NEWBURYPORT HARBOR
AND NORTH POINT, PLUM ISLAND
NEWBURYPORT, MASSACHUSETTS

§204 PROJECT
BENEFICIAL USE OF DREDGED MATERIALS

ENVIRONMENTAL ASSESSMENT
FINDING OF NO SIGNIFICANT IMPACT
AND SECTION 404(B)(1) EVALUATION

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FINDING OF NO SIGNIFICANT IMPACT
Maintenance Dredging of the Newburyport Harbor Federal Navigation Project and Placement of Dredged Material on Plum Island's North Point, Newburyport, Massachusetts

The Newburyport Harbor Federal Navigation Project (FNP) requires periodic maintenance dredging of the Federal navigation channel in Newburyport, Massachusetts. It is the responsibility of the Army Corps of Engineers (USACE) to maintain this FNP to ensure shoaling does not present a hazard to vessels navigating the channel within the Merrimack River. Maintenance dredging of this FNP is typically required every three to ten years depending on shoaling rates and the prevalence of significant storm events in the watershed or in the Gulf of Maine which impact sediment transport and deposition.

The proposed maintenance dredging effort involves the removal of about 220,000 cubic yards (cy) of sandy material that has shoaled areas of the 9-foot deep, 200-foot wide inner harbor channel, and the 15-foot deep, 400-foot wide entrance channel of the FNP. Dredged material is likely to be removed utilizing a hopper dredge or hydraulic pipeline dredge over a four-month period. Larger quantities of dredged material, in excess of 220,000 cy, may require removal based on updated bathymetric surveys of the channel shoaling. This excess material may include an additional 30,000 cy for a total of 250,000 cy resulting in an increase to the quantities identified and will be placed at either of the placement sites described below.

There are two dredged material placement alternatives. The Federal Base Plan includes placement at two nearshore placement locations, one off Salisbury Beach and the other off Plum Island Beach and a portion of the material (about 57,000 cy) placed on the beach at Plum Island's North Point to protect the inlet's south jetty from flanking due to coastal erosion. The Federal Base Plan is the least costly alternative for construction of the project.

The second alternative includes onshore beach placement at North Point with the entire 220,000 cy of the dredged material. Placement of 57,000 cy of material would be accomplished as part of the Federal Base Plan, while the additional 163,000 cy would be accomplished under the Beneficial Use of Dredge Material Program authorized under Section 204 of the Water Resources Development Act (WRDA) of 1992, as amended. The Section 204 program allows the Federal Government to participate in cost share agreements for alternative uses of dredged material for the purposes of aquatic ecosystem restoration or coastal storm damage risk management where a non-Federal sponsor is willing to share a portion of the cost. The non-Federal sponsor for the Section 204 project is the Massachusetts Department of Conservation and Recreation, the owners of the North Point Reservation.

Construction windows have been established to avoid impacts to environmental resources and will be further defined in coordination with Federal and State environmental resource agencies including the National Marine Fisheries Service, U.S.

Fish and Wildlife Service, and the Massachusetts Division of Marine Fisheries. Construction windows are applied differently depending on the location of the dredging or dredged material placement.

Work will be permitted within the following timeframes:

A. Dredging Activities (by location):

- 15-Foot Entrance Channel: All year (no timeframe restriction).
- 9-Foot Inner Harbor Channel: 1 July to 14 February

B. Placement Activities (by location):

- Nearshore Placement: All year (no timeframe restriction)
- Onshore Placement at North Point: 1 September to 31 March

The dredging of the 9-foot inner harbor channel of the FNP will be conducted between 1 July and 14 February to avoid adverse impacts to spawning winter flounder, and anadromous fish migration, and interactions with the endangered species. Dredging of the 15-foot entrance channel and placement at the nearshore sites off the coast of Salisbury and Plum Island Beach is likely to have minimal impacts to these species and other environmental resources, no timeframe restrictions for dredging or material placement have been implemented for these activities. Onshore placement activities on North Point will be restricted to 1 September to 31 March to avoid interactions with nesting piping plovers.

Material placed on the beach at North Point would also require a slope no steeper than 1V:10H to provide suitable piping plover foraging habitat after project completion. Evaluation of the project site and planned dredging and placement activities indicates that there will be no unacceptable environmental impacts to piping plovers or other protected species.

I find that based on the evaluation of environmental effects discussed in the Environmental Assessment (EA), this project is not a major federal action significantly affecting the quality of the human environment. Under the Council on Environmental Quality ("CEQ") NEPA regulations, "NEPA significance" is a concept dependent upon context and intensity (40 C.F.R. § 1508.27). When considering a site-specific action like the proposed project, significance is measured by the impacts felt at a local scale, as opposed to a regional or nationwide context. The CEQ regulations identify a number of factors to measure the intensity of impact. These factors are discussed below, and none are implicated here to warrant a finding of NEPA significance. A review of these NEPA "intensity" factors reveals that the proposed action would not result in a significant impact to the human environment.

Impacts on public health or safety: The project is expected to have no effect on public health and safety.

Unique characteristics: There are no unique characteristics of the project area that would be impacted by maintenance dredging or placement of dredged material.

Controversy: The proposed project is not controversial. State and Federal resource agencies agree with the USACE impact assessment.

Uncertain impacts: The impacts of the proposed project are not uncertain; they are readily understood based on past experiences from this project and other similar USACE projects.

Precedent for future actions: The proposed project involves the maintenance of an authorized project and will not establish a precedent for future actions.

Historic resources: The project will have no known negative impacts on any pre-contact or historic period archaeological sites recorded by the State of Massachusetts.

Endangered species: The project as proposed is not likely to adversely affect endangered species under the jurisdiction of the State of Massachusetts, or Federally under the jurisdiction of the National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS).

Potential violation of State or Federal law: This action will not violate Federal or State law.

The environmental effects of the proposed action are discussed in Section 7, with measures to minimize adverse environmental effects discussed in Section 8 of the EA.

Based on my review and evaluation of the environmental effects as presented in the Environmental Assessment, I have determined that the Newburyport Harbor Federal Navigation Project is not a major Federal action significantly affecting the quality of the human environment. This project, therefore, is exempt from requirements to prepare an Environmental Impact Statement.

_____ _____

Date

John A. Atilano II
Colonel, Corps of Engineers
District Engineer

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NEWBURYPORT HARBOR AND PLUM ISLAND NORTH POINT
NEWBURYPORT, MASSACHUSETTS
BENEFICIAL USE OF DREDGED MATERIALS

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ABBREVIATIONS

CAA	Clean Air Act
CAP	Continuing Authorities Program
CBRS	Coastal Barrier Resources System
CO	Carbon Monoxide
CZMA	Coastal Zone Management Act
dB	Decibels
EA	Environmental Assessment
DPS	Distinct Population Segment
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FNP	Federal Navigation Project
GOM	Gulf of Maine
IOSN	Isles of Shoals North Disposal Site
IPCC	Intergovernmental Panel on Climate Change
MACZM	Massachusetts Office of Coastal Zone Management
MADCR	Massachusetts Department of Conservation and Recreation
MADMF	Massachusetts Division of Marine Fisheries
MESA	Massachusetts Endangered Species Act
MHW	Mean High Water
MLW	Mean Low Water
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
MPRSA	Marine Protection and Research Sanctuaries Act
MSA	Magnuson-Stevens Act
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHFG	New Hampshire Fish and Game Department
NPS	National Park Service
NOAA	National Oceanic and Atmospheric Administration
NLEB	Northern Long-Eared Bat
NMFS	National Marine Fisheries Service

NO2	Nitrogen Dioxide
O3	Ozone
Pb	Lead
PBFs	Physical or Biological Factors
SIP	State Implementation Plans
SO2	Sulfur dioxide
SWQS	Surface Water Quality Standards
USACE	Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WQC	Water Quality Certification
WRDA	Water Resources Development Act

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ENVIRONMENTAL ASSESSMENT

1.0 INTRODUCTION

The proposed project involves the maintenance dredging of the Newburyport Harbor Federal Navigation Project (FNP), in Newburyport, Massachusetts. It is the responsibility of the Army Corps of Engineers (USACE) to maintain the authorized depths of the Newburyport Harbor FNP. Areas of shoaling in the Federal channel have been identified, creating shallow depths that are hazardous to vessel navigation within the 9-foot and 15-foot channels. Maintenance dredging of about 220,000 cubic yards (cy) of sandy material, based on recent surveys, is needed to bring the Federal channel to its authorized depths. Shoaling since the latest surveys is expected to increase the dredging volume to about 250,000 by the time dredging can begin. Under the Federal Base Plan about 57,000 cy of material would be placed on the North Point of Plum Island behind the existing stone spur jetty to help prevent erosion from flanking the inlet's South Jetty. The remaining dredged material would be placed in nearshore locations off Salisbury and Plum Island Beaches, also under the Federal Base Plan. Alternatively, under the authority of Section 204 of the Water Resources Development Act (WRDA) of 1992, as amended. for "Beneficial Use of Dredged Material" at least 163,000 cy of material that would be placed nearshore under the Base Plan would instead be place on North Point atop the spur jetty fill and along the beach areas to the west of the spur jetty.

This Environmental Assessment (EA) presents information on the environmental features of the project area and to review the design information to determine the potential environmental impacts of the proposed project. This EA describes project compliance with the National Environmental Policy Act (NEPA) of 1969 and all appropriate Federal and State environmental regulations, laws and executive orders. Methods used to evaluate the environmental resources of the area included biological sampling, sediment analysis, review of available information, and coordination with the appropriate environmental agencies and knowledgeable persons. This report provides an assessment of environmental impacts, alternatives considered, and other pertinent data.

Newburyport Harbor is in the lower 2.5 miles of the estuary of the Merrimack River in Essex County, Massachusetts (Figure EA-1). The harbor extends from the mouth of the Merrimack River to the U.S. Route 1 Bridge. The harbor is located 54 miles north of Boston and 20 miles southwest of Portsmouth, New Hampshire. The City of Newburyport is on the south shore of the river and the Town of Salisbury is on the northern shore. The Merrimack River is the fourth largest river in New England with a drainage basin measuring 5,058 square miles. The river rises at the confluence of the Pemigewasset and Winnipesaukee rivers in Franklin, New Hampshire, and stretches 117 miles through Massachusetts and empties into Newburyport Harbor (NPB, 2017). The most prominent water uses of Newburyport Harbor is recreational boating, along with commercial and recreational fishing. As Newburyport Harbor is at the mouth of the Merrimack River, mariners from Newburyport, Salisbury and other upriver towns depend on the harbor for ocean access. The U.S. Coast Guard also operates a station in the harbor.

The existing Federal project in Newburyport Harbor, as shown in Figure 2 and 3, consists of:

- Two jetties, one projecting 4,118 feet from the north shore, the other projecting 2,445 feet from the south shore, about 1,000 feet apart, at the mouth of the Merrimack River.
- The partial closing of Plum Island Basin by a timber dike and similar dikes extending from either side of Woodbridge Island.
- A channel 400 feet wide and 15 feet deep at Mean Lower Low Water (MLLW) through the mouth of the Merrimack River, then 200 feet wide and 9 feet deep at MLLW to the U.S. Route 1 Bridge.

2.0 PURPOSE AND NEED

The purpose of this project is to dredge the shoaled areas of the FNP to restore safe vessel navigation, and to beneficially place sandy dredged material to nourish local beach areas. Shoaling occurring in the Newburyport Harbor FNP makes vessels more susceptible to groundings, exposing them to hazardous conditions when tides and weather create rough seas. Hydrographic surveys of the FNP have identified enough shoaling to be a hazard to navigation. This shoaling has presented the need for the USACE to perform maintenance dredging within the Federal channel to bring these areas to their authorized depths. The Federal channel supports ocean access for over 2,000 permitted vessels that are launched or moored in Newburyport, Salisbury and additional harbors upriver. Vessels that transit Newburyport Harbor include recreational boats, commercial and recreational fishing vessels, a whale-watch charter and Coast Guard ships (Personal Communication, Paul Hogg, Newburyport Harbormaster, 2020).

It is important that material dredged from Newburyport FNP be beneficially used if there is an opportunity to do so. Coastal beach areas of Salisbury and Plum Island have sustained high rates of erosion leading to increased storm damage to residential and commercial buildings and utilities. Coastal storm damage has been most concerning on North Point due to the high erosion rates occurring on the beach over the past eight years, and the damage to residential properties that occurred during a Nor'easter storm in 2013. Nourishment of these coastal beaches would increase stability and abate coastal erosion. This nourishment occurs by direct onshore placement of dredged material or placement in the nearshore to create sediment feeder berms to allow material to migrate onto the adjacent beach through wave action and tidal currents.

3.0 AUTHORITY AND MAINTENANCE HISTORY

The existing Newburyport Harbor FNP project was adopted in 1828 and was supplemented by enactments through 1992. The south jetty was completed in 1905, and the north jetty was completed in 1915. From 1968 to 1970 both jetties underwent major rehabilitation to restore them to authorized dimensions. In 1970 the south jetty was extended landward and a rock revetment was constructed to protect the inner end of the structure. The authorizing documents for the project are the River and Harbor Act dated 1828, and House Document No. 703, 76th Congress, 3rd Session approved by the River and Harbor Act of 2 March 1945.

The Newburyport FNP has been maintained by the USACE for navigation purposes since the early 1800s. Work is performed on an "as-needed" basis in response to severe shoaling conditions that is addressed when funding is available. Dredged material placement options have included offshore, open-water placement by hopper dredge, nearshore placement by hopper dredge (most common method), beach placement using hydraulic pipeline, and placement adjacent to the channel by sidecasting dredge.

Maintenance dredging of Federal navigation channel has been performed periodically, every 3-4 years from 1961-2010 in response to shoaling (Table EA-1). The USACE last dredged the Newburyport Harbor FNP in 2010 when approximately 165,000 cubic yards of sandy material was hydraulically dredged from the channel and pumped via pipeline directly onto Plum Island Beach (about 120,000 cy) and Salisbury Beach (about 45,000 cy) to stabilize the primary dunes and extend the width of the beach about 50 feet. Dredged material has been historically placed most frequently in the nearshore areas off Plum Island and Salisbury, on either side of the Merrimack River inlet.

The onshore placement of material on Plum Island's North Point would be conducted under Section 204 of WRDA. Section 204 authorizes beneficial use of dredged material from the construction, operation or maintenance of authorized civil works projects to protect, restore and create ecologically related habitats and for coastal storm damage risk management. The Section 204 project would be conducted in partnership with the Massachusetts Department of Conservation and Recreation (DCR) and the City of Newburyport.

Table EA-1 Newburyport Harbor Maintenance Dredging History		
Item	**Work Dates**	**Quantity in Cubic Yards (cy)**
Maintenance Dredging of entrance channel by Government Hopper Dredge HYDE	26 July - 12 August 1961	250,000 cy
Maintenance Dredging of entrance channel by Government Hopper Dredge HYDE	18 - 25 May 1964	131,000 cy
Maintenance Dredging of entrance channel by Government Hopper Dredge LYMAN	3 - 16 May 1966	50,000 cy
Maintenance Dredging of entrance channel by Government Hopper Dredge HYDE	2 - 13 July 1968	86,000 cy
Maintenance Dredging of entrance channel by contract	20 August - 16 October 1970	106,190 cy
Maintenance Dredging of entrance channel by Government Hopper Dredge HYDE	15 August - 3 September 1973	93,650 cy
Maintenance Dredging of entrance channel by Government Hopper Dredge DAVISON	16 June - 3 July 1977	54,000 cy
Maintenance Dredging of entrance channel by privately owned Hopper Dredge ATCHAFALAYA	19 June - 1 July 1981	102,600 cy
Maintenance Dredging of entrance channel by privately owned Hopper Dredge MERMENTAU	9 - 26 August 1983	123,500 cy
Maintenance Dredging of entrance channel by privately owned Hopper Dredge	July – September 1987	156,265 cy
Maintenance Dredging of entrance channel by Government Hopper Dredge CURRITUCK	June – July 1990	62,460 cy
Maintenance Dredging of entrance channel by privately owned Hopper Dredge GULF COAST TRAILING	August - September 1991	135,290 cy
Maintenance Dredging of entrance channel by privately owned Hopper Dredge NORTHERLY ISLAND	26 - April - 10 May 1993	125,040 cy
Maintenance Dredging of the 15-foot entrance channel by privately owned Hopper Dredge	8 – 26 September 1996	125,386 cy
Maintenance Dredging of the 15-foot entrance channel by privately owned hopper dredge ATCHAFALAYA	28 July – 16 August 1999	145,017 cy
Maintenance Dredging of the 15-foot entrance channel by privately owned hydraulic cutter-head pipeline dredge GREAT LAKES DREDGE ILLINOIS	16 September- 14 October 2010	165,000 cy

4.0 PROPOSED PROJECT

The proposed maintenance dredging project would remove 220,000 cy of clean sand from shoaled areas of the 9-foot and 15-foot Federal channel. Larger quantities of dredged material, about 250,000 cy by the time dredging can begin, may be found to require removal once updated surveys of the shoaled channel are available. The amount of sand placed behind the spur jetty, and the amount of sand placed on North Point areas to the west of the spur jetty would be adjusted based on availability of dredged sand, and the fill capacity at each of the sites on North Point, with fitting as much sand on North Point being the priority. Any excess dredged sand not placed on North Point would be placed in one or both of the nearshore bar placement sites. For continuity in this EA, the 220,000 cy total dredged volume and the 57,000 and 163,000 cy increments will be cited in the remainder of the document.

The total area proposed for dredging is approximately 30 acres. The primary location of the dredging activity is a recurring sandbar seaward of the jetties at the mouth of the Merrimack River within the 15-foot entrance channel (Figure EA-2). The other proposed dredging locations reside within the 9-foot channel just downriver of the Route 1 Bridge within Newburyport Harbor (Figure EA-3). The material proposed for dredging is composed of clean, medium-grain sand that is tan in color (Table EA-2).

There are two beach nourishment alternatives for placement of the proposed dredged material. The Federal Base Plan[1] includes placement of material at two nearshore placement locations, one off of Salisbury Beach and the other off of Plum Island Beach and a portion of the material (57,000 cy) as beach placement at Plum Island's North Point to protect the inlet's south jetty from flanking due to erosion. The second alternative includes shoreline beach placement at North Point with the entire 220,000 cy of the dredged material. Placement of 57,000 cy of material at North Point would be accomplished as part of the Federal Base Plan, while the remaining material placement would be accomplished under Section 204 of WRDA. Shoaled areas that require dredging in excess of the anticipated 220,000 cy would be placed at either of the placement sites based on the selected plan and receiving capacity at each placement site.

Both placement alternatives are considered beneficial use of the dredged material. The nearshore sites off Salisbury Beach and Plum Island Beach are adjacent to locations previously used for dredged material placement in the nearshore. Recent study of the sand migration patterns in the area and sub-bottom habitat indicate the proposed placement locations are optimal for nourishing the intended beach areas while minimizing impacts to the environment (ERDC, 2017; USACE, 2013).

The northern nearshore placement site "Salisbury Nearshore", is located just east of Salisbury Beach, 1.5 miles north of the navigation channel and mouth of the Merrimack River. The footprint of the placement area is 1 mile long and 0.15 miles wide. The southern nearshore placement site "Plum Island Nearshore", is located east of Plum Island Beach, 1.2 miles south of the Merrimack and is 0.8 miles long and 0.15 miles wide (Figure EA-4). Both nearshore sites are located between the 10-foot MLW and 30-foot MLW depth contours.

