

**BLUE HILL HARBOR
MAINE
NAVIGATION IMPROVEMENT PROJECT**

APPENDIX G

ESSENTIAL FISHERIES HABITAT ASSESSMENT

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ESSENTIAL FISH HABITAT ASSESSMENT
FOR THE
BLUE HILL HARBOR NAVIGATION IMPROVEMENT PROJECT

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1.0 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 for fish spawning, breeding, feeding, or growth to maturity.” Blue Hill Harbor and the proposed placement site, the Eastern Passage Disposal Site (EPDS) located in Blue Hill Bay, fall into this category and may provide habitat for fish species in the area. The following is an assessment of the impacts to EFH from Blue Hill Harbor Federal Navigation Improvement Project.

2.0 Proposed Action

The proposed Blue Hill Harbor project will dredge a 6-foot deep mean lower low water (MLLW), 80-foot wide channel from the outer harbor, extending 5,400 feet northwest to the town wharf (Figure 1). Only the upper 2,600 feet of the project will require dredging, with channel limits in the lower reaches declared for jurisdictional purposes. This channel will be widened at its upper end to form a turning basin, 160 feet by 80 feet (0.6 acres), adjacent to the town wharf. Approximately 71,500 cubic yards (CY) of mixed gravel, sand, and silt will be removed from the proposed project area using a mechanical dredge. The 52,100 CY of dredged material deemed suitable for open water disposal will be loaded onto scows and towed about 14 miles to the Eastern Passage Disposal Site (EPDS), a previously used disposal site near Dodge Island, for placement (Figure 2). Approximately 10,600 CY of material from the upper two feet of the inner harbor, which was deemed unsuitable for open water placement due to the presence of polycyclic aromatic hydrocarbons (PAHs) and metals, will be placed in a confined aquatic disposal (CAD) cell within Blue Hill Harbor (Figure 3). The CAD cell will be constructed by removing approximately 19,500 CY of suitable of mixed gravel, sand, and silt material from an area adjacent to the designated channel. Material generated from the CAD cell creation will be placed at the EPDS. About 8,800 CY of material dredged from the lower channel reaches would be used to cap the CAD cell. The improvement project would deepen portions (approximately 25.5 acres) of the natural subtidal channel in Blue Hill Harbor and replace approximately 3.7 acres of intertidal area in the upstream portion of the harbor with subtidal area. All dredging will be by mechanical dredge and scow that will be able to operate in shallow draft areas in the channel. Construction will occur between November 8th and April 8th and is expected to take about four months to complete.

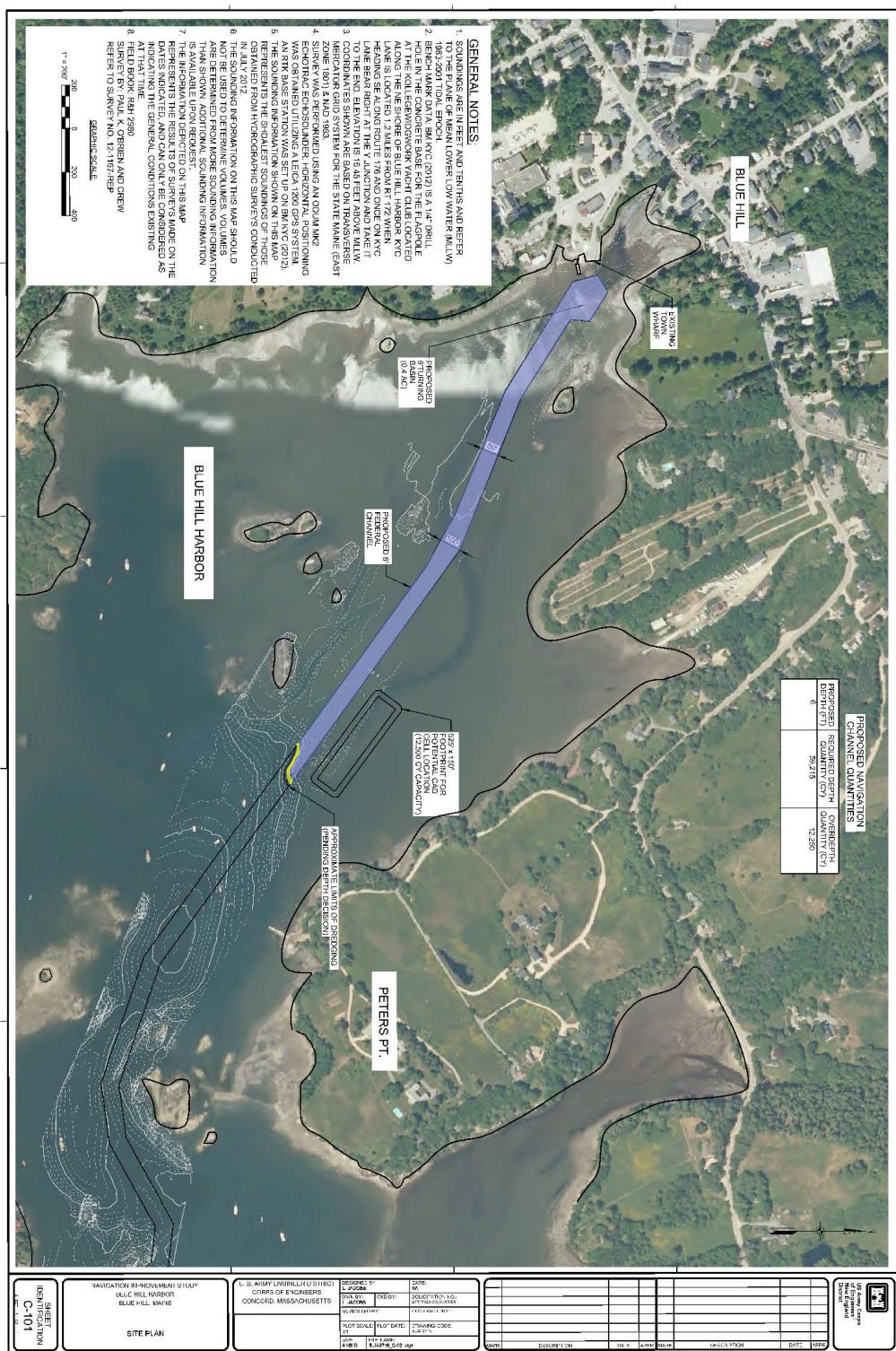


Figure 1. Location of the proposed Blue Hill Harbor Navigation Improvement Project outlined in black. Blue shading represents the required material and yellow shading represents overdepth only dredging.

