

**Harbor Dredging Project  
Wellfleet Harbor  
Wellfleet, Massachusetts**

**Draft Essential Fish Habitat Assessment**

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**I. INTRODUCTION**

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act require that an Essential Fish Habitat (EFH) consultation be conducted for activities that may adversely affect important habitats of federally managed marine and anadromous fish species. EFH includes “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” The proposed dredging location within Wellfleet Harbor and the proposed beach nourishment site fall into this category and thus have the potential to provide habitat for fish species in the area. The following is an assessment of the EFH for the maintenance dredging of Wellfleet Harbor at the Town Pier and associated beach nourishment.

**II. PROPOSED ACTION: Dredging and Disposal**

The Town of Wellfleet is seeking permission for maintenance dredging to reestablish the previously authorized channel and anchorage depths throughout Area I of Wellfleet Harbor and Area II in Chipman’s Cove as shown on Exhibit A. The proposed dredge footprint of Area I matches the last dredging project to restore safe navigation and mooring in the Town Marina. The total access channel length is approximately 2,750 feet with the South Channel 100 feet wide increasing to 150 feet wide in the North Channel. The L-Pier Access Channel is approximately 300 feet in length and 0.85 acres. The North Anchorage is approximately 600 feet long and 4.3 acres. All of these areas would be dredged to elevation -6 feet MLW with an over dredge depth of 1 foot MLW. A summary of the required areas and volumes is shown in the table below.

	Dredge Area (acres)	Target Dredge Volume (Cubic Yards)	1’ Over dredge Volume (Cubic Yards)	Total Dredge Volume (Cubic Yards)
North and South Access Channel	10.3	65,000	16,000	81,000
North Anchorage Basin	4.33	25,000	7,000	32,000
L-Pier Access Channel	0.85	2,500	1,000	3,500
<b>Totals</b>	<b>15.48</b>	<b>92,500</b>	<b>24,000</b>	<b>116,500</b>

The proposed dredging of Area II seeks to reestablish the historic dredge depths and footprint as per MA DPW Contract #1769. This area is approximately 1750’ long and 23 acres and abuts the southern boundary of the Federal Anchorage Basin. The area will be dredged to a depth of -6 feet MLW with overdredge to -7 feet MLW.

With no change in mooring configuration, the historic footprint is not large enough to incorporate all the vessels that are currently being moored in the South Anchorage. This could ultimately result in the loss of 50 moorings if the basin is limited to the historic footprint.

	Dredge Area (acres)	Target Dredge Volume (Cubic Yards)	1’ Over dredge Volume (Cubic Yards)	Total Dredge Volume (Cubic Yards)
<b>Historic Footprint Dredge</b>	<b>21.72</b>	211,000	37,000	<b>248,000</b>

All material removed as part of the dredge will be taken for unconfined open water disposal at the Cape Cod Bay Disposal site.

## **ANALYSIS OF IMPACTS**

Impacts to EFH from any dredging and disposal activity include potential changes in the physical and chemical properties of the water column, possible changes in sediment types both within the channel and at adjacent areas, and changes in water depth. Consequently, changes in the abundance and/or distribution of prey species may also result from both dredging and disposal activities. These impacts may range from both short-term, (i.e. impacts to the water column (increases in turbidity and total suspended solids)), to longer term impacts (i.e. changes in bathymetry as a result of dredging within the channel and deposition at the disposal site(s)).

### **A. Physical Environment**

*Water Quality* — Any impacts on water quality with dredging the Wellfleet Harbor are expected to be temporary, short-term, and limited to the immediate project area. Water quality impacts would be primarily a result of increased turbidities and suspended sediment (TSS) loads within the water column as a result of both the dredging operations. The sediments are mainly medium to fine grained sand (>98 % retained by a #200 or smaller # sieve). Consequently any suspended sediments should quickly settle out of the water column.