[1] *The base plan is the dredged material placement plan that is consistent with sound engineering practice and meets all Federal environmental standards including the environmental standards established by Section 404 of the Clean Water Act of 1972 or Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended.*

Figure EA-1. Newburyport Harbor Project Location

Figure EA-2. Newburyport Harbor FNP Outer Harbor Dredge Area

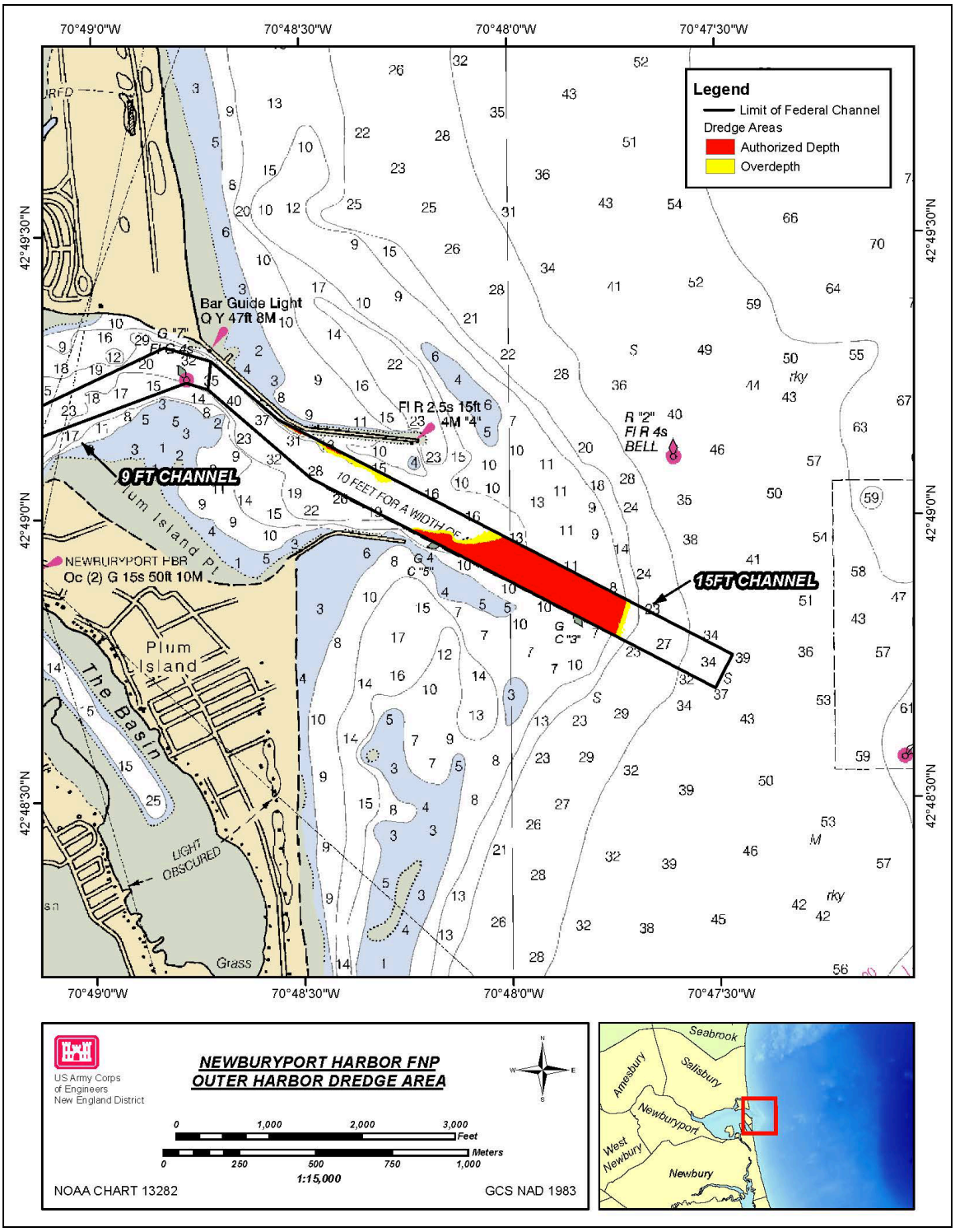


Figure EA-3. Newburyport Harbor FNP Inner Harbor Dredge Area

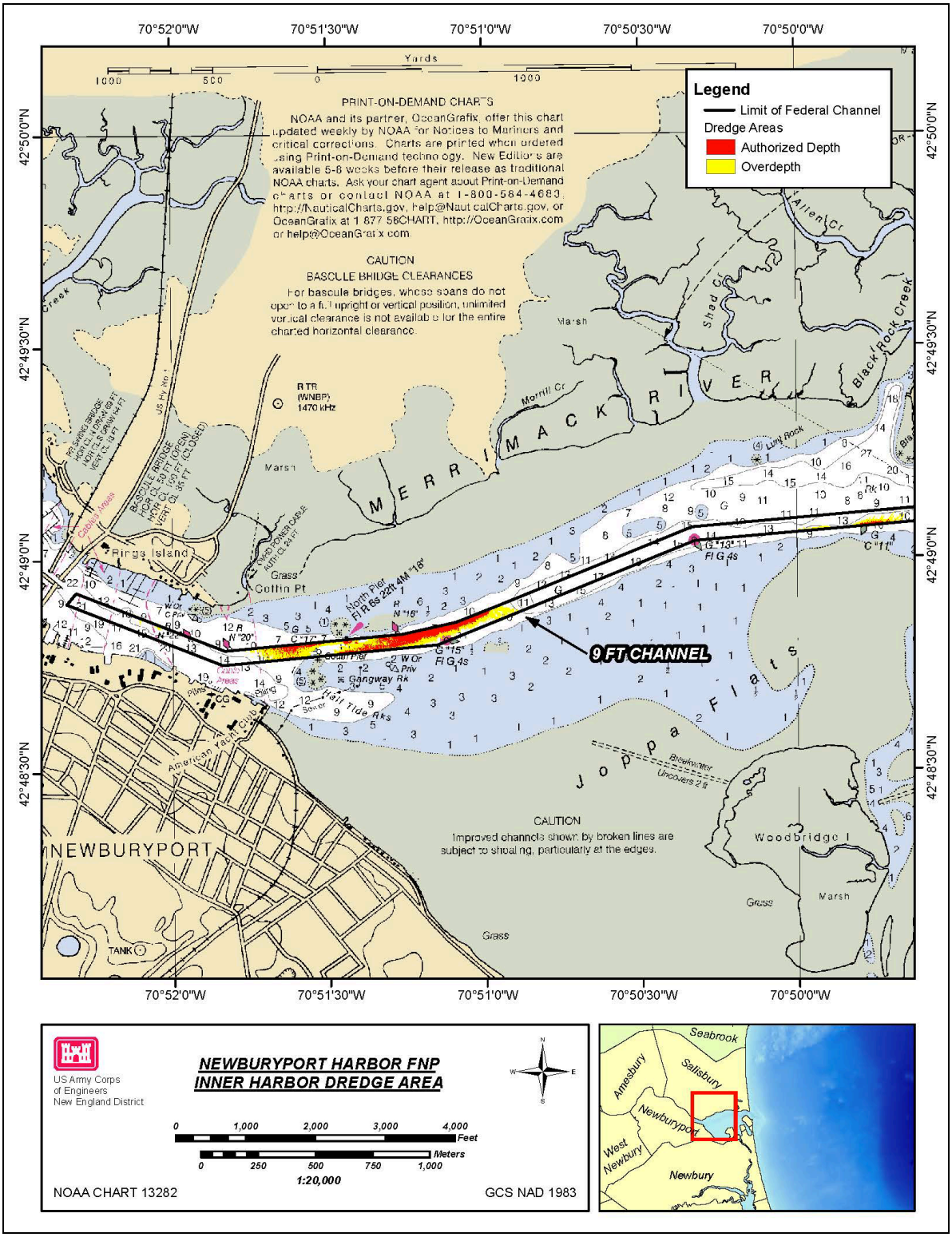
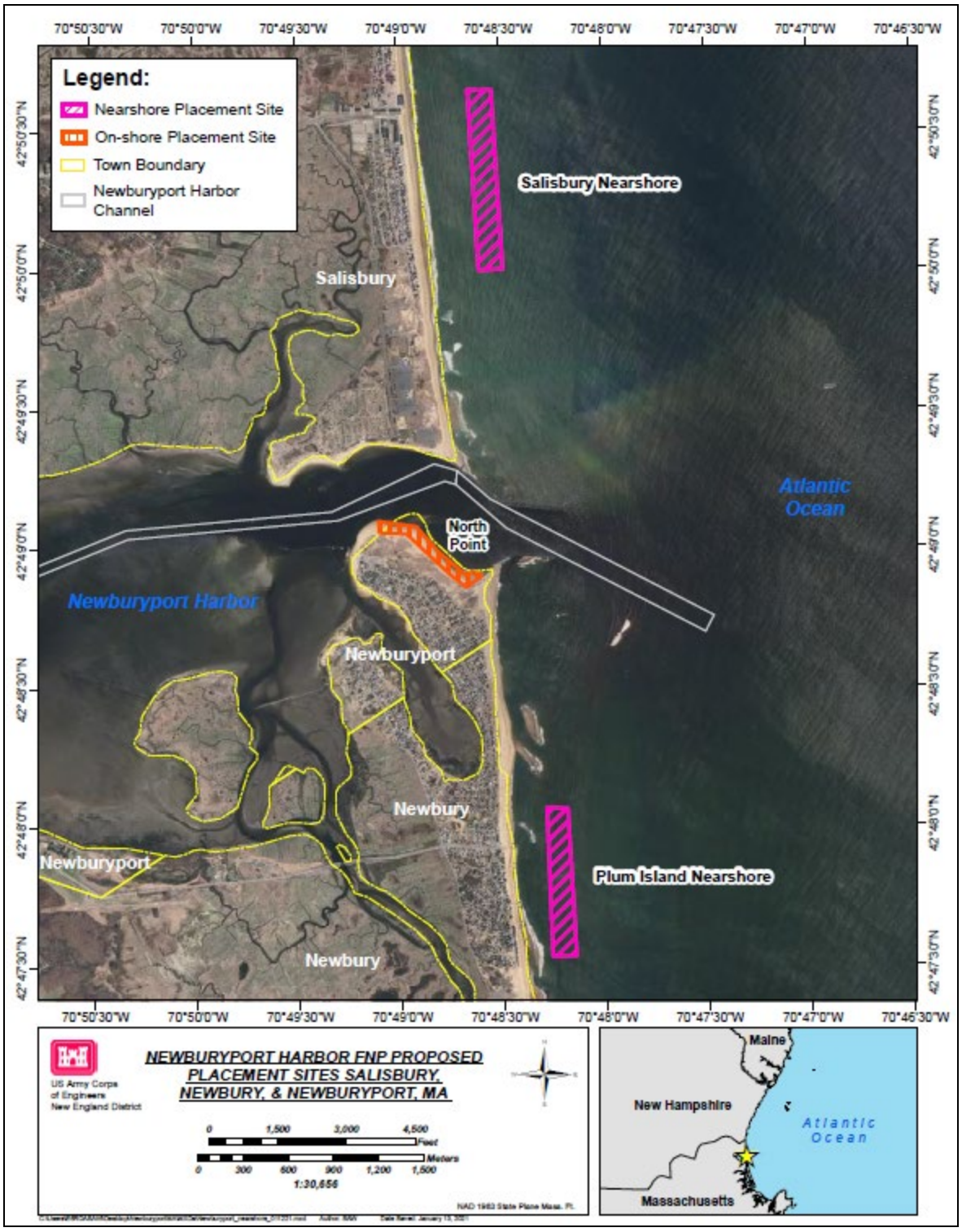


Figure EA-4. Newburyport Harbor FNP Dredge Material Placement Sites



The beach placement area at North Point is approximately 0.3 miles long, and is located just west of the south jetty, on the southern shoreline of the Merrimack River at the inlet (Figure EA-4). Direct beach placement would replenish sand on the beach in accordance with engineering design specifications to ensure stability of the shoreline and longevity of the sand fill.

5.0 ALTERNATIVES

5.1 Alternative Plans

5.1.1 No Action Alternative

The No Action Alternative serves as a baseline against which the proposed action and alternatives can be evaluated. Evaluation of the No Action Alternative involves assessing the environmental effects that would result if the project never took place. Under a No Action Alternative, the FNP in Newburyport Harbor would not be dredged, which would allow shoaling to remain and worsen creating increasingly hazardous conditions for vessels navigating the channel. Also, there would be no placement of dredged material at either the nearshore sites or on the beach at North Point, which would allow the coastal beaches to continue to erode increasing the risk of storm damage.

5.1.2 Federal Base Plan

The Federal Base Plan includes dredging of 220,000 cy, and potentially about 250,0000 cy, of sandy material from shoaled areas of the FNP. This alternative also involves placement at two nearshore placement locations, one off of Salisbury Beach and the other off of Plum Island Beach, with a portion of the material (about 57,000 cy) placed on the beach of at North Point to protect the inlet's south jetty from flanking due to coastal erosion.

5.1.3 North Point Placement (Section 204)

The North Point placement alternative includes dredging of up to about 220,000 cy, and potentially about 250,0000 cy, of sandy material from shoaled areas of the FNP. This alternative also involves placement of all the dredged material along a 0.3-mile-long section of beach at Plum Island's North Point just west of the south jetty, on the southern shoreline of Merrimack River. Placement of 57,000 cy of material would be accomplished as part of the Federal Base Plant, while the additional 163,000 cy would be accomplished under the USACE CAP Section 204 project alterntive.

5.1.4 Preferred Plan

The North Point placement alternative is the preferred plan with 220,000 cy, and potentially about 250,0000 cy, of dredged material placed on the beach. The designed fill zones to receive the dredged material would promote the longest period of erosion protection possible, thus delaying damage to landward property and utilities for the longest period. Given the history of erosion in this area of beach, this alternative is the preferred method to beneficially use dredged material to stabilize the beach and abate the occurring erosion.

5.2 Alternative Dredging Methods

There were several dredging methods considered for this project including the use of a hopper dredge, hydraulic pipeline dredge, mechanical dredge, or sidecasting dredge. In general, characteristics of the dredge area, placement sites and type of material to be removed dictates the type of dredge plant ultimately selected for the work. Considerations also include but are not limited to environmental concerns, the size and location of the area to be dredged, time of year restrictions, weather conditions, composition of the material to be dredged, and the nature of the dredged material placement. Historically, maintenance dredging of the Newburyport Harbor FNP has been performed by a small class, self-propelled hopper dredge with placement in the nearshore and less frequently using a hydraulic pipeline dredge with placement directly on adjacent beaches.

5.2.1 Hopper Dredge

A hopper dredge is a type of hydraulic dredge that uses a suction pump to loosen and remove material from the bottom. The loose material mixes with water and is pumped and deposited into hoppers aboard the dredge vessel. As pumping occurs, the solid particles settle while excess water and some material passes overboard through troughs. When the hoppers are full, the drag arm is raised and secured to the vessel. The vessel then travels to the placement site and releases material through a split hull or pumps off the material from the hoppers. The dredge then returns to the dredging site to begin another cycle. Hopper dredges come in various sizes from a few hundred to several thousand cubic yard bin capacity. In New England, hopper dredges are most often used to remove sandy material from harbor entrance channels and deposit the material off local beaches (nearshore placement).

Hopper dredges are less subject to damage from wave action and have little impact on vessel traffic because the dredge moves while underway and does not employ anchoring devices while working in the channel. A small hopper dredge using split hull discharge would likely be used for the proposed project if material is placed in the nearshore. For hopper dredging with direct placement on the beach, a large-class hopper dredge with onboard pump-off capability would be required. These vessels are larger than those typically used for working in New England waters. Using this method, a pipeline would pump dredged material from a moored hopper dredge to the designated beach placement site. The use of a small hopper dredge is considered for the project and the environmental impacts of its use are analyzed in this report.

5.2.2 Hydraulic Cutterhead Dredge

A hydraulic dredge consists of a cutterhead on the end of an arm connected to a hydraulic pump, which loosens the bottom sediments and entrains the sediment in a water slurry that is pumped up from the bottom. The material is pumped via pipeline to a nearby beach site or upland area or pumped into a confined (diked) disposal/dewatering area.

Hydraulic cutterhead dredge, of the type typically used in New England waters, are sometimes unable to work safely in the high-energy wave environments that may be experienced at the Newburyport Harbor entrance channel. These dredges anchor using spuds, or anchor and cable systems that have limited mobility and working reach, requiring a tug to move the dredge from area to area within the channel being dredged. Working during periods of unpredictable and severe ocean swells would pose a threat to dredge personnel

and equipment given the anchoring and positioning systems that this dredge type uses. Vessel traffic may be adversely impacted by stationary equipment, including the cables and pipeline based on the dredge configuration. However, the most recent dredging of the harbor utilized this dredge method to pump sand directly on the adjacent beaches, therefore this method may be selected for use again for placement of material at North Point. Therefore, this dredging method is considered for the project and the environmental impacts are analyzed in this report.

5.2.3 Mechanical Bucket Dredge

Mechanical bucket dredging involves the use of a barge-mounted crane, backhoe or cable-arm with a bucket to dig the material from the dredge area. Typical dredging buckets come in various sizes from five cubic yards to fifty or more cubic yards. A mechanical dredge is highly maneuverable and well-suited for work in small harbors in and around berthing areas and slips. The material is placed in scows for transport to the placement site by tug. For nearshore placement or open-water placement, either a split-hull or bottom-dump scow is generally used for ease of disposal and to minimize the discharge plume. Mechanical dredging can be a continuous operation with the use of multiple scows.

A mechanical bucket dredge utilizing scows to transport and place material at the nearshore sites would be effective. Use of a mechanical dredge with a typical scow operation could not directly place material on the beach and would likely not be used for placement at North Point. However, a mechanical dredge could fill a scow and pump the material by hydraulic pipeline to accomplish placement on the beach at North Point. Therefore, this dredging method is considered for the project and the environmental impacts are analyzed in this report.

5.2.4 Sidecasting Dredge

The sidecasting type of dredge is a shallow-draft vessel, designed to remove material from the bar channels of small coastal inlets. The hull design is similar to that of a hopper dredge, however sidecasting dredges do not usually have hopper bins. Instead of collecting the material in hoppers onboard the vessel the dredge pumps the material directly overboard through an elevated discharge boom; thus, it has a shallow draft that is unchanged as it maintains a channel. The discharge pipeline is suspended over the side of the hull by structural means and may be supported by either a crane or a truss-and-counterweight design.

The use of a sidecasting dredge is considered impractical for the proposed project. A sidecasting dredge would not be able to transport dredged material far enough away from the dredging area to meet the placement objectives. Also, sidecasting dredges are more appropriate for sea conditions where wind and wave directions are relatively constant and unidirectional; which is not the situation found at the mouth of the Newburyport Harbor FNP. Therefore, this method was removed from consideration and environmental impacts are not analyzed in this report.

5.2.5 Preferred Dredging Method

If material is placed at the nearshore locations, a small hopper dredge is likely to be used. If direct beach placement is performed, either a large pump-off hopper or a hydraulic pipeline dredge would be the preferred method. However, beach placement can also be

accomplished using a mechanical bucket dredge to fill a scow, or hopper dredge to fill the bin and then pump sand from the scow/bin onto the beach using hydraulic pipeline transport.

5.3 Placement Alternatives

5.3.1 Nearshore Placement

There are two nearshore locations considered for dredged material placement, one off the coast of Salisbury Beach and the other off Plum Island Beach. Placement at these sites is relatively shallow, within the 10 to 30 feet depth contours. Investigation of sediment transport patterns along the Plum Island-Salisbury Beach system shows that placement of dredged material in the designated nearshore areas would keep the material within the littoral drift system and nourish the intended beaches. Adjacent nearshore placement areas have historically been used as needed (i.e., near the beach most in need of nourishment at that time).

