GREAT CHEBEAGUE ISLAND
MAINE
NAVIGATION IMPROVEMENT PROJECT

APPENDIX J

ESSENTIAL FISH HABITAT ASSESSMENT

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ESSENTIAL FISH HABITAT ASSESSMENT
FOR THE
GREAT CHEBEAGUE ISLAND
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." Great Chebeague Island and the proposed placement site, the Portland Disposal Site (PDS), 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 the Great Chebeague Island Navigation Improvement Project.

2.0 Proposed Action

The proposed navigation improvements on Great Chebeague Island (GCI) would create a new channel and turning basin in the vicinity of Stone Wharf (Figure J-1). The channel would extend from deep water in Casco Bay southeasterly ~1,600 feet to GCI public landing. The channel would be 100 feet wide and dredged to -10 feet deep mean lower low water (MLLW), with widening to 150 feet alongside the pier. An upper turning basin, 0.5 acre in size, between the channel and the boat/barge ramp would also be constructed by dredging to -8 feet MLLW to accommodate vessel maneuvering.

The proposed work consists of improvement dredging of about 33,000 cubic yards of sediments to create a channel and turning basin (Figure J-1). The dredge material is comprised of a mix sand and silt, with some gravel in the turning basin area. The work will be performed by a private contractor, using a mechanical dredge and scows, under contract to the government. The dredge will remove the material from the harbor bottom and place the material in scows. The scows will be towed by tug to the Portland Disposal Site (Figure J-2), where the material will be placed at designated locations within the PDS.

The work will be accomplished over a five to six-month period, between October 1 and April 1, of the year(s) in which funds become available. The Contractor will be allowed to dredge 24 hours per day, 7 days per week. Officials from the State of Maine and the Town of Chebeague have requested that this project would then be maintained in perpetuity by the USACE as a Federal Navigation Project (FNP).

This study is authorized under the provisions of Section 107 of the River and Harbor Act of 1960, as amended. Section 107 provides authority for the USACE to improve navigation including dredging of channels, anchorage areas, and turning basins and construction of breakwaters, jetties and groins, and other general navigation features in partnership with non-Federal government sponsors such as cities, counties, special chartered authorities or units of state or tribal government.

