APPENDIX C

ESSENTIAL FISH HABITAT ASSESSMENT FOR DSNY EIGHT MTSs

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ESSENTIAL FISH HABITAT ASSESSMENT

1.0 Introduction

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

The amended Magnuson Stevens Act requires that Federal agencies work with NMFS to minimize damage to EFH when funding activities that "may adversely affect" EFH.[1] An "adverse effect" is defined as any impact which reduces quality and/or quantity of EFH.[2] An adverse effect can result from the following types of impacts:

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

A consultation with NMFS is required for Federally funded proposed activities that may impact EFH. The goal of the consult is to develop EFH Conservation Recommendations. The consult satisfies the response requirements of sections 305(b)(4)(A) and 305(b)(4)(B) of the Magnuson-Stevens Act. The end products of the consult usually contain the following:

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

NMFS does not have the authority to veto Federal projects adversely affecting EFH. This process guides Federal agencies through a mandate preventing habitat damage before an activity begins. The main goal of the EFH is to ensure a sustainable harvest of fisheries

resources. In addition to EFH, Fishery Management Plans have identified Habitat Areas of Particular Concern (HAPC).[2] HAPC must fulfill at least on of the following criteria:

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

New York Harbor does not contain any HAPC. Therefore, an analysis of HAPC was not necessary for this assessment.

The NMFS Mid-Atlantic Fishery Management Council (MAFMC) has identified and delineated regions of EFH in their fishery management plan. NMFS has created maps of EFH areas using a variety of sampling methods and analyses in order to determine which areas to consider as EFH for species groups. NMFS has mapped these geographic areas on a grid. Each grid represents a 10' x 10' square of latitude and longitude (quadrat). The associated quadrats in which the New York City Department of Sanitation (DSNY) Marine Transfer Stations (MTS) are located are shown in Figure 1.[3] The study area includes two quadrats. The quadrat outlined in purple contains the Southwest Brooklyn MTS. The quadrat outlined in orange contains the North Shore, South Bronx, East 91st Street, Greenpoint, Hamilton Avenue, West 135th Street, and West 59th Street MTS. Each quadrat has an associated list of species and life stages designated as EFH by NMFS. Table 1 lists the finfish species designated as EFH species by the NMFS occurring in the two quadrats of Figure 1. In addition, Table 1 lists each applicable life stage along with the specified quadrat the species is found.[3] Table 2 lists the management councils responsible for governing each EFH designated species.[4]

Table 3 lists all pertinent EFH information for benthic and pelagic finfish species found in the study areas where it is anticipated potential habitat will either be lost or impacted as a result of the proposed project. The following parameters are listed for each species: life stage, water temperature, salinity, depth, season, habitat, and comments on migrations and food habits.[4,5]

A total of twenty finfish species are listed by NMFS as important EFH species in the study area. Of the twenty finfish species, the following three shark species are considered highly migratory: dusky shark *(Carcharinus obscurus),* sandbar shark *(Carcharinus plumbeus),* and sand tiger shark *(Odontaspis taurus).* Although these species are included in the EFH analysis, they are not common in the study area and based on their life history, will most likely not be impacted by the project. Note that EFH information is lacking for the early life stages (eggs, larvae) of several of these highly migratory species. The distribution of the sharks is mostly influenced by temperature. Due to overfishing and the relatively old age-at-maturity these stocks are highly exploited.

In addition to the highly migratory species, some other species rarely occur in the region and will likely not be impacted by the proposed project. The following three species are rare in the New York Bight, and more commonly found in the South Atlantic Bight: king mackerel (*Scomberomorus cavalla),* Spanish mackerel (*Scomberomorus maculatus),* and cobia (*Rachycentron canadum*).

2.0 Project Description

The New York City Department of Sanitation (DSNY) has eight marine transfer stations (MTS) located throughout New York City. There are three MTS in Manhattan (East 91st Street, West 59th Street, and West 135th Street); three MTS in Brooklyn (SW Brooklyn, Hamilton Avenue, and Greenpoint); one MTS in Queens (North Shore); and one MTS in the Bronx (South Bronx). The locations of these MTS are shown in Figure 2. These facilities were used to move municipal solid waste (MSW) from truck to barge, and the barges were transported to Fresh Kills Landfill on Staten Island to dispose of the MSW. The MTS became inactive with the closing of Fresh Kills Landfill, except for West 59th Street, which is used for paper recycling. DSNY is considering modifying the MTS facilities and restoring solid waste transfer operations at these facilities. This EFH Assessment was conducted because the modification and new operations planned for the facilities will require varying degrees of over-water (and on-shore) construction.

3.0 Essential Fish Habitat

As previously mentioned, EFH designations are specified for 10-minute by 10-minute grids. The Southwest Brooklyn MTS is located in a grid bounded by 40° 40.0' N to the north, 74° 00.0' W to the east, 40° 30.0' N to the south, and 74° 10.0' W to the west. The seven other MTS are located within a grid bounded by 40° 50.0' N to the north, 73° 50.0' W to the east, 40° 40.0' N to the south, and 74° 00.0' W to the west. The grids are outlined in Figure 1. EFH designations for these areas were based on information compiled by the NOAA / National Ocean Services (NOS) Estuarine Living Marine Resources (ELMR) Program, the New England Fisheries management Council (NEFMC), and NMFS.

EEA conducted a year-long marine biological study of the eight MTS in 2003.[6] During that study, ten of the twenty EFH designated species were collected. Table 4 lists the species collected in 2003. Table 5 lists the EFH designated species collected at each MTS and the life stages collected (eggs, larvae, juveniles, and adults). This table also indicates the life stages for which EFH is designated by NMFS at each MTS. Note that this table only lists the ten species that were collected during the sampling period. Also note that adult, juvenile, larvae, and eggs were sampled at North Shore, South Bronx, Greenpoint, Southwest Brooklyn, West 135th Street, and West 59th Street, however, bottom topography at East 91st Street and Hamilton Avenue only enabled egg and larval sampling.

The ten EFH listed species collected during the year-long study were: Atlantic butterfish, Atlantic herring, black sea bass, bluefish, little skate, scup, summer flounder, windowpane flounder, winter flounder, and winter skate.[6] Each MTS will be analyzed below for the EFH species observed on site. For a more detailed description of the biological analysis of each MTS, refer to the MTS Marine Biological Studies report.

3.1 North Shore

Three EFH listed species were collected from the North Shore MTS: Atlantic herring, windowpane flounder, and winter flounder (see Table 5). The larvae, juvenile, and adult life stages of Atlantic herring have EFH designation at North Shore, but only the adults were observed at the North Shore MTS in 2003. Both windowpane flounder and winter flounder have egg, larvae, juvenile, and adult designations at this MTS, but only windowpane flounder eggs and winter flounder larvae and adults were collected during EEA's study.

3.2 South Bronx

Six EFH listed species were collected at the South Bronx MTS (see Table 5). The species collected were Atlantic butterfish, Atlantic herring, bluefish, summer flounder, windowpane flounder, and winter flounder. Adults of all of these species were collected in 2003, except for the Atlantic butterfish, where only juveniles were collected. Several life stages of the flounders were collected during the sampling period. Juvenile and adult summer flounder; eggs, larvae, and adult windowpane flounder; and all four life stages of winter flounder were collected at the South Bronx MTS.

3.3 East 91st Street

Three EFH listed species were found at the East 91st Street MTS: summer flounder, windowpane flounder, and winter flounder (see Table 5). Due to physical restraints of the bottom topography, sampling could not be conducted for adult finfish, only ichthyoplankton. The larvae of all three aforementioned species and eggs of windowpane and winter flounder were collected during sampling in 2003.

3.4 Greenpoint

Five EFH listed species were collected at Greenpoint (see Table 5). Most of the individuals collected were adults. Adult Atlantic herring, bluefish, summer flounder, and winter flounder were collected at this MTS. Larval windowpane flounder and winter flounder were also collected here in 2003.

3.5 Hamilton Avenue

Three EFH listed species were collected from this MTS: Atlantic herring, windowpane flounder, and winter flounder (see Table 5). Due to physical restraints of the bottom topography, sampling could not be conducted for adult finfish, only ichthyoplankton. Larvae of all three aforementioned species plus eggs of windowpane flounder were collected during the 2003 MTS biological studies.

3.6 Southwest Brooklyn

The greatest number of EFH listed species (10) was collected at SW Brooklyn (see Table 5). Adult Atlantic herring, bluefish, little skate, scup, summer flounder, windowpane flounder, winter flounder, and winter skate were collected in 2003. Larval and juvenile Atlantic butterfish and juvenile black sea bass were also collected. Of the species already mentioned, other life stages were also collected during the year. Juvenile Atlantic herring, scup, and summer, windowpane, and winter flounder were collected. Larvae of scup, windowpane flounder, and winter flounder, and eggs of windowpane flounder were also present.

3.7 West 135th Street

Five EFH listed species were collected at West 135th Street (see Table 5). Juvenile and adult Atlantic butterfish and bluefish were collected, along with adult summer flounder. Also, larval and juvenile windowpane flounder and winter flounder were observed at this MTS.

3.8 West 59th Street

Six EFH listed species were collected from the West 59th Street MTS: Atlantic butterfish, Atlantic herring, bluefish, summer flounder, windowpane flounder, and winter flounder (see Table 5). Juvenile and adult Atlantic butterfish, larval and adult Atlantic herring, and adult bluefish were collected in 2003. Juvenile and adult summer flounder; eggs larvae, and juvenile windowpane flounder; and all four life stages of winter flounder were present at the West 59th Street MTS.

4.0 Species Assessments

Twenty finfish species have EFH designated in the quadrats in which the MTS are located.[3] Ten of these species were collected during a year-long marine biological survey.[6] Species specific information on the twenty species with EFH designations are outlined in Table 3. This table describes temperature and salinity tolerances, depth preferences, seasonal occurrence, and habitat preferences for each life stage of the listed species. General comments are also listed for the species. Detailed information about the ten species collected at the eight MTS in 2003 is presented in the MTS Marine Biological Study report.

5.0 Impact Assessments

The potential impacts to the finfish species living in the areas where MTS construction is slated follow. Over-water construction will entail dredging and pile driving, activities which cause both turbidity and siltation. Finfish communities and their food sources, benthic and epibenthic organisms, will be discussed as the impact on the finfish community will be greatly determined by the impact on their food sources. Construction and operation of the MTS for the proposed containerization program will have both short and long term impacts on the surrounding marine environment and ambient natural resources. In this section, two types of

impacts will be discussed: short term or construction impacts, and long term or operational impacts.

5.1 Construction Impacts. Construction impacts to the marine environment result from both the demolition of existing structures and the fabrication of new facilities. Construction impacts are limited temporally to the span of the activities, typically a few years. On a generic basis these impacts include, but are not limited to, loss of benthic habitat due to dredging, turbidity and siltation from piling removal or installation, loss of encrusting organism habitat from piling removal, and general disruption due to human and mechanical activity. Minor water quality impacts such as localized anoxia may result if newly exposed reduced sediments draw down dissolved oxygen on contact. A list of the potential impacts at the MTS is presented in Table 1. The proposed construction plans call for some activity at each of the eight MTS, but the extent varies with some sites being totally rebuilt and others having relatively minor alterations.

