Section 107 Navigation Improvement Project
Detailed Project Report and
Environmental Assessment

# Blue Hill Harbor
# Blue Hill, Maine

US ARMY CORPS
OF ENGINEERS
New England District

February 2022

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DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NORTH ATLANTIC DIVISION
FORT HAMILTON MILITARY COMMUNITY
302 GENERAL LEE AVENUE
BROOKLYN, NY 11252-6700

FEB 2 2 2022

CENAD-PD-C (11-2a4)

MEMORANDUM FOR Commander, US Army Corps of Engineers, New England District (CENAE-EP), 696 Virginia Road, Concord, MA 01742-2752

SUBJECT: Approval of the Final Detailed Project Report and Environmental Assessment for Blue Hill Harbor, ME, CAP Section 107 Study (P2# 328230)

1. References:

a. Memorandum, CENAE-PDP, 02 December 2021, Submittal of Final Detailed Project Report and Environmental Assessment (DPR and EA) for Blue Hill Harbor, ME, CAP Section 107 Study (PWI: 328230) for Approval

b. Memorandum, CENAD-PD-P, 02 February 2022, Final Detailed Project Report and Environmental Assessment (DPR & EA) for Blue Hill Harbor, ME Section 107 Project (PWI 328230) for Approval

2. The New England District (NAE) submitted for approval the Final Feasibility Report, Environmental Assessment and Finding of No Significant Impact for the Blue Hill Harbor, Maine, study as part of the Continuing Authorities Program - Section 107 (Reference 1.a.).

3. The North Atlantic Division (NAD) Review Team reviewed the package, commented on, and backchecked the revised final submission package and recommends approval by the NAD Commander (Reference 1.b.).

4. I concur with the findings and recommendations of the New England District Commander, Colonel John A. Atilano II, which consists of dredging approximately 91,000 cubic yards of material from the existing channel and depositing the majority of the material in open water and the portion unsuitable for open water deposition in an adjacent confined aquatic disposal (CAD) cell. The total project cost is approximately $3.45M with a cost sharing ratio of 90% Federal and 10% Non-Federal. The Non-Federal Sponsor is the Town of Blue Hill, ME. This report recommends that a Federal navigation project be adopted at Blue Hill Harbor, Maine, under the authority of Section 107 of the River and Harbor Act of 1960, as amended.

5. The date of this report approval, CW170, should be recorded in the P2 project schedule. This completes the feasibility phase for the study.

6. The point of contact is Mr. Joseph Forcina, Chief, Civil Works Integration Division, at (347) 370-4584 or joseph.forcina@usace.army.mil.

THOMAS J. TICKNER
Brigadier General, USA
Commanding

Encls
1. CENAE-PDP Transmittal Memo
2. CENAD-PD-P Review Memo

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NORTH ATLANTIC DIVISION
FORT HAMILTON MILITARY COMMUNITY
302 GENERAL LEE AVENUE
BROOKLYN, NY 11252-6700

CENAD-PD-P (800B-11-2-220a) 2 February 2022

MEMORANDUM FOR Chief, Civil Works Integration Division (Mr. Joseph Forcina)

SUBJECT: Final Detailed Project Report and Environmental Assessment (DPR & EA) for Blue Hill Harbor, ME Section 107 Project (PWI 328230) for Approval

1. References:

a. CENAD-PD-C Email dated 2 February 2022 transmitting the updated Executive Summary and the EA/FONSI in reply to Reference 1b.
b. CENAD-PD-P Memorandum dated 28 January 2022 transmitting the comments in reply to Reference 1d.
c. Pre-brief for the final DPR & EA conducted on 16 December 2021.
d. CENAD-PD-C Email dated 11 December 2021 transmitting the subject Blue Hill DPR and EA package and requesting review.
e. CENAE-PD-P Memorandum dated 2 December 2021 transmitting the final DPR and EA for the Blue Hill Harbor, ME Section 107 Project.
f. CENAD-PD-P Memorandum dated 12 May 2021 transmitting comments on review of draft report to CENAD-PD-C.

2. The Policy & Legal Compliance Review (P&LCR) Team led by the North Atlantic Division Planning and Policy Division (CENAD-PD-P) conducted a backcheck review of the updated documents transmitted via Reference 1a and determined that all economic and editorial comments have been adequately addressed. The team recommends approval of the Blue Hill Harbor DPR and EA for the Design & Implementation Phase. T

3. Please direct any questions to Ms. Naomi Fraenkel, AICP, Navigation Planning Program Lead at (917) 359-2819 or Mr. Young Kim, P.E., Planning Program/CAP Manager at (347) 370-4514.

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JOSEPH R. VIETRI
Chief, Planning and Policy Division
Programs Directorate

CF: Christopher Ricciardi, Ph.D./CWID DST

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

CENAE-PDP

02 December 2021

MEMORANDUM FOR Commander, North Atlantic Division, U.S. Army Corps of Engineers, (ATTN: CENAD-PD-CID-P, Mr. Christopher Ricciardi), Fort Hamilton Military Community, 301 General Lee Avenue, Brooklyn, NY 11252-8400

SUBJECT: Submittal of Final Detailed Project Report and Environmental Assessment (DPR and EA) for Blue Hill Harbor, ME Section 107 Project (PWI 328230) for Approval

1. Public Review of this report was concluded in May 2020. MSC review of the draft report was completed 12 May 2021. ATR was certified 11 August 2021. The project addresses the need for commercial navigation improvements at Blue Hill Harbor, located in Hancock County, in the Town of Blue Hill, Maine, the project Sponsor. The recommended plan consists of a 6-foot channel and turning basin to access the town wharf in the inner harbor to principally benefit the town's commercial lobstering fleet.

2. NAE hereby requests NAD approve the enclosed Final DPR and EA. As discussed at the 14 September 2021 pre-brief, the report was prepared using FY21 price levels, and an updated FY22 estimate will be provided when the PPA package is submitted.

3. The non-federal sponsor, the Town of Blue Hill, has provided a letter of support for the project and a Self-Certification of Financial Capability.

4. Additional information on this investigation can be obtained by contacting the Project Manager, Mr. Mark Habel, at (978) 318-8871 or Mark.L.Habel@usace.army.mil.

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8 Encls
See Attached Submittal List

JOHN A. ATILANO II
COL, EN
Commanding

**MSC Review of Final Detailed Project Report (DPR)
and Environmental Assessment (EA)**

**Section 107 Feasibility Phase Decision Document**

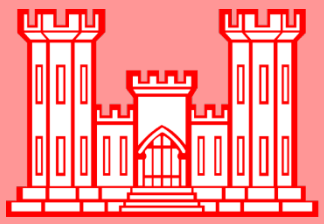
Submittal Pre-Brief Held with NAD and District: 14 September 2021

| List of Final Report Submittal Items | |
|---|---|
| 00 | Transmittal Memo from NAE Commander to NAD Commander (With Copy to CWID) transmitting the Final report |
| 01 | Final DPR/EA and Appendices, Including: |
| | Main Report |
| | Environmental Assessment and FONSI |
| | Appendix A – Correspondence<br>Appendix B – Economics<br>Appendix C – Engineering Design<br>Appendix D – Cost Engineering<br>Appendix E – Real Estate<br>Appendix F – Sediment Testing<br>Appendix G – EFH Assessment<br>Appendix H – Suitability Determination |
| 02 | Track Change Version of DPR and EA and Economics Appendix Showing Edits made Since the Draft Report |
| 03 | Response to Comments Document – Draft PGM (Word File) |
| 04 | Certification of District Quality Control Review – 14 September 2021 |
| 05 | Certification of Agency Technical Review – 11 August 2021 |
| 06 | Updated Certification of Legal Sufficiency – 24 September 2021 |
| 07 | Updated CAP Project Fact Sheet – 14 September 2021 |
| 08 | Non-Federal Sponsor Letter of Support and Self-Certification of Financial Capability for Decision Documents – 8 November 2021 |

# BLUE HILL HARBOR
# BLUE HILL, MAINE

## NAVIGATION IMPROVEMENT PROJECT

## DETAILED PROJECT REPORT
## AND
## ENVIRONMENTAL ASSESSMENT



**FEBRUARY 2022**

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# EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (USACE), in partnership with the town of Blue Hill, Maine (Town) conducted this feasibility study to examine establishing a Federal Navigation Project (FNP) in Blue Hill Harbor, Blue Hill, Maine. The study was conducted to determine if Federal participation in channel and related navigation improvements is warranted. The proposed channel improvements would increase the harbor's ability to accommodate safe and efficient commercial fishing vessel operations from the town landing. Establishing a FNP would also eliminate groundings of fishing boats transiting to and from the landing at lower tides.

There is no existing Federal Navigation Project for Blue Hill Harbor. A prior study in 1972 recommended adoption of a project consisting of a channel to the town landing with a turning basin at its head. Lack of local financing prevented implementation of a project at that time. An initial appraisal and Federal Interest Determination (FID) was completed August 13, 2013 and recommended proceeding with this cost-shared feasibility study. A Feasibility Cost-Sharing Agreement was executed between the town of Blue Hill and the USACE on June 29, 2015.

This study developed and analyzed various alternatives for navigation channel improvements and the benefits that each alternative provides. The Recommended Plan, as shown in Figure ES-1, would establish a channel -6 feet deep at mean lower low water by 80 feet wide, extending about 5,400 feet from deep water off Parker Point up-harbor to the Blue Hill town landing with a one-half-acre turning basin at its head. Only the upper 2,600 feet of the channel would require dredging. The dredging would be by mechanical bucket dredge and scow that will be able to operate in shallow draft areas in the channel.

The project would involve the dredging of about 71,500 cubic yards (CY) of mixed silty and sandy material from the channel and turning basin. Testing has determined that most of this material is suitable for open-water placement at the previously used Eastern Passage Disposal Site. Dredged material from the upper channel reaches includes about 10,600 cubic yards from the upper two feet of material that has been determined unsuitable for unconfined open water placement. To dispose of the unsuitable portion of the dredged material a confined aquatic disposal cell (CAD), about 1.8 acres in size, would be constructed in the harbor north of the channel. Forming the CAD cell would require dredging an estimated 19,500 cubic yards of material. Of the remaining 60,900 CY of the suitable dredged material from the lower channel reaches, about 8,800 CY, would be used to cap the CAD cell after it is filled. All remaining suitable material, including 52,100 CY from the channel and the 19,500 CY dredged to create the CAD cell (a total of 71,600 CY) would be placed at the previously used Eastern Passage Disposal Site.

Various other channel depths and upland disposal options for the unsuitable material were also evaluated. The Recommended Plan, with a 6-foot channel and turning basin and disposal of unsuitable material in a CAD cell would result in the greatest economic net benefits derived for providing the commercial fishermen with reliable and improved access to the facilities in Blue Hill Harbor.


The USACE has concluded the proposed navigation improvements would cause a temporary disruption of the environmental resources present in the construction work area and immediately adjacent during dredging operations and no significant long-term effects are anticipated. Due to the benefits attributable to the commercial fishing industry, any effects are considered to be offset by the improvement and the resulting overall economic benefit to the region.

Future maintenance dredging of the completed improvements by the Federal government would be done when needed contingent upon the availability of maintenance funds, the continued economic justification of the project, and the environmental acceptability of maintenance activities.

An analysis of climate change focused on anticipated sea level rise rates and their effect on the feasibility of proposed navigation improvements through accessibility of the Town Landing. Three levels of sea level rise, historic, intermediate and high were evaluated for the 50-year project economic life and the 100-year planning horizon. The analysis was conducted with respect to mean higher high water, and the 99% Annual Exceedance Probability storm surge at mean high water was used to approximate an annual storm event or nor'easter highest annual tide levels. The analysis determined that the level of risk was not assumed to effect project feasibility.

The total estimated cost of design and construction for the recommended plan, based on price levels as updated in February 2022 for Fiscal Year 2022 (October 2021) price levels, would be $3,253,000. Annual benefits to commercial navigation would be $181,000 as compared to annual costs of $125,400 resulting in a benefit to cost ratio of 1.44, and net annual benefits of $55,600.

The Lands, Easements, Rights of Way, Relocations and Disposal Areas (LERRDs) costs for town provision of a construction access for the town wharf include $5,000 in Government administrative costs and $5,000 in town costs. The latter cost may be credited against the town's additional ten percent post-construction share of total project costs.

Escalating the design and implementation cost to FY2024 (December 2023) price levels gives a fully funded cost of $3,447,000. The non-Federal Sponsor would be required to provide ten percent of the cost of design and construction ($344,700) up-front upon execution of a Project Partnership Agreement before project design can be completed, and a second ten percent upon completion of construction, which after credit for Town-provided easements ($5,000) would be $339,700. The total non-Federal share of project implementation is $689,400, including real estate. The total Federal share, 90 percent up-front, is $3,102,300.

**Table ES-1**
**Blue Hill Harbor, Maine**
**Section 107 Navigation Improvement Project Summary**
**Projected Costs and Cost-Sharing for the Recommended Plan**

| | | |
|---|---|---|
| Improvement Dredging - Cubic Yards – Channel<br>– CAD Cell | | 71,500 CY<br>19,500 CY |
| Project First Costs (FY 2022 (Oct 2021) Price Levels) | | |
| Construction Costs and Contingencies (Oct 2021) | | $2,678,000 |
| Planning, Engineering and Design | | $354,000 |
| Construction Management | | $212,000 |
| Real Estate Costs (LERR – Town Wharf Access) | | $10,000 |
| Total Project Costs | | $3,253,000 |
| Total Investment Cost (with IDC) | | $3,262,000 |
| Cost-Benefit Analysis<br>(Updated FY 2022 Price Levels)<br>(2.25% FY22 Interest Rate = 0.03352) | Commercial Navigation Benefits Only | Commercial & Recreational Benefits |
| Annual Cost | $125,600 | $125,600 |
| Annual Benefits | $181,000 | $327,600 |
| Annual Net Benefits | $55,400 | $202,000 |
| Benefit Cost Ratio | 1.44 | 2.61 |
| Cost-Sharing – Design & Implementation (FY24 Fully-Funded Price Levels) | | |
| Fully Funded Project Cost (December 2023) | | $3,447,000 |
| Federal Cost – 90% | | $3,102,300 |
| Non-Federal Cost – Up-Front – 10% | | $344,700 |
| Non-Federal Additional Contribution Post Construction | | $344,700 |
| LERR Credit | | -$5,000 |
| Total Non-Federal Cost Share - Cash | | $684,400 |

The District Engineer finds that Federal participation in providing commercial navigation improvements at Blue Hill Harbor, Maine is warranted. The proposed action would result in positive economic benefits to the commercial fishing fleet and the local economy, exceeding annualized costs. Based on the review and evaluation of the environmental effects of the proposed action as presented in the accompanying USACE 2021 Environmental Assessment, the adoption of a Federal Navigation Project at Blue Hill Harbor is not a major Federal action significantly affecting the quality of the human environment. In making this determination the District Engineer has considered public and other comments on the Federal Action.