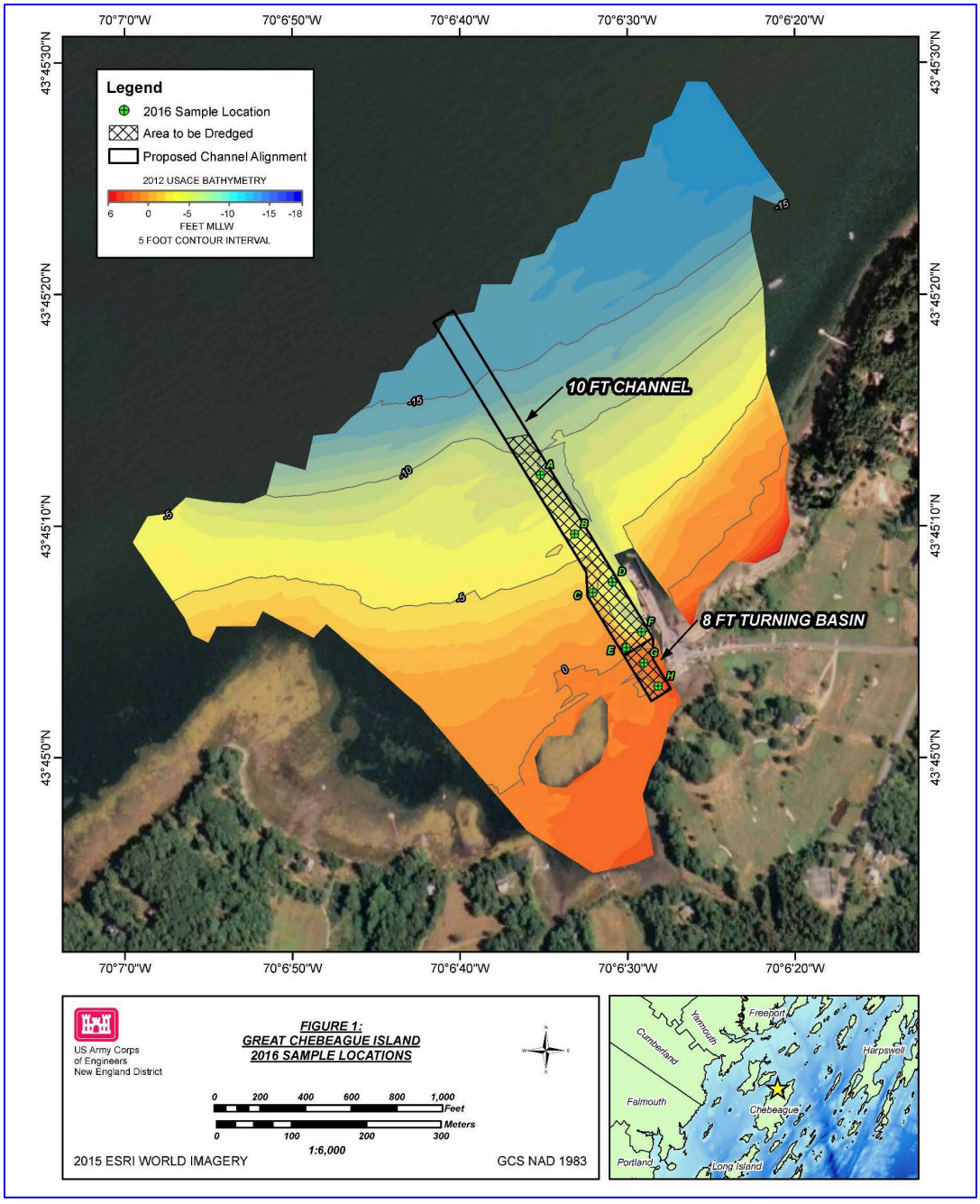

Figure J-1. Proposed Great Chebeague Island navigation improvement project and 2016 sediment sample locations.