5.3.2 Beach Placement

Beach placement would involve placing the entirety of the 220,000 cy, and potentially about 250,0000 cy, of dredged material on the beach at North Point for the purpose of beach nourishment and erosion control and to protect the flanking south jetty. Direct sand placement would replenish sand on the beach above the MLLW line in accordance with engineering design specifications to ensure stability of the shoreline and to conform to the historical and recreational standards of the area. The placement of the material at North Point was considered practical given the Section 204 feasibility evaluation. Extensive coordination for this beach placement has been carried out by Federal, state and local agencies, as well as property owner's organizations, contractors, and citizens.

5.3.3 Upland Placement Areas

Upland placement typically involves pumping sand via pipeline into a contained embankment in an upland location (not a beach) where the material can be dewatered. No upland placement areas were identified in close proximity to this project; therefore, this placement alternative was not considered further. The material to be dredged is clean sand that is an important resource for the Plum Island-Salisbury Beach littoral system. Removal of this material from the littoral system is not the preferred method of managing the use of clean dredged material. Upland disposal was therefore not analyzed further in this report.

5.3.4 Offshore Disposal

Placement of material at an offshore, open-water placement site is considered when no other environmentally acceptable alternatives (e.g. beach nourishment, upland placement) exist or when it is economically preferable. The nearest open-water dredged material placement site in the vicinity of Newburyport Harbor is the Isles of Shoals North Disposal Site (IOSN) located approximately 23 miles offshore to the northwest, in the Atlantic Ocean. Dredged material would be transported and released by scow within the footprint of the offshore site.

The Environmental Protection Agency (EPA) published a Final Rule designating the 1.5 mile diameter IOSN to be used for offshore placement of dredged material from the Southern

Maine, New Hampshire, and Northern Massachusetts Coastal Region in the Federal Register on September 25, 2020 and took effect on October 26, 2020 (85 FR 60370). IOSN is located entirely within Federal waters and is therefore not subject to an evaluation under the Clean Water Act (CWA), but is subject to regulations under Section 103 of the Marine Protection and Research Sanctuaries Act (MPRSA)

It is USACE policy to use dredged material for beneficial use purposes when practicable alternatives exist such as placing sandy dredged material at nearshore sites or directly upon beaches to keep the sand within the local littoral system. Offshore placement was therefore not considered a preferred alternative because material would not be beneficially used and would be removed from the littoral systems.

5.3.5 Preferred Placement Alternative

The preferred alternative is a combination of the Federal Base Plan for placing about 57,000 cy behind the spur jetty at the eastern end of North Point, and placement of the remaining 163,000 cy on North Point to the west of the spur jetty under the Section 204 project, for a total of about 220,000 cy of dredged material placed on the beach. The combined plan would be a beneficial use of dredged material and abate coastal erosion occurring behind the South Jetty and elsewhere on the beach. This alternative is considered environmentally acceptable and would keep material with the local littoral system.

6.0 AFFECTED ENVIRONMENT

The affected environment for the proposed project includes those areas to be dredged (Federal channel), as well as those areas where dredged material would be placed (nearshore placement site, beach placement site) and the path of the scow, barge or pipeline to transport the material between the two locations. The affected environment of these locations is described in the sections below.

6.1 Project Location

The City of Newburyport is a small coastal city in Essex County, Massachusetts. Newburyport is comprised of approximately nine square miles. About 40 percent of the land is developed, with the remaining areas considered open spaces that include woodland, farmland, and freshwater or tidal wetland. Newburyport Harbor is a historic seaport with a vibrant tourism industry that includes moorings for recreational and commercial boats. Newburyport is off a major north-south highway, Interstate 95. The outer circumferential highway of Boston, Interstate 495, passes nearby in Amesbury, MA. The Newburyport Turnpike (U.S. Route 1) traverses Newburyport on its way north.

Land use around the harbor is densely residential in the City of Newburyport and on Plum Island with several commercial and retail properties. The harbor is a large estuary containing extensive saltwater wetlands to the north and south. The estuary to the north feeds into a barrier beach and recreational area within Salisbury Beach State Reservation. To the south is a large estuarine embayment and barrier beach complex that encompasses Joppa Flats and the northern extent of the Parker River National Wildlife Refuge. The FNP is located within the lower 4.5 miles of the Merrimack River south of the U.S. Route 1 bridge.

Newburyport Harbor is fed by the Merrimack River. The Merrimack is the fourth largest river in New England and the associated drainage basin occupies a 5,058 square mile area. The river descends from the White Mountains in New Hampshire southward 115 miles to the coast. The major urban centers along the Merrimack River include the cities of Concord, Manchester, and Nashua, New Hampshire, as well as Lowell, Lawrence, and Haverhill, Massachusetts. Several parks and beaches are within the city limits, including Plum Island Point Beach, Simmons Beach, Joppa Park, Waterfront Park, Woodman Park, Cashman Park, Moseley Pines Park, Atkinson Common and March's Hill Park. Newburyport Forest is located in the southwest corner of the city, and Maudslay State Park lies along the northwest part of the city, along the banks of the Merrimack River (NPB, 2017).

North of Newburyport Harbor is the town of Salisbury, which is host to Salisbury Beach State Reservation that extends 3.8 miles from south to north along the Atlantic Ocean from the Merrimack River to the New Hampshire border. Salisbury Beach is a popular recreation spot for locals and tourists for swimming and sunbathing. The Reservation is a popular camping area with over 400 seasonal camp sites. The Salisbury Beach shoreline is largely developed with commercial and residential buildings to the north and beach barrier dunes within the reservation limits to the south. There are camping and parking facilities along the ocean and coastal inlet of the Merrimack River. Buildings and structures range from 250-800 feet from the water's edge.

To the south of the harbor is Plum Island Beach and Newbury Beach, recreational beach areas that serve residents and tourists, with access south of the Merrimack River. North Point is located at the northern portion of Plum Island Beach in Newburyport, along the south side of the Merrimack River inlet. North Point is a State Reservation operated by the City of Newburyport under agreement with the Massachusetts DCR. The beach is located between the south jetty at the river inlet and the old Coast Guard Station. The area has beachfront homes, businesses, the state reservation, and the old Coast Guard station ranging from 150 to 615 feet from the water

6.1.1 Climate, Weather, Tides

The Plum Island- Newburyport region hosts a variable temperate climate characterized by moderately warm summers, cold winters, and ample rainfall. Severe weather conditions occur in the upper basin. The area lies in the path of prevailing westerlies and the cyclonic disturbances that cross the country from the west or southeast toward the east or northeast. The region is occasionally exposed to coastal storms traveling up the Atlantic coast. The Merrimack River Basin receives an annual average precipitation of 43 inches; northern and southern regions averaging 46 and 41 inches, respectively. Annual snowfall varies from approximately 98 inches in the headwaters to half that in the southern portion of the basin (WU, 2020).

The rate of relative sea level rise is currently about one foot per 100 years; however, the Intergovernmental Panel on Climate Change (IPCC) predicts that sea-level rise and its risk to coastal resources would accelerate over the next 100 years. Conservative projections of sea-level rise by the end of the century range from 4 to 21 inches (NESC, 2020).

The Atlantic Ocean provides a tide range of 7.8 feet in Newburyport Harbor as shown in Table EA-2. The tidal range for the region is semi-diurnal. Maximum tidal currents at the mouth of the Merrimack River do not exceed 2.2 knots (NOAA, 2020a).

Table EA-2 Newburyport Harbor Tide Ranges (feet)		
	At Newburyport	Merrimack River Entrance
Mean Tide Range	7.8	8.3
Mean Spring Tide Range	9.0	9.5
Mean Sea Level (above MLW)	3.9	4.1

6.1.2 Physical Environment

6.1.2.1 Sediment Characteristics

In July of 2016, USACE collected sediment grab samples for grain size analysis from nine locations throughout the proposed dredge area, identified as stations A through I (Figure EA-5 and EA-6; Table EA-3). Results of the grain size analysis show that sediment within the navigation channel are predominately poorly graded, fine to coarse sand, the majority being medium-grained sand (Table EA-3).

Table EA-3. Grain Size Results from Newburyport Harbor FNP Sediment Grabs (USACE, 2016)

Sample ID	% Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines
A	0.0	0.1	98.5	1.4	0.0
B	0.0	0.3	98.7	1.0	0.0
C	3.8	27.2	68.9	0.2	0.0
D	46.2	17.2	35.9	0.1	0.0
E	0.1	0.8	67.4	31.7	0.0
F	0.6	3.7	76.6	19.2	0.0
G	0.1	3.2	80.6	16.1	0.0
H	3.6	17.0	78.1	1.2	0.0
I	0.1	0.3	93.8	5.8	0.0

The sediment characteristics of the area are influenced by the physical forces impacting sediment transport, the most significant of which is Nor'easter storms. These storms frequently occur from December through February. The storm related erosion accretes offshore bars that migrate offshore/onshore and then north to south in the littoral transport system. Sand bars at the mouth of the Merrimack River, which is regularly shoaled, tend to have their largest sediment accumulation during winter months. This is when short-period, steep waves are predominant, and beaches typically undergo a net loss of sand. Furthermore, an ebb tidal delta has formed seaward of the jetties, at the mouth of the Merrimack River. This delta has a large effect on longshore drift patterns, ultimately forming bar deposits of sediment adjacent to the jetties within the FNP (ERDC, 2017).

Figure EA-5. Newburyport FNP Outer Harbor Sediment Sampling Locations

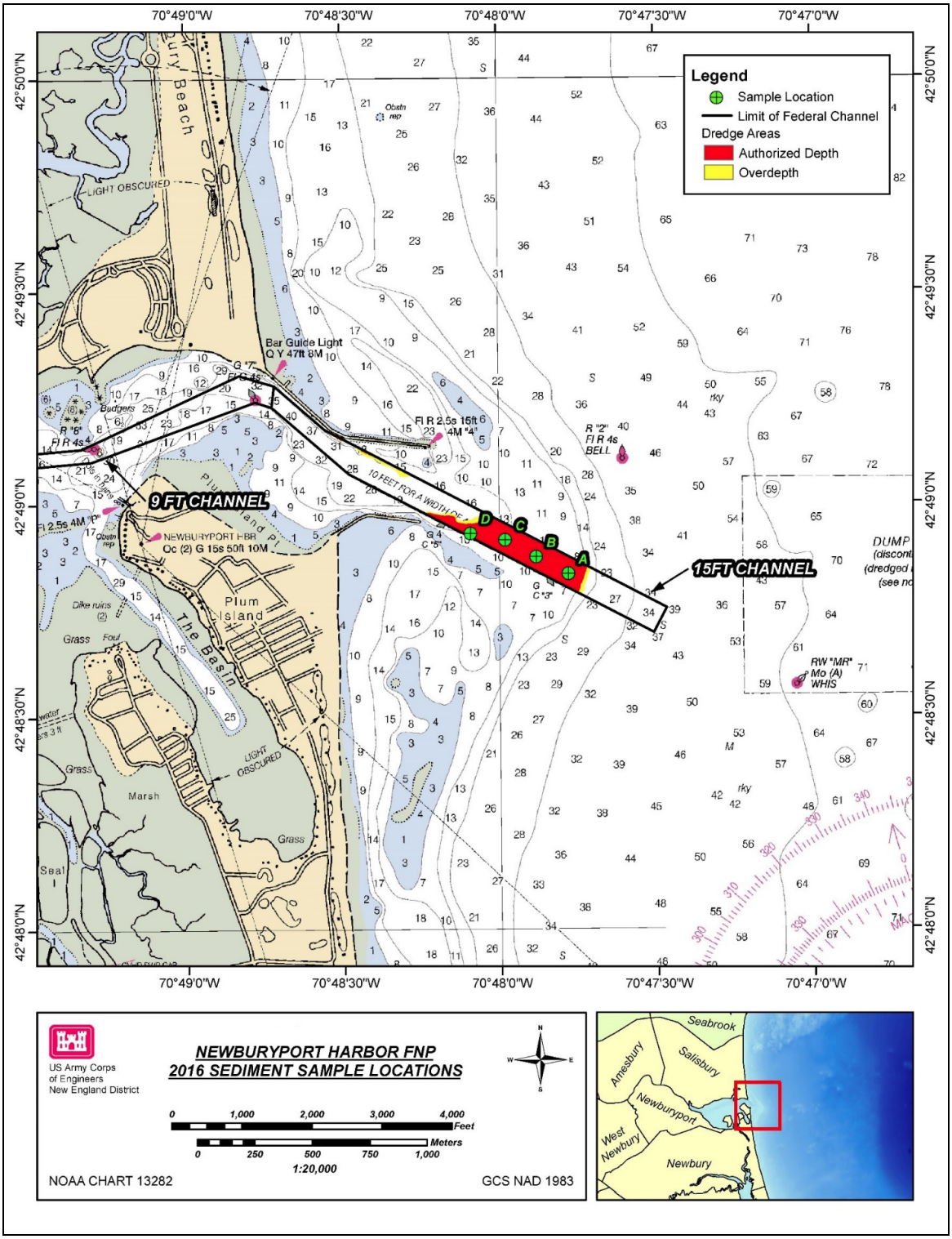
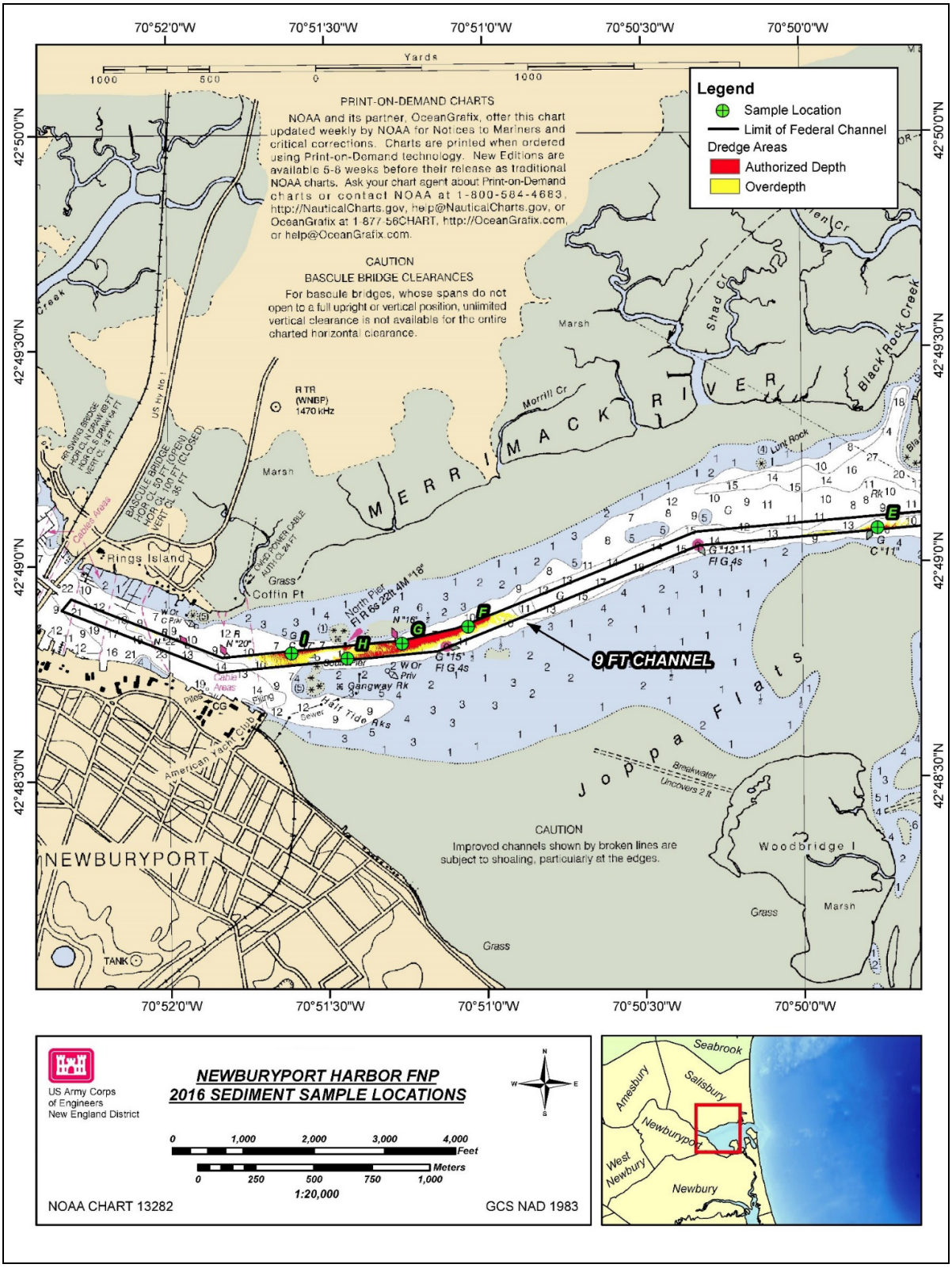


Figure EA-6. Newburyport FNP Inner Harbor Sediment Sampling Locations



6.1.3 Water and Sediment Quality

6.1.3.1 Water Quality

Historically, the water quality of Newburyport Harbor and the Merrimack River was severely degraded by industrial and domestic wastes. In the 1960s, the river was listed as one of the nation's ten most polluted waterways, primarily as a result of discharges of raw sewage, paper and textile mill wastes, and tannery sludge. However, since the passage of the Federal Clean Water Act in 1972, the water quality of the river has greatly improved (EPA, 2020). The Massachusetts Surface Water Quality Standards (SWQS) designate the most sensitive uses for which the surface waters of the state shall be enhanced, maintained, and protected. The State prescribes minimum water quality criteria required to sustain the designated uses.

The Merrimack River from Creek Brook, Haverhill to the Atlantic Ocean is designated as Class SB waters. This class of waters is designated as a habitat for fish, other aquatic life and wildlife and for primary and secondary contact recreation. Approved areas shall be suitable for shellfish harvesting with depuration. These waters shall have consistently good aesthetic value (MDEP 2013). All dredge areas and waters off North Point are located in Class SB waters. The coastal and marine waters of the Merrimack River Estuary, and Plum Island Sound are designated as class SA waters. These waters are designated as excellent habitat for fish, other aquatic life and wildlife and for primary and secondary contact recreation. Some approved areas are suitable for shellfish harvesting. These waters shall have excellent aesthetic value (MDEP, 2013). The proposed nearshore placement sites are in Class SA waters.

6.1.3.2 Sediment Chemistry

The USACE has sampled the proposed dredged material and determined that since the material is medium-grained sand from a high energy environment it meets the exclusionary criteria established under Section 404 of the Clean Water Act, and therefore no further chemical testing is required. The sediments from the Newburyport Harbor FNP are suitable for both beach and nearshore placement. This determination has been made in coordination with the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MDEP). The Newburyport Harbor FNP Suitability Determination conducted by USACE for the placement of the dredged material is contained in Appendix F of this report.

6.1.4 Biological Environment

6.1.4.1 Wetlands

Newburyport Harbor is surrounded by a large estuarine saltmarsh wetland with tributaries connecting to the harbor and mainstem of the Merrimack River. To the north of the harbor is an 850-acre saltmarsh that is part of the Salisbury Beach State Reservation. To the south is an even larger and more complex estuarine system known locally as "Great Marsh" that is 12,800 acres and stretches south from Newburyport Harbor to Gloucester, MA. This saltwater wetland encompasses Joppa Flats, Woodbridge Island, Seal Island, and the estuaries surrounding Plum Island River, Plum Island Sound and Parker River National Wildlife Refuge. Areas surrounding Parker River have been designated as an Area of Critical Environmental Concern by the Commonwealth of Massachusetts Executive Office of

Environmental Affairs. This expanse of wetlands is the largest contiguous area of salt marsh north of Long Island, New York (MADCR, 2018).

The salt marsh in these areas are primarily comprised of low salt marsh wetland vegetation dominated by saltwater cordgrass (*Spartina alterniflora*). The dredge area of the inner harbor, east of the Route 1 Bridge, is the closest dredge area to the salt marsh. The dredge footprint is approximately 800 feet from a large complex of salt marsh to the north along the edge of the Merrimack River (US FWS, 2019a).