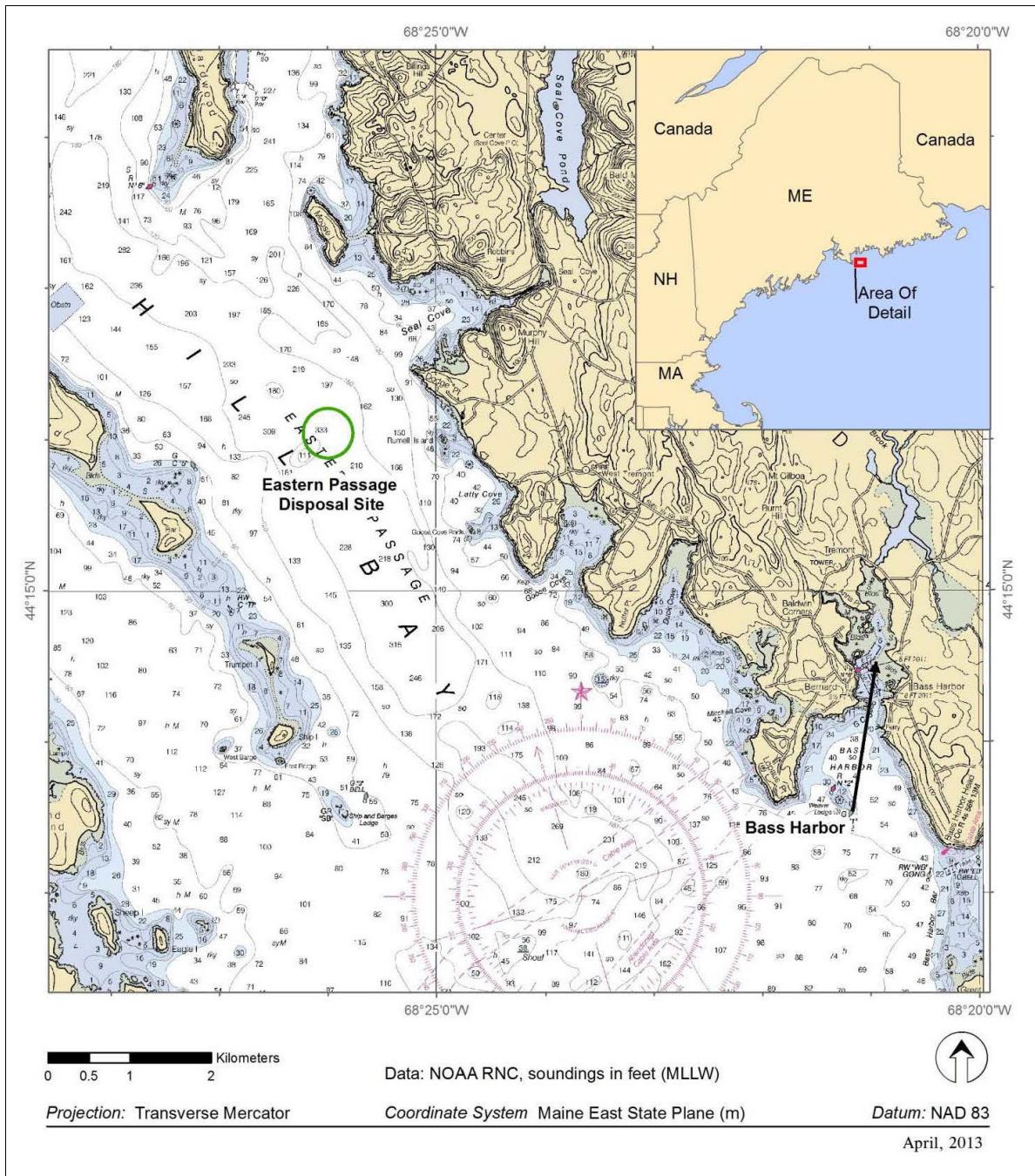
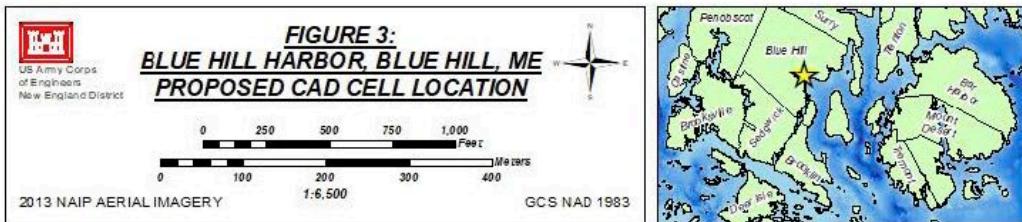
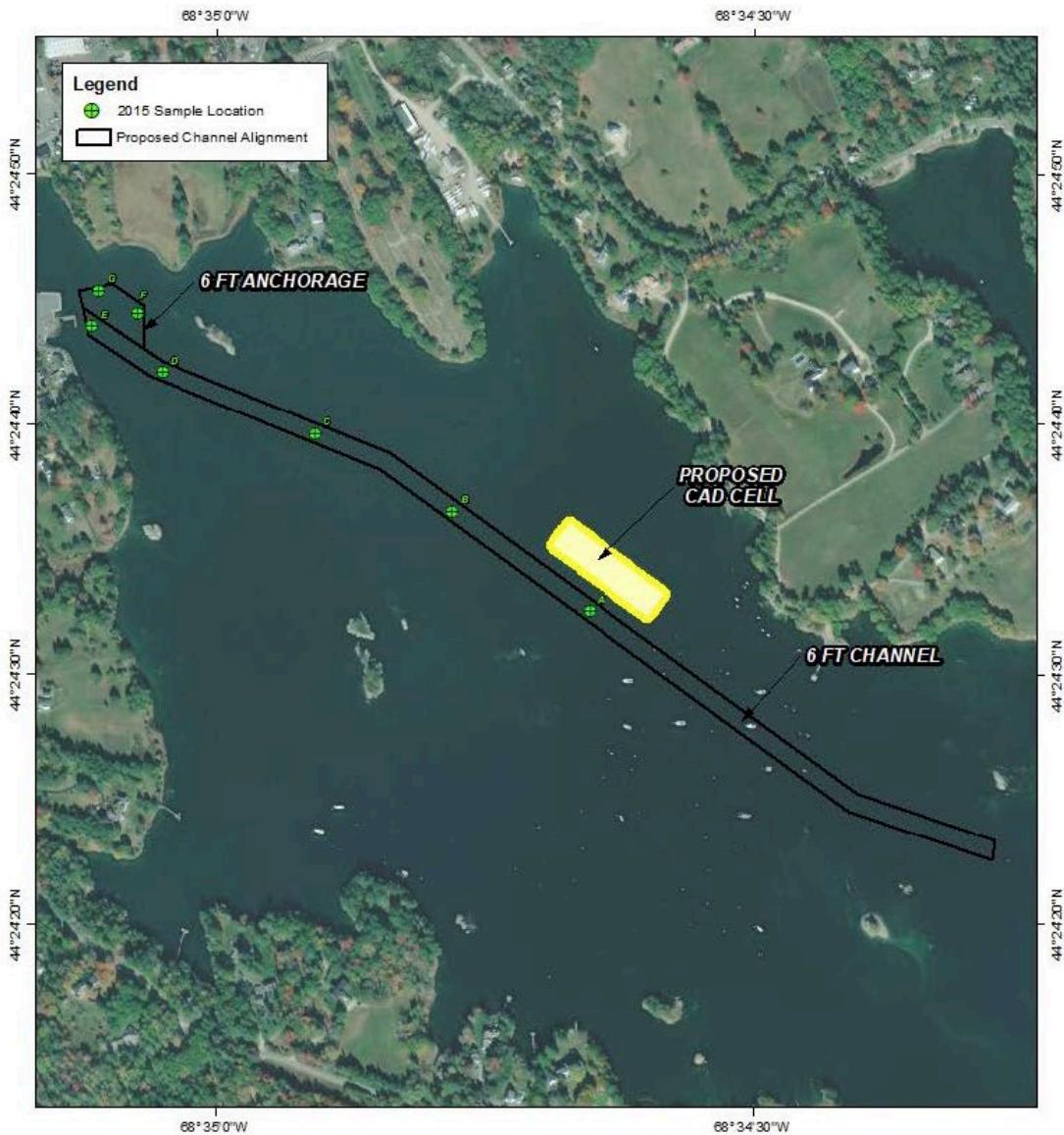