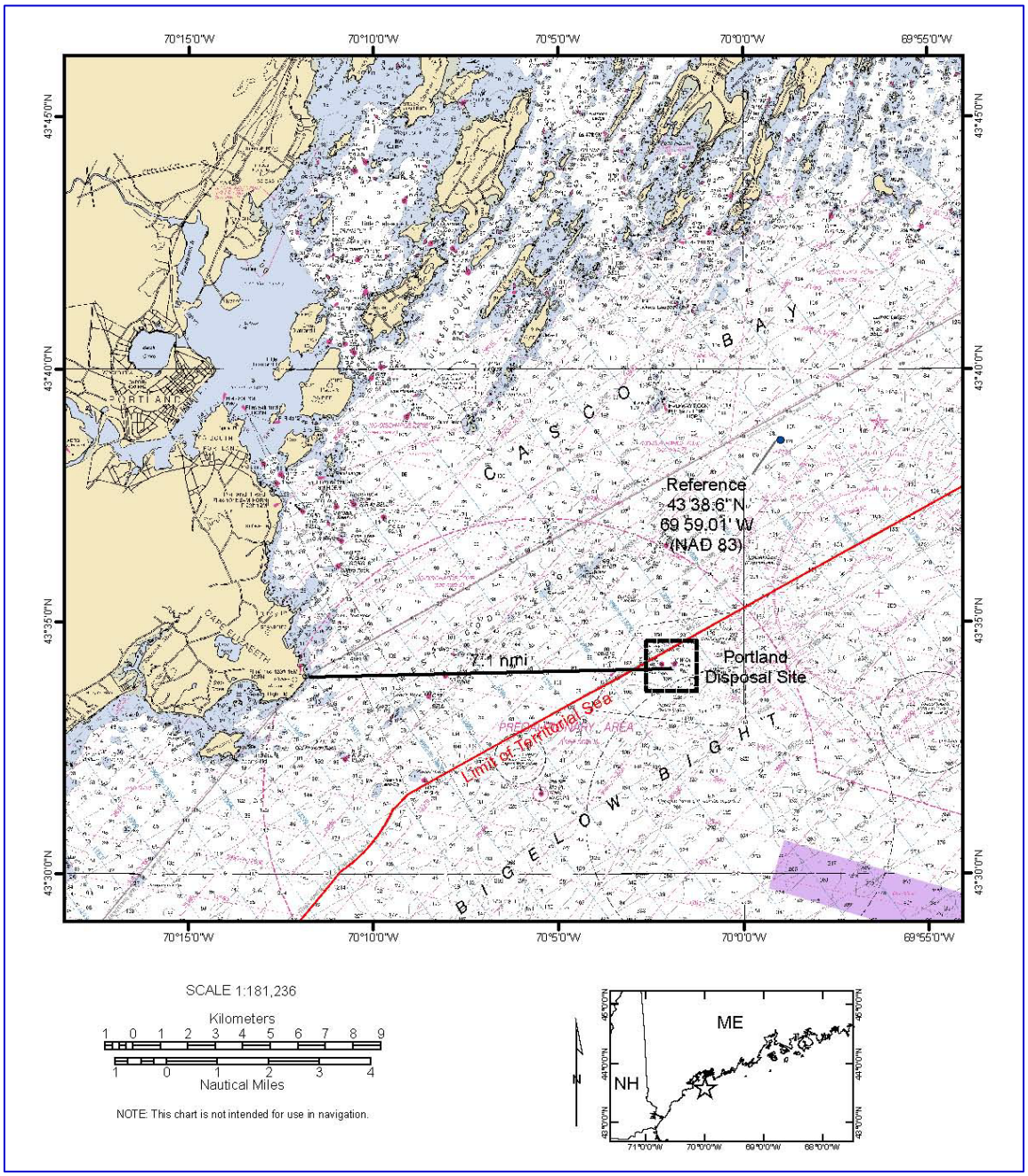

Figure J-2. Location of the Portland Disposal Site (PDS)

3.0 Analysis of Impacts

Impacts on EFH from any dredging and placement activity, include potential changes in the physical and chemical properties of the water column, changes in sediment types both within the channel and at adjacent areas, and changes in water depth. Consequently, changes in abundance and/or distribution of prey species may also result from both dredging and placement activities. These impacts may range from both short-term (i.e. impacts to the water column,

increases in turbidity and total suspended solids (TSS)), to long term impacts (changes in bathymetry as a result of dredging within the channel and deposition at the placement site of suitable material, permanent loss of EFH for certain managed species).

The impacts from the proposed Great Chebeague Island improvement project include short-term impacts to water quality and the benthic forage base within the project footprint. Additionally, the project will result in the permanent loss of eelgrass habitat and the permanent conversion of intertidal areas to subtidal areas. These permanent impacts will be mitigated for with an eelgrass restoration effort in Maine state waters. All impacts are discussed below. Mitigation efforts are noted below and described in detail in Appendix I.

3.1 Physical Environment

Water Quality – Any impacts from the dredging of the channel of GCI 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 sand flats at low tide. Consequently, any suspended sediments concentrations (which are anticipated to be minor) should quickly settle or be flushed out by tidal activity. Any increases in the turbidity of ocean waters during open water disposal at the PDS 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.

Bathymetry/water depth – The proposed project will result in a -10-foot deep mean lower low water (MLLW), 100-foot wide, and ~1,600-foot long channel from Casco Bay to Stone Wharf at GCI public landing. The improvement project would deepen the natural subtidal channel in Great Chebeague Island. An upper turning basin, 0.5 acre in size, between the channel and the boat/barge ramp would also be constructed by dredging to -8 feet MLLW to accommodate vessel maneuvering. The turning basin would convert 26,830 square feet of intertidal area into subtidal area. The loss of intertidal area as habitat will be mitigated for and is described in detail in the Mitigation Plan (Appendix I). The dredged material will be disposed of at the existing Portland Disposal Site and will raise the existing elevations of the PDS slightly.