Decreases in dissolved oxygen (DO) levels are sometimes a concern with dredging and disposal activities. Sandy material is generally not associated with high levels of organic carbon, and dredging operations are not likely to result in release of nutrients or decreases in dissolved oxygen. **The area is dynamic and well flushed due to tidal activity.** Therefore, dissolved oxygen levels are not anticipated to be impacted by dredging and/or disposal activities of this project. No appreciable changes in the salinity regime, tidal flows or tide height are expected as a result of the proposed dredging or disposal activity.

*Bathymetry/Water Depth* — Other impacts from the proposed project include changes in the bathymetry of the areas to be dredged and the disposal site(s) due to the removal and placement of sediment. The area within Wellfleet Harbor that is to be dredged will result in deeper waters than the surrounding area. The deposition of dredged materials on the shore for beneficial reuse as beach nourishment may contribute minimally to the decrease in depths immediately off shore as sand is moved over the long term until natural events move the deposited sand.

### **B. Biological Environment**

*Prey Species* — The abundance and/or distribution of prey species, for which EFH has been designated, may be impacted from dredging and disposal activities conducted for the Wellfleet Harbor dredge project. Many of these fish feed on organisms that live in or on the sediment. At the locations that are to be dredged, these prey species will be disrupted and or destroyed during the dredging process. However, following project completion the substrate types at dredging locations are expected to be similar to pre-project conditions thus promoting rapid recolonization by organisms from adjacent areas. Therefore, any impacts to the habitat in which these fish species use for forage, would be expected to be

temporary, especially since this is a dynamic environment consisting of shifting sands. Any biota inhabiting these areas would be opportunistic and capable of rapid recolonization.

Prey species that live in the water column are also likely to be impacted during dredging activities. The increased suspended sediments resulting from dredging activities have the potential to destroy/disrupt planktonic species in the vicinity of the TSS plume. However, given the short-lived and transient nature of these water column disturbances, it is expected that any impacts would be of a temporary nature and quickly return to ambient conditions upon cessation of operational activities. Thus any impacts would not be expected to have any long-term effects on prey species within the project area.

Much of the Land under Ocean proposed for dredging in this project is also considered Land Containing Shellfish as per MA GIS mapping. However while some of the dredge area is approved as shellfish growing area, a large majority of the dredge area is conditionally restricted as shellfish growing area per MA GIS mapping. It is anticipated that any areas of actual dredging within the overall zone of dredging will be more dynamic with considerable sediment movement and are less likely to be important shellfish resources. The Town will consult with the Wellfleet Shellfish Constable to further investigate potential impacts prior to filing applications as well as prior to actual dredge events.

#### **IV. Life History of EFH Species**

##### **A. Selection of EFH Species**

The National Marine Fisheries Service Guide to Essential Fish Habitat web site was used to determine which species have designated EFH in Wellfleet Harbor and Surrounding areas. The species and the life stages of those species that have EFH in the study area was determined by using the quick reference 10 x 10 minute squares of latitude and longitude. The coordinates of the 10 x 10 minute square that is representative of the geographic area of the proposed dredging and disposal activities are provided in Table 1 below.

Table 2 presents a list of the species that have designated EFH within Wellfleet Harbor and surrounding areas. A short summary of the EFH for each life stage of each particular species is described in the sections below. Information on the species was taken from the NMFS “Guide to EFH Species Designations”, the Essential Fish Habitat Amendment, October 7, 1998, prepared by the New England Fishery Management Council located at <http://www.nefmc.org/habitat/index.html> and [www.fishbase.org](http://www.fishbase.org).