Figure 2. Eastern Passage Disposal Site.



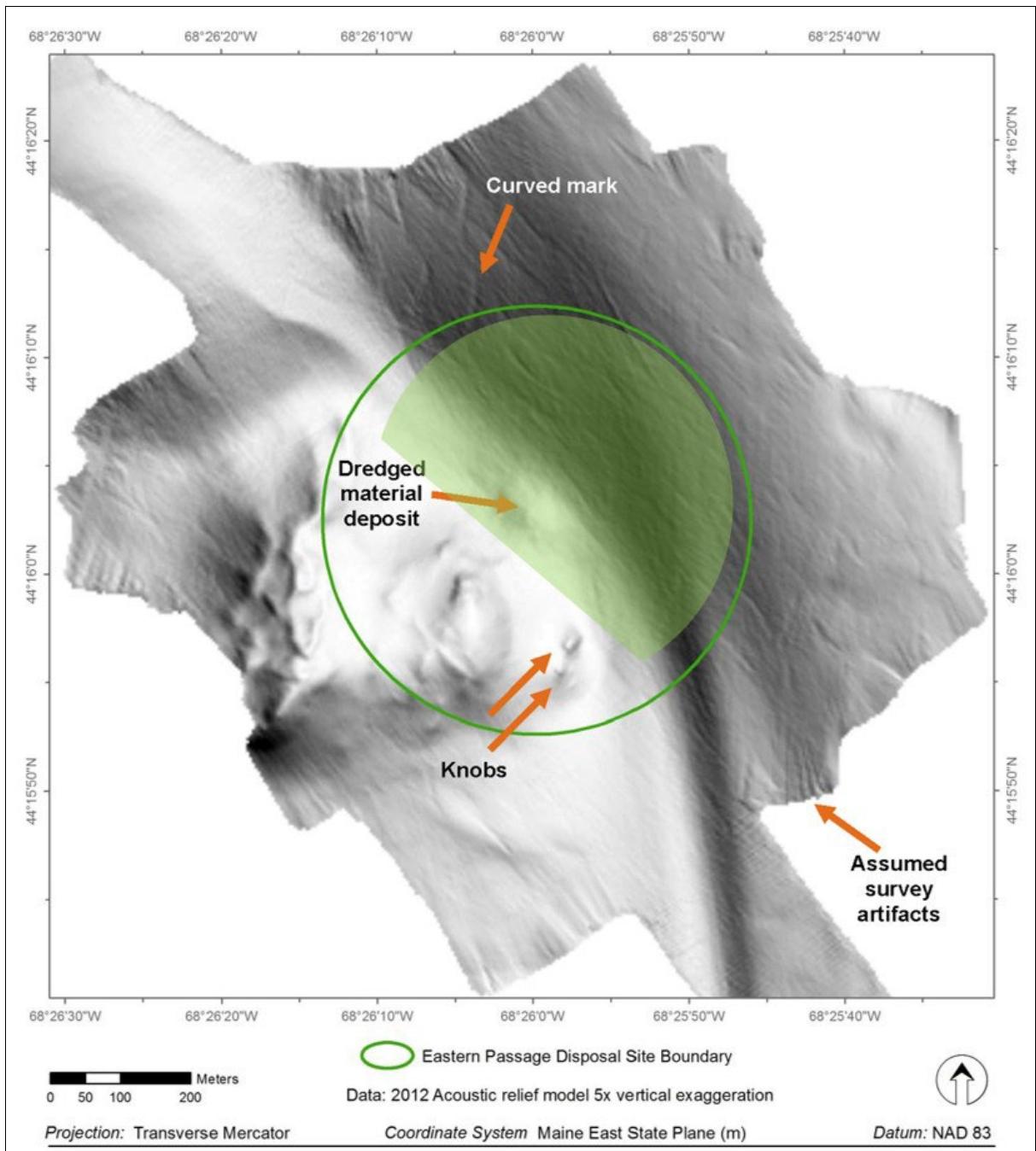


Figure 4. Bathymetry and bottom features of the Eastern Passage Disposal Site.