3.2 Biological Environment

3.2.1 Prey Species

The abundance and/or distribution of prey species for fish which EFH has been designated, may 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. However, following project completion, the majority of the substrate type at the dredging locations and placement locations will be similar to current conditions, thus recolonization by organisms from adjacent areas are expected to

occur. Therefore, the majority of impacts to fish species using these areas for forage, would be expected to be temporary.

3.2.2 Eelgrass Habitat

Eelgrass habitat, which is considered EFH for several managed species, will be affected by the creation of a channel and turning basin in the project area. The area of eelgrass that will be impacted by the creation of a channel and turning basin in the project area was calculated by estimating eelgrass resources within the proposed navigation features. Additionally, a 3:1 slope around all features was evaluated and included in the overall impact estimate. The area of the 3:1 slope equates to a 30-foot perimeter extending around the 10-foot deep channel boundary and a 24-foot perimeter extending around the 8-foot deep turning basin. The eelgrass impact area within the channel and side slope footprint is 40,490 square feet and the area within the proposed turning basin and side slope is 6,705 square feet, totaling 47,195 square feet. Areal impact estimations are considered to be due to direct dredging of the project footprint and the proposed side slopes. The impact to eelgrass habitat will be mitigated for through in-kind compensatory mitigation. A mitigation plan has been developed and incorporated in the study design (see Appendix I).

There will also be a temporal lag in the development of the eelgrass resources at the mitigation site and as such there will be a temporary loss of full functions and values of the eelgrass resource. To compensate for the temporal loss of eelgrass during this period, an additional amount (2,832 square feet) of eelgrass mitigation is being provided. Appendix I details the calculations of the additional mitigation.

4.0 Life History of EFH Species

4.1 Selection of EFH Species

The National Marine Fisheries Service (NFMS) Final Omnibus Essential Fish Habitat Assessment Amendment 2 Including a Final Environmental Impact Statement (EIS), along with GIS shapefiles of EFH designations from NMFS, were used to determine which species have designated EFH in the project area and surrounding areas. Table J-1 presents a list of species that have designated EFH in the Great Chebeague Island project area. A short summary of the EFH for each life stage of each particular species is described below.

Table J-1. Species with Essential Fish Habitat in the proposed project area.

Species	Eggs	Larvae	Juveniles	Adults
American plaice (*Hippogloissoides platessoides)*	X	X	X	X
Atlantic Cod (*Gadus morhua*)	X	X	X	X
Ocean pout (*Macrozoarces americanus*)	X		X	X
Pollock (*Pollachius virens*)			X	
White Hake (*Urophycis tenuis*)			X	X
Windowpane flounder (*Scophtalmus aquosus*)	X	X	X	X
Winter flounder (*Pseudopleuronectes americanus*)	X	X	X	X
Silver Hake (*Merluccius bilinearis)*	X	X		X
Red Hake (*Urophycis chuss*)	X	X	X	X
Smooth skate (*Malacoraja senta)*			X	
Thorny Skate (*Amblyraja radiata)*		X		
Little Skate (*Leucoraja erinacea*)			X	X
Winter Skate (*Leucoraja ocellata*)			X	
Atlantic sea scallop (*Placopecten magellanicus*)	X	X	X	X
Atlantic Herring (*Clupea harengus)*		X	X	X
Atlantic mackerel (*Scomber scombrus*)			X	X
Atlantic Butterfish *(Peprilus triacanthus)*			X	X
Atlantic Wolfish (*Anarhichas lupus*)	X	X	X	X
Haddock (*Melanogrammus aeglefinus*)			X	
Acadian Redfish (*Sebastes fasciatus*)		X		
Yellowtail Flounder (*Pleuronectes ferruginea)*	X	X	X	X
Monkfish (*Lophius americanus*)			X	X
Bluefin Tuna (*Thunnus thynnus*)				X

American plaice (*Hippogloissoides 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 this bay are both considered EFH for this species. However, the effects of the proposed projects are short term and limited to the project area and is therefore not expected to harm the egg and larval life stages of this species. The dredging portion of this project occurs in intertidal and shallow subtidal zones, and therefore no adverse effects on American plaice EFH are expected because they primarily reside on the bottom between 120 and 600 feet. Placement of material at the PDS may temporarily displace any plaice that may be present at the site. However, all placement effects are short term and plaice EFH should not be permanently altered.