#### **Summary of Essential Fish Habitat (EFH) Designation**

**Table 1. 10' x 10' Square Coordinates:**

Boundary	North	East	South	West
Coordinate	42° 00.0' N	70° 00.0' W	41° 50.0' N	70° 10.0' W

**Square Description (i.e. habitat, landmarks, coastline markers):** Waters within the square within Cape Cod Bay affecting the following: the coast west of Eastham and Wellfleet, MA., north up to Corn Hill in Truro, MA. Also affected are Billingsgate Shoal and I., Smalley Bar, Stony Bar, Woods Beach Rock, Lieutenant I., Indian Neck, Loagy Bay, Blackfish Creek, Duck Creek, Griffin I., Great I., the Pamet River, and Hatches Creek.

**Table 2. Species and their respective life stages designated as Essential Fish Habitat.**

Species	Eggs	Larvae	Juveniles	Adults
Atlantic cod ( <i>Gadus morhua</i> )	X	X	X	X
haddock ( <i>Melanogrammus aeglefinus</i> )	X	X		
pollock ( <i>Pollachius virens</i> )		X	X	X
whiting ( <i>Merluccius bilinearis</i> )	X	X	X	X
red hake ( <i>Urophycis chuss</i> )	X	X	X	X
white hake ( <i>Urophycis tenuis</i> )	X	X	X	X
winter flounder ( <i>Pseudopleuronectes americanus</i> )	X	X	X	X
yellowtail flounder ( <i>Limanda ferruginea</i> )	X	X	X	X
windowpane flounder ( <i>Scophthalmus aquosus</i> )	X	X	X	X
American plaice ( <i>Hippoglossoides platessoides</i> )	X	X	X	X
ocean pout ( <i>Macrozoarces americanus</i> )	X	X	X	X
Atlantic halibut ( <i>Hippoglossus hippoglossus</i> )	X	X	X	X
Atlantic sea scallop ( <i>Placopecten magellanicus</i> )	X	X	X	X
Atlantic sea herring ( <i>Clupea harengus</i> )	X	X	X	X
monkfish ( <i>Lophius americanus</i> )	X	X	X	
bluefish ( <i>Pomatomus saltatrix</i> )			X	X
long finned squid ( <i>Loligo pealeii</i> )	n/a	n/a	X	X
short finned squid ( <i>Illex illecebrosus</i> )	n/a	n/a	X	X
Atlantic butterfish ( <i>Peprilus triacanthus</i> )	X	X	X	X
Atlantic mackerel ( <i>Scomber scombrus</i> )	X	X	X	X
summer flounder ( <i>Paralichthys dentatus</i> )				X
scup ( <i>Stenotomus chrysops</i> )	n/a	n/a	X	X
black sea bass ( <i>Centropristis striata</i> )	n/a			X
surf clam ( <i>Spisula solidissima</i> )	n/a	n/a	X	X

spiny dogfish ( <i>Squalus acanthias</i> )	n/a	n/a	X	X
blue shark ( <i>Prionace glauca</i> )				X
bluefin tuna ( <i>Thunnus thynnus</i> )			X	X

**B. Summary of EFH Species**

**Atlantic Cod**

EFH is designated for the adult life stage of Atlantic cod (*Gadus morhua*) within the project area. The adults are found on bottom habitats with a substrate of rocks, pebbles, or gravel. The adults prefer depths between 40 and 130 meters. Wellfleet Harbor is shallower than their preferred habitat depth. Atlantic cod are broadly distributed in the northwest Atlantic Ocean from Greenland to Cape Hatteras, North Carolina. Any disruption of EFH will be temporary and not significant to the total population due to their wide geographical range and broad habitat requirements. Adults should be able to avoid any potential impacts due to their mobility. Therefore, no more than minimal impacts on Atlantic cod EFH would be expected as a result of this project.