3.0 Analysis of Impacts

The impacts from the proposed Blue Hill Harbor improvement project include short-term impacts to water quality from increased suspended sediments and the temporary loss of the benthic forage base within the project footprint at the dredging and placement sites. The project will also result in the permanent conversion of intertidal areas to subtidal areas and changes in elevation at the dredging and placement sites. As the intertidal areas are contaminated with PAHs, the proposed project will dredge and sequester the unsuitable sediments in a CAD cell. The resultant habitat will be subtidal but will allow for the establishment of healthy benthic communities that are currently lacking. Thus offsetting the loss of compromised intertidal habitat. As such, no mitigation for the intertidal habitat conversion is being proposed.

3.1 Physical environment

Water Quality

Any impacts from the dredging of the channel of Blue Hill Harbor are expected to be temporary, short term, and limited to the project area. Water quality impacts would be primarily a result of minor increases in suspended sediment (TSS) loads within the water column as a result of the dredging operations. The areas to be dredged are both intertidal and subtidal and subject to strong tidal flushing. Intertidal areas become mudflat at low tide. Consequently, any suspended sediments concentrations (which are anticipated to be minor) should quickly settle or be flushed out of the harbor by tidal activity. Unsuitable sediments would be removed and disposed of in a CAD cell within the harbor and should not result in any significant negative impacts to water quality. Any increases in the turbidity of near shore waters during disposal at the EPDS would be temporary and short term.

Dissolved oxygen levels are sometimes a concern with dredging and placement activities, however, the proposed project area is well flushed by tidal activity. No appreciable changes in the salinity regime, tidal flows, or tide height are expected as a result of the proposed dredging and placement activity.

Abiotic Habitats

Proposed Channel and Turning Basin

The proposed Blue Hill Harbor project will dredge a 6-foot deep mean lower low water (MLLW), 80-foot wide channel from the outer harbor, extending 5,400 feet northwest to the town wharf (Figure 1). Only the upper 2,600 feet of the project will require dredging, with channel limits in the lower reaches declared for jurisdictional purposes. This channel will be widened at its upper end to form a turning basin, 160 feet by 80 feet (0.6 acres), adjacent to the town wharf. The areal extent of the channel dredging is approximately 25.5 acres. The improvement project would deepen the natural subtidal channel in Blue Hill Harbor. The surficial sediments in the channel are currently dominated by a mix of silt, sand and gravel. Following the improvement dredging, the surficial sediments are expected to remain silt, sand and gravel.

The inner channel and turning basin would convert 3.7 acres of intertidal area into subtidal area. The intertidal zone is an important point of nutrient exchange and productivity in estuarine ecosystems. Numerous organisms, from benthic invertebrates to birds, utilize this environment through all or part of their lifecycles. However, due to the presence of polycyclic aromatic hydrocarbons (PAHs) and other metals in Blue Hill Harbor noted in the suitability determination, the intertidal areas in the harbor have been found to have depressed functions and values (e.g., depauperate benthic communities and poor sediment quality). The removal of the 10,500 CY of material from the upper two feet of the inner harbor would reduce the risk of ecological receptors being exposed to toxicity. Therefore, dredging this intertidal area will be beneficial for aquatic resources because potential contaminants will be removed from the site and not be bioavailable, enhancing breeding and higher quality feeding opportunities for organisms utilizing the intertidal zone. The conversion of intertidal habitat is not being mitigated for as the intertidal areas are contaminated with PAHs and the proposed project will dredge and sequester the unsuitable sediments in a CAD cell. The surficial sediments in the proposed turning basin are composed of a mix of gravels, sands, and silt. The sediments are anticipated to be similar following dredging.

Eastern Passage Disposal Site

The dredged material will be disposed of at the existing EPDS and will raise the existing elevations of the EPDS slightly. Material will be placed in the portions of the site that contain soft bottom (i.e., silty sediments) habitat. The area that will be targeted for placement is shown in Figure 4.

3.2 Biological Environment

3.2.1 Prey Species

The abundance and/or distribution of prey species for fish which EFH has been designated will be impacted from dredging and placement activities. Many of these fish feed on organisms that live in or on the sediment and have the potential to be buried by the direct material placement and/or by removal during the dredging process. Following project completion, the majority of the substrate type at the dredging locations and placement locations will be similar to current conditions. As such, recolonization by organisms from adjacent areas and a return of benthic prey assemblages to a pre-dredge conditions is expected to occur.

4.0 Life History of EFH Species

4.1 Selection of EFH Species

The National Marine Fisheries Service (NMFS) Essential Fish Habitat Mapper (NOAA-NMFS, 2021) was used to generate a list of species at the dredge and CAD cell site and at the placement site. Table 1 shows the species with EFH and Table 2 shows the species with Habitat Area of Particular Concern (HAPC) in the project areas. The inner harbor turning basin is located at approximately 44° 24' 44.18" N, 68° 35' 6.63" W, and the project area extends 2,500 feet to the southeast toward Blue Hill Bay. A short summary of the EFH for each life stage of each particular species and the impact of the project is described in section 4.2.

Table 1. List of species with designated EFH in Blue Hill Harbor (BHB) and Eastern Passage Disposal Site (EPDS). *present at both the dredging site and placement site. **present at the placement site.

Species	Eggs	Larvae	Juveniles	Adults
American plaice* (<i>Hippoglossoides platessoides</i>)	X	X	X	X
Atlantic Cod* (<i>Gadus morhua</i>)	X	X	X	X
Atlantic wolffish* (<i>Anarhichas lupus</i>)	X	X	X	X
Ocean pout* (<i>Macrozoarces americanus</i>)	X		X	X
Pollock* (<i>Pollachius virens</i>)			X	
White Hake* (<i>Urophycis tenuis</i>)			X	X
Windowpane flounder* (<i>Scophthalmus aquosus</i>)	X	X	X	X
Winter flounder* (<i>Pseudopleuronectes americanus</i>)	X	X	X	X
Silver Hake* (<i>Merluccius bilinearis</i>)				X
Red Hake* (<i>Urophycis chuss</i>)	X	X	X	X
Smooth skate* (<i>Malacoraja senta</i>)		X		
Thorny Skate* (<i>Amblyraja radiata</i>)			X	
Little Skate* (<i>Leucoraja erinacea</i>)			X	X
Winter Skate* (<i>Leucoraja ocellata</i>)			X	
Atlantic sea scallop* (<i>Placopecten magellanicus</i>)	X	X	X	X
Atlantic Herring* (<i>Clupea harengus</i>)		X	X	X
Atlantic mackerel* (<i>Scomber scombrus</i>)			X	X
Atlantic Butterfish* (<i>Peprilus triacanthus</i>)			X	X
Haddock** (<i>Melanogrammus aeglefinus</i>)			X	
Monkfish** (<i>Lophius americanus</i>)			X	

Table 2. Species with Habitat Area of Particular Concern in the proposed project area.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Cod (<i>Gadus morhua</i>)			X	

4.2 EFH Species

American plaice (*Hippoglossoides platessoides*) - Adults, juveniles, larvae, and eggs all inhabit subtidal benthic or pelagic habitats in the Gulf of Maine of at least 40 meters. The high and mixed salinity zones for Blue Hill Harbor and the EPDS are both considered EFH for this species.

