# Section 107 Navigation Improvement Project
# Environmental Assessment, Finding of No Significant Impact and Clean Water Act Section 404(b)(1) Evaluation for Improvement Dredging

## Blue Hill Harbor
## Blue Hill, Maine


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## 1.0 INTRODUCTION

The purpose of this Environmental Assessment (EA) is to present information on the environmental features of the project area and to review design information to determine the potential impacts of the proposed Blue Hill Harbor navigation improvement project. This Environmental Assessment describes project compliance with the National Environmental Policy Act of 1969 (NEPA) and all appropriate Federal and State environmental regulations, laws, and executive orders. Methods used to evaluate the environmental resources of the area include biological sampling, sediment analysis, review of available information, and coordination with appropriate environmental agencies and knowledgeable persons. This report provides an assessment of environmental impacts and alternatives considered along with other data applicable to the Clean Water Act Section 404(b)(1) Evaluation requirements.

## 2.0 STUDY AREA

Blue Hill Harbor is the principal commercial fishing harbor of the Town of Blue Hill, located in Hancock County, Maine (Figure 1). The harbor is located 160 miles by highway northeast of Portland, Maine, 34 miles west of Bar Harbor, 30 miles southeast of Bangor and 13 miles southwest of Ellsworth, Maine. Blue Hill Harbor is located on the northwest side of Blue Hill Bay, northwest of Long Island and Mount Desert Island. Small boat harbors in the area are Union River 11 miles to the northeast, Bass Harbor about 19 miles to the southeast, and Northeast Harbor about 24 miles to the southeast.

## 3.0 PURPOSE, NEED, HISTORY AND AUTHORITY

The purpose of this report is to provide an assessment of the potential environmental effects of the navigation improvement project proposed for Blue Hill Harbor in Blue Hill, Maine (Figure 2). The navigation improvements would increase the harbor's ability to accommodate safe and efficient vessel operations to and from the Blue Hill Town Landing. These improvements would alleviate delays for the commercial fishing vessels that use the landing for offloading catch, fueling, and provisioning. The improvements would also eliminate groundings of fishing boats transiting to and from the landing at lower tides. The commercial fleet at Blue Hill Harbor, which includes vessels based out of several small coves and harbors along the Town's shores on Blue Hill Bay, has been increasing over the past 10 years. Improvements to the town landing in Blue Hill over that timeframe have provided a central location for the fleet to work from. However, lack of adequate channel depth and turning area at the Town Wharf has limited the landings use to only periods of high tide. This causes a portion of the Blue Hill Harbor fleet to operate out of distant coves and harbor areas, which are located in exposed locations. This exposure limits the time periods that the fleet can effectively operate safely or has the potential to damage vessels that choose to operate in adverse conditions.

Navigation improvements to Blue Hill Harbor would provide all tide access to the Blue Hill town landing. This would reduce operating costs for the fleet by allowing access to a sheltered landing and reduce the possibility of vessel groundings or accidents that could occur in exposed areas.

This project is being completed under the authority and provisions of Section 107 of the 1960 River and Harbor Act, as amended. Section 107 of the River and Harbor Act of 1960 provides authority for the U.S. Army Corps of Engineers to improve navigation including dredging of channels, anchorage areas, and turning basins and construction of breakwaters, jetties and groins, through a partnership with non-Federal government sponsors such as cities, counties, special chartered authorities -such as port authorities- or units of state government.

There is no existing Federal navigation project for Blue Hill Harbor. Blue Hill Harbor has been studied by the USACE for navigation improvements four times in the past: 1890, 1912, 1951 and 1972. The first three studies resulted in a decision that no Federal improvements were warranted due to lack of navigation use of the harbor. The 1972 report found improvements to be warranted but did not recommend a project be adopted as the community was unable to provide the required cost share funds for construction.

## 4.0 PROJECT DESCRIPTION

The proposed Blue Hill Harbor project will dredge a 6-foot deep mean lower low water (MLLW), 80-foot wide channel from the outer harbor, extending 5,600 feet northwest to the town wharf. Only the upper 2,600 feet of the project will require dredging, with channel limits in the lower reaches declared for jurisdictional purposes. This channel will be widened at its upper end to form a turning basin, 160 feet by 80 feet, adjacent to the town wharf. Approximately 62,500 cubic yards (CY) of mixed gravel, sand, and silt will be removed from the proposed project area using a mechanical dredge. The 52,000 CY of dredged material deemed suitable for open water disposal will be loaded onto scows and towed about 11 miles to the Eastern Passage Disposal Site (EPDS), a previously used disposal site near Dodge Island, for placement. Approximately 10,500 CY of material from the upper two feet of the inner harbor, which was deemed unsuitable for open water placement due to the presence of polycyclic aromatic hydrocarbons (PAHs) and metals, will be placed in a confined aquatic disposal (CAD) cell within Blue Hill Harbor. The CAD cell will be constructed by removing approximately 19,500 CY of suitable of mixed gravel, sand, and silt material from an area adjacent to the designated channel. Material generated from the CAD cell creation will be placed at the EPDS. All dredging will be by mechanical dredge and scow that will be able to operate in shallow draft areas in the channel. Construction will occur between October 1 and April 1and is expected to take three to four months to complete.

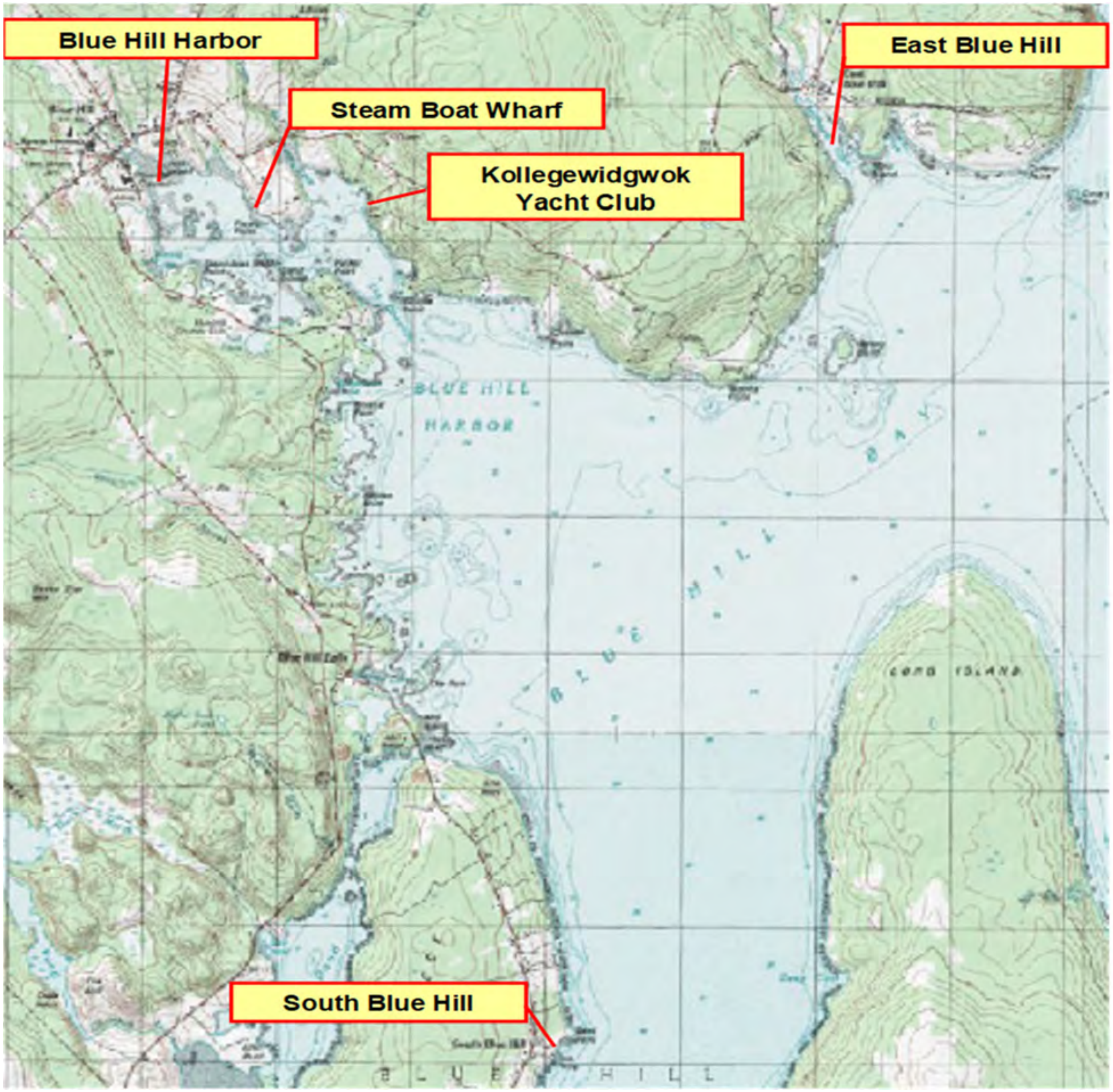


Figure 1: Location of Blue Hill Harbor, Maine.

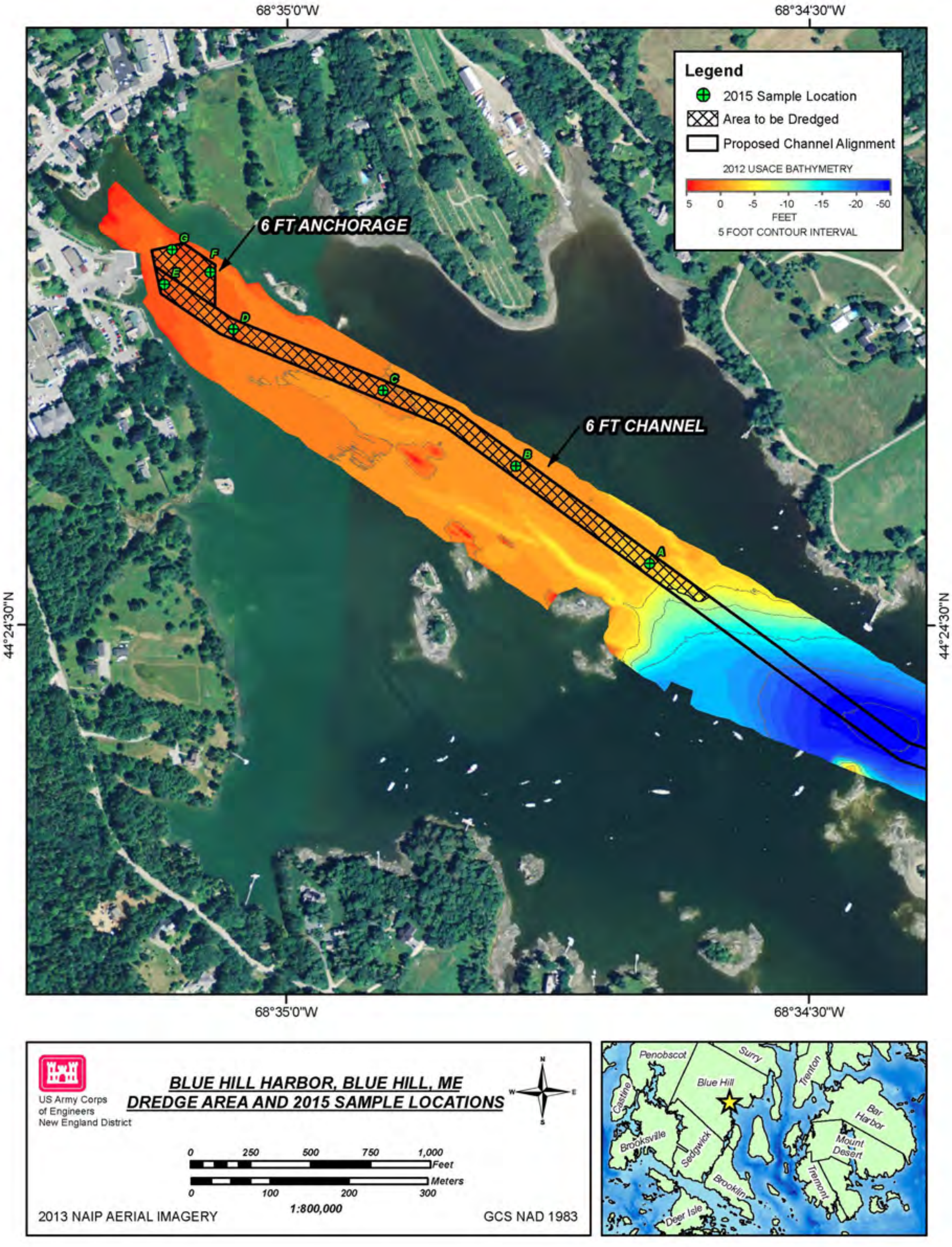


Figure 2: Blue Hill Harbor Proposed Project Area.