**Haddock**

EFH is designated within the project area for juvenile and adults of haddock (*Melanogrammus aeglefinus*). Juveniles are found in bottom habitats with a substrate of pebble gravel on the perimeter of Georges Bank, the Gulf of Maine, and the middle Atlantic south to Delaware Bay. Generally, the following conditions exist where haddock juveniles are found: water temperatures below 11° C, depths from 35 - 100 meters, and a salinity range from 31.5 - 34‰. Adult haddock are typically found in bottom habitats with a substrate of pebble gravel or gravelly sand in water temperature below 6° C with a salinity range of 31.5 to 34‰, at depths of 131 to 492 feet (40-150 m). This project is expected to have minimal effects on EFH for haddock because adults tend to be found in waters deeper than those in the area of Wellfleet Harbor. Haddock are also found in bottom habitats made of pebble gravel. The bottom of Wellfleet consists of mainly sand therefore the project area would be unsuitable for Haddock.

**Pollock**

EFH is designated in the project areas for the larvae, juveniles, and adults of pollock (*Pollachius virens*). Larvae are pelagic, and found at depths significantly deeper than the proposed dredging. The juveniles have been reported over a wide variety of substrates, including sand, mud, or rocky bottom, and vegetation. Most common juveniles are found at depths of 82 to 246 feet although they can be found from the surface to 410 feet deep. Adults show little preference for bottom type and they inhabit a wide range of depths from 115 to 1197 feet. This project is expected to have minimal effects on EFH of pollock since the larvae, juveniles, and adults are all commonly found at depths deeper than the proposed project depths. Additionally, any juvenile and adult pollock in the dredge impact area would be able to easily avoid any disturbance caused by dredging. Therefore, no more than minimal impacts on pollock EFH would be anticipated as a result of this project.

**Whiting**

Whiting or Silver Hake EFH is designated within the area of the proposed project for all like stages. Eggs are found at sea surface temperatures below 20° C and water depths between 50 and 150 meters. Whiting eggs are observed all year, with peaks from June through October. Larvae are generally found at sea surface temperatures below 20°C and water depths between 50 and 130 meters. Whiting larvae are observed all year, with peaks from July through September. 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‰. Generally, the following conditions exist where most whiting adults are found: water temperatures below 22° C and depths between 30 and 325 meters. The depth that all Whiting EFH life stages are generally found is much deeper than the proposed dredge depth therefore minimal to no impact is anticipated.

### **Red Hake**

EFH is designated in the project area for all life stages of Red Hake. Red Hake eggs are found at the sea surface temperatures below 10° C along the inner continental shelf with salinity less than 25‰. Hake eggs are most often observed during the months from May - November, with peaks in June and July. Red hake larvae are found at sea surface temperatures below 19° C, water depths less than 200 meters, and salinity greater than 0.5‰. Red hake larvae are most often observed from May through December, with peaks in September - October. Red Hake juveniles are found in water temperatures below 16° C, depths less than 100 meters and a salinity range from 31 - 33‰. Red Hake adults are generally found in water temperatures below 12° C, depths from 10 - 130 meters, and salinity range from 33 - 34‰. Although Red Hake EFH is located within the project area, juveniles and adults are very mobile and would be able to flee from the dredging or disposal areas once activities commence. The dynamic sand movements within the project area would minimize any potential spawning and larvae habitat within the project area. Consequently, any potential impacts that occur will be localized and short term. Therefore, no more than minimal impacts on all life stages of the Red Hake EFH would be anticipated as a result of this project.

### **White Hake**

EFH is designated within the project area for all life stages of white hake (*Urophycis tenuis*). Eggs are found in surface waters while the larvae are pelagic, both are found from August through September. Juveniles have a pelagic and demersal stage. In the demersal stage, the juveniles are found on bottom habitats with seagrass beds or a substrate of mud or fine-grained sand, with water temperatures below 19° C, and depths from 16 to 738 feet. The adults are found associated with bottom habitats with a substrate of mud or fine grained sand, water temperatures below 14° C, and depths from 16 to 1,066 feet. Although there would be some temporary impacts to EFH for white hake both juveniles and adults will be able to avoid any disturbance within the project area and would be easily able to resettle in the area after construction is completed. Also, this species is broadly distributed in the northwest Atlantic from the Gulf of St. Lawrence to Cape Hatteras. Therefore, no more than minimal impacts on white hake EFH would be anticipated as a result of this project.