5.1.1 Benthic Communities. Benthic organisms, being immobile (at least in the adult stages) are subject to impacts of construction activities that have the potential for disruption or even obliteration of the populations in the impact zone. The benthic species found at each MTS are listed in Table 2. If benthic species diversity is the accepted indicator for overall "health" of the communities around each MTS, it follows that the MTS zones with the highest diversities are likely to be more greatly impacted than those with lower diversities. While species diversity is an accepted indicator, caution must be used in interpreting the data because certain specific monocultures can also be considered highly valuable systems. Nonetheless, lower diversity benthic communities are usually opportunistic species with high abundances and toleration for more degraded environments. The most abundant species observed at these MTS were those species tolerant of degraded environments: *Streblospio benedict, Capitella capitata*, polychaetes, and oligochaetes. With these caveats in mind, benthic species diversity will be used in this impact analysis to determine probable impacts to the benthic communities.

The Shannon-Weaver Index for benthic organisms was computed for all MTS. This index is used as a measure of community diversity but also accounts for numbers of individual organisms. In rank of the indices from the highest to the lowest, where a high index indicates a high species diversity, the stations and their respective indices were:

MTS	Shannon-Weaver Index	Rank
W. 135th Street	2.014	High
South Bronx	1.921	High
S. W. Brooklyn	1.815	High
Hamilton Avenue	1.509	Medium
North Shore	1.487	Medium
W. 59th Street	1.286	Medium
E. 91st Street	1.116	Medium
Greenpoint	0.780	Low
Mean, all MTS	1.700	

The ranking of high, medium, and low are somewhat arbitrary; however, this ranking can be used as a general grouping of the respective MTS indices to determine impacts. A Shannon-

Weaver Index above 1.8 was given a high rank, and index between 1.0 and 1.8 was assigned a medium rank, and an index below 1.0 was given a low rank.

At present the plan is for the following degrees of activity and consequent potential for benthic impacts. The MTS that will have construction involving the construction of mew platforms, causing turbidity and siltation, were assigned a high impact rank. Those with minimal or no construction were assigned a low or no impact rank.

MTS	Construction Activity	Marine Resource Impacts	
W. 135th Street	New, larger platform	Turbidity, siltation	(high)
W. 59th Street	New, larger platform	Turbidity, siltation	(high)
E. 91st Street	New, larger platform	Turbidity, siltation	(high)
South Bronx	New, larger platform	Turbidity, siltation	(high)
Greenpoint	New, smaller platform	Turbidity, siltation	(high)
Hamilton Avenue	Existing platform removed	Minimal	(low)
S.W. Brooklyn	Existing platform to remain	None	(none)
North Shore	New, larger platform	Turbidity, siltation	(high)

If the two above tables are combined the following matrix can be constructed. In order to determine the expected impacts, turbidity and siltation received a high rank, while the removal of platforms with no new construction received a low rank. If two high ranks were compared, the expected impact was high. If a high and medium rank was compared, the expected impact was moderate. If the Shannon-Weaver Index or construction activity had a low rank, the expected impact was ranked as minimal or none.

MTS	Degree of Expected Impacts
W. 135th Street	High
South Bronx	High
S. W. Brooklyn	None
Hamilton Avenue	Minimal
North Shore	Moderate
W. 59th Street	Moderate
E. 91st Street	Moderate
Greenpoint	Minimal

The needs of the project require that the old platforms be removed and new ones constructed. SW Brooklyn is an exception; the existing platform will remain in place. The construction of new platforms will cause turbidity and siltation, which could smother benthic communities. Impacts will be greatest to the benthic communities at the MTS that have the most diverse benthic communities. The above ranking of expected benthic impacts from construction appears logical as West 135th Street and South Bronx had the highest Shannon-Weaver indices and significant construction activities. Conversely, SW Brooklyn, Greenpoint and Hamilton Avenue ranked low on impacts. No impacts are expected at SW Brooklyn, as no over-water platform construction is slated. No new over-water construction is planned at Hamilton Avenue

and the benthic community at Greenpoint is not very diverse, so the limited construction should not result in drastic impacts.

5.1.2 Epibenthic Communities. Examination of the colonization plates revealed that most of the MTS had extensive macrofaunal communities within a single growing season. Most growth was observed in the spring and summer months. The most abundant species were those that are tolerant of degraded environments, such as the amphipod *Corophium insidiosum*, the polychaete worm, *Polydora sp.*, and the tunicate *Molgula manhattensis*. All species found on the colonization arrays at each MTS are listed in Table 3. Removal of the existing structures will temporarily eliminate these communities and cause a localized loss of food sources for fish species (e.g., tautog) that prey on them. At Hamilton Avenue MTS this impact will be the most pronounced compared to the others because substrate for growth will be permanently removed. Greenpoint will also have a loss of macrofauna due to a reduction in platform size. The other MTS will have as much or more new hard surface available for colonization so this initial habitat loss will not be significant. The epibenthic community is expected to remain at SW Brooklyn, as no pier removal or construction is planned at this MTS.

It is important to note that colonization was observed during one sampling season and therefore the new structures are expected to be colonized fairly quickly. However, colonization may be delayed if treated lumber is used in construction. Treated lumber prevents marine growth until enough of the treatment has leached out of the lumber to allow a suitable environment for growth. Two widely used treatments for marine construction are creosote and chromated copper arsenate (CCA). Although both are used to deter marine growth, studies have suggested that they do not pose a significant risk to aquatic life.[6] Creosote releases polycyclic aromatic hydrocarbons (PAHs) and CCA releases copper, chromium, and arsenic, however, the most leaching occurs with the initial introduction to the water and leaching decreases with time.[7] The leachate from both types of treated lumber is absorbed by the sediment and is either metabolized by microorganisms or becomes biologically unavailable.[7] Because leaching decreases with time, both benthic and epibenthic organisms are expected to recolonize the sediment and reclaim the submerged structures. It must also be noted that many of the benthic and epibenthic organisms found around the MTS were those tolerant of degraded environments and would generally be the first to be found again.

5.1.3 Adult Finfish. Construction impacts such as turbidity and siltation will be limited spatially to the immediate area of the transfer station. These impacts will also be restricted temporally to the time of construction, approximately one to one and a half years. Adult finfish impacts are not expected because motile organisms will avoid construction activities that produce less than optimal environmental conditions. Fish generally display avoidance behavior of areas that have a milligram per liter or more of suspended sediment.[8] Some fish are more tolerant of suspended sediment than others. For example, bottom dwellers, such as flounders, are more tolerant of suspended particles than pelagic species, and clupeids (herring) are most sensitive to suspended sediment as it easily clogs their gills.[8] Table 4 shows the relative sensitivity of the finfish collected at the MTS to suspended particles in the water column.

The pile-driving activity associated with pier construction may also cause fish to avoid the construction sites. Relative finfish sensitivity to noise is listed in Table 4. Studies on the effects of offshore pile-driving on finfish, which may be more intense than the type used in this project, have indicated that in general, bottom dwelling fish (flatfish, etc.) are less sensitive to pile-driving than pelagic fish (whose swim bladders are sensitive to pressure changes, which in turn effects the ear).[9] Herring have been documented to show escape responses to pile-driving.[9] Avoidance response of juvenile salmonids to pile-driving activity in harbors has also been documented.[10] Although there were no salmonids at any of the MTS studied, this study may be extrapolated to suggest that finfish would probably avoid the areas where marine construction is occurring.

Table 5 lists the adult finfish species collected at each MTS. The flatfishes (flounders) and clupeids were totaled for each MTS. Four of the six MTS that were trawled (South Bronx, Southwest Brooklyn, W. 135th Street, and W. 59th Street) had substantially more flatfish than herrings. The finfish communities at the above mentioned MTS indicate that there may possibly be a less drastic community shift at those MTS during platform modification than an MTS with a high clupeid population. North Shore and Greenpoint had more herrings surrounding the MTS, and may experience more finfish avoidance behavior than the other MTS. General avoidance behavior of the finfish that live near the MTS was observed during the summer months when the dissolved oxygen levels decreased in the water resulting in the movement of fish away from the affected areas. A similar response would occur if marine construction released anoxic sediment that absorbed the oxygen form the water, causing a temporary drop in dissolved oxygen levels.

5.1.4 Ichthyoplankton. Ichthyoplankton are more sensitive to construction impacts than adult finfish. This is due to high mortality experienced in egg and larval stages. The lethal concentration of suspended sediment for finfish eggs and larvae is generally one milligram per liter of water.[8] For demersal fish eggs (those that lay on the substratum) the impacts are similar to those of the benthic invertebrates. These eggs could be smothered by sediment during construction. Pelagic eggs are free floating and could be carried or swept through an impact zone, but given the current velocities in most of the MTS areas, are unlikely to stay for any extended period. Table 6 indicates the time of year and egg type of the more abundant species located in the central part of the Mid-Atlantic Bight. This table may be used as an indicator of those species more at risk to impacts from construction.

Larval forms that have motility (e.g., can swim) will behave like the adult finfish and avoid areas where the environmental conditions are unfavorable. As with the eggs, any that are swept through the construction sites by currents would not be exposed to suspended sediments for extended periods of time due to current velocities in the areas.

Currents may play an important factor in reducing impacts to non-motile finfish eggs and larvae. Most of the MTS have slated construction that would cause siltation, however, any egg or larvae swept into the construction zone should be swept out of the zone fairly quickly due to strong currents experienced at MTS sites. The two MTS that are on restricted waterbodies with less strong current regimes, Greenpoint and Hamilton Avenue, are places where eggs and larvae may have a greater residence time and exposure to suspended sediment. However, these MTS

have a lesser degree of over-water construction planned than most other MTS and had among the lowest concentrations of finfish eggs and larvae, so impacts should be minimal.

The finfish eggs and larvae collected at each MTS are presented in Tables 7 and 8. Winter flounder is the only species collected at the MTS that lays demersal eggs. Because of its recreational importance and declining numbers, winter flounder is of concern to fisheries biologists and regulatory scientists.[11] Winter flounder eggs were collected at three of the MTS – South Bronx, East 91st Street, and West 59th Street. Winter flounder larvae were collected at all eight MTS. Construction impacts are expected to be negligible to winter flounder or other ichthyoplankton species.

5.2 Operational Impacts. While the construction impacts are limited to the duration of the activities, the operational impacts will persist for the duration of the facilities life span, a time span measured in decades. The major operational impact will be the footprint of the structures over water. While the littoral zone covered by the structures will not be devoid of invertebrate and finfish resources, the coverage will block sunlight and hinder primary production. Each of the MTS has differing amounts of existing and proposed coverage, but in summary the differences are as follows:

MTS	Existing sq. ft.	Proposed sq. ft.	Difference
W. 135th Street	52,905	97,019	44,114
W. 59th Street	65,275	92,468	27,193
E. 91st Street	34,717	73,410	38,693
South Bronx	42,610	64,559	21,949
Greenpoint	34,695	13,048	(21,647)
Hamilton Ave.	34,905	0	(34,905)
S.W. Brooklyn	23,855	23,855	0
North Shore	40,747	86,669	45,922
Total	329,709	451,028	121,319

Inspection of the above table reveals that Greenpoint, Hamilton Avenue, and Southwest Brooklyn MTS can be eliminated from the long term impact discussion since they are either remaining in place or are being replaced with facilities that have substantially smaller footprints.