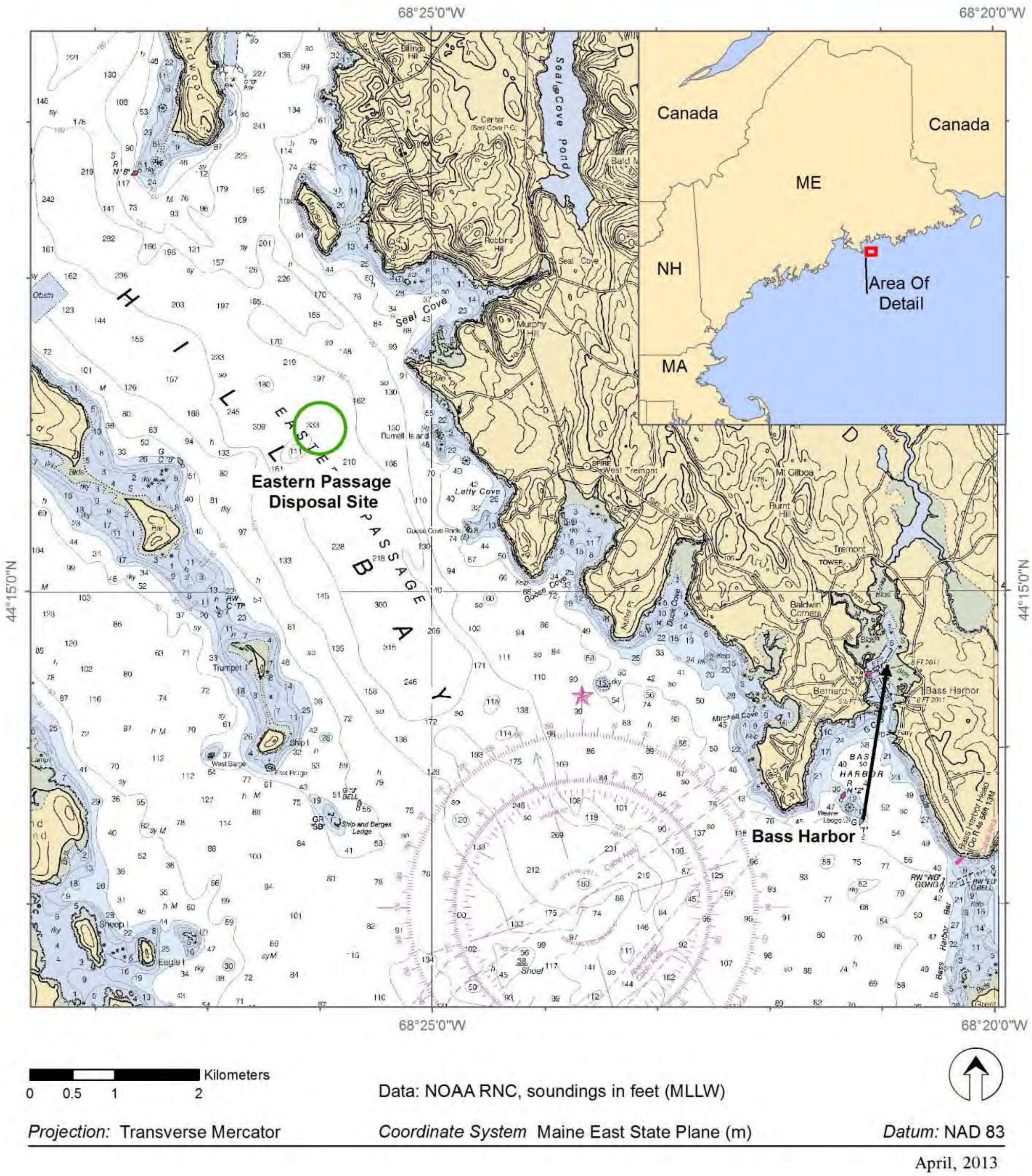


Figure 3: Eastern Passage Disposal Site.

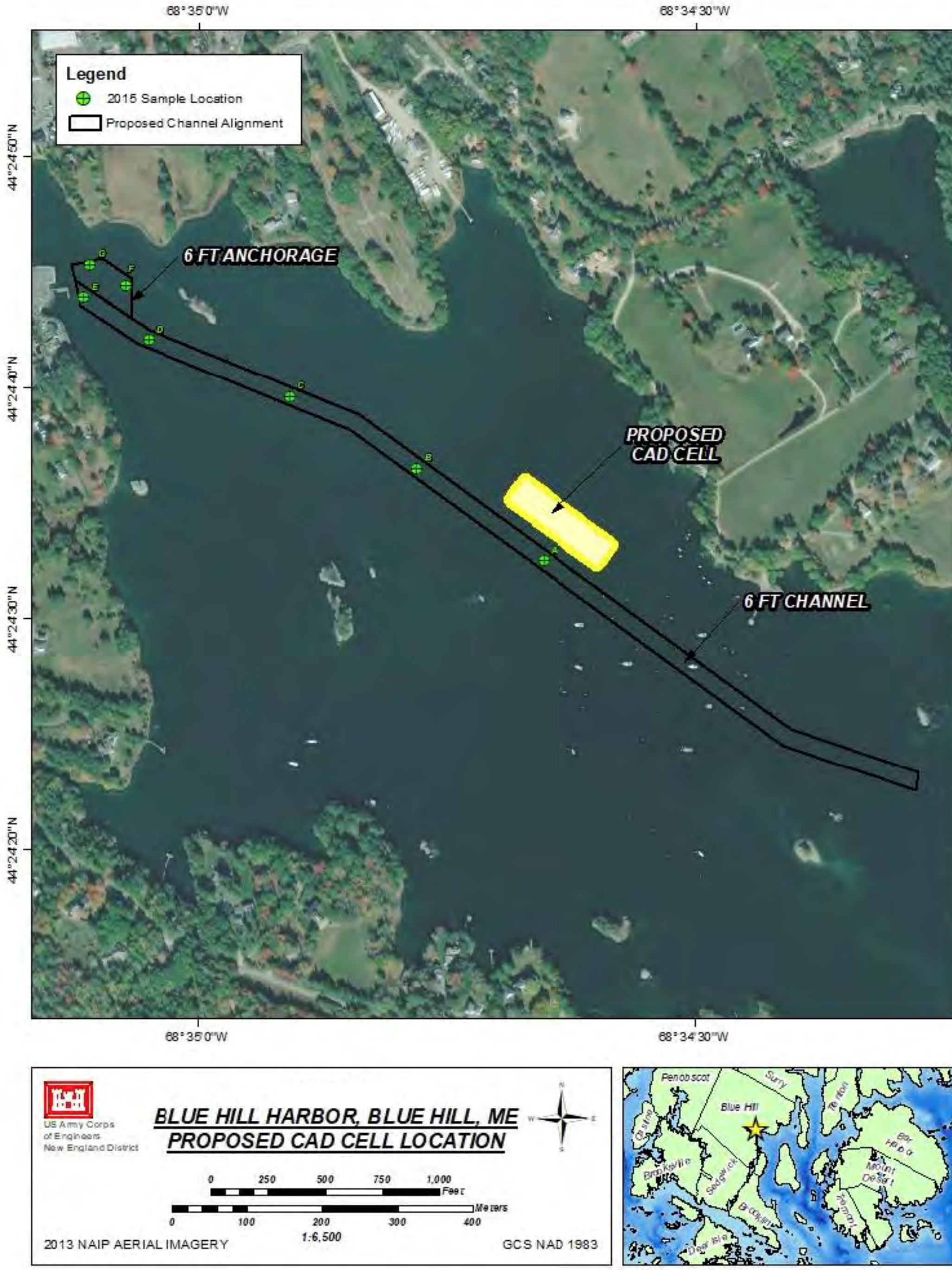


Figure 4: Blue Hill Harbor Confined Aquatic Disposal (CAD) Cell.

## 5.0 ALTERNATIVES

### 5.1 No Action Alternative

The No Action Alternative, not improving the navigation situation in Blue Hill Harbor in any way, would result in a continuation of existing difficulties for commercial and recreational vessels in the harbor.

Blue Hill Harbor is home to a sizeable lobster fleet as well as charter fishing boats, other inshore and offshore commercial fishing craft, and recreational boats. These vessels are served by two public landings (Central Blue Hill Harbor landing and South Blue Hill Harbor landing), a fish pier, a marina, a boat club, and rental boat facilities. Currently, the wharf in central Blue Hill Harbor is rarely used since it is accessible at only the highest tides, generally only 3 hours per day. Without the proposed navigation improvements, full time access to the town wharf is not possible and fishermen who wish to fuel or offload must use the South Blue Hill harbor landing. However, the South Blue Hill Harbor landing offers no power or water service, nor does it have a fueling station. Fuel trucks deliver fuel directly to vessels pulled up at the dock. Supplies and catch are loaded and off-loaded while vessels are pulled up at either the dock or at barges moored nearby. The South Blue Hill Harbor landing is exposed to winds and waves, particularly from the south. Vessels frequently incur damages while loading or offloading during high winds and high waves. Due to these conditions at the South Blue Hill Harbor landing, commercial vessels are often damaged by knocking against the pilings during periods of rough weather. The No Action alternative would allow these conditions to continue. This alternative is considered to be unacceptable.

### 5.2 Non Structural Alternatives

<u>Fleet Relocation</u>

The transfer of some of the fishing vessels to nearby harbors is contingent on the ability of these harbors to provide adequate protection, capacity, and efficiency of operation. It is not likely that any commercial operators would permanently transfer their vessel if an alternative site does not have the capacity to provide adequate features and facilities. USACE planning efforts determined that harbors in the vicinity of Blue Hill do not meet the necessary qualifications of an "adequate" fishing port. Nearby harbors, such as Bass Harbor in Tremont, Maine and Stonington Harbor in Stonington, Maine, suffer from overcrowding. These ports cannot handle the potential influx of vessels due to their lack of adequate berthing space. The only other option in Blue Hill bay is the Union River Federal Navigation Project at Ellsworth, Maine. This harbor is seasonally restricted by ice formation and does not have shore support facilities necessary for the fishing fleet and boats operating from Blue Hill. All three alternative harbor would increase the daily haul distance by 20 to 25 miles roundtrip.

Within Blue Hill the commercial fleet has apportioned itself in the most efficient way possible given the existing conditions. Of the 50 fishing vessels that are based in Blue Hill 23 are moored at South Blue Hill, 12 moor at Steamboat Wharf, 8 moor at East Blue Hill,

and 7 moor elsewhere. South Blue hill is the most developed of the alternatives within the town, but only 23 moorings are available. The South Blue Hill landing is at maximum capacity and is abutted by privately owned residences, making expansion of the landing cost prohibitive. South Blue Hill is exposed to wind and waves from all directions. Some fishermen not moored at South Blue Hill unload their catch there, contributing to the congestion related delays.
Steam Boat Wharf lacks facilities to load/unload provision and catch. The landing is completely on privately owned land and access could be rescinded at any time. East Blue Hill's shore facilities are not equipped for commercial use. The anchorage is full and primarily utilized by recreational vessels.

Tidal Navigation

Tidal navigation is presently practiced by the portion of the fleet that unload at the town wharf in Blue Hill Harbor. New England experiences a semidiurnal tide; in general there are two high tides and two low tides every 24 hours and 50 minutes. The highs and lows (and therefore range of the tide) can vary considerably from one tidal cycle to the next. Experienced fishermen understand the tides in the areas they operate and pay attention to the tide charts. Even so, the effects of storms, waves, swells, surges, currents, winds and other factors all contribute to uncertainties in navigating shallow coastal waters and harbors. Groundings can occur when deeper draft boats are operated without sufficient underkeel clearance to account for these conditions and the effect on a boat's hull in the water and sail area (cross section exposed to the wind) above the water.

