the Atlantic Ocean south of Southampton, NY, from south of Mecox Bay to just west of the Shinnecock Inlet, within eastern Shinecock Bay. Also, waters within Great South Bay estuary can be found at the very bottom of the square.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Salmon *(Salmo salar)*			x	x
Pollock (Pollachius virens)			x	
Whiting (Merluccius bilinearis)	x	x	x	x
Red Hake (Urophycis chuss)	x	x	x	
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Mackerel *(Scomber scombrus)*	x	x	x	x
Summer Flounder (Paralicthys dentatus)		x	x	x
Scup (Stenotomus chrysops)	x	x	x	x
Black Sea Bass (Centropristus striata)	n/a		x	
Surf Clam (Spisula solidissima)	n/a	n/a		
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)				x
White Shark (Charcharadon carcharias)			x	
Dusky Shark (Charcharinus obscurus)		x		
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Tiger Shark (Galeocerdo cuvieri)			x	
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008
Notes: Boundary coordinates: North: 41° 00.0’ N, East: 72° 20.0’ W, South: 40° 50.0’ N, West: 72° 30.0’ W.
n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 11 (40° 40.0’ N, 72° 20.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square one square south of the square affecting the following: western Little Peconic Bay and eastern Great Peconic Bay, southwest of New Suffolk, NY, Cutchogue, NY, North Sea, NY, Sebonac Neck, NY, and within the Atlantic Ocean, waters affecting Southampton , NY, and Shinecock Hills, NY, and Southampton, NY.

Species	Eggs	Larvae	Juveniles	Adults
Haddock (Melanogrammus aeglefinus)		x		
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Witch Flounder (Glyptocephalus cynoglossus)		x		
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)	x		x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	x
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Mackerel *(Scomber scombrus)*	x			
Summer Flounder (Paralicthys dentatus)			x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a		x	
Surf Clam (Spisula solidissima)	n/a	n/a		x
Ocean Quahog (Artica islandica)	n/a	n/a	x	x
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Common Thresher Shark *(Alopias vulpinus)*		x	x	x
Blue Shark (Prionace glauca)		x	x	x
White Shark (Charcharadon carcharias)			x	
Tiger Shark (Galeocerdo cuvieri)		x	x	
Dusky Shark (Charcharinus obscurus)		x	x	
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	x
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008
Notes: Boundary coordinates: North: 40° 50.0’ N, East: 72° 20.0’ W, South: 40° 40.0’ N, West: 72° 30.0’ W.
n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 12 (40° 50.0’ N, 72° 10.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): Waters within the square affecting the following: from south of East Hampton, NY, to half way through Mecox Bay, east of Southampton, NY, including south of Wainscott, NY, and Bridgehampton, NY, within the Atlantic Ocean.

Species	Eggs	Larvae	Juveniles	Adults
Haddock (Melanogrammus aeglefinus)		x		
Whiting (Merluccius bilinearis)	x	x		
Red Hake (Urophycis chuss)	x	x	x	
Redfish (Sebastes fasciatus)	n/a			
Witch Flounder (Glyptocephalus cynoglossus)		x		
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x	x		
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	x
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Summer Flounder (Paralicthys dentatus)				x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a		x	
Surf Clam (Spisula solidissima)	n/a	n/a		
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)				x
White Shark (Charcharadon carcharias)			x	
Dusky Shark (Charcharinus obscurus)		x	x	
Shortfin Mako Shark *(Isurus oxyrhyncus)*			x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Tiger Shark (Galeocerdo cuvieri)		x	x	
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x

Source: NOAA 2008

Notes: Boundary coordinates: North: 41° 00.0’ N, East: 72° 10.0’ W, South: 40° 50.0’ N, West: 72° 20.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 13 (40° 50.0' N, 72° 00.0' W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Long Island Sound affecting north of Devon Yacht Club and Amagansett, NY, along with affecting south of Long Island from just southeast of Hither Hills State Park to southeast of East Hampton, NY.

Species	Eggs	Larvae	Juveniles	Adults
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Redfish (Sebastes fasciatus)	n/a			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x			x
Windowpane Flounder (Scopthalmus aquosus)	x		x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*			x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	x
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Atlantic Butterfish (Peprilus triacanthus)		x		
Summer Flounder (Paralicthys dentatus)				x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a		x	x
Surf Clam (Spisula solidissima)	n/a	n/a	x	x
Ocean Quahog (Artica islandica)	n/a	n/a	x	x
Spiny Dogfish (Squalus acanthias)	n/a	n/a		
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Common Thresher Shark *(Alopias vulpinus)*		x	x	x
Blue Shark (Prionace glauca)		x	x	x
White Shark (Charcharadon carcharias)			x	
Dusky Shark (Charcharinus obscurus)		x		
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Tiger Shark (Galeocerdo cuvieri)		x	x	
Bluefin Tuna (Thunnus thynnus)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x
Basking Shark (Cetorhinus maximus)			x	