Vegetation common to salt marshes includes those types of plant species that can tolerate or live only in saltwater, and generally comprises two zones of a lower and an upper elevation that are flooded by the incoming tide twice per day. The lower elevation zone is flooded for a longer duration and is dominated by saltwater cordgrass. The upper zone is at a higher elevation and flooded for less time during the tide stage and is dominated by salt marsh hay (*Spartina patens*). Saltwater wetlands form linkages between inland landscapes and the ocean. These intertidal plant communities provide a great ecological benefit as foraging and refuge habitat for several bird, fish and invertebrates species. Stands of saltmarsh stabilize sediments preventing erosion and more readily dissipate wave energy from coastal storms. These plant communities also serve to filter nutrients from the water column improving water quality. However, these wetlands may be lost over time due to erosion, salinity changes, land subsidence and changes in sediment deposition patterns (Dahl and Stedman, 2013).

6.1.4.2 Vegetation

Aquatic Vegetation

Eelgrass (*Zostera marina*) is an aquatic plant likely to be in the waters of Newburyport Harbor and or along the coast. This flowering underwater plant has 1/4-inch wide leaves that can reach 3 feet in length. Eelgrass beds are completely submerged, and their roots, known as rhizomes, anchor the grass to sandy or muddy bottoms. This species is a true flowering plant found in clear water to depths of 25 feet MLW but is more commonly restricted to areas 15 feet MLW or less (MA DMF, 2006).

Stands of eelgrass act as a refuge and nurseries for juvenile fish and shellfish as individual eelgrass blades function as an important substrate. These seagrass beds also help to prevent erosion by stabilizing sediments with their extensive root systems as well as aid in filtering contaminants from the water column. No current or historical eelgrass beds have been documented within the extent of the proposed dredge areas. No eelgrass has been observed during field sampling of sediments in the dredge footprints. The river currents and the and shifting nature of the sub-bottom sediment within the channel are not conducive for eelgrass growth in the proposed dredge areas.

Dune Vegetation/ Habitat

See section 6.2.4.2 Vegetation, for impacts described for the placement sites. No dune areas are found close to the proposed dredge areas.

6.1.4.3 Benthos

Benthic invertebrates in the area inhabit the ocean floor (snails, worms), are buried within bottom sediment (arthropods, clams) or are attached to rocks and other hard structures (oysters, barnacles). Environmental conditions that are important in influencing invertebrate occurrence include water depth, substratum, temperature, and salinity. The tidal regulated depth in the area create a division between the intertidal and subtidal populations. The unique estuarine habitat of the lower Merrimack River supports a wide range of benthic species, including shellfish beds. However, commercial and recreation shellfishing has largely been prohibited in the Merrimack River since 1986 due to contamination issues, particularly elevated bacteria levels. These sites are listed as “prohibited” or “conditionally restricted” under the Massachusetts Division of Marine Fisheries (DMF) Designated Shellfish Growing Area Program (MA DMR, 2016).

Limited commercial clamming has been restored in Newburyport in the Joppa Flats and Plum Island Basin areas (MA DMR, 2016). Only softshell clams (*Mya arenaria*) may be harvested by specially licensed “master” diggers. Longstanding regulations limit harvest in “Conditionally Restricted Areas” to weekdays only. The reopening of clam harvesting areas encompasses over 251 acres of the southeastern portion of the Joppa Flats, while the northwest section remains closed and classified as “prohibited” as part of a closed safety zone around the Newburyport Wastewater Treatment Plant discharge. An additional 534 acres of Merrimack River estuary clam flats in Newburyport and Salisbury were reopened in 2006 (MA DMR, 2016). The proposed dredge area within the inner harbor is greater than 1,000 feet from the shallow areas of Joppa Flats, where productive shellfish are likely to be.

Polychaete worms such as *Nephtys* and *Spio* spp. along with bivalve mollusks such as the Baltic clam (*Macoma balthica)* and amethyst gem clam (*Gemma gemma*) are common in sandy substrates in New England Estuaries. Soft-shell clams and blue mussels (*Mytylus edulis*) are believed to be abundant in the lower reaches of the Merrimack River, and razor clams (*Siliqua patula*) are believed to be found in small quantities in the estuarine environments. Soft shell clams are believed to be the most prevalent shellfish in Newburyport Harbor. These are filter feeders that burrow into the sediment and extend their siphons at periods of high tide to feed. This species typically spawns once between early spring and late fall. Their eggs develop into free-swimming larvae that eventually settle onto a hard substrate attached by a byssal thread. After approximately 2-5 weeks, clams mature enough to be able to burrow into the sediment. At the juvenile life stage, burial is shallow in sandy substrates, so predation is high, and they are subject to movement by storms (Abraham and Dillon, 1986; Newell and Hidu, 1986). As clams age, their burying depth increases and adults can be found as deep as 12 inches in the sediment (Abraham and Dillon, 1986).

6.1.4.4 Fisheries

Commercially important lobsters (*Homarus americanus*) reside within the inshore waters of the Newburyport and Plum Island region. Lobsters are widely distributed over the continental shelf of the North Atlantic Ocean coast and are most abundant from Maine to New Jersey in waters out to a depth of 40 meters. From December to May adults are largely offshore and move inshore for spawning between May and August. Adult lobsters remain in nearshore areas in highest abundance between May and December. The preferred habitat for protection from predators is complex substrate, particularly cobble, but eelgrass and peat

reefs have also been noted (Palma *et al*., 1998). Lobsters exhibit strong habitat-selection behavior and are shelter-dependent, suggesting that a lack of complex substrate may limit their population size (Wahle and Steneck, 1991).

Commercial lobster fishing occurs in the outer portion of Newburyport Harbor and along the coast. In 2006 there were 20 lobster fishermen that landed in Newburyport, totaling 55,000 pounds of lobster (Dean, 2010). Gloucester Harbor, 13 miles south of Newburyport Harbor is the leading port for both active lobstermen and amount of annual lobster landings in the Commonwealth of Massachusetts. From 2012 to 2017, Gloucester has averaged 2.94 million pounds of lobster landings per year (Horgan, 2018). Lobster fishing in the surrounding area generally runs from spring to fall. According to the Massachusetts Division of Marine Fisheries (MADMF) most recent Technical Report TR-39 regarding lobster fishery statistics, most commercial lobster landings occurred from May through December, with peak landings in September (Dean, 2010). Dense areas of recreational lobster traps have been identified in waters off Salisbury Beach.

6.1.4.5 Finfish

The Merrimack River Estuary and nearby offshore areas support many commercial and recreational finfish species. The riverine and estuarine habitats of the Merrimack River provide spawning and nursery habitat for several species of fish. Species likely to be found in Newburyport Harbor include American sand lance (*Ammodytes americanus*), Atlantic silverside (*Menidia menidia*), bluegill (*Lepomis macrochirus*), brown bullhead (*Ictalurus nebulosus*), carp (*Cyprinus carpio*), mummichog (*Fundulus heteroclitas*), nine-spine stickleback (*Pungitius pungitius*), northern pipefish (*Syngnathus fuscus*), spottail shiner (*Notropis hudsonius*), red hake (*Urophycis chuss),* three-spine stickleback (*Casterosteus aculeatus*), white perch (*Morone Americana),* and winter flounder (*Pseudopleuronectes americanus*) (NOAA, 2017).

Several species of anadromous fish may transit the project areas to spawn in upriver locations, primarily in the months of May and June. Anadromous fish spend most of their adult lives at sea but return to fresh water to spawn. Species that may transit the area for spawning include: American eel (*Anguilla rostrata),* striped bass (*Morone saxatilis*), smelt (*Osmerus mordax*), rainbow smelt (*Osmerus mordax)*, American shad (*Alosa sapidissima*), alewife (*Alosa pseudoharengus*), and blueback herring (*Alosa aestivalis*). Fish counts of anadromous fish are taken yearly at the Essex Dam, upriver of Newburyport Harbor on the Merrimack River (Table EA-4).

Table EA-4. Fish Counts on the Merrimack River, Essex Dam, Lawrence, Massachusetts (USFWS, 2017).

Species	Total Returns
River Herring	91,616
American Shad	62,846
Atlantic Salmon	5
Sea Lamprey	2,068
American Eel	9,842

Anadromous fish like alewives and blueback herring, collectively called river herring, provide important forage for bluefish, striped bass, bluefin tuna and other species of commercial and recreational importance. These schooling fish are prey for whales, seals and other marine mammals. River herring were listed as a Species of Concern by the National Marine Fisheries Service (NMFS) in 2006. This listing is due to drastic declines of the species throughout much of their range from Maine to Florida. Threats to the species include loss of habitat due to decreased access to spawning sites, from dam construction and other impediments to migration as well as habitat degradation, fishing, and increased predation by the recovering population of striped bass (MADFM, 2018)

River herring spawning runs in the Merrimack River are likely to begin in early to mid-April and last about two months. Alewife spawning generally precedes that of blueback herring in the same watershed by 3-4 weeks, but there is considerable overlap between species. Alewife spawn in freshwater lakes and ponds as blueback herring typically spawn in the main stem of the freshwater portions of the river. Alewife generally initiate spawning runs when water temperature reaches 5º C to 10º C, and blueback herring at 10º C to 15º C. Both species return to sea shortly after spawning (Bigelow and Schroder, 2002). Hatched larvae mature quickly and reach juvenile age about two weeks after hatching. Juveniles remain in freshwater nursery areas through spring and early summer. Emigrations occurs beginning in late June/early July and can continue through the fall depending on seasonal influences (Kosa and Mather, 2001; Yako et al., 2002).

American shad also enter the Merrimack River to spawn in great numbers (Table 4). This species is also a highly migratory, coastal pelagic, schooling species that spends most of their lives at sea. In the spring shad enter their natal coastal rivers when water temperatures range from 10º C to 15º C. In the Gulf of Maine, the seasonality of spawning is typically mid-April with the main spawning run occurring in May and June, with few occasional spawners as late as July. In large rivers like the Merrimack River, this species typically migrates far upriver spawning repeatedly along their ascending migration route. This species returns to sea immediately after spawning (Bigelow and Schroder, 2002).

The sea lamprey is a parasitic anadromous fish that spends its egg and larval life stages entirely in fresh water. At transformation (the process by which the lamprey's body changes into that of a parasite), it moves out to sea for its parasitic life phase during which it lives on a host fish. After one to two years at sea, it returns to fresh water as an adult to spawn. Spawning season varies longitudinally within the range of the lamprey, but in Northern Massachusetts, spawning likely occurs from late April through early summer. Spawning peaks when water temperatures are about 17º to 19º C (Bigelow and Schroder, 2002).

American eel is a catadromous species, meaning that they live most of their lives in freshwater, but migrate to marine waters to spawn. Migration for spawning typically occurs in Massachusetts in the fall between September and November. The USFWS reviewed this species' status in 2006 as a Candidate Species under the Endangered Species Act (ESA). Although, USFWS did not find that an ESA-listing was warranted, they did recognize that present abundance of American eel is likely far below historic levels. Passage barriers, habitat alteration, and overfishing are thought to be the main threats to this species (MADMF, 2018).

Winter flounder is a commercially important species that it likely to spawn in estuarine embayment of Newburyport Harbor. This species in not anadromous but spawns in the nearshore or estuarine environment from late winter through spring, with peak spawning occurring during late February and March in Northern Massachusetts. Spawning areas often occur in shallow bays and estuaries along the coast, where hydrodynamic function keeps hatched larvae from being dispersed (Pearcy 1962; Crawford and Carey 1985). However, recent studies show that spawning activity of inshore populations have been observed in nearshore coastal habitat as well as in waters of Georges Bank (Weunschel et al., 2009; Fairchild et al., 2013). Major egg production occurs in New England waters before temperatures reach 3.3ºC with an upper limit of about 4.4-5.6º C in the inner parts of the Gulf of Maine. Spawning can occur at depths of less than 5 meters to more than 45 meters on Georges Bank, and at salinities of 11 ppt inshore to 31-33 ppt offshore (Bigelow and Schroeder, 2002). Winter flounder eggs are adhesive and deposited in clusters on the sub-bottom. 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.

6.1.4.6 Terrestrial Wildlife

The coastal shoreline habitat likely supports a variety of terrestrial wildlife species common to Massachusetts including white-tailed deer, gray squirrels, raccoons, red fox, cottontails, skunks, and small rodents (mice, chipmunks, voles, etc.).

6.1.4.7 Birds

Seasonal concentrations of songbirds, waterfowl, and shorebirds utilize open water areas, intertidal areas, beach dunes and marshes for nesting, feeding, and resting within the area surrounding Newburyport Harbor. The large estuarine salt marsh habitat on Plum Island and areas of Joppa Flats are particularly productive waterfowl habitat, with thousands of individuals visiting each year. Common shore and sea birds found in Newburyport Harbor estuary include terns, dunlin, plovers, gulls, turnstones, American oystercatchers, and double-crested cormorants. The area hosts a variety of migratory birds that visit the area seasonally as noted in Table EA-5.

Table EA-5. Migratory Birds of the Newburyport- Salisbury Region (US FWS, 2019b)

Species
American oystercatcher (*Haematopus palliatus*)
Bald eagle (*Haliaeetus leucocephalus*)
Black guillemot (*Cepphus grille*)
Black rail (*Laterallus jamaicensis*)
Black scoter (*Melanitta nigra*)
Black skimmer (*Rynchops niger*)
Black-billed cuckoo (*Dolichonyx oxyzivorus*)
Black-legged kittiwake (*Rissa tridactyla*)
Buff-breasted sandpiper (*Calidris subruficollis*)
Clapper rail (*Rallus crepitrans*)
Common eider (*Somateria mollissima*)
Common loon (*Gavia immer*)
Common tern (*Sterna hirundo*)
Cory's shearwater (*Calonectris diomedea*)
Double-crested cormorant (*Phalacrocorax auritus*)
Dunlin (*Calidris alpina arcticola*)
Great shearwater (*Punus gravis*)
Gull-billed tern (*Gelochelidon nilotica*)
Herring gull (*Larus argentatus*)
Least tern (*Sterna antillarum*)
Lesser yellowlegs (*Tringa avipes*)
Northern gannet (*Morus bassanus*)
Prairie warbler (*Dendroica discolor*)
Purple sandpiper (*Calidris maritime*)
Razorbill (*Alca torda*)
Red phalarope (*Phalaropus fulicarius*)
Red-throated loon (*Gavia stellate*)
Ring-billed gull (*Larus delawarensis*)
Roseate tern (*Sterna dougallii*)
Royal tern (*Thalasseus maximus*)
Ruddy turnstone (*Arenaria interpres morinella*)
Rusty blackbird (*Euphagus carolinus*)
Seaside sparrow (*Ammodramus maritimus*)
Semipalmated sandpiper (*Calidris pusilla*),
Short-billed dowitcher (*Limnodromus griseus*)
Snowy owl (*Bubo scandiacus*)
Surf scoter (*Melanitta perspicillata*)
Whimbrel (*Numenius phaeopus*)
White-winged scoter (*Melanitta fusca*)
Wouldet (*Tringa semipalmata*)
Wilson's storm-petrel (*Oceanites oceanicus*)
Wood thrush (*Hylocichla mustelina)*

6.1.5 Threatened and Endangered Species

The proposed maintenance dredging project is being coordinated with the U.S. Fish and Wildlife Service and National Marine Fisheries Service under Section 7 of the Endangered Species Act. The threatened and endangered species that may occur in the project areas are described in the sections below.

6.1.5.1 Birds and Bats

According to the U.S. Fish and Wildlife Service "Information for Planning and Consultation" website, the dredging and placement activities may have interactions with the following species: red knot (*Calidris canutus rufa*), piping plover (*Charadrius melodus*), roseate tern (*Sterna dougallii dougallii*) and the northern long-eared bat (*Myotis septentrionalis*) (US FWS, 2019b).

Red Knot

The red knot is considered a federally threatened species which could be present in the Merrimack River as a transient species, most likely during the southern migration in the late summer or fall. The red knot is a medium-sized shorebird that migrates annually between its breeding grounds in the central Canadian Arctic and several wintering regions, including the Southeast United States (Southeast), the Northeast Gulf of Mexico, northern Brazil, and Tierra del Fuego at the southern tip of South America. During both the northbound (spring) and southbound (fall) migrations, the red knot uses key staging and stopover areas to rest and feed in suitable habitats along the Atlantic and Gulf coasts from Argentina to Massachusetts (Cohen *et al*., 2009).

Long-distance migrant shorebirds are highly dependent on the continued existence of quality habitat at a few key staging areas. These areas serve as steppingstones between wintering and breeding areas. Habitats used by red knots in migration and wintering areas are generally coastal marine and estuarine habitats with large areas of exposed intertidal sediments. In many wintering and stopover areas, quality high-tide roosting habitat (i.e., close to feeding areas, protected from predators, with sufficient space during the highest tides, free from excessive human disturbance) is limited. The supra-tidal (above the high tide) sandy habitats of inlets provide important areas for roosting, especially at higher tides when intertidal habitats are inundated (Harrington 2001).

In North America, red knots are commonly found along sandy, gravel, or cobble beaches, tidal mudflats, salt marshes, shallow coastal impoundments and lagoons, and peat banks. In Massachusetts, red knots use sandy beaches and tidal mudflats during fall migration. Red knots also show some fidelity to migration staging areas between years (Harrington 2001).

Due to the habitat conditions found at the project area and its general geographic region of Massachusetts, this area is not a stopover location for the red knot. The only documented sighting of red knot in the region were observed on August 27, 2017, when three were spotted in the vicinity of Newburyport Harbor (CLO, 2020).

Piping Plover

The piping plover is a Federally threatened bird that has nested in coastal dunes adjacent to the beach at North Point. Plovers nest, rest, and feed on coastal beaches and dunes in the Plum Island-Newburyport region. Piping plovers return to their breeding grounds in early April and nest into late August. Nesting habitat consists of sandy beaches, sand flats at the ends of barrier islands, gently sloping foredunes, sandy patches created by blowouts in frontal dunes, and wash over areas in frontal dunes. Nests are situated above the high tide line and consist of a shallow scraped depression in the sand or in shell and pebble cobble. The nest site is typically situated in sparse vegetation like American beach grass, or in open areas of the dune (USFWS, 2019).

Adults typically lay a clutch of four eggs; eggs are incubated for 27-28 days after egg laying is complete. Chicks are precocial and can run and forage shortly after hatching. Chicks remain with adults until they are able to fly (fledge) at 25 to 35 days. If disturbance causes the adults to abandon a nest, a pair would commonly re-nest once at a different location. For this reason, although most chicks have fledged by the end of July, flightless chicks may be on the beach through late August if initial nesting is disturbed. Plovers feed on invertebrates such as marine worms, fly larvae, beetles, small crustaceans or mollusks. Feeding areas range from intertidal flats up to the high tide wrack line and shorelines of lagoons, salt marshes and coastal ponds. The importance of various feeding habitat would vary by location, and by the stage of the breeding cycle. Feeding habitats are often (but not always) contiguous to nesting habitats, and feeding can occur at all hours of the day and night, and at all tidal stages (US FWS, 2019b).

The Massachusetts Audubon Society has provided maps of piping plover nests observed during the 2017 nesting season on the beaches of Plum Island. Nesting and fledging piping plovers are likely to be active near these previous nesting locations from 1 April to 31 August. There are two piping plover nests (01a and 02b) marked near the proposed beach nourishment area (Figure EA-7). Nest 01a is approximately 550 feet west, and nest 02a is approximately 450 feet east, of the proposed North Point beach placement area within the foredunes of the beach.