Fishing boats leave the harbor loaded down with provisions, ice, fuel, and bait, and return to the harbor loaded down with catch on ice. When loaded draft, plus a reasonable underkeel clearance for sea and channel conditions, exceeds the available controlling depth in the channel, then groundings can occur. The only solution short of dredging is to delay the channel transit, which costs the boat time, and if inbound fuel and labor. Significant delays inbound can result in spoilage of catch and reduction in the ex-vessel value of the catch.

At Blue Hill the non-Federal Sponsor and the commercial fleet have requested the USACE to examine channel improvement in order to alleviate tidal delays and groundings. Further reliance by the fleet on tidal navigation would fail to address the problems experienced by the fleet.

### 5.3 Alternative Dredging Methods

Dredging methods that were considered for this project include hydraulic, hopper, and mechanical dredges. A hydraulic dredge pumps sediments via pipeline to a land or an intertidal disposal area. A hopper dredge uses a cutterhead and pump to suction sediments through an arm into hoppers within the dredge; when the hopper is full the dredge moves to the disposal site and the material is released by opening the hopper doors. A mechanical dredge excavates material with a bucket-type apparatus and deposits it into a scow for transport to the disposal site where it is released through an opening in the bottom of the scow.

A hydraulic dredge is generally used for sandy material that will be disposed of in an upland area or on a nearby beach, or for pumping any type of unconsolidated material in a confined (diked) disposal/dewatering area. As there are no practicable upland disposal sites (see discussion below), the use of a hydraulic dredge and pipeline system is impractical and cannot be used in this project.

A hopper dredge uses a suction pump similar to a hydraulic dredge to loosen and remove material from the bottom. The material is then deposited into hoppers aboard the dredge vessel. When the hoppers are full, the suction arm is raised and secured to the vessel, which then travels to the disposal site and releases 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 cubic yards bin capacity to several thousand yards capacity. In New England, hopper dredges are most often used to remove sandy materials from harbor entrance channels and deposit the material offshore of beaches to nourish littoral bar systems. Hopper dredges are not efficient in the dredging of glacial tills as these sediments tend to be very compact. As the material from Blue Hill Harbor is mainly glacial till, the use of a hopper dredge was not selected for this project.

Mechanical bucket dredging involves the use of a barge-mounted crane, hoe or cable-arm with a bucket to dig the material from the harbor bottom. Typical dredging buckets come in various sizes from five cubic yards to fifty or more cubic yards. The material is placed in a scow for transport to the disposal site by tug. For open-water disposal, a split-hull scow is usually used for ease of disposal and to minimize the discharge plume. Material is typically discharged at a dump buoy, or by using preset coordinates monitored by the tug. Mechanical dredging is a slow process, as the time to fill a scow with dredge material is dependent upon the size of the bucket and the speed of the crane. However, mechanical dredging is the most efficient and practical way to remove silty material. Mechanical dredging was selected as the preferred dredging method of the Blue Hill Harbor improvement project.

## 5.4 Alternative Disposal Sites

General disposal site alternatives for dredging projects include open water disposal, upland disposal, intertidal or shallow water disposal with possible habitat development, and beach disposal. These alternatives are discussed below.

### 5.4.1 Upland Disposal

An upland disposal site was identified in collaboration with Maine Department of Environmental Protection (ME DEP). The Juniper Ridge landfill in Alton, ME was determined to be the closest acceptable site for upland placement. The site is located 56 miles north of Blue Hill, ME. The use of the identified upland site would require the material to be triple handled as the material would have to be dredged from the harbor, placed in a dewatering area adjacent to the harbor, and placed in trucks to be transported to the disposal area. Although the upland site was identified, no appropriate dewatering areas are available in the project area. Additionally, the distance to the upland site as well as the physical nature of the material prevents the possibility of hydraulically pumping the material to the upland site. Therefore, this disposal option is considered impracticable.

5.4.2 Open Water Disposal

Rockland Disposal Site: The nearest Environmental Protection Agency (EPA) approved ocean disposal site to Blue Hill Harbor is the Rockland Disposal Site (RDS), which is over 50 miles from the project area. RDS covers a 0.25 $nmi^2$ (0.87 $km^2$) area of seafloor within West Penobscot Bay and is centered at 44° 07.105' N, 69° 00.269' W. It is located approximately 3.1 nmi (5.7 km) east-southeast of Brewster Point, Glen Cove, Maine. The distance to this disposal site makes its use impracticable.

5.4.3 Nearshore Disposal

Eastern Passage Site: The nearest previously used nearshore disposal site to Blue Hill Harbor is the Eastern Passage Disposal Site (EPDS). This site is located approximately 14 miles southeast of Blue Hill Harbor (Figure 3). This site is the preferred disposal site for the portion of this dredging project found suitable for open water disposal.

Confined Aquatic Disposal Cell

A Confined Aquatic Disposal (CAD) cell is an engineered containment feature for the isolation of dredged material. Confined aquatic disposal (CAD) cells are constructed to reduce the risk from unacceptably contaminated sediments (UCSs) by storing them in a depression in the bottom of an aquatic system. Confined aquatic disposal cells may be constructed from (1) naturally occurring bottom depressions; (2) sites from previous mining operations, such as beach nourishment borrow sites; or (3) new dredging operations created expressly for the containment structure. Confined aquatic disposal cells can reduce the risk from UCSs by confining the sediments to a smaller footprint, increasing contaminant diffusion times, removing UCSs farther from physical processes that can result in transport, and providing a means to effectively cap the sediments.

5.4.4 Beach Disposal

Placement of the dredged material from the Blue Hill Harbor project was considered for beach nourishment. However, as noted in section 6.2, the material from the proposed project contains a substantial amount of fine material (i.e., silt). The fine material is physically incompatible with the surrounding beach areas thus rendering this alternative impracticable.

### 5.5 Alternative Dredging Dimensions and Depths

Based upon fleet size and fleet dimension data, it was determined that a width of 80 feet would provide proper clearance for vessels to maneuver to the offloading docks and around other vessels.

Dredging the navigation features to depths of -5 feet, -6 feet, and -7 feet were evaluated. The -6 foot is alternative provides the dimensions necessary to accommodate the expected vessel use through the channel and at the town wharf. The -6 foot depth and configuration of the turning area also allows for sufficient room for maneuvering boats accessing the shore facilities.

## 6.0 AFFECTED ENVIRONMENT

### 6.1 Physical Setting

*Dredging Site & CAD cell (Blue Hill Harbor)*

Blue Hill Harbor is the principal commercial fishing harbor of the Town of Blue Hill, located on the western shore of Blue Hill Bay in Hancock County, Maine. The harbor is located about 30 miles southeast of Bangor and 13 miles southwest of Ellsworth, Maine. Blue Hill Harbor is located off the northwest end of Blue Hill Bay just west-northwest of Long Island and due west of Union River Bay. Mean tidal range is 12.6 feet and spring tidal range is 14.4 feet with a mean tide level of 6.3 feet.

Physical habitats of Blue Hill Harbor are typical of northeast coastal Maine, including: marine deepwater habitat, aquatic bed, unconsolidated sand and cobble-gravel shorelines, mudflats, and rocky shore of exposed bedrock. Uplands of the Blue Hill Harbor area support broad-leaved deciduous and coniferous forest and wetlands, as well as agricultural land and lawn. The National Wetlands Inventory (2019) classifies outer Blue Hill Harbor as estuarine and marine deep-water and inner Blue Hill Harbor as estuarine and marine wetland.

*Disposal Site*

The Eastern Passage Disposal Site (EPDS) is located in approximately 330 feet of water between Bar Island and Dodge Point (Figure 3). EPDS is located in a trough in the tidal channel of Blue Hill Bay with hard rocky bottom to the southwest and a slope of soft sediment to the east (Carey et al. 2013). This area is approximately 4 nautical miles from Blue Hill Harbor and is located landward of the Territorial Sea Baseline.

### 6.2 Sediment Quality

*Dredging Site (Blue Hill Harbor) & CAD cell*

On 28 October 2015 USACE-NAE collected sediment vibracores from seven locations throughout the proposed dredging area identified as Stations A through G on Figure 3. USACE-NAE personnel described each sediment core in the field and composited the length of each individual core for analysis of grain size, total solids, and water content. USACE-NAE then composited the core samples according to the plan outlined in the sampling and analysis plan for chemical analysis of the contaminants of concern (COC) specified in the Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters (RIM, USACE/EPA 2004).

The sediments in the outer portion of the proposed channel (Stations A, B, and C) were predominantly poorly graded fine to coarse sands with overlying marine silt and clay deposits. There was fine woody organic debris in all three cores from this area. Core penetration at the inner harbor stations (D, E, F, and G) was limited due to gravel and coarse sand deposits near the sediment surface and was 2.0 feet or less at Stations D, F, and G. Grain size results are presented in Table 1.

Table 1: Physical Testing Results from Blue Hill Harbor Sediment Cores (October 2015)

| Sample ID | % Cobble | % Gravel | % Coarse Sand | % Medium Sand | % Fine Sand | % Total Fines | % Moisture |
|---|---|---|---|---|---|---|---|
| A | 0.1 (U) | 0.1 | 2.2 | 6.6 | 21.6 | 69.5 | 55.3 |
| B | 0.1 (U) | 0.1 (U) | 1.7 | 3.5 | 7.4 | 87.4 | 51.2 |
| C | 0.1 (U) | 1.1 | 1.9 | 4.9 | 12.1 | 80 | 54.5 |
| D | 0.1 (U) | 4.4 | 13.2 | 34.8 | 35 | 12.6 | 19.6 |
| E | 0.1 (U) | 1.8 | 8.8 | 26.7 | 37.9 | 24.8 | 33.2 |
| F | 0.1 (U) | 5 | 14 | 30.6 | 29.8 | 20.6 | 26.8 |
| G | 0.1 (U) | 45.9 | 12.4 | 16.7 | 16.2 | 8.8 | 21.4 |

U = Non-detected analytes are reported as the RL and qualified with a "U".

No polychlorinated biphenyls (PCBs) or pesticide analytes were detected above the method detection limit in the harbor samples with the exception of individual compounds in Composite DE. There were detectable concentrations of polycyclic aromatic hydrocarbons (PAHs) and metals in all four composite samples. To examine the harbor concentrations in an ecologically meaningful context, USACE-NAE screened the values with Sediment Quality Guidelines (SQGs). Applicable SQG screening values for marine and estuarine sediments are the National Oceanic and Atmospheric Administration (NOAA) effects-range low (ERL) and effects-range median (ERM). ERL/ERM values are empirically derived guidelines that identify contaminant levels that indicate when toxic effects are unlikely (ERL) and when an increased probability of toxic effects is evident (ERM).

No COCs in Composite A or BC exceeded the ERL value as shown on Table 2. All COCs in Composite DE and FG were also below the ERL value with the exception PAHs which were above the ERL in Composite DE and above the ERM in Composite FG (Table 2). This suggests that a toxic response from exposure to sediments from Composite A or BC would be highly unlikely but there is increased potential for a toxic response from exposure to sediments from Composites DE and FG due to elevated PAHs.

Table 2: Chemical Testing Results from Blue Hill Harbor Sediment Cores and Sediment Quality Guidelines (October 2015)

| Chemical or Class | ERL | ERM | Unit | COMP A | COMP BC | COMP DE | COMP FG |
|---|---|---|---|---|---|---|---|
| Arsenic | 8.2 | 70 | mg/kg | 4.5 | 7.7 | 5.2 | 6.3 |
| Cadmium | 1.2 | 9.6 | mg/kg | 0.6 | 0.8 | 0.1 | 0.2 |
| Chromium | 81 | 370 | mg/kg | 21.1 | 30.9 | 12.3 | 10.8 |
| Copper | 34 | 270 | mg/kg | 17.6 | 16.5 | 14.3 | 6.9 |
| Lead | 46.7 | 218 | mg/kg | 21.7 | 21.8 | 23.0 | 10.5 |
| Mercury | 0.15 | 0.71 | mg/kg | 0.03 | 0.03 | 0.02 | 0.02 |
| Zinc | 150 | 410 | mg/kg | 54.2 | 64.1 | 40.6 | 37.9 |
| HMW PAH* | 1,700 | 9,600 | µg/kg | 879 | 629 | 3,703 | 20,089 |
| HMW PAH* | 552 | 3,160 | µg/kg | 165 | 123 | 646 | 7,388 |
| Total PCBs* | 22.7 | 180 | µg/kg | 9.36 | 5.99 | 8.03 | 6.17 |
| Total DDT* | 1.58 | 46.1 | µg/kg | 0.8 | 0.7 | 0.9 | 0.5 |

*For total values non-detects calculated as half the reporting limit

USACE-NAE reviewed results from the initial round of testing and performed a second sampling effort on 10 May 2016 to better define the vertical and spatial extent of the elevated PAH concentrations around Composites DE and FG. USACE-NAE collected push cores at low tide from ten stations in the inner harbor and one location at the mouth of the each of the three tributaries as shown on Figure 5. Similar to the vibracore effort core penetration with this sampling method was limited to approximately 2 feet for this area of the harbor. USACE-NAE personnel described the push cores in the field and then collected discrete subsamples for PAH analysis from the top six inches and from six inches to the end of each core. Results from this analysis showed no discernable pattern for the spatial distribution of PAHs in the harbor (See Appendix I - Suitability Determination).