### **Winter flounder**

EFH is designated within the area of the proposed project areas for all life stages of the winter flounder (*Pseudopleuronectes americanus*). The eggs of winter flounder, which are demersal, are typically found at depths of less than 16.4 feet (5 m) in bottom waters in a broad range of salinities (10-30 ‰). Spawning, and therefore the presence of eggs, occurs from February to June. EFH for larvae, juveniles, and adults includes bottom habitats of mud and fine-grained sandy substrate in waters ranging from 0.3 to 328 feet (0.1-100 m) in depth. Spawning adults are typically associated with similar substrates in less than 19.7 feet (6 m) of water. Although winter flounder EFH is located within the project area, juveniles and adults are very mobile and would be able to flee from the dredging or disposal areas once activities commence. Winter flounder move into the upper portions of the bay during the fall and remain in the area until spawning is completed. The young-of-the-year flounder generally remain in the immediate area where they hatched. The dynamic sand movements within the project area would minimize any potential spawning and larvae habitat within the project area. Consequently, any potential impacts that occur will be localized and short term. Therefore, no more than minimal impacts on all life stages of the winter flounder EFH would be anticipated as a result of this project.

### **Yellowtail Flounder**

EFH is designated for adult Yellowtail Flounder as bottom habitats with a substrate of sand or sand and mud on Georges Bank, the Gulf of Maine, and the southern New England shelf south to Delaware Bay. Generally, the following conditions exist where yellowtail flounder adults are found: water temperatures below 15° C, depths from 20 - 50 meters, and a salinity range from 32.4 - 33.5‰. Yellowtail Flounder are highly mobile species and would be expected to have the ability to avoid dredging and disposal activities. The EFH for adult Yellowtail Flounder is also deeper than the proposed dredge depth in the project area. Minimal to no impact to the habitat is anticipated.

### **Windowpane Flounder**

EFH is designated for adult windowpane flounder (*Scophthalmus aquosus*) in Wellfleet Harbor. Adults are generally found in bottom habitats with substrates of mud or fine grained sand in depths of 3.3 to 328 feet (1 to 100 m). Adults are highly mobile and would be able to flee from any potential water quality effects in the area once beach nourishment activities commence. Any potential impacts that occur will be localized and short term. Therefore, no more than minimal impacts on the adult life stage of the windowpane flounder EFH would be anticipated as a result of this project.

### **American Plaice**

EFH is designated for adult American Plaice. Their bottom habitats are found with with fine-grained sediments or a substrate of sand or gravel in the Gulf of Maine and Georges Bank. Generally, the following conditions exist where most American plaice adults are found: water temperatures below 17° C, depths between 45 and 175 meters and a wide range of salinities. Although adult American Plaice EFH is located within the project area, adults are very mobile and would be able to flee from the dredging areas once activities commence. No more than minimal impact on adult American Plaice is anticipated as a result of this project.

### **Ocean Pout**

EFH is designated in the project area for all life stages of Ocean Pout. Due to low fecundity, relatively few eggs (< 4200) are laid in gelatinous masses, generally in hard bottom sheltered nests, holes, or crevices where they are guarded by either female or both parents. Generally, the following conditions exist where ocean pout eggs are found: water temperatures below 10° C, depths less than 50 meters, and a salinity range from 32 - 34‰. Ocean pout egg development takes two to three months during late fall and winter. Larvae are relatively advanced in development and are believed to remain in close proximity to hard bottom nesting areas. Generally, the following conditions exist where ocean pout larvae are found: sea surface temperatures below 10° C, depths less than 50 meters, and salinities greater than 25‰. Ocean pout larvae are most often observed from late fall through spring. Juveniles are generally found in conditions where water temperatures are below 14°C, depths less than 80 meters, and salinities greater than 25‰. Generally adults are found in water temperatures below 15°C, depths less than 110 meters, and a salinity range from 32 - 34‰. Due to the dynamic environment of Wellfleet Harbor, these conditions would be unsuitable for Ocean Pout eggs and larvae as they tend to exist in hard bottom nesting areas. EFH for the juvenile and adult are within the project area however impact will be minimal as Ocean Pout are mobile in their juvenile and adult stage, and have the ability to avoid dredging activities