It is safe to say that the impacts of large platforms on the harbor estuary ecology are controversial. Studies conducted by EEA in the late 1980's showed similar finfish and benthic communities in the interpier and underpier environments in two large scale programs on the Hudson and East Rivers, respectively.[12,13,14] Other studies, primarily by Able *et., al.* have shown that caged winter flounder failed to thrive underneath large platforms.[15,16] Able's studies are controversial, however, because the fish were caged, and this may impact the results of the study. Some fish are even known to associate with submerged structures, as it provides shelter and surfaces for food to grow. While the field tests appear to be contradictory for finfish, there is no doubt that fish do indeed inhabit at least the interface of platforms and the benthic invertebrate communities are virtually identical in the underpier and interpier zones.

From a regulatory perspective, there is acceptance that platforms do not necessarily cause the underpier zones to be devoid of life but they are still considered to be a taking of marine environmental resources and the procedural, if not environmental, equivalent of fill.

5.2.1 Benthic Communities. The studies done by EEA and published in the late 1980's and early 1990's were conclusive regarding the benthic organism communities under large platforms in the Hudson and East Rivers. A comparison involving hundreds of grab samples from the inter and underpier zones indicated there was no statistically significant difference in species composition and abundance.[12,13,14] Based largely upon these published studies and benthic analysis in the 2003 program, it appears unlikely that the reconstruction, or even enlargement of the present platforms will materially alter the benthic meiofauna communities over the long term. Benthic communities that may have experienced toxicity due to leachate from treated lumber used to build the piers would quickly be rebuilt as the leaching decreases and the pollution-tolerant organisms, that had dominated the benthic communities before construction started, would come back. Those communities displaced by construction would begin reclaiming the sediment soon after construction was completed.[17,18] The opportunistic species would appear first, followed by longer lived species.[17,18]

5.2.2 Epibenthic Communities. The long term impact to the epibenthic communities will be beneficial. The planned enlargement of the platforms will provide significantly more hard surface for macrofauna and the finfish that use them as a food source. The five MTS that will have increased platforms, and therefore increased areas for epibenthic growth, once the treated lumber has lost its toxicity, are W. 135th Street, W. 59th Street, E 91st Street, South Bronx, and North Shore. The increase in epibenthic colonizers should lead to an increase in finfish species that feed on these organisms (e.g. cunner and tautog).

5.2.3 Adult Finfish. The EEA studies on the East River showed altered finfish communities in the under and interpier zones. Abundances of fish under South Street Seaport Pier 17, which was used as a model, did show moderately lower numbers under piers and different types of finfish in the two zones.[12] It is possible, even likely, that construction of larger platforms at E. 91st Street and South Bronx, located on the East River, and possibly North Shore, located in Flushing Bay off the East River, will cause population declines and shifts in finfish species composition underneath these platforms. Interpier-underpier studies on the Hudson River also showed slightly different finfish densities for several species beneath piers as opposed to in open water.[13,14] Using this study as a model, there is a possibility of a shift in the finfish communities at the W. 59th and W. 135th Street MTS with the expansion of piers. Conversely, MTS that have a reduction in pier coverage, Greenpoint and Hamilton Avenue, may also see a small shift in local finfish communities. Because finfish for the most part are transient, these shifts cannot be quantified absent a future monitoring program. Regardless, a conservative approach would be to allow for some reduction, measurable or not, in local fish stocks due to construction of the enlarged platforms.

The present plan is to construct 121,319 sq. ft. (approximately 2.8 acres) of new platforms in the harbor estuary should full build out be accomplished. Based upon existing data and previous studies, the MTS which will experience a net gain in pier coverage will be the most likely finfish impact receptors.

5.2.4 Ichthyoplankton. Aside from the possible population shifts at the MTS with increased pier structures, there is little likelihood that the enlarged MTS would have any significant or even measurable impacts on ichthyoplankton communities.

5.3 Overview of Marine Environmental Impacts. Construction, or short term impacts resulting from the project will be limited both spatially and temporally. The greatest impacts will be temporary destruction of benthic and epibenthic communities and avoidance by finfish due to suspended particles and food source reduction. While they may not be amenable to avoidance or reduction, these impacts will be limited and will not last beyond one seasonal cycle for invertebrates. Construction impacts on finfish will not be quantifiable.

Full build out of the project will result in an additional 2.8 acres of new platform in the harbor marine environment. From a regulatory perspective, this impact may be significant due to the time-frame of the project (e.g., decades). If the judgment of the agencies is a finding of significant negative impact, then mitigation programs may need to be devised, assuming that no landside alternative is possible.

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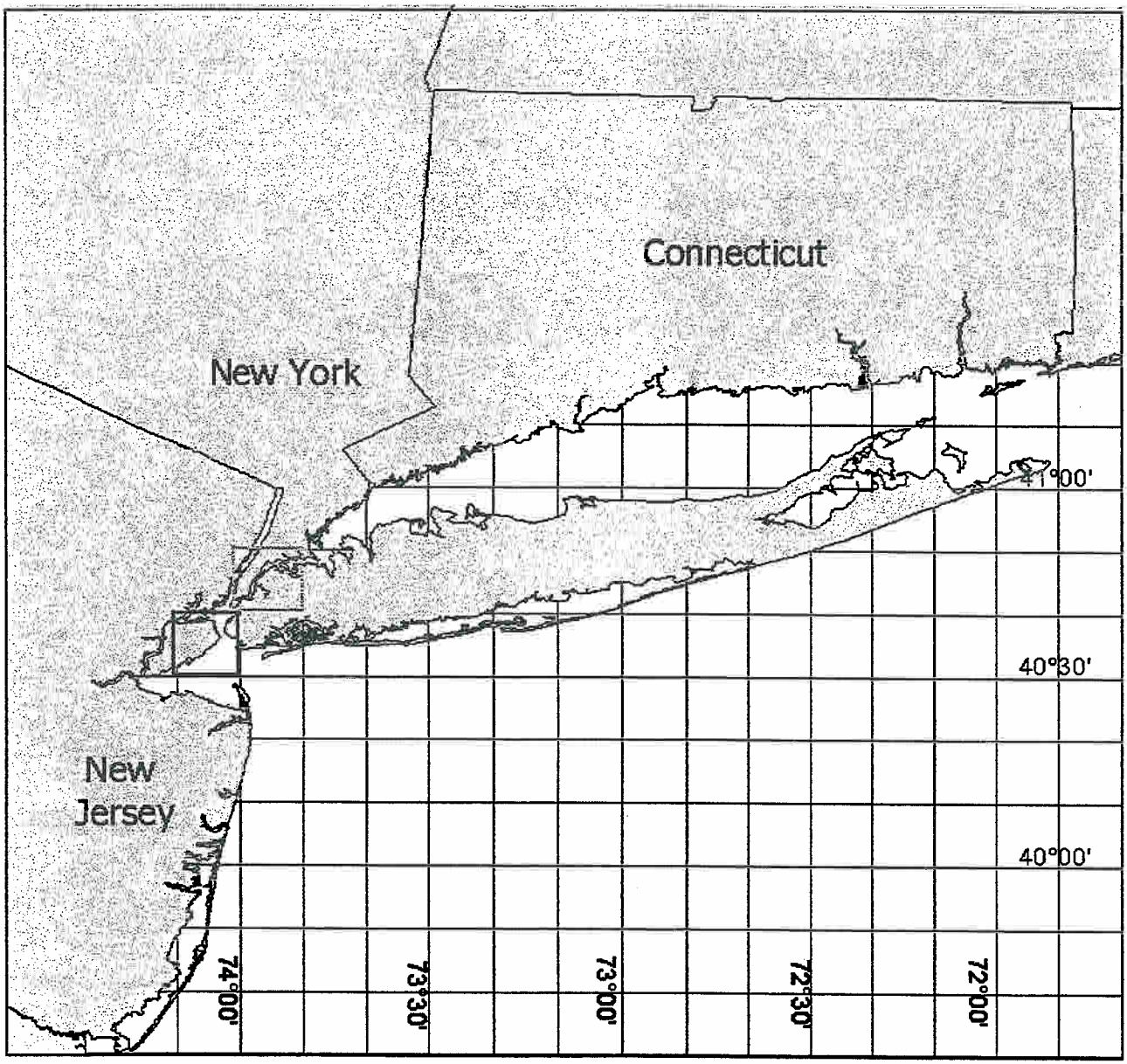
Figure 1
Quadrats in which MTS are Located



Southwest Brooklyn

North Shore
South Bronx
East 91st Street
Greenpoint
Hamilton Avenue
West 135th Street
West 59th Street

Source: National Marine Fisheries Web Page. http://www.nero.noaa.gov/ro/STATES4/ConnNYNJ.htm

Table 1
EFH Designated Life Stages at MTS

Species	MTS	
	North Shore South Bronx East 91st Street Greenpoint Hamilton Avenue West 135th Street West 59th Street	Southwest Brooklyn
Atlantic Butterfish	L,J,A	L,J,A
Atlantic Herring	L,J,A	L,J,A
Atlantic Mackerel	J,A	J,A
Black Sea Bass	J,A	J,A
Bluefish	J,A	J,A
Clearnose Skate	J,A	J,A
Cobia	E,L,J,A	E,L,J,A
Dusky Shark	L	L,J
King Mackerel	E,L,J,A	E,L,J,A
Little Skate	J,A	J,A
Pollock	J,A	
Red Hake	L,J,A	E,L,J
Sand Tiger Shark	L	L
Sandbar Shark	L,A	L,A
Scup	E,L,J,A	E,L,J,A
Spanish Mackerel	E,L,J,A	E,L,J,A
Summer Flounder	L,J,A	L,J,A
Windowpane Flounder	E,L,J,A	E,L,J,A
Winter Flounder	E,L,J,A	E,L,J,A
Winter Skate	J,A	J,A

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

Source: National Marine Fisheries Service Web Page. http://www.nero.noaa.gov/ro/STATES4/ConnNYNJ.htm

Table 2
List of Management Councils that Govern EFH Species

New England Fishery Management Council (NEFMC)

Common Name	Scientific Name
Atlantic (Sea) Herring	*Clupea harengus*
Clearnose Skate	*Raja eglanteria*
Little Skate	*Raja erinacea*
Red Hake	*Urophycis chuss*
Windowpane Flounder	*Scopthalmus aquosus*
Winter Flounder	*Pleuronectes americanus*
Winter Skate	*Raja ocellata*

Mid-Atlantic Fishery Management Council (MAFMC)

Common Name	Scientific Name
Atlantic Butterfish	*Peprilus triacanthus*
Atlantic Mackerel	*Scomber scombrus*
Black Sea Bass	*Centroptistus striata*
Bluefish	*Pomatomus saltatrix*
Scup	*Stenotomus chrysops*
Summer Flounder / Fluke	*Paralicthys dentatus*

South Atlantic Fishery Management Council (SAFMC)

Common Name	Scientific Name
Cobia	*Rachycentron canadum*
King Mackerel*	*Scomberomorus cavalla*
Spanish Mackerel*	*Scomberomorus maculatus*

Atlantic States & Gulf Coast States Marine Fishery Comission (ASMFC, GCMFC)

Common Name	Scientific Name
Dusky Shark*	*Charcharinus obscurus*
Sand Tiger Shark*	*Odontaspis taurus*
Sandbar Shark*	*Charcharinus plumbeus*

* Indicates species also managed by NMFS.