In conclusion, the USACE recommends that a Federal navigation project be adopted at Blue Hill Harbor, Maine, under the authority of Section 107 of the River and Harbor Act of 1960, as amended, in accordance with the Recommended Plan identified in the Detailed Project Report, with such further modifications thereto as in the discretion of the Chief of Engineers may be advisable.

The recommendations contained in this report reflect the information available at this time and current USACE Departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are authorized for implementation funding.

# Blue Hill Harbor, Maine
# Navigation Improvement Project
# Detailed Project Report

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# BLUE HILL HARBOR, MAINE
# SECTION 107 NAVIGATION IMPROVEMENT PROJECT
# DETAILED PROJECT REPORT

## 1 INTRODUCTION

This study evaluates the feasibility of establishing a Federal Navigation Project (FNP) in Blue Hill Harbor, Blue Hill, Maine. The improvements would increase the harbor's ability to accommodate safe and efficient vessel operations from the town landing. Navigation improvements would alleviate delays for the commercial fishing vessels using the landing for offloading catch, fueling, and provisioning. They would also eliminate groundings of fishing boats transiting to and from the landing at lower tides.

The commercial fleet at Blue Hill has increased over the years, with boats being based out of several small coves and harbors along the Town's shores on Blue Hill Bay. Improving the town landing at Blue Hill Harbor would provide a central location for the fleet to work from. This would assist in attracting a stable group of buyers for the catch landed by the fleet, place the fleet closer to services, supplies and fuel providers, and enable near year-round operations from a protected harbor area.

Lack of adequate channel depth and turning area at the town wharf have limited its use to higher tide stages. Part of the Town's fleet chooses to operate out of more distant small coves and harbor areas, which are in more exposed locations that limit their months of operation and safety of access. Reduced operating costs could be realized with a central and more accessible landing. These tidal delays and damages increase the operating costs of Blue Hill fishermen, reducing net incomes and reducing overall economic efficiency.

This Detailed Project Report (DPR) is the result of an engineering, economic and environmental feasibility study of navigation improvements in Blue Hill Harbor, Maine (Figure 1). The town is home to a large commercial fishing fleet and a number of seasonal recreational boats and facilities.

A 1972 U.S. Army Corps of Engineers (USACE) DPR concluded that establishing a Federal navigation channel in Blue Hill Harbor was in the Federal interest, but lack of local financing prevented implementation at that time. By letter of September 9, 2009 the town of Blue Hill requested that the USACE revisit the feasibility and Federal interest in the improvements proposed in 1972 for the navigation conditions in Blue Hill Harbor. An initial appraisal and determination of Federal Interest was completed August 13, 2013 and approved by the North Atlantic Division on October 24, 2013. The Section 107 Fact Sheet was approved by the Assistant Secretary of the Army for Civil Works (ASA-CW) on November 21, 2014. A Feasibility Cost-Sharing Agreement was executed between the town of Blue Hill and the USACE on June 29, 2015. The principal Federal interests at Blue Hill are improving the safety and efficiency of commercial navigation for vessels accessing the town wharf where grounding damages, tidal delays, and congestion delays hinder vessel operations.

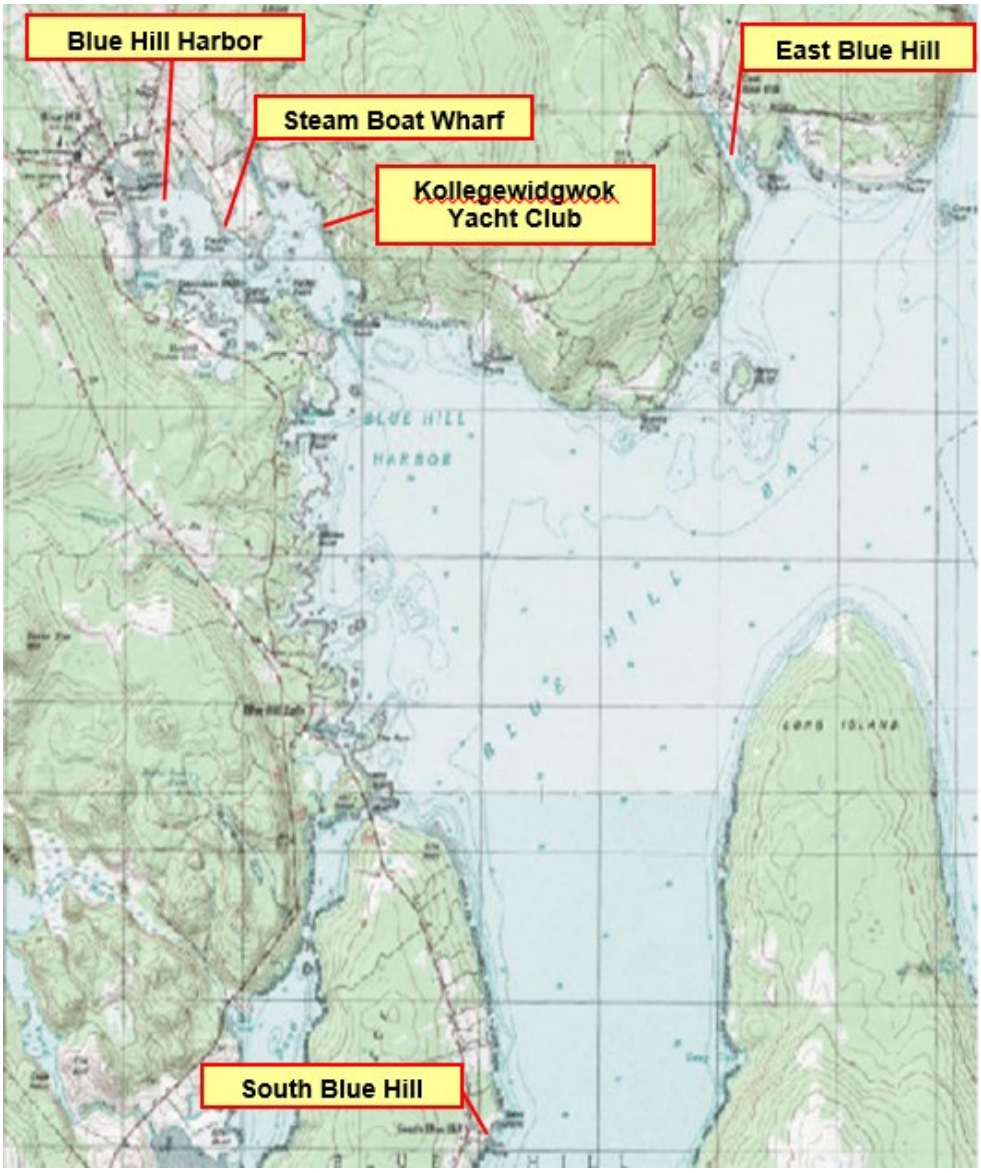

Figure 1 – Project Location Blue Hill Harbor, ME Navigation Improvement Project

## 1.1 Study Purpose and Authority

This report is prepared and submitted under the authority and provisions of Section 107 of the River and Harbor Act of 1960, as amended. Section 107 provides authority for the USACE to improve navigation including dredging of channels, anchorage areas, and turning basins and construction of breakwaters, jetties and groins, and other general navigation features in partnership with non-Federal government sponsors such as municipalities, counties, special chartered authorities, or units of state government. The town of Blue Hill is the non-Federal sponsor for this study and project.

## 1.2 Project Study Process

The feasibility study is cost-shared 50/50 between the non-Federal Sponsor and the U.S. Army Corps of Engineers, except for the first $100,000 in study costs which is funded 100

percent by the Federal government. The feasibility study examines reasonable alternatives for the problems and needs and determines the best solution consistent with Federal policy. The solution must pass three criteria: economic feasibility, environmental impacts, and it must have a local partnership. The steps in the process are:

1. Feasibility Study - The first $100,000 of Feasibility Study costs were 100 percent federally funded, including the preparation of a Federal Interest Determination that recommended proceeding with the feasibility study. Costs over the $100,000 are being shared with the non-federal sponsor on a 50/50 basis (up to one-half of the non-federal share can be in the form of in-kind services).
2. Final Project Design and Preparation of Plans and Specifications - Detailed design and preparation of plans and specifications are treated as part of total project costs for purposes of cost sharing and the non-federal cost share for these activities is collected with the construction cost share.
3. Project Construction - Funding of project design and construction for commercial navigation projects with a design depth of 20 feet or less is initially 90 percent Federal and 10 percent non-Federal. The non-Federal Sponsor is also responsible for an additional 10 percent contribution after construction, payable over a period of up to 30-years.
4. Future Project Maintenance - The U.S. Army Corps of Engineers is responsible for future maintenance of projects for commercial navigation for project depths of 50 feet or less, subject to available funding. Funding for shallow draft project maintenance has been constrained in recent years. Maintenance of projects constructed for recreational navigation purposes, or separable project features designed to provide recreational benefits, are a 100 percent non-Federal responsibility.

## 1.3 Project Location

Blue Hill Harbor is the principal commercial fishing harbor of the town of Blue Hill, located in Hancock County, Maine. The harbor is located 160 miles by highway northeast of Portland, Maine, 16 miles west of Bar Harbor, and 13 miles southwest of Ellsworth, Maine. Blue Hill Harbor is located on the northwest side of Blue Hill Bay, northwest of Long and Mount Desert Islands. 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. Blue Hill Harbor and the surrounding location can be found on the National Ocean Survey Chart #13316 entitled "Blue Hill Bay." Blue Hill is located in Maine's second Congressional District.

## 1.4 Scope of the Study

This DPR summarizes the investigation of alternatives for providing navigation improvements at Blue Hill Harbor, Maine, for the benefit of the area's commercial fishing fleet. The steps in the study included an inventory of applicable and available information, performance of topographic and hydrographic surveys, environmental sampling and testing, and preparation of base plans. Public officials and harbor users were contacted to provide information and seek input in the study process. Based on these efforts, planning objectives and constraints were developed and alternative plans formulated. These plans were developed and evaluated in coordination with state authorities and the final alternative plans were selected for detailed study.

This report provides for the following:

- Identifying existing conditions and historical trends within the study area;
- Determining the navigational problems and needs of the area;
- Determining the most probable future condition without Federal improvements;
- Developing alternative improvement plans;
- Evaluating and comparing the engineering, economic, environmental, and social impacts of the alternative plans, with respect to the future condition; and
- Recommending improvements that are implementable, economically feasible, environmentally and financially acceptable, and socially beneficial.

The geographic scope includes:

- The inner portion of Blue Hill Harbor which includes town wharf and the area known as Steamboat Wharf,
- The naturally deep channel area, connecting the inner, middle, and outer portions of Blue Hill Harbor,
- Alternative landing points for the commercial fishing fleet within the town of Blue Hill, including South Blue Hill and East Blue Hill,
- Areas of possible impacts beyond the immediate vicinity of Blue Hill Harbor, including the dredged material disposal site and the areas from which resources are harvested by the commercial fleet.

## 1.5 Prior Studies and Improvements

Navigation improvement studies of the Blue Hill area have occurred since 1891 when the first survey of navigation conditions was conducted by USACE. The River and Harbor Act of 1890 authorized a survey of Blue Hill Harbor for the purpose of securing a large entrance to the harbor. The survey report in 1891 found that Blue Hill Harbor was not worthy of improvement by removal of the ledges known as "Middle Ground, Eastern and Western", but aids to navigation were recommended.

The River and Harbor Act of 1911 authorized a preliminary examination of Blue Hill inner harbor for the purpose of providing a navigable channel to the town wharf, but the findings of the report were that Federal funding was not justified.

The River and Harbor Act of 1945 authorized a preliminary examination of Blue Hill inner harbor for the purpose of providing a navigable channel to the town wharf. The preliminary examination report in 1946 found that improvements were warranted pending study of cost and local cooperation. The 1951 survey report concluded that providing a channel to and a turning basin near the town wharf was not economically justified at that time.

The River and Harbor Act of 1965 authorized a survey of Blue Hill Harbor to determine the advisability of providing improvements in the interest of navigation and allied purposes. A reconnaissance report in 1969 recommended further study of the feasibility of establishing a channel in Blue Hill Harbor. The 1972 Detailed Project Report recommended constructing a channel 100 feet wide, 6 feet deep, from deep water to the Town Wharf including a turning basin 300 feet by 300 feet, 6 feet deep, adjacent to the wharf. The planned improvement did not proceed due to project non-Federal Sponsor funding limitations.

Figure 2 – West and Northwest at the Town-Owned Landing in Inner Blue Hill Harbor

## 1.6 Study Participants and Coordination

The preparation of this report required the cooperation of Federal agencies, state and local government agencies, elected officials of the state and local governments, local commercial fishermen, other harbor users, and interested individuals. Appendix A contains a record of public involvement, agency coordination, and project correspondence.