### **Atlantic Halibut**

EFH is designated within the area of Wellfleet Harbor for all life stages of Atlantic halibut (*Hippoglossus hippoglossus*), but the project area is too shallow to have any effect on the EFH of this species. Atlantic halibut eggs are bathypelagic, floating not at the surface, but suspended in the water column at depths ranging from 177 to 656 feet (54-200 m). The eggs are observed between late fall and early spring, with peaks in November and December. The larvae are pelagic floating within 50 m of the



surface. Juveniles and adults are found on bottom habitats with a substrate of sand, gravel, or clay. The juveniles are found in depths from 65 to 197 feet (20-60 m), where as the adults are found at depths of 328 to 2,297 feet (100-700 m). The EFH for the entire life stage of Atlantic Halibut is much deeper than the depth within the proposed project area, therefore minimal to no impact is anticipated.

#### **Atlantic Sea Scallop**

EFH is designated in the project area for all life stages of Atlantic Sea Scallops. Eggs are heavier than seawater and remain on the seafloor until they develop into the first free-swimming larval stage. Spawning occurs from May through October, with peaks in May and June in the middle Atlantic area and in September and October on Georges Bank and in the Gulf of Maine. Larvae, juveniles and adults are found in pelagic waters and bottom habitats with a substrate of gravelly sand, shell fragments, and pebbles. The project is located within the EFH for Atlantic Sea Scallop eggs however dredging will be subject to time of year restrictions, typically October through January. This would have minimal impact on eggs as they spawn May through October. There would be a minimal impact to Atlantic Sea Scallop larvae, juveniles and adults as the EFH all exist within cobble coarse/gravelly sand which is contrasting to the sandy dynamic system within Pleasant Bay.

#### **Atlantic Sea Herring**

EFH is designated for juveniles and adults for Atlantic Sea Herring. Generally, the following conditions exist where Atlantic herring juveniles are found: water temperatures below 10°C, water depths from 15 - 135 meters, and a salinity range above 28‰. Minimal to no impact on Atlantic Sea Herring is anticipated as the depths for the EFH for Atlantic Sea Herring is deeper than the proposed dredge depth. These fish are also highly mobile and have the ability to avoid any dredging activity.

#### **Monkfish**

EFH is designated in the project area for eggs, larvae and adult Monkfish. Eggs are generally found in the following conditions: sea surface temperatures below 18° C and water depths from 15 - 1000 meters. Monkfish egg veils and larvae are most often observed during the months from March to September. Monkfish larvae are generally found in water temperatures 15° C and water depths from 25 - 1000 meters. Adult Monkfish EFH consists of a sand-shell mix, algae covered rocks, hard sand, pebbly gravel, or mud along the outer continental shelf in the middle Atlantic, the mid-shelf off southern New England, along the outer perimeter of Georges Bank and all areas of the Gulf of Maine. Generally, the following conditions exist where monkfish adults are found: water temperatures below 15° C, depths from 25 - 200 meters, and a salinity range from 29.9 - 36.7‰. There will be minimal impact to Monkfish eggs and larvae habitats as they are typically found in water deeper than 15 meters, which is deeper than the projects proposed dredge depth. The EFH for adult Monkfish will be minimal as their habitat consists of hard-sand, pebbly gravel and sand-shell mix, which is unlike the sandy bottom in Wellfleet Harbor.