Due to the inability to penetrate inner harbor sediments to the design depth and determine the vertical extent of the elevated PAH concentrations, the Town of Blue Hill dug four test pits in October 2016 (Figure 6). The Town's contractor placed timber mats across the harbor at low tide and used an excavator to dig 4-9 foot deep test pits at predetermined locations (Figure 7). USACE-NAE personnel were on-site to describe the lithology of the pit walls and subsample the sediment in two foot horizons for PAH analysis. Results from this analysis are presented in Appendix A of the Suitability Determination (Appendix I) and showed that the extent of PAH contamination is limited to the upper two feet of the inner harbor sediments.

USACE-NAE evaluated the sediment from the Blue Hill Harbor Navigation Improvement Project through §230.61 of the CWA and found the material suitable for open water placement at EPDS with the exception of 10,500 cubic yards of material from the upper two feet of the inner harbor. The sediment from this portion of the harbor is not suitable for open water placement due to elevated PAH concentrations. USACE-NAE proposes to contain the unsuitable material in a CAD cell. The material excavated to create the CAD cell is outside of the elevated PAH footprint, adjacent to Composites A and BC, and is suitable for open water placement at ELDS.

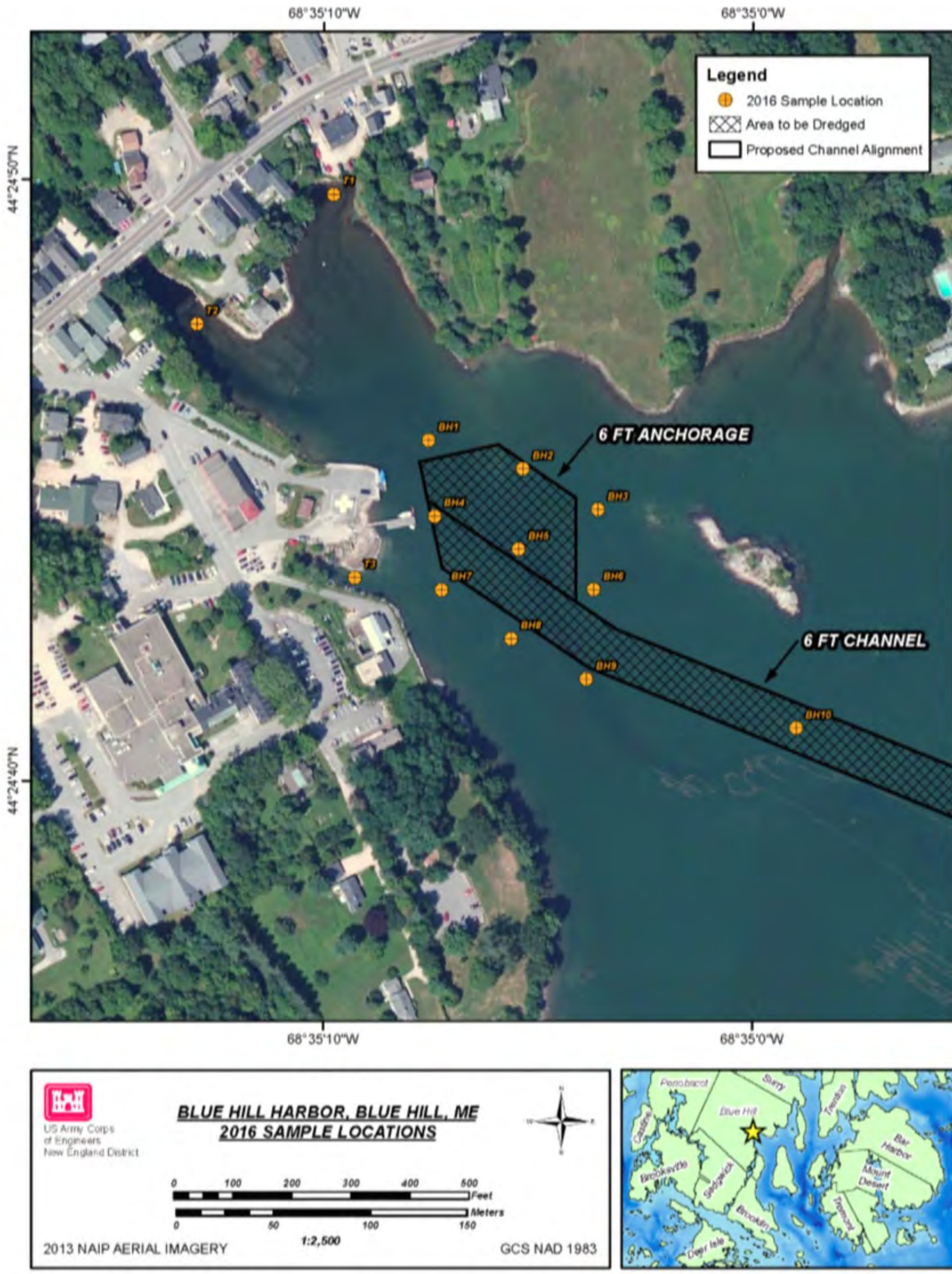


Figure 5: Location of push core samples within Blue Hill Harbor

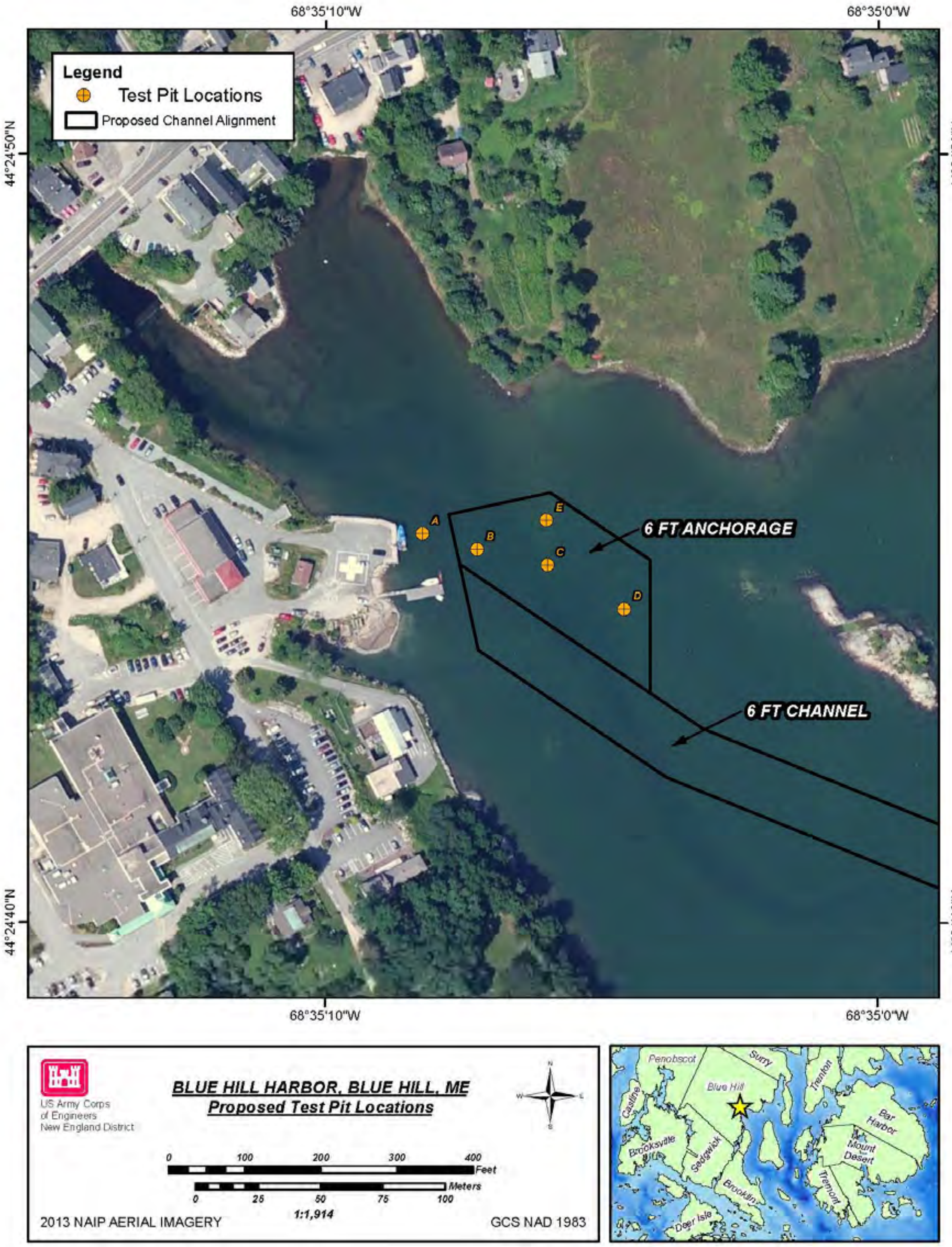


Figure 6: Location of excavated test pits within Blue Hill Harbor in 2016

Test Pit B

Test Pit C

Test Pit D

Test Pit E

Figure 7: Photographs of the test pits in Blue Hill Harbor.

*Disposal Site*

The sediments at the EPDS were characterized as dark-olive, sandy silt with approximately 80-90% of the material in the silt particle size range (USACE, 2006). A 2012 Disposal Area Monitoring System (DAMOS) survey of EPDS revealed two distinct sedimentary habitats within EPDS: a fine-grained, soft-bottom habitat in the central trough and northeast shoal area, and a hard-bottom habitat in the southwest shoal area (Carey et al 2013). Dredged material placed at the site in 2011-2012, which was a combination of sandy-silt, coarse sand, and rock was placed primarily in the central trough area on fine-grained, soft-bottom substrata (Carey et al 2013).

## 6.3 Water Quality

The Maine Bureau of Water Quality Control classifies the waters of Blue Hill Harbor as SB. Class SB waters are suitable for water contact recreation and fishing, for the harvesting and propagation of shellfish, and for fish and wildlife habitat.

The Blue Hill waste water treatment plant (BH-WWTP) discharges into Blue Hill Harbor.

## 6.4 Aquatic Resources

### 6.4.1 Benthos

*Dredging Site & CAD cell (Blue Hill Harbor)*

On October 28, 2015 and May 1, 2016, the Army Corps of Engineers conducted benthic sampling surveys within the Blue Hill Harbor project area (Figure 8). Samples were collected with a 0.04 $m^2$ VanVeen grab from locations within the proposed navigation channel and turning basin in 2015 and 2016. Samples were collected from the location of the proposed CAD cell in 2016.

The overall surficial sediment type, and therefore habitat type, for the project area was categorized as a mixture of sand and silt. All stations displayed a fairly low diversity of species of macrobenthic organisms (Table 3). All the assemblages were dominated by pioneering stage and stress tolerant organisms such as the polychaetes *Capitella* sp. and *Streblospio benedicti*. Diversity (number of species present) and abundance (number of individuals present) values were extremely low in the inner harbor stations (i.e., Stations B3, B4, and C). Increases in diversity and abundance (compared to the inner harbor) were seen in the mid-harbor and outer harbor stations. The concentration of contaminants in the surficial sediments of the inner harbor are likely a contributing stressor to the low diversity and abundance values seen in the inner harbor.