Occurrence in Project Area and Impacts: The effects of the proposed dredging are not anticipated to affect American plaice EFH as dredge area depths are outside of plaice EFH. Placement of material at the EPDS may temporarily displace or bury any plaice that may be present at the site and will temporarily disturb any benthic resources in the footprint of the material placement, thus impacting plaice EFH. Monitoring of benthic communities in other disposal sites in Maine waters has shown that recovery of benthic resources that serve as a forage based for plaice occurs following material placement (USACE 2017) and as such, no long-term significant impacts to plaice EFH is expected.

Atlantic Cod (*Gadus morhua*) – EFH for juvenile cod includes intertidal habitats and sub-tidal habitats out to a maximum depth of 120 meters. Juvenile habitat types include eelgrass, mixed sand and gravel, and rocky habitats with and without attached macroalgae and emergent epifauna. In inshore waters, young-of-the-year juveniles prefer gravel and cobble habitats and eelgrass beds after settlement. EFH for adult cod is sub-tidal benthic habitats between 30 and 160 m.

Occurrence in Project Area and Impacts: Juvenile cod EFH as defined above is found in the project area as portions of the proposed project contain a mix of sand-gravel substrate, which is also considered a habitat of particular concern (HAPC) for inshore juvenile cod. These areas are within the proposed turning basin feature that is planned to be created. However, the sediments located within the areas meeting the definition of cod EFH are contaminated with elevated levels of PAHs (see Environmental Assessment Section 5). These contaminated areas will be removed to allow for the colonization of benthic organisms that serve as a forage base for cod. The sediment type following the creation of the tuning basin feature will remain the same however the area will be converted from intertidal to subtidal.

The proposed dredge areas are shallow and not considered adult cod EFH. The placement site, the EPDS, is adult cod EFH. Placement of material at EPDS will temporarily disturb benthic resources at EPDS, however monitoring has shown that benthic recovery can be expected (USACE 2017). Placement of material at EPDS will also raise the elevations of the seafloor bottom. Material placement at EPDS will be contained to areas of soft bottom and will avoid hard bottom or gravel areas. The impacts of material placement at EPDS is not anticipated to significantly affect adult cod EFH.

Atlantic wolffish (*Anarhichas lupus*) – EFH is designated for this species in the project area. Egg EFH occurs in less than 300 feet depths under rocks and boulders. Larvae habitat is in subtidal and pelagic habitats, while juvenile EFH is designated as the subtidal benthic habitats at depths between 230-600 feet deep. Adult EFH is designated as subtidal benthic habitats in less than 173 meters of water.

Occurrence in Project Area and Impacts: As the proposed dredging would occur in intertidal and shallow subtidal zones, no impacts to Atlantic wolffish EFH are expected in the dredge footprint as wolffish EFH is in deeper subtidal waters. The dredge areas do not contain the EFH noted for this species, and therefore no adverse impacts to wolffish EFH are expected.

The placement site, the EPDS, is wolffish EFH. Placement of material at EPDS will temporarily disturb benthic resources at EPDS, however monitoring at placement areas has shown that benthic recovery can be expected (USACE 2017). Placement of material at EPDS will also raise the elevations of the seafloor bottom. The impacts of material placement at EPDS are not anticipated to significantly affect wolffish EFH.

Ocean pout (*Macrozoarces americanus*) – Ocean pout egg EFH is hard bottom habitat, juvenile EFH is designated as sub and intertidal benthic areas, and adult EFH is designated as being in waters which are 65.6 – 459.3 feet and in high salinity zones in estuaries north of Cape Cod.

Occurrence in Project Area and Impacts: EFH is designated for ocean pout eggs and juveniles in the proposed area of the Blue Hill Harbor project. The disturbance of ocean pout EFH for eggs and juveniles is possible as a result of this project. The project areas are anticipated to remain silty-sand and silty-gravel bottoms following construction. Therefore, no significant impacts to egg and juvenile pout EFH will occur.

The proposed dredge areas are shallow and not considered adult ocean pout EFH. The placement site, the EPDS, contains adult ocean pout EFH. Placement of material at EPDS will temporarily disturb benthic resources at PDS, however monitoring has shown that benthic recovery at disposal sites can be expected (USACE 2017). Placement of material at EPDS will also raise the elevations of the seafloor bottom. The impacts of material placement at EPDS are not anticipated to significantly affect adult ocean pout EFH.

Pollock (*Pollachius virens*) – EFH for pollock eggs and larvae is pelagic inshore and offshore habitats in the Gulf of Maine, on Georges Bank, and in southern New England. EFH for juveniles includes inshore and offshore pelagic and benthic habitats from the intertidal zone to 180 meters in the Gulf of Maine. Juveniles require rocky bottom habitat with attached micro algae or eelgrass beds, and spawning occurs over hard, stony, or rocky habitat. EFH for adults includes offshore pelagic and benthic habitats in the Gulf of Maine between 80 and 300 meters.

Occurrence in Project Area and Impacts: EFH for eggs, larvae, and juvenile pollock occur in the project area. The benthic habitat in the proposed project area is comprised of silts, and silty-sandy-gravel intertidal area. The project will impact pollock EFH. The project areas are anticipated to remain silty-sand and silty-gravel bottoms following construction. Therefore, no significant impacts to egg, larval, and juvenile pollock EFH will occur.

The proposed dredge areas are shallow and not considered adult pollock EFH. The placement site, the EPDS, is pollock EFH. Placement of material at PDS will temporarily disturb benthic resources at PDS, however monitoring has shown that benthic recovery at disposal sites can be expected (USACE 2017). Placement of material at EPDS will also raise the elevations of the seafloor bottom. The impacts of material placement at EPDS are not anticipated to significantly affect adult pollock EFH.