Source: National Marine Fisheries Service. Guide to Essential Habitat Descriptions. National Marine Fisheries Service Web Page. http://www.nero.noaa.gov/ro/doc/list.htm

Essential Fish Habitat Species Located Near MTS

Species	Life Stage	Temp. °C	Salinity °/oo	Depth m	Seasonal Occurrence	Habitat	Comments
Carcharinus obscurus (dusky shark)	Larvae Juveniles	Warm, Temperate	-	0-25	-	Inlets, estuaries and shallow coastal waters.	Highly migratory. Prey- small schooling fish.
Carcharinus plumbeus (sandbar shark)	Larvae Adults	-	-	0-25	-	Shallow, coastal waters; submerged flats (1-4m).	Highly migratory.
Centropristis striata (black sea bass)	Juveniles	>6	>18	<10	Apr. to Dec.,peak June to Nov.-coastal. Winter-offshore south of NJ. Summer & Spring-estuaries.	Rough bottom, shellfish, eelgrass beds; man-made structures-sandy-shelly areas, offshore clam beds, shell patches-wintering.	YOY use salt marsh edges, channels-high habitat fidelity.
	Adults	>6	>20	10-20	May to Oct.-inshore, estuaries. Winter offshore south of NY.	Structured habitats (natural & man-made); sand & shell preferred.	Spawn in coastal bays, change sex to males with growth. Prey: benthic, near-bottom inverts, squid, small fish.
Clupea harengus (Atlantic sea herring)	Larvae	22-24	1.4-60; prefer 10-20	Surface	-	May associate with vegetation.	Major prey: copepod nauplii and copepodites. Diurnal vertical migrations to move into estuaries.
	Juveniles	<10	26-32	15-135	-	Pelagic waters & bottom habitats.	School, negative response to light, feed on zooplankton.
	Adults	<10	>28	20-130	-	Pelagic waters & bottom habitats.	Selective feeding on zooplankton.
	Spawning Adults	<15	32-33	20-80	July through Nov.	Bottom habitats-gravel, sand, cobble and shell. Also on aquatic macrophytes.	Overwinter after spawning.
Odontaspis taurus (sand tiger shark)	Larvae	-	-	-	-	Shallow coastal waters, bottom or dermersal. Sandy coastal waters, shallow bays, estuaries and rocky or tropical reefs	Highly migratory. Feeds on fish, small sharks, rays, squid, crustaceans.

Essential Fish Habitat Species Located Near MTS

Species	Life Stage	Temp. °C	Salinity °/oo	Depth m	Seasonal Occurrence	Habitat	Comments
Paralichthys dentatus (summer flounder/fluke)	Larvae	9-12	23-33 fresh in Hudson, Raritan	1-70	Sep. to Feb. (MAB)	Pelagic Waters-larvae mostly 19-83km offshore.	High use of tidal creeks and creek mouths.
	Juveniles	>11	10-30	1-70; 0.5-5 in estuary	-	Demersal Waters, muddy substrate but prefer sand; lower estuary flats, channels, slat marsh creeks and eelgrass.	HAPC-macroalgae, seagrasses, fw & tidal macrophytes-any size bed & loose aggregations, within adult & juv. EFH. Major prey: mysid, shrimp.
	Adults	-	-	1-360	Warmer months-shallow coast & estuarine, offshore in colder months.	Demersal waters and estuaries.	HAPC-macroalgae, seagrasses, fw & tidal macrophytes-any size bed & loose aggregations, within adult & juv. EFH. Major prey: fish, shrimp, squid, polychaetes.
Peprilus triacanthus (Atlantic butterfish)	Juveniles	3-28	3-37	10-365 (most <120)	Winter-shelf Summer to Fall-estuaries	Pelagic Waters Larger fish-sandy, muddy substrates.	
	Adults	3-28	4-26	10-365 (most <120)	Winter-shelf Summer to Fall-estuaries	Pelagic Waters (schools over sandy, sandy-silt, muddy substrates)	
Pollachius virens (pollock)	Juveniles	0-15.6	29-32	5-250; most 25-75	July to November	Inshore, sand, mud, rocky or aquatic vegetation bottoms. Shallow intertidal.	Intertidal important nursery. Major prey is crustaceans.
	Adults	<14	31-34	15-365	-	Hard bottom habitats including artificial reefs	Major prey: crustaceans, fish, mollusks
Pomatomus saltatrix (bluefish)	Juveniles	19-24	23-36	-	May to Oct.	Pelagic waters, ubiquitous in mixing and seawater zones. Seldom found beyond Continental Shelf. Shallow nearshore habitats. Estuaries as nursery.	Highly migratory, major prey fish. Visual feeders on polychaetes, crustaceans, fish. Can change depths rapidly-secretes gas into swim bladder fastest rate known.
	Adults	14-16	>25	-	April to Oct.		

Essential Fish Habitat Species Located Near MTS

Species	Life Stage	Temp. °C	Salinity °/oo	Depth m	Seasonal Occurrence	Habitat	Comments
Pseudopleuronectes americanus (winter flounder)	Eggs	<10: spawn at 3	10-32	Inshore 0.3-4.5	February to June	Bottom habitats, substrate of sand, mud, gravel, algae.	Demersal, adhesive eggs.
	Larvae	<15; most 2-15	3.2-30	Inshore 1-4.5	March to July	Pelagic and bottom waters. Fine sand, gravel.	Feed on copepods and phytoplankton.
	Juveniles (YOY)	2-29.4; prefer 19.5	5-33	Inshore 0.5-12	Yearly, abundant summer and fall.	Benthic substrate near shallow natal waters. Mud, sand with shell/leaf litter. Ulva, eelgrass.	Feed on copepods nauplii, polychaetes, nemerteans, ostracods.
	Juveniles (Age 1+)	10-25	10-30	<200; LIS: 18-27	Yearly, abundant spring, winter and fall.	Bottom habitats, substrate of mud, fine-grained sand, silt, shell.	Major prey: amphipods, copepods, polychaetes, bivalve siphons.
	Adults	0.6-23; prefer 12-15	15-33	1-100	Yearly, abundant spring, winter and fall.	Inshore waters, estuaries. Bottom habitats,of mud.	Major prey: annelids, cnidarians and mollusks.
	Spawning Adults	<25	5.5-36; most 31-32.5	Inshore 1-30	February to June	Inshore waters, estuaries. Bottom habitats,of mud, sand, gravel, cobble, rock.	
Rachycentron canadum (cobia)	Eggs Larvae Juveniles Adults	>20	>25	-	-	Sandy shoals of capes, offshore bars; high profile rock bottoms, barrier island oceanside waters from surf to shelf from Gulfstream shoreward; high salinity bays, estuaries, seagrass habitats.	All coastal inlets. Life stages not separated.
Raja erinacea (little skate)	Juveniles	1-21	15-35	0-371 most < 111	-	Sand and gravel bottoms. Sometimes mud.	Buries in bottom depressions suring day and active at night. Prey: polychaetes and amphipods.
	Adults	2-19	18-35	0-371 most < 111	-	Sand and gravel bottoms. Sometimes mud.	Buries in bottom depressions suring day and active at night. Prey: polychaetes, amphipods, and fish.

Essential Fish Habitat Species Located Near MTS

Species	Life Stage	Temp. °C	Salinity °/oo	Depth m	Seasonal Occurrence	Habitat	Comments
Raja ocellata (winter skate)	Juveniles	-1.2 - 21	15-35	0-371 most < 111	-	Sand and gravel bottoms. Sometimes mud.	Buries in bottom depressions suring day and active at night. Prey: polychaetes and amphipods.
	Adults	-1.2 - 21	15-35	0-371 most < 111	-	Sand and gravel bottoms. Sometimes mud.	Buries in bottom depressions suring day and active at night. Prey: polychaetes, amphipods, and fish.
Scomber scombrus (Atlantic mackerel)	Juveniles	4-22; most 10.	>25	0-320	Year round.	Pelagic Waters	
	Adults	4-16	>25	0-380	Year-round.	One group overwinters in deep shelf waters. Spring move inshore, summer shelf edge.	Opportunistic feeders-filter or select prey. Major prey: crustaceans, pelagic mollusks, polychaetes, squid, fish.
Scomberomorus cavalla (king mackerel)	Eggs Larvae Juveniles Adults	>20	>30	-	-	Sandy shoals of capes, offshore bars; high profile rock bottoms, barrier island oceanside waters from surf to shelf from Gulfstream shoreward; high salinity bays, estuaries, seagrass habitats.	All coastal inlets. Life stages not separated.
Scomberomorus maculatus (Spanish mackerel)	Eggs Larvae Juveniles Adults	>20	>30	Through-out water column, outer estuary.	-	Sandy shoals of capes, offshore bars; high profile rock bottoms, barrier island oceanside waters from surf to shelf from Gulfstream shoreward; high salinity bays, estuaries, seagrass habitats.	All coastal inlets. Life stages not separated.

Essential Fish Habitat Species Located Near MTS

Species	Life Stage	Temp. °C	Salinity °/oo	Depth m	Seasonal Occurrence	Habitat	Comments
Scophthalmus aquosus (windowpane)	Eggs	<20	-	<70	Feb. to Nov. Peaks May & Oct. (MAB)	Surface Waters	
	Larvae	<20	-	<70	Feb. to Nov. Peaks May & Oct. (MAB)	Pelagic Waters	
	Juveniles	<25	5.5-36	1-100	-	Bottom habitats-mud, fine-grained sand.	
	Adults	<25	5.5-36	1-75	-		
	Spawning Adults	<21	5.5-36	1-75	Feb. to Dec. Peak in May (MAB)		
Squalus acanthias (spiny dogfish)	Eggs Larvae	n/a (Juv 1-28)	n/a	n/a (Juv 5-481)	n/a	n/a	Juveniles and adults prey on fish, crabs, squids.
Stenotomus chrysops (scup)	Eggs	13-23	>15	<30	May to August	Pelagic waters in estuaries.	
	Larvae	13-23	>15	<20	May to September	Pelagic waters in estuaries.	
	Juveniles	>7	>15	0-38	Spring, Summer-estuaries, bays.	Demersal waters; inshore sands, mud, mussel & eelgrass substrates.	
	Adults	>7	>15	2-185	Adults winter offshore south of NY.	Demersal waters, inshore estuaries on various substrates.	Spawn <30m during inshore migration May-Aug. Prey: small benthic invertebrates.