Atlantic Cod (*Gadus morhua*) – EFH is designated for all life stages of this species in the proposed project area. In this area, eggs are found in surface waters around the perimeter of the Gulf of Maine, while larvae are found in pelagic waters. Juveniles prefer bottom habitats with rock, pebble, or gravel in this region, and spawning adults prefer bottom habitats with smooth sand, rocks, pebbles, or gravel and depths of 32.8- 492.1 feet. Cod need structurally complex hard bottom habitats composed of gravel, cobble, and boulder substrates and emergent epifauna and macroalgae. The proposed project would occur mainly in a shallow subtidal and intertidal areas with predominantly silt and sand substrate. There are some areas within the turning basin feature that are composed of sand with gravel fractions, however these areas are in the immediate vicinity of a barge landing area and are continually disturbed by vessel prop wash and not considered prime intertidal habitat. Therefore, the proposed project will likely only have minimal effects on Atlantic Cod EFH.

Atlantic wolfish (*Anarhichus lupus*) – EFH is designated for this species in the project area, but since the proposed project would occur in the intertidal and shallow subtidal zones, no impacts to Atlantic wolfish are expected since they inhabit deeper subtidal waters. 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. The project area does not contain the EFH noted for this species, and therefore no adverse impacts to wolfish EFH are expected.

Ocean pout (*Macrozoarces americanus*) – EFH designated in the high salinity zone of Great Chebeague Island for this species. Egg EFH is hard bottom habitat, juvenile EFH is designated as sub and intertidal benthic areas, and adult EFH in 65.6 – 459.3 feet and in high salinity zones in estuaries north of Cape Cod. Juvenile ocean pout EFH may also occur in the high salinity zone. Disturbance of ocean pout EFH for eggs and juveniles may be realized, but due to the small project footprint and temporary nature of disturbance limited to the project area, minimal effects to ocean pout EFH are expected.

Pollock (*Pollachius virens*) – EFH designated in the mixed and salinity zones for juvenile Pollock in Great Chebeague Island. However, juveniles require rocky bottom habitat with attached micro algae or eelgrass beds, and spawning occurs over hard, stony, or rocky habitat. The benthic habitat in the proposed project area is mostly sand and silt and eelgrass. Therefore,

the loss of pollock EFH will be realized. However, the loss of eelgrass habitat will be mitigated for. Therefore, temporary adverse effects to EFH for this species are anticipated.

White Hake (*Urophycis tenuis*) – EFH for juveniles and adults occurs in GCI, in both brackish and salinity zones for juveniles and in the salinity zone for adults. Juvenile EFH is in intertidal and subtidal marine habitats, and adult EFH is fine-grained, muddy substrates in mixed soft and rocky habitats. White hake EFH will therefore be impacted by this project. However, impacts to hake EFH are expected to be short-term and limited to the small footprint of the project area.

Windowpane flounder (*Scophtalmus aquosus*) – EFH for all windowpane flounder life stages is designated for the high salinity and brackish zones of GCI. Juveniles and adults prefer mud and sand substrates in the intertidal and subtidal benthic zones. Windowpane EFH will be affected by the proposed project. However, impacts to windowpane EFH are expected to be short-term and limited to the small footprint of the project area.

Winter Flounder (*Pseudopleuronectes americanus*) – EFH for all life stages is designated in both the brackish and salinity zones of GCI. Egg EFH is designated as sub-tidal estuarine and coastal benthic habitat from mean low water to five meters, while larval EFH is designated to a maximum depth of 229.7 feet. Juvenile EFH extends from the intertidal zone to 196.9 feet, and for adults it extends to 229.7 feet. Adult habitat occurs in muddy or sandy substrates, which are present in CGI. However, the impacts will be short term and limited to the project area, and therefore long-term adverse effects on winter flounder EFH are not expected.