#### **Bluefish**

EFH is designated within Wellfleet Harbor for adult Bluefish. Adult bluefish occur in the open ocean, large embayments, and most estuarine systems within their range. Although they occur in a wide range of hydrographic conditions, they prefer warmer temperatures. Depending on time of year, adult Bluefish habitat can be found in depths from 1-100m. The project will occur within the EFH however adult Bluefish are very mobile and will be able to avoid any dredging activity.

#### **Squid (Long Finned and Short Finned)**

EFH is designated within Pleasant Bay for juveniles and adults of long finned (*Logio pealei*) and short finned (*Illex illecebrosus*) squid. EFH is the pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine through Cape Hatteras, North Carolina where the highest catches are found. The squid are highly mobile in their juvenile and adult stage, and

have the ability to avoid dredging and disposal activities. Minimal to no impact to the habitat is anticipated.

### **Atlantic Butterfish**

EFH is designated within the project area for all life stages of the Atlantic butterfish (*Peprilus triacanthus*). Butterfish eggs and larvae are pelagic and occur at salinities that range from estuarine (brackish) to oceanic. They have been collected to a depth of about 1200 feet (366 m). Juvenile and adult butterfish are pelagic, form loose schools, often near the surface. Although EFH for the butterfish is within the project area, this species is broadly distributed in north and mid-Atlantic waters from the Gulf of Maine to Cape Hatteras. The adults and juveniles should be able to avoid any potential impacts because of their mobility. Eggs and larvae will only have the potential to be impacted by localized, short-term turbidity associated with the project activities. Therefore, any disruption of EFH as a result of project activity would be temporary and no more than minimal impacts on all life stages of Atlantic butterfish EFH would be anticipated as a result of this project.

### **Atlantic Mackerel**

EFH is designated within the area of the proposed project for all life stages of Atlantic mackerel (*Scomber scombrus*). Since all life stages of Atlantic mackerel are generally found offshore, no impacts to Atlantic mackerel EFH are expected within the project area. The eggs are pelagic and occur in water having salinities greater than 34 ‰, floating in surface waters above the thermocline or in the upper 33 to 49 feet (10-15 m). Larvae are primarily distributed at depths between 33 feet and 425 feet (10-129.5 m). The juveniles and adults change depth seasonally. Atlantic mackerel is a pelagic schooling species distributed in the northwest Atlantic from the Gulf of St. Lawrence to Cape Lookout, North Carolina. Any adults and juveniles in the project area should be able to avoid any potential impacts because of their mobility. Therefore, no more than minimal impacts on all life stages of Atlantic mackerel EFH would be anticipated as a result of this project.

### **Scup**

EFH is designated within the project area for all juvenile and adult Scup (*Stenotomus chrysops*). Scup juveniles and adults have the potential to occur in estuarine systems during the spring and summer months. All life stages of scup prefer salinities greater than 15 ‰. Juveniles and adults use structured areas for foraging and refuge, which do not exist in the project area. Scup are highly mobile species and would be expected to have the ability to avoid dredging and disposal activities. Therefore, no more than minimal impacts to Scup EFH would be anticipated as a result of this project.

### **Black Sea Bass**

EFH is designated for larvae, juveniles, and adult black sea bass (*Centropristus striata*) within the project area. Larvae are found in pelagic waters found over the Continental Shelf from the coast out to the limits of the EFH. Juveniles are found in demersal waters over the Continental Shelf and in estuaries with waters warmer than 6° C with salinities greater than 18 ‰ during the spring and summer months. EFH for the adults of this species is predominantly within estuarine systems with oceanic salinities. Adults are found in estuaries during spring and summer months in water temperatures above 6° C and salinities greater than 18 ‰. Black sea bass prefer rough, shelly substrates and can be found in natural and man-made structured habitats. Although sea bass may occur in the project area, juveniles and adults should be able to avoid any potential impacts because of their mobility. Therefore, no more than minimal impacts to black sea bass EFH are anticipated as a result of this project.