Essential Fish Habitat Species Located Near MTS

Species	Life Stage	Temp. °C	Salinity °/oo	Depth m	Seasonal Occurrence	Habitat	Comments
Urophycis chuss (red hake)	Eggs	<10	<25		May to November Peaks June and July	Surface waters of the inner continental shelf.	New larvae need shelter, including live sea scallops, floating or mid-water objects.
	Larvae	<19	>0.5	<200	May to December Peaks September/October	Surface Waters	
	Juveniles	2-22; most 3-16	>22; most 31-33	<100	Year round.	Bottom habitats w/ shell substrate, incl. areas with many live scallops. Estuaries, outer shelf.	Feed on crustaceans, polychaetes, amphipods.
	Adults	2-22; most 8-10	>20; most 33-34	5-300+; prefer 30-130	Year round.		Feed on fish and crustaceans.

Sources: National Marine Fisheries Service. Guide to Essential Habitat Descriptions. National Marine Fisheries Service Web Page. http://www.nero.noaa.gov/ro/doc/list.htm

National Marine Fisheries Service. Summary of Essential Fish Habitat (EFH) and General Habitat Parameters for Federally Managed Species. http://www.nero.noaa.gov/ro/doc/efhtables.pdf

Figure 2
Marine Transfer Station Locations

★ Location of MTS

Table 4
EFH Listed Species Collected by EEA in 2003

Common Nane	Scientific Name
Atlantic (Sea) Herring	*Clupea harengus*
Atlantic Butterfish	*Peprilus triacanthus*
Black Sea Bass	*Centroptistus striata*
Bluefish	*Pomatomus saltatrix*
Little Skate	*Raja erinacea*
Scup	*Stenotomus chrysops*
Summer Flounder / Fluke	*Paralicthys dentatus*
Windowpane Flounder	*Scopthalmus aquosus*
Winter Flounder	*Pleuronectes americanus*
Winter Skate	*Raja ocellata*

Source: New York City Department of Sanitation (DSNY). 2004. MTS Marine Biological studies. Prepared by EEA, Inc.

Table 5

EFH Designations and Observations at MTS

Species	North Shore		South Bronx		East 91st Street	
	EFH Designated Life Stages	Life Stages Observed	EFH Designated Life Stages	Life Stages Observed	EFH Designated Life Stages	Life Stages Observed
Atlantic Butterfish	L,J,A		L,J,A	J	L,J,A	
Atlantic Herring	L,J,A	A	L,J,A	A	L,J,A	
Black Sea Bass	J,A		J,A		J,A	
Bluefish	J,A		J,A	A	J,A	
Little Skate	J,A		J,A		J,A	
Scup	E,L,J,A		E,L,J,A		E,L,J,A	
Summer Flounder	L,J,A		L,J,A	J,A	L,J,A	L
Windowpane Flounder	E,L,J,A	E	E,L,J,A	E,L,A	E,L,J,A	E,L
Winter Flounder	E,L,J,A	L,A	E,L,J,A	E,L,J,A	E,L,J,A	E,L
Winter Skate	J,A		J,A		J,A	

Species	Greenpoint		Hamilton Avenue		Southwest Brooklyn	
	EFH Designated Life Stages	Life Stages Observed	EFH Designated Life Stages	Life Stages Observed	EFH Designated Life Stages	Life Stages Observed
Atlantic Butterfish	L,J,A		L,J,A		L,J,A	L,J
Atlantic Herring	L,J,A	A	L,J,A	L	L,J,A	J,A
Black Sea Bass	J,A		J,A		J,A	J
Bluefish	J,A	A	J,A		J,A	A
Little Skate	J,A		J,A		J,A	A
Scup	E,L,J,A		E,L,J,A		E,L,J,A	L,J,A
Summer Flounder	L,J,A	A	L,J,A		L,J,A	J,A
Windowpane Flounder	E,L,J,A	L	E,L,J,A	E,L	E,L,J,A	E,L,J,A
Winter Flounder	E,L,J,A	L,A	E,L,J,A	L	E,L,J,A	L,J,A
Winter Skate	J,A		J,A		J,A	A

Species	West 135th Street		West 59th Street	
	EFH Designated Life Stages	Life Stages Observed	EFH Designated Life Stages	Life Stages Observed
Atlantic Butterfish	L,J,A	J,A	L,J,A	J,A
Atlantic Herring	L,J,A		L,J,A	L,A
Black Sea Bass	J,A		J,A	
Bluefish	J,A	J,A	J,A	A
Little Skate	J,A		J,A	
Scup	E,L,J,A		E,L,J,A	
Summer Flounder	L,J,A	A	L,J,A	J,A
Windowpane Flounder	E,L,J,A	L,J	E,L,J,A	E,L,J
Winter Flounder	E,L,J,A	L,J	E,L,J,A	E,L,J,A
Winter Skate	J,A		J,A	

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

* Observed juveniles were age 0 and adults were age 1 and older

* North Shore, South Bronx, Greenpoint, SW Brooklyn, W 135th Street, and W 59th Street were samples for E,L,J, and A.
* E 91st Street and Hamilton Ave. were only sampled for E and L due to physical restraints of the areas.

* **This table only lists the finfish species collected by EEA in 2003 that have EFH designations in New York Harbor.** Several other species in the Harbor have EFH listing, but were not collected during this study.

Sources: New York City Department of Sanitation (DSNY). 2004. MTS Marine Biological Studies. Prepared by EEA, Inc.

National Marine Fisheries Service. Guide to Essential Fish Habitat Designations in the Northeastern United States. Image Map. National Marine Fisheries Service Web Page. http://www.nero.noaa.gov/ro/STATES4/ConnNYNJ.htm

Table 6
List of Potential Impacts to Marine Communities at MTS

mical
vy metals released from sediment during dredging
vy metals and PAHs intruduced to sediment and water from treated lumber used in construction
pended particles from marine construction and dredging
xia from release of reduced sediments during dredging
logical
upted communities
noval of food sources
sical
nnel dredging
dged material disposal
dging and filling
itat degradation

Organisms Collected in Benthic Grabs at Each MTS
January – October 2003

North Shore			
Species	**Total Number**	**Species**	**Total Number**
Streblospio benedicti	4751	*Nephtys* sp.	5
Oligochaeta	1459	Capitellidae	4
Haploscoloplos sp.	1457	Hesionidae	4
Eteone sp.	192	*Cassura longicirrata*	4
Annelida	150	Gasrtopoda	3
Corophium sp.	83	*Edotea triloba*	3
Mulinea lateralis	68	Nudibranchia	3
Sigambra sp.	59	*Mya arenaria*	2
Nereis sp.	45	*Tellina agilis*	2
Ilyanassa sp.	36	Sabellidae	2
Cirratulidae	29	*Mytilus edulis*	2
Phyllodocidae	25	*Cirratulus cirratus*	2
Neomysis americana	23	*Cossura longocirrata*	2
Pagurus sp.	22	*Molgula* sp.	2
Polydora sp.	19	*Glycera* sp.	1
Capitella capitata	15	*Melita nitida*	1
Bivalvia	15	*Rictaxis punctostriatus*	1
Amphipoda	13	*Molgula manhattensis*	1
Polychaeta	13	*Gammurus* sp.	1
Leucon americanus	12	*Ilyanassa obsoleta*	1
Polydora ligni	12	Caprellidae	1
Pectinaria gouldii	10	Atherinidae	1
Hypaniola grayi	9	Pysnogonidae	1
Ampelisca sp.	8	*Tharyx* sp.	1
Nereis succinea	7	*Paranaitis speciosa*	1
Crangon septemspinosa	7	*Jassa falcata*	1
Anemone	5	*Limulus polyphemus*	1
Spionidae	5	Sipunculid	1
Total			**8603**

South Bronx					
Species	**Total Number**	**Species**	**Total Number**	**Species**	**Total Number**
Streblospio benedicti	6497	Caprellidae	11	*Crangon septemspinosa*	2
Oligochaeta	2861	Actinaria	10	*Heteromysis formosa*	2
Cirratulidae	1025	Polynoidae	10	*Crepidula fornicata*	2
Haploscoloplos sp.	678	*Edotea triloba*	8	*Eumida sanguinea*	2
Hypaniola grayi	321	Atherinidae	8	Nudibranchia	2
Eteone sp.	224	*Molgula manhattensis*	7	*Lysianopsis alba*	2
Nereis sp.	205	Ampharetidae	7	*Lepidonotus* sp.	2
Polydora sp.	105	*Corophium* sp.	6	*Cirratulis grandis*	2
Mulinea lateralis	100	*Sigambra* sp.	6	*Parapholis spinosus*	2
Pectinaria gouldii	98	Platyhelminthes	6	*Neomysis americana*	1
Nereis succinea	77	Anemone	5	*Leucon americanus*	1
Capitellidae	66	Amphithoidae	5	*Edotea* sp.	1
Parametopella cypris	66	*Yolida* sp.	5	*Acteocina canaliculata*	1
Phyllodocidae	61	Bivalvia	4	*Erichthonius* sp.	1
Elasmopus levis	59	*Ampelisca* sp.	4	*Spio* sp.	1
Spionidae	50	*Gammurus* sp.	4	*Glycera americana*	1
Xanthidae	48	Hesionidae	4	Syllidae	1
Melitidae	46	*Sabelleria vulgaris*	4	*Hyatella* sp.	1
Mya arenaria	30	Polychaeta	3	*Cassura longicirrata*	1
Amphipoda	27	Corophidae	3	*Ampharete artila*	1
Capitella capitata	21	Pysnogonidae	3	*Asabellides* sp.	1
Podarke obscura	21	Decapoda	3	*Crepidula plana*	1
Glycera sp.	18	Aoridae	3	*Dyspanopeus sayi*	1
Melita nitida	17	*Cerepus tubularis*	3	*Sabella microphthalmus*	1
Gasrtopoda	15	*Panopeus herbstii*	3	*Schistomeringos* sp.	1
Tellina agilis	11	*Podarke* sp.	3	*Tellina* sp.	1
Sabellidae	11	*Polydora ligni*	2		
Total					**12933**