*Disposal Site*

A 2012 survey of EPDS revealed two distinct sedimentary habitats within the site: a fine-grained, soft-bottom habitat in the central trough and northeast shoal area and a hard-bottom habitat in the southwest shoal area (Carey et al 2013). Two distinct biological communities, each associated with the different habitat types, were documented within EPDS. A typical fine-grained, soft-bottom infaunal community was documented in the central trough and northeast shoal areas, while a hard-bottom epifaunal fouling community was documented in the southwest shoal area.

Table 3: Macrobenthic organisms collected in Blue Hill Harbor (Blue Hill, ME) navigation improvement project area. Numbers are per 0.04 $m^2$.

| | B1 | B2 | B3 | B4 | Channel South (A) | Channel Bend (B) | Turning Basin (C) | CAD cell (D) |
|---|---|---|---|---|---|---|---|---|
| | 10/28/15 | 10/28/15 | 10/28/15 | 10/28/15 | 5/1/16 | 5/1/16 | 5/1/16 | 5/1/16 |
| Species | | | | | | | | |
| *Annelida* | | | | | | | | |
| *Polychaetea* | | | | | | | | |
| *Capitella sp.* | - | - | - | - | 8 | 1 | 4 | 1 |
| *Harmothoe imbricata* | - | - | - | - | - | - | - | 1 |
| *Leitoscoloplos robustus* | - | - | - | - | 4 | - | - | - |
| *Mediomastus ambiseta* | 1 | 6 | 3 | - | 8 | - | 2 | - |
| *Nereis succinea* | - | - | - | - | - | 3 | 6 | - |
| *Paraonis sp.* | 2 | - | - | - | 17 | - | - | - |
| *Polydora sp.* | 2 | - | - | - | 6 | 1 | - | - |
| *Scolecolepides viridis* | - | - | - | - | 3 | - | - | - |
| *Spio setosa* | - | 1 | - | - | - | - | - | - |
| *Streblospio benedicti* | 12 | 4 | - | - | 11 | 1 | - | - |
| *Unidentified Lumbrineridae* | - | - | - | - | - | - | - | 1 |
| *Oligochaeta* | | | | | | | | |
| *Unidentified Oligochaete* | - | 2 | 1 | 1 | 8 | - | 3 | - |
| | | | | | | | | |
| *Arthropoda* | | | | | | | | |
| *Crustacea* | | | | | | | | |
| *Ampelisca sp.* | - | - | - | - | 3 | - | - | 1 |
| *Carcinus maenus* | - | - | - | - | 1 | - | - | - |
| *Unidentified Ampeliscidae* | - | 1 | - | - | - | - | - | - |
| | | | | | | | | |
| *Mollusca* | | | | | | | | |
| *Bivalvia* | | | | | | | | |
| *Tellina agilis* | 3 | - | - | - | 4 | - | - | 1 |
| | | | | | | | | |
| **Total Number of Species** | **5** | **5** | **2** | **1** | **11** | **4** | **4** | **5** |
| **Total Number of Individuals** | **20** | **14** | **4** | **1** | **69** | **6** | **15** | **5** |

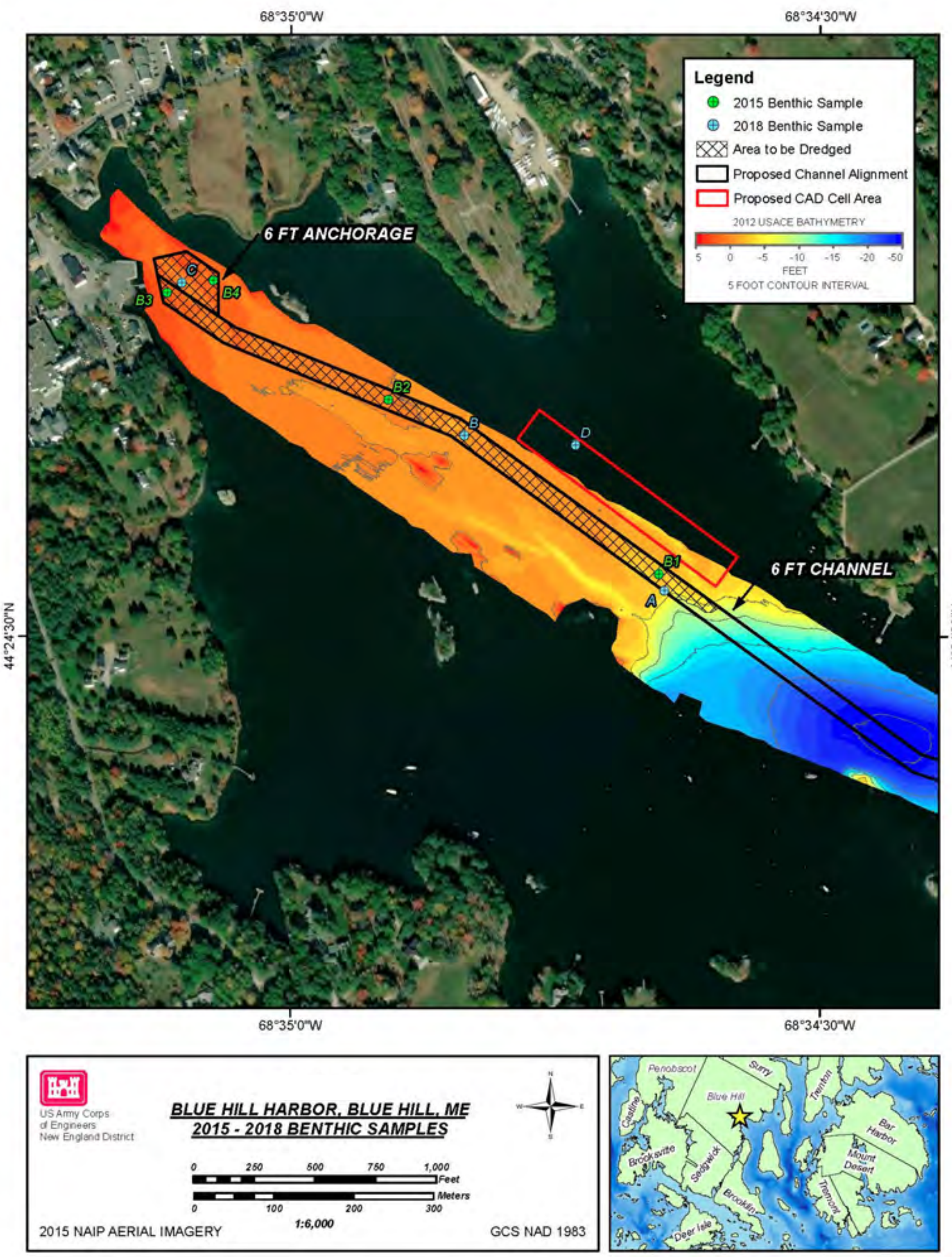


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Figure 8: Location of benthic sample stations in 2015 and 2016.

## 6.4.2 Fish

The fish assemblages found in Blue Hill Harbor and Blue Hill Bay are typical of Maine nearshore marine habitats (NOAA, 2005). A full list of managed fishery species can be found in section 6.6 of this report. In addition to managed species, a suite of forage species would be expected to occur in the harbor and at the EPDS.

### 6.4.3 Shellfish and Lobster

*Dredging Site & CAD cell (Blue Hill Harbor)*

Shellfish

According to the Town of Blue Hill's 1999 comprehensive plan, the inner harbor has historically contained some of the most productive shellfish (specifically soft-shell clam) growing areas in Blue Hill, particularly the Peter's Point area, the area around the municipal landing, and the area around Parker's Point (Blue Hill, 1999). The comprehensive plan also noted that pollutants from the village and from the licensed municipal discharge from the Blue Hill WWTP resulted in the shellfish growing areas being closed to harvesting for many years and that the 1998 harvest of soft-shell clams was minimal.

Maine DMR's "2010 molluscan shellfish data" GIS data layer classifies the intertidal areas within inner Blue Hill Harbor as soft-shell clam habitat. In October 2011, the Blue Hill Shellfish Committee allowed for the harvest of approximately 500 bushels of soft shell clams from Blue Hill Harbor. Following the 2011 harvest, total densities (which included the 500 bushels removed) within the harbor area were estimated (based on the clams collected) at 800 bushels of legal sized clams (Ellsworth American, 2011). As of April 2018, the majority of inner Blue Hill Harbor was prohibited for shellfish harvesting. Visual observation for the presence of soft shell clam burrows were made during periods of low tide during USACE's 2015 and 2016 sediment sampling efforts, however, no signs of burrows or soft-shell clam activity was observed (Todd Randall, USACE, personal observations).

During the excavation of test pits for sediment chemistry sampling in the inner harbor in 2016 (Figure 6), several soft-shell clam shells and shell fragments were observed, however, no live soft-shell clams were noted. No soft-shell clams were observed in the 2015 or 2016 benthic samples.

Lobster

Lobster resources in the project footprint are minimal. Portions of the project footprint are within intertidal areas which are not preferred lobster habitat. During the sediment sampling efforts, no lobsters were noted in the intertidal areas during low tide and no evidence of lobster fishing gear was observed during high tide periods. The subtidal areas within the project footprint may contain lobster. However, during the sediment sampling events, no evidence (i.e., the presence of lobster fishing gear) was noted in the footprint of the proposed project. The Blue Hill Harbormaster (Randall, personal communication) noted that there was generally no lobster fishing in inner Blue Hill Harbor.

*Disposal Site*

Shellfish

Maine DMR's "2010 molluscan shellfish data" GIS data layer does not classify the area that encompasses to EPDS as shellfish habitat. Benthic community analysis of the site did not show evidence of any commercially important bivalve species.

Lobster

Lobster resources are likely to occur in the EPDS. Several adult lobsters were observed during the 2012 DAMOS monitoring survey of the EPDS (Carey et al 2013). However, no site specific lobster abundance data is available. Lobster resources within the footprint of the EPDS are assumed to be as abundant as the average lobster resources in Blue Hill Bay.

6.4.4 Submerged Aquatic Vegetation

*Dredging Site, CAD cell (Blue Hill Harbor), and Disposal Site*

According to the Maine Department of Marine Resources GIS database, no current or historic eelgrass (*Zostera marina*) resources have been documented within Blue Hill Harbor or within the EPDS (https://maine.maps.arcgis.com/apps/StorytellingSwipe/index.html?appid=e7db0b0cce6643ca8fa23bd71ce229a2).

**6.5 Wildlife Resources**

6.5.1 Shorebirds and Waterfowl

Coastal Maine is important for shorebirds as a feeding and resting area during migration. In addition, piping plover and spotted sandpiper breed along the coast of Maine and the purple sandpiper is a winter resident. Shorebirds feed on invertebrates in intertidal mudflats and roost on sand, gravel beaches, spits, wetlands, or near shore ledges (Schettig and Schettig 1980). The habitat of northeastern Maine, which is described by the U.S. Fish and Wildlife Service (Schettig and Schettig 1980), is generally characterized as excellent habitat for all migrating and wintering waterfowl species of Maine. The high quality of the Maine habitat is due in large part to the large tidal range, which exposes extensive mudflats in the harbor. This supplies excellent habitat for dabbler ducks, particularly black ducks (Schettig and Schettig 1980).

While the existing intertidal areas within Blue Hill Harbor provide valuable resting areas for bird species, the low diversity and low abundance of benthic invertebrate resources in the intertidal and subtidal habitats within the areas examined for this study are well below typical values (see Section 6.4.1), thus reducing the function of the area as an important wildlife feeding area. The apparent ecological stressor that is causing the reduced function and value of the Blue Hill Harbor intertidal flat as a feeding ground is PAH contamination of the sediments (see Section 6.2).

## 6.6 Essential Fish Habitats

The 1996 amendments to the Magnuson-Stevens Fishery Conservation Management Act strengthen the ability of the National Marine Fisheries Service (NMFS) and the New England Fishery Management Council to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans. This habitat is termed "essential fish habitat", and is broadly defined to include "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Table 4 notes the managed species from both the dredging and disposal sites.