Figure EA-7. Previous Nesting Locations of Piping Plover on Plum Island (Mass Audubon, 2017)

Roseate Tern

The roseate tern is listed as a Federally endangered species for its Northeast breeding population. The roseate tern could potentially use the shallow water habitats in the Merrimack River for foraging during its mating and nesting seasons (late spring through summer). The birds arrive at breeding islands in Massachusetts in May. After a 3-week courtship, 1-5 eggs (average 2) are laid in May to mid-June. The nest is a simple scrape in dense vegetation or under rocks or driftwood. The chicks hatch in about 23 days, they stay close to the nest site and are fed by the parents for 22-30 days before they fledge. Roseate terns feed on small fish, such as white hake, four bearded rockling, herring, pollock, and sand lance. The birds favor fishing over shallow sand shoals and tide rips. During August and early September, large flocks of roseate can be observed at migratory staging areas (inlets, barrier beaches, and islands) (MDIFW, 2003).

Due to the habitat conditions found at the project area and its general geographic region of Massachusetts, the project area is not a breeding ground for roseate turn. According to the Cornell Laboratory of Ornithology, there have not been any sighting of this species in recent years on Plum Island or at Salisbury Beach State Reservation (CLO, 2020).

Project activities would not occur in May and June when chicks are likely to be most active. The project area likely sees few if any roseate turns foraging in its shallow waters of Newburyport Harbor.

Northern Long-Eared Bat

The northern long-eared bat (NLEB) is designated as Federally threatened and is found across much of the eastern and north central United States and all Canadian provinces from the Atlantic coast west to the southern Northwest Territories and eastern British Columbia. The species' range includes 37 states. White-nose syndrome, a fungal disease known to affect bats, is currently the predominant threat to this bat, especially throughout the Northeast where the species has declined by up to 99 percent from pre white-nose syndrome levels at many hibernation sites (US FWS, 2014).

During summer, NLEBs roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Males and non-reproductive females may also roost in cooler places, like caves and mines. These bats have also been found, roosting in structures like barns and sheds. NLEBs spend winter hibernating in caves and mines, called hibernacula. They typically use large caves or mines with large passages and entrances; constant temperatures; and high humidity with no air currents (USFWS, 2014). The closest documented hibernation site for NLEB is 23 miles away in Reading, Massachusetts (MA DEP, 2020). Northern long-eared bats emerge at dusk to fly through the understory of forested hillsides and ridges feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch while in flight using echolocation. This bat also feeds by gleaning motionless insects from vegetation and water surfaces (US FWS, 2014).

6.1.5.2 Fish

Atlantic Sturgeon

Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) which are designated under the Gulf of Maine Distinct Population Segment (DPS) for the Merrimack River, are Federally threatened and have the potential to occur within the project area. The Merrimack River is also designated as Atlantic sturgeon critical habitat from the mouth of the river to the Essex Dam, which includes the proposed dredge area. There are five DPS of Atlantic sturgeon, the New York Bight, Chesapeake Bay, South Atlantic and Carolina DPSs are listed as endangered; the Gulf of Maine DPS is the only segment listed as Federally threatened. The marine range of all five DPSs extends along the Atlantic coast from Canada to Cape Canaveral, Florida (ASSRT, 2007). The National Marine Fisheries Service ESA Section 7 Mapper classifies Newburyport Harbor and lower reaches of the Merrimack River as being used for foraging and nursery habitat for Atlantic sturgeon (NOAA, 2020). There is no evidence that this species spawns in the upper reaches of the river, although historically the Merrimack River has been a spawning location for the species (NOAA, 2020). No known estimates of the number of Atlantic sturgeon present in Newburyport Harbor are available.

Atlantic sturgeon is anadromous, meaning that adults spawn in freshwater portions of large rivers and migrate into estuarine and marine waters where they spend most of their lives. They migrate to freshwater rivers to spawn in May and June in the region. Spawning occurs in flowing water over rocky substrate, often just above the salt front (the border between freshwater and saltwater) (NOAA, 2015). They spawn in moderately flowing water (46-76 cm/s) in deep parts of large rivers. Sturgeon eggs are highly adhesive and are

deposited on bottom substrate, usually on hard surfaces (e.g., cobble). It is likely that cold, clean water is important for proper larval development. Following spawning, males may remain in the river or in the lower estuary until the fall; females typically exit the rivers within four to six weeks (NOAA, 2015). Juveniles move downstream and inhabit brackish waters for a few months. When they reach a size of about 30 to 36 inches (76-92 cm) they move into nearshore coastal waters. Tagging data indicate that these immature Atlantic sturgeons travel widely once they emigrate from their natal (birth) rivers.

When at sea, the adults mix with populations from other rivers, but return to their natal rivers to spawn as indicated from tagging records (Collins, *et al*., 2000) and from population genetic studies showing relatively low rates of gene flow (King *et al*., 2001 and Waldman *et al*. 2002). During winter months, adult Atlantic sturgeon primarily occupy deeper water offshore; they occupy the deepest waters during winter and early spring (November–March) and shallower waters during late spring to early fall (May–September) (NOAA, 2014).

Subadults and adults live in coastal waters and estuaries when not spawning, generally in shallow (10 to 50 meter depths) nearshore areas dominated by gravel and sand substrates (NOAA, 2015). These fish are omnivorous benthic feeders that forage for insects, mollusks, gastropods, amphipods, isopods and fish.

Atlantic Sturgeon Critical Habitat

On August 17, 2017, the National Marine Fisheries Service (NMFS) published in the Federal Register a Final Rule (82 FR 3916) designating over 3,900 river miles along the east coast as critical habitat for the five DPS of Atlantic Sturgeon. The agency chose these areas based on the presence of “physical or biological factors” (PBFs) essential for the conservation of the species and may require special management considerations or protection. Under the ESA, impacts to critical habitat must be evaluated in Federal permitting actions, in addition to impacts to the species itself.

The Merrimack River from the mouth of the river to the Essex Dam, which includes the proposed dredge areas is located within Atlantic sturgeon critical habitat. Critical habitat is defined by Section 3 of the ESA as; “(1) the specific areas within the geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features; (a) essential to the conservation of the species; and (b) which may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination by the Secretary that such areas are essential for the conservation of the species (NOAA 2016).”

According to the Final Rule designating Atlantic sturgeon critical habitat, there are four physical features essential for reproduction and recruitment. These include hard bottom substrate (e.g., rock, cobble, gravel, limestone, boulder, etc.) in low salinity waters (i.e., 0.0 to 0.5 parts per thousand range) for settlement of fertilized eggs, refuge, growth, and development of early life stages; aquatic habitat with a gradual downstream salinity gradient of 0.5 to 30 parts per thousand and soft substrate (e.g., sand, mud) downstream of spawning sites for juvenile foraging and physiological development; water of appropriate depth and absent physical barriers to passage (e.g., locks, dams, reservoirs, gear, etc.) between the river mouth and spawning sites.

These features are necessary to support: (1) Unimpeded movement of adults to and from spawning sites; (2) seasonal and physiologically dependent movement of juvenile Atlantic sturgeon to appropriate salinity zones within the river estuary; and (3) staging, resting, or holding of subadults or spawning condition adults. Water depths in main river channels must also be deep enough (e.g., ≥1.2 m) to ensure continuous flow in the main channel at all times when any sturgeon life stage would be in the river; and water, especially in the bottom meter of the water column, with the temperature, salinity, and oxygen values that, combined, support: (1) Spawning; (2) annual and interannual adult, subadult, larval, and juvenile survival; and (3) larval, juvenile, and subadult growth, development, and recruitment (e.g., 13 °C to 26 °C for spawning habitat and no more than 30° C for juvenile rearing habitat, and 6 mg/L dissolved oxygen for juvenile rearing habitat). The rule does not identify specific habitat requirements for the essential features that support successful foraging for growth and survival of subadults and adults beyond benthic foraging in soft substrates (NOAA, 2016).

Shortnose Sturgeon

Shortnose sturgeon (*Acipenser brevirostrum*) (32 FR 4001; Recovery plan: NMFS 1998) are Federally endangered and known to occur in the Merrimack River. The National Marine Fisheries Service ESA Section 7 Mapper classifies Newburyport Harbor and lower reaches of the Merrimack River as used for migrating and foraging (NOAA, 2020). Adults migrate to specific reaches in their natal rivers to spawn. This species spawns in substrates consisting of boulder, cobble, and gravel with water depths of less than 10 meters. Water temperatures during spawning range from 9.0°C to 18.0°C (MA DFW, 2015). Spawning runs have been observed during late April in the Merrimack River, in upriver freshwater reaches.

Ultrasonic tagging studies (Kieffer and Kynard, 1996) occurring in 1989 and 1990 was performed to identify timing and location of spawning and identification of spawning habitat in the Merrimack River. The study showed estimated spawning times occurred over a 5-day period (26-30 April) in 1989 and an 8-day period (22-29 April) in 1990. Migrating fish moved upstream to just below head of tide, concentrating in a 2-kilometer reach at the town of Haverhill, Massachusetts. Spawning sites covered about 10.5 hectares in 1989 and 13.5 hectares in 1990. Physical characteristics observed spawning sites with boulder-rubble substrate, water depth of 1.8-5.5 meter, and bottom water velocity of 0.3-0.7 meters per second.

This study showed a low abundance estimates at that time for spawning fish (9 in 1989 and 16 in 1990) indicating that the shortnose sturgeon population in the Merrimack River is small (Kieffer and Kynard, 1996). Recent tagging studies using acoustic telemetry have revealed that some shortnose sturgeon are more migratory than previously believed. Shortnose sturgeon tagged in the Merrimack River have been detected in the Kennebec River. Shortnose sturgeon native to the Kennebec River have been captured in the Merrimack River, but later detected in the Kennebec River during the spawning season. It appears that shortnose sturgeon may move extensively between coastal river systems to forage but return to their natal rivers to reproduce (NMFS, 1998).

Adults forage on sandy and muddy substrates often near the upper reaches of tidal influence, north of the Route 1 Bridge on the Merrimack River. They use fleshy barbels on their pointed snouts to detect benthic invertebrates with their sucker-like mouths, which they use to vacuum up their prey. Adult shortnose sturgeon primarily eat mollusks and large

crustaceans. Juveniles feed primarily on insects and small crustaceans. Both adults and juveniles feed on the river bottom day and night. Feeding and overwintering activities may occur in both fresh and saline habitats.

Atlantic Salmon

The Gulf of Maine (GOM) distinct population segment (DPS) of Atlantic salmon (*Salmo salar*) is listed as Federally endangered. This species utilizes riverine habitats in the State of Maine for spawning and juvenile development, for which critical habitat is designated. This species once used the Merrimack for spawning; however, the population has been reduced to only a few individuals (likely stocked fish) that are counted at Essex Dam each year (5 individuals in 2017). Atlantic salmon's freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Denny's River (NMFS and USFWS, 2005). The marine range of the GOM DPS extends from the Gulf of Maine, throughout the Northwest Atlantic Ocean, to the coast of Greenland; included in the GOM DPS are all associated conservation hatchery populations used to supplement the natural populations. This species is highly migratory, undertaking long marine migrations from their natal rivers where they are distributed seasonally over much of the region. The marine phase starts with the completion of smolt life stage and migration through the estuary of the natal river (NMFS and USFWS, 2005).

The project area is outside of the Gulf of Maine DPS, and the Merrimack River is no longer a natural spawning area for population of Atlantic Salmon. Due to the counter currents in the Gulf of Maine, salmon smolts may be present in late spring to early summer in coastal waters.

6.1.5.3 Marine Mammals

Marine mammals such as whales, porpoises and seals may travel through the nearshore placement sites. Whales are large marine mammals that generally feed and migrate in deep waters of the Atlantic Ocean. The fin whale (*Balaenoptera physalus*) (35 FR 18319; Recovery plan: NMFS 2010) and North Atlantic right whale (*Eubaleana glacialis*) (73 FR 12024; Recovery plan: NMFS 2005) are species in the region. Although, these species are estimated to be in the region of the project, interactions with these species are expected to be rare due to the shallow depths of the area. The USACE is not aware of any reported sightings of whales in the vicinity of Newburyport Harbor.

6.1.5.4 Turtles

Four species of Federally listed threatened or endangered sea turtles are found seasonally in the coastal waters of the Gulf of Maine. Species within the North Atlantic distinct population segment (DPS) include the threatened green turtle (*Chelonia mydas*) (81 FR 20057; Recovery plan: NMFS & USFWS 1991), the threatened loggerhead turtle (*Caretta caretta*) (76 FR 58868; Recovery plan: NMFS & USFWS 2008), the endangered Kemp's ridley turtle (*Lepidochelys kempi*) (35 FR 18319; Recovery plan: NMFS and USFWS, 2011), and the endangered leatherback turtle (*Dermochelys coriacea*) (35 FR 8491; Recovery plan: NMFS & USFWS, 1992).

In general, listed sea turtles are seasonally distributed in coastal U.S. Atlantic waters, migrating to and from habitats extending from Florida to New England, with overwintering concentrations in southern waters. As water temperatures rise in the

spring, these turtles begin to migrate northward. As temperatures decline rapidly in the fall, turtles in northern waters begin their southward migration. Sea turtles are expected to be in the GOM in warmer months, typically when water temperatures are at least 15°C. This generally coincides with the months of May through November, with the highest concentration of sea turtles present from June through October (Shoop and Kenney 1992; Morreale and Standora 2005). Outside of these times, sea turtle presence in the region is considered unlikely.

Most of these species are pelagic (open ocean) animals; however, they are common in the shallow, coastal areas in the summer when they forage for food. These turtles are not likely to be foraging within shallow estuary waters of Newburyport Harbor. We are unaware of any sea turtle studies that focus on the project areas (dredge area, placement sites, and transit routes). Studies of sea turtles near Long Island, New York have shown that these species typically occur in waters with depths between 16 and 49 feet deep and in areas where the waters are slow-moving or still (i.e., less than 2 knots) to forage (Ruben and Morreale, 1999). Thus, based on the best available information, we assume their preferred foraging depth is between 16 and 49 feet in calm waters.

Most sea turtle sightings within Massachusetts waters involve the leatherback sea turtle, the most cold hardy of all the species and distributed world-wide. Leatherbacks feed exclusively on jellyfish. In the spring, they move to the northeastern U.S. continental shelf to forage. Although leatherback sea turtles are primarily an open ocean species, they also come into shallow coastal waters during the summer months to feed on concentrations of jellyfish. Twenty or more are reported annually along the Massachusetts coast, mostly in southern Cape Cod Bay near the Cape Cod Canal, or farther south (MADFW, 2015). Aerial surveys of the mid and north Atlantic noted the presence of leatherback turtles from April to November in the Gulf of Maine (NMFS, 1992).

Green sea turtles have been reported in Massachusetts waters; however, sightings are extremely rare. Green sea turtles generally inhabit shallow waters where they have access to seagrass beds. In Massachusetts, juvenile green sea turtles are found on the southern and eastern beaches of Cape Cod Bay in December and January as the water temperatures drop (MADFW, 2015). Kemp’s ridely are rarely found in the northeastern waters. Adult Kemp's ridely primarily occupy nearshore coastal waters with depths less than 160 feet, which typically contain muddy or sandy bottoms (Byles and Plotkin, 1994).

6.1.5.5 State Species of Concern

North Point is within a Priority Habitat of Rare Species (PH 1321) and Estimated Habitat of Rare Wildlife (EH 65) as designated by the Massachusetts Natural Heritage and Endangered Species Program (NHESP). All projects within Priority Habitat fall under the jurisdiction of the MA Endangered Species Act (MESA). Bird species occurring at the site may include piping plover, roseate tern (See Section 6.1.5.1 Avian Species), least terns (*Sternula antillarum*), and common tern (*Sterna hirundo*). These tern species may forage along the coastal waters. However, these species nest in large colonies in the spring and summer months, and no evidence suggests that North Point is a nesting area. Historically, the least tern has been documented nesting at the nearby Parker River National Wildlife Refuge (MA NHESP, 2020).

6.1.6 Essential Fish Habitat

Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act and amended by the Sustainable Fisheries Act of 1996, an Essential Fish Habitat (EFH) consultation is necessary for this project. EFH is broadly defined as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity." Newburyport Harbor, the Merrimack River and the nearshore placement sites fall into this category and thus have the potential to provide habitat for fish species in the area. Each EFH species and life stage is designated by location based on the National Marine Fisheries Service's Omnibus Essential Fish Habitat Amendment 2 (NOAA, 2017 – see Table EA-6). Location data for species potentially impacted by the proposed project were identified using the NOAA EFH Mapper (NOAA, 2019). A short summary of the EFH for each life stages impacted by this project is described in Appendix G.

6.1.7 Noise

Noise is defined as unwanted or disturbing sound. Sound becomes unwanted when it either interferes with normal activities such as sleeping, conversation, or disrupts or diminishes one's quality of life. Noise can also interfere with wildlife that may use the surrounding area for resting, breeding, feeding or sheltering. The effects of noise are determined mainly by the duration and level of the noise, but also influenced by the frequency. Long-lasting, high-level sounds are the most damaging to hearing and generally the most noticeable at greater distances. High-frequency sounds tend to be more hazardous to hearing than low-frequency sounds. The way sounds are distributed in time is also important, in that intermittent sounds are typically less damaging to hearing than continuous sounds, because of the ear's ability to regenerate during the intervening quiet periods.

The decibel (dB) is the unit used to measure the intensity of the sound. The decibels are measured on a logarithmic scale and they correspond to how a human's ear interprets sound pressure. A "weighted" scale (dBA) is used to account for the frequency range with respect to how people respond to sound. The threshold for audible sound is usually within a range of 10-25 dBA with a threshold of pain at the upper scale of audibility at approximately 135 dBA (US EPA, 1981). Table EA-7 compares common sounds and its corresponding effects and shows how they rank in terms of the noise level expressed in dBA. A small increase in decibels corresponds to a great increase in intensity; therefore, each increase in 10 dBA is perceived as twice as loud to the human's ear.

The project area includes noise from passing boats in Newburyport Harbor and along the Merrimack as well as car traffic in the Plum Island community. The area is rural with few residences that would contribute little to ambient noise, although noise levels are expected to vary significantly. During the night in a rural area, average ambient noise levels would be approximately 25 dBA. Traffic noise depends on a number of elements, including vehicle speed, vehicle characteristics (engine type, transmission type, tire type), road characteristics (e.g. surface type, grade), traffic volume, wind and the surrounding terrain. 75 percent to 90 percent of overall traffic noise is a result of tire contact with the road. Diesel trucks can produce 85 dBA at 50 mph (at 50 feet). However, noise produced by freeway traffic is typically 70 dBA at 300 feet and light automobile traffic is approximately 50 dBA (100 feet).