Organisms Collected in Benthic Grabs at Each MTS
January – October 2003

East 91st Street			
Species	**Total Number**	**Species**	**Total Number**
Streblospio benedicti	16952	*Ilyanassa obsoleta*	5
Oligochaeta	1738	*Neomysis americana*	4
Annelida	1637	*Gammurus* sp.	4
Haploscoloplos sp.	569	Amphithoidae	4
Hypaniola grayi	401	*Tharyx* sp.	4
Eteone sp.	393	*Nereis succinea*	3
Spionidae	324	*Parametopella cypris*	3
Cirratulidae	151	Xanthidae	3
Mulinea lateralis	136	*Acteocina canaliculata*	3
Nereis sp.	79	Caprellidae	3
Polydora sp.	65	Actinaria	3
Pectinaria gouldii	55	Corophidae	3
Phyllodocidae	35	*Sigambra* sp.	2
Capitella capitata	25	Polychaeta	2
Ilyanassa sp.	20	*Tellina agilis*	2
Glycera sp.	19	Nudibranchia	2
Bivalvia	17	*Lysianopsis alba*	2
Corophium sp.	13	Decapoda	2
Amphipoda	13	*Fabrica sabella*	2
Rictaxis punctostriatus	13	*Leucon americanus*	1
Mya arenaria	12	*Polydora ligni*	1
Edotea triloba	10	*Scolocolepides viridis*	1
Anemone	8	*Crepidula fornicata*	1
Sabellidae	8	*Erichthonius* sp.	1
Podarke obscura	7	*Glycera americana*	1
Crangon septemspinosa	6	Isopoda	1
Elasmopus levis	6	*Mytilus edulis*	1
Molgula manhattensis	6	*Idotea balthica*	1
Ampharetidae	6	*Ovatella myosotis*	1
Gasrtopoda	5	*Pinnixa* sp.	1
Ampelisca sp.	5		
Total			**22801**

Greenpoint			
Species	**Total Number**	**Species**	**Total Number**
Streblospio benedicti	23169	*Corophium* sp.	5
Capitella capitata	1338	*Sigambra* sp.	3
Oligochaeta	1071	*Mya arenaria*	3
Eteone sp.	958	Anemone	2
Annelida	497	*Scolocolepides viridis*	2
Polydora sp.	248	*Glycera* sp.	2
Haploscoloplos sp.	113	*Podarke obscura*	2
Polydora ligni	112	*Melita nitida*	2
Capitellidae	58	*Unciola* sp.	2
Nereis sp.	55	*Ilyanassa* sp.	1
Cirratulidae	36	Bivalvia	1
Phyllodocidae	26	Amphipoda	1
Neomysis americana	23	*Elasmopus levis*	1
Mulinea lateralis	17	*Ampelisca* sp.	1
Spionidae	16	*Edotea triloba*	1
Ilyanassa obsoleta	16	*Pagurus* sp.	1
Crangon septemspinosa	15	Syllidae	1
Hypaniola grayi	9	*Gammarus mucronatus*	1
Nereis virens	7	*Palaemonetes* sp.	1
Nereis succinea	6		
Total			**27823**

Organisms Collected in Benthic Grabs at Each MTS
January – October 2003

Hamilton Avenue			
Species	**Total Number**	**Species**	**Total Number**
Capitella capitata	4746	Nematoda	6
Streblospio benedicti	1702	*Ilyanassa* sp.	5
Oligochaeta	1196	*Corophium* sp.	5
Polydora sp.	462	*Nereis succinea*	4
Annelida	210	*Palaeomonetes vulgaris*	4
Nereis sp.	126	*Leucon americanus*	3
Edotea sp.	115	*Ampelisca* sp.	3
Platyhelminthes	54	*Glycera* sp.	3
Haploscoloplos sp.	29	*Mulinea lateralis*	2
Neomysis americana	26	*Mya arenaria*	2
Phyllodocidae	24	Polychaeta	2
Polydora ligni	22	*Balanus* sp.	2
Podarke obscura	22	*Phyllodoce arenae*	2
Crangon septemspinosa	20	*Schistomeringos rudolphi*	2
Spionidae	13	Amphipoda	1
Capitellidae	12	Sabellidae	1
Cirratulidae	10	*Monoculodes edwardsi*	1
Eumida sanguinea	9	*Nephtys* sp.	1
Scolocolepides viridis	7	*Nereis virens*	1
Hesionidae	7	Decapoda	1
Molgula manhattensis	6	*Fabrica sabella*	1
Syllidae	6	*Hippolyte* sp.	1
Total			**8877**

Southwest Brooklyn			
Species	**Total Number**	**Species**	**Total Number**
Streblospio benedicti	4058	*Mya arenaria*	5
Oligochaeta	991	*Pagurus* sp.	5
Haploscoloplos sp.	477	*Hypaniola grayi*	4
Annelida	336	Bivalvia	4
Capitellidae	162	*Eumida sanguinea*	4
Nereis sp.	159	*Gammurus* sp.	3
Gasrtopoda	104	Hesionidae	3
Phyllodocidae	75	Atherinidae	3
Heteromysis formosa	72	*Palaeomonetes vulgaris*	3
Eteone sp.	62	Isopoda	3
Acteocina canaliculata	54	*Paranaitis speciosa*	3
Cirratulidae	51	*Cirratulus* sp.	3
Capitella capitata	45	*Polydora* sp.	2
Ilyanassa sp.	45	*Polydora ligni*	2
Crepidula fornicata	42	*Podarke obscura*	2
Pectinaria gouldii	35	*Edotea triloba*	2
Ampelisca sp.	34	*Sabelleria vulgaris*	2
Erichthonius sp.	34	*Nephtys* sp.	2
Amphipoda	22	*Pagurus longicarpus*	2
Melita nitida	20	*Leucon americanus*	1
Glycera sp.	19	*Corophium* sp.	1
Eulalia viridis	17	*Scolocolepides viridis*	1
Nereis succinea	15	Polychaeta	1
Tellina agilis	15	Caprellidae	1
Elasmopus levis	13	Syllidae	1
Rictaxis punctostriatus	13	Nudibranchia	1
Glycera americana	12	*Lysianopsis alba*	1
Mytillidae	12	*Mytilus edulis*	1
Xanthidae	10	*Lepidonotus* sp.	1
Paranatus sp.	10	*Oxyurustylis smithi*	1
Notoacmea testudinalis	9	*Clymenella* sp.	1
Neomysis americana	8	*Idotea metallica*	1
Ampelisca venili	8	*Microphthalmus aberrans*	1
Crangon septemspinosa	7	*Phyllodoce* sp.	1
Ilyanassa obsoleta	7	*Polinices duplicata*	1
Mulinea lateralis	5	*Sigalionidae* sp.	1
Spionidae	5		
Total			**7137**

Table 7 Continued

Organisms Collected in Benthic Grabs at Each MTS

January – October 2003

West 135th Street			
Species	**Total Number**	**Species**	**Total Number**
Oligochaeta	2866	Leptosynapta	8
Streblospio benedicti	1095	*Crangon septemspinosa*	7
Annelida	992	*Edotea triloba*	6
Mulinea lateralis	381	*Monoculodes edwardsi*	6
Neomysis americana	379	*Corophium* sp.	5
Haploscoloplos sp.	361	*Hyatella* sp.	5
Eteone sp.	164	*Podarke obscura*	4
Phyllodocidae	147	*Cyathura polita*	4
Leucon americanus	106	*Glycera* sp.	3
Bivalvia	66	*Gammurus* sp.	3
Scolocolepides viridis	65	Gasrtopoda	2
Nereis sp.	61	*Ampelisca* sp.	2
Capitella capitata	40	Isopoda	2
Spio sp.	28	Cumacea	2
Spionidae	25	*Molgula manhattensis*	1
Notomastus sp.	21	*Sabelleria vulgaris*	1
Polychaeta	18	Pysnogonidae	1
Mulinea sp.	17	*Gammarus mucronatus*	1
Amphipoda	16	*Callinectes sapidus*	1
Ilyanassa sp.	14	*Gammarus* sp.	1
Capitellidae	13	*Macoma* sp.	1
Nereis succinea	9	*Portunus* sp.	1
Mya arenaria	8		
Total			**6959**

West 59th Street			
Species	**Total Number**	**Species**	**Total Number**
Oligochaeta	2486	*Sabelleria vulgaris*	3
Streblospio benedicti	1220	*Nereis succinea*	2
Polydora sp.	122	*Corophium* sp.	2
Eteone sp.	74	*Scolocolepides viridis*	2
Haploscoloplos sp.	68	*Podarke obscura*	2
Leucon americanus	57	*Melita nitida*	2
Capitella capitata	35	*Monoculodes edwardsi*	2
Annelida	31	Orbiniidae	2
Nereis sp.	31	Anemone	1
Crangon septemspinosa	27	Phyllodocidae	1
Ampelisca sp.	14	*Ilyanassa* sp.	1
Cirratulidae	12	*Sigambra* sp.	1
Neomysis americana	10	*Glycera* sp.	1
Mulinea lateralis	8	Xanthidae	1
Edotea triloba	7	*Mulinea* sp.	1
Pectinaria gouldii	6	*Palaeomonetes vulgaris*	1
Capitellidae	5	Pysnogonidae	1
Stenopleustes gracilis	5	*Mytilus edulis*	1
Bivalvia	4	*Lepidonotus* sp.	1
Spionidae	3	Cumacea	1
Amphipoda	3	*Oxyurustylis smithi*	1
Gammurus sp.	3		
Total			**4261**

Epibenthic Organisms Collected at Each MTS
April 2003 – February 2004

North Shore
Ampellisca sp.
Antinoella sarsi
Balanus sp.
Copepoda
Corophium insidiosum
Corophium sp.
Elasmopus levis
Gammarus mucronatus
Hydrozoa, Mud, & Algal Film
Jassa falcata
Melita nitida
Microdeutopus sp.
Molgula manhattensis
Nereis succinea
Phyllodoce arenea
Phyllodocidae
Pleusymtes glaber
Polydora sp.
Sabella microphthalma
Spionidae
Stenothoidae

South Bronx
Ampellisca sp.
Antinoella sarsi
Balanus sp.
Caprella sp.
Corophium insidiosum
Crustacea
Elasmopus levis
Eumida sanguinea
Hydrozoa, Mud, & Algal Film
Isopoda
Jassa falcata
Melita nitida
Microdeutopus sp.
Molgula manhattensis
Mytilus edulis
Nereis succinea
Paracaprella tenuis
Phyllodoce arenae
Pleusymtes glaber
Polydora sp.
Sabella microphthalma
Scoloplos sp.
Sipunculoidea
Stenothoidae
Tharyx sp.