White Hake (*Urophycis tenuis*) – EFH for white hake eggs and larvae include the pelagic habitats in the Gulf of Maine. EFH for juvenile white hake occurs in intertidal and sub-tidal estuarine and marine habitats in the Gulf of Maine to a maximum depth of 300 meters. Pelagic phase juveniles remain in the water column for about two months. In nearshore waters, essential fish habitat for benthic phase juveniles occurs on fine-grained, sandy substrates in eelgrass, macroalgae, and un-vegetated habitats. Adult EFH occurs in sub-tidal benthic habitats in the Gulf of Maine in depths greater than 25 meters in fine-grained, muddy substrates and in mixed soft and rocky habitats.

Occurrence in Project Area and Impacts: EFH for juvenile white hake occurs in the project area. The benthic habitat in the proposed project area is comprised of silt, and silty-sandy-gravel intertidal area. The project will impact juvenile white hake EFH. The project areas are anticipated to remain silty-sand and silty-gravel bottoms following construction. Therefore, no significant impacts to juvenile white hake EFH will occur.

The proposed dredge areas are shallow and not considered EFH for white hake eggs, larvae, or adults. The placement site, the EPDS, is EFH for these life stages of white hake. Placement of material at EPDS will temporarily disturb benthic resources at EPDS, however monitoring has shown that benthic recovery at disposal sites can be expected (USACE 2017). Placement of material at EPDS will also raise the elevations of the seafloor bottom. The impacts of material placement at EPDS are not anticipated to significantly affect adult white hake EFH.

Windowpane flounder (*Scophthalmus aquosus*) – EFH for all windowpane flounder life stages is designated in intertidal and sub-tidal benthic habitats in estuarine, coastal marine, and continental shelf waters in the Gulf of Maine. Eggs and larvae are pelagic while juveniles and adults prefer mud and sand substrates in the intertidal and subtidal benthic zones.

Occurrence in Project Area and Impacts: EFH for all life stages of windowpane flounder are expected to be impacted by the proposed project. The areas of the proposed project that are subtidal (i.e., the proposed channel and the EPDS) and considered EFH are expected to experience temporary impacts associated with sediment removal and sediment placement (elevated suspended sediments and loss of benthic fauna) as well as the permanent impacts of changes in elevation. The areas of intertidal habitat EFH will be permanently altered to subtidal areas, but will still be windowpane EFH. Therefore, only temporary impacts to windowpane EFH are expected.

Winter Flounder (*Pseudopleuronectes americanus*) – EFH for all life stages of winter flounder is designated in Blue Hill Bay and in the Gulf of Maine. Egg EFH is designated as subtidal estuarine and coastal benthic habitat from mean low water to five meters, while larval EFH is designated to a maximum depth of 70 meters. Essential habitats for winter flounder eggs include mud, muddy sand, sand, gravel, macroalgae, and submerged aquatic vegetation. Bottom habitats are unsuitable if exposed to excessive sedimentation which can reduce hatching success. Larval flounder EFH is considered estuarine, coastal, and continental shelf water column habitats from the shoreline to a maximum depth of 70 meters. Juvenile EFH extends from the intertidal zone to 60 meters and includes a variety of bottom types, such as mud, sand, rocky substrates with attached macroalgae, tidal wetlands, and eelgrass. Young-of-the-year juveniles are found inshore on muddy and sandy sediments in and adjacent to eelgrass and macroalgae, in bottom debris, and in marsh creeks. They tend to settle to the bottom in soft-

sediment depositional areas where currents concentrate late-stage larvae and disperse into coarser-grained substrates as they get older. Adult EFH is designated as estuarine, coastal, and continental shelf benthic habitats extending from the intertidal zone to a maximum depth of 70 meters. EFH for adult winter flounder occurs on muddy and sandy substrates and on hard bottom on offshore banks.

Occurrence in Project Area and Impacts: EFH for all life stages of winter flounder are expected to be impacted by the proposed project. The areas of the proposed project that are shallow subtidal and intertidal habitat (i.e., the proposed channel, turning basin, and CAD cell) and EFH for all life stages are expected to experience temporary impacts associated with sediment removal (elevated suspended sediments and loss of benthic fauna) as well as the permanent impacts which are expected (changes in elevation). The areas of intertidal habitat EFH will be permanently altered to subtidal areas but will still be winter flounder EFH.

Placement of material at EPDS will temporarily disturb the pelagic water column habitat as well as the benthic habitats at the site during placement events. The effect on the water column EFH for larval flounder will be short term and highly localized. Placement will temporarily disturb benthic resources at EPDS, however monitoring has shown that benthic recovery at placement sites can be expected (USACE 2017). Placement of material at EPDS will also raise the elevations of the seafloor bottom. The impacts of material placement at EPDS are not anticipated to significantly affect winter flounder EFH of any life stage.

Silver Hake (*Merluccius bilinearis*) –EFH is designated for eggs, larvae, juveniles, and adults in pelagic habitats in the Gulf of Maine. Adult EFH is also designated for areas with sandy substrates in pelagic and benthic habitats greater than 35 meters and juvenile EFH is designated over similar sediments in areas greater than 40 meters.

Occurrence in Project Area and Impacts: The proposed dredge areas are shallow and not considered EFH for silver hake eggs, larvae, juvenile or adults. The placement site, the EPDS, is EFH for these life stages of silver hake. Placement of material at EPDS will temporarily disturb benthic resources at EPDS, however monitoring has shown that benthic recovery at disposal sites can be expected (USACE 2017). Placement of material at EPDS will also raise the elevations of the seafloor bottom. The impacts of material placement at EPDS are not anticipated to significantly affect adult and juvenile silver hake EFH.

Red Hake (*Urophycis chuss*) – No EFH for red hake eggs or larvae is designated in Blue Hill Bay although there is designated EFH in the pelagic waters of the Gulf of Maine. EFH for juvenile red hake is designated in intertidal and subtidal waters throughout Blue Hill Bay and the Gulf of Maine notably in habitats with habitat complexity, while adult EFH is designated in subtidal waters of Casco Bay and the Gulf of Maine

Occurrence in Project Area and Impacts: EFH for all life stages of red hake are expected to be impacted by the proposed project. The areas of the proposed project that are shallow subtidal and intertidal (i.e., the proposed channel, CAD cell, and turning basin) and considered EFH are expected to experience temporary impacts associated with sediment removal and sediment placement (elevated suspended sediments and loss of benthic fauna) as well as the permanent impact of change in elevation. The areas of intertidal habitat EFH will be permanently altered to subtidal areas, but will still be red hake EFH. Placement of material at EPDS will temporarily

disturb the pelagic water column during placement events, however the effect on the water column as EFH for eggs and larval red hake will be short term and highly localized.