## 1.7 Non-Federal Sponsor

The project's non-Federal Sponsor is town of Blue Hill, Maine. The town first requested a study of Blue Hill Harbor in their letter of 4 September 2009. The study was initiated in 2012 and a Federal Interest Determination was approved by the North Atlantic Division 24 October 2013. The Section 107 Fact Sheet was approved by the Assistant Secretary of the Army for Civil Works (ASA-CW) on November 21, 2014. A Feasibility Cost Sharing Agreement was executed with the Town on 29 June 2015.

## 1.8 Environmental Operating Principles

The USACE has reaffirmed its commitment to the environment in a set of "Environmental Operating Principles". These principles foster unity of purpose on environmental issues and reflect a positive tone and direction for dialogue on environmental matters. By implementing these principles within the framework of USACE regulations, the USACE continues its efforts to evaluate the effects of its projects on the environment and to seek better ways of achieving environmentally sustainable solutions in partnership with stakeholders. The seven "Environmental Operating Principles" are as follows:

1. Foster sustainability as a way of life throughout the organization.
2. Proactively consider environmental consequences of all USACE activities and act accordingly.
3. Create mutually supporting economic and environmentally sustainable solutions.
4. Continue to meet our corporate responsibility and accountability under the law for activities undertaken by the USACE, which may affect human and natural environments.
5. Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.

6. Leverage scientific, economic and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.
7. Employ an open, transparent process that respects views of individuals and groups interested in USACE activities.

## 1.9 USACE Campaign Plan

The U.S. Army Corps of Engineers Campaign Plan guides USACE policy decisions on how we organize, train, and equip our personnel; how we plan, prioritize, and allocate resources; and how we respond to emerging requirements and challenges and meet national priorities. The Campaign Plan is regularly updated and the current version of the plan covers the period of FY2018 to FY2022.

The USACE strategic plan effort towards improvement began in August 2006 with the "12 Actions for Change" and has evolved to four goals and associated objectives. Although the effort originally developed with a focus on missions that seek to manage risk associated with flooding and storm damage, the Campaign Plan Goals and Objectives are applied to all aspects of the USACE service to the nation including its civil works mission. USACE Campaign Plan Goals and Objectives are derived, in part, from the Commander's Intent, the Army Campaign Plan, and Office of Management and Budget guidance. The four goals are (1) Support National Security, (2) Deliver Integrated Water Resource Solutions, (3) Reduce Disaster Risk, and (4) Prepare for Tomorrow.

The goal and associated objectives most closely related to the study and recommendation of a navigation improvement project at Blue Hill Harbor is:

**Goal 2:** Deliver Integrated Water Resource Solutions

- Objective 2a – Deliver Quality Water Resources Solutions and Services
  The Recommended Plan for navigation improvements at Blue Hill Harbor meets this objective by delivering a project which, within the limits of Federal participation established by Congress, meets to the extent practicable the expectations of our partners and stakeholders in providing safe and efficient navigation for the commercial fleet operating from the town wharf in Blue Hill Harbor.
- Objective 2c – Develop the Civil Works Program to Meet the Future Needs of the Nation
  The Recommended Plan for navigation improvements at Blue Hill Harbor meets this objective by delivering a project which, within the limits of Federal participation established by Congress, provides sustainable system of channel improvements. The study and recommendation were conducted with stakeholder engagement and the public received an opportunity to review and comment on the study and its recommendations through the National Environmental Policy Act (NEPA) process.
- Objective 2d – Manage the Life-Cycle of Water Resources Infrastructure Systems to Consistently Deliver Reliable and Sustainable Performance
  The project has been formulated with the complete life-cycle in mind, with a consideration of the costs and impacts of both initial construction and future operations and maintenance, to determine the most cost-effective alternative solution to address problems and opportunities with navigation at Blue Hill Harbor.

# 2 PROBLEM IDENTIFICATION

This section discusses the project area and the reasons requiring navigational improvements. It establishes the planning objectives and constraints that direct subsequent planning tasks.

## 2.1 Existing Conditions

### 2.1.1 General Description

Blue Hill Harbor, which is extensive in area, is divided into three parts known locally as the outer, middle, and inner harbors. The outer harbor, situated southeast of Parker and Sculpin Points, has an area of approximately 350 acres, with depths ranging from 24 to 48 feet. The outer harbor is exposed to easterly and southerly winds. The middle harbor has an area of 80 acres with depths from 6 to 30 feet. The outer and middle harbors are connected by a deep natural channel between Parker and Sculpin Points. This channel has a width of about 150 feet and a controlling depth of 20 feet. The middle harbor is well protected in all directions. It connects with the inner harbor through a natural channel passing between Parker and Peters Points. The channel has a minimum width of 150 feet and a controlling depth of about 19 feet. The inner harbor contains 57 acres in which shallow depths prevail, ranging from 6 feet at a point 2,200 feet southeast of the town wharf to +3.5 feet at the head of the harbor. The mean lower low water (MLLW) line is about 500 feet seaward of the town wharf. The mean range of the tide is 10.3 feet, and the spring range is 11.7 feet.

Under existing conditions, about half the fishing vessels based in the various parts of Blue Hill load and offload their vessels primarily at South Blue Hill Wharf. Some also use the inner harbor wharf when it is accessible, at high tide. While South Blue Hill Wharf is the most used commercial fishing area, the wharf has no power, water, or other services. 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 landing at South Blue Hill is very exposed to winds and waves, particularly from the south and southeast. Loading and offloading delays occur frequently due to both congestion and the exposed conditions. As the only loading and offloading facility in the harbor, South Blue Hill facilities can be congested, requiring vessels to wait for a space to load or offload. Offloading delays of one to two hours are common, particularly in the summer months, with fishing vessels often lined up to offload. Offloading delays also occur during bad weather and the winter months, when high winds or waves make tying up to the exposed wharf too hazardous. Vessels which do tie up in bad weather are sometimes damaged from banging against the dock. The municipal wharf and floats at South Blue Hill are also regularly damaged, requiring repairs, as vessels knock against the wharf and floats during rough weather.

Some vessels use the inner harbor wharf periodically, depending on conditions and tides. When using the inner harbor wharf, tidal delays can be significant, with vessels lining up to wait for the tide. Another concern in the inner harbor is that vessels moored in the Steamboat Wharf area use private land to access their vessels and park vehicles. If this access is no longer allowed, an alternative location for access and parking will be required. Access and parking at South Blue Hill Harbor is already at capacity, particularly in the summer months. At East Blue Hill access is more limited, with a small boat ramp, limited parking, and no other public facilities. A large private marina occupies much of the harbor area at East Blue Hill. Fishermen and their floats are moored in the harbor's outer reaches. The harbor would

have difficulty accommodating more than the 8 fishing boats that already work out of that location.

### 2.1.2 Recreation/Tourism

The town's economy is heavily dependent on the seasonal summer tourist business. The summer residents, most of whom come from other states, have built up the shoreline of Blue Hill so that about 80 percent of its 15 miles of shoreline is now occupied by estates and summer homes. The town's population is about 2,650 (2020 estimate), a decline of about two percent since 2010. In the summer months the population of Blue Hill swells to over 6,000 with the addition of tourists and seasonal residents attracted to the many recreation and tourism opportunities of the area, cultural amenities such as art galleries, a chamber music center, and nearby Acadia National Park.

Blue Hill Bay borders the west side of Mount Desert Island. During the summer months this reach of the Maine coast offers an unexcelled cruising ground for the boating enthusiast. Bar Harbor on Mount Desert Island is considered the largest yachting center east of Marblehead, Massachusetts. Although there are three other harbors along the east and south sides of the island which are used by boats on vacation cruises, there are no suitable harbors on the Blue Hill Bay (western) side of the bay to attract these craft. An expansion of Bass Harbor on the island's southwest tip completed in 2011 is already fully used by the expanded fishing fleet of that island harbor.

While the principal focus of improvement to Blue Hill Harbor is the commercial fishing fleet on the Bay's western shore, harbor improvements here may also incidentally benefit seasonal recreational boating. Improvements to Blue Hill Harbor would provide access to a population center which would attract craft that presently by-pass the upper reach of Blue Hill Bay. Factors which deter visitors from using the Blue Hill Harbor under existing conditions include the congestion encountered at the yacht club and boat yard landings and lack of public facilities. Without additional access to all-tide public wharf facilities, transients will continue to by-pass the harbor seeking other ports where suitable wharf facilities are available. Any recreational boating benefits would stem from joint use of the improvements designed for the commercial fishing fleet.

### 2.1.3 Economic Conditions

Appendix B contains the Economic Assessment of the proposed Federal Action. The town of Blue Hill is located in northeastern Maine in Hancock County. In 2010, Blue Hill had a population of 2,686 and contained 1,936 housing units (US Census Bureau, 2010). Summary socioeconomic statistics for the town, county and state are shown in the tables below. Between 2000 and 2010, the population and the number of housing units increased, with a population growth of 12.4% and a 30.3% increase in housing units (US Census Bureau, 2000). The median family income in Blue Hill in 2010 was $44,158 (US Census Bureau, 2010). This is slightly lower than the median family income in Maine of $46,933.

In 2016, Blue Hill had a labor force of 1,240 and an unemployment rate of 3.1%. The largest employment sectors in Blue Hill in 2016 were Health care and Social Assistance (27.5%), Retail Trade (18.8%), Accommodation and Food Services (9.1%), and Educational Services (9.0%). (Maine Department of Labor, Center for Workforce Research and Information)

Commercial fishing is a major industry in Maine. It plays a significant role in the economy of Blue Hill and the wider regional area. The economic impact of the industry extends beyond the fishermen to include the many fish buyers, fish processors, and suppliers to Blue Hill fishing activity. Fishing also provides a more year-round income than the seasonal industries that cater to tourists and summer visitors.

In 2014, Blue Hill fishermen landed nearly 1.8 million pounds of catch, including 1,547,549 pounds of live lobster valued at nearly $5,600,000 (Blue Hill Harbormaster, 2015). Other major species landed include eel and scallops. In 2014, total landings were valued at $6,113,000 (Blue Hill Harbormaster, 2015). Blue Hill fishermen generally fish seven to eight months a year, six days a week, and typically fish full-time. Lobster boats predominate, with generally one or two crew per boat plus a captain.

### 2.1.4 Vessel and Fleet Presence

Currently, the Town of Blue Hill contains 428 vessels, of which 50 are commercial fishing vessels and 378 are seasonal recreational vessels. In comparison, in the early 1970's there were seven commercial vessels operating out of Blue Hill. Commercial vessels moor at several areas around the town, including South Blue Hill, Inner and Outer Blue Hill Harbor (including Steamboat Wharf), and at East Blue Hill. The geographical location of Blue Hill Harbor provides prime commercial fishing access to Blue Hill Bay. The fishing vessels range in draft from three to ten feet, with 96 percent of the vessels having drafts 4.5 feet or below.

Recreational craft are used only seasonally, generally between Memorial Day and Columbus Day. Recreational craft are based at private docks all along the Town's shoreline, with concentrations at marinas at Webbers Cove Boatyard at East Blue Hill, Kollegewidgwok Yacht Club at Peters Cove, and the Blue Hill Boatyard on the Inner Harbor. Recreational boating was not a focus of this study. However recreational craft which do not operate out of the marinas and transient recreational craft could benefit incidentally from any navigation improvements designed to serve the commercial fishing fleet through improved access to the town wharf.

### 2.1.5 Harbor Operations

Facilities to support the commercial fishing fleet are located at South Blue Hill and in the inner harbor. The inner harbor is located in the center of town within the main downtown retail district, in upper Blue Hill Bay. In 2012, the town completely rebuilt the inner harbor town wharf, a $300,000 to $400,000 investment, with the long-term goal of relocating commercial fishing loading and offloading operations to a protected location in the center of town. The new town wharf has a crane as well as water service and electricity and ample parking. Currently, the town wharf in the inner harbor is used only minimally since it is accessible at only the highest tides, generally 3 daylight hours per tidal cycle. So high tide access to the town wharf is only available once for 3 hours per working day. The upper end of the inner harbor is dry at mean low tide, with the mean low water line being about 500 feet from the town wharf.

At Peters Point, about 3,400 feet downstream of the town wharf, there are remains of an old steamship company wharf (Steamboat Wharf) upon which a small timber dock has been built. This property is now privately owned as part of a large summer estate. There is a depth of

about 13 feet of water near this wharf. Owners of the dock allow transients and some locally-based boat-owners to use the dock. However there are no supply facilities or ramp and parking is limited. Boat access is by skiff. The wharf is located about 1.25 miles from the center of town. Access by land is over a state highway and a dirt road leading to the summer estate which cannot be acquired by the town.

## 2.2 Problems and Opportunities

The principal navigation issue at Blue Hill Harbor is that the existing conditions do not accommodate safe and efficient operations of comm1ercial fishermen and other vessel operators in the Blue Hill area. Regional demands on the commercial fishing fleet, navigation delays, and inefficiencies have become problematic for the fleet. There is a lack of sufficient water depth in the inner harbor to access the publicly-owned shorefront facilities in Blue Hill Harbor. Under present conditions, navigation is limited to the period of 1.5 hours before and 1.5 hours after high tide, a total of 3 hours, or about one-quarter of the tidal cycle. At low tide a boat drawing two feet or more cannot approach closer than 2,000 feet seaward of the Town Wharf. The only other landings in Blue Hill Harbor that have adequate water access are the Kollegewidgwok Yacht Club in Peter's Cove and the privately owned old Steamboat Wharf site on Peter's Point. The yacht club is a private seasonal recreational facility. The owner of the old Steamboat Wharf site does allow several fishermen to launch across that shore but the site has limited parking and facilities available and would not support expanded or more efficient commercial fleet operations.

Currently, a majority of commercial vessels load and offload at town facilities at South Blue Hill, located outside the protected inner harbor and five miles by road from the town center. South Blue Hill Wharf contains a municipal ramp, docks and floats, as well as 23 moorings for commercial fishermen. South Blue Hill is at maximum capacity with no room for expansion. The heavy use of this area by many of the vessels and the narrow width of the ramp results in frequent and significant congestion delays. The lack of appropriate access to the unloading facilities has caused delays for some boats as they wait to unload their catch resulting in excess labor and fuel costs. The exposure of the site along the more open lower bay also presents challenges to expanded operations.