### **Atlantic Surfclam**

EFH is designated for juvenile and adult Atlantic surfclam (*Spisula solidissima*) in Wellfleet Harbor. Juveniles and adults are usually found in well-sorted, medium sand and silty-fine sand. They are

commonly found in depths 8-66m. Although the EFH for Atlantic surf clam is present in Wellfleet Harbor, the project's impact is anticipated that any areas of actual dredging within the overall zone of dredging will be more dynamic with considerable recent sediment movements and shoaling, as a result, are less likely to be important shellfish resources.

### **Spiny Dogfish**

EFH is designated for juveniles and adult spiny dogfish (*Squalus acanthias*) in Wellfleet Harbor. Juveniles can be found in waters ranging from 6-85m and water temperature anywhere from 2-21 ° C. Adults can be found in waters ranging from about 11-85m and water temperatures ranging from about 5-20 ° C. Both juvenile and adult Spiny Dogfish are very mobile and can avoid any disturbances during dredging or disposal activity. Little to no impact to their EFH is anticipated in the project.

### **Blue Shark**

EFH habitat is designated within Wellfleet Harbor for adult Blue shark (*Prionace glauca*). Adults can be found in waters ranging from 1-350m deep. Occasionally they can be found close inshore where the continental shelf is narrow. The prefer temperatures ranging from 12-20 ° C. Blue Sharks are highly migratory with complex movement patterns. There is little to no impact on adult Blue Shark habitat as these species are highly mobile and are able to avoid any dredging activity.

### **Bluefin Tuna**

EFH is designated within the Wellfleet Harbor area for bluefin tuna (*Thunnus thynnus*) juveniles and adults. Bluefin tuna is a highly migratory species found in pelagic waters of at least 82 feet (25 m) depth. The few that enter coastal waters are highly mobile and can evade any potential short-term water column disturbances as a result of dredging and disposal activities. Therefore, no impacts to highly migratory species would be anticipated as a result of this project.

## **V. CUMULATIVE EFFECTS**

Cumulative impacts are those resulting from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions. Dredging has been conducted in Wellfleet Harbor previously. Reasonably foreseeable future actions include the continuation of proposed dredging and navigation activities. Water quality, air quality, hydrology, and other biological resources are expected to not be significantly affected by these actions based on prior dredging activity. The direct effects of this project are not anticipated to add to impacts from other actions in the area. Maintenance dredging in Wellfleet Harbor will preserve the navigation of this dynamic area while allowing the Town of Wellfleet to minimize impacts by following the naturally existing channel as it moves. No adverse cumulative impacts are projected as a result of this project.

## **VI. SUMMARY OF EFFECTS**

The dredging activities proposed for maintenance dredging in Wellfleet Harbor could potentially have limited minimal temporary impacts on EFH of designated species found within the vicinity of the pier. In general, eggs and larvae are more susceptible to impacts than juveniles and adults (Sherk *et al.*, 1975) which can avoid dredging related disturbance. Demersal species such as flounders are more susceptible to impacts than pelagic species since most dredging related disturbance occurs near the bottom, but the adults of these species tend to be the most tolerant to suspended solids (Sherk *et al.*, 1975). Consequently, the EFH of species with the greatest potential to be affected by the Wellfleet Harbor dredging project are those with demersal eggs (winter flounder), the eggs can be dredged or buried by disposal. Due the dynamic nature of the project area any demersal eggs in the area would be impacted by naturally occurring events on a greater scale than that caused by this maintenance dredging.

Species with planktonic eggs and larvae suspended in the water column (Atlantic butterfish) have less potential to be impacted by dredging operations. These eggs and larvae may be physically damaged or killed from exposure to elevated concentrations of suspended solids, but the sediment contains few, if any fines, so little material will remain suspended in the water column.

**A. Conclusions**

**VI. REFERENCES**

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