Silver Hake (*Merluccius bilinearis)* –EFH is designated for eggs, larvae, and adults in the high and mixed salinity zones of Great Chebeague Island. Although adult EFH is designated for shallow areas with sandy substrates, they are usually found in pelagic and benthic habitats greater than 114.8 feet, while eggs and larvae are found at the surface. Due to the short-term nature of impacts limited to the project area, there will be minimal effects on silver hake EFH.

Red Hake (*Urophycis chuss*) – EFH in high salinity zones is designated in GCI for all life stages. The adult EFH is only designated as shallow as 65.6 feet in Great Chebeague Island so no impacts on adult red hake EFH are expected due to the shallow intertidal nature of the proposed project area. Red hake egg, larval, and juvenile EFH is designated in the intertidal and subtidal zone, but due to the short-term impacts limited to the project area, minimal impacts on juvenile red hake EFH are expected.

Skates – Laval EFH for thorny skate, juvenile EFH for smooth, thorny, little, and winter skate, and adult EFH for little skate is designated in GCI. The impacts of dredging the channel in Great Chebeague Island will be temporary, short term, and limited to the project area, so minimal impacts to skate EFH are expected. No EFH is designated in GCI for Rosette, Clearnose, and Barndoor skates. There are no egg or larval designations for any of the skates.

Atlantic sea scallop (*Placopecten magellanicus*) – EFH is designated for all Atlantic sea scallop life stages in the high salinity zone of GCI. Shells, pebble, gravel, and sand substrates are part of scallop EFH. Due to the presence of potentially contaminated sediments in the project area, the removal of those unsuitable materials from the site in the proposed project may be beneficial to the Atlantic sea scallop and other benthic organisms in the harbor.

Atlantic Herring (*Clupea harengus*) – EFH is designated for Atlantic Herring larvae, juveniles, and adults in GCI. 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. This is a highly mobile species, making extensive seasonal migrations. Therefore, due to the temporary and short-term nature of disturbance from the proposed project, minimal impact to Atlantic herring EFH is expected.

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. Spawning occurs in spring and early summer (typically June) at any location, resulting in pelagic egg and larval stages that are dispersed by currents.

Impacts to Atlantic mackerel juveniles and adults and their EFH at the proposed project area and placement sites 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

Juvenile and adult butterfish are likely to move from the water column areas while dredged material is being disposed, resulting in only minimal impacts to individuals. As noted above, impacts to the water column are expected to be short term and localized, therefore no significant effects to Atlantic Butterfish EFH are expected.

Haddock (*Melanogramus aeglefinus*) – EFH is designated within the project area for juvenile haddock. Juvenile haddock are usually found on bottom habitats with a substrate of broken ground, pebbles, smooth hard sand and smooth areas between rocky patches. They are generally found in water temperatures below 7 °C, depths from 130 to 490 feet (40 - 150 m), and a salinity range from 31.5 - 35‰. This project is expected to have minimal effects on EFH for haddock as the depths in the GCI are not correct for the adults. At the disposal site the adults can swim away from any area of disturbance. Any disruption of EFH will be associated with the disposal activities and therefore will not be long-term.

Acadian Redfish (*Sebastes fasciatus*) – EFH for redfish larvae include pelagic habitats in the Gulf of Maine, on the southern portion of Georges Bank, and on the continental slope north of

37°38'N latitude. Larvae could be affected as the water column may experience impacts during material disposal at the site. However, as the material is to be placed at the PDS, consisting of similar sediments and benthic community as GCI, and since the water column effects from disposal are short term and localized, no significant effects to larval redfish EFH are expected.