East 91st Street
Ampellisca sp.
Antinoella sarsi
Balanus sp.
Brania wellfleetensis
Caprella penantis
Corophium insidiosum
Corophium sp.
Elasmopus levis
Erichthonius brasiliensis
Eumida sanguinea
Exogone dispar
Hydrozoa, Mud, & Algal Film
Jassa falcata
Lyonsia sp.
Melita nitida
Microdeutopus sp.
Molgula manhettansis
Mytilus edulis
Nereis succinea
Paracaprella tenuis
Phyllodoce arenae
Phyllodoce sp.
Pleusymtes glaber
Polydora sp.
Polynoidae
Sabella microphthalma
Sabellaria vulgaris
Sabellidae
Spionidae
Stenothoidae
Xanthidae

Greenpoint
Ampellisca sp.
Balanus sp.
Corophium insidiosum
Corophium sp.
Eumida sanguinea
Gammarus mucronatus
Hydrozoa, Mud, & Algal Film
Melita nitida
Microdeutopus sp.
Molgula manhattensis
Mytilus edulis
Nereis succinea
Pleusymtes glaber
Polydora sp.
Sabella microphthalma
Spionidae
Stenothoidae
Syllidae

Epibenthic Organisms Collected at Each MTS
April 2003 – February 2004

Hamilton Avenue
Ampellisca sp.
Balanus sp.
Copepoda
Corophium insidiosum
Corophium sp.
Eumida sanguinea
Gammarus mucronatus
Hydrozoa, Mud, & Algal Film
Isopoda
Jassa falcata
Lepidonotus squamatus
Lysonia sp.
Melita nitida
Microdeutopus sp.
Molgula manhattensis
Mytilus edulis
Nereidae
Nereis sp.
Nereis succinea
Phyllodocidae
Pleusymtes glaber
Polydora sp.
Sabella microphthalma
Sabellaria vulgaris
Sabellidae
Stenothoidae
Syllidae

Southwest Brooklyn
Actinaria
Ampellisca sp.
Ampithoe valida
Antinoella sarsi
Aoridae
Balanus sp.
Caprella penantis
Caprella sp.
Corophium insidiosum
Corophium sp.
Crepidula fornicata
Crepidula plana
Elasmopus levis
Enrichthonius sp.
Eumida sanguinea
Gammarus oceanicus
Hydrozoa, Mud, & Algal Film
Isopoda
Jassa falcata
Lepidonotus squamatus
Lyonsia sp.
Melita nitida
Melitidae
Microdeutopus sp.
Molgula manhattensis
Mytilus edulis
Nereis sp.
Nereis succinea
Paracaprella sp.
Paracaprella tenuis
Phyllodocidae
Pleusymtes glaber
Polydora sp.
Stenothoidae
Syllidae

West 135th Street
Ampellisca sp.
Ampithoe valida
Balanus sp.
Corophium insidiosum
Corophium sp.
Hydrozoa, Mud, & Algal Film
Isopoda
Jassa falcata
Lyonsia sp.
Melita nitida
Nereis sp.
Nereis succinea
Pleusymtes glaber
Polydora sp.
Sabella microphthalma
Spionidae
Stenothoidae

West 59th Street
Ampellisca sp.
Ampithoe valida
Balanus sp.
Corophium insidiosum
Corophium sp.
Eumida sanguinea
Gammarus sp.
Hydrozoa, Mud, & Algal Film
Isopoda
Lyonsia sp.
Melita nitida
Molgula manhattensis
Nereis succinea
Phyllodoce arenea
Pleusymtes glaber
Polydora sp.
Spionidae
Stenothoidae

Table 9

t Finfish Sensitivitv to Susnended Particles and Noise Associated with Marine Constructi

Common Name	Suspended Particles	Noise
Alewife	High	High
American Eel	Moderate	Moderate
American Shad	High	High
Atlantic Butterfish	Moderate	Moderate
Atlantic Croaker	Moderate	Moderate
Atlantic Herring	High	High
Atlantic Menhaden	High	High
Atlantic Silverside	Moderate	Moderate
Atlantic Tomcod	Moderate	Moderate
Bay Anchovy	Moderate	Moderate
Black Sea Bass	Moderate	Moderate
Blueback Herring	High	High
Bluefish	Moderate	Moderate
Cunner	Moderate	Moderate
Gizzard Shad	High	High
Grubby Sculpin	Moderate	Moderate
Hickory Shad	High	High
Hogchoker	Low	Low
Lined Sea Horse	Moderate	Moderate
Little Skate	Low	Low
Naked Goby	Moderate	Low
Northern Pipefish	Moderate	Moderate
Oyster Toadfish	Low	Low
Scup	Moderate	Moderate
Smallmouth Flounder	Low	Low
Smooth Dogfish	Moderate	Low
Spotted Hake	Moderate	Moderate
Striped Bass	Moderate	Moderate
Striped Searobin	Moderate	Moderate
Summer Flounder	Low	Low
Tautog	Moderate	Moderate
Weakfish	Moderate	Moderate
White Perch	Moderate	Moderate
Windowpane	Low	Low
Winter Flounder	Low	Low
Winter Skate	Low	Low

te: This table uses information from the below sources to show a relative sensitivity of the fish collected at the
3 to activities associated with marine construction. Both studies were conducted in Europe and discuss
›pean species. The families of the fish studied were used to determine impact on the local finfish families.

Sources:
Bio/consultant as. Evaluation of the Effect of Sediment Spill from Offshore Wind Farm Construction on Marine Fish.
Bio/consultant as. Evaluation of the Effect of Noise from Offshore Pile-Driving on Marine Fish.

Table 10
Number of Adult Finfish Collected at Each MTS
January – December 2003

North Shore		
Species	**Total Number**	**EFH Listed**
Atlantic Silverside	44	
Atlantic Herring	40	*
Atlantic Menhaden	21	
Striped Bass	15	
Bay Anchovy	2	
Winter Flounder	2	*
Grubby Sculpin	1	
Northern Pipefish	1	
Total	**126**	**2**

South Bronx		
Species	**Total Number**	**EFH Listed**
Bay Anchovy	25	
Atlantic Butterfish	16	*
Atlantic Croaker	9	
Striped Bass	8	
Summer Flounder	6	*
Winter Flounder	5	*
Atlantic Tomcod	4	
Spotted Hake	4	
Tautog	4	
Grubby Sculpin	3	
Atlantic Herring	2	*
Bluefish	2	*
Windowpane	2	*
Atlantic Menhaden	1	
Cunner	1	
Hickory Shad	1	
Northern Pipefish	1	
Smallmouth Flounder	1	
Total	**95**	**6**

Greenpoint		
Species	**Total Number**	**EFH Listed**
Striped Bass	35	
Atlantic Menhaden	10	
Atlantic Tomcod	10	
Atlantic Silverside	8	
Atlantic Herring	5	*
Bluefish	5	*
Naked Goby	5	
Winter Flounder	5	*
American Shad	4	
Spotted Hake	3	
White Perch	3	
American Eel	1	
Bay Anchovy	1	
Striped Searobin	1	
Summer Flounder	1	*
Tautog	1	
Total	**98**	**4**

Table 10 Continued
Number of Adult Finfish Collected at Each MTS
January – December 2003

Southwest Brooklyn		
Species	**Total Number**	**EFH Listed**
Bay Anchovy	898	
Weakfish	69	
Scup	68	*
Little Skate	39	
Windowpane	38	*
Summer Flounder	35	*
Atlantic Croaker	24	
Atlantic Herring	20	*
Atlantic Silverside	18	
Striped Bass	15	
Striped Searobin	14	
Winter Flounder	10	*
Spotted Hake	9	
Atlantic Butterfish	8	*
Atlantic Menhaden	6	
Atlantic Tomcod	4	
Bluefish	4	*
Smooth Dogfish	3	
Black Sea Bass	2	*
Northern Pipefish	2	
Winter Skate	2	
Alewife	1	
Grubby Sculpin	1	
Lined Sea Horse	1	
Oyster Toadfish	1	
Smallmouth Flounder	1	
Total	**1293**	**8**

West 135th Street		
Species	**Total Number**	**EFH Listed**
Atlantic Croaker	881	
Striped Bass	23	
Winter Flounder	17	*
Hogchoker	5	
White Perch	5	
Atlantic Menhaden	3	
Bluefish	3	*
Atlantic Butterfish	2	*
Hickory Shad	2	
Windowpane	2	*
American Eel	1	
Atlantic Tomcod	1	
Bay Anchovy	1	
Gizzard Shad	1	
Summer Flounder	1	*
Total	**948**	**5**

West 59th Street		
Species	**Total Number**	**EFH Listed**
Striped Bass	356	
Hogchoker	282	
Atlantic Tomcod	174	
Weakfish	119	
Bay Anchovy	104	
Spotted Hake	85	
Atlantic Croaker	79	
White Perch	67	
Windowpane	30	*
Atlantic Butterfish	19	*
Winter Flounder	16	*
Summer Flounder	13	*
Grubby Sculpin	8	
Hickory Shad	7	
Atlantic Herring	5	*
American Eel	4	
Northern Pipefish	4	
Striped Searobin	4	
Atlantic Menhaden	3	
Blueback Herring	3	
Smallmouth Flounder	3	
Atlantic Silverside	2	
Bluefish	1	*
Cunner	1	
Gizzard Shad	1	
Total	**1390**	**6**

Table 11
Life History Characteristics of Finfish Found in the Central Part of the Mid-Atlantic Bight

Scientific Name	Common Name	Spawning Time	Spawning Location	Egg Type	Habitat	
					Summer	Winter
Mustelus canis	Smooth Dogfish	March - May	Estuary / Mid-Atlantic Bight	Live	Estuary	Ocean
Anguilla rostrata	American Eel	March - May	Sargasso Sea	?	Estuary	Estuary
Conger oceanicus	Conger Eel	June - February	Sargasso Sea	?	Estuary	?
Alosa aestivalis	Blueback Herring	March - May	Fresh Water	Pelagic	Estuary	Ocean
Alosa mediocris	Hickory Shad	March - May	Fresh Water	Demersal / Pelagic	?	?
Alosa pseudoharengus	Alewife	March - May	Fresh Water	Pelagic	Estuary	Ocean
Alosa sapidissima	American Shad	March - May	Fresh Water	Demersal / Pelagic	Fresh Water / Estaury	Ocean
Brevoortia tyrannus	Atlantic Menhaden	Sept.-Nov. & Mar.-May	Mid and South Atlantic Bight	Pelagic	Estuary	Ocean
Clupea harengus	Atlantic Herring	March - May	Mid-Atlantic Bight	Demersal	?	?
Anchoa hepsetus	Striped Anchovy	June - August	Mid-Atlantic Bight	Pelagic	Estuary / Ocean	Estuary / Ocean
Anchoa mitchilli	Bay Anchovy	June - August	Estuary / Mid-Atlantic Bight	Pelagic	Estuary	Ocean
Osmerus mordax	Rainbow Smelt	March - May	Fresh Water	Demersal	Brackish	Estuary
Synodus foetens	Inshore Lizardfish	?	South Atlantic Bight	?	?	Ocean
Microgadus tomcod	Atlantic Tomcod	December - February	Fresh Water	Demersal	Estuary / Fresh Water	Fresh Water
Pollachius virens	Pollock	September - February	Mid-Atlantic Bight	Pelagic	Estaury	Ocean
Urophycis chuss	Red Hake	June - August	Mid-Atlantic Bight	Pelagic	Ocean	Ocean
Urophycis regia	Spotted Hake	June-Nov. & Mar.-May	Mid-Atlantic Bight	Pelagic	Ocean	Ocean
Urophycis tenuis	White Hake	March - May	Mid-Atlantic Bight	Pelagic	Ocean	Ocean
Ophidion marginatum	Striped Cusk-Eel	June - November	Mid-Atlantic Bight	Pelagic	Estuary / Ocean	Ocean
Opsanus tau	Oyster Toadfish	March - August	Estuary	Demersal	Estuary	Estuary
Strongylura marina	Atlantic Needlefish	March - May	Estuary	Demersal	Estuary	?
Cyprinodon variegatus	Sheepshaed minnow	March - August	Estuary	Demersal	Marsh	Estuary
Fundulus heteroclitus	Mummichog	March - August	Estuary	Demersal	Marsh	Estuary
Fundulus luciae	Spotfin Killifish	March - August	Estuary	Demersal	Marsh	Estuary
Fundulus majalis	Striped Killifish	March - August	Estuary	Demersal	Creeks / Shores	Estuary
Lucania parva	Rainwater Killifish	March - August	Estuary	Demersal	Marsh	Estuary
Gambusia holbrooki	Eastern Mosquitofish	June - August	Fresh Water	Live	Fresh Water / Estaury	Fresh Water / Estuary
Menidia beryllina	Inland Silverside	March - August	Estuary	Demersal	Marsh	Estuary
Menidia menidia	Atlantic Silverside	March - August	Estuary	Demersal	Estuary	Ocean
Apeltes quadracus	Fourspine Stickleback	March - May	Estuary	Demersal	Eelgrass	Estuary
Gasterosteus aculeatus	Threespine Stickleback	March - May	Estuary	Demersal	Marsh	Ocean
Hippocampus erectus	Lined Seahorse	March - August	Estuary / Mid-Atlantic Bight	Live	Estuary	Ocean
Syngnathus fuscus	Northern Pipefish	June - August	Estuary	Live	Estuary	Ocean
Prionotus carolinus	Northern Searobin	June - November	Mid-Atlantic Bight (Estuary?)	Pelagic	Estuary / Ocean	Ocean
Prionotus evolans	Striped Searobin	June - November	Mid-Atlantic Bight (Estuary?)	Pelagic	Estuary / Ocean	Ocean
Myoxocephalus aenaeus	Grubby	December - February	Estuary / Mid-Atlantic Bight	Demersal	Estuary / Ocean?	Estuary / Ocean?