Table EA-6. Species and their Respective Life Stages Designated as Essential Fish Habitat for the Project Area

Species	EFH Life Stage			
	Eggs	Larvae	Juvenile	Adult
Acadian Redfish (*Sebastes fasciatus*)		X		
American Place (*Hippoglossoides platessoides*)	X			
Atlantic Sea Scallop (Placopecten magellanicus)		X	X	X
Atlantic Mackerel (*Scomber scombrus*)	X	X	X	X
Atlantic Butterfish (*Peprilus triacanthus*)			X	X
Atlantic Cod (*Gadus morhua*)	X	X	X	X
Atlantic Herring (*Clupea harengus*)	X	X	X	
Atlantic Sea Scallop (*Placopecten magellanicus*)	X	X	X	X
Atlantic Surfclam (*Spisula solidissima*)			X	X
Atlantic Wolfish (*Anarhichas lupus*)	X	X	X	X
Black Sea Bass (Centropristis striata)			X	
Bluefin Tuna (*Thunnus thynnus*)				X
Haddock (*Melanogrammus aeglefinus*)			X	
Little Skate (*Leucoraja erinacea*)			X	X
Longfin Inshore Squid (*Doryteuthis pealeii*)			X	X
Monkfish (*Lophius americanus*)	X	X		
Northern Shortfin Squid (*Illex illecebrosus*)				X
Ocean Pout (*Macrozoarces americanus*)	X		X	X
Pollock (*Pollachius virens*)	X	X		
Pollock (*Pollachius virens*)	X	X	X	
Porbeagle Shark (*Lamna nasus*)		X	X	X
Red Hake (*Urophycis chuss*)	X	X	X	
Scup (Stenotomus chrysops)			X	X
Silver Hake (*Merluccius bilinearis*)	X	X		X
Silver Hake (*Merluccius bilinearis*)	X	X		
Spiny Dogfish (*Squalus acanthias*)			Sub-Adult Female	Male/ Female
White Hake (*Urophycis tenuis*)	X	X	X	X
Windowpane Flounder (*Scophthalmus aquosus*)	X		X	X
Winter Flounder (*Pseudopleuronectes americanus*)	X	X	X	X
Winter Skate (*Leucoraja ocellata*)			X	X
Witch Flounder (*Glyptocephalus cynoglossus*)				X
Yellowtail Flounder (*Limanda ferruginea*)			X	X

Table EA-7. Sound Levels and Human Response (USEPA, 1981)

Noise Level (dBA)	Common Sounds	Effect
0		Hearing begins
10		Just audible
20	Broadcasting studio	
30	Library Soft whisper (15 feet)	Very quiet
40	Living room, Bedroom Quiet office	
50	Light auto traffic (100 feet)	Quiet
60	Air conditioning unit (20 feet)	Intrusive
70	Noisy restaurant Freeway traffic Man' s voice (3 feet)	Telephone use difficult
80	Alarm clock (2 feet) Hair dryer	Annoying
90	Heavy truck (50 feet) City traffic	Very annoying, Hearing damage (8 hours)
100	Garbage truck	
110	Pile drivers	
120	Jet takeoff (200 feet) Auto horn (3 feet)	Maximum vocal effort
130	No Example	
140	Carrier deck jet operation Air raid siren	Painfully loud

Table EA-8. Construction Equipment Noise Level at 50 feet (USEPA, 1971)

Noise Level (dBA) at 50 feet			
Equipment Powered by Internal Combustion Engines	Earth Moving	Compacters (rollers)	73-75
		Front Loaders	72-84
		Backhoes	72-94
		Tractors	76-96
		Scrapers, Graders	80-93
		Pavers	86-88
		Trucks	82-93
	Materials Handling	Concrete Mixers	75-88
		Concrete Pumps	81-83
		Cranes (Movable)	76-87
		Cranes (Derrick)	86-88
	Stationary	Pumps	69-71
		Generators	71-82
		Compressors	74-86
Impact Equipment		Pneumatic Wrenches	83-88
		Jack Hammers and Rock Drills	81-98
		Pile Drivers (Peak)	95-105
Other		Vibrator	69-81
		Saws	72-81

In 2013, the USACE conducted a study of the noise produced by the *Currituck,* a 200-300 cy capacity hopper dredge, during dredging at Cuttyhunk Harbor in Cuttyhunk, MA and Green Harbor in Marshfield, MA. Sound recordings were taken from beach areas adjacent to the harbor dredge sites in both locations ranging from a 50 to 450-yard linear distance from the active dredge (USACE, 2020).

The results of the Cuttyhunk Harbor study show that background noise during the study (recorded while no active dredging was occurring) was generally in the range of 60-70 decibels (dB). While the dredge was actively working, sound levels increased by a maximum of about 10-15 dB. Noise levels in Green Harbor during the study showed similar results. Background noise was in the range of 60-70 dB and during active dredging, noise levels increased by about 10-15 dB depending on how close the dredge was to the sound recorder.

The results of both studies show that active dredging contributes relatively low amounts of noise (5-15 dB) above what would otherwise be experienced adjacent to an active harbor (USACE, 2020). While the dredge is inactive or transiting, dredge pumps would be turned off, and noise levels would be the same as that of passing vessels.

6.1.8 Air Quality

Air quality is defined by ambient air concentrations of specific pollutants determined by the U.S. Environmental Protection Agency (USEPA) to be of concern related to the health and welfare of the general public and the environment The Clean Air Act (CAA) establishes the framework for modern air pollution control, and delegates primary responsibility for regulating air quality to the States, with oversight by the USEPA. The USEPA develops rules and regulations to preserve and improve air quality as minimum requirements of the CAA, and delegates specific responsibilities to State and local agencies.

The USEPA has identified seven specific pollutants (called criteria pollutants) that are of concern with respect to the health and welfare of the general public. The criteria pollutants are carbon monoxide (CO), sulfur dioxide (SO2), nitrogen dioxide (NO2), ozone (O3), particulate matter 10 micrometers or less in aerodynamic diameter (PM10), particulate matter 2.5 micrometers or less in aerodynamic diameter (PM2.5), and lead (Pb). These pollutants have established National Ambient Air Quality Standards (NAAQS).

Areas that do not meet the NAAQS are called non-attainment areas. For nonattainment areas, the CAA requires States to develop and adopt State Implementation Plans (SIPs). The SIP sets the basic strategies for implementation, maintenance, and enforcement of the NAAQS. The Commonwealth of Massachusetts is authorized by the USEPA to administer its own air emissions permit program, which is shaped by its SIP. In Massachusetts, Federal actions must conform to the Massachusetts Ambient Air Quality Standards which are consistent with the National Standards. The USACE must evaluate and determine if the proposed action (construction and operation) would generate air pollution emissions that aggravate a non-attainment problem or jeopardize the maintenance status of the area for ozone. When the total direct and indirect emissions caused by the operation of the Federal action/facility are less than threshold levels established in the rule (40 C.F.R. § 93.153), a Record of Non-applicability (RONA) is prepared and signed by the facility environmental coordinator.

The entire state of Massachusetts is designated as an attainment zone for sulfur dioxide, lead, carbon monoxide, nitrogen dioxide, particulate matter-10, and particulate matter-2.5. The project location in Essex County, Massachusetts is also in attainment for ozone (O3). Attainment zones are areas where the NAAQS have been met. The entire project area is located within a designated attainment zone according to the NAAQS set forth by the USEPA (USEPA, 2018).

The primary mobile sources of emissions in the vicinity of the project include private, commercial and government vehicles being operated on the roadways adjacent to the project area and boats that utilize the harbor and surrounding waters.

6.1.9 Socioeconomic and Recreation

The U.S. Census Bureau estimates the population of Newburyport in 2018 to be 18,202 people, living in 7,918 households. The population density was 2,086 people per square mile (792.0/km^2). There were 7,897 housing units at an average density of 942 per square mile (363.8/km^2). The median income for a household is $103,220 (2018 dollars). The per capita income for the city is $61,503. About 2.8% of families and 5.2% of the population were below the poverty line, including 4.5% of those under age 18 and 6.9% of those age 65 or over (U.S. Census, 2019). The ethnic composition of the population of Essex County, MA is composed of White residents (68.9%), Hispanic or Latino residents (21.9%), Asian residents (3.63%), Black or African American residents (3.18%). About 10.9% of individuals within Essex County are below the poverty level (US Census Bureau, 2019).

Newburyport is a city with high seasonal tourism with recreational and commercial boaters during the spring, summer and fall months. Newburyport Harbor has several private yacht clubs on the shores and a large public boardwalk with both temporary docking space for visitors and permanent space for several commercial and charter vessels. According to the Massachusetts Division of Fisheries and Wildlife, approximately 200,000 fishing licenses are granted in Massachusetts annually; freshwater angling alone contributes half a billion dollars to the Massachusetts economy (MDMR, 2019).

The nearby Salisbury Beach State Reservation is a highly used camping area within Massachusetts. It is also one of the most popular sites in the area for beach use, swimming, boating and fishing. On an annual basis, the Reservation generates over $500,000 in day-use revenues and over $850,000 in camping revenues. The Reservation has an annual attendance rate of over one million visitors (MBBTF, 1994).

6.1.10 Cultural Resources

The Massachusetts State Historic Preservation Officer (MA SHPO) concurred, by letter dated August 20, 2018, that the Newburyport Harbor FNP dredging project would have "no effect" on significant historic properties in accordance with Section 106 of the National Historic Preservation Act and implementing regulations 36 CFR 800.

The Massachusetts Board of Underwater Archaeological Resources (MA BUAR), which has jurisdiction over intertidal and subtidal areas of the Commonwealth, responded by letter dated August 9, 2018, stating that the proposed project is unlikely to impact submerged cultural resources. However, the proposed Salisbury nearshore site is adjacent to one documented historic archaeological site, the "Jennie M. Carter", a shipwreck site located along the Salisbury Beach State Reservation. As this site is landward of the proposed placement locations, it should be avoided. Any disturbance of the site, including the placement of sand over it, should not be undertaken without additional consultation.

The northern end of the Salisbury nearshore site is currently under permit by the Board for Underwater Archaeological Investigations and should be avoided. Regarding the nearshore site at Plum Island and onshore site North Point, these areas may be archaeologically sensitive for shipwreck events. Approximately 40 shipwrecks have been identified in the vicinity of the river's mouth and to the south along Plum Island (Mastone, 1996). At least one vessel, the Revolutionary War privateer Neptune (1777) was reportedly lost in that area. Given the proximity to known and potential historic archaeological sites, the

BUAR considers both nearshore placement sites to be highly archaeologically sensitive. Therefore, should submerged cultural resources be encountered, steps should be taken to limit impacts and the BUAR would be notified in accordance with the Board's Policy Guidance for the Discovery of Unanticipated Archaeological Resources. Additionally, work in these areas would cease and USACE would follow the process for unanticipated and inadvertent discoveries codified at 36 CFR 800.13 (Post-review discoveries).

The USACE contacted the Mashpee Wampanoag Tribe and the Aquinnah Wampanoag Tribe by letter dated August 1, 2018, regarding the proposed project and received no response. Since no response was received the USACE assumes concurrence with the proposed activities.

6.2 Proposed Placement Sites

There are two potential nearshore placement sites evaluated to receive the proposed dredged material from the Newburyport Harbor FNP; one is off Salisbury Beach and the other is off Plum Island Beach. An additional alternative would place dredged material directly on the beach at North Point.

Depths within the nearshore area off Salisbury Beach are between -10 and -22 feet Mean Lower Low Water (MLLW) (Figure EA-8). The depths of the Plum Island nearshore site range from -10 to -27 feet MLLW (Figure EA-9). Selection of nearshore dredged material placement locations are based on the Merrimack Estuary and Newburyport Harbor Sediment Management Studies by the Engineer Research and Development Center, and a study of the Salisbury Beach nearshore area conducted by Normandeau Associates (ERDC, 2017; NAI, 1996;). These studies evaluated the nearshore placement sites in context of their physical, environmental, and hydrographic features to determine their acceptability as placement sites. Wave and sediment transport analysis were studied to verify the benefit of construction of a feeder berm within the nearshore environment at the most appropriate location on along the coast.

The proposed beach placement site at North Point is a high energy beach area abutting the Merrimack River. A reversal of sediment transport occurs along the beach at North Point due to influences of the outflowing Merrimack River or due to refraction of northeasterly waves crossing the bar at the mouth of the entrance channel. Sediment in this area either accretes behind the Plum Island jetties or moves offshore to join the southerly moving sediment transport system. Coastal engineering analysis has determined that onshore placement would stabilize sediment for as long at the material remains onshore.

Figure EA-8. Salisbury Beach Nearshore Placement Site Depth Contours
(Figure Based on Evaluation of Placement Locations Under the Piscataqua River FNP)

Figure EA-9. Plum Island Beach Nearshore Placement Site Depth Contours
(Figure Based on Evaluation of Placement Locations Under the Piscataqua River FNP)

6.2.1 Climate, Weather, Tides

The climate, weather and tides of the nearshore areas are described in detail in Section 6.1.1.

6.2.2 Physical Environment

6.2.2.1 Sediment Characteristics

The sediments sampled from the placement locations were found to be consistently medium-grained and fine-grained sand (Table EA-9). Sediment grab sampling of the proposed placement sites was performed as follows; North Point (2017), Salisbury Nearshore site (2013), and Plum Island Nearshore site (2013). These results show sediment composition at the placement sites to be similar to sediments within the proposed dredge area, both being poorly-graded, fine to course sand.

Table EA-9. Grain Size Results from Proposed Placement Sites

Sample ID	% Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines
North Point (2017)					
PIIB-T1-H	0.0	1.5	95.5	2.9	0.0
PIIB-T1-M	0.0	13.5	81.2	3.6	0.0
PIIB-T1-L	0.0	7.4	87.2	3.7	0.0
PIIB-T2-H	0.0	1.1	95.8	2.9	0.0
PIIB-T2-M	0.0	0.9	97.8	1.2	0.0
PIIB-T2-L	0.0	0.6	98.9	0.5	0.0
Plum Island Nearshore (2013)					
PINS-A	0.0	0.1	49.1	50.8	0.0
PINS-B	0.3	0.7	87.2	11.9	0.0
PINS-C	0.0	0.0	66.0	34.0	0.0
PINS-D	0.1	0.2	57.2	42.6	0.0
PINS-E	0.0	0.2	96.5	3.2	0.0
Salisbury Nearshore (2013)					
SNS-A	0.0	0.1	73.2	26.7	0.0
SNS-B	0.0	0.0	2.7	97.3	0.0
SNS-C	0.0	0.0	74.9	25.0	0.0
SNS-D	0.0	0.1	83.1	16.8	0.0
SNS-E	0.0	0.0	1.4	98.5	0.0

6.2.3 Sediment and Water Quality

6.2.3.1 Water Quality

The proposed placement areas for this project are in Class SB waters (MDEP, 2013). Waters assigned to this class are designated as habitat for fish, other aquatic life and wildlife and for primary and secondary contact recreation.

Water samples are analyzed for Enterococci, which is the bacterial standard indicator organism for determining levels of contamination at marine beaches in Massachusetts. The Newburyport Board of Health is responsible for performing water quality testing during the summer months based on funding from the MA Department of Public Health. Water samples are collected at four locations (two on the Merrimack River and two on the Atlantic Ocean) on a bi-weekly basis (MDPH, 2020).

6.2.3.2 Sediment Chemistry

The proposed dredged material is comprised of medium-grained sand that is considered free of contaminants under exclusionary criteria under Section 404 of the Clean Water Act.

6.2.4 Biological Resources

6.2.4.1 Wetlands

The placement sites consist of ocean areas and a coastal beach that do not have wetland resources in close proximity.

6.2.4.2 Vegetation

Aquatic Vegetation

The nearshore placement sites were surveyed by underwater video transects in July 2013 for aquatic vegetation. Enough footage was obtained to characterize the sub-bottom for vegetation density. At both nearshore locations sporadic clumps of drift algae were observed in contact with the bottom. Eelgrass was not observed within any portion of either survey area (USACE, 2013). No eelgrass beds have been documented within the extents of the nearshore sites. North Point is not expected to have any aquatic vegetation along the dynamic shoreline.

Dune Vegetation/ Habitat

Landward of the beach at North Point there is approximately 12 acres of coastal dune habitat concentrated to the northeaster portion of the beach. These dunes have moderately dense vegetative cover with a 5-acre area that is unvegetated to the north. The dominant vegetation in the dune area is American beachgrass (*Ammophila breviligulata*). Other species observed in this dune complex include beach pea (*Lathyrus japonicus*), coastal panic grass (*Panicum amarum var. amarulum*) and northern bayberry (*Myrica pensylvanica*).

A coastal dune is defined as a natural hill, mound or ridge of sediment landward of a coastal beach shaped by wind action or storm overwash. Coastal dunes are also defined by sediment deposited by artificial means and serving the purpose of storm damage prevention or flood control (310 Code of Mass. Regulations 10.28(2)) (MDEP, 2020a). These dune resources are protected by Massachusetts wetland regulations due to their significance to storm damage prevention, flood control, and the protection of wildlife habitat.

Many avian species depend on coastal sand dune habitat. The piping plover, and horned lark (*Eremophila alpestris),* use coastal sand dunes for breeding while the semi-palmate plover (*Charadrius semipalmatus*), semi-palmated sandpiper (*Calidris pusilla*),

sanderling (*Calidris alba*), short-eared owl (*Asio flammeus*), horned lark and Ipswhich/Savannah sparrow (*P. s. princeps*) use coastal sand dunes for migration. The sanderling, short-eared owl, horned lark, and Ipswhich/Savannah sparrow use coastal sand dunes for wintering (Hunt, 2004). The species that utilize these habitats vary depending upon vegetative community cover, topography, and hydrologic regime. Dune systems also support a variety of mammals, amphibians, reptiles, and insects.

6.2.4.3 Benthos

Benthic samples collected at the proposed nearshore placement sites at Plum Island Beach and Salisbury Beach. Five benthic samples were collected with a Van Veen grab at each nearshore location on July 31, 2013. The results of the benthic samples indicated that the benthic community within the nearshore site off Salisbury was dominated by burrowing amphipods (*Haustorius canadensis*). A wide range of polychaete species (typically *Syllids* and *Spionids*) were also present. Razor clams (*Ensis directus*) were present in low numbers, while juvenile surf clams were abundant (Table EA-10). The nearshore site off Plum Island exhibited a benthic community that was dominated by a mix of *Syllid* polychaetes (*Brania* sp. and *Exogone dispar*), capitellid polychaetes (*Capitella* sp.) and oligochaetes (Table EA-11). Surf clams were present within the site in low numbers. All surf clams were juvenile. The community found at these sites represents a sandy nearshore assemblage typical of New England intertidal and shallow subtidal environments (Croker and Hager, 1975).

Table 10. Benthic Species Abundance of the Plum Island Nearshore Placement Site

Species	A	B	C	D	E
ANNELIDA					
POLYCHAETA					
Brania spp.	-	63	170	112	8
Capitella sp.	1	96	186	25	3
Drilonereis spp.	-	-	-	-	1
Exogone dispar	123	-	-	-	22
Polydora spp.	-	-	-	-	1
Sabaco elongatus	7	-	-	-	8
Scolelepis squamata	-	-	5	-	-
CLITELLATA					
Unidentified Tubificidae	6	33	-	42	-
NEMATODA					
Unidentifed Nematoda	-	58	29	10	30
MOLLUSCA					
BIVALVIA					
Spisula solidissima	-	5	-	-	3
ARTHROPODA					
MALACOSTRACA					
Chiridotea spp.	-	11	1	1	2
Unidentified Gammaridae	4	-	-	2	-
Haustorius canadensis	-	3	-	-	-
Politolana sp.	-	-	1	-	-
TOTALS					
# of Species	**5**	**7**	**6**	**6**	**9**
# of Individuals	**141**	**269**	**392**	**192**	**78**

Table EA-11. Benthic Species Abundance of the Salisbury Nearshore Placement Site

Species	A	B	C	D	E
ANNELIDA					
POLYCHAETA					
Arabella iricolor	-	-	4	2	-
Brania spp.	-	-	16	7	-
Capitella capitata	-	-	2	1	-
Nephtys caeca	-	6	-	-	-
Nephtys picta	-	4	6	2	5
Sabaco elongatus	-	-	-	-	2
Schistomeringos rudolphii	-	4	-	-	-
Scolelepis squamata	1	3	-	1	-
Streblospio benedicti	-	7	-	-	24
NEMATODA					
Unidentifed Nematoda	-	2	-	-	-
MOLLUSCA					
BIVALVIA					
Ensis directus	-	-	-	-	9
Spisula solidissima	1	17	7	9	188
GASTROPODA					
Ilyanassa trivittata	-	1	1	-	3
ARTHROPODA					
MALACOSTRACA					
Chiridotea spp.	-	4	-	-	15
Cyathura polita	-	-	1	-	-
Oxyurostylis spp.	-	-	-	-	4
Gammaridae spp.	-	2	-	-	2
Haustorius canadensis	15	235	314	102	557
Leptocheirus pinguis	-	-	-	-	4
ECHINODERMATA					
ECHINOIDEA					
Echinarachnius parma	-	-	1	-	1
Strongylocentrotus droebachiensis	-	-	1	-	-
TOTALS					
# of Species	**3**	**11**	**10**	**7**	**12**
# of Individuals	**17**	**285**	**353**	**124**	**814**

6.2.4.4 Fisheries

Commercially important lobsters may be found in or near the placement locations. The nearshore areas were surveyed use acoustic sub-bottom profiling to identify hardbottom habitats, only small sand waves were observed in these areas. The preferred lobster habitat

is complex substrate, particularly cobble. Therefore, this is not an area significantly used by lobster for refuge. As previously noted, adult lobsters remain in nearshore areas in highest abundance between May and December.