Yellowtail Flounder (*Pleuronectes ferruginea*) – EFH is designated within the GCI area for all life stages of yellowtail flounder. The eggs are pelagic; they are found in depths of 98 to 295 feet (30-90 m) and most often observed during the months from mid-March to July. Larvae are found at depths of 33 to 295 feet (10-90 m), water temperatures below 17° C, and a salinity range from 32.4 - 33.5 ‰. Both juveniles and adults are found on bottom habitats with a substrate of sand or sand and mud, water temperatures below 15° C, salinity 32.4 - 33.5 ‰, and depths from 66 to 164 feet (20-50 m). All life stages typically prefer deeper habitat than the project area. Juvenile and adults are motile and can leave the area of disturbance. Therefore, no more than minimal impacts would be expected to occur to the yellowtail flounder EFH.

Monkfish (*Lophius americanus*) – Monkfish, or goosefish, are distributed in the northwest Atlantic from the Gulf of St. Lawrence to Cape Hatteras North Carolina. Adult monkfish are found in bottom habitats with various substrates including hard sand, sand-shell mix, mud, gravel, and algae covered rocks along the continental shelf in waters from 70 to 100 meters (230 to 328 feet) in depth, but may also be found at depths of 800 meters (2625 feet). On the other hand, juveniles spend several months in a pelagic phase before settling to the bottom. Larger mobile adults will likely move to avoid the disposal plume, while juveniles in the water column may experience impacts during material disposal at the site. As the material is to be placed at the PDS, consisting of similar sediments and benthic community as GCI, the disposal site should recover following the cessation of disposal events and no significant impact to adult monkfish EFH is expected. Additionally, since the water column effects from disposal are short term and localized, no significant effects on monkfish EFH are expected.

Bluefin Tuna (*Thunnus thynnus*) – EFH is designated within the PDS area for bluefin tuna 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 disposal activities. Therefore, no impacts to highly migratory species would be anticipated as a result of this project.

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 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 the proposed project area include the maintenance dredging of the proposed project, maintenance of the town landing and piers, and navigation through the project. Reasonably foreseeable future actions include the continuation of maintenance and navigation activities. The effects of these previous, existing and future actions are generally limited to infrequent disturbances of the benthic communities in the dredged areas. The direct effects of this project

are not anticipated to add significantly to impacts from other actions in the area. Therefore, no significant adverse cumulative impacts are projected as a result of this project.

6.0 Future Conditions

Impacts to the proposed project area are detailed in Section 6.4 of the Environmental Assessment. Impacts to essential fish habitat in the project area may be affected by sea level rise and climate change in the future. Future maintenance dredging efforts in the 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 Casco Bay and comparison with similar projects along the Maine coast. The town landing at Stone Wharf is located on the island's protected lee shore and erosion on the adjacent rocky shoreline is minimal. There are no rivers entering the vicinity of the landing or any large rivers entering that area of the bay. 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. Limited dredging to remove high shoal spots at the Stone Wharf was done 17 year ago by the Town of Cumberland in 2003. 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 navigation improvement of Great Chebeague Island will have some permanent impacts to EFH for some managed species. Additionally, some limited temporary impacts to EFH and managed species found in the vicinity of the dredge and placement areas would be realized as a result of the project. Permanent impacts include loss of 47,195 square feet of eelgrass habitat and the conversion of 26,830 feet of intertidal area to subtidal area. 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 dredge and disposal locations.

EFH species that are anticipated to be affected by the loss of eelgrass and intertidal habitat include those species that inhabit nearshore bottoms habitats such as winter flounder, red hake, and white hake. The EFH species with the greatest potential to be affected by the increase is 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. Great Chebeague Island is a heavily used harbor with a significant amount of boat traffic, therefore the consistent disturbance from those activities is expected to create a localized area of unsuitable habitat coinciding with the project area.

7.1 Conclusions

Although there is the potential for project activities to impact EFH and managed species, which may occur in the dredging and disposal areas, many impacts are expected to be short-term and limited to the immediate project area. Hydrological conditions such as tides and currents will not change as a result of the proposed project. Any changes to water quality (temperature, TSS, DO) 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. In areas where permanent impacts to EFH include the loss of eelgrass habitat and intertidal habitat, compensatory mitigation is being proposed. Appendix F details the mitigation proposed of the project.