Other fishermen are based in East Blue Hill Harbor, located outside the protected inner harbor to the northeast. Other fishermen work from the former Steamboat Wharf site, located on the harbor's eastern shore. In addition to the 23 fishing vessels which moor at South Blue Hill, 8 commercial vessels moor at East Blue Hill, 12 moor at the Steamboat Wharf area, and 7 moor elsewhere around the harbor. Currently, there is some use of the town wharf in the inner harbor, but its use is limited due to the shallow access. A large float and gangway is located next to the boat ramp at the Town Wharf and is accessible at higher tides.

The Blue Hill commercial fishing fleet has already maximized the available berthing and offloading space so providing a new channel will alleviate the commercial fleet's navigation problems. The vessels utilizing Blue Hill as a base of operations, must be better accommodated if the commercial operators at Blue Hill are to continue to be competitive in the New England region fish industry. If accommodations are not made, the existing commercial fleet will continue to experience delays, groundings and berthing difficulties reducing the efficiency of commercial fishing operations. To improve navigation conditions that the town seeks dredging of a new channel to allow vessels to safely reach the town wharf

and its access and offloading areas. This study analyzes the alternatives for channel improvement and the benefits that each alternative provides to the existing fleet.

In summary the problems for commercial navigation at Blue Hill are as follows:

- There is a lack of sufficient water depth in the inner harbor to access the publicly-owned shorefront facilities in Blue Hill Harbor. This limits access to the town wharf to only a few hours either side of high tide.
- Fishermen are limited to short period of the day in which they may launch, provision, fuel and offload catch from their boats at the wharf.
- In response to lack of efficient public access many fishermen operate out of other coves in the town or harbor that provide less protection, less adequate access facilities, greater congestion and competition with recreational craft, and damages and delays associated with these conditions.

The opportunity exists to reduce or eliminate these inefficiencies for the commercial fishing fleet at Blue Hill by improving navigational (waterside) access to existing public landing facilities. Improvements in waterside access would benefit the area's fishermen by reducing the cost of operation and harvest of their catch. Goals and methods to achieve these improvements are describe in following sections.

## 2.3 Without Project Condition

The *"Without Project Condition"* is the expected condition if the federal government takes no action to improve the navigation capabilities in the Blue Hill Harbor area.

- At South Blue Hill the wharf will continue to be the only loading and offloading area with all-tide access for Blue Hill fishermen. The exposure of the South Blue Hill wharf to storms and other bad weather conditions will continue to result in damages to vessels, damages to town infrastructure, seasonal restrictions on use, congestion, and resulting delays.
- At East Blue Hill lack of a commercial wharf, congestion and competition with the larger recreational fleet will continue to constrain fishing operations.
- For those vessels which use the Blue Hill Harbor inner harbor town wharf, extensive tidal delays, groundings, and congestion will continue. Fishing boats that use other areas in the harbor, such as the Steamboat Wharf site will continue to operate without adequate landing facilities for commercial operations.
- These delays and damages increase the operating costs of Blue Hill fishermen, reducing their net incomes and reducing overall economic efficiency.

The most likely future condition with navigation at Blue Hill is a continuation of the existing conditions which constrain commercial fishing operations. The improvements that the town has made to the town landing will continue to be under-utilized.

## 2.4 Planning Objectives

Planning Objectives are the desired results of the planning process that will address the identified problems and typically result in the desired changes between the without- and with-project conditions. Planning objectives serve to eliminate from consideration alternatives and considerations that will not address the identified problem.

State and local objectives for the project area include the continued development, management and success of the Blue Hill Harbor area as a base for commercial fishing. The Federal objective of water and related land resources project planning is to contribute to National Economic Development (NED) consistent with protecting the Nation's environment, pursuant to national environmental statutes (National Environmental Policy Act), applicable executive orders, and other Federal planning requirements. This requirement involves:

- Water and related land resources project plans shall be formulated to alleviate problems and take advantage of opportunities in ways that contribute to this objective.
- Contributions to NED are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net benefits that accrue in the planning area and the rest of the Nation. Contributions to NED include increases in the net value of those goods and services that are marketed, and also of those that may not be marketed.

Planning objectives that have been identified to specifically address the navigation problems and opportunities at Blue Hill Harbor for the 50-year period of analysis are:

- Reduce the cost of commercial fishing boat operations in Blue Hill Harbor by eliminating tidal delays and related inefficiencies with waterside access to public landing facilities. .
- Contribute to safer conditions for the commercial fishing fleet in Blue Hill Harbor by reducing or eliminating the risk of vessel groundings and congestion, and providing access to more protected year-round public landing facilities.

## 2.5 Planning Constraints

Planning Constraints are the parameters (natural, fiscal, institutional, etc.) that limit the implementation of a proposed plan or plans to allow for improvement of the navigation conditions in support of the commercial and recreational industries at Blue Hill.

- The primary constraint at Blue Hill Harbor is the natural conditions. Blue Hill inner harbor is a tidal mudflat that is exposed across most of its area at low tide with several areas of rock ledge showing. Navigation improvements within the harbor should be aligned to avoid encountering ledge and minimize the dredged material volume.
- Another constraint is the nature of the material to be dredged and the limitations that places on suitable disposal alternatives. The 71,500 CY material to be dredged for the proposed channel improvements includes approximately 10,600 CY of surficial sediment in the project area nearest to the town wharf that was found to contain polycyclic aromatic hydrocarbons (PAHs). This material while not contaminated to an extent that would require remediation, was found to be unsuitable for unconfined open water placement. This material must be transported upland to an approved landfill or contained on site in a manner consistent with USACE, Environmental Protection Agency (EPA) and state policies.
- The town’s resources are limited, given the low population and limited fiscal resources available to the municipality. Recommended improvements will need to take the town’s fiscal resource limits into account.
- The presence of fisheries and shellfish resources in the harbor and the bay will limit the time of year in which dredging and dredged material disposal can take place to the mid-

fall to early spring timeframe. The routes selected for hauling dredged material must be coordinated with resources agencies and fishermen active in the bay to avoid conflict.

# 3 FORMULATION OF PLANS

The formulation of alternatives for navigation improvement at Blue Hill considered the problems and needs of the study area, and the opportunities and objectives of the study. An alternative must be considered reasonable and designed to achieve the planning objectives and are developed with regard to the planning constraints previously identified. State and non-Federal Sponsor objectives are essential considerations in the evaluation of alternative plans.

## 3.1 Plan Formulation Rationale

The formulation of alternative plans is based on a standard set of criteria. Each of the alternative plans must:

- be complete so that it provides and accounts for necessary investments or other actions to ensure the realization of the planned effects;
- be effective to alleviate the specified problems and achieve the specified opportunities;
- be efficient, demonstrating a cost-effective means of alleviating the specified problems and realizing the specified opportunities;
- be acceptable by state and local entities and the public, and;
- be compatible with existing laws, regulations, and public policies.

Each alternative is considered on the basis of its effective contribution to the planning objectives, and the selection of a specific plan is based on technical, economic, and environmental criteria that allows for a fair and objective appraisal of the effects and feasibility of alternative solutions.

Technical criteria require that the plan have the dimensions necessary to accommodate the expected vessel use, sufficient navigation area to provide for maneuvering of boats, and allow for development or continued use of shore facilities. All plans must contribute to navigational efficiency and be complete within themselves.

Economic criteria require that the benefits of the navigation improvement exceed the economic costs and that the scope of the project is such to provide maximum net benefits. Environmental criteria require that the tentatively selected plan preserve and protect the environmental quality of the project area. This includes the identification of effects to the natural and social resources of the area and the minimization of expected impacts that adversely affect the surrounding environment. It also includes the assessment of effects that may arise during the construction of the proposed navigation improvements and those activities attracted to the area after plan implementation.

## 3.2 Management Measures

Management measures can be identified and evaluated as the basis for formulating alternative plans to solve the navigation problems in Blue Hill Harbor. These management measures are categorized as either structural or non-structural.

Structural measures are those that involve the construction of features that would, to varying degrees, meet the planning objectives developed for Blue Hill Harbor. These include channel improvements such establishing a channel to access additional port areas. A channel would need to be deep enough to reduce or eliminate tidal delays and the risk of grounding. A channel of sufficient width would reduce or eliminate channel congestion and assist in maneuvering for facility access and egress.

Nonstructural measures involve those that would achieve the same planning objectives, but without resorting to structural improvements. An example of a nonstructural measure applicable to small fishing harbors involves the transfer of commercial fishing vessels to neighboring ports having capacity to sufficiently accommodate additional vessels at existing facilities. Another example of a nonstructural measure for a small fishing harbor would be use of tidal navigation to avoid dredging. These are discussed in the general consideration of alternatives below.

Given the limited nature of the improvements under consideration for this Section 107 CAP small navigation project more costly structural solutions such as relocation of port facilities to areas with deeper navigation access were not considered. The Blue Hill Harbor town wharf in the inner harbor is already developed for navigation access. Acquisition of private lands for public commercial port development in other areas of the harbor or town would be far more costly than constructing a channel to the existing inner harbor town wharf.

## 3.3 Analysis of Alternatives Considered

### 3.3.1 General Considerations and Non-Structural Alternatives

Navigation improvement alternatives were developed and analyzed during the early stages of the planning study. These alternatives included both structural measure (various dredging options) and nonstructural measures, including the possibility of transferring commercial fishing vessels to neighboring ports (Table 1).

Fleet Transfer to Other Harbors: 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 vessels if another alternative site does not have the capacity to provide adequate access 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, are fully used and suffer from overcrowding. These ports cannot handle the potential influx of vessels due to their lack of adequate anchorage or berthing space.

The only other option in Blue Hill Bay is the Union River Federal Navigation Project at Ellsworth, Maine. This harbor is a tidal river port, seasonally restricted by winter ice formation and does not have shore support facilities necessary for the fishing fleet and boats operating from Blue Hill. All three alternative harbors would increase the daily haul distance by 20 to 25 miles roundtrip.

| Table 1 – Distances to Alternative Ports | | | |
|---|---|---|---|
| From Blue Hill Harbor | Bass Harbor | Union River | Stonington Harbor |
| Miles Overland by Road | 37 | 14 | 24 |
| Miles by Water | 21 | 20 | 26 |

Within the town of Blue Hill the commercial fishing 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 in Blue Hill Harbor, 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.

Steamboat Wharf lacks facilities to load/unload provisions and catch on launch boats. 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.

Continue Tidally Restricted 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 to alleviate tidal delays and groundings. Further reliance by the fleet on tidal navigation would fail to address the problems experienced by the fleet.

### 3.3.2 Structural Alternatives

The Town of Blue Hill has made improvements to benefit commercial interests to the town wharf, located in the inner harbor which is completely protected. The town wharf has water, electricity, and a crane for loading/unloading. The wharf also has a heavy duty concrete boat ramp for launching vessels. The town wharf is directly adjacent to a hospital and a fire department. It also serves as the base of operation for the Harbormaster. The town wharf is in the town center, which provides ease of access to fuel, ice, and other necessary provisions.

The town center is accessed by state highways. A channel into the town wharf would provide necessary access to facilities and would provide relief to overcrowding at other landings. All tide access to the town wharf in the inner Blue Hill Harbor is the only reasonable alternative to relieve the delays and groundings experienced by the existing fleet. Due to the constraint of avoiding rock ledge in the harbor and the fixed location of the town wharf, only one channel alignment was analyzed.

Due the presence of elevated PAH levels in the upper two feet of sediment in the proposed channel's upper reach, alternatives were developed to handle the material determined unsuitable for unconfined open water placement at either of the two existing and recently used open water sites in Blue Hill Bay. After conferring with the Town and state regulatory agencies it was determined that the 10,600 of material with higher PAH levels could either be rehandled at the shore and hauled away by truck to an approved landfill or placed in a confined aquatic disposal cell constructed in the harbor to receive that material (Figure 3).

Alternatives were developed based on project depth optimization and disposal options for unsuitable dredged material. Project depths of 5, 6, and 7 feet at MLLW were evaluated to aid in optimization of the tentatively selected plan. Alternatives for disposal of unsuitable dredged material include placement in an in-harbor Confined Aquatic Disposal (CAD) Cell, or re-handling material ashore for dewatering and transport to an upland disposal facility. Table 2 below shows the features of the alternative plans.

**Table 2 – Blue Hill Harbor, Summary of Detailed Plans**

| Federal Plan Description | Plan 1 | Plan 2 | Plan 3 |
|---|---|---|---|
| Channel Depth (MLLW) | 5 Feet | 6 Feet | 7 Feet |
| Channel Length - Total | 5,400 | 5,400 | 5,400 |
| Channel Length - Dredged | 2,500 | 2,600 | 2,700 |
| Channel Width | 80 Feet | 80 Feet | 80 Feet |
| Turning Basin | 0.6 Acres | 0.6 Acres | 0.6 Acres |
| Disposal Alternatives | Plan A | Plan B | |
| Suitable Material | Open Water EPDS | Open Water EPDS | |
| Unsuitable Material | CAD cell | Upland | |

**(1) Plan A – Town Wharf Channel & CAD Cell** – This alternative for navigation improvement proposes to establish a channel in Blue Hill Harbor 80 feet wide from deep water northeast of Parker's Point up-harbor to the Blue Hill town wharf with the channel widened to form a turning basin 160 by 160 feet adjacent to the town wharf. Based on the vessel size and the amount of congestion in the area it was determined that a width of 80 feet would provide proper clearance for vessels using the town wharf to maneuver to the offloading docks, and around other vessels.