Table 11 Continued
Life History Characteristics of Finfish Found in the Central Part of the Mid-Atlantic Bight

Scientific Name	Common Name	Spawning Time	Spawning Location	Egg Type	Habitat	
					Summer	Winter
Morone americana	White Perch	March - May	Fresh Water	Demersal / Pelagic	Estuary / Fresh Water	Estuary
Morone saxatilus	Striped Bass	March - May	Fresh Water	Pelagic	Estuary / Fresh Water	Estuary
Centropristis striata	Black Sea Bass	March - November	Mid-Atlantic Bight	Pelagic	Estuary / Ocean	Ocean
Pomatomus saltatrix	Bluefish	March - August	Mid and South Atlantic Bight	Pelagic	Estuary	Ocean
Caranx hippos	Crevalle Jack	?	South Atlantic Bight	Pelagic	Estuary	?
Lutjanus griseus	Gray Snapper	June - August	South Atlantic Bight	Pelagic	?	?
Stenotomus chrysops	Scup	March - August	Estuaries, Bays, Cont Shelf	Pelagic	Estuary	Ocean
Bairdiella chrysoura	Silver Perch	June - August	?	Pelagic	Estuary	?
Cynoscion regalis	Weakfish	March - August	Estuary / Mid-Atlantic Bight	Pelagic	Estuary	Ocean
Leiostomus xanthurus	Spot	December - February	Southern Mid-Atlantic Bight	Pelagic	Estuary	Ocean
Menticirrhus saxatilis	Northern Kingfish	June - August	Mid-Atlantic Bight	Pelagic	Ocean / Estuary	Ocean
Micropogonias undulatus	Atlantic Croaker	June - November	Southern Mid-Atlantic Bight	Pelagic	Estuary	Estuary
Pogonias cromis	Black Drum	June - August	Mid-Atlantic Night	Pelagic	Estuary	Ocean
Chaetodon ocellatus	Spotfin Butterflyfish	?	South Atlantic Bight	Pelagic	Estuary	?
Mugil cephalus	Striped Mullet	December - February	South Atlantic Bight	Pelagic	Estuary / Fresh Water	Ocean
Mugil curema	White Mullet	March - May	South Atlantic Bight	Pelagic	Estuary	Ocean
Sphyraena borealis	Northern Sennet	March - May	South Atlantic Bight	Pelagic	Estuary	?
Tautoga onitis	Tautog	March - November	Estuary / Mid-Atlantic Bight	Pelagic	Estaury	Estuary
Tautogolabrus adspersus	Cunner	March - November	Mid-Atlantic Bight	Pelagic	Estuary	Estuary / Ocean
Pholis gunnellus	Rock Gunnel	December - February	Estuary / Mid-Atlantic Bight	Demersal	Estuary	Ocean
Astroscopus guttatus	Northern Stargazer	June - August	Estuary / Mid-Atlantic Bight	?	Estuary / Ocean	?
Hypsoblennius hentz	Feather Blenny	June - August	Estuary	Demersal	Estuary	Estuary
Ammodytes americanus	American Sand Lance	December - February	?	Demersal	Estuary	Estuary
Gobionellus boleosoma	Darter Goby	June - August	Estuary	Demersal	Estuary	Estuary
Gobiosoma bosc	Naked Goby	March - August	Estuary	Demersal	Estuary	Estuary
Gobiosoma ginsburgi	Seaboard Goby	June - August	Estuary	Demersal	Estuary / Ocean	?
Peprilus triacanthus	Butterfish	June - August	Estuary / Mid-Atlantic Bight	Pelagic	Estuary / Ocean	Ocean
Scophthalmus aquosus	Windowpane	Mar.-May & Sept.-Nov.	Estuary / Mid-Atlantic Bight	Pelagic	Estuary / Ocean	Ocean
Eutropus microstomus	Smallmouth Flounder	March - November	Mid-Atlantic Bight	Pelagic	Estuary / Ocean	Ocean
Paralichthys dentatus	Summer Flounder	September - February	Mid-Atlantic Bight	Pelagic	Estuary	Estuary
Pseudopleuronectes americanus	Winter Flounder	December - February	Estuary / Mid-Atlantic Bight	Demersal	Estuary	Estuary / Ocean?
Trinectes maculatus	Hogchoker	March - November	Estaury	Pelagic	Estaury	Estuary
Sphoeroides maculatus	Northern Puffer	March - August	Estuary	Demersal	Estuary	Ocean

Source : Able, K.W. & Fahay, M.P. 1998 The First Year in the Life of Estuarine Fishes in the Middle Atlantic Bight. Rutgers University Press. New Brunswick, NJ.

Table 12
Finfish Eggs Collected at Each MTS
January – September 2003

ast 91st Street	EFH Listed	Greenpoint	EFH Listed	Hamilton Avenue	EFH Listed	North Shore	EFH Listed
Cunner		Bay Anchovy		Cunner		Cunner	
Bay Anchovy		Cunner		Bay Anchovy		Atlantic Menhaden	
antic Menhaden		Labridae		Tautog		Labridae	
Labridae		Tautog		Atlantic Menhaden		Tautog	
Tautog		Atlantic Menhaden		Windowpane	*	Fourbeard Rockling	
ırbeard Rockling		Fourbeard Rockling		Labridae		Bay Anchovy	
Hogchoker				Searobin spp.		Windowpane	*
Searobin ssp.				Fourbeard Rockling		Searobin spp.	
Windowpane	*			Smallmouth Flounder		Smallmouth Flounder	
Vinter Flounder	*						

South Bronx	EFH Listed	Southwest Brooklyn	EFH Listed	West 135th Street	EFH Listed	West 59th Street	EFH Listed
lantic Menhaden		Atlantic Menhaden		Bay Anchovy		Bay Anchovy	
Cunner		Bay Anchovy		Labridae		Atlantic Menhaden	
urbeard Rockling		Cunner		Atlantic Menhaden		Labridae	
Labridae		Tautog		Cunner		Cunner	
Tautog		Searobin spp.		Tautog		Fourbeard Rockling	
Searobin spp.		Windowpane	*	Anchovy spp.		Tautog	
Bay Anchovy		Labridae		Searobin spp.		Hogchoker	
Vinter Flounder	*	Smallmouth Flounder		Northern Pipefish		Winter Flounder	*
Windowpane	*	Fourbeard Rockling				Windowpane	*
Hogchoker							

Table 13
Finfish Larvae Collected at Each MTS
January – September 2003

East 91st Street	EFH Listed
Winter Flounder	*
Anchovy spp.	
Goby spp.	
tlantic Menhaden	
Herring spp.	
Sculpin spp.	
ourbeard Rockling	
Northern Pipefish	
Weakfish	
Windowpane	*
Rock Gunnel	
Tautog	
eespine Stickleback	
Summer Flounder	*

Greenpoint	EFH Listed
Anchovy spp.	
Goby spp.	
Atlantic Menhaden	
Winter Flounder	*
Herring spp.	
Sculpin spp.	
Labridae	
Fourbeard Rockling	
Rock Gunnel	
American Sand Lance	
American Eel	
Banded Killifish	
Windowpane	*

Hamilton Avenue	EFH Listed
Winter Flounder	*
Anchovy spp.	
Atlantic Mehnaden	
Goby spp.	
Sculpin spp.	
Tautog	
Windowpane	*
Weakfish	
Herring spp.	
Rock Gunnel	
Northern Pipefish	
Alewife	
American Sand Lance	
Atlantic Herring	*
Labridae	
Fourbeard Rockling	
Feather Blenny	
Striped Bass	
Cunner	

North Shore	EFH Listed
Herring spp.	
Atlantic Menhaden	
Anchovy spp.	
Winter Flounder	*
Goby spp.	
Atlantic Menhaden	
Sculpin spp.	
Tautog	
Cunner	
Northern Pipefish	
Rock Gunnel	

South Bronx	EFH Listed
tlantic Menhaden	
Winter Flounder	*
Goby spp.	
Anchovy spp.	
Sculpin spp.	
Herring spp.	
Rock Gunnel	
Tautog	
Northern Pipefish	
Weakfish	
Atlantic Silverside	
Windowpane	*
Cunner	

Southwest Brooklyn	EFH Listed
Winter Flounder	*
Anchovy spp.	
Goby spp.	
Atlantic Menhaden	
Windowpane	*
Herring spp.	
Sculpin spp.	
Northern Pipefish	
Weakfish	
American Sand Lance	
Tautog	
Threespine Stickleback	
Fourbeard Rockling	
Smallmouth Flounder	
Labridae	
Searobin spp.	
Rock Gunnel	
Scup	*
Cunner	
Fourspot Flounder	
Atlantic Butterfish	*
Striped Searobin	

West 135th Street	EFH Listed
Winter Flounder	*
Anchovy spp.	
Goby spp.	
Atlantic Menhaden	
Weakfish	
Sculpin spp.	
American Sand Lance	
Herring spp.	
Atlantic Tomcod	
Hogchoker	
Atlantic Silverside	
Rock Gunnel	
Windowpane	*

West 59th Street	EFH Listed
Anchovy spp.	
Winter Flounder	*
Goby spp.	
Atlantic Menhaden	
Weakfish	
Atlantic Herring	*
Threespine Stickleback	
Windowpane	*
Herring spp.	
Sculpin spp.	
Tautog	
Rock Gunnel	
American Sand Lance	
American Eel	
Labridae	
Northern Pipefish	
Hogchoker	