Table 4: List of species that have designated EFH in Blue Hill Harbor (NMFS 2017).

| Species | Eggs | Larvae | Juveniles | Adults |
|---|---|---|---|---|
| American plaice (*Hippogloissoides platessoides*) | X | X | X | X |
| Atlantic Cod (*Gadus morhua*) | X | X | X | X |
| American wolfish (*Anarhichus lupus*) | X | X | X | X |
| Ocean pout (Macrozoarces americanus) | X | | X | X |
| Pollock (*Pollachius virens*) | | | X | |
| White Hake (*Urophycis tenuis*) | | | X | X |
| Windowpane flounder (*Scophtalmus aquosus*) | X | X | X | X |
| Winter flounder (*Pseudopleuronectes americanus*) | X | X | X | X |
| Silver Hake (*Merluccius bilinearis*) | X | X | X | X |
| Red Hake (*Urophycis chuss*) | X | X | X | X |
| Smooth skate (*Malacoraja senta*) | X | X | X | X |
| Thorny Skate (*Amblyraja radiata*) | X | X | X | X |
| Little Skate (*Leucoraja erinacea*) | X | X | X | X |
| Winter Skate (*Leucoraja ocellata*) | X | X | X | X |
| Atlantic sea scallop (*Placopecten magellanicus*) | X | X | X | X |
| Atlantic Herring (*Clupea harengus)* | X | X | X | X |
| Atlantic salmon (*Salmo sala)** | | | | X |

*The project is more than 3 miles from the nearest EFH-designated river (Union River, 13 miles linear distance)

## 6.7 Threatened and Engendered Species

Coordination with the U.S Fish and Wildlife Service and National Marine Fisheries Service (NMFS) indicates that several threatened and endangered species have the potential to occur in the project areas.

The northern long eared bat may be found in areas adjacent to Blue Hill Harbor. However, no long-eared bats are expected to be present in the project footprint.

Atlantic salmon adults and juveniles also have the potential to occur in the project area. The Gulf of Maine Distinct Population Segment (DPS) of Atlantic salmon was listed as a federally endangered DPS in November of 2000. This DPS includes all naturally reproducing remnant populations of Atlantic salmon from the Kennebec River downstream of the former Edwards Dam site northward to the mouth of the St. Croix River.

Transient Atlantic sturgeon (*Acipenser oxyrhynchus oxyrinchus*) adults and subadults belonging to the Gulf of Maine Distinct Population Segment (DPS), which are considered federally threatened, have the potential to occur in Blue Hill Bay. To date, no data exists on the presence or absence of Atlantic sturgeon in the Blue Hill Harbor system. Additionally, transient adult short-nose sturgeon (*Acipenser brevirostrum*), which are considered federally endangered, also have the potential to occur in Blue Hill Bay during migration periods. To date, no data exists on the presence or absence of short-nose sturgeon in the project area.

Four species of federally threatened or endangered sea turtles may be found seasonally in the coastal waters of Maine: the federally threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead turtle (*Caretta caretta*); the federally endangered Kemp's Ridley (*Lepidochelys kempi*); the green turtle (*Chelonia mydas*); and the leatherback (*Dermochelys coriacea*) sea turtle. 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 can be expected in the waters of the Gulf of Maine in warmer months, typically between the months of May through November. All four species of sea turtle have the potential to occur in the project area for migration and foraging.

## 6.8 Historic and Archeological Resources

Blue Hill is a town in Hancock County, incorporated on February 2, 1789 from Blue Hill Bay Plantation. It annexed land from Sedgwick in 1831 and ceded land to Penobscot in 1845 (Maine - An Encyclopedia: Blue Hill). The National Register nomination form for the Blue Hill Historic District (1980) provides the following history:

"Originally settled in 1762 by settlers from Andover, Massachusetts, Blue Hill emerged in the 19th Century as a thriving diversified community with important maritime ties. With the arrival of its first settled minister, the remarkable Jonathan Fisher in 1796 and the chartering of Blue Hill Academy, the community early became a remarkably cosmopolitan center in a then remote area.

Lumbering became the first major industry following the erection of the earliest sawmill in 1765 and easy access to the sea resulted in large scale export of the product to Boston and other ports. Shipbuilding was also an important part of the economy for almost exactly a century between 1792 and 1891. In 1790, a potash works at the town landing began production. The early 19th Century saw the development of varied industry along Mill Brook including a very early cotton mill, a carding and fulling mill, a tool shop, grist mill, furniture mill and a cooperage. Granite quarrying for export began in 1816 and in 1836, eighteen large cargoes were shipped for use in construction at Charlestown Navy Yard in Massachusetts.

In 1876, copper was discovered in the area and a mining boom of significant proportions began with many companies' formed and large numbers of outside workers brought in. Boarding homes and more primitive dwellings sprang up and Joseph Holt's early brick block (#27) was refurbished as a mining exchange and fine hotel called the Pendleton House. Speculation was rampant and the boom collapsed in 1881 with unstable copper prices and poor management. Of 39 companies, only six survived and the last of these closed in 1919. The Pendleton House remains as the sole reminder of this brief episode.

Against this economic background is set the village of Blue Hill today with many fine residences reflecting commercial and industrial prosperity as well as some built by the numerous sea captains produced by this active port. Since the 1870's, Blue Hill has lured large numbers of summer visitors and residents who have built homes largely along the shore. The intellectual flavor of Blue Hill has been carried on by individuals such as composer Ethelbert Nevin who built a summer house in the area, and noted Maine author Mary Ellen Chase who was born in the Chase House.

As an intact 19th Century Maine mid-coastal community, Blue Hill conveys a remarkable sense of time and place and retains the same scale and balance in proportion between building types as it did a century ago" (Beard 1980).

The Jonathan Fisher House, designed by its namesake, is listed on the National Register of Historic Places. The old Blue Hill Academy (1833) has since been replaced by the George Stevens Academy (1898), the town's high school. The 1815 Holt House is home to the Blue Hill Historical Society. Blue Hill is a fast growing coastal community, leaping in population by over 23% from 1990 to 2000 (Maine – An Encyclopedia: Blue Hill).

Archaeologically sensitive areas have been mapped by the Town of Blue Hill and a total of twelve Native American archaeological sites are located along the coast of Blue Hill. These are shell midden sites that are the remnants of Native campsites along the shore, and are primarily located in the Blue Hill village and Salt Pond areas of the town (Town of Blue Hill 1999). This has also been confirmed by the Tribal Historic Preservation Officer for the Penobscot Indian Nation in a personal communication (Sockalexis 2019) and the concerns for these sites was noted and highlighted.

## 6.9 Air Quality and Noise

Air Quality

Ambient air quality is protected by Federal and state regulations. The U.S. EPA has developed National Ambient Air Quality Standards (NAAQS) for certain air pollutants and air quality standards for each state cannot be less stringent than the NAAQS. The NAAQS determined by the EPA set the concentration limits that determine the attainment status for each criteria pollutant. EPA 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 ($SO_2$), nitrogen dioxide ($NO_2$), ozone ($O_3$), particulate matter 10 micrometers or less in aerodynamic diameter ($PM_{10}$), particulate matter 2.5 micrometers or less in aerodynamic diameter ($PM_{2.5}$), and lead (Pb). The entire state of Maine is currently designated as attainment for the air pollutants listed above.

Noise

Blue Hill Harbor is an active fishing port. The noise environment in the project area consists routinely of noise from motoring fishing and recreational vessels, noise from construction, maintenance, and loading/unloading efforts on the docks and piers immediately adjacent to the area, and typical noise associated with the marine environment (i.e., wildlife, water movement, and air movement).

### 6.10 Recreational Resources

Blue Hill Harbor and its associated rocky shorelines, intertidal flats, marshes, and open water areas are valuable ecological resources that are utilized by the public as recreational shellfishing and fishing areas, recreational boating areas (including boat launching), hiking areas, and public swimming areas. The aesthetic scenery provided by the areas not only benefit the residents of the Maine coastal communities, but attracts tourists from around the world.

The EPDS is located in deep waters of Blue Hill Bay. Recreational uses such as fishing and boating over the site are common.

# 7.0 ENVIRONMENTAL CONSEQUENCES

## 7.1 Physical Setting

*No Action Alternative*

The no action alternative would have no impact on the physical setting of Blue Hill Harbor and the Eastern passage Disposal Site.

*Dredging Site & CAD cell (Blue Hill Harbor)*

The proposed improvement project would deepen portions (approximately 25.5 acres) of the natural subtidal channel in Blue Hill Harbor and replace approximately 3.7 acres of intertidal area in the upstream portion of the harbor with subtidal area. This modification of Blue Hill Harbor is not anticipated to have any significant effect on the flushing characteristics or current patterns in the harbor.

The area of the CAD cell is approximately 1.8 acres and is located in an existing subtidal environment. The excavated CAD cell is proposed to be filled with unsuitable material and capped with suitable material to restore elevations within the CAD cell to within 1-foot of existing conditions.

*Disposal Site*

The EPDS is a previously used dredged material placement area. The placement of suitable material from the proposed project is not anticipated to change the physical characteristics of the site.

## 7.2 Sediment Quality

*No Action Alternative*

The no action alternative would have no impact on the sediment quality of Blue Hill Harbor or the Eastern passage Disposal Site.

*Dredging Site, CAD cell (Blue Hill Harbor), and Disposal Site*

USACE-NAE AE evaluated the sediment from the Blue Hill Harbor Navigation Improvement Project through §230.61 of the CWA and found the material suitable for open water placement at EPDS with the exception of 10,500 cubic yards of material from the upper two feet of the inner harbor. The sediment from this portion of the harbor is not suitable for open water placement due to elevated PAH concentrations. USACE-NAE proposes to contain the unsuitable material in a CAD cell. The material excavated to create the CAD cell is outside of the elevated PAH footprint and is suitable for open water placement at ELDS.

### 7.3 Water Quality

*No Action Alternative*

The no action alternative would have no impact on the water quality of Blue Hill Harbor or the Eastern passage Disposal Site.

*Dredging Site, CAD cell (Blue Hill Harbor), and Disposal Site*

The proposed project is not expected to change the SB water quality classification of Blue Hill Harbor or the waters overlaying the EPDS. Short term water quality impacts (specifically turbidity and elevated concentrations of contaminants in the water column) are anticipated to be localized to the immediate dredging area and within the CAD cell that will be created to hold the unsuitable dredged material.

Turbidity – Mechanical Dredging

The dredging efforts are proposed to be performed with a mechanical clamshell dredge. This action will remove and suspend some of the bottom sediments, causing localized increases in turbidity and sedimentation. Numerous studies (ranging over decades) have been conducted to document levels of suspended sediments and sediment plume distances associated with mechanical dredging and are discussed below.

New London Harbor Monitoring Example

Analysis of the spatial and temporal persistence of the turbidity plume from the dredging of silts was quantified in 1977 from dredging the Thames River/New London Harbor channels (Bohlen et. al., 1979). The conclusions of this study defined the measurable suspended sediment plume as extending 700 meters downstream. Analysis of the composition and concentration of the plume indicated the majority of material suspended occurred within 300 meters of the dredge. Suspended material concentrations closest to the dredge ranged from 200 mg/l to 400 mg/l resulting from suspension of approximately 1.5 to 3.0% of the substrate in each bucket load. Suspended material concentrations were reduced by a factor of ten within the first 200 meters downstream of the dredge. Surface concentrations returned to normal 250 meters downstream of the dredge. Mid-water and near bottom concentrations returned to background levels 700 meters downstream of the dredge.

New Haven Harbor Monitoring

Sediment plumes were monitored during a maintenance dredging effort of the New Haven Harbor FNP between October 1993 and January 1994 (USACE, 1996). Dredging of silty material from New Haven Harbor was conducted with an enclosed mechanical bucket. The two major objectives of the New Haven monitoring were to: 1) establish the background suspended solids concentration before and after dredging, and 2) document the movement of the dredge plume relative to fisheries resource areas. The results of the survey revealed that background suspended sediments in the harbor average 8 mg/l prior to dredging efforts, and that during dredging, numerous aperiodic short duration spikes of 100 mg/l were seen.

The study also concluded that there were dredge-induced sediment plumes, and that the plumes did travel outside of the navigation channel. However, these excursions onto the shoal areas outside the channel only occurred when the dredge was in the immediate vicinity (i.e., dredging the side of the channel directly adjacent to the shoal areas).

The study also noted that monitoring detected several long duration (1-3 days) - high suspended sediment perturbations (concentrations reaching 700 mg/l) that could not be related to dredging operations. Evidence from meteorological data and wastewater effluent records indicate that these high suspended sediment events were likely the result of winds and wind-generated waves, alone or in combination with discharges from wastewater treatment plant outfalls.