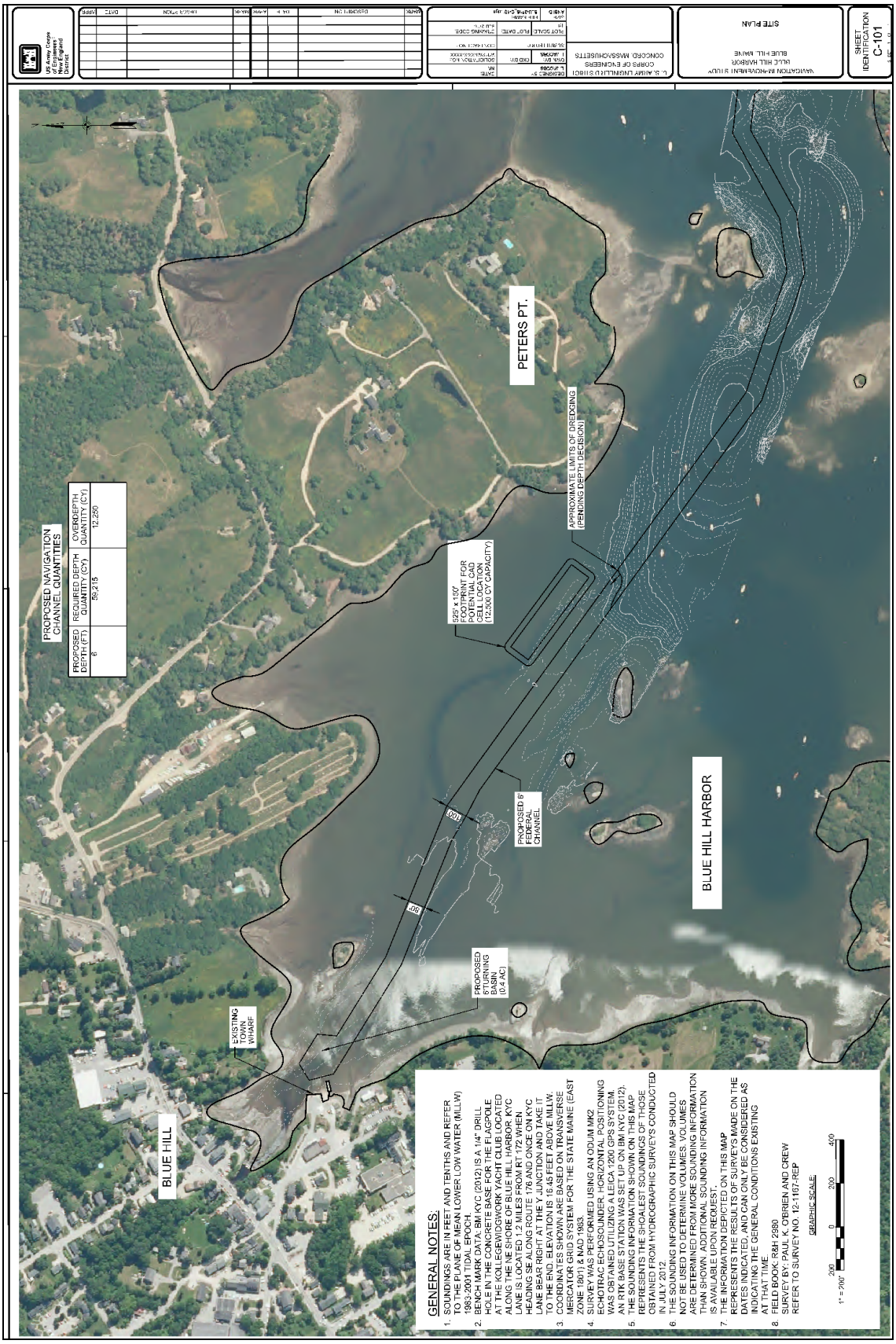


Figure 3 – Location of Plan A and Plan B

Under this plan disposal of suitable dredged material would be at one of two available open water placement sites in Blue Hill Bay. Both sites are located about 14 miles from the town wharf at Blue Hill Harbor. The remaining 10,600 CY of unsuitable material would be placed in a CAD cell dredged in the inner harbor along the channel. The material dredged to form the CAD cell would be placed in the open water site in the bay. Suitable material dredged from the lower channel reaches would be used to cap the CAD cell once it was filled with the unsuitable material. To accommodate the unsuitable material and the cap about 19,500 CY of material would be dredged to form the CAD cell. After filling the CAD would be capped using suitable material dredged from the lower channel reaches.

**(2) Plan B –Town Wharf Channel & Upland Disposal** – This alternative allows for the same channel dimensions and features as Plan A but with a different disposal method for the unsuitable material. The portion of dredged material not suitable for open water placement would be excavated and re-handled ashore for dewatering, then placed into lined trucks and transported to a licensed landfill for disposal. Table 3 below shows the quantities of dredged material estimated for each of the three project depth increments and the breakdown of those quantities into suitable and unsuitable materials.

**Table 3 – Quantity Estimates (in Cubic Yards) for Plans A and B**

| Channel Depth Increment | Required Removal | 1-Foot Overdepth Allowance | Total Cubic Yards (cy) | Total Suitable Material | Total Unsuitable Material |
|---|---|---|---|---|---|
| 5-Foot Channel | 48,600 | 11,800 | 60,400 | 49,800 | 10,600 |
| 6-Foot Channel | 59,200 | 12,300 | 71,500 | 60,900 | 10,600 |
| 7-Foot Channel | 73,000 | 13,200 | 86,200 | 75,600 | 10,600 |
| CAD Cell excavation with Plan A would require an additional 19,500 cy of dredging under each depth increment. 6-Foot Quantities revised for modified channel bend. | | | | | |

## 3.4 Dredged Material Management Alternatives

Appropriate suitable disposal of the dredged material can impact project cost and engineering feasibility, due to the distance and location associated with the disposal, special handling of the dredged material, the method of dredging required by the disposal method, and the need for any containment or treatment of the dredged material.

The material to be dredged at Blue Hill Harbor is predominantly poorly graded fine to coarse sands with overlying marine clay deposits (see Environmental Assessment). A cobbley glacial till material is found in the upstream areas by the town landing. A suitability determination was prepared based on sediment test results and was concurred with by the USACE, EPA and the state of Maine. Approximately 10,600 CY of sediment localized in the upper two feet of sediment located in the upper channel reach and proposed turning basin portions of the project was determined to be unsuitable for open water placement due to elevated PAH levels. All other sediment from the proposed Blue Hill Harbor Navigation Improvement Project, excluding that 10,600 CY, was found to be suitable for open water placement. Five options for disposal of the material were considered: open water placement, upland disposal, CAD cell, Confined Disposal Facility (CDF), and beneficial use:

- Open Water Placement – The nearest available ocean disposal site in Blue Hill Bay is the Eastern Passage Disposal Site (EPDS). This site is approximately 14 miles southeast of Blue Hill Harbor. This site is the preferred disposal site for the portion of this dredging project found suitable for open water disposal.
- Upland Disposal – An upland disposal site was identified in collaboration with Maine 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 material unsuitable for open water placement would need to be either dewatered and trucked offsite or transported in lined trucks to the disposal site.
- Confined Aquatic Disposal Cell – A CAD cell is an engineered containment feature for the isolation of dredged material determined to be unsuitable for unconfined open water placement. CAD cells are constructed to reduce the risk from unsuitable sediments by storing them in a depression in the bottom of an aquatic system. CAD 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 unsuitable materials by confining the sediments to a smaller footprint, increasing contaminant diffusion times, removing them farther from physical processes that can result in transport, and providing a means to effectively cap the sediments.
- Confined Disposal Facility – A CDF is an engineered structure for containment of dredged material. The confinement dikes or structures in a CDF enclose the disposal area above any adjacent water surface, isolating the dredged material from adjacent waters during placement. The Town had considered construction of a containment along the shore to the north of the turning basin site by bulk-heading an area seaward of the existing shore and backfilling the area using material from the dredging project and potentially the adjacent tidal flats between the basin and shore that was unsuitable for open-water placement. The cost of constructing a stone or sheet pile bulkhead would be significantly in excess of the cost of constructing a CAD cell in the harbor or the bay. Any difference in cost would need to be borne by the Town. This disposal measure was dropped from further consideration due to cost.
- Beneficial Use - Nourishment – The project provides opportunity to evaluate beach nourishment and nearshore disposal. These are considered actions that provide beneficial reuse of the dredged material and are generally considered to have positive environmental benefits and generally have the least adverse effects from the proposed navigation improvement. The unsuitable material in the upper two feet of the upstream dredge areas cannot be used for either beach or nearshore placement. The remainder of the material from the lower strata to be dredged is a mix of till, marine clays, sands and gravels with a dredge cut of between one to five feet. This mixed material in a shallow cut does not lend itself to segregation of materials in a manner that would allow them to be used as nourishment. There are also no public beaches in the upper or western regions of Blue Hill Bay that would benefit from nourishment actions.
- Beneficial Use - Wetlands – Dredged materials of mixed grain size can sometimes be used for saltmarsh or mudflat restoration or creation. Such features have been constructed along the Maine coast in the past when that option was determined to be the least costly

means of disposing of the dredged material. When not the least cost means, Federal participation must be based on an evaluation of ecological habitat benefits v. the increase in project costs, or the non-Federal Sponsor must be willing to pay the cost difference. Such project typically involve rehandling of the dredged material, using of additional dredge plant and equipment, and long-term site management and monitoring. Incorporation of habitat restoration project features into the dredging project for Blue Hill Harbor would be more costly than open water placement at either of the two existing nearby sites. No opportunities for development of saltmarsh or other coastal wetlands habitat using the dredged material from Blue Hill were identified during the study.

- Beneficial Use – Ship Island – Ship Island is located in lower Blue Hill Bay about 16 miles from Blue Hill Harbor and is operated by the U.S. Fish and Wildlife Service as part of the Maine Coastal Islands National Wildlife Refuge Complex. The Service contacted the USACE in early 2021 proposing that the suitable silty dredged material from Blue Hill Harbor be placed upland on the island to mitigate the effects of sea level rise on the island's elevation. Based on similar recent projects in New England that involved re-handling of material to beach sites the Service was informed that the cost of such an alternative would likely be more than twice the cost of open water placement. This alternative was not considered further.

## 3.5 Results of Initial Screening of Alternatives

All three project depth increments would improve navigation safety, reduce tidal delays and channel congestion by providing improved channel dimensions and therefore have significant benefits to the commercial fishing fleet. Benefits increase for each increment of depth, with no commercial vessels requiring a depth of more than 7 feet. Plans A and B with their different disposal methods for unsuitable material also address the planning objectives. The combined depth and disposal plans are each complete within themselves. No additional work is required for any plan to generate its evaluated benefits relative to the without-project condition. Those plans are efficient in that increment depth optimization has identified the channel depths for each that produce the maximum net benefit. Plans A and B are acceptable to the non-Federal Sponsor, port users, and regulatory agencies as they contribute to the viability of the commercial fishing industry.

### 3.5.1 System of Accounts

The Principals and Guidelines for Water and Related and Resource Implementation Studies (P&G) require all studies to consider the impact of various alternatives with respect to four accounts, National Economic Development, Environmental Quality, Regional Economic Development and Other Social Effects.

- National Economic Development (NED): Plan A produces net NED benefits (benefits greater than the costs of the improvements) by contributing to improvement in the efficiency of navigation. Plan B does not produce net commercial NED benefits.
- Environmental Quality (EQ): Plan A involves dredging to improve navigation access. Dredging results in disturbance to the harbor bottom and a temporary loss of benthic biota and other minor impacts. Placement of the dredged material will bury benthic biota in the placement site. All these impacts will be temporary and are not considered significant.

- Regional Economic Development (RED): The benefits of port infrastructure improvements typically extend beyond the NED benefits which are measured on the vessel and at the dock in terms of operational efficiencies (crew time, fuel, repairs, etc.), costs of transporting cargo and passengers, and changes in ex-vessel value of catch landed. More economic activity on the water generally means more activity shore side for provisioning ships, servicing ships, offloading and processing, marketing, buying and transporting catch, operating and maintain shore facilities, operating the port, and other activities. These are examples of the RED benefits that could be expected to accrue to the region from harbor improvements. All of the plans considered would yield RED benefits, as all would improve the efficiency of navigation. But only Plan A could be expected to generate sufficient RED benefits to justify its cost with respect to commercial navigation.
- Other Social Effects (OSE): Other Social Effects include those that extend beyond economic development and environmental quality to include impacts to the community, human health and safety, energy conservation, and cultural resources impacts. Those working in the fishing fleet, those who provision and service the boats and shore facilities, and those who process, transport and distribute their catch are members of the community to which their employment contributes. Infrastructure improvements that improve the efficiency of port operations and navigation safety will have a positive effect on the community as a whole. Improving safety of vessel and port operations, and helping to ensure timely delivery and freshness of catch contribute to human health and safety. Improving navigational efficiency would contribute to energy conservation by saving the fishing fleet at sea time and fuel.

The results of cultural resource investigations and coordination with state and tribal cultural resource officials have concluded that dredging and dredged material disposal under Plan A will have no significant impact on historic or archaeological resources.

# 4 COMPARISON AND EVALUATION OF DETAILED PLANS

## 4.1 Plan Features

Screening of alternatives eliminated those which involved development of a new or expanded public wharf/town landing facilities at sites other than the existing town landing at Blue Hill Harbor, transfer of the fishing fleet to other towns, or a continuation of tidally constrained use of the harbor. Consultation with the town and harbor users also resulted in elimination of other sites around Blue Hill Harbor for a new public landing. The only plans carried forward for detailed development and analysis are Plan A and Plan B for a channel with a turning basin to allow better access to the wharf and boat ramp at the existing year-round town landing.

Plan A and Plan B are acceptable alternatives to improve navigation within the study area. For both plans a 6-foot channel would extend from deep water in the lower harbor northeast of Parker's Point up-harbor about 5,400 feet to the town landing at Blue Hill. Only about the upper 2,500 to 2,700 feet of the channel would require dredging. The lower channel reaches would be jurisdictional limits to ensure that the channel remained open and un-encroached by facilities and moorings. The channel would be 80 feet wide, widened to 160 feet at its upper end to provide a turning basin off the town wharf about 160 feet long.