6.2.4.5 Finfish

Finfish trawls in the vicinity of the nearshore placement areas revealed the presence of Atlantic cod (*Gadus morhua*), Atlantic herring (*Clupea harengus*), Atlantic whiting (*Merluccius bilinearis*), pollock (*Pollachius virens*), winter skate (*Leucoraja ocellata*), long-horn sculpin (*Myoxocephalus octodecemspinosus*), sand dab (*Hippoglossoides platessoides*); yellowtail flounder (*Pleuronectes ferruginea*); winter flounder (*Pseudopleuronectes americanus*); and windowpane flounder (*Scophthalmus aquosus*) (USACE, 1973). Forage species include several species of anadromous fish, which may transit the project area during particular times of the year.

6.2.4.6 Wildlife

There is no terrestrial wildlife near the nearshore areas. Impacts to wildlife have been covered in greater detail in other sections.

6.2.4.7 Birds

See Section 6.1.4.7 for birds that may be encountered in the placement areas. North Point is likely used as foraging habitat along the intertidal areas of the beach by plovers, sandpiper, terns and gulls. The nearshore placement areas likely support foraging terns, gulls and cormorants. Nesting plover have been documented on Plum Island and near North Point. The proposed placement at North Point is near previously used plover nesting areas that will be inactive during the proposed timeframe for on-beach placement.

6.2.5 Threatened and Endangered Species

See Section 6.1.5 for threatened and endangered species information. The locations of the nearshore placement sites have greater exposure to the open Atlantic Ocean, foraging sea turtles and marine mammal interactions may be more prevalent in these areas. The beach of North Point contains historical nests of piping plovers that also forage along the beach. The beach may also have common terns or least terns that forage or transit the beach area.

6.2.6 Noise

The nearshore placement sites are located more than 1,000 feet off the coast of Salisbury and Plum Island Beach. Other vessels regularly pass within this distance of the beach with no apparent adverse effects to beachgoers, foraging or nesting birds or terrestrial wildlife. Placement activities are not likely to produce noise much greater than background conditions.

6.2.7 Essential Fish Habitat

Species with EFH in the placement areas are the same as those found in the dredging area. See section 6.1.6. Also see Appendix G for descriptions of EFH for each species.

6.2.8 Air Quality

See Section 6.1.8. for air quality information

6.2.9 Socioeconomic and Recreation

As noted in Section 6.1.9 of this document, there are several recreational boaters as well as commercial and recreational fishermen that utilize Newburyport Harbor and the surrounding waters. The nourishment of the beach areas is expected to abate erosion and reduce the risk of property damage and generally improve tourism attraction, likely providing a positive socioeconomic impact.

6.2.10 Cultural Resources

See section 6.1.10. for a discussion of cultural resources.

7.0 ENVIRONMENTAL EFFECTS

The no action alternative would result in no dredging of the FNP or placement of material at any or the proposed placement sites. This alternative would avoid the short-term environmental impacts described below. The Federal channel would continue to shoal causing a hazard to vessel navigation, potentially causing vessels to capsize and emit oil and debris into the environment. Beach erosion and the resulting risk to property loss from costal storms would persist without stabilizing the beach sediment. The no action alternative may result in damage to buildings and infrastructure causing debris and destabilizing the shoreline. Therefore, the no action would likely have some adverse effect on the environment with the addition of debris and pollutants in the waterway and degradation of shoreline habitat.

7.1 Physical Environment

7.2.1 Sediment Characteristics

Material to be dredged in the Federal Navigation Project is composed primarily of medium-grained sand. It is anticipated that the bottom sediments would remain medium-grained sand following dredging activities. The Suitability Determination for the placement of the dredged material from the Newburyport Harbor FNP is contained in Appendix F of this report. The sandy sediments in the FNP channel were deemed suitable by the USACE for placement at the nearshore locations or as beach placement on North Point. There should be no significant chemical impacts to water or sediment from the placement of material at the proposed locations as they are free of contaminants. Based on the information provided, it is anticipated that the use of any of the placement areas would have no long-term negative effects on the sediment characteristics of the project area.

7.2 Water Quality and Turbidity

The proposed dredging and placement activities would cause sediment particles to be suspended in the water column, increasing local turbidity levels. However, it is expected that most of these increases would attenuate within a relatively short distance from the area of activity. Several factors affect the amount of time that sediments would remain suspended in

the water column and the size and orientation of the sediment plume. These include grain size of the dredged material, current velocities in the area, water depth, and the dredge and placement equipment/method being used.

All areas of the FNP experience high turbidity during certain times of year. The entrance channel of the FNP likely experiences greater turbidity under normal conditions than the inner harbor due to it being situated at the mouth of the river and experiencing more dynamic water and sediment movement influenced by the ocean and river interface. The Merrimack River likely experiences high turbidity after rain events when sediment laden runoff enters the river. Storm events can greatly shift and suspend sub-bottom sediments as water flows increase and become more erratic. Major costal storms occur about one to three times per year and can displace sediments in greater amounts than dredging operations. Storms are also more frequent and affect larger regions than localized dredging operations (Wilber and Clarke, 2001). Increased water column turbidity is therefore expected to cause only short-term and localized effects to water quality in the area compared to conditions frequently experienced.

Coastal and estuarine organisms are exposed to suspended sediments from tidal flows, currents, and storms. Therefore, they have adaptive behavioral and physiological mechanisms for dealing with this feature of the habitat. Increased turbidity has the potential to affect the performance of visual predators such as fish and birds, production of phytoplankton, growth and survival of benthic organisms (Karel, 1999), and may impact sensitive receptors (e.g. gill abrasion) (Kurland et al., 1994). Turbidity can alter light regimes (i.e. reduce light) which has the potential to impact species distribution, behavior, feeding ability and movements of fish, especially larval fish. However, areas with increased turbidity are not always detrimental. Some species such as the American eel readily utilize turbid waters as protection from predators (Berry et al., 2003).

Dredging by hopper dredge or hydraulic dredge would resuspend material as the dragheads loosens sediments as it moves over the sub-bottom. Turbidity would also be generated by overflow from the hopper or scow resulting from the continued pumping as it fills with slurry. As a mechanical dredge would resuspend material when the bucket hits the bottom sediments as well as when the bucket is lifted. At the placement sites, the material would be released through the bottom opening doors of the scow for deposition on the bottom. The release would result in limited exposure to the water column during the rapid descent of sand particles. The placement at North Point would involve pumping of sand on the beach using a hydraulic pipeline and would allow for some sediment runoff along the beach, resulting in minimal water column impacts.

A study conducted on turbidity following dredging of sandy sediments by small hopper dredges found that suspended sediments above 150mg/l were only present within small volumes of the central portions of the plume, and concentrations above 50 mg/l were generally confined to within 300 feet of the active overflow (USACE, 1973). Information on suspended sediment plumes associated with mechanical clamshell bucket dredges indicate that the concentration of suspended sediments would be highest close to the bottom (on the order of 445 mg/l) and lowest near the surface of the water column (on the order of 105 mg/l) (USACE, 2001; SAIC, 2005a). A study by Burton (1993) measured turbidity levels at 500, 1000, 2000, and 3300 feet from an active mechanical dredge. Based on these analyses, elevated suspended sediment levels of up to 450 mg/l may be present in the immediate vicinity of the clamshell bucket, and suspended sediment levels of up to 190 mg/l could be present within 2,000 feet.

The proposed dredging operations of the Newburyport Harbor FNP and dredged material placement is not expected to have any long-term negative effects on water quality. The dredge would be moved frequently to each shoaled area throughout the project, dredging generated plumes would only expose discrete sections of the navigation channel for a limited time. Although the dredging operation is expected to occur continuously, the actual dredging is intermittently stopping while empty barges are positioned and for other logistical reasons allowing for the material to settle. The dredged material is sand and should settle out of the water column within several minutes after dredging ceases. Turbidity would be limited to the duration of the dredging activity. Given the open coastal hydrodynamic system of the project area, any negative impacts from dredging of sand should be of short duration and limited to the general project area.

7.3 Biological Environment

7.3.1 Wetlands

As noted previously, Newburyport Harbor is surrounded by estuarine salt marsh with large areas to the north and south of the Federal channel to be dredged. The wetland resources are setback, generally 1,000 feet away from the dredge footprint and would not be directly or indirectly impacted by the proposed dredging or the resuspension of sediment. Given the far distance of the salt marsh from the proposed dredging activities, sedimentation of dredged material is unlikely to bury or otherwise impact these wetland areas.

7.3.2 Vegetation

Aquatic Vegetation

The nearshore locations do not contain eelgrass (*Zostera marina*) based on video surveys of each site. No eelgrass was observed during sediment sampling of the dredge locations. The high energy and dynamic nature of the sediment in the Federal channel are not conducive for eelgrass growth. There are no current or historical eelgrass beds that have been documented within the extent of the dredge or placement footprints, therefore, no aquatic plants would be removed, buried or otherwise impacted as a result of the proposed project.

Dune Vegetation/ Habitat

The placement of sand at North Point will not be performed within the areas of the coastal dune. Sand placement is not expected to harm, bury or degrade dune vegetation or habitat. Beach nourishment would aid in protecting the dune area from coastal storms and add to the volume of sand on the beach preventing dune erosion, resulting in a benefit to this habitat.

7.3.3 Benthos

Benthic organisms such as tube worms, arthropods and bivalves associated with the dredge sediments would be removed during the dredging process. Mobile organisms living on the surface would be displaced. Increased suspended sediment generated by dredging operations are expected be confined to the main channel of the Merrimack River. The large grained sediments of the dredged material are likely to fall within a few hundred feet and are

not likely to reach shellfish beds in Joppa Flats that are greater than 600 feet off the main river channel. It is unlikely that concentrations of suspended sediments would reach levels that would adversely affect shellfish populations given the distance between the flats and the dredging area.

Shellfish are well adapted to turbid environments and would be able to cope with periotic elevated suspended sediment concentrations from the dredging operation. Most of the dredge area is in a high energy system. High energy environments are normally low in epifauna, with infauna limited to a few species that are adapted to stressful and ever-changing conditions (Wilber and Clarke, 2001). Therefore, the number of benthic species which may be affected by dredging activity is likely to be minimal. Removal of the shoaled areas in the navigation channel would temporarily decrease the amount of benthic resources available to fish as forage. However, areas adjacent to the navigation channel would continue to serve as a food source while the impacted area recolonizes, and benthic populations rebuild.

The dredged areas are expected to experience recolonization of benthos from adjacent areas within a short timeframe after dredging is completed. Newell et al. (2004) provided a time sequence of recovery of macrofauna in coastal marine deposits in an area of high energy after cessation of dredging activities. Initial colonization of small mobile species and larval recolonization was seen in as little as 7 days, but it took about 100 days for species diversity to be restored to within 70-80% of that occurring in the surrounding areas. At about 175 days, population density is restored to 70-90% of the surrounding area, with full restoration taking 2-3 years.

The nearshore placement sites are dynamic with sand waves constantly shifting. The placement area at North Point is subject to frequent and significant changes of the shoreline during storm events, including coastal erosion (Croker and Hager, 1975). These conditions limit the benthic diversity and species richness in these areas to some degree. Recolonization by benthic species to pre-placement levels is expected to occur quickly with no long-term impacts to these areas.

7.3.4 Finfish

The effects of the proposed dredging and placement operations are not expected to have any significant long-term negative effects on finfish inhabiting the vicinity of Newburyport Harbor or placement sites. While impacts to fish species would likely differ between species depending on life history, habitat use, distribution and abundance, most fish are motile and can avoid any disturbances caused by the operational activities. Larvae and juveniles are less able to avoid project related disturbances and are more susceptible to water quality and sedimentation impacts. Under most dredging scenarios, fish and other motile organisms encounter localized suspended sediment. Due to the open nature of the dredging and placement areas, adult finfish species should be able to avoid the disturbed areas. Most finfish are quite tolerant of short-term exposure to elevated suspended sediment levels (Stern and Stickle 1978), fish in the vicinity of dredging activity are unlikely to be significantly impacted by the dredge or placement activities. Although, it is possible for bottom fish to be entrained by the dredge while in operation.

Project dredging of the 9-foot inner harbor channel would be restricted to occur between 1 July to 14 February to avoid impacts to spawning winter flounder entering the harbor from 15 February to 30 June, and anadromous fish (alewife, blueback herring,

American shad, sea lamprey) migration from 15 March to 30 June. Winter flounder are likely to utilize shallow estuarine areas of Joppa Flats for spawning and egg development which would be avoided by this dredging timeframe. Anadromous fish would enter the river and swim up the channel to upriver locations to spawn and then return to sea. These fish species would be able to enter the river while the 15-foot entrance channel is actively being dredged, and therefore no timeframe restrictions have been implemented for dredging of the entrance channel. The placement activities would not interfere with spawning migrations or spawning areas and therefore no timeframe restrictions were implemented for placement. These timeframes will be or have been coordinated with the Massachusetts Department of Marine Fisheries and the National Marine Fisheries Service. The time of year proposed for the project avoids peak fish spawning and egg and larval presence; thus, no significant impacts to fish species are expected to occur as a result of this project.

7.3.5 Terrestrial Wildlife

The project is not likely to adversely impact terrestrial wildlife species. Any terrestrial wildlife species that may be displaced due to dredging and placement activity would return once the project is complete.

7.3.6 Birds

The project is not likely to significant adversely impact waterfowl, shorebirds, or nesting birds given the project timeframes. Some individuals may be displaced due to noise created during dredging/placement activities but use of the area should occur rapidly following completion of the project.

7.3.7 Fisheries

Lobster fishing occurs in areas off the coast of the nearshore placement areas. The placement of sediments would not occur on hardbottom habitats that lobsters utilize for refuge. The nearshore sites exhibit flat shifting sand bottoms with high tidal energy that likely have low density of lobster (JBF, 1977). Lobster resources in adjacent areas should not be significantly impacted and would serve as a recruitment source following the cessation of the activities. Impacts from elevated turbidity on lobster resources in the vicinity of the dredging operation should be minimal as the impact area would be highly localized and temporary. Adult lobsters are tolerant of exposure to elevated suspended sediment concentrations (Stern and Stickle 1978). Therefore, the proposed project should not have long-term, or significant impacts to lobsters in the area.

7.4 Threatened and Endangered Species

This project is expected to have no significant impact on any State or Federally listed threatened or endangered species, either through direct project operations or indirectly through turbidity. The proposed activities and their impacts are, or have been, coordinated with the U.S. Fish and Wildlife Service and National Marine Fisheries Service under Section 7 of the Endangered Species Act. The full results of ESA coordination will be included in Appendix A when complete.

The inner harbor of the FNP (9-foot channel) would be conducted between 1 July and 14 February, this timeframe would avoid the shortnose sturgeon spawning migration from April to May, when fish would enter the river to spawn in freshwater locations further upriver.

This timeframe would also avoid much of the Atlantic sturgeon foraging timeframe that may begin in the early summer months by transient juveniles and adult individuals. Any sturgeon foraging within the river are likely to avoid dredging activities and remain in the shallow estuarine areas off the main channel. The Merrimack River is not a spawning or overwintering location for Atlantic sturgeon, during winter months this species would move offshore from November to March. These species may also be foraging or overwintering in the upriver portions of the Merrimack River during winter months and unlikely to be in the project area in the winter.

Threatened and endangered sea turtles may be opportunistically foraging in the area of the dredging and placement areas during the summer and early fall months when waters are warm. However, the dredging area occurs in swift moving currents where the species would not likely be foraging. Transient sea turtles would move south when the water cools in the late fall and winter, when the project would be active. Marine mammals like fin whales and North Atlantic right whales are not likely to be foraging close to shore or near the project area. Scows and barges are not to exceed 10 knots when transiting or placing material. The regulated speed of project vessels would reduce the potential for vessel strikes or interactions with turtles and whales. Based on the site conditions and the proposed operation timeframes there would likely be rare or discountable impacts to turtles and marine mammals.

The red knot, roseate tern and northern long-eared bat would not be impacted by the project activities. The area is not a stopover location or historical breeding/hibernacula location for any of these species and few if any have been spotted within the region of the project. The common tern and least tern can be found foraging within the project area, but due to the area being highly populated by humans there are no colonial nesting locations close to the project. The Federally threatened piping plover is present during the late spring and summer months on the beach at North Point. There are several nesting locations that are used each year near Plum Island's North Point. If placement of sediment occurs at North Point, the USACE has made the determination that the proposed project is not likely to adversely affect piping plover under the following conditions: 1) No dredged material is to be placed at North Point during piping plover nesting season from 1 April to 31 August; and 2) all dredged material placement on the beach shall be graded to slope no steeper than 1V:10H to allow for adequate piping plover foraging in the intertidal zone.

7.5 Noise

Increased levels of noise may influence birds and terrestrial wildlife in the vicinity of the active dredge. The results of USACE conducted noise studies indicate that active dredging contributes relatively low amounts of noise (5-15 dB) above what would otherwise be experienced adjacent to an active harbor (USACE, 2020). The dredge area is far removed (thousands of feet) from biota sensitive to noise, like nesting piping plovers. While the dredge is inactive or transiting, dredge pumps would be turned off, and noise levels would be the same as that of passing vessels.

The nearshore placement sites are located approximately 1,000 feet or more off the coast of Salisbury and Plum Island Beach. Nearshore placement is not anticipated to produce noise greater than passing vessels. Other vessels regularly pass within this distance of the beach with no apparent adverse effects to beachgoers, foraging or nesting birds or terrestrial wildlife. The pumping of sand from a hydraulic pipeline onto North Point is likely to

produce noise not typically experienced on the beach. All beach placement activities would be conducted from 1 September to 31 March to avoid interactions with nesting piping plovers. Since pipeline beach placement would avoid interrupting nesting birds, and there would be little noise disturbance during dredging and nearshore placement, impacts from noise would have minimal impact to the natural or human environment.

7.6 Essential Fish Habitat

The dredging and placement activities are likely to have a minimal effect on designated EFH. There would be a sediment plume associated with the operation of the dredge and the placement of dredged material. However, the increase in turbidity is expected to be minimal and localized as the material is sand and would settle close to the dredge or placement locations. Benthic organisms serve as an important food source for many fish species. Benthic organisms inhabiting the area to be dredged would be removed by the dredging activities. Benthic resources would recolonize the areas dredged by recruitment from surrounding areas. Surveys of the nearshore locations have included sub-bottom profiling of the area indicating that no hardbottom habitats would be buried from the placement of sediment. Therefore, impacts to EFH as a result of this project are expected to be minimal.

7.7 Air Quality

Essex County in Massachusetts is in attainment for all seven criteria air pollutants. The project area is in an attainment area; therefore, a General Conformity Determination is not required under the CAA.

7.8 Socioeconomic and Recreation

Maintenance dredging of Newburyport Harbor and placement of dredged material at the selected sites is likely to have a positive socioeconomic effect on the area. The nourishment of the beach areas is expected to abate erosion and reduce the risk of property damage and generally improve tourism attraction to the beach areas, providing a socioeconomic benefit. Improving navigation of the FNP is expected to have a positive impact on boating and seasonal recreation and thus a positive impact to the local economy.