Skates – EFH for juvenile smooth, thorny, little, and winter skate is designated in Blue Hill Bay and the Gulf of Maine. EFH for adult little skate is designated in Blue Hill Bay. EFH for adult smooth, thorny, little, and winter skate is designated in the Gulf of Maine.

Occurrence in Project Area and Impacts: The proposed dredge areas are shallow and not considered EFH for smooth, thorny, or winter skate. Little skate EFH is present in the dredge area. The conversion of intertidal habitats to subtidal habitats should not significantly reduce little skate EFH as their preferred habitats are subtidal sand and mud habitats. The placement site, the EPDS, is EFH for all skate species and life stages. Placement of material at EPDS will temporarily disturb benthic resources at PDS, however monitoring has shown that benthic recovery at disposal sites can be expected (USACE 2017). Placement of material at EPDS will also raise the elevations of the seafloor bottom. The impacts of material placement at EPDS are not anticipated to significantly affect adult and juvenile skate EFH.

Atlantic sea scallop (*Placopecten magellanicus*) – EFH is designated for all Atlantic sea scallop life stages in Blue Hill Bay and in the Gulf of Maine.

Occurrence in Project Area and Impacts: The proposed dredge areas are shallow and not considered EFH for any Atlantic sea scallop life stage. The placement site, the EPDS, is EFH for all life stages of sea scallop. Placement of material at EPDS will temporarily disturb benthic resources at EPDS, however monitoring has shown that benthic recovery at placement sites can be expected (USACE 2017). Placement of material at EPDS will also raise the elevations of the seafloor bottom. The impacts of material placement at EPDS are not anticipated to significantly affect sea scallop EFH.

Atlantic Herring (*Clupea harengus*) – EFH is designated for Atlantic Herring larvae, juveniles, and adults in Blue Hill Bay and in the Gulf of Maine. Larvae are transported long distances inshore into bays and estuaries while juvenile EFH occurs in intertidal and subtidal pelagic habitats to 984.3 feet. Similarly, adult EFH occurs in subtidal pelagic habitat to a maximum depth of 984.3 feet. Unless spawning, they usually remain near the surface.

Occurrence in Project Area and Impacts: The proposed dredge areas are shallow and not considered EFH for Atlantic herring eggs, larvae, and adults. Juvenile herring EFH is present in the dredge areas. As the dredge areas will remain silty-sand and silty-gravel subtidal habitat following construction, the persistence of juvenile herring EFH is not anticipated to be affected. The placement site, the EPDS, is EFH for all life stages of Atlantic herring. Placement of material at EPDS will temporarily disturb the water column and will also raise the elevations of the seafloor bottom. The impacts of material placement at EPDS are not anticipated to significantly affect Atlantic herring EFH.

Atlantic Mackerel (*Scomber scombrus*) – The Atlantic mackerel is distributed in the northwest Atlantic between Labrador and North Carolina. The mackerel is a fast swimming pelagic fish found in very large schools. Atlantic mackerel are generally found offshore and are not dependent on the coastline or bottom substrate for any period of their lives. Smaller fish, however, may move inshore into estuaries and harbors in search of food. EFH for all life stages

includes pelagic habitats in inshore estuaries and embayments throughout the Gulf of Maine. Spawning occurs in spring and early summer (typically June) at any location, resulting in pelagic egg and larval stages that are dispersed by currents.

Occurrence in Project Area and Impacts: Impacts to all EFH for all life stages of Atlantic mackerel at the proposed project areas and placement site are expected to be minimal. Impacts to the water column habitat from dredged material disposal are expected to be short term and localized, therefore no significant effects to Atlantic mackerel EFH are expected.

Atlantic butterfish (*Peprilus triacanthus*) - The Atlantic butterfish *Peprilus triacanthus* is distributed in the northwestern Atlantic from Newfoundland to Florida but is most common between the Gulf of Maine and Cape Hatteras North Carolina. This species tends to loosely school near the surface in waters overlying sand bottoms several hundred feet from shore. Butterfish are common in coastal waters during the summer months, moving north and inshore to feed. During winter, butterfish move south and offshore to deeper warmer water to overwinter. Spawning occurs in the coastal waters offshore during the summer months (June through August). Eggs and larvae are pelagic and drift in the plankton. EFH for all life stages includes pelagic habitats in inshore estuaries and embayments throughout the Gulf of Maine.

Occurrence in Project Area and Impacts: Impacts to all EFH for all life stages of Atlantic butterfish at the proposed project areas and placement site are expected to be minimal. Impacts to the water column habitat from dredged material disposal are expected to be short term and localized, therefore no significant effects to Atlantic butterfish EFH are expected.

Haddock (*Melanogrammus aeglefinus*) – EFH for haddock eggs and larvae occurs in pelagic waters in the Gulf of Maine. EFH for juveniles occurs in subtidal waters deeper than 40 meters, while adult haddock EFH is considered subtidal habitats below 50 meters.

Occurrence in Project Area and Impacts: Impacts to haddock egg and larvae EFH at the placement site are expected to be minimal as water column impacts are expected to be short-term and localized. Placement of material at EPDS will temporarily disturb the water column and benthic resources at EPDS, however monitoring has shown that benthic recovery at placement sites can be expected. Placement of material at EPDS will also raise the elevations of the seafloor bottom. The impacts of material placement at EPDS are not anticipated to significantly affect juvenile or adult haddock EFH.

Monkfish (*Lophius americanus*) – Monkfish, or goosefish, are distributed in the northwest Atlantic from the Gulf of St. Lawrence to Cape Hatteras North Carolina. EFH for eggs and larvae are pelagic habitats in inshore areas in southern Maine and in the Gulf of Maine. EFH for juvenile monkfish include sub-tidal benthic habitats in depths between 20 and 400 meters in the Gulf of Maine. A variety of habitats are essential for juvenile monkfish, including hard sand, pebbles, gravel, broken shells, and soft mud; they also seek shelter among rocks with attached algae. EFH for adult monkfish includes sub-tidal benthic habitats in depths between 20 and 400 meters in the Gulf of Maine. EFH habitat characteristics include areas of hard sand, pebbles, gravel, broken shells, and soft mud.