Table 4 summaries the alternatives and the expected results from implementation with respect to the project purpose and need. Plan A and Plan B differ in the means of disposing of dredged material for the upper two feet of the dredge cut in the upper areas of the channel and turning basin that has been determined unsuitable for unconfined open water placement. That material is about 15 percent of the total to be dredged for the 6-foot channel and basin.

Subsurface analysis indicates that the removal of rock or ledge is not required for any plan evaluated. The dredged material for Plan A and Plan B is a mixture of clean sand, silt, and gravel suitable for open water disposal, and unsuitable material that will require an alternative disposal option. The suitable material would be placed at the EPDS, located 14 miles southeast of Blue Hill Harbor, in Blue Hill Bay. This site was last used in 2010-2011 for disposal of material from the maintenance and improvement dredging of the nearby Bass Harbor Federal Navigational Project.

The suitable material could also be placed at the Tupper's Ledge disposal site in Union River Bay at the head of Blue Hill Bay. Tupper's Ledge was last used for the maintenance dredging of the Union River FNP in 2000-2004. Tupper's Ledge could benefit from the placement of suitable dredged material atop the disposal mound from 2004. For purpose of this report the Eastern Passage Disposal Site is the recommended placement site.

The alternatives for disposal of the 10,600 CY of unsuitable material from the upper project reaches are construction of a CAD cell in the harbor, or re-handling, dewatering, and overland transport of the material to a lined landfill licensed to receive such material. With room for a cap the CAD cell would require the removal of about 19,500 CY of parent material suitable for open water placement.

**Table 4 – Description of Navigation Improvements**

| | Proposed Action | Resulting Project Condition | Disposal of Dredged Material |
|---|---|---|---|
| Plan A Channel with CAD cell | Both Plans: Construct an 80-foot-wide Federal channel from deep water to the town landing and an 0.6acre turning basin. | Both Plans: Provide the necessary channel width and depth for commercial vessels to overcome tidal delays and avoid groundings. | Suitable Material to EPDS Unsuitable Material – Construct a 19,500 cubic yard in-harbor CAD Cell |
| Plan B Channel with Upland Disposal | | | Suitable Material to EPDS Unsuitable Material – Rehandling and overland transport to a landfill |

Preliminary screening of the several depth options was carried out to determine the optimal depth and the combination of alternatives that would yield the greatest net economic benefits. This analysis is summarized here and described in greater detail in Appendix B – Economic Assessment. Preliminary estimates of project cost and benefits using FY 2019 price levels were used for initial screening of alternatives. Due to risk and uncertainties at that level of analysis unit prices and contingencies used were high. This analysis is shown in Table 5.

In total three project depth increments (-5, -6, or -7 feet MLLW) were compared to determine which depth would optimize net economic benefits. The two disposal alternatives for the

dredged material were also evaluated to determine if either were economically feasible. Economic analysis determined that a -7-foot MLLW channel depth would serve 100% of the existing fleet at Blue Hill, so no depths beyond -7 feet were considered in this analysis.

## 4.2 Project Costs

The project first costs and annual charges are directly related to the volume of material to be removed, increasing as the dredging depth increases, shown in Table 6. The total first cost of design and implementation is the amount cost-shared with the non-Federal Sponsor. No new aids to navigation would be required. Appendix D, Cost Engineering, provides a more detailed cost breakdown including total project cost summary and contingency risk analysis.

Once a tentatively selected plan for disposal method was identified, cost engineering and economic analysis were further refined and updated to better estimate project costs and benefit-cost comparison. The impact of risk on design and construction was examined. Several assumptions were made to evaluate the projected costs as follows:

- The estimate assumes mechanical dredging with a floating plant consisting of a dredge barge with an 8-cy bucket, two split hull bottom dump scows of about 1500 cy capacity, one tug, and survey and work boats.
- Suitable dredged material from the project and CAD cell will be placed at the EPDS, a 14-mile tow (one way) from Blue Hill Harbor.
- The dredging and disposal work would take about three months.
- Based on experience with other similar work in the area dredging and disposal would be limited to a period of roughly 8 November to 8 April, though specific resource impacts may restrict the work further.
- Abbreviated Risk Analysis was revised for the feasibility stage resulting in contract contingencies of 15%, 14% for Planning, Engineering, and Design (PED), and 17% for construction Supervision and Administration (S&A).
- Real estate interests (lands or damages) for the project would be limited to construction access from the town (non-Federal Sponsor) for use of the town wharf. No utility relocations will be needed for the project. All work, dredging and disposal, will be seaward of mean high water and all plant will be floating. All dredging and disposal will be in areas seaward of MHW and subject to the Government's Navigation Servitude.
- Construction of the project, given its limited scope and straightforward method is estimated to take about two months.

Project first costs and annual charges are directly related to the volume of material to be removed, increasing as the dredging depth increases. Construction costs will be reviewed and certified by the USACE Cost Engineering Center of Expertise. Table 5 compares the construction costs and annual costs associated with each of the incremental depths analyzed for Plans A and Plan B for FY20 price levels. This was the time at which screening of plans and optimization were evaluated. Updated costs and benefits for the recommended plan at current Federal fiscal year price levels will be presented in later sections.

Planning, Engineering and Design Costs: Each of the plans evaluated consists of the same project features and are small in scope to the point that PED costs are similar for all plans and were expressed as a percentage of the construction cost. Surveys and other site investigations would cover the same project area regardless of depth increment. Whether alone or combined

all work would fit on a single drawing, have a single dredging line item, and result in no difference in the cost of design investigation or bid document preparation.

Construction Management Costs: Similarly the limited nature of the improvements and the short on-site construction duration (3 to 4 months) result in Construction Management (CM) costs that are similar for the various plans and depth increments, and so will also be expressed as a percentage of the construction cost. Construction Management includes the costs of contract administration, supervision and inspection.

Aids to Navigation: No new United States Coast Guard (USCG) or local aids to navigation would be required. The USCG has buoyed the approach to the harbor and the narrows in the outer harbor as far as Peter's Point. From Peter's Point to the town wharf the channel is a fairly direct route with only two low-angle bends that would not require markers.

Annual Costs: Annual costs include interest and amortization of the project design and implementation cost plus the annualized cost of future project operation and maintenance. Interest and Amortization (I&A) used for alternatives screening is based on the interest rate for Federal fiscal years 2019-2020, 2.75 percent amortized over 50 years in the case of navigation projects, or a factor 0.03704. The updated analysis provided later will use rates from the current fiscal year. To compute I&A the cost of interest during construction (IDC) must first be added to the project first cost.

Annual Maintenance: The frequency of project maintenance in Blue Hill Harbor is expected to be minimal for the proposed alternative. Shoaling has not been a major issue in nearby Federal channels. In the nearby Bass Harbor FNP there has only been one maintenance dredging (2010) action needed in the years after the initial improvement effort in 1963. A total of 9,700 CY of maintenance material were removed. That represents an annual shoaling average of 206 CY over the 47-year period between 1963 and 2010 or an annual shoaling rate of about 0.2% of the 1963 improvement volume of 87,000 CY at Bass Harbor.

Other Federal projects in the area (Stonington Harbor and Southwest Harbor) have not required maintenance since their initial construction in 1984 and 1961, respectively. These harbors are typical of this section of the Maine coast in that they all lack sediment input from either tributary rivers or longshore transport. At Blue Hill only a small stream flows into the harbor from west of the town wharf. For this analysis an annual shoaling rate of 0.5% was used for Blue Hill Harbor, which would result in accumulation of about 365 cubic yards each year, or about 18,200 cubic yards every 50 years.

As the results in Table 5 show, none of the depth increments generated a benefit-cost ratio of greater than 0.75:1 for the upland disposal alternative (Plan B), and this plan was not analyzed further. With CAD cell disposal under Plan A, both the 6-foot and 7-foot depth increments generated positive net annual benefits and benefit cost ratios of greater than 1:1.5. Based on this level of analysis it was determined that only Plan A would be carried forward for detailed cost and economic analysis and further depth optimization.

Project costs were updated in November 2020 to Fiscal Year 2021 price levels, and again in February 2022 to Fiscal Year 2022 price levels to provide the most current estimate. This update was prepared only for the optimized project depth of 6 feet. The updated estimate is shown in Table 6.

| Table 5 – Preliminary Screening of Alternative Plans | | | | | | |
|---|---|---|---|---|---|---|
| FY 2019 Price Levels (Oct 2018) | Plan A – Dispose of Unsuitable Material On-Site in a CAD Cell | | | Plan B – Dispose of Unsuitable Material at an Upland Location | | |
| Plan and Project Depth | Plan A-1 5-Foot | Plan A-2 6-Foot | Plan A-3 7-Foot | Plan B-1 5-Foot | Plan B-2 6-Foot | Plan B-3 7-Foot |
| Total Estimated Contract Cost Including Escalation & Contingency | $3,228,000 | $3,496,000 | $3,778,000 | $7,429,000 | $7,695,000 | $7,972,000 |
| Planning, Engineering, and Design | $646,000 | $699,000 | $756,000 | $1,486,000 | $1,539,000 | $1,594,000 |
| Construction Management | $323,000 | $350,000 | $378,000 | $743,000 | $770,000 | $797,000 |
| Total Estimated Project Cost | $4,197,000 | $4,545,000 | $4,911,000 | $9,657,000 | $10,003,000 | $10,364,000 |
| Annual Costs | | | | | | |
| Interest During Construction (IDC) | $5,000 | $5,000 | $6,000 | $12,000 | $12,000 | $12,000 |
| Total Investment Cost | $4,202,000 | $4,551,000 | $4,917,000 | $9,669,000 | $10,015,000 | $10,376,000 |
| Interest and Amortization (2.875%) | $159,400 | $172,700 | $186,600 | $366,900 | $380,100 | $393,800 |
| Annual Maintenance Costs | $21,000 | $22,700 | $24,600 | $48,300 | $50,000 | $51,800 |
| Total Annual Cost | $180,400 | $195,400 | $211,100 | $415,200 | $430,100 | $445,600 |
| Annual Benefits | | | | | | |
| Commercial Benefits | $62,100 | $184,500 | $191,100 | $62,100 | $184,500 | $191,100 |
| Recreational Benefits | $46,500 | $139,500 | $145,300 | $46,500 | $139,500 | $145,300 |
| Total Benefits | $107,700 | $324,000 | $336,400 | $107,700 | $324,000 | $336,400 |
| Benefit-Cost Analysis | | | | | | |
| Total Benefits BCR | 0.60 | 1.66 | 1.59 | 0.26 | 0.75 | 0.75 |
| Total Net Annual Benefits | ($72,700) | $128,600 | $125,300 | ($307,500) | ($106,100) | ($109,200) |

| Table 6 – Updated Cost for the Recommended Plan of Improvement | | |
|---|---|---|
| **Costs for Updated Price Levels** | **Plan A2 with CAD Cell 6-Foot Project Depth** | |
| **First Costs** | **FY 2021 - Oct 2020** | **FY 2022 - Oct 2021** |
| Mobilization/Demobilization | $363,000 | $521,000 |
| Mechanical Dredging and Disposal | $1,618,000 | $1,807,000 |
| Remaining Construction Items | $104,000 | - - - |
| Total Contract Cost | $2,085,000 | $2,328,000 |
| Contingencies (15%) | $314,000 | $350,000 |
| Subtotal | $2,399,000 | $2,678,000 |
| Real Estate – Town Wharf Access | $9,000 | $10,000 |
| Planning, Engineering and Design | $345,000 | $354,000 |
| Construction Management | $207,000 | $212,000 |
| Total First Costs | $2,960,000 | $3,253,000 |
| Interest During Construction (IDC) | $9,000 | $9,000 |
| Total Implementation Cost | $2,969,000 | $3,262,000 |
| **Annual Costs** | (0.03526) | (0.03352) |
| Interest & Amortization | $104,700 | $109,300 |
| Maintenance Dredging | $14,800 | $16,300 |
| Total Annual Charges | $119,500 | $125,600 |

## 4.3 Project Benefits

This section summarizes the benefits of establishing a channel with all tide access to the town landing in Blue Hill Harbor. Table 7 summarizes the breakdown of annual project benefits for Plan A by project depth increment. These benefits were used in the screening of detailed plans and depth optimization in 2019. The same level of benefits would also be produced by Plan B. Commercial benefits were derived from reductions in congestion and tidal delays, including vessel damage cost, lost labor cost, increased fuel consumption cost, and increased ordinary maintenance cost to the fishing fleet. Incidental recreational navigation benefits were developed for joint use of the town landing by small seasonal craft taking advantage of the improved channel access. Appendix B (Economics) provides greater detail.

| Table 7 – Annual Benefits of Detailed Plans | | | |
|---|---|---|---|
| FY2019 Commercial Benefits | Plan A-1 5-Foot | Plan A-2 6-Foot | Plan A-3 7-Foot |
| Damages Prevented to Wharves and Floats | $9,700 | $29,200 | $30,400 |
| Damages Prevented to Fishing Vessels | $21,300 | $63,900 | $66,600 |
| Offloading Delays Reduced - Time Savings | $10,800 | $32,300 | $33,600 |
| Offloading Delays - Fuel Savings | $11,200 | $33,600 | $35,000 |
| Tidal Delays Reduced - Time Savings | $2,700 | $8,000 | $8,300 |
| Tidal Delays Reduced - Fuel Savings | $5,500 | $16,500 | $17,200 |
| Total Commercial Benefits | $61,200 | $183,500 | $191,100 |
| FY2020 Recreational Benefits | $46,500 | $139,500 | $145,300 |
| Total Annual Benefits | $107,700 | $324,000 | $336,400 |

Project benefits were also updated in November 2020 to reflect Fiscal Year 2021 prices. As with project costs this update was limited to the recommended plan at the depths that showed a positive benefit to cost ratio with the prior estimates only the 6-foot and 7-foot project depths (Plan A-2 and A-3) were reanalyzed. Table 8 provides this benefit update.