The study concluded that dredged induced sediment resuspension was found to be a minor perturbation to the much longer duration, larger amplitude events associated with wind, wind-waves, and effluent discharges from outfalls. The effects of dredge related spikes in suspended sediments on the winter flounder spawning grounds (i.e., the shoal areas outside the channel), and the regional water quality in general, appear to have been limited in duration and of relatively low amplitude (USACE, 1996).

Boston Harbor Monitoring Example

Monitoring was conducted in 1996 for dredging of the surface silty material during construction of a confined aquatic disposal (CAD) cell for the Boston Harbor Navigation Improvement Project. This monitoring included: 1) documentation of the spatial and temporal distribution of the sediment plume for the four extremes of tidal currents (high water slack, maximum ebb, low water slack, maximum flood) on two days within the first week of dredging; 2) collection of water samples from the lower half of the water column at two locations – 1,000 feet up current of the dredging and 500 feet down current from the dredging; and 3) analysis of water samples for TSS.

During dredging, turbidity measurements ranged from 3-5 NTU (Nephelometric Turbidity Units) at the reference station 1,000 feet up current from dredging the silty surface material using an environmental bucket. Turbidity was only slightly elevated at the station 500 feet down current of the dredging ranging from 4-11 NTU. TSS ranged from 4-5 mg/l at the reference station and from 5-9 mg/l at the down current station. No plume was visible at the surface outside the immediate area of the dredging operation, and no significant plume was detected in the water column (ENSR, 1997).

Monitoring of turbidity plumes in 1998 associated with the dredging of silty maintenance material from Boston Harbor was also performed (USACE/Normandeau, 1998b). Mapping of the turbidity associated with use of a closed mechanical bucket (i.e., an environmental bucket) to dredge silty material in Boston Harbor was performed during periods of high and low water slack and during maximum flood and ebb tides. The mapping required generation of plan views of turbidity at mid-depth and near bottom extending from 300 feet up current to 1,000 feet down current of continuous dredging operations. Generation of a cross section of turbidity located 300 feet down current of the dredging was also required. Near bottom turbidity values were highest for all measurements with values no higher than 100 NTU approximately 300 feet down current of the dredging operation. Mid-depth turbidity was much less, and all values returned to background levels (10-20 NTU) between 600 and 1,000 feet down current (ENSR, 2002).

The monitoring studies noted above show that turbidity plumes associated with mechanical bucket dredges are produced during dredging, however they are generally limited to the immediate vicinity of the dredge. Therefore, while suspended sediment plumes will be produced during the construction of the proposed project, they are not anticipated to significantly impact water quality.

Water Quality Chemical Concentrations

USACE-NAE evaluated potential water quality effects by modeling the release of contaminants from dredged sediments during the disposal process at EPDS. To determine if the discharge of dredged material would attain compliance with Water Quality Standards, USACE-NAE performed a Tier II evaluation following the protocols outlined in the RIM. This evaluation utilizes the Short-Term Fate (STFATE) numerical model to analyze the physical behavior of a disposal cloud as it descends through the water column after release from a barge. Results of the STFATE evaluation predicted that the water column would attain State of Maine Water Quality Standards within four hours of disposal and therefore meet the criteria in the testing protocol.

## 7.4 Aquatic Resources

*No Action Alternative*

The no action alternative would allow the existing conditions in the proposed project area to remain as documented in Section 6.4.

### 7.4.1 Benthos

*Dredging Site & CAD cell (Blue Hill Harbor)*

Dredging in the proposed channel and turning basin area would result in both permanent and temporary impacts to the benthic communities in Blue Hill Harbor. Permanent impacts include the conversion of 3.7 acres of intertidal habitat to subtidal habitat which in turn will permanently change the benthic community structure of those areas. Temporary impacts include short-term loss of benthos within the direct footprint of the dredging areas and CAD cell area and localized increases in turbidity in areas adjacent to the dredging.

Dredging in the inner harbor area will displace some intertidal habitat. Approximately 3.7 acres of intertidal habitat would be permanently converted to subtidal habitat. The ecological functions of existing 3.7 acres of intertidal area, as related to benthic invertebrate communities, is currently impaired. Surveys of the benthic communities in these areas show very low diversity and abundance numbers which suggest the habitat is being subject to some stressor beyond naturally occurring ecological pressure. As the material in these area contains elevated concentrations of contaminants (predominantly PAHs) which have been determined to be unsuitable for open water placement, it has been concluded that the contamination is the cause of the diminished benthic community. The removal and sequestering of the contaminated material should allow the newly created subtidal areas to be contaminant free and allow for the colonization of the area by adjacent benthic populations. Community structure in the new subtidal habitat is expected to be similar to that in the outer harbor subtidal areas. Mitigation is not being proposed for the loss of intertidal habitat as the area is currently impaired and will be replaced with a habitat that will provide higher quality ecological value to the Blue Hill Harbor system.

The benthic community in the proposed project area will be eliminated by direct removal from improvement efforts. Once dredging is completed, the benthic community of the channel, turning basin, and side slope areas are expected to begin recolonization by recruitment from benthic species in other areas of Blue Hill Harbor. As the benthic community throughout the existing channel and side slopes is a mix of opportunistic early-successional stage benthic communities and mid-successional stage benthic communities, a return to a similar community following dredging is expected within approximately 1-3 years.

Turbidity impacts to benthos are dependent on the concentration and the duration of the suspended sediments (Clarke and Wilber, 2000; Suedel 2015). Motile benthic organisms (e.g., lobster and crab) can generally avoid unsuitable conditions in the field and, under most dredging scenarios, encounter localized suspended sediment plumes for exposure durations of minutes to hours, unless the organism is attracted to the plume and follows its location. Although adult bivalve mollusks are silt-tolerant organisms (Sherk, 1972 in Clarke and Wilber, 2000), they can be affected by high suspended sediment concentrations. Hard clams (Pratt and Campbell, 1956 in Clarke and Wilber, 2000), and oysters (Kirby, 1994 in Clarke and Wilber, 2000), exposed to fine silty-clay sediments have exhibited reduced growth and survival, respectively. Suspended sediment concentrations required to elicit these responses and mortality, however, are extremely high, i.e., beyond the upper limits of concentrations reported for most estuarine systems under natural conditions, as well as typical concentrations associated with dredging operations (See Section 7.3). Therefore, the temporary increases in turbidity associated with the proposed project are not anticipated to significantly adversely impact the benthic communities adjacent to the dredge areas.

*Disposal Site*

The physical impacts of dredged material disposal to benthic communities have been well studied (Diaz and Boesch, 1977; McCall, 1977; Wright, 1978). Burial during disposal would result in direct mortality of organisms at the disposal site. Organisms in the immediate vicinity of the disposal-mound would be impacted by the fluid mud which spreads out when the material impacts the bottom. Initial recolonization by opportunistic polychaete species would occur within a matter of weeks. These species, which are capable of rapid population increases, rework the sediments through their feeding and burrowing activities. This biological mixing of the sediments homogenizes and aerates the upper few centimeters of the sediment, making the area more favorable for later successional stages to colonize. Community structure can be expected to return to background within a 1 to 2 year period following disposal.

7.4.2 Fish

The proposed project would impact fish species in the project area. Effects of the proposed project include possible death and injury of fish, interference with fish movements, disruption of the forage base, and changes in water quality during dredging operations. As noted in Section 7.4.1, direct removal of bottom habitats will occur in the dredging areas and direct covering of bottom habitats will occur in the placement area. As noted in section 7.3, indirect impacts due to changes in water quality will occur, however they are anticipated to be short-term and localized to within hundreds of feet of the dredging and disposal efforts.

Intermittent, short-term impacts to fish also include disturbance of fish throughout the water column within the localized area during dredging and disposal efforts. Due to their mobility, most fish would be expected to move out of an active dredging area or a dredged material burial area. The sediment plume associated with dredging and the plume following material placement would also have potential short-term water quality impacts that may also have indirect impacts on fish by temporarily altering certain finfish behaviors, such as migration, spawning, foraging, schooling, and predator evasion (O'Connor, 1991). Increased turbidity has also been associated with potential gill abrasion and respiratory damage (Saila, et al. (1971); Wilber & Clark (2001)).

Sediment characteristics and the life stage of species affect how sensitive species are to suspended sediment, with egg and larval stages tending to be the most sensitive (Johnson, et al., (2008); Berry *et al*. (2003), Wilber & Clark (2001)). During material placement, these impacts are limited both in duration and spatially due to the short time needed for dredged material to reach the bottom (Kraus (1991); Dragos & Lewis (1993); Dragos & Peven (1994)). Saila, et al. (1971) also point out that “aquatic animals are able to tolerate high concentrations of suspended sediments for short periods.” Since the tolerance level for suspended solids is high in shallow and mid-depth coastal waters, and fish and lobster may experience major changes in turbidity during storms, Saila, et al. (1971) conclude that mortality due to elevated sediment concentrations in the water column resulting from dredged material placement is not likely.

As noted through this document, concentrations of sediments and the duration needed to cause impacts to fish resources are expected to be short-term and localized and as such, effects to fish resources in the proposed project areas should be minimal.

As noted in Section 7.4.1, dredging in the inner harbor area will displace approximately 3.7 acres of intertidal habitat and permanently convert it to subtidal habitat. The ecological functions of the existing 3.7 acres of intertidal area is currently impaired by contamination, which will be removed and sequestered by the proposed project. The subtidal habitat that will be created is anticipated to provide higher quality habitat for fish resources in the Blue Hill Harbor system than the existing habitat.

#### 7.4.3 Shellfish

*Dredging Site & CAD cell (Blue Hill Harbor)*

Shellfish in the direct footprint of the dredging effort will be removed and would not be expected to survive relocation to a placement area. In areas where the dredging is occurring in existing subtidal waters, a temporary loss of shellfish resources is expected. However, natural recruitment for subtidal areas that will not be dredged will provide a seed source to recolonize the areas disturbed by dredging. The loss of shellfish in intertidal areas that are being converted to subtidal habitat is also expected. However, observations of shellfish resources in the intertidal areas during sediment sampling for the project and an analysis of the benthic communities in the intertidal areas show that the intertidal areas are experiencing stressors that are resulting in a diminished (i.e., low diversity and low abundance) benthic assemblage. The extent of the impaired benthic community correlates with the extent of an approximately 2-foot layer of sediments contaminated by PAHs (see section. The removal and sequestering of the contaminated material will allow for the newly created subtidal areas to be colonized through recruitment from adjacent subtidal shellfish resources.

*Disposal Site*

Any shellfish species present at EPDS in the direct footprint of placement activities would be buried by sediments and would be expected to perish. Recruitment of shellfish species from adjacent areas not affected by placement would be expected. No significant commercially important shellfish resources are known to occur within the EPDS.

#### 7.4.4 Submerged Aquatic Vegetation

No SAV will be impacted by the proposed project. According to the State of Maine GIS data layers for SAV, there is no SAV within the project footprint or in areas adjacent to Blue Hill Harbor or the EPDS.

### 7.5 Wildlife

*No Action Alternative*

The no action alternative would have no impact on the wildlife of Blue Hill Harbor or the Eastern Passage Disposal Site.

*Dredging Site, CAD cell (Blue Hill Harbor), and Disposal Site*

The proposed project will have negative effects on wildlife in the project area. Construction activities associated with dredging and disposal (i.e., presence of dredges, scows, and tending vessels) could temporarily displace wildlife species during construction activities. However these impacts will be temporary, as following completion of dredging, the equipment will be removed. Therefore construction activities should not significantly affect the long term use of Blue Hill Harbor by wildlife resources.

The conversion of 3.7 acres of intertidal habitat to subtidal habitat may affect wildlife by removing resting habitat for birds. Under pristine conditions, the removal of intertidal habitat would also remove foraging habitat for wildlife, however as noted in throughout Section 7.4, the intertidal areas to be dredged are currently impaired by PAH contamination. As a result of elevated concentrations of PAHs in the sediments, the benthic communities of the intertidal flats are depressed (i.e., have low diversity and low abundance) and are not functioning as typical Maine intertidal habitat. While the conversion of the intertidal habitat to subtidal habitat will eliminate access to the habitat by some wildlife resources (i.e., birds that do not dive and mammals), it is expected that the removal and sequestering of the contaminated material in the system will provide more ecosystem functions and values than currently exist.