Negative impacts to the recreation and aesthetic resources in Newburyport Harbor would be temporary and localized. Dredging of the 9-foot inner harbor channel during the offseason (September to March) would avoid major impacts to recreational users of the harbor and beach areas. Views would be impacted by the addition of the dredge, scows, and associated construction equipment, but aesthetics would only be temporarily impacted for a few months of the year in which work takes place. Placement of dredged material at North Point would likely close portions of the beach during an off-season period reducing its recreational use. However, nourishment of the local beaches would improve the use of these public areas for a multitude of recreational uses over the long-term.

7.9 Cultural Resources

Maintenance dredging of Newburyport Harbor and placement of dredged material at any of the selected placement sites is unlikely to have an effect upon any structure or site of historic, architectural or archaeological significance as defined by the National Historic Preservation Act of 1966, as amended.

7.10 Coastal Barrier Resources Act

The U.S. Fish and Wildlife Service oversees the Coastal Barrier Resources Act (CBRA), a law that was passed in 1982 to provide protection to undeveloped coastal barriers along the Atlantic and Gulf coasts. Areas designated under the 1982 CBRA became part of the John H. Chafee Coastal Barrier Resources System (CBRS), thus becoming ineligible for most new Federal expenditures and financial assistance. The law encourages the conservation of hurricane prone, biologically rich coastal barriers by restricting Federal expenditures that encourage development, such as Federal flood insurance.

The Salisbury Beach nearshore placement location resides within the John H. Chaffee Coastal Barrier Resources System (CBRS) map number MA-01P, Salisbury Beach Unit. This CBRS units extend seaward out to either the 20- or 30-foot bathymetric contour. However, the maintenance or improvement of existing Federal navigation channels (including the Intracoastal Waterway) and related structures are exempt from the CBRA. (16 U.S.C 3501(b). Therefore, the proposed project activities are in compliance with this act.

7.11 Environmental Justice and Protection of Children

Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” requires Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its program, policies, and activities on minority and low-income populations in the U.S., including Native Americans. Executive Order 13045, “Protection of Children from Environmental Health Risks and Safety Risks,” requires Federal agencies to identify and assess environmental health risks and safety risks that may disproportionately affect children. No significant adverse impacts to children, minority or low-income populations are anticipated as a result of this project or the proposed alternatives.

The proposed project is designed to maintain a Federal navigation project. Signage and possibly temporary fencing would be provided by the contractor to alert children and the general public of the staging area for equipment and to secure the area. The dredging and placement areas would not pose any significant or adverse short or long-term health and safety risks to children due to the location of, and access to, the project area. Construction would be limited to areas of the river channel; nearshore and waters; and one beach located within a cove of the harbor.

7.12 Mitigation

The dredging and proposed placement of material is not likely to have significant long-term impacts on the surrounding environment. Therefore, no mitigation is required for the proposed actions.

7.13 Floodplain

Executive Order 11988 requires that Federal agencies avoid, to the extent possible, adverse impacts associated with the occupancy and modification of flood plains and to avoid support of floodplain development wherever there is a practicable alternative. The beach at North Point is designated as an “AE” area under the FEMA National Flood Hazard Map. This area has a 1% chance of annual flooding (100-year flood) (MDEP, 2020b). The proposed project would not result in the further development of the floodplain and will not result in any long- or short-term adverse impacts associated with the occupancy and modification of the floodplain.

7.14 Hazardous Waste

The proposed project will not transport, store, create or have an effect on hazardous substances or pollutants.

8.0 ACTIONS TAKEN TO MINIMIZE ADVERSE IMPACTS

The following actions would be performed to minimize impacts to marine and estuarine resources, and water quality impacts, while conducting the proposed dredging of the Newburyport Harbor FNP. The following actions includes:

A. Dredging of the Newburyport FNP inner harbor channel (9-foot channel) would be conducted between 1 July and 14 February to avoid adverse impacts to spawning winter flounder(15 Feb. to 30 June), anadromous fish migration (15 March to 30 June, and interactions with endangered species (shortnose sturgeon spawning migration 15 April to 30 May). No dredge timeframe restrictions would be implemented for dredging of the FNP entrance channel (15-foot channel).

B. Placement of dredged material on the beach at North Point is prohibited from 1 April to 31 August to avoid piping plover nesting season. No placement timeframe restrictions would be implemented for placement of dredged material at either of the nearshore placement sites off Salisbury Beach and Plum Island Beaches.

C. On-beach placement of dredged material at North Point would require a slope no steeper than 1V:10H to provide suitable piping plover foraging habitat after project completion.

D. Vessels including tugs, barges, and scows transiting between the dredge site and the placement site shall operate at speeds not to exceed 10 knots. For unanticipated conditions, a vessel may operate at a speed necessary to maintain safe maneuvering speed instead of the required 10 knots. The intent of this condition is to reduce the potential for vessel collisions or adverse interactions with sea turtles and/or marine mammals.

E. At the end of the placement operations, a report will be submitted by email to both the National Marine Fisheries Service, and the USACE, summarizing the vessel route taken, number of trips, sightings of ESA-listed species, and any action taken to avoid interactions with ESA-listed species.

9.0 RESOURCE AGENCY COORDINATION

This project is being coordinated with the following Federal, State, local and tribal entities:

Federal

U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
National Marine Fisheries Service
U.S. Coast Guard

State

Massachusetts Division of Marine Fisheries
Massachusetts Office of Coastal Zone Management
Massachusetts Department of Environmental Protection
Massachusetts Historical Commission
Massachusetts Department of Conservation and Recreation

Municipal Officials and Local Stakeholder Organizations

The Town of Salisbury
The City of Newburyport
The Town of Newbury
The Plum Island Foundation

Recognized Tribes

Mashpee Wampanoag Tribe
Aquinnah Wampanoag Tribe

10.0 COMPLIANCE WITH ENVIRONMENTAL STATUTES AND EXECUTIVE ORDERS

A. Federal Statutes

1. Archaeological Resources Protection Act of 1979, as amended, 16 USC 470aa et seq.

Compliance: Not applicable. No archaeological resources are likely to be impacted by the proposed activities.

2. Preservation of Historic and Archeological Data Act of 1974, 54 USC 3125 et seq.

Compliance: Not applicable. No historical or archaeological resources are likely to be impact by the project activities.

3. American Indian Religious Freedom Act of 1978, 42 U.S.C. 1996.

Compliance: Must ensure access by Native Americans to sacred sites, possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.

4. Clean Air Act, as amended, 42 U.S.C. 7401 et seq.

Compliance: Public notice of the availability of this report to the Environmental Protection Agency is required for compliance pursuant to Sections 176c and 309 of the Clean Air Act. This project is an operation and maintenance project and is therefore exempt from air quality conformity.

5. Clean Water Act of 1977 33 U.S.C. 1251 et seq.

Compliance: A Section 404(b)(1) Evaluation and Compliance Review have been incorporated into this report. Placement of dredged material would occur at two nearshore sites (Salisbury Nearshore and Plum Island Nearshore) or onshore placement at North Point. An application will be filed for State of Massachusetts Water Quality Certification pursuant to Section 401 of the Clean Water Act.

6. Coastal Zone Management Act of 1982, as amended, 16 U.S.C. 1451 et seq.

Compliance: A CZM consistency determination was provided to the State of Massachusetts for review and concurrence that the proposed project is consistent with the CZM program.

7. Coastal Barrier Resources Act, 16 U.S.C. 3501 et seq

Compliance: No coastal barriers would be altered or impacted as a result of this project.

8. Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq.

Compliance: Coordination with the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) has been, or will be, conducted for this project and is summarized within the correspondence with these agencies, see Appendix A. Correspondence.

9. Estuarine Areas Act, 16 U.S.C. 1221 et seq.

Compliance: Not applicable, as this report is not being submitted to Congress.

10. Federal Water Project Recreation Act, as amended, 16 U.S.C. 4601-12 et seq.

Compliance: Public notice of availability of this report submitted to the National Park Service (NPS) and Office of Statewide Planning the Massachusetts Coastal Program relative to the Federal and State comprehensive outdoor recreation plans signifies compliance with this Act.

11. Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661 et seq.

Compliance: Coordination with the FWS, NMFS, and State environmental agencies signifies compliance with this Act.

12. Land and Water Conservation Fund Act of 1965, as amended, 54 U.S.C. 200301 et seq.

Compliance: Public notice of the availability of this report submitted to the National Park Service (NPS) and the Massachusetts Coastal Program relative to the Federal and State comprehensive outdoor recreation plans signifies compliance with this Act.

13. Marine Protection, Research, and Sanctuaries Act of 1971, as amended, 33 U.S.C. 1401 et seq.

Compliance: Placement of material is occurring in State waters of Massachusetts; therefore, this Act is not applicable to the proposed activities.

14. National Historic Preservation Act of 1966, as amended, 16 U.S.C. 300101 et seq.

Compliance: Coordination with the State Historic Preservation Office, and the Tribal Historic Preservation Office, resulted in no impacts to historical resources.

15. Native American Graves Protection and Repatriation Act (NAGPRA), 25 U.S.C. 3000-3013, 18 U.S.C. 1170

Compliance: Regulations implementing NAGPRA would be followed if discovery of human remains and/or funerary items occur during implementation of this project.

16. National Environmental Policy Act of 1969, as amended, 42 U.S.C 4321 et seq.

Compliance: Preparation of an Environmental Assessment signifies partial compliance with NEPA. Full compliance shall be noted at the time the Finding of No Significant Impact or Record of Decision is issued.

17. Rivers and Harbors Act of 1899, as amended, 33 U.S.C. 401 et seq.

Compliance: No requirements for USACE projects or programs authorized by Congress. The proposed maintenance dredging has been approved by Congress under the Rivers and Harbors Acts.

18. Watershed Protection and Flood Prevention Act as amended, 16 U.S.C 1001 et seq.

Compliance: The project would not adversely affect floodplains.

19. Wild and Scenic Rivers Act, as amended, 16 U.S.C 1271 et seq.

Compliance: No wild or scenic rivers would be impacted by this project.

20. Magnuson-Stevens Act, as amended, 16 U.S.C. 1801 et seq.

Compliance: Coordination with the National Marine Fisheries Service and preparation of an Essential Fish Habitat (EFH) Assessment signifies compliance with the EFH provisions of the Magnuson-Stevens Act.

21. Marine Mammal Protection Act of 1972, 16 U.S.C. 1361-1407

Compliance: Coordination with the National Marine Fisheries Service signifies compliance with this Act.

22. Bald and Golden Eagle Protection Act, 16 U.S.C. 688 et seq

Compliance: Coordination with the U.S. Fish and Wildlife Service signifies compliance with this Act.

B. Executive Orders

1. Executive Order 11593, Protection and Enhancement of the Cultural Environment, 13 May 1971

Compliance: Coordination with the State Historic and Tribal Historic Preservation Office Preservation Office signifies compliance.

2. Executive Order 11988, Floodplain Management, 24 May 1977 amended by Executive Order 12148, 20 July 1979.

Compliance: Public notice of the availability of this report or public review fulfills the requirements of Executive Order 11988, Section 2(a)(2).

3. Executive Order 11990, Protection of Wetlands, 24 May 1977.

Compliance: Public notice of the availability if this report for public review fulfills the requirements of Executive Order 11990, Section 2 (b).

4. Executive Order 12114, Environmental Effects Abroad of Major Federal Actions, 4 January 1979.

Compliance: Not applicable to projects located within the United States.

5. Executive Order 12898, Environmental Justice, 11 February 1994.

Compliance: Not applicable, the project is not expected to have a significant impact on minority or low-income population, or any other population in the United States.

6. Executive 13007, Accommodation of Sacred Sites, 24 May 1996

Compliance: Not applicable unless on Federal lands, then agencies must accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and avoid adversely affecting the physical integrity of such sacred sites.

7. Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. 21 April 1997.

Compliance: Not applicable, the project would not create a disproportionate environmental health or safety risk for children.

8. Executive Order 13061, and Amendments- Federal Support of Community Efforts Along American Heritage Rivers

Compliance: No American Heritage Rivers would be impacted by this project.

9. Executive Order 13112, Federal Agencies may not authorize, fund or carry out actions likely to cause or promote the introduction or spread of invasive species

Compliance: No invasive species were identified to be introduced or spread as a result of this project.

10. Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, 6 November 2000.

Compliance: Consultation with Indian Tribal Governments, where applicable, and consistent with executive memoranda, DoD Indian policy, and USACE Tribal Policy Principles signifies compliance.

C. Executive Memorandum

1. Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing NEPA, 11 August 1980.

Compliance: Not applicable, the project does not involve or impact agricultural lands.

2. White House Memorandum, Government-to-Government Relations with Indian Tribes, 29 April 1994.

Compliance: Consultation with Federally Recognized Indian Tribes, where appropriate, signifies compliance.

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NEW ENGLAND DIVISION
U.S. ARMY CORPS OF ENGINEERS, CONCORD, MA
CLEAN WATER ACT
SECTION 404 (b)(1) EVALUATION

PROJECT: Maintenance Dredging of the Newburyport Harbor Federal Navigation Project and Placement of Dredged Material on Plum Island's North Point, Newburyport, Massachusetts

PROJECT MANAGER: Mark Habel **(978) 318-8871**

FORM COMPLETED BY: Reid Lichwell **(978) 318-8148**

PROJECT DESCRIPTION:

The Newburyport Harbor Federal Navigation Project (FNP) involves dredging of the Federal navigation channel in Newburyport, Massachusetts. The current maintenance dredging effort involves the removal of about 220,000 cubic yards of sandy material that has shoaled areas of the 9-foot deep, 200-foot wide inner harbor channel, and the 15-foot deep, 400-foot wide entrance channel of the FNP. Larger quantities of dredged material, in excess of 220,000 cy, may require removal based on updated bathymetric surveys of the channel shoaling. This excess material may include an additional 30,000 cy for a total of 250,000 cy resulting in an increase to the quantities identified and will be placed at either of the placement sites described below.

Dredged material will be removed utilizing a hopper dredge or hydraulic dredge over a four-month period. Dredging of the inner harbor (9-foot channel) will be conducted from 1 July to 14 February to avoid adverse impacts to spawning winter flounder, and anadromous fish spawning migration, and interactions with endangered species. Dredging of the entrance channel (15-foot channel) of the FNP will not have seasonal work restriction, this channel can be dredged any time of year.

If the USACE does not receive cost share funds from a non-Federal sponsor, the material will be placed at a nearshore placement sites off of Salisbury Beach or off of Plum Island Beach with a portion of material (57,000 cy) placed on the beach at Plum Island's North Point to protect the inlet's south jetty as the Federal Base Plan. Both nearshore sites are located approximately 1,000 feet seaward of the mean low water line. Placement at the nearshore locations will have no seasonal restrictions, however, placement of material on North Point shall be conducted from 1 September to 31 March to avoid interactions with nesting piping plovers.

If the USACE does receive cost share funds from a non-Federal sponsor, the entire 220,000 cy of dredged material will be placed along a 0.3-mile-long section of beach just west of the south jetty at North Point. Placement of 57,000 cy of material would be accomplished as part of the Federal Base Plan, while the additional 163,000 cy would be accomplished under the Beneficial Use of Dredged Material Program authorized under Section 204 of the Water Resources Development Act (WRDA) of 1992, as amended.

1. <u>Review of Compliance (Section 230.10(a)-(d)).</u>

a. The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose. X YES ____ NO

b. The activity does not appear to: 1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the CWA; 2) jeopardize the existence of Federally listed threatened and endangered species or their habitat; and 3) violate requirements of any Federally designated marine sanctuary. X YES ____ NO

c. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values. X YES ____ NO

d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem. X YES ____ NO

2. <u>Technical Evaluation Factors (Subparts C-F).</u>

a. Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C.)

	N/A	Not significant	Significant
1)		X	
2)		X	
3)		X	
4)	X		
5)	X		
6)	X		

b. Potential Impacts on Biological Characteristics of the Aquatic Ecosystem (Subpart D).

1)		X	
2)		X	
3)		X	

c. Potential Impacts on Special Aquatic Sites (Subpart E).

1)	X		
2)	X		
3)		X	
4)	X		
5)	X		

d. Potential Effects on Human Use Characteristics (Subpart F).

1)	X		
2)		X	
3)		X	
4)		X	
5)		X	

3. Evaluation and Testing (Subpart G).

a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material. (Check only those appropriate.)

1) Physical characteristics.....X
2) Hydrography in relation to known or anticipated sources of contaminants.....
3) Results from previous testing of the material or similar material in the vicinity of the project.....X
4) Known, significant sources of persistent pesticides from land runoff or percolation.....
5) Spill records for petroleum products or designated hazardous substances (Section 311 of CWA).....
6) Public records of significant introduction of contaminants from industries, municipalities, or other sources.....
7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities.....
8) Other sources (specify).....

List appropriate references. See Environmental Assessment.

b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and disposal sites and not likely to require constraints. The material meets the testing exclusion criteria.

X
YES NO

4. Disposal Site Delineation (Section 230.11(f)).

a. The following factors, as appropriate, have been considered in evaluating the disposal site.

1) Depth of water at disposal X
2) Current velocity, direction, and variability at disposal site.....X
3) Degree of turbulence.....X
4) Water column stratification.....X
5) Discharge vessel speed direction.....X
6) Rate of discharge.....X
7) Dredged material characteristics (constituents, amount, and type of material, settling velocities).....X
8) Number of discharges per unit of time X
9) Other factors affecting rates and patterns of mixing X

List appropriate references. See Environmental Assessment.

b. An evaluation of the appropriate factors in 4a above indicated that our disposal sites and/or size of mixing zone are acceptable.

X
YES ___ NO

5. Actions To Minimize Adverse Effects (Subpart H).

All appropriate and practicable steps have been taken, through application of recommendation of Section 230.70-230.77 to ensure minimal adverse effects of the proposed discharge.

X
YES ___ NO

List actions taken.

The following actions will be taken to minimize adverse impacts to the biological resources within the projects area:

A. Dredging of the Newburyport FNP inner harbor channel (9-foot channel) will be conducted between 1 July and 14 February to avoid adverse impacts to spawning winter flounder, and anadromous fish migration, and interactions with endangered species. No dredge timeframe restrictions will be implemented for dredging of the FNP entrance channel (15-foot channel).

B. Placement of dredged material on the beach at North Point will be conducted from 1 September to 31 March to avid piping plover nesting season.

C. On-beach placement of dredged material at North Point will require a slope no steeper than 1V:10H to provide suitable piping plover foraging habitat after project completion.

D. Vessels including tugs, barges, and scows transiting between the dredge site and the placement site shall operate at speeds not to exceed 10 knots. For unanticipated conditions, a vessel may operate at a speed necessary to maintain safe maneuvering speed instead of the required 10 knots. The intent of this condition is to reduce the potential for vessel collisions or adverse interactions with sea turtles and/or marine mammals.

E. At the end of the disposal operations, a report will be submitted by email to both the National Marine Fisheries Service, and the USACE, summarizing the vessel route taken, number of trips, sightings of ESA-listed species, and any action taken to avoid interactions with ESA-listed species.

6. Factual Determination (Section 230.11).

All review of appropriate information, as identified in items 2 - 5 above, indicate there is minimal potential for short or long term environmental effects of the proposed discharge as related to:

a. Physical substrate at the disposal site (review sections 2a, 3,4, and 5 above).	X YES	___ NO
b. Water circulation, fluctuation and salinity (review sections 2a, 3, 4, and 5).	X YES	___ NO
c. Suspended particulates/turbidity (review sections 2a, 3, 4, and 5).	X YES	___ NO
d. Contaminant availability (review sections 2a, 3, and 4).	___ YES	X NO
e. Aquatic ecosystem structure, function and organisms (review sections 2b and c, 3, and 5)	X YES	___ NO
f. Proposed disposal site (review sections 2, 4, and 5).	X YES	___ NO
g. Cumulative effects on the aquatic ecosystem.	X YES	___ NO
h. Secondary effects on the aquatic ecosystem.	X YES	___ NO

7. Findings of Compliance or Non compliance

The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines.	X YES	___ NO

Date

John A. Atilano II
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District Engineer