**Table 8 – Annual Benefits Update – FY2021**

| FY2021 Commercial Benefits | Plan A-2 6-Foot | Plan A-3 7-Foot |
|---|---|---|
| Damages Prevented to Wharves and Floats | $29,500 | $30,700 |
| Damages Prevented to Fishing Vessels | $64,700 | $67,400 |
| Offloading Delays Reduced - Time Savings | $35,100 | $36,600 |
| Offloading Delays - Fuel Savings | $28,900 | $30,100 |
| Tidal Delays Reduced - Time Savings | $8,600 | $9,000 |
| Tidal Delays Reduced - Fuel Savings | $14,200 | $14,800 |
| Total Commercial Benefits | $181,000 | $188,600 |
| FY2021 Recreational Benefits | $146,600 | $152,700 |
| Total Annual Benefits | $327,600 | $341,300 |

## 4.4 Comparison Summary

Table 9 provides a summary of annual project benefits compared to annual project costs for Plan A-2, consisting of a -6-foot MLLW channel 80 feet wide from deep water off Parker Point up-harbor to the town landing with an 0.6 acre turning basin at its head. To dispose of the unsuitable portion of the dredged material a 19,500 cubic yard CAD cell would be constructed north of the channel. All suitable dredged material, including that produced by construction of the CAD cell, would be placed at the previously used Eastern Passage Disposal Site.

Plan A-2 has been developed consistent the USACE Environmental Operating Principals and in a manner which meets to goals of the USACE Campaign Plan with respect to water resources infrastructure and the civil works program. The plan has been formulated to meet the planning objectives for this project by improving the safety and efficiency of commercial fishing fleet operations at Blue Hill Harbor. Plan A-2 also meets the plan formulation criteria of completeness, effectiveness, efficiency, and acceptability and is compatible with existing laws, regulations, and policies. Interest and amortization (I&A) cost is based on the interest rate for the current Federal fiscal year (2022), 2-1/4 percent amortized over 50 years in the case of navigation projects, or a factor 0.03352.

Plan A2 produces net annual NED commercial navigation benefits, will have no significant impact on environmental quality, will promote regional economic development through improved port operations, and will have an overall positive impact from the perspective of other social effects.

| Table 9 – Blue Hill Harbor – Updated Economic Impacts<br>Plan A2 (6-Foot Depth) – With CAD Cell Disposal of Unsuitable Material | | |
|---|---|---|
| FY 2022 Price Levels (Cost) and Benefits<br>2.25% (0.03352) | Total Benefits | Commercial Benefits Only |
| Annual Benefits | $327,600 | $181,000 |
| Annual Cost | $125,600 | $125,600 |
| Benefit-Cost Ratio | 2.61 | 1.44 |
| Net Annual Benefits | $202,000 | $55,400 |

# 5 ASSESSMENT AND EVALUATION OF DETAILED PLANS

This section summarizes the analyses for the alternatives selected for detailed study based on their impacts on the environment, existing navigation, and social and cultural resources of the study area. Economic costs and benefits of project implementation have also been analyzed.

## 5.1 Environmental Impacts

The proposed Federal action has been reviewed under the authorities of the National Environmental Policy Act and all applicable Federal environmental laws, regulations, Executive Orders and Executive Memorandums. The NEPA analysis (see Environmental Assessment) outlines the expected impacts to habitats and environmental resources from dredging and at the disposal sites. This section summarizes the expected environmental effects from dredging and disposal of dredged material.

### 5.1.1 Dredged Material Suitability

The materials to be dredged have been sampled and tested for physical and chemical parameters and subjected to tier II biological testing. In October 2015 USACE collected sediment vibracores from seven locations throughout the proposed dredging area and depth horizon (see EA, Figure EA-3). Each sediment core was described in the field and composited for analysis of grain size, total solids, and water content. The composited samples were then analyzed 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 were predominantly poorly graded fine to coarse sands with overlying marine clay deposits and fine woody organic debris. Core penetration for the inner harbor samples was limited due to gravel and coarse sand deposits near the sediment surface and did not reach the proposed dredge depth due to refusal.

There were detectable concentrations of polycyclic aromatic hydrocarbons (PAHs) and metals in all four composite samples. To examine sediment chemistry concentrations in an ecologically meaningful context, result values were screened using the 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 were identified in the outer channel samples. All COCs in the inner channel samples were also below the ERL value with the exception PAHs which were above the ERL in one composite and above the ERM in another. This suggests that there is increased potential for an adverse response from exposure to surficial sediments from the inner channel area due to elevated PAHs.

A second sampling effort was conducted in May 2016 to better define the vertical and spatial extent of the elevated PAH concentrations in the inner channel area. Push cores were taken at low tide from ten stations in the inner harbor and one location at the mouth of the each of the three tributary streams and outfalls. Core lengths were again limited by refusal. Subsamples for PAH analysis were taken 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 4 to 9 foot deep test pits in October 2016 in the upper channel/turning basin area using a small excavator. 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 showed the material to be a stony till with PAH contamination limited to the upper two feet of the inner harbor sediments.

The proposed dredged material from the Blue Hill Harbor Navigation Improvement Project was evaluated through §230.61 of the Clean Water Act (CWA) and found suitable for unconfined open water placement at EPDS with the exception of 10,600 cubic yards of material from the upper two feet of the inner harbor area. The sediment from this portion of the harbor does not require remediation, but is not suitable for open water placement due to elevated PAH concentrations and it is proposed to contain the unsuitable material on-site 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 the EPDS.

### 5.1.2 General Environmental Effects of Dredging

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.

The ecological functions of the existing 3.7 acres of intertidal area, as related to benthic invertebrate communities, are 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 was concluded that the contamination is the cause of the diminished benthic community. The

removal and sequestering of the unsuitable material should allow the newly created shallow 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. 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. 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.

Turbidity impacts to benthos are dependent on the concentration and the duration of the suspended sediments (Wilber and Clarke, 2001; Suedel 2014). 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. Although adult bivalve mollusks are silt-tolerant organisms (Sherk, 1974), they can be affected by high suspended sediment concentrations. Hard clams (Pratt and Campbell, 1956), and oysters (Clarke and Wilber, 2001), exposed to fine silty-clay sediments have exhibited reduced growth and survival, respectively. Suspended sediment concentrations required to elicit these responses and mortality are extremely high. Meaning these responses are beyond the upper limits of concentrations reported for most estuarine systems under natural conditions, as well as typical concentrations associated with dredging operations. 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

### 5.1.3 Summary of Expected Disposal Impacts

No eelgrass is located in or adjacent to the disposal site. Placing suitable mixed sandy and silty material at the proposed EPDS should not have significant long-term effects on the benthic communities at the site. No significant shellfish or lobster resources are located in the disposal site. Direct impacts to fish resources at the placement site are expected to be minimal. Any fish in the vicinity of the placement site would be either expected to avoid the areas of disturbance, be smothered by the material, or be exposed to elevated turbidity for brief periods. Elevated suspended sediment levels should be short-term and localized to the placement site area since the material to be placed at the site is sand. Benthic organisms buried at the disposal site will temporarily eliminate a forage area for fish. Recolonization by benthic species from adjacent areas and new recruitment is expected to occur in a relatively short period of time. The proposed dredging and placement of the sediment will occur during the period of November 8th through April 8th. This window minimizes the presence of aquatic resources in the project area and takes advantage of the lower levels of natural, environmental stresses placed on species that may reside in the work areas. The USACE made the preliminary determination that the proposed project is not likely to adversely impact any state or Federally listed threatened or endangered species. Several listed marine mammals may occur as transient species in the general area but are unlikely to occur within the dredging or placement areas.

### 5.1.4 Summary of the NEPA Evaluation – Finding of No Significant Impact

A NEPA evaluation (see the EA and draft FONSI) was prepared for the proposed action. Based on the findings the District Engineer has determined that the environmental effects, as presented in the Environmental Assessment, for the improvement dredging of Blue Hill Harbor is not a major Federal action significantly affecting the quality of the human environment. The FONSI will be finalized when signed by the District Engineer upon approval of the Detailed Project Report and Environmental Assessment by the North Atlantic Division Commander.

## 5.2 Economic Impacts

The expected economic impacts from construction and operation of the alternatives were evaluated by determining costs and benefits. The cost estimates and annual costs, listed in Table 6 and described fully in Appendix D are based on several factors including the quantity and type of dredged material, mobilization and demobilization costs, equipment costs, project design (engineering and supervision) and administrative costs and contingencies. Charges for IDC are based on construction durations and are computed for the purpose of comparing benefits to costs. IDC charges are not included in the cost apportionment.

Costs and benefits are based on a 50-year evaluation period, starting in 2022, and presented in annual terms using the FY21 Federal interest rate for water resources projects of 2.5 percent. The benefits of the proposed plans of improvement have been based on the following assumptions:

- Elimination of tidal delays would result in decreased labor and fuel costs for harvest of the existing catch.
- Increasing the channel depth and length would reduce grounding damage and provide maneuverability and access to existing facilities built by local interests.

The benefits to the existing commercial fleet would occur immediately following the implementation of these improvements. The navigation improvements will not affect harvest rates or prices for the commercial fish market. There will be benefits resulting from a reduction in harvesting costs for the existing level of catch.

## 5.3 Real Estate Requirements

Real estate interests required for the project are limited to access to the town wharf for the contractor's crew and office for which the town of Blue Hill, the project's non-Federal Sponsor, will provide construction access. The cost to the town to provide the access is estimated at $5,000 and the Government's administrative cost for Lands, Easements, Rights of Way, Relocations and Disposal Areas (LERRDs) review and acceptance is estimated at $5,000. The $10,000 LERRDs cost is included in the total project cost. The town may receive a credit for their $5,000 real estate cost against their additional post-construction 10 percent contribution payment of total project costs.

All work at the dredging and ocean disposal sites would be subtidal, within the waters of the United States, and subject to the Federal government's navigation servitude (see Real Estate Planning Report – Appendix E). All construction equipment would be waterborne plant (dredge, scows, tug, survey, and work boats).

## 5.4 Climate Change Analysis

Climate change most often impacts navigation projects with respect to sea level rise and its potential to affect operation of shoreline facility access through flooding and restricting allowable air draft for vessel passage beneath bridges. There are no bridges over the routes between Blue Hill Harbor and the open waters of the bay and ocean fished by its fleet. The town landing bulkhead, with a top elevation of about +13.8 feet at MLLW, is not currently impacted at the highest annual tide levels even with elevations about one foot lower moving towards the boat ramp.

Due to the uncertainty associated with future sea level change, USACE policy is to look at three scenarios of sea level change and investigate impacts to project feasibility. The three sea level change scenarios are the low (historic) rate of SLC at the project site, an intermediate rate, and a high rate of SLC and include the global (eustatic) sea level rise rate and vertical land movement. These rates were calculated using the USACE Sea Level Change Calculator (Version 2019.21), using the closest NOAA tide station (Bar Harbor) for the historic trend, to develop approximate changes in sea level rise for Blue Hill Harbor from 2022 to 2122. This time range includes both anticipated project economic life (50 years) and the planning horizon (100 years).

Sea level change is expected to impact access to the town landing over time. To assess the wharf's vulnerability projected changes in sea level were added to existing water levels and compared to the wharf elevation to evaluate if sea level rise will impact landslide infrastructure on or access to the town landing. Mean Higher High Water (MHHW) was selected to evaluate high water levels that are projected to occur daily. The 99% Annual Exceedance Probability (AEP) (1-year Annual Recurrence Interval) storm surge at Mean High Water (MHW) was used to approximate an annual storm event or nor'easter. The MHHW and 99% AEP surge at MHW levels for the years 2072 and 2122 are provided in Table 10 below for each scenario.

A comparison of the wharf elevation, approximately +13.8 feet MLLW (8 feet NAVD88), to the projected water levels in Table 8 shows that the wharf is not projected to be impacted by MHHW alone under the low and intermediate SLC scenarios through 2072. However, wharf access will be affected under the high SLC scenario as MHHW is projected to exceed the wharf elevation at the tail end of the 50-year period of economic analysis in 2068. Looking out 100 years to 2122, the wharf will again not be exceeded by MHHW alone under the low and intermediate SLC scenarios. However, inundation at MHHW under the high SLC scenario will make the entirety of the town landing inaccessible. This level of risk was not assumed to impact project feasibility. However, if a higher sea level scenario is realized, the town will need to make improvements to the wharf area to maintain its access across the tidal cycle.

| Table 10 – Climate Change Analysis | | | |
|---|---|---|---|
| **USACE Sea Level Change Rates – Future Scenarios** | | | |
| **Year** | **Low RSLC (Feet)** | **Intermediate RSLC (Feet)** | **High RSLC (Feet)** |
| 2072 | 0.59 | 1.16 | 2.97 |
| 2122 | 0.96 | 2.47 | 7.23 |
| Note: Sea level change values are relative to the base year of 1992 which corresponds to the midpoint of the current National Tidal Datum Epoch of 1983-2001. | | | |
| **Projected Water Surface Elevations – Future Scenarios** | | | |
| **Year** | **Scenario** | **MHHW (Feet, MLLW)** | **99% AEP Surge at MHW (Feet, MLLW)** |
| 2072 (50 Years) | Low | 11.73 | 13.22 |
| | Intermediate | 12.30 | 13.79 |
| | High | 14.11 | 15.60 |
| 2122 (100 Years) | Low | 12.10 | 13.59 |
| | Intermediate | 13.61 | 15.10 |
| | High | 18.37 | 19.86 |

# 6 SELECTION OF A PLAN

## 6.1 The Selected Plan

The Selected Plan for navigation improvements is Plan A-2, shown in Figure 4. The Selected Plan is based on consideration of economic efficiency, minimization of environmental impacts, navigational safety and the needs of state government and local stakeholders. Plan A2 results in the greatest net benefits and is the preferred NED plan. This plan provides the most favorable improvement method for meeting the project objective of reducing navigation hazards and delays.