Source: NOAA 2008
Notes: Boundary coordinates: North: 41° 00.0' N, East: 72° 00.0' W, South: 40° 50.0' N, West: 72° 10.0' W.
n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 14 (41° 00.0' N, 71° 50.0' W)

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square affecting the northeast tip of Long Island from just west of Rocky Point on the north side around Fort Pond Bay, past Lake Montauk, Shagwong Pt., False Pt., Montauk Pt., and Montauk, NY, to just east of Hither Hills State Park.

Species	Eggs	Larvae	Juveniles	Adults
Whiting (Merluccius bilinearis)	x	x	x	
Redfish (Sebastes fasciatus)	n/a			
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)			x	x
Ocean Pout (Zoarces americanus)	x	x		x
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	
Short-finned Squid (Illex illecebrosus)	n/a	n/a		
Summer Flounder (Paralicthys dentatus)			x	x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a		x	
Surf Clam (Spisula solidissima)	n/a	n/a		
Ocean Quahog (Artica islandica)	n/a	n/a		
Spiny Dogfish (Squalus acanthias)	n/a	n/a	x	x
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)		x	x	x
Dusky Shark (Charcharinus obscurus)		x	x	
Shortfin Mako Shark *(Isurus oxyrhyncus)*			x	
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Bluefin Tuna (Thunnus thynnus)			x	x

Source: NOAA 2008

Notes: Boundary coordinates: North: 41° 10.0' N, East: 71° 50.0' W, South: 41° 00.0' N, West: 72° 00.0' W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.

Grid 15 (40° 50.0’ N, 71° 50.0’ W)

Square Description (i.e. habitat, landmarks, coastline markers): The waters within the square within the Atlantic Ocean one square south of the eastern most tip of Long Island, south one square.

Species	Eggs	Larvae	Juveniles	Adults
Haddock (Melanogrammus aeglefinus)		x		
Whiting (Merluccius bilinearis)	x	x	x	
Red Hake (Urophycis chuss)	x	x	x	
Redfish (Sebastes fasciatus)	n/a			
Witch Flounder (Glyptocephalus cynoglossus)		x		
Winter Flounder (Pseudopleuronectes americanus)	x	x	x	x
Yellowtail Flounder (Limanda ferruginea)	x	x	x	x
Windowpane Flounder (Scopthalmus aquosus)	x	x	x	x
Ocean Pout (Zoarces americanus)	x	x		x
Atlantic Sea Herring *(Clupea harengus)*		x	x	x
Monkfish (Lophius americanus)	x	x		
Bluefish (Pomatomus saltatrix)			x	x
Long-finned Squid *(Loligo pealei)*	n/a	n/a	x	x
Short-finned Squid (Illex illecebrosus)	n/a	n/a	x	
Atlantic Butterfish (Peprilus triacanthus)			x	
Summer Flounder (Paralicthys dentatus)				x
Scup (Stenotomus chrysops)	n/a	n/a	x	x
Black Sea Bass (Centropristus striata)	n/a		x	x
Surf Clam (Spisula solidissima)	n/a	n/a	x	x
Ocean Quahog (Artica islandica)	n/a	n/a	x	x
Spiny Dogfish (Squalus acanthias)	n/a	n/a	x	
King Mackerel (Scomberomorus cavalla)	x	x	x	x
Spanish Mackerel (Scomberomorus maculatus)	x	x	x	x
Cobia (Rachycentron canadum)	x	x	x	x
Sand Tiger Shark (Odontaspis taurus)		x		
Blue Shark (Prionace glauca)		x	x	x
White Shark (Charcharadon carcharias)			x	
Dusky Shark (Charcharinus obscurus)		x	x	
Shortfin Mako Shark *(Isurus oxyrhyncus)*		x	x	x
Sandbar Shark (Charcharinus plumbeus)		x	x	x
Tiger Shark (Galeocerdo cuvieri)		x	x	
Bluefin Tuna (Thunnus thynnus)			x	x
Yellowfin Tuna (Thunnus albacares)			x	x
Skipjack Tuna (Katsuwonus pelamis)				x
Common Thresher Shark *(Alopias vulpinus)*		x	x	x
Basking Shark (Cetorhinus maximus)			x	

Source: NOAA 2008

Notes: Boundary coordinates: North: 41° 00.0’ N, East: 71° 50.0’ W, South: 40° 50.0’ N, West: 72° 00.0’ W.

n/a = these species either have no data available on the designated lifestages, or those lifestages are not present in the species' reproductive cycle.