## 7.6 Essential Fish Habitat Assessment

*No Action Alternative*

The no action alternative would allow existing EFH conditions in Blue Hill Harbor and the Eastern Passage Disposal Site to persist as described in Section 6.0..

*Dredging Site, CAD cell (Blue Hill Harbor), and Disposal Site*

The proposed project would impact EFH for managed species. The habitats affected include shallow subtidal soft bottom habitat, intertidal flat habitat, and water column habitat. Effects of the proposed project include death and injury of fishes and forage during dredging operations and subsequent maintenance dredging operations. Direct removal of soft bottom habitats will occur in the dredging areas and direct covering of soft bottom habitats will occur in the placement areas. Indirect impacts due to changes in water quality will occur, however, they are anticipated to be short-term and localized to within hundreds of feet of the dredging and disposal efforts. These effects have been documented in Sections 7.3 and 7.4. The list below summarizes potential effects of the proposed project on EFH and managed species. Details on the effects to specific groups of managed species associated with certain essential fish habitats can be found in Appendix G.

1. Directly affecting mortality or injury of individual fishes (adults, subadults, juveniles, larvae, and/or eggs, depending on species, time of year, location, etc.) due to dredge equipment during construction dredging (an effect temporary in duration).

2. Indirectly affecting foraging behavior of individuals through production of turbidity at dredging and disposal sites (an effect temporary in duration).

3. Indirectly affecting movements of individuals around/away from dredging sites due to construction equipment and related disturbed benthic habitats (an effect temporary in duration).

4. Indirectly affecting foraging and refuge habitats by removal of benthic habitat (i.e., soft bottom) (an effect temporary in duration).

5. Conversion of 3.7 acres of intertidal habitat with impaired functions (due to contamination) to 3.7 acres of subtidal habitat (with no contamination).

Many of the dredging related impacts (i.e., increases in turbidity, changes in fish movement behavior) are common temporary occurrences in estuarine systems. Therefore, these temporary impacts normally occur under existing conditions (i.e., in the No Action alternative). However, the proposed project involves a longer duration of these temporary impacts. Individually or in sum, the above are not anticipated to significantly adversely affect managed species or most species EFHs. Where possible, the above effects have been minimized via project design. An EFH Assessment has been prepared for this project and is presented in Appendix G.

### 7.7 Threatened and Endangered Species

*No Action Alternative*

The no action alternative would have no impacts to threatened or endangered species in Blue Hill Harbor or the Eastern Passage Disposal Site.

*Dredging Site, CAD cell (Blue Hill Harbor), and Disposal Site*

Dredging activities are not likely to adversely affect any Federally-listed threatened or endangered species within Blue Hill Harbor or at the EPDS. Based on the information from U.S. Fish and Wildlife Service and National Marine Fisheries Service databases (IPAC and ESA mapper, respectively) Federally-listed species under the jurisdiction of the Services are known to occur in the project area. However, the using time of year restrictions, the proposed construction efforts would occur outside of the periods when the listed species would be present in the project area.

### 7.8 Historic and Archaeological Resources

*No Action Alternative*

The no action alternative would have no impact on any historic or archaeological resources in Blue Hill Harbor or the Eastern Passage Disposal Site.

*Dredging Site, CAD cell (Blue Hill Harbor), and Disposal Site*

A review of the National Oceanic and Atmospheric Administration (NOAA) Coast Survey's Automated Wreck and Obstruction Information System (AWOIS) and Electronic Navigation Charts (ENC) identified no potential submerged archaeological sites or shipwrecks within the project area and proposed disposal locations. Sediment cores were collected to project depth throughout the channel from seven sample stations (see sample locations figure). Sediments in the outer portion of the channel were predominantly gray, poorly graded medium to coarse sands overlying marine silt and clay deposits with mixtures of fine, woody organic debris. Sediments within the inner harbor were composed of medium to coarse sands overlain by a thin layer of loose fine sand and silt with shell and wood fragments. The area surrounding the town dock was composed of mixed sand, gravel, and silt over a cobble and gravel substrate.

Sanborn Fire Insurance maps of Blue Hill (1925) depict the G.M. Allen and Son sawmill adjacent to the dam in the inner harbor area (Main Street). Earlier historic maps (Walling 1860 and Colby 1881 - Map of Blue Hill Village) indicate a dense concentration of commercial and industrial development in the inner harbor area. The Blue Hill Historic District is centered on and around Main Street. However, dredging of the harbor will commence from the Town Wharf south, well outside of the inner harbor area. Historic and archaeological properties are not expected within this area.

Native American archaeological sites in the form of shell middens are located along the coast and in the Salt Pond area. However, these site locations are outside of the proposed harbor dredging and disposal activities. Impacts are not expected.

Therefore, dredging of Blue Hill Harbor with disposal within a CAD cell adjacent to the channel, at the Eastern Passage Disposal Site, or via transport to the Juniper Ridge landfill will have no effect upon any site or structure of historic, architectural or archaeological significance as defined by Section 106 of the NHPA and implementing regulations 36 CFR 800. The Maine Historic Preservation Commission, by letter dated December 11, 2018, has concurred with this determination. If unanticipated historic properties are identified during project construction, we will follow the procedures for post-review discoveries at 36 CFR 800.13.

## 7.9 Air Quality Statement of Conformity & Noise Impacts

*No Action Alternative*

The no action alternative would have no impact on the air quality or noise environment of Blue Hill Harbor or the Eastern Passage Disposal Site.

*Dredging Site, CAD cell (Blue Hill Harbor), and Disposal Site*

Air Quality: The improvement dredging of Blue Hill Harbor is subject to Clean Air Act requirements. However, since the project is located in an attainment area (Washington County) this project is not subject to the general conformity rule and a air quality conformity analysis is not needed.

The project should have no long-term impacts on air quality. During construction equipment operating on the site would emit pollutants including nitrogen oxides that can lead to the formation of ozone. In order to minimize air quality effects during construction, construction activities would comply with applicable provisions of the Maine Air Quality Control Regulations pertaining to dust, odors, construction, noise, and motor vehicle emissions.

Noise: Minor increases in noise are expected as dredging operations will utilize dredges, scows, and support vessels. Noise sources will be from the engines, generators, and other machinery associated with the afore mentioned equipment. An increase in noise in the project area will be temporary and noise levels will return to preconstruction levels following construction of the project.

### 7.10 Recreational Resources

Minor impacts to recreation in the area may occur as a result of dredging activities. Recreational and commercial boating traffic may experience delays during periods of low tide as navigable water may be limited in the areas surrounding the dredge. Every effort will be made to accommodate vessel traffic in the harbor. Dredging and construction activities will occur during the late fall and winter months when vessel traffic is at a minimum. The creation of a channel that accesses the Blue Hill town landing at all tides may increase recreational boating traffic in the harbor.

The EPDS was used previously with no significant impacts to recreation. Placement activities at the EPDS will occur in the fall and winter months. Therefore, no impacts to the recreation use of the site are anticipated.

## 8.0 CUMULATIVE EFFECTS

Cumulative impacts are those resulting from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions. Past and current activities in Blue Hill Harbor include the dredging of the project and navigation through the channel and anchorages. Past and current activities at the disposal site include dredged material disposal, navigation, and limited commercial fishing. The proposed improvements and disposal activities would not result in any expansion of either the commercial or recreational fleets at Blue Hill Harbor. Reasonably foreseeable future actions include the continuation of periodic maintenance and navigation activities (i.e., recreational boating and commercial fishing fleet usage). Therefore, no adverse cumulative impacts are projected as a result of this project.

## 9.0 ENVIRONMENTAL JUSTICE AND OTHER CONSIDERATIONS

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, " require 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. The Proposed Action will not have any disproportionately high or adverse impacts on minority or low-income populations, or any adverse short or long-term environmental justice impacts because the project is not located near any areas with these populations.

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. The Proposed Action will not pose any significant or adverse short or long-term health and safety risks to children because access to the project area during construction will be limited as it will be occurring within Blue Hill Harbor and therefore should not pose a risk to children.

## 10.0 MEASURES TAKEN TO MINIMIZE ENVIRONMENTAL CONSEQUECES

The following actions would minimize potential adverse impacts associated with this project.

1. The dredging contractor will be required to fully accommodate vessel traffic during dredging operations.
2. Contractors will be responsible for complying with any special conditions and/or stipulations incorporated into the appropriate Federal and state regulatory approvals.
3. Dredging and disposal activities will be limited to a period between October 1 and April 1 to avoid impacts to biological resources (fisheries/shellfish).

## 11.0 COORDINATION

Coordination has been conducted with the appropriate state and Federal agencies. Copies of the public notice and coordination letters received are contained in Appendix A. Coordination has occurred with the following agencies and officials:

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| US Environmental Protection Agency | US Fish and Wildlife Service |
| National Marine Fisheries Services | United States Coast Guard |
| Maine Department of Environmental Protection | Maine Coastal Program |
| Maine State Historic Preservation Commission | Maine Geologic Survey |
| Maine Department of Marine Resources | Passamaquoddy Tribal Nation |
| Penobscot Indian Nation | Town of Blue Hill Town Manager |
| Town of Blue Hill Harbor Master | |

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## 13.0 COMPLIANCE WITH ENVIRONMENTAL FEDERAL STATUTES AND EXECUTIVE ORDERS

### Federal Statutes

1. Clean Water Act of 1977 (Federal Water Pollution Control Act Amendments of 1972) 33 U.S.C. 1251 et seq.

Compliance: A Section 404(b)(1) Evaluation and Compliance Review have been incorporated into this report. A State Water Quality Certification, pursuant to Section 401 of the Clean Water Act, will be requested from the Maine Department of Environmental Protection.

2. Marine Protection, Research, and Sanctuaries Act of 1972, as amended, 33 U.S.C. 1401 et seq.

Compliance: Not applicable. This project is being evaluated under Section 404 (b) (1) of the Clean Water Act, not 103 of the MPRSA, as disposal is in the nearshore (33 CFR Part 338).

3. National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 et seq.

Compliance: Coordination with the State Historic Preservation Office to determine whether historic or archaeological resources would be affected by the proposed project signifies compliance with this Act.

4. Preservation of Historic and Archaeological Data Act of 1974, as amended, 16 U.S.C. 469 et seq. This amends the Reservoir Salvage Act of 1960 (16 U.S.C. 469).

Compliance: Not applicable. Project does not require mitigation of historic or archaeological resources.

5. 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) is on-going. The Corps has made the preliminary determination that impacts associated with the proposed project are not likely to adversely affect threatened or endangered species under the jurisdiction of the FWS or NMFS.

6. The Estuary Protection Act (16 U.S.C. 1221)

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

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

Compliance: Coordination with the FWS, NMFS, the Maine Department of Environmental Protection and the Maine Department of Marine Resources signifies compliance with the Fish and Wildlife Coordination Act.

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

Compliance: Preparation of this report signifies partial compliance with NEPA. Full compliance shall be noted at the time the Finding of No Significant Impact is issued.

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

Compliance: Not applicable.

10. Coastal Zone Management Act of 1972, as amended, 16 U.S.C. 1431 et seq.

Compliance: A CZM consistency determination will be provided to the Maine Coastal Program for review and concurrence that the proposed project is consistent, to the maximum extent practicable, with the approved State CZM program.

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

Compliance: Public notice of the availability of this report to the Regional Administrator of the Environmental Protection Agency for review pursuant to Sections 176c and 309 of the Clean Air Act signifies compliance.

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

Compliance: Not applicable.

13. Land and Water Conservation Fund Act of 1965, as amended, 16 U.S.C. 4601-1.

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

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

Compliance: No requirements for Corps of Engineers projects or programs authorized by Congress. The proposed navigation improvement project is included under the continuing authority of the Rivers and Harbors Act.

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

Compliance: Not applicable.

16. 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. Coordination is ongoing.

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

Compliance: Not applicable. No archaeological resources are located in the project area.

18. 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. Coordination revealed no conflicts.

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

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

**Executive Orders**

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

Compliance: Coordination with the State Historic Preservation Officer 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: This project would not create a disproportionate environmental health or safety risk for children and is therefore compliant with this Order.

8. 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.

**Executive Memorandum**

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

Compliance: Not applicable. This 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.