This plan would establish a channel from deep water in the outer harbor off Parker Point up-harbor to the Blue Hill town landing. The channel would be 80 feet wide and have a depth of -6 feet at MLLW and would have an 0.6-acre turning basin at its upper end opposite the town wharf. Only the upper 2,600 feet of the channel would require dredging. The project would involve the dredging of about 91,000 cubic yards of material, of which 71,500 cubic yards would be from the channel and an estimated 19,500 cubic yards from the CAD cell construction. The dredging would be by mechanical dredge and scow that will be able to operate in shallow draft areas in the channel.


The dredged material to be disposed is a mixture of clean sandy material suitable for open water disposal and unsuitable material that will require an alternative disposal option. The suitable material will be placed at the EPDS, located 14 miles southeast of Blue Hill Harbor, in Blue Hill Bay. This site has been used in the past for disposal of material from the maintenance dredging of the nearby existing Federal Navigational Projects. The disposal of the unsuitable material will be in a CAD cell to be constructed within Blue Hill Harbor adjacent to the channel. USACE work estimates are based on an 8 cubic yard bucket dredge or excavator, two or more split-hull scows of about 1500 CY, and a tug to tow the scows to the disposal sites. Small survey and workboats would also be used. All construction equipment would be waterborne plant. No onshore staging would be required. The contractor would be responsible for securing any shore side access for personnel and fuel according to their specific needs. All work at the dredging and disposal sites would be within the waters of the United States.

The total annual benefits in fuel and time cost savings for each project alternative are weighed against the costs of each alternative to determine the benefit-cost ratio. Benefit-cost ratios of each alternative are determined by dividing annual benefits by annual costs. A project is considered economically justified if it has a benefit to cost ratio of 1.0 or greater. The Recommended Plan maximizes net annual commercial navigation benefits is the NED plan. At FY22 price levels and interest rates the Recommended Plan has a BCR of 1.44 and produces net annual benefits of $55,400 using commercial navigation benefits only. Using both commercial navigation and incidental recreational navigation benefits from joint use project features the recommended plan has a BCR of 2.61 and net annual benefits of $202,000.

## 6.2 Implementation Responsibilities

### 6.2.1 Cost Apportionment

For harbor improvements for commercial navigation purposes with a design depth of 20 feet or less, local interests are required to provide cost-sharing of ten percent of the cost of design and construction up-front upon execution of a Project Partnership Agreement (PPA). The remaining 90 percent up-front share of the first cost of design and construction is the Federal contribution. A further additional non-Federal contribution of ten percent of the cost of design and construction is payable at the conclusion of construction and can be paid over a period of up to a 30-years. These cost sharing requirements are as specified in the Water Resources Development Act of 1986 (Public Law 99-662), as amended. Table 11 below provides the cost-sharing responsibilities for design and implementation of the Recommended Plan.

### 6.2.2 Federal Responsibilities

The Federal government will be responsible for preparation of plans and specifications and contract advertisement, award and supervision and inspection of the work. The Federal government will be responsible for project compliance with Federal environmental laws and regulations, including NEPA, the Endangered Species Act (ESA), consistency with the Coastal Zone Management Act (CZM), the National Historic Preservation Act (NHPA), the Fish and Wildlife Coordination Act (FWCA), and the CWA. Federal responsibility includes only the dredging and maintenance of the designated Federal channels, and does not include any berthing facilities, shoreline protection, or site work at upland disposal areas. There is no non-Federal OMRR&R required for the project as the existing town wharf provides sufficient public access.

**Table 11 – Cost Apportionment for the Recommended Plan**

| FY 2024 – Q1 Costs<br>December 2023 Mid-Point of Construction | Total Fully Funded Cost | Federal Share 90% | Non-Federal Share 10% |
|---|---|---|---|
| Dredging and Disposal | $2,476,000 | | |
| Contract Contingencies | $372,000 | | |
| Construction Total | $2,848,000 | | |
| Real Estate LERRs | $10,000 | | |
| Engineering and Design | $366,000 | | |
| Construction Management | $223,000 | | |
| First Cost of Design and Construction | $3,447,000 | $3,102,300 | $344,700 |
| Post-Construction Additional Contribution | - - - - - | - - - - - | $344,700 |
| Real Estate Credit (Applied to Contribution) | | | -$5,000 |
| Total Cost Allocation | $3,447,000 | $3,102,300 | $684.400 |

### 6.2.3 Non-Federal Responsibilities

The following is a list of some of the items of local cooperation required for projects authorized under Section 107. The non-Federal sponsor must provide assurance that they

intend to meet these items prior to project authorization. The PPA details these and other requirements of the Government and the non-Federal Sponsor for implementation and future maintenance of the project.

1. Provide without cost to the United States, all LERRDs necessary for completing, inspecting, operating, maintaining, repairing, rehabilitating, or replacing the project. This project consists solely of dredged general navigation features and will be constructed using waterborne dredging plant and placement of the dredged materials will be in nearshore waters. All work areas are seaward of mean high water and subject to the government's navigation servitude. Therefore, no LERRDs are required from the non-Federal Sponsor for initial construction. At this time it is assumed that future operation and maintenance of the project will be accomplished in the same manner. However, should different construction methods be used for future Operation and Maintenance the non-Federal Sponsor may be required to obtain LERRDs.
2. Hold and save the United States free from all damages arising from construction, operation, maintenance, repair, replacement, and rehabilitation of the project, except for damages due to the fault or negligence of the United States or its contractors;
3. Assume full responsibility for all non-Federal costs associated with the project. Current law requires that the non-Federal sponsor provide at least 10 percent of the first cost of design and construction of General Navigation Facilities not exceeding 20 feet in depth up-front, and provide an additional 10 percent after completion of initial construction of the project.
4. Agree to be responsible for total project costs in excess of the Federal cost limit of $10 million in accordance with Section 107 of the River and Harbor Act, as amended.
5. Not use funds from other Federal programs, including any non-federal contribution required as a matching share therefore, to meet any of the non-Federal sponsor's obligations for the project unless the Federal agency providing the funds verifies in writing that such funds are authorized to be used to carry out the project;
6. Provide, maintain and operate without cost to the United States, an adequate public landing open and available to use for all on an equal basis. The state pier and other state and municipal facilities around the harbor are adequate to satisfy this responsibility for both the existing FNP and for the recommended improvement.
7. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) such as any new developments on project lands, easements, and rights-of-way or the addition of facilities which might reduce the outputs produced by the project, hinder operation and maintenance of the project, or interfere with the project's proper function;
8. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, (42 U.S.C. 1962d-5b) and Section 101(e) of the WRDA 86, Public Law 99-662, as amended, (33 U.S.C. 2211(e)) which provide that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;

9. Keep, and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project, for a minimum of 3 years after completion of the accounting for which such books, records, documents, and other evidence are required, to the extent and in such detail as will properly reflect total cost of the project, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and local governments at 32 CFR, Section 33.20;

10. Perform, or ensure performance of, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the Federal government determines to be necessary for the initial construction, operation and maintenance of the project;

11. Assume, as between the Federal government and the non-Federal sponsor, complete financial responsibility for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under lands, easements, or rights-of-way required for the initial construction, or operation and maintenance of the project;

12. Agree, as between the Federal government and the non-Federal sponsor, that the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability;

13. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended, (42 U.S.C. 4601-4655) and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way necessary for operation, and maintenance of the project including those necessary for relocations, the borrowing of material, or the placement of dredged or excavated material; and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

14. Comply with all applicable Federal and state laws and regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto; Army Regulation 600-7, entitled “Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army”; and all applicable Federal labor standards requirements including, but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a et seq.), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 et seq.), and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c));

15. Give the Federal government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor owns or controls for access to the project for the purpose of completing, inspecting, operating, maintaining, repairing, rehabilitating, or replacing the project."

## 6.3 Risk Informed Decision-Making

The non-Federal Sponsor and the public must be informed of the risks associated with the formulation, evaluation, and recommendation of a plan of improvement for Blue Hill Harbor. The contingency risk analysis performed as part of the cost estimate sought to capture these risks and their potential impacts on cost and implementation. The following are some of the risks captured in the contingency analysis.

- With construction limited to late fall to mid-winter for environmental resource impact reasons, it is possible the contractor will encounter significant weather-related delays that will impede his ability to mobilize to the site or transit to and from the disposal area. Further, the project is in eastern Maine, meaning there is potential for ice in the channel which may obstruct contractor access and reduce dredge efficiency.
- The work is in an area influenced by glaciation and characterized by ground moraine and outwash plain deposits. It is possible that materials such as gravel and small boulders will be encountered. These materials can be removed by the mechanical bucket dredge plant that would be used to dredge the project features and can be placed in the disposal site, but may slow production somewhat if encountered.
- The economic benefit of this project has been measured in improved efficiency of vessel operations – fuel and labor savings, reductions in vessel damages, etc. Blue Hill is an active stable port which has shown growth in ships, catch volume and catch value over time. Any risk that the projected benefits will not be achieved is low.
- Availability of competent responsive bidders can be an issue when funding for such small projects regionally results in more work being advertised than the dredging industry can accommodate. In past years some projects have failed to attract any responsive bidders. Given the low level of funding in the past several years for small harbor projects a lack of responsive bidders is not expected to be an issue.
- Knowledge of potential environmental resource impacts from marine construction projects and the concern given species can change over time. If significant time passes between completion of the feasibility phase and project construction, then it is possible that changing resource concerns could change the work window for the project or make mitigation of impacts necessary. New species could be listed as threatened or endangered, or additional habitat could be noted as critical for fisheries resources or climate change could result in a change in species in the project area. At this time coordination with Federal and state resource agencies has not shown any concerns of this nature.
- On rare occasions previously unknown cultural resources can be encountered during construction. In such cases coordination with state and tribal historic preservation officials is re-initiated. Documentation of any finds is a requirement. Depending on the nature of the resource encountered work may be delayed at least in part while coordination is pursued. Research and site investigations made during this study indicate that the potential for such resources in the project area is low.
- Federal funding for small harbor maintenance has been difficult to budget in recent years. Though under current law maintenance of the Federal Navigation Projects is eligible for 100% Federal funding, the budget situation has delayed maintenance of these project. While we cannot predict the situation with respect to future Federal budgets, the non-Federal Sponsor should be aware that delays in Federal funding may delay necessary maintenance dredging.

# 7 CONCLUSIONS

USACE has evaluated the data for the proposed Federal plan for improving navigation at Blue Hill Harbor. USACE will review, evaluate, and consider the comments and views of interested agencies, stakeholders, and the concerned public regarding the alternative plans. The potential consequences of each alternative will be evaluated on the basis of engineering feasibility, environmental impact and economic efficiency.

We find substantial benefits are to be derived by providing the commercial fishermen with reliable and improved access to the facilities in Blue Hill Harbor. The proposed Federal action was considered individually and cumulatively under the provisions of NEPA, and the action was determined not to have significant effects on the quality of the human environment. The proposed action also incorporates the provisions for protection and ensures compliance with other Federal environmental laws, regulations, Executive Orders and Executive Memorandum such as, for example, the ESA, the FWCA, the NHPA, the CWA, etc. The USACE has concluded the proposed navigation improvements would cause a temporary disruption of the environmental resources present in the construction work area and immediately adjacent during dredging operations and no significant long term effects are anticipated. Due to the significant benefits attributable to the commercial fishing industry, any effects are considered to be offset by the improvement and the resulting overall economic growth of the region.

The Recommended Plan, Plan A-2, would result in the greatest economic net benefits and is therefore the NED Plan. The Recommended Plan establishes a -6-foot MLLW by 80-foot wide Federal channel extending about 5,400 feet from deep water off Parker Point up-harbor to the town landing with an 0.6 acre turning basin at its head. To dispose of the unsuitable portion of the dredged material a CAD cell would be constructed north of the channel. All suitable material, including material dredged to create the CAD cell, would be placed at the previously used Eastern Passage Disposal Site.

# 8 RECOMMENDATION

The USACE recommends that a Federal navigation project be adopted at Blue Hill Harbor, Maine, under the authority of Section 107 of the River and Harbor Act of 1960, as amended, in accordance with the Recommended Plan identified in this Detailed Project Report, with such further modifications thereto as in the discretion of the Chief of Engineers may be advisable.

The recommendations contained in this report reflect the information available at this time and current USACE Departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are authorized for implementation funding.

28 February 2022
Date

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

# 9 REFERENCES


- Pratt, D.M., and D.A. Campbell. 1956. Environmental factors affecting growth in Venus mercenaria. Limnology and Oceanography 1: 2- 17.
- Suedel BC, Clarke JU, Lutz CH, Clarke DG, Godard-Codding C, Maul J (2014) Suspended sediment effects on walleye (Sander vitreus). J Gt Lakes Res 40:141–148
- Sherk JA, O'Connor JM, Neumann DA, Prince RD, Wood KV (1974) Effects of suspended and deposited sediments on estuarine organisms—phase II. Final report, September 17, 1970–December 31, 1973. Natural Resources Institute University, Maryland, College Park, Maryland, pp 299
- US EPA New England and US Army Corps of Engineers New England District (EPA/USACE). 2004. Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England waters. April, 2004. Boston, MA and Concord, MA. (Available at http://www.epa.gov/region1/topics/water/dredging.html)
- Wilber D, Clarke D (2001) Biological effects of suspended sediments: a review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries. N Am J Fish Manag 21:855–875
- U.S. Census Bureau, 2000 Census of Population and Housing, Summary Population and Housing Characteristics, PHC-1-23, Massachusetts Washington, DC, 2002
- U.S. Census Bureau, 2010 Census of Population and Housing, Population and Housing Unit Counts, CPH-2-23, Massachusetts U.S. Government Printing Office, Washington, DC, 2012

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