Occurrence in Project Area and Impacts: The proposed dredge areas are shallow and not considered EFH for any life stage of monkfish. The placement site, the EPDS, is EFH for all monkfish life stages. Placement of material at EPDS will temporarily disturb the water column and benthic habitats at EPDS, however monitoring has shown that benthic recovery at placement sites can be expected (USACE 2017). Placement of material at EPDS will also raise the elevations of the seafloor bottom. The impacts of material placement at EPDS are not anticipated to significantly affect monkfish EFH.

4.3 Habitat Areas of Particular Concern

Atlantic Cod (*Gadus morhua*) -- The inshore areas of the Gulf of Maine and Southern New England between 0-20 meters are designated as HAPC for juvenile cod. The coastal areas of the Gulf of Maine and Southern New England contain structurally complex rocky-bottom habitat that supports a wide variety of emergent epifauna and benthic invertebrates. Although this habitat type is not rare in the coastal Gulf of Maine, it provides two key ecological functions for juvenile cod: protection from predation, and readily available prey.

Occurrence in Project Area and Impacts: Portions of the proposed project contain a mix of sand-gravel substrate, which is considered a habitat of particular concern (HAPC) for inshore juvenile cod. These areas are within the proposed turning basin feature that is planned to be created. However, the sediments located within the HAPC areas are contaminated with elevated levels of PAHs (see Environmental Assessment Section X). These contaminated areas will be removed to allow for the colonization of benthic organisms that serve as a forage for cod and improve the HAPC. The sediment type following the creation of the tuning basin feature will remain the same however the area will be converted from intertidal to subtidal.

5.0 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. Past and current activities in Blue Hill Harbor include boat traffic from the large commercial fleet spread across four landings (Blue Hill Town Wharf, Steamboat Wharf, South Blue Hill, and East Blue Hill). The harbor is also populated with recreational boaters, recreational fishing, and other water-based recreation. The effects of these previous and existing actions are generally limited to infrequent disturbances of benthic communities, for example in the grounding of a vessel due to the falling tide or urban discharges. Land use around the harbor is primarily low density residential with several businesses and the Blue Hill Memorial Hospital. The Blue Hill Fire Department and wastewater treatment plant are located adjacent to the town wharf. There are two automotive garages on Main Street that were former gas stations. The Maine Department of Environmental Protection documented the removal of multiple gasoline and diesel underground storage tanks (UST), and there was one reported gasoline discharge from these properties. There are no other known spills other than the UST history noted here. The creation of a federal navigation channel will service existing traffic from the commercial and recreational fleet in an already heavily utilized harbor and are not expected to add to impacts from other actions in the area. Although the project will transform approximately 3.7 acres of intertidal habitat to subtidal habitat, the removal and sequestering of contaminated sediments will be beneficial to the local ecological communities. Therefore, no adverse cumulative impacts to EFH species are anticipated as a result of this project.

6.0 Future Conditions

Impacts to the proposed project area are detailed in Section 6 of the Environmental Assessment. Impacts to essential fish habitat in the project area could be affected by sea level rise and climate change in the future. Sea level rise could further deepen the habitats that exist within the proposed project footprint. While most managed species EFH would not be affected by additional depth, some managed species such as winter flounder have the potential to lose EFH with significantly increasing depths. Increased water temperatures brought about by climate change could shift species ranges . Future maintenance dredging efforts in the proposed channel and turning basin areas will produce impacts to essential fish habitat that are similar to those described in this EFH assessment.

The frequency of USACE navigation project maintenance of the channel and turning basin is expected to be minimal due to the strong tidal flushing in Blue Hill Bay and comparison with similar projects along the Maine coast. The town landing at Blue Hill is located on the island's protected lee shore and erosion on the adjacent shoreline is minimal. Other non-riverine harbors on the Maine coast such as Bass Harbor and Bucks Harbor did not require maintenance for more than 40 to 50 years after their initial construction. Maintenance of the proposed channel and turning basin would be required when shoaling has compromised the underkeel clearance needed for all-tide operation, for a shoal volume of about 40% of the initial improvement volume. Regardless of depth, maintenance would likely be on at least a 20-year frequency, or about twice during the 50-year project life.

7.0 Summary of Effects

The dredging activities proposed for the federal navigation improvement of Blue Hill Harbor will have permanent impacts to EFH for some managed species. Additionally, several short-term and highly localized impacts to EFH for managed species found in the vicinity of the dredge and placement areas would be realized as a result of the project. Permanent impacts include the conversion of 3.7 acres of intertidal area to subtidal area and changes to subtidal elevations in the dredging and placement areas. The removal and sequestration of contaminated sediments located in the inner harbor will also allow healthy benthic communities to develop which will be beneficial to EFH for several managed species. Temporary impacts include the temporary loss of benthic forage base in the project footprint and short-term and localized impacts of suspended sediments in the water columns at the dredge and disposal locations.

Managed species (and their associated habitat) that are anticipated to be affected by the conversion of intertidal habitat to subtidal habitat include those species that inhabit nearshore bottoms habitats such as cod, winter flounder, red hake, and white hake. These species are likely to benefit from the removal of the unsuitable material in the inner harbor by reducing the risk of those potentially toxic substances being exposed to the managed species. Additionally, the establishment of healthy benthic communities in the inner harbor will be beneficial for those species that forage in the area. The managed species with the greatest potential to be affected by the increase in suspended sediments from this project are those with planktonic eggs and larvae suspended in the water column, such as red hake and windowpane flounder. These eggs and larvae may be physically damaged or killed from exposure to elevated concentrations of

suspended solids, but the significant tidal flushing in the area will function to rapidly disperse and settle out any fines remaining in the water column after dredging.

7.1 Conclusions

The proposed project activities will impact EFH for several managed species in both the dredging and placement areas. Many impacts are expected to be short-term and limited to the immediate dredging or disposal area. However, permanent impacts (conversion of intertidal habitat) will also occur. The removal of the unsuitable material in the inner harbor will reduce the risk exposure to toxic substances and will allow functional benthic communities to establish and become a forage source for EFH managed species. Hydrological conditions such as tides and currents will not change as a result of the proposed project. Any changes to water quality (temperature, turbidity, dissolved oxygen levels) will be temporary and water quality will return to pre-project conditions following project completion. Prey species destroyed or otherwise impacted during the dredging and placement processes are expected to return following project completion.

8.0 References

NOAA-NMFS, 2021. Essential Fish Habitat Mapper tool.
<https://www.habitat.noaa.gov/application/efhmapper/index.html>

USACE, 2017. Monitoring Survey at the Portland Disposal Site August 2014. DAMOS Contribution #200. US Army Corps of Engineers, New England District, Concord, MA 01742 